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Description of deformation zone model version 2.3, Forsmark

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Update notice

The original report, dated January 2015, was found to contain both factual and editorial errors which have been corrected in this updated version. The corrected factual errors are presented below.

Updated 2015-11

Location	Original text	Corrected text
Page 3, Second paragraph, line 5	KFM08A	KFM08D
Page 19, Fifth paragraph, second bullet	KFM08A	KFM08D
Page 19, Last paragraph, line 3	KFM08A	KFM08D

Summary

The Forsmark stage 2.2 deterministic model for deformation zones has been upgraded into model version 2.3, after taking account of the modifications carried out on the geometric position of boreholes in 3D space, the new geological and geophysical data that emerged 2006–2007 during stage 2.3 of the Forsmark site investigation and the version 1.0 deterministic model for deformation zones at SFR completed 2011. The modelling work followed the established conceptual understanding of deformation zones at the Forsmark site as presented in SKB reports and peer-reviewed publications. The work also followed the same methodology, used the same modelling assumptions and is affected by the same uncertainties as those presented in stage 2.2; it involved four work tasks.

Task 1 addressed the interaction between the stage 2.2 local and regional deformation zone models for Forsmark and the version 1.0 regional deformation zone model for SFR. Task 2 addressed the geometric modifications that were needed following the revised interpretation of lineaments defined by magnetic minima based on the stage 2.3 high-resolution ground magnetic data and the input of stage 2.3 data from boreholes KFM02B, KFM08D, KFM11A and KFM12A. Task 3 involved an adjustment of all deformation zones so that the intersection of a zone along a borehole, as indicated in the geological single-hole interpretation work, matches the intersection of the borehole in space in the 3D model. This task was completed for each zone as Tasks 1 and 2 progressed. Task 4 involved the modification of the properties of deformation zones.

Minor modifications have been completed in the zones in both the local and regional models. Furthermore, the modifications have also resulted in a change from in total 103 zones in model stage 2.2 to 110 zones in model version 2.3. These changes were steered by the modifications during stage 2.3 of the lineaments defined by magnetic minima, the results from the drilling of borehole KFM08D and the results of the later SFR modelling work. Sixty-seven deformation zones have been modelled deterministically in the local model volume. More than 70% of these zones have been confirmed directly by geological data from borehole or tunnel intersections, or from outcrop observations, and are not identified solely on the basis of indirect geophysical data (e.g. a lineament defined by magnetic minima or a seismic reflector). Twenty-seven of these zones as well as forty-three more zones outside the local model volume, which are either gently dipping or are vertical or steeply dipping zones longer than 3,000 m at the ground surface, comprise the components in the regional model. Only c. 20% of the zones included in the regional model that lie outside the local model volume share the same high degree of confidence in existence. As in stage 2.2, the importance of the vertical or steeply dipping brittle deformation zones with ENE–WSW, NNE–SSW or NE–SW strike at –470 m elevation inside the selected area for the repository is highly conspicuous.

By making use of the information in the property tables for deformation zones presented here and in the SFR modelling work, it is recommended that the intersection of each zone in all the boreholes and tunnels at Forsmark (including SFR) are placed in the Sicada rock domain, fracture domain and deformation zone database (GE306).

Contents

1 Introduction

1.1 Background

Between 2002 and 2008, the Swedish Nuclear Fuel and Waste Management Company (SKB) carried out investigations at two different locations in Sweden, Forsmark and Laxemar-Simpevarp, with the objective of siting a geological repository for spent nuclear fuel. More than 30 years of studies (see review in Milnes et al. 2008) culminated with the submission of an application to the governmental regulatory authorities by SKB to build a repository at –470 m elevation at Forsmark (see, for example, SKB 2011).

The investigations at Forsmark were conducted in five campaigns punctuated by data freezes. After each data freeze, the site data were analysed and modelling work completed. Following the data freeze referred to as stage 2.2, the final geological models in the Forsmark site investigation, together with complementary geophysical and geological studies, were presented in Stephens et al. (2007) and Stephens and Skagius (2007), respectively. These models were used subsequently in various tasks, for example hydrogeology, and were included in the site description of Forsmark at completion of the site investigation phase (SKB 2008a). Primary geological and geophysical data acquired at and beneath the current ground surface during stage 2.3 of the Forsmark site investigation (2006–2007) were not available for use in these geological models. However, the implications for and verification of the deterministic geological models based on these complementary data were addressed prior to completion of the site investigation work (Stephens et al. 2008).

The orientation of geological structures at depth is estimated with the help of the Boremap methodology adopted by SKB. The input data used to calculate the orientation of a geological feature include deviation measurements of the boreholes, oriented images of the borehole walls obtained by the Borehole Image Processing System (BIPS) and the borehole diameter. Between autumn 2006 and autumn 2007, SKB carried out a critical review of the methodology of the Boremap system, in order to identify potential errors and to quantify uncertainties in the orientation of geological entities in boreholes (Munier and Stigsson 2007, Nilsson and Nissen 2007). An important consequence of this review was that all orientation data for geological structures in the cored boreholes and the geometry of boreholes, which were available at the data freeze 2.2, were recalculated and provided with numerical estimates of uncertainty. Only data corrected up to mid-May 2007 were used in the stage 2.2 geological modelling work. Due to the modifications, the current modelled intersections of deformation zones, rock domain boundaries and fracture domain boundaries along boreholes in 3D space do not conform exactly to the borehole intersections inferred from the geological single-hole interpretations.

During 2008, SKB initiated an investigation program for a future expansion of the final repository for short-lived, low and medium level radioactive waste at Forsmark, the so-called SFR facility. Earlier geological models provided in this programme (SKB 2008b, Curtis et al. 2009) were subsequently refined and the final geological models for the SFR facility were completed (Curtis et al. 2011). These models have evaluated and made use of both older and more recent geological and geophysical data from the current ground surface, from tunnels and from boreholes close to SFR. Naturally, these geological models and the background data evaluation upon which they are based were also not available for use in the Forsmark stage 2.2 models.

During 2011 and 2012, several shallow boreholes were drilled in connection with preparatory work for the construction of the final repository for spent nuclear fuel at Forsmark. Once again, these geological models and the background data evaluation upon which they are based were not available for use in the Forsmark stage 2.2 models.

In summary, the current local and regional geological models for the Forsmark site, developed in SKB's 3D rock visualization system (RVS) and stored in the model database Simon, remain at the Forsmark stage 2.2 level and have been outdated by the acquisition of new data and the modification of older data during and after 2006.

1.2 Scope and objective

The current project aims to upgrade the Forsmark stage 2.2 deterministic model for deformation zones (Stephens et al. 2007) by taking into account:

- The modifications carried out on the geometric position of boreholes in 3D space.
- The new data that emerged during stage 2.3 of the Forsmark site investigation (Stephens et al. 2008).
- The version 1.0 deterministic model for deformation zones at SFR (Curtis et al. 2011).

There are different scales of resolution in the Forsmark site investigation and SFR models and this difference needs to be taken account of in the upgrading work. The version 1.0 regional model in the SFR work was carried out at the same scale of resolution as the stage 2.2 local model in the Forsmark site investigation and, consequently, a fully integrated model that honours the size limits at this scale of resolution has been derived in the current study. For this reason, only vertical or steeply dipping (dip > 45°) deformation zones with a trace length around 1,000 m or more at the ground surface and all detectable gently dipping (≤ 45°) zones are included in the revised model, referred to here as Forsmark model version 2.3.

For purposes of clarity, it needs to be noted that the revised model presented here has not taken into account the zones modelled at the local scale of resolution at SFR or the results from the preparatory work for the construction of the final repository for spent nuclear fuel. The latter involved a revision of a gently dipping zone in the near-surface realm and two minor (< 1,000 m trace length at the ground surface), steeply dipping zones in the stage 2.2 deformation zone model and was not complete when modelling progressed during 2011 and 2012 in the current study. Furthermore, after consultation with SKB, it was agreed that all the necessary adjustments of the stage 2.2 rock domain and fracture domain models will be completed internally at SKB and lie outside the scope of the current project.

2 Regional geological setting

The Forsmark area in central Sweden consists of a crystalline bedrock that formed between 1.89 and 1.85 Ga (1 Ga = 1,000 million years) inside a 2.0–1.8 Ga orogenic system (Hermansson et al. 2007, 2008a, Stephens et al. 2009), Figures 2-1 and 2-2. Penetrative ductile deformation of variable intensity, under amphibolite facies metamorphic conditions, affected this bedrock between 1.87 and 1.86 Ga and was completed prior to 1.85 Ga (Hermansson et al. 2008a), Figure 2-2.

Around 1.85 Ga, the bedrock currently exposed at the ground surface at Forsmark started to cool beneath c. 500°C and ductile deformation along more discrete deformation zones, under lower amphibolite or greenschist facies metamorphic conditions, occurred around 1.8 Ga (Hermansson et al. 2008b), Figure 2-2. Continued uplift and cooling beneath c. 350°C and c. 300°C, and the establishment of regional, sub-greenschist facies metamorphic conditions, followed at around 1.7 Ga (Söderlund et al. 2009), Figure 2-2. Thus, at some time between 1.8 and 1.7 Ga, the bedrock close to the ground surface at Forsmark had cooled sufficiently to be able to respond to deformation in a ductile–brittle or brittle manner. A conceptual model for the formation and reactivation of deformation zones at the Forsmark site from 1.8–0.9 Ga was presented by Stephens et al. (2007) and developed further in Saintot et al. (2011). Deviations of the 1.8–1.7 Ga stress field inside the Forsmark tectonic lens and the significance of σ_1 and σ_2 stress permutations at 1.8–1.7 Ga and around 1.0 Ga to explain subordinate extensional paleostress fields were proposed in Saintot et al. (2011).

Deposition and erosion of sedimentary basins in one or more loading and unloading cycles, igneous activity and predominantly reactivation of structures in the older crystalline bedrock dominate the Precambrian geological history around and after 1.7 Ga in central Sweden (Figure 2-1). This part of the geological history occurred in connection with the far-field effects of orogenic events further west and south (Figure 2-1). For example, the far-field effects of the 1.1–0.9 Ga Sveconorwegian orogeny in south-western Sweden and southern Norway have been identified in the bedrock at Forsmark using both U-Pb (titanite) and ^{40}Ar-^{39}Ar (adularia) isotope geochemical data (Hermansson et al. 2007, Sandström et al. 2009), Figure 2-2. Furthermore, it has been inferred that this major tectonic event was associated with the development of a foreland sedimentary basin that covered central Sweden (Larson et al. 1999).

Following erosion during the later part of the Precambrian, a sub-Cambrian peneplain was established (Figure 2-1) and has been identified over a large part of southern Sweden, including the Forsmark area (Lidmar-Bergström 1996). The later part of the Precambrian in Scandinavia was characterised by a period of glaciation and was followed after c. 600 Ma (1 Ma = 1 million years), during the latest part of the Precambrian and during the Palaeozoic, by the deposition of a sedimentary cover sequence, including oil shale. The Palaeozoic sedimentary rocks covered the Forsmark area (Cederbom et al. 2000) but were subsequently eroded away in another loading followed by unloading cycle (Figure 2-1). Disturbance of the crystalline bedrock at Forsmark, after the establishment of the sub-Cambrian peneplain, is apparent (Söderlund et al. 2009).

Alternating cold glacial and warm interglacial stages, once again in connection with loading and unloading cycles, have prevailed during the ongoing Quaternary period in Scandinavia (Sohlenius and Hedenström 2008), Figure 2-1. Plate motion related to mid-Atlantic ridge push, in combination with glacial isostatic rebound following removal of the latest Weichselian ice sheet and crustal unloading, are the two geological processes that constrain current strain conditions in the crust in northern Europe (Slunga 1991, Muir Wood 1993, 1995, Redfield and Osmundsen 2013).

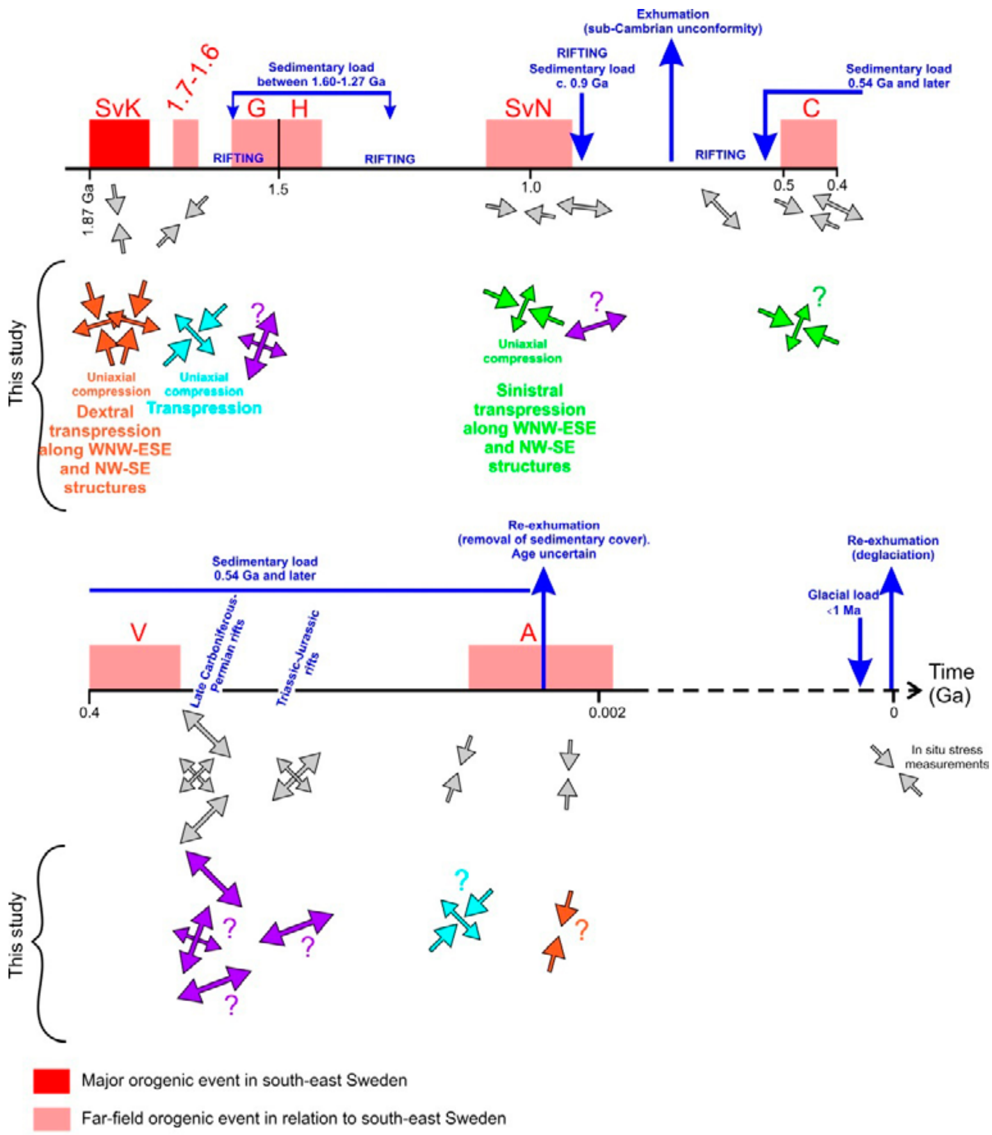

***Figure 2-1.** Orogenic activity, rifting and oscillatory vertical loading and unloading cycles that affected the Fennoscandian Shield in the south-eastern part of Sweden from 1.9 Ga to the Holocene (after Saintot et al. 2011). The respective trends of bulk crustal shortening or compression and extension in inferred paleostress fields are based on the compilation in Stephens and Wahlgren (2008) and the complementary information in Roberts and Gee (1985), Munier and Talbot (1993), Muir Wood (1995), Möller (1998), Heeremans et al. (1996), Bergerat et al. (2007), Stephens et al. (2009) and Viola et al. (2009), shown in grey arrows, and the results from Saintot et al. (2011), where the colours of the arrows correspond to the paleostress fields inferred from kinematic data along fractures at Forsmark. Alternative interpretations that cannot be fully rejected but are considered less probable are marked with questionmarks. SvK = Svecokarelian orogeny (1.9–1.8 Ga); 1.7–1.6 Ga = orogeny at 1.7–1.6 Ga; G = Gothian orogeny (1.6–1.5 Ga); H = Hallandian orogeny (1.5–1.4 Ga); SvN = Sveconorwegian orogeny (1.1–0.9 Ga); C = Caledonian orogeny (0.5–0.4 Ga); V = Variscan orogeny (0.4–0.25 Ga); A = Laramide inversion and Alpine orogeny (0.1–0.002 Ga).*

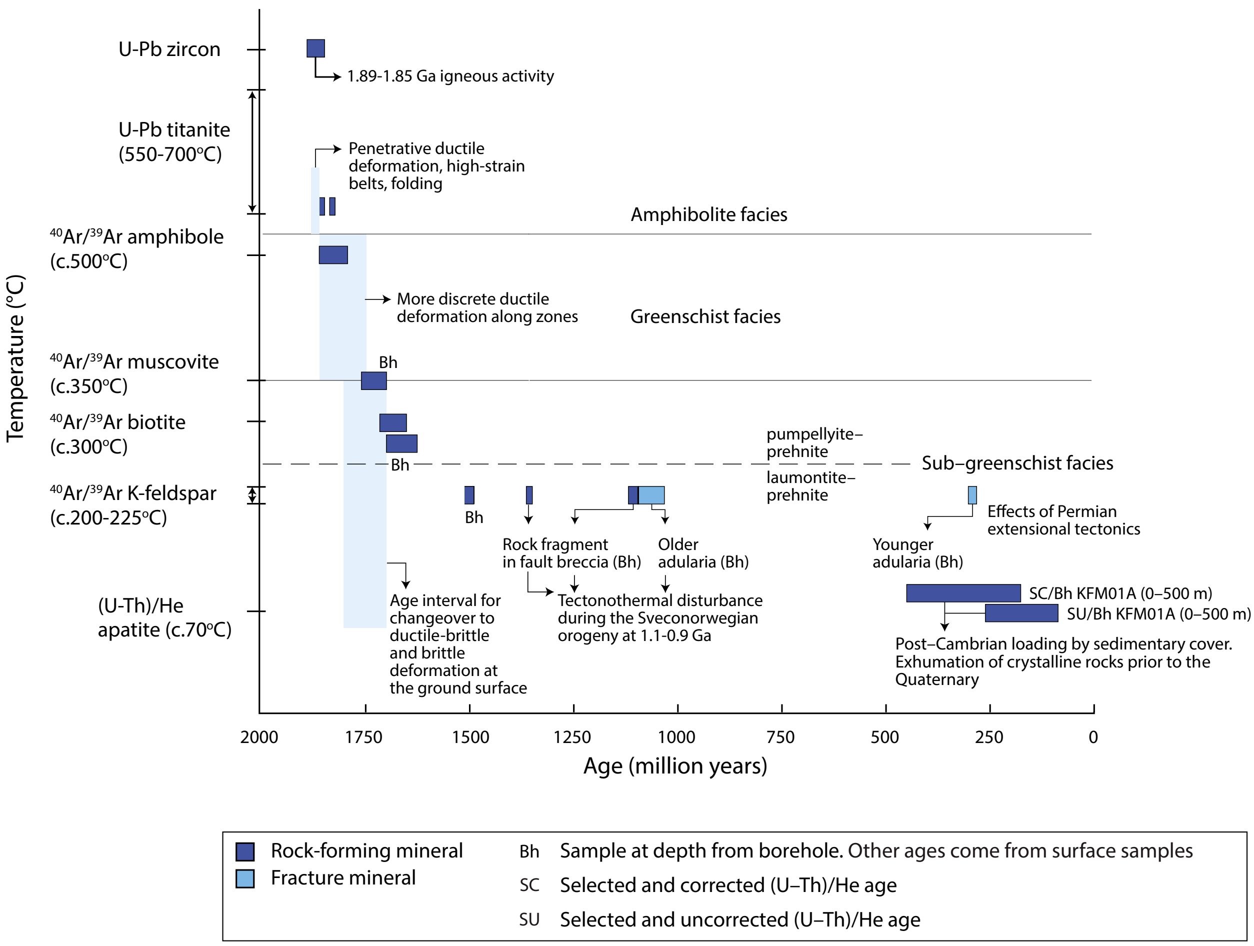

Figure 2-2. *Summary of radiometric age data and the bedrock geological evolution in the Forsmark area (after Saintot et al. 2011). Data from Hermansson et al. (2007, 2008a, b), Sandström et al. (2009) and Söderlund et al. (2008, 2009). Only a selection of (U-Th)/He data from drill core KFM01A, as discussed in Stephens and Wahlgren (2008), is shown.*

3 Data and models used in version 2.3 modelling work

3.1 Forsmark stage 2.2 deformation zone model

The stage 2.2 regional[1] and local[2] models for deformation zones at the Forsmark site were extracted from the model database Simon. Furthermore, the geological single-hole interpretations for all the boreholes at Forsmark have been extracted from the Sicada database[3]. This information as well as the property tables of the deformation zones presented in Appendices 15 and 16 in Stephens et al. (2007) have formed the basis for all the adjustments carried out in the generation of model version 2.3 for deformation zones.

3.2 Data and models acquired after Forsmark stage 2.2

3.2.1 Complementary data from the Forsmark site investigation, stage 2.3 (2006–2007)

The following geological and geophysical data were acquired at Forsmark after the data freeze for model stage 2.2 and before the final stage 2.3 data freeze on 2007-03-30; these data were used in the generation of model version 2.3 for deformation zones:

- Data acquired in connection with the standard site investigation work carried out along four cored boreholes (KFM02B, KFM08D, KFM11A and KFM12A) and five percussion boreholes close to drill sites 11 and 12 (HFM33, HFM34, HFM35, HFM36 and HFM37), (Figures 3-1 and 3-2). These data include borehole TV-logging with BIPS, standard geophysical logging and interpretation, borehole radar logging and interpretation, geological mapping of the crystalline bedrock (rock type, alteration phenomena and both ductile and brittle structures) and the integrated geological and geophysical single-hole interpretation (see Stephens et al. 2007). The results of the borehole geological mapping (BOREMAP) and single-hole interpretation work for all these boreholes were extracted from the Sicada database[4].
- Complementary geological single-hole interpretation work (see Stephens et al. 2007) for the possible deformation zones that have been recognized with high confidence along the cored boreholes KFM01C, KFM01D, KFM02B, KFM06C, KFM07B, KFM07C, KFM08C, KFM08D, KFM09A, KFM09B, KFM10A, KFM11A and KFM12A (see summary in Stephens et al. 2008). These boreholes are located at the corresponding drill sites DS1, DS2, DS6, DS7, DS8, DS9, DS10, DS11 and DS12 (Figure 3-1). This work addressed in more detail, relative to the standard single-hole interpretation, the character of the possible deformation zones, in particular the character of fault core, if present, and the kinematic data. The results were extracted from the Sicada database[5].
- High-resolution ground magnetic data and the interpretation of lineaments from these data inside the candidate area to the south-east and south-west of Bolundsfjärden, and mostly in the sea area around SFR (Figure 3-3). All magnetic lineaments have been extracted from SKB's GIS database[6] and made use of in the generation of model version 2.3 for deformation zones.

[1] DZ_PFM_REG_v22.rvs

[2] DZ_PFM_Loc_v22.rvs

[3] Sicada extract with ID SICADA_11_023

[4] Sicada extract with ID SICADA_11_023

[5] Sicada extract with ID SICADA_11_023

[6] SDEADM.GV_FM_GEO_6044

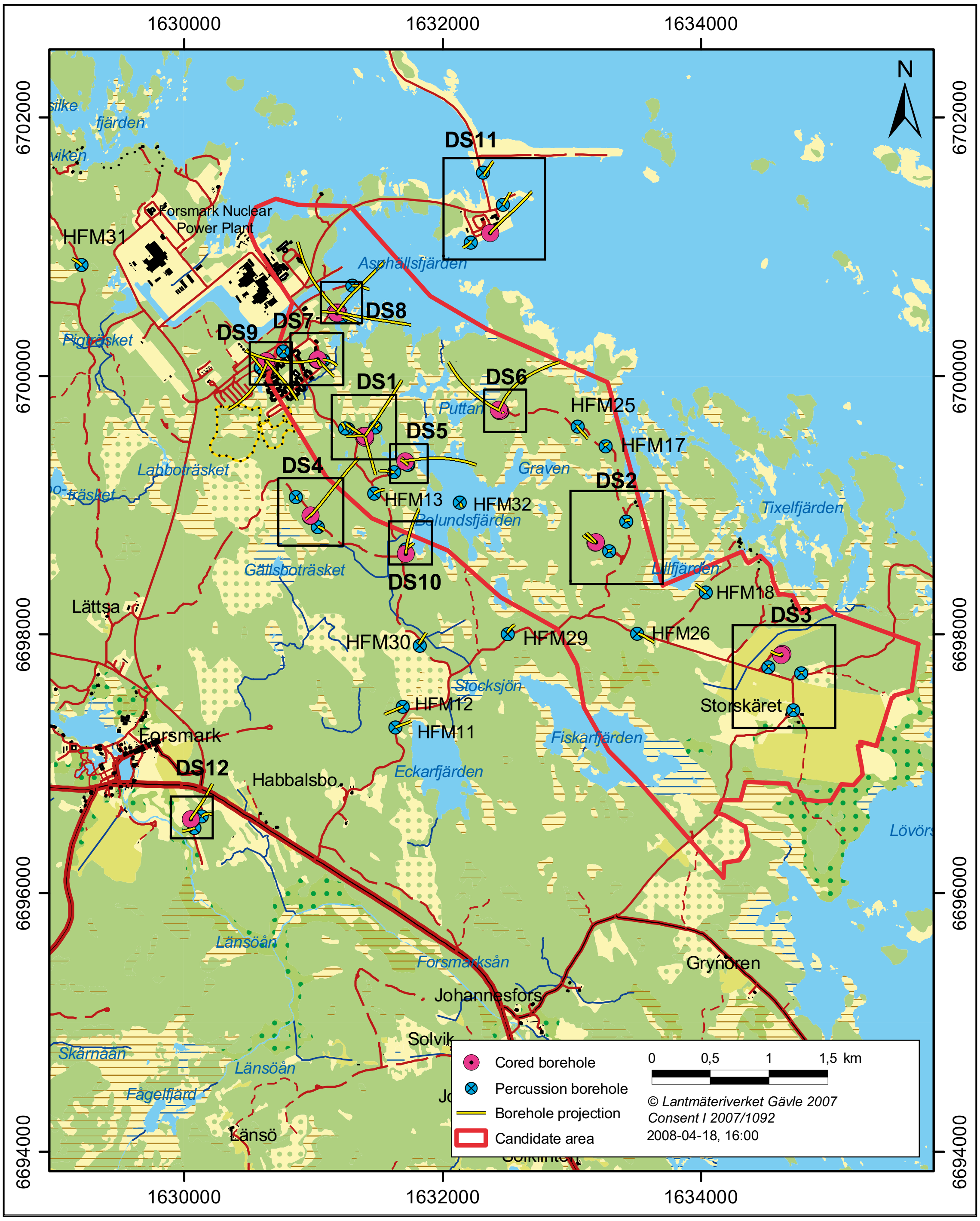

Figure 3-1. *Location of drill sites and projection of boreholes on the ground surface at the Forsmark site. The geological and geophysical data from the cored boreholes KFM02B, KFM08D, KFM11A and KFM12A, and the percussion boreholes HFM33, HFM34, HFM35, HFM36 and HFM37 were acquired after model stage 2.2. Coordinates are provided using the RT90 (RAK) system.*

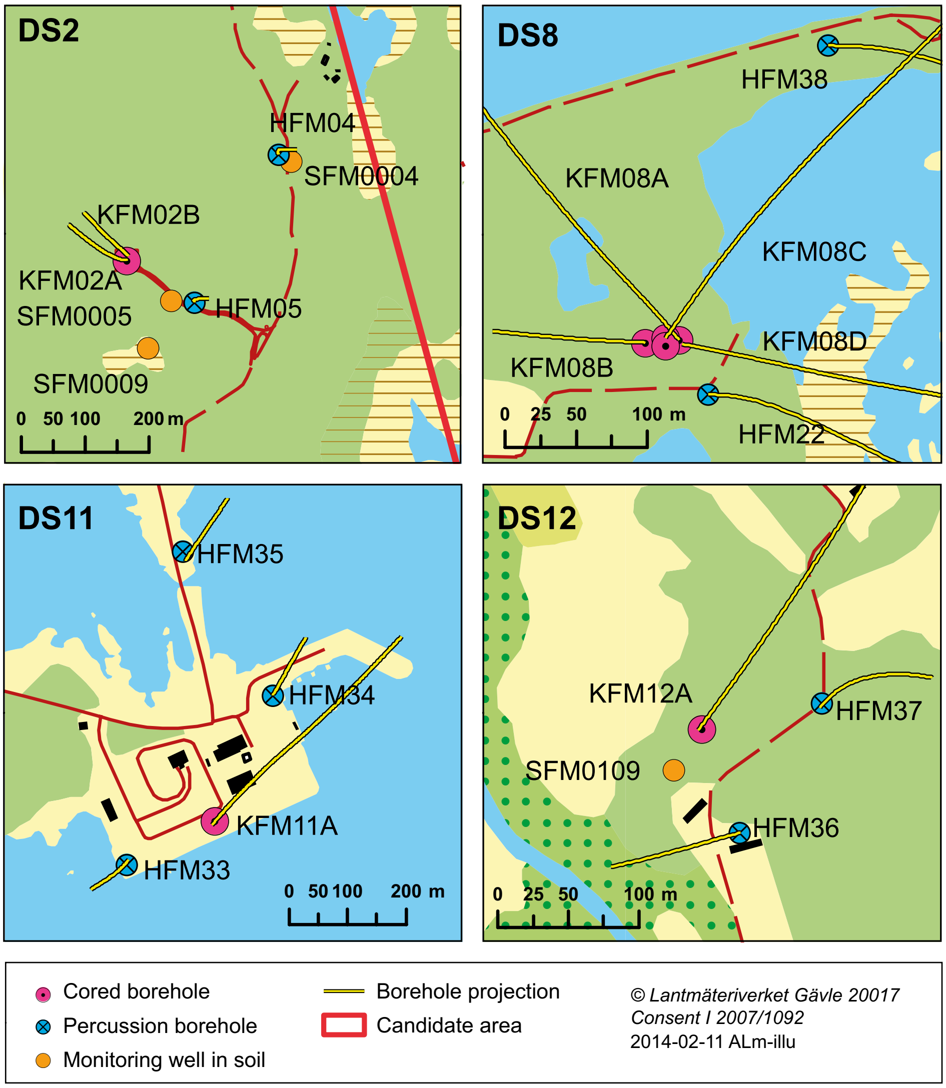

Figure 3-2. *Detailed view of the location and projection of boreholes on the ground surface at drill sites 2, 8, 11 and 12 (DS2, DS8, DS11 and DS12).*

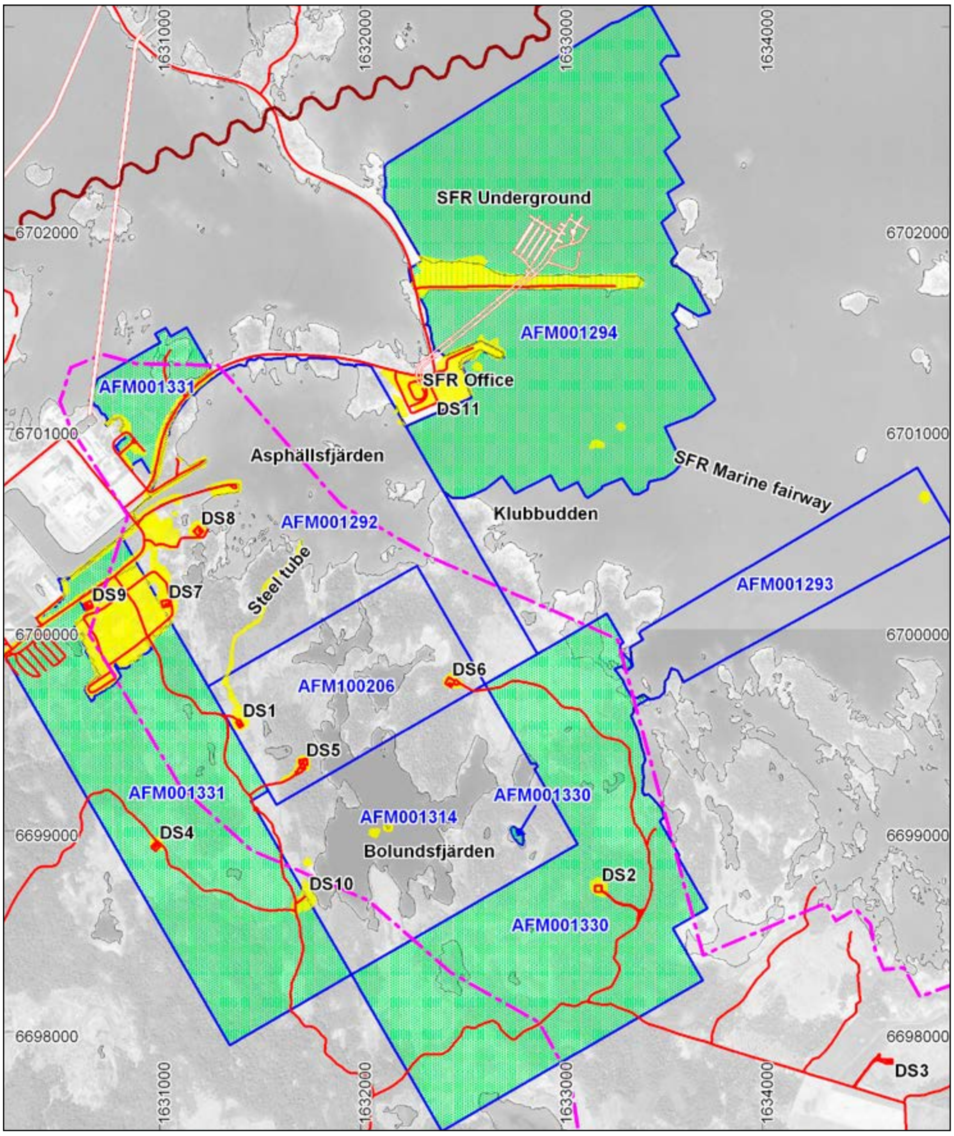

__Figure 3-3.__ Location and extension of all the high-resolution, ground magnetic surveys at Forsmark. The areas where complementary data were acquired between data freezes 2.2 and 2.3 are shown in green (activity codes AFM001294, AFM001330 and AFM001331). Disturbed areas due to buildings and constructions are shown in yellow. The Fennoskan HVDC cable between Sweden and Finland is displayed as a brown wavy line, whereas the SFR underground facilities and the cooling water tunnels from reactors Forsmark 1–2 and Forsmark 3 are shown with red lines and white filling. The Forsmark candidate area is delimited with a thick, dot-dashed magenta line, whereas roads and drill sites are marked with red colour. © Lantmäteriverket Gävle 2007. Consent I 2007/1092. Modified slightly after Isaksson et al. (2007).

3.2.2 Deformation zone model acquired during the SFR site investigation (2008–2010)

Older data from the SFR facility, relevant data from the Forsmark site investigation and data mainly from new boreholes have been evaluated and made use of in the construction of deformation zone models for SFR (SKB 2008b, Curtis et al. 2009, 2011). Separate deformation zone models with different degrees of resolution were generated in the SFR regional and local model volumes (Figure 3-4) in connection with the final modelling work (Curtis et al. 2011). The preliminary deformation zone models for SFR[7] were extracted from SKB model database Simon and made use of in the generation of model version 2.3 for deformation zones.

[7] SFR modell used. DZ_SFR_REG_v 1.0

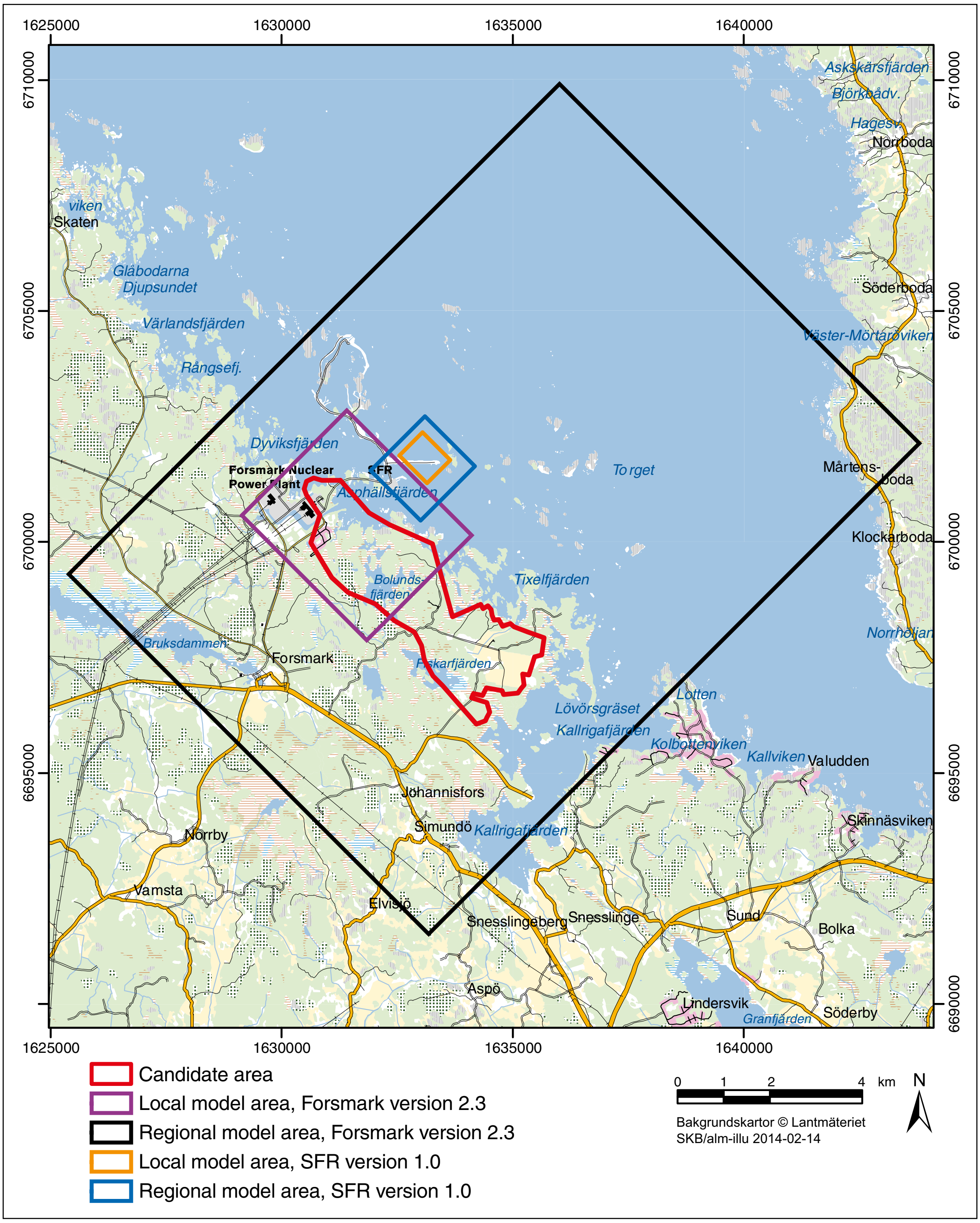

Figure 3-4. Regional and local model areas for SFR model version 1.0, and regional and local model areas used during Forsmark model version 2.3.

3.3 Model volumes

The regional and local model areas at the ground surface that have been used for deterministic modelling of deformation zones in model version 2.3 are shown in Figure 3-4. The coordinates defining the intersection of the regional and local model volumes with the ground surface are shown in Table 3-1. The two areas extend down to an elevation of –2,100 m and –1,100 m, respectively and, in both cases, up to +100 m in the respective 3D modelling blocks. These two volumes are identical in size and orientation to those used during model stage 2.2.

Table 3-1. Coordinates in metres (RT90 (RAK) system) defining the intersection of the version 2.3 regional and local model volumes with the ground surface.

Model	Easting	Northing
Regional	1625400	6699300
Regional	1636007	6709907
Regional	1643785	6702129
Regional	1633178	6691522
Local	1629171	6700562
Local	1631434	6702824
Local	1634099	6700159
Local	1631841	6697892

4 Methodology

The version 2.3 modelling of deformation zones using the 3D modelling system RVS started with the import of Forsmark model stage 2.2. The subsequent modelling work followed the same methodology and used the same modelling assumptions as those presented in Stephens et al. (2007, Section 5.1). This work also followed the established conceptual understanding of deformation zones at the Forsmark site presented in Stephens et al. (2007, Section 5.2) and developed further in Saintot et al. (2011). The modelling work was carried out deterministically, i.e. in a manner where outcomes were determined by expert judgment using known relationships among attributes and events without any room for random variation.

On the basis of these guidelines, zones that are 1,000 m (corresponding to an equivalent radius of 564 m for a planar circular disc) or longer but less than 3,000 m in trace length at the ground surface have been included in the deterministic, local deformation zone model. On account of the uncertainty in the assessment of the size of a zone, even a few zones in the length span 900–1,000 m have been included in the local model. Naturally, zone segments < 900 m but considered to be part of a zone which, overall, is longer than 1,000 m are also included in this model.

Deformation zones that are 3,000 m or longer are included in the deterministic, regional model, following the procedures adopted in stage 2.2. The length of gently dipping zones is difficult to estimate and varies considerably with depth. Furthermore, these structures are important from a hydrogeological viewpoint (SKB 2008a). For these reasons, all the identified gently dipping zones have been included in the regional model regardless of their size.

Task 1 in the version 2.3 modelling work addressed the interaction between the stage 2.2 local and regional deformation zone models for Forsmark (Stephens et al. 2007) and the version 1.0 regional deformation zone model for SFR (Curtis et al. 2011). Where deemed necessary inside the volume of overlap with the SFR model (Figure 3-4), the stage 2.2 model was adjusted so as to conform to the geometry presented in the SFR model. This procedure is motivated since the stage 2.3 high-resolution ground magnetic data was used in the SFR modelling work. Task 1 was addressed at an early stage in the modelling procedure.

Task 2 in the version 2.3 modelling work addressed the geometric modifications that were needed following:

- The revised interpretation of lineaments defined by magnetic minima based on the stage 2.3 high-resolution ground magnetic data (Isaksson et al. 2007, Stephens et al. 2008, Tables A-1 and A-2).
- The input of stage 2.3 data from boreholes KFM02B, KFM08D, KFM11A and KFM12A (Stephens et al. 2008).

The modifications to the models for deformation zones recommended in Stephens et al. (2008), especially Tables 3-7, 4-7, 5-7 and 6-6, were used as a steering guideline in the model upgrading process.

Task 3 involved an adjustment of all deformation zones so that the intersection of a zone along a borehole, as indicated in the geological single-hole interpretation work, matches the intersection of the borehole in space in the 3D model. In this manner, the revised deviation measurements for the cored boreholes and the resulting adjustments made with the position of boreholes in 3D space, following the delivery of model stage 2.2 for deformation zones, have now been addressed in the models for these zones. This task was completed for each zone as Tasks 1 and 2 progressed.

Task 4 involved the modification of the properties of deformation zones taking account of the modifications in the geometric model for deformation zones, the input of stage 2.3 data from boreholes KFM02B, KFM08D, KFM11A and KFM12A (Stephens et al. 2008) and the input of complementary geological single-hole interpretation work during stage 2.3 (see summary in Stephens et al. 2008). The stage 2.2 property tables for deformation zones presented in Appendices 15 and 16 in Stephens et al. (2007) were modified taking account of the changes completed during the current work in, for example, the orientation, length and modelled thickness of the deformation zones. A careful check was made that properties included in the RVS version 2.3 model are identical to the properties included in the property tables presented together with this report.

The modelling work continually made use of the relevant published literature on the geology at Forsmark, both in the form of open file SKB reports and peer-reviewed published articles in scientific journals some of which are also referred to here. Quality-assured bedrock geological and geophysical data and their handling, which were published in more than 250 data reports in SKB's P- and R-series and are listed in Appendix 3 (Table 1) in SKB (2008a), form the primary basis for the modelling work. The reports on the modelling work completed prior to stage 2.2 as well as the key background reports to the SDM-Site main report (SKB 2008a) are listed in Appendix 3 (Table 1) and in Figure 1-9, respectively, in SKB (2008a). An overview of the bedrock geology at Forsmark and an excursion guide at the ground surface is also available (Stephens 2010).

5 Version 2.3 deformation zone model, property tables, uncertainties and recommendation

5.1 General character

Sixty-seven deformation zones have been modelled deterministically in the local model volume. More than 70% of these zones have been confirmed directly by geological data from borehole or tunnel intersections, or from outcrop observations (see Appendices 1 and 2), and are not identified solely on the basis of indirect geophysical data (e.g. a lineament defined by magnetic minima or a seismic reflector). Twenty-seven of these zones as well as forty-three more zones outside the local model volume, which are either gently dipping or are vertical or steeply dipping zones longer than 3,000 m at the ground surface, comprise the components in the regional model. Only c. 20% of the zones included in the regional model that lie outside the local model volume share the same high degree of confidence in existence. The use of indirect data and the absence of confirmatory geological data are far more prevalent for these zones.

In comparison with model stage 2.2, which was used for the site description at the completion of the Forsmark site investigation phase (SKB 2008a), the following more significant modifications have taken place:

- Three deformation zones have been assigned a different ID number on the basis of a refined affiliation to a particular orientation sub-set (ZFMNNE0842 to ZFMNE0842, ZFMENE2332 to ZFMNE2332 and ZFMWNW1173 to ZFMNW1173).
- Five deformation zones in the vicinity of the SFR facility have been removed (ZFMNNE0869, ZFMWNW0835A, ZFMWNW0835B, ZFMWNW1056 and ZFMWNW1127). Apart from zone ZFMNNE0869 (Zone 3 at SFR), which is now judged to be less than 1,000 m in length (Curtis et al. 2011), all these zones were based solely on the interpretation of magnetic lineaments and had only a medium confidence of existence in the stage 2.2 model. They also failed confirmation in the SFR and subsequent version 2.3 modelling work.
- Three deformation zones have each been split up into two separate segments, partly as result of the stage 2.3 lineament interpretation work (ZFMENE103, ZFMENE1192) and partly as a result of the SFR modelling work (ZFMNW0805).
- Nine new deformation zones have been identified. Seven of these zones (ZFMENE0168, ZFMENE2325A, ZFMENE2325B, ZFMENE2403, ZFMNE2282, ZFMNNE2300 and ZFMWNW0044) were also modelled deterministically during model stage 2.2 as minor deformation zones with variable confidence of existence (Stephens et al. 2007, Appendix 16). On the basis of the results from KFM08D and the stage 2.3 lineament interpretation work, these zones have been upgraded to local major zones with trace length at the ground surface around 1,000 m or longer and with a more certain confidence of existence. The other two zones (ZFMWNW1035 and ZFMWNW3259) emerged as a result of the SFR modelling work.

These modifications, which affect both the local and regional models, account for the change from 103 zones in model stage 2.2 to 110 zones in model version 2.3. In summary, these changes were steered by the stage 2.3 changes in the lineaments defined by magnetic minima, the results from the drilling of borehole KFM08D and the results of the SFR modelling work.

Inspection of the local model shows a clear dominance of vertical or steeply dipping, brittle deformation zones with ENE–WSW, NNE–SSW or NE–SW strike, sandwiched between more regionally significant, composite ductile and brittle deformation zones occurring along both the north-eastern and south-western sides of the local model block (Figure 5-1). The more regionally significant zones are vertical or steeply dipping and strike WNW–ESE or NW–SE. Only a few gently dipping, brittle deformation zones are present inside the local model volume. Although the gently dipping zones ZFMA2 and ZFMA8 are conspicuous in the south-eastern part of the local model in the near-surface realm (Figure 5-2), gently dipping zones are of little significance at –470 m elevation, corresponding to the depth chosen for the repository (Figure 5-3). Indeed, most of the gently dipping brittle deformation zones occur to the south-east of and outside the local model volume. The importance of the vertical or steeply dipping, ENE–WSW, NNE–SSW and NE–SW sub-sets of brittle deformation zones at –470 m elevation inside the selected area for the repository is highly conspicuous (Figure 5-3).

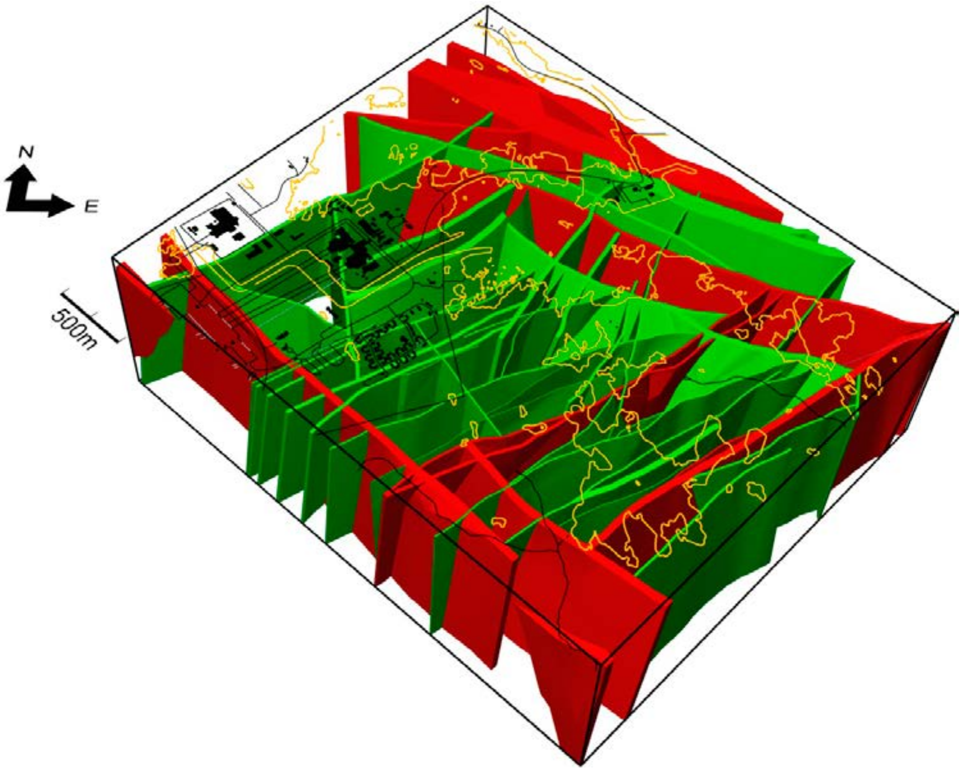

Figure 5-1. Three-dimensional model for vertical or steeply dipping deformation zones inside the local block model. Zones marked in red have a trace length at the surface longer than 3,000 m. Zones marked in green are less than 3,000 m in length.

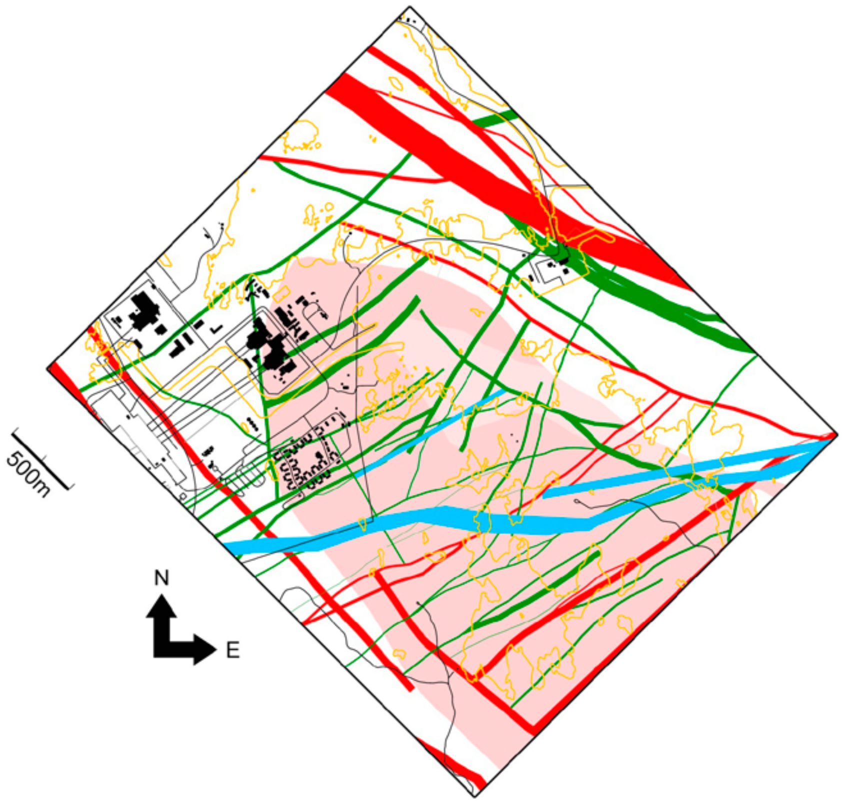

Figure 5-2. Two-dimensional model for deformation zones at the ground surface inside the local block model. Zones marked in red are vertical or steeply dipping and have a trace length at the surface longer than 3,000 m. Zones marked in green are vertical or steeply dipping and are less than 3,000 m in length. Zones marked in blue are gently dipping to the south and south-east.

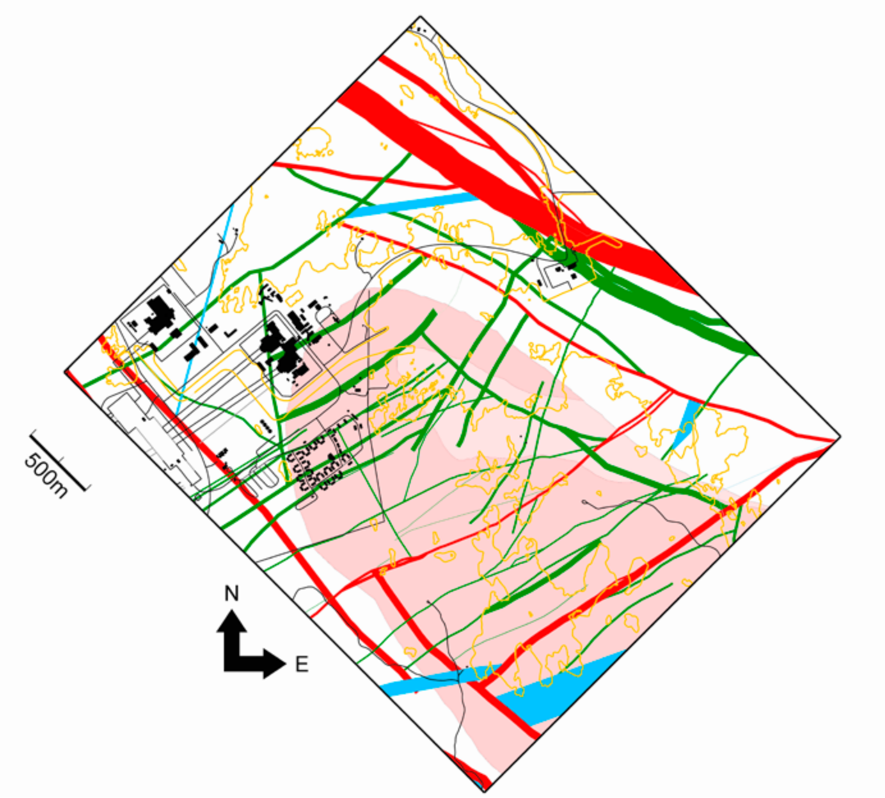

Figure 5-3. Two-dimensional model for deformation zones at –470 m elevation inside the local block model. Zones marked in red are vertical or steeply dipping and have a trace length at the surface longer than 3,000 m. Zones marked in green are vertical or steeply dipping and are less than 3,000 m in length. Zones marked in blue are gently dipping to the south and south-east.

5.2 Summary of the properties of the vertical or steeply dipping zones with ENE–WSW, NNE–SSW or NE–SW strike inside the local model volume

The definitions of geological properties of zones (e.g. orientation, thickness, length etc.) are presented in the opening text in Appendix 2. The properties of each of the 110 zones in the local and regional version 2.3 models are also provided in this appendix. A conspicuous feature, not least along KFM08D, is the occurrence of several zones close to or along the boundary between different lithologies (Appendix 1). The vertical or steeply dipping zones with ENE–WSW, NNE–SSW or NE–SW strike are generally less than 3 km in trace length at the ground surface and are second-order structures compared with the vertical or steeply dipping zones in the bounding WNW–ESE and NW–SE sub-sets which are, in some cases, longer than 10 km in trace length. A summary of the properties of the vertical or steeply dipping zones with ENE–WSW, NNE–SSW or NE-SW strike, which are partly or entirely inside the local model volume, is provided below. More details of the properties of the other orientation sets can be found in Stephens et al. (2007) and in SKB (2008a).

Excluding the shorter zone segments (8), which represent extensions or sub-parallel parts of a particular zone, the surface trace length of the ENE–WSW, NNE–SSW and NE–SW sub-sets included in the local model volume (29) varies from c. 1,000 m to 3,500 m, and most are less than 2,000 m. The modelled thickness of these zones shows a range between 3 and 48 m with a mean value of 19 m. Only zones ZFMENE0060A and ZFMENE0062A, with modelled thicknesses of 17 m and 44 m, respectively, exceed 3,000 m in trace length at the ground surface. The zones with ENE–WSW, NNE–SSW or NE–SW strike contain more than one orientation set of fractures but, nevertheless, the dominant fracture set in a zone generally has an orientation coinciding with the orientation of the zone. Only minor adjustments in the length and modelled thickness of the zones have been made with respect to model stage 2.2.

Fault-slip data indicate a strong strike-slip component of displacement with both sinistral and dextral senses of shear and movement along them in connection with different stress regimes during geological time (Saintot et al. 2011). Inspection of the total magnetic field anomaly maps in the Forsmark area (Stephens et al. 2007) suggests that at least the bulk strike-slip displacement along the zones with ENE–WSW, NNE–SSW or NE–SW strike is below the limit that can be detected in the high-resolution ground magnetic data, i.e. displacements in the range a few metres up to a maximum of a few tens of metres are inferred.

The vertical or steeply dipping zones with ENE–WSW, NNE–SSW or NE–SW strike show hydrothermal alteration characterised by hematite dissemination (Sandström et al. 2008) and, locally, quartz dissolution with the development of vuggy rock (Petersson et al. 2012). The occurrence of different mineral generations (Sandström et al. 2009) along the fractures in the zones suggests multiphase reactivation of these brittle deformation zones in different mineral stability fields, consistent with the conclusions drawn from the analysis of the fault-slip data (Saintot et al. 2011). Epidote formed when the rocks currently close to the ground surface inside the Forsmark tectonic lens behaved in a ductile–brittle manner around 1.8 Ga (latest Svecokarelian orogenic event) and probably later in the brittle regime, but prior to the initiation of the 1.1–0.9 Ga tectonic development in Scandinavia (Sveconorwegian orogenic event). By contrast, hematite-stained adularia and laumontite formed in connection with and possibly also prior to the Sveconorwegian orogeny. Other minerals including sulphides, quartz, adularia and clay minerals formed later during the Phanerozoic. The occurrence of different mineral generations along different fracture sets in a single zone, including the oldest fracture mineral epidote, suggests formation of these zones during the oldest phase of the ductile–brittle or brittle tectonic evolution inside the epidote stability field.

5.3 Uncertainties

All deterministic modelling, not least of deformation zones, is strongly dependent on an accurate positioning of boreholes at depth. The uncertainty calculated for the spatial position of boreholes in all three dimensions generally increases somewhat with depth and is more significant in the horizontal plane than in the vertical dimension (Munier and Stigsson 2007). However, the estimated uncertainty in the position of, for example, a deformation zone in a borehole does not exceed c. 30 m in the horizontal plane. In most cases, the uncertainty is less than 10 m in the horizontal plane and less than 6 m in the vertical dimension. These uncertainties are approximately of the same order of magnitude as the uncertainty in the position of lineaments defined by magnetic minima using airborne magnetic data and of seismic reflectors; all these uncertainties are relatively minor in character.

The expert judgement in the modelling work to match a lineament defined by a magnetic minimum to a particular deformation zone in a single-hole interpretation, the assumption concerning the down-dip extension of vertical or steeply dipping zones (Stephens et al. 2007) and the uncertainty in the definition of the boundaries of deformation zones in the geological single-hole interpretation are the intrinsic weaknesses in the modelling procedure. These features affect directly the estimate of dip and, consequently, the position of the zone in 3-D space as well as the estimate of the thickness of the zone. For this reason, the deterministic model for deformation zones inside a particular model block is non-unique.

The data from borehole KFM08D (Figure 3-1), which were not available and consequently not used when the stage 2.2 geological modelling work was carried out, have been used for model verification (Stephens et al. 2008). Nine of the twelve zones identified in the geological single-hole interpretation of borehole KFM08D (Carlsten et al. 2007) correlate with deterministically modelled zones in the verification procedure, either directly (three zones) or after a minor modification (1–10°) of the dip or strike of the zones (six zones). Several of the latter were originally assigned a lower confidence of existence and their dip was judged to be uncertain in the modelling work. The three other zones identified in the single-hole interpretation, with a lower confidence, were not able to be linked to a deterministically modelled zone or to a lineament defined by magnetic minima at the ground surface. They were inferred to be steeply dipping structures with a size that is below the level of resolution adopted in the local modelling procedure. The result of this verification procedure was judged to be highly satisfactory and the recommended modifications in Stephens et al. (2008) have now been adopted in the generation of model version 2.3 here.

There remain two more significant uncertainties in the modelling of deformation zones – the size of gently dipping brittle deformation zones and the size and orientation of the brittle deformation zones in the single-hole interpretations that have not been modelled deterministically.

The uncertainty in the extension of the gently dipping zones increases radically with distance from the seismic profile lines (see summary in Stephens et al. 2007). As in model stage 2.2, and if no other information is available, this uncertainty has been addressed using a conservative approach in which these zones have been modelled so as to terminate against the nearest, vertical or steeply dipping zone. Since it has not been possible to link the brittle deformation zones in the single-hole interpretations that have not been modelled deterministically to geophysical anomalies and since they commonly occur along short borehole intervals, it is judged that they are predominantly minor geological features with a size that is below the level of resolution adopted in the local modelling procedure.

5.4 Recommendation for delivery to geological model database (GE306) in Sicada

By making use of the information in the property tables for deformation zones presented here (Appendix 2) and in Curtis et al. (2011, Appendix 11) for SFR, it is recommended that the intersection of each zone in all the boreholes and tunnels at Forsmark (including SFR) are placed in the Sicada rock domain, fracture domain and deformation zone database (GE306). This work component was not a part of the current study.

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Appendix 1

Rock domains (RFM), deformation zones (ZFM) and fracture domains (FFM) presented on a borehole by borehole basis

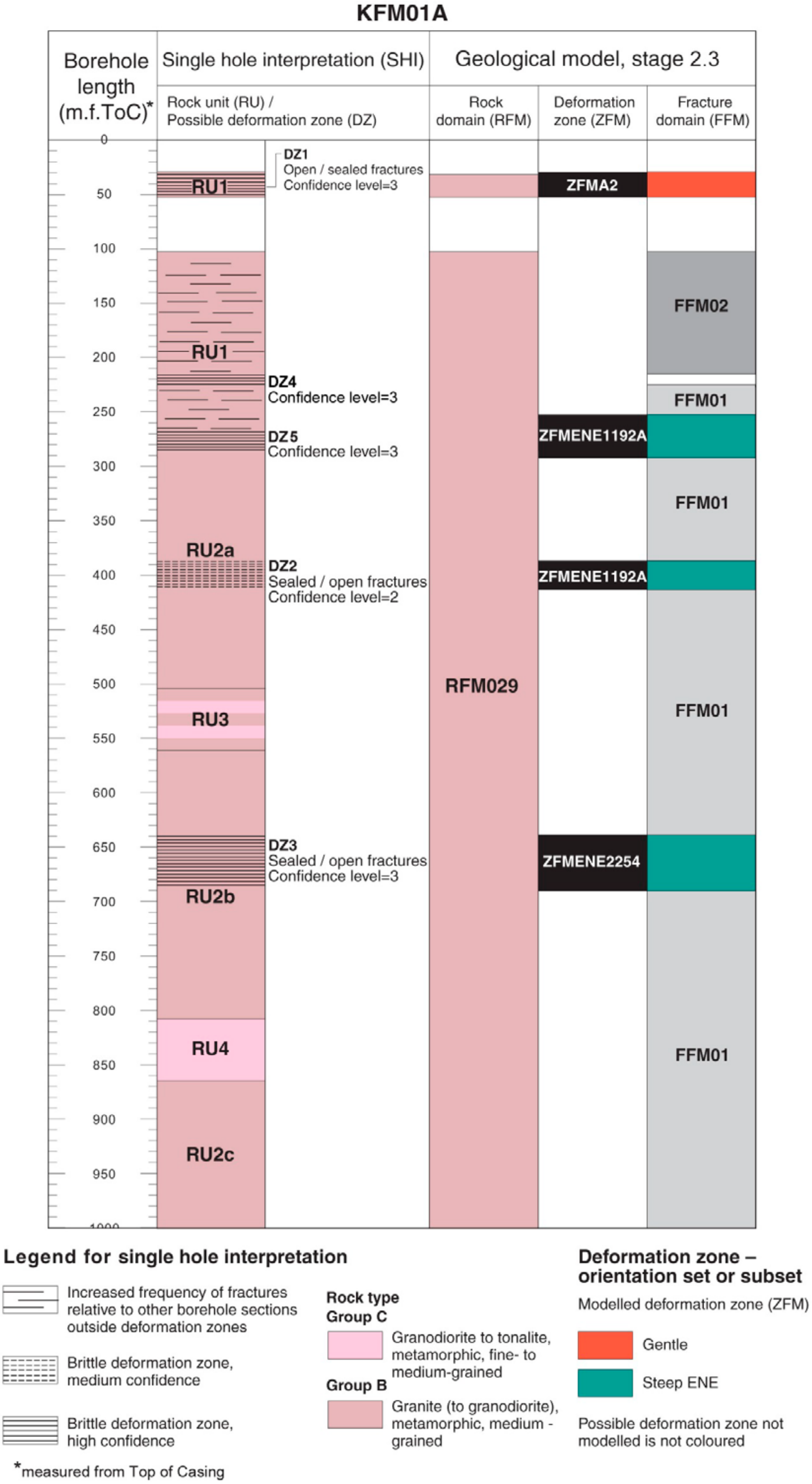
The rock domains (RFM), deformation zones (ZFM) and fracture domains (FFM), which have been identified during model version 2.3 at the Forsmark site, are presented for each of the 25 cored boreholes used in the modelling work. These domains and zones are shown in relation to an overview of rock units (RU) and possible deformation zones (DZ) in the single-hole interpretation (SHI) of each borehole. The definitions of terms presented below are based on Stephens et al. (2007):

- **Rock unit (RU).** A rock unit is defined primarily on the basis of the composition, grain size and inferred relative age of the dominant rock type. Different groups of rocks at the Forsmark site (A–D), distinguished on the basis of their relative age, are defined in Table A1-1. Other geological features including the degree of bedrock homogeneity, the degree and style of ductile deformation, the occurrence of early-stage alteration (albitisation) that affects the composition of the rock, and anomalous fracture frequency also help to define rock units. Both dominant rock type and subordinate rock types are defined for the rock units that are defined solely or partly on the basis of rock composition. The term rock unit is used in the bedrock mapping work at the surface (2D) and in connection with the single-hole interpretation work (essentially 1D). In the latter, rock units are referred to as RUxx, where the name of the rock unit is coupled to a single borehole. Thus, there is no unique name for the rock units at the site.
- **Rock domain (RFM).** A rock domain refers to a rock volume in which rock units that show specifically similar composition, grain size, degree of bedrock homogeneity, and degree and style of ductile deformation have been combined and distinguished from each other. The occurrence of early-stage alteration (albitisation) is also used as a help to distinguish rock domains. The term rock domain is used in the 3D geometric modelling work and different rock domains at Forsmark are referred to as RFMxxx.
- **Deformation zone (DZ and ZFM).** A deformation zone is a general term that refers to an essentially 2D structure along which there is a concentration of brittle, ductile or combined brittle and ductile deformation. The term fracture zone is used to denote a brittle deformation zone without any specification whether there has or has not been a shear sense of movement along the zone. A fracture zone that shows a shear sense of movement is referred to as a fault zone. The term deformation zone is used at all stages in the geological work; bedrock surface mapping, single-hole interpretation and 3D modelling. In the single-hole interpretation work, deformation zones are referred to as DZxx, where the name is coupled to a single borehole, and, in the 3D modelling work, the deformation zones at Forsmark are referred as to ZFMxxx.
- **Fracture domain (FFM).** A fracture domain refers to a rock volume outside deformation zones in which rock units show similar fracture frequency characteristics. Fracture domains at Forsmark are defined on the basis of the single-hole interpretation work and the results of a subsequent statistical treatment of fractures. The term is used in the first instance as a basis for the discrete fracture network modelling work (geological DFN). Different fracture domains at Forsmark are referred to as FFMxxx.

The fracture domain (FFM) column to the right in each figure in this appendix shows both modelled fracture domains and the orientation set or subset of the modelled deformation zones along each borehole. White areas without any shading correspond to: 1) Deformation zones identified in the single-hole interpretation (DZxx) that were not modelled deterministically; 2) the uppermost part (commonly 100 m) of most boreholes where geological data are either lacking or are of poor quality; and 3) in two cases (KFM11A and KFM12A), boreholes situated outside the volume selected for fracture domain modelling.

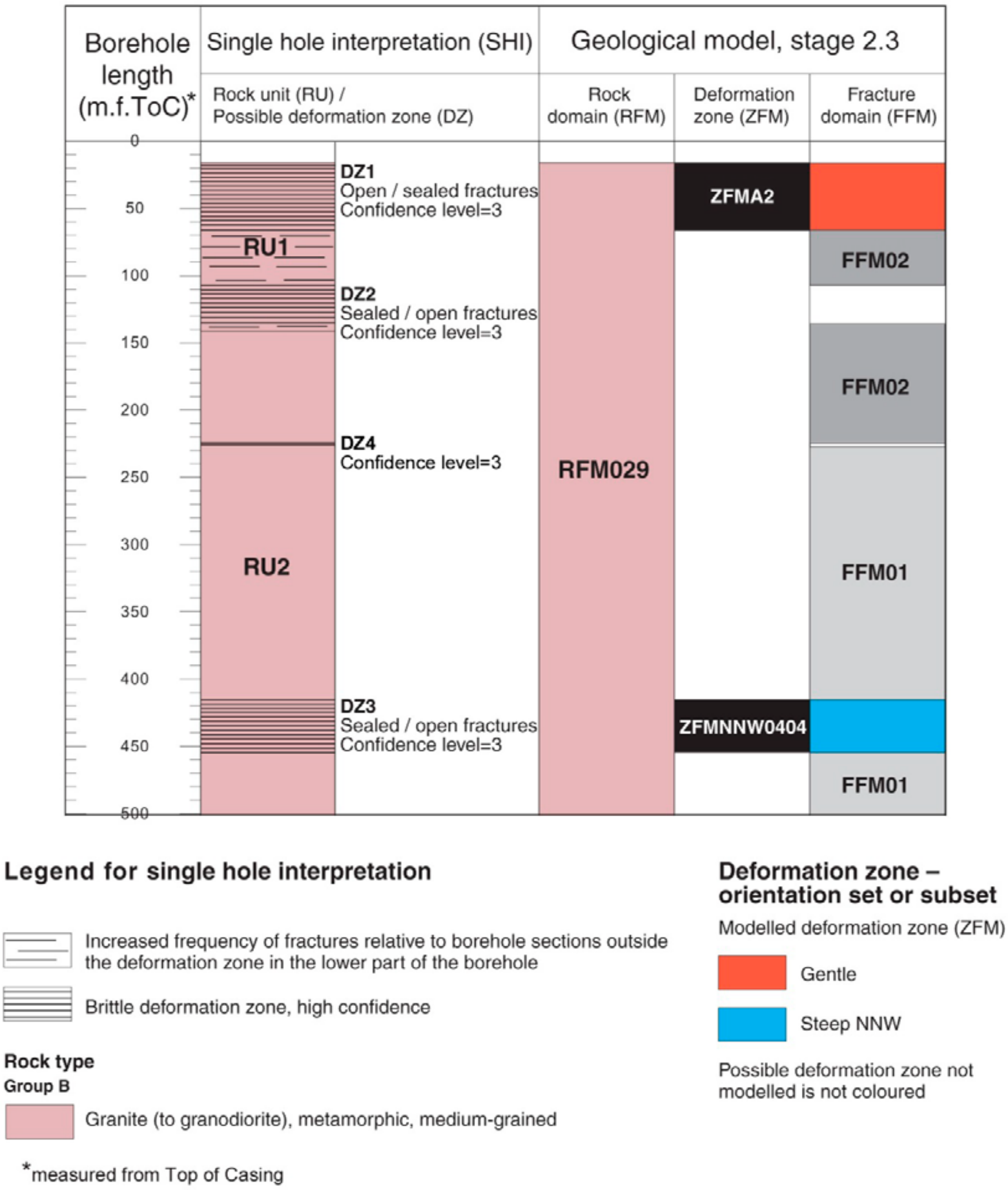
Table A1-1. Major groups of rocks at the Forsmark site, which are distinguished solely on the basis of their relative age. SKB rock codes that distinguish different rock types in each group are shown in brackets. The alteration code 104 for albitisation is also included.

Groups of rocks
All rocks are affected by brittle deformation. The fractures generally cut the boundaries between the different rock types. The boundaries are predominantly not fractured.
Rocks in Group D are affected only partly by ductile deformation and metamorphism.
Group D (c 1,851 million years)
• Fine- to medium-grained granite and aplite (111058). Pegmatitic granite and pegmatite (101061) Variable age relationships with respect to Group C. Occur as dykes and minor bodies that are commonly discordant and, locally, strongly discordant to ductile deformation in older rocks.
Rocks in Group C are affected by penetrative ductile deformation under lower amphibolite-facies metamorphic conditions.
Group C (c 1,864 million years)
• Fine- to medium-grained granodiorite, tonalite and subordinate granite (101051). Occur as lenses and dykes in Groups A and B. Intruded after some ductile deformation in the rocks belonging to Groups A and B with weakly discordant contacts to ductile deformation in these older rocks.
Rocks in Groups A and B are affected by penetrative ductile deformation under amphibolite-facies metamorphic conditions.
Group B (c 1,886–1,865 million years)
• Biotite-bearing granite (to granodiorite) (101057) and aplitic granite (101058), both with amphibolite (102017) as dykes and irregular inclusions. Local albitisation (104) of granitic rocks.
• Tonalite to granodiorite (101054) with amphibolite (102017) enclaves. Granodiorite (101056).
• Ultramafic rock (101004). Gabbro, diorite and quartz diorite (101033).
Group A (supracrustal rocks older than 1,885 million years)
• Sulphide mineralisation, possibly epigenetic (109010).
• Volcanic rock (103076), calc-silicate rock (108019) and iron oxide mineralisation (109014). Subordinate sedimentary rocks (106001).

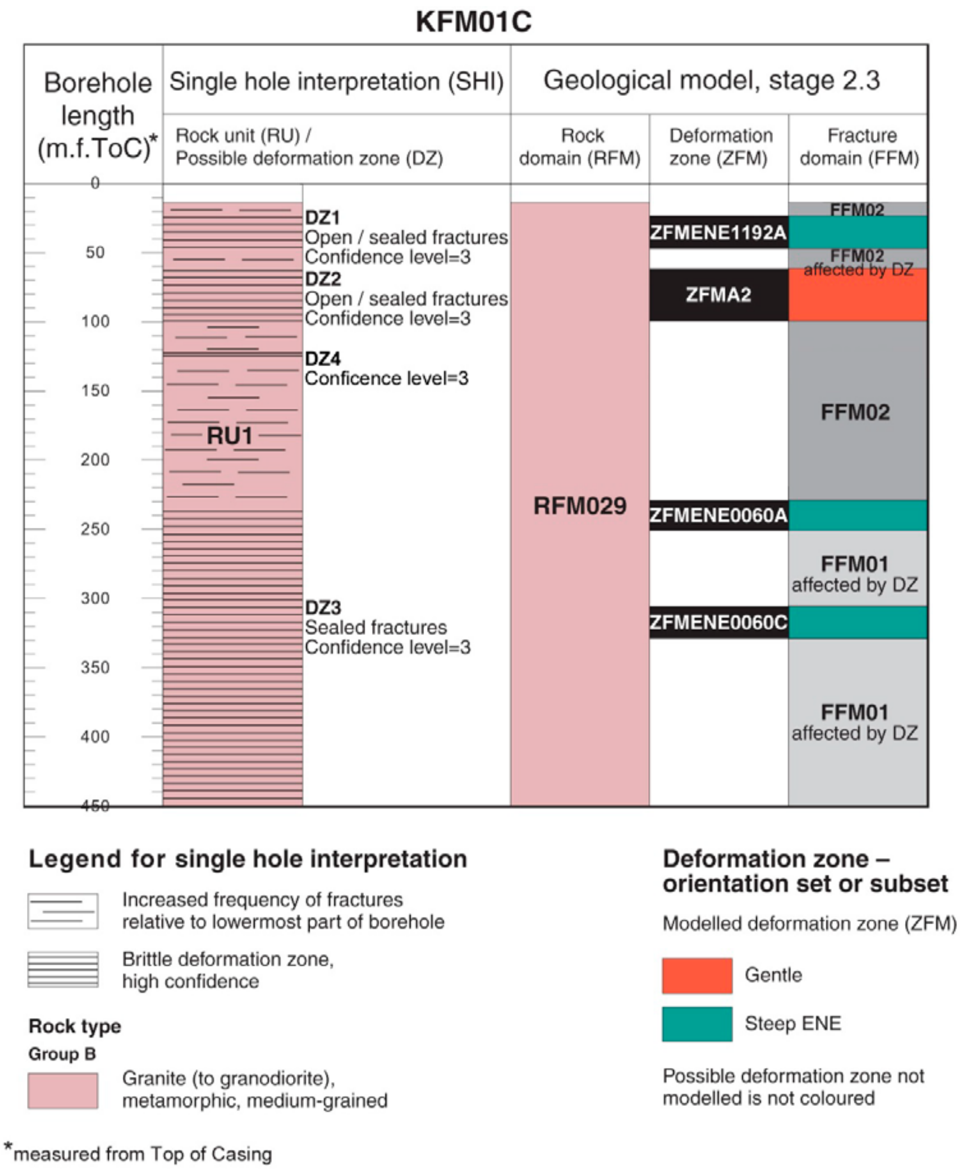


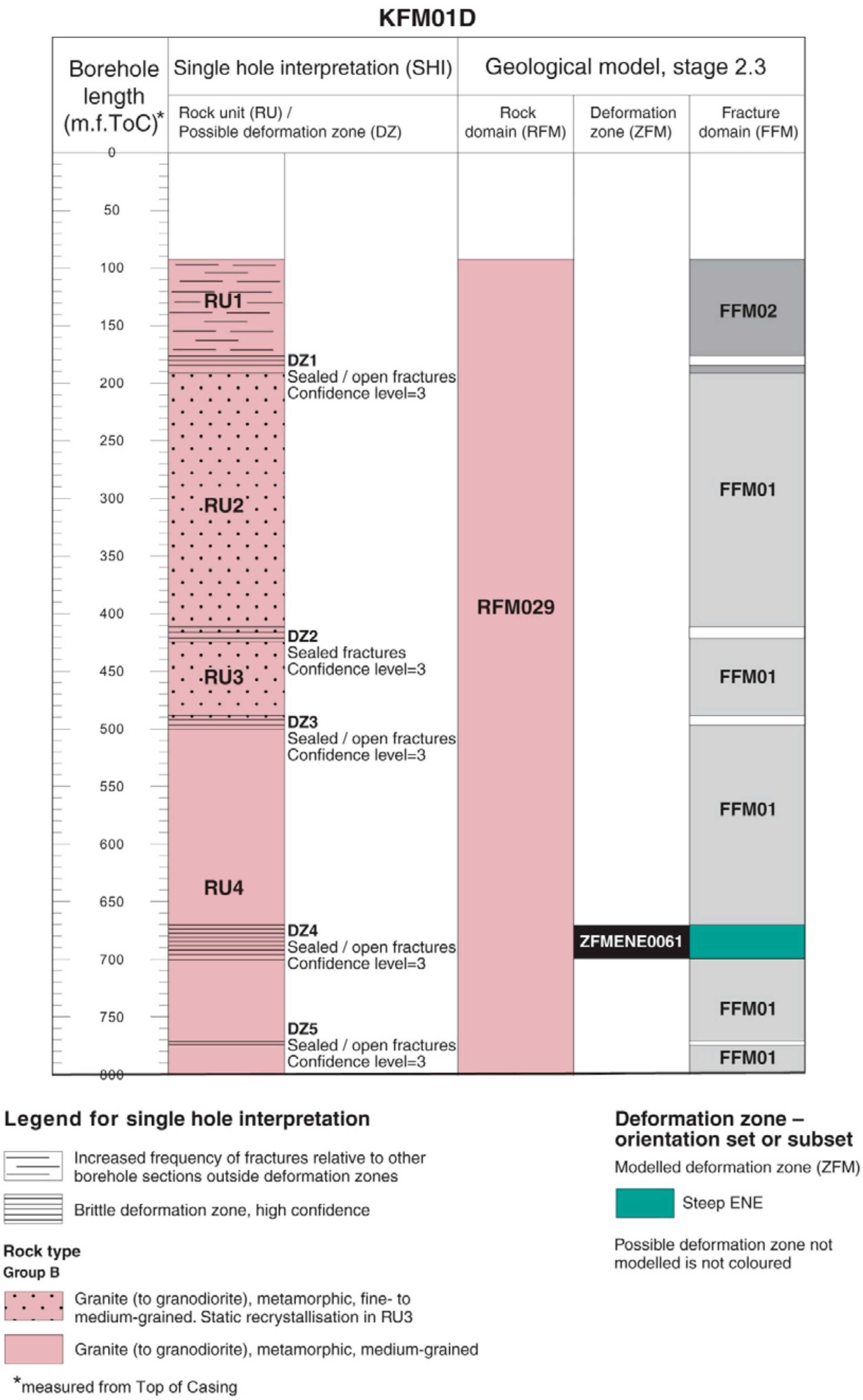
KFM01A
Borehole length (m.f.ToC)*
Single hole interpretation (SHI)
Rock unit (RU) / Possible deformation zone (DZ)
Geological model, stage 2.3
Rock domain (RFM)
Deformation zone (ZFM)
Fracture domain (FFM)
0
50
100
150
200
250
300
350
400
450
500
550
600
650
700
750
800
850
900
950
1000
RU1
DZ1
Open / sealed fractures
Confidence level=3
RU1
DZ4
Confidence level=3
DZ5
Confidence level=3
RU2a
DZ2
Sealed / open fractures
Confidence level=2
RU3
DZ3
Sealed / open fractures
Confidence level=3
RU2b
RU4
RU2c
RFM029
ZFMA2
ZFMENE1192A
ZFMENE1192A
ZFMENE2254
FFM02
FFM01
FFM01
FFM01
FFM01
Legend for single hole interpretation
Increased frequency of fractures relative to other borehole sections outside deformation zones
Brittle deformation zone, medium confidence
Brittle deformation zone, high confidence
*measured from Top of Casing
Rock type
Group C
Granodiorite to tonalite, metamorphic, fine- to medium-grained
Group B
Granite (to granodiorite), metamorphic, medium - grained
Deformation zone – orientation set or subset
Modelled deformation zone (ZFM)
Gentle
Steep ENE
Possible deformation zone not modelled is not coloured

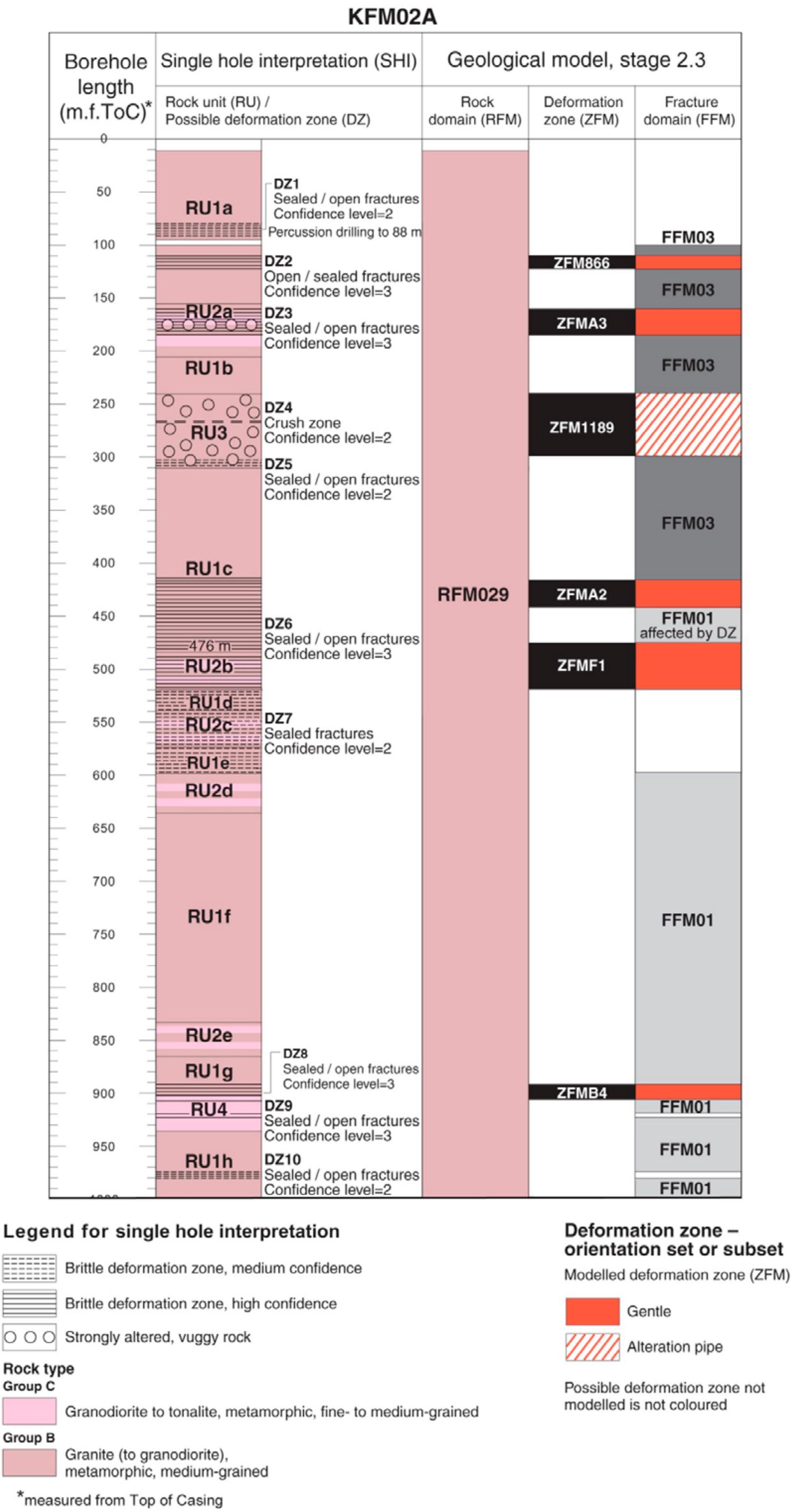
KFM01B

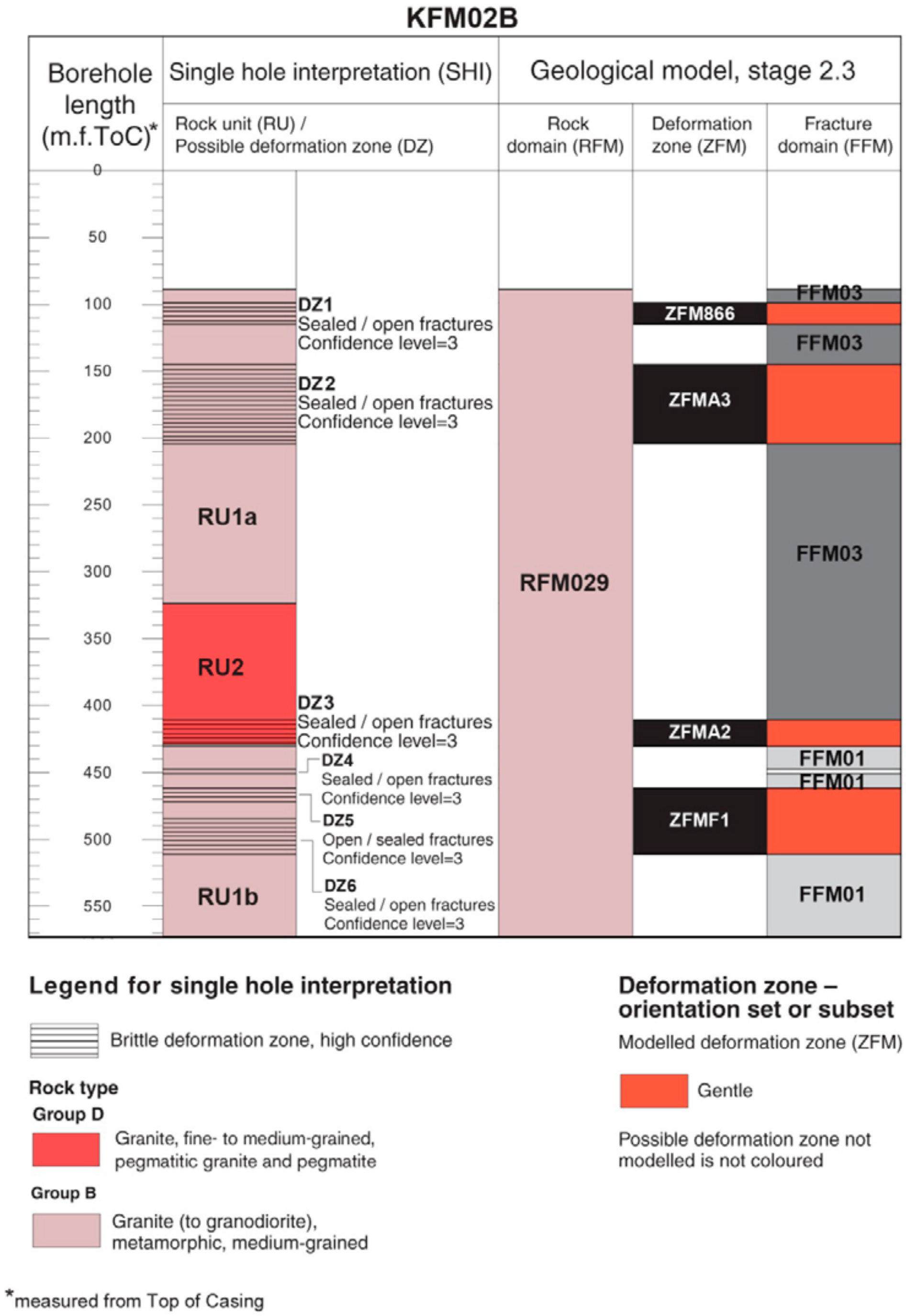


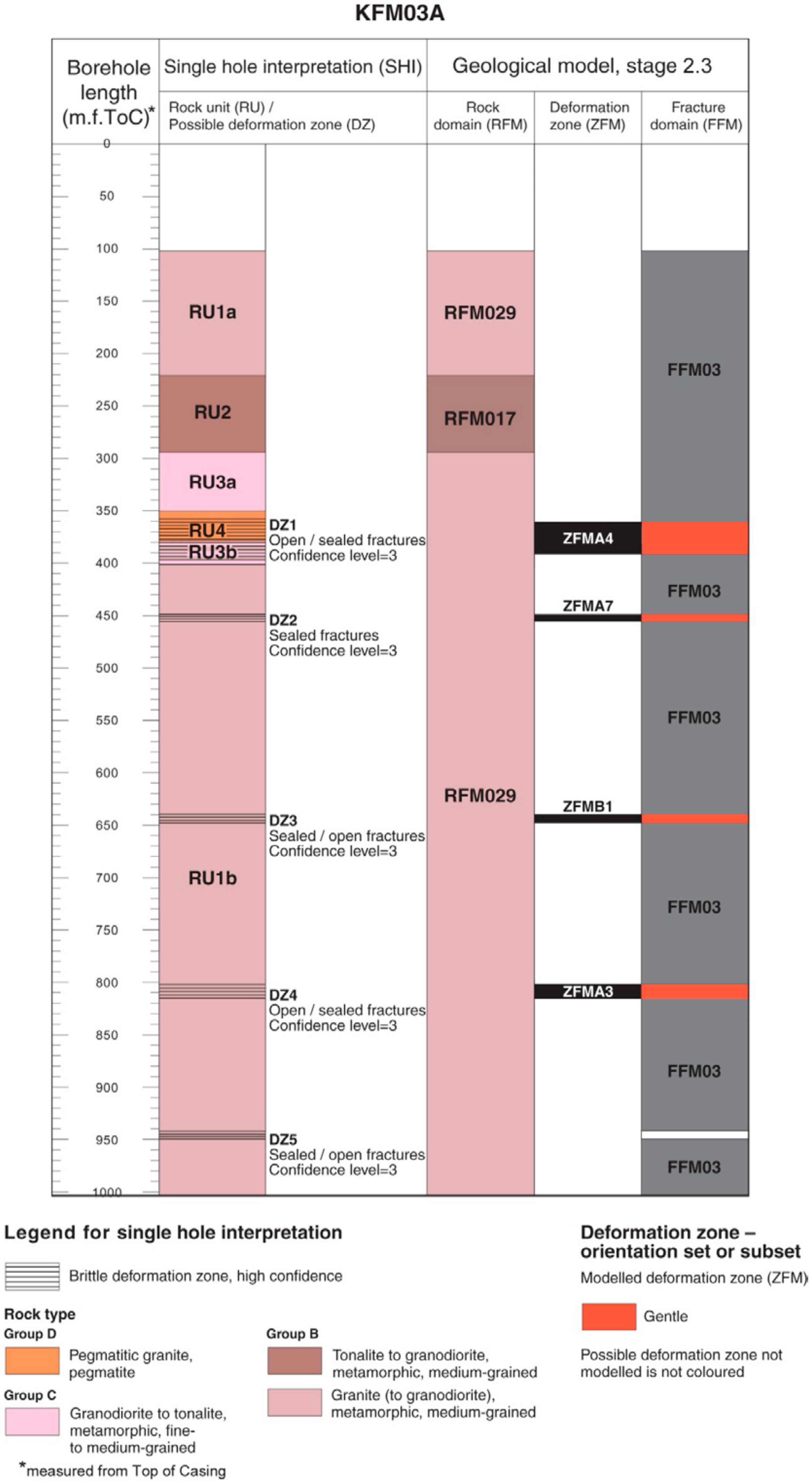
KFM01B
Borehole length (m.f.ToC)*
Single hole interpretation (SHI)
Geological model, stage 2.3
Rock unit (RU) / Possible deformation zone (DZ)
Rock domain (RFM)
Deformation zone (ZFM)
Fracture domain (FFM)
0
50
100
150
200
250
300
350
400
450
500
RU1
RU2
DZ1
Open / sealed fractures
Confidence level=3
DZ2
Sealed / open fractures
Confidence level=3
DZ4
Confidence level=3
DZ3
Sealed / open fractures
Confidence level=3
RFM029
ZFMA2
ZFMNNW0404
FFM02
FFM02
FFM01
FFM01
Legend for single hole interpretation
Increased frequency of fractures relative to borehole sections outside the deformation zone in the lower part of the borehole
Brittle deformation zone, high confidence
Rock type
Group B
Granite (to granodiorite), metamorphic, medium-grained
*measured from Top of Casing
Deformation zone – orientation set or subset
Modelled deformation zone (ZFM)
Gentle
Steep NNW
Possible deformation zone not modelled is not coloured


KFM01C
Borehole length (m.f.ToC)*
Single hole interpretation (SHI)
Rock unit (RU) / Possible deformation zone (DZ)
Geological model, stage 2.3
Rock domain (RFM)
Deformation zone (ZFM)
Fracture domain (FFM)
0
50
100
150
200
250
300
350
400
450
DZ1
Open / sealed fractures
Confidence level=3
DZ2
Open / sealed fractures
Confidence level=3
DZ4
Conficence level=3
RU1
DZ3
Sealed fractures
Confidence level=3
RFM029
ZFMENE1192A
ZFMA2
ZFMENE0060A
ZFMENE0060C
FFM02
FFM02 affected by DZ
FFM02
FFM01 affected by DZ
FFM01 affected by DZ
Legend for single hole interpretation
Increased frequency of fractures relative to lowermost part of borehole
Brittle deformation zone, high confidence
Rock type
Group B
Granite (to granodiorite), metamorphic, medium-grained
Deformation zone – orientation set or subset
Modelled deformation zone (ZFM)
Gentle
Steep ENE
Possible deformation zone not modelled is not coloured
*measured from Top of Casing

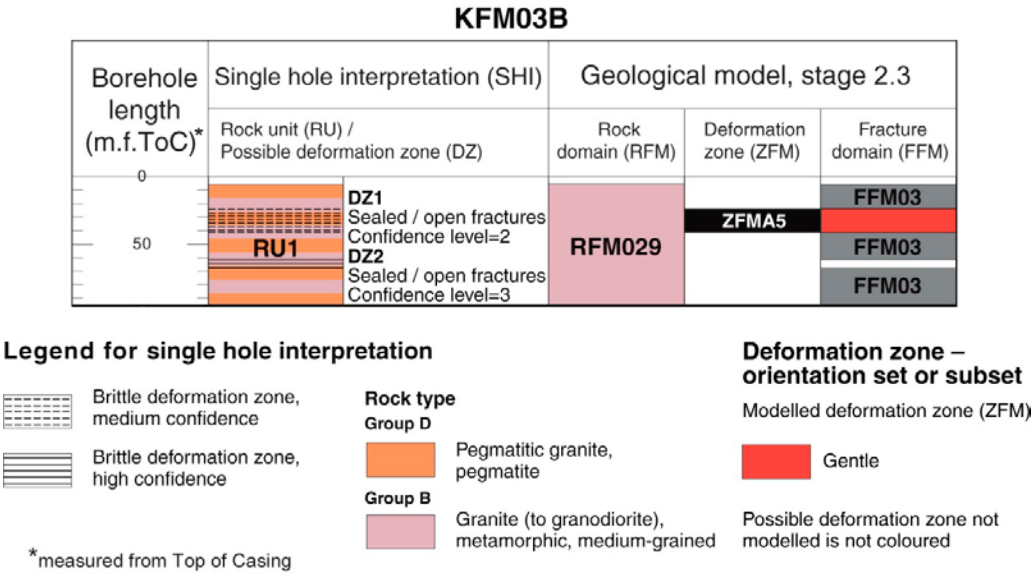

KFM01D
Borehole length (m.f.ToC)*
Single hole interpretation (SHI)
Geological model, stage 2.3
Rock unit (RU) / Possible deformation zone (DZ)
Rock domain (RFM)
Deformation zone (ZFM)
Fracture domain (FFM)
0
50
100
150
200
250
300
350
400
450
500
550
600
650
700
750
800
RU1
RU2
RU3
RU4
DZ1
Sealed / open fractures
Confidence level=3
DZ2
Sealed fractures
Confidence level=3
DZ3
Sealed / open fractures
Confidence level=3
DZ4
Sealed / open fractures
Confidence level=3
DZ5
Sealed / open fractures
Confidence level=3
RFM029
ZFMENE0061
FFM02
FFM01
FFM01
FFM01
FFM01
FFM01
Legend for single hole interpretation
Increased frequency of fractures relative to other borehole sections outside deformation zones
Brittle deformation zone, high confidence
Rock type
Group B
Granite (to granodiorite), metamorphic, fine- to medium-grained. Static recrystallisation in RU3
Granite (to granodiorite), metamorphic, medium-grained
*measured from Top of Casing
Deformation zone – orientation set or subset
Modelled deformation zone (ZFM)
Steep ENE
Possible deformation zone not modelled is not coloured


KFM02A
Borehole length (m.f.ToC)*
Single hole interpretation (SHI)
Geological model, stage 2.3
Rock unit (RU) / Possible deformation zone (DZ)
Rock domain (RFM)
Deformation zone (ZFM)
Fracture domain (FFM)
0
50
100
150
200
250
300
350
400
450
500
550
600
650
700
750
800
850
900
950
RU1a
DZ1
Sealed / open fractures
Confidence level=2
Percussion drilling to 88 m
DZ2
Open / sealed fractures
Confidence level=3
RU2a
DZ3
Sealed / open fractures
Confidence level=3
RU1b
RU3
DZ4
Crush zone
Confidence level=2
DZ5
Sealed / open fractures
Confidence level=2
RU1c
DZ6
Sealed / open fractures
Confidence level=3
476 m
RU2b
RU1d
RU2c
RU1e
DZ7
Sealed fractures
Confidence level=2
RU2d
RU1f
RU2e
RU1g
DZ8
Sealed / open fractures
Confidence level=3
RU4
DZ9
Sealed / open fractures
Confidence level=3
RU1h
DZ10
Sealed / open fractures
Confidence level=2
RFM029
ZFM866
ZFMA3
ZFM1189
ZFMA2
ZFMF1
ZFMB4
FFM03
FFM03
FFM03
FFM03
FFM01
affected by DZ
FFM01
FFM01
FFM01
FFM01
Legend for single hole interpretation
Brittle deformation zone, medium confidence
Brittle deformation zone, high confidence
Strongly altered, vuggy rock
Rock type
Group C
Granodiorite to tonalite, metamorphic, fine- to medium-grained
Group B
Granite (to granodiorite), metamorphic, medium-grained
*measured from Top of Casing
Deformation zone – orientation set or subset
Modelled deformation zone (ZFM)
Gentle
Alteration pipe
Possible deformation zone not modelled is not coloured

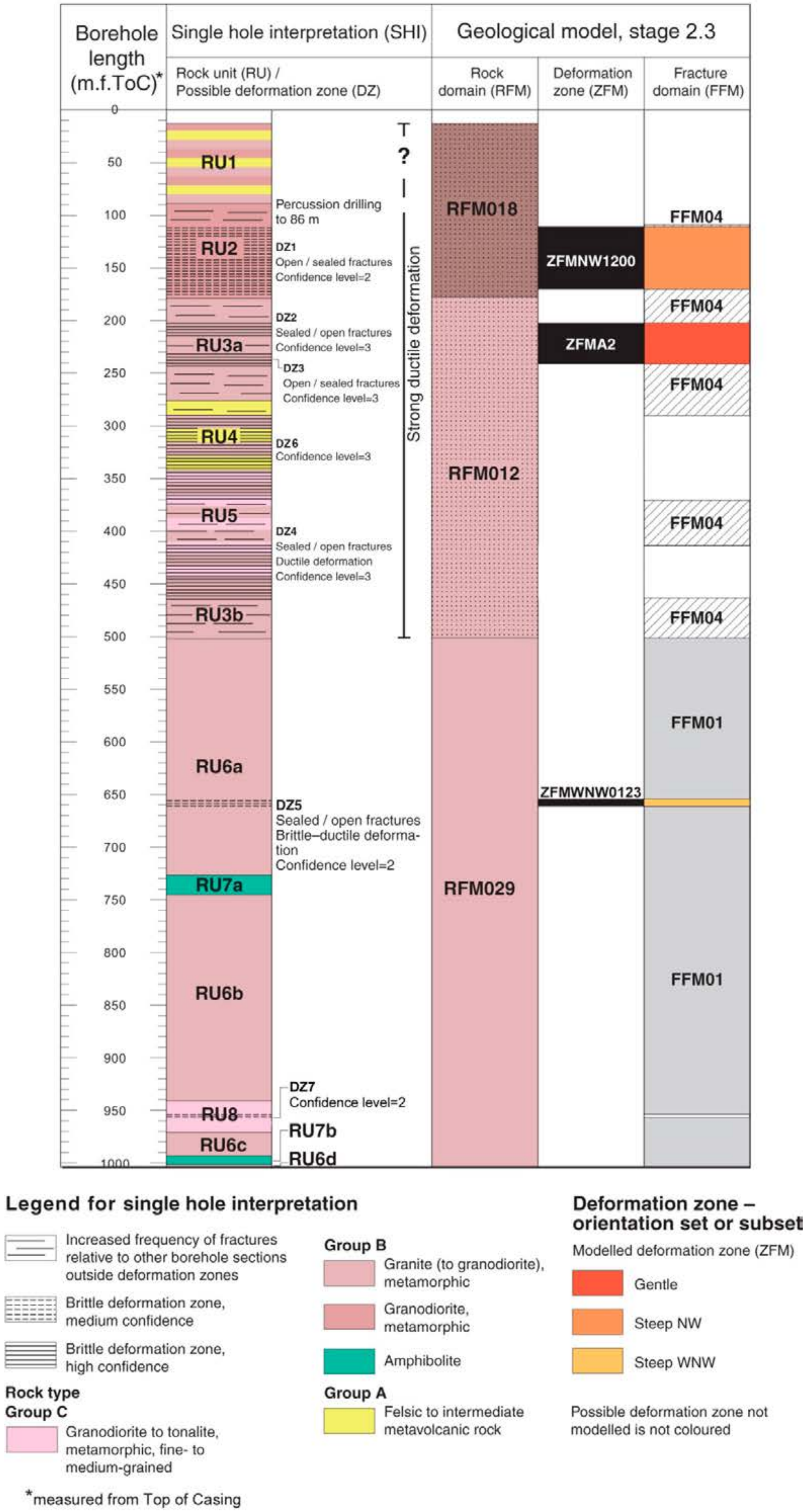

KFM02B
Borehole length (m.f.ToC)*
Single hole interpretation (SHI)
Geological model, stage 2.3
Rock unit (RU) / Possible deformation zone (DZ)
Rock domain (RFM)
Deformation zone (ZFM)
Fracture domain (FFM)
0
50
100
150
200
250
300
350
400
450
500
550
DZ1
Sealed / open fractures
Confidence level=3
DZ2
Sealed / open fractures
Confidence level=3
RU1a
RU2
DZ3
Sealed / open fractures
Confidence level=3
DZ4
Sealed / open fractures
Confidence level=3
DZ5
Open / sealed fractures
Confidence level=3
DZ6
Sealed / open fractures
Confidence level=3
RU1b
RFM029
ZFM866
ZFMA3
ZFMA2
ZFMF1
FFM03
FFM03
FFM03
FFM01
FFM01
FFM01
Legend for single hole interpretation
Brittle deformation zone, high confidence
Rock type
Group D
Granite, fine- to medium-grained, pegmatitic granite and pegmatite
Group B
Granite (to granodiorite), metamorphic, medium-grained
Deformation zone – orientation set or subset
Modelled deformation zone (ZFM)
Gentle
Possible deformation zone not modelled is not coloured
*measured from Top of Casing



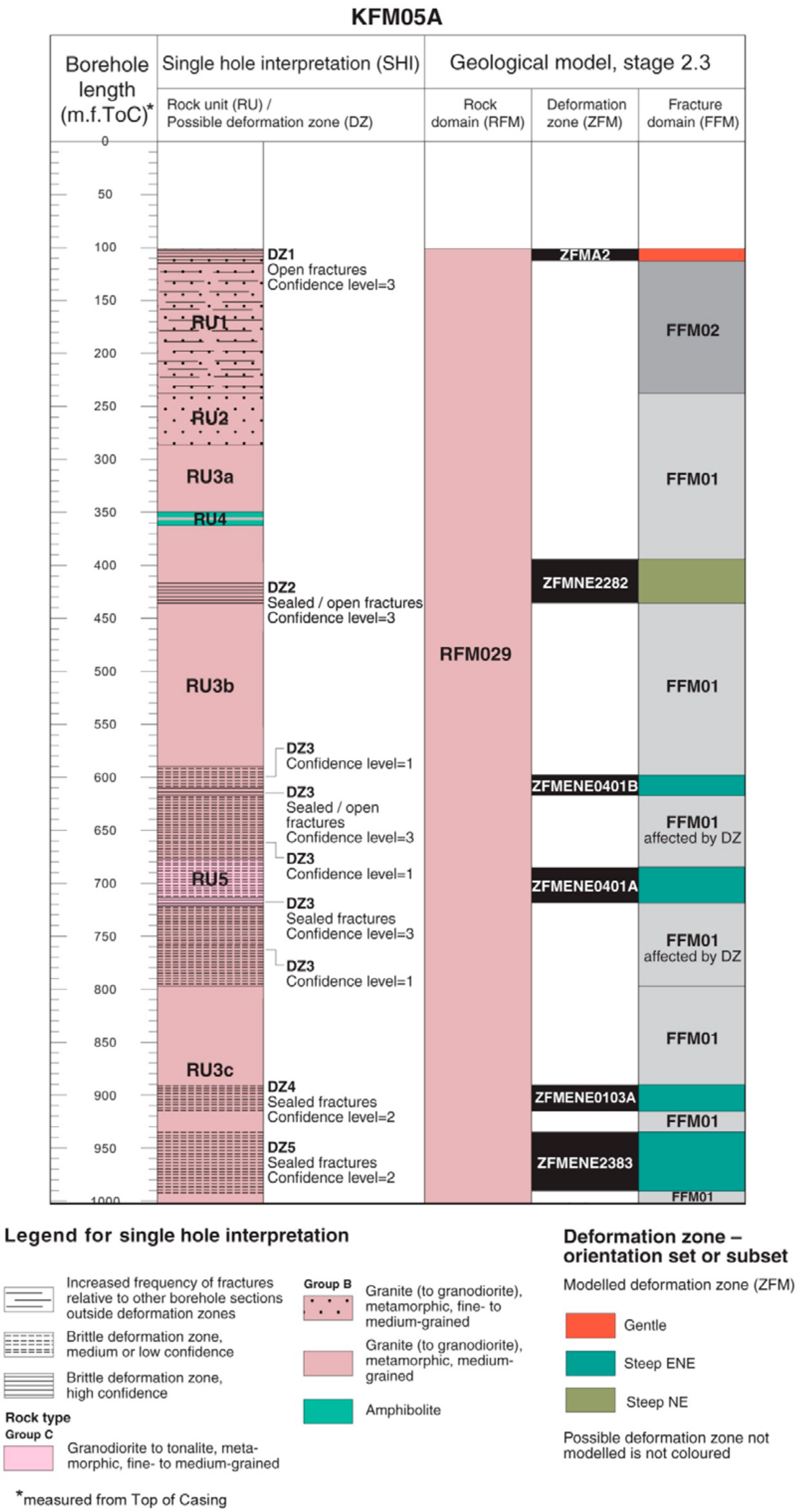
KFM03A
Borehole length (m.f.ToC)*
Single hole interpretation (SHI)
Geological model, stage 2.3
Rock unit (RU) / Possible deformation zone (DZ)
Rock domain (RFM)
Deformation zone (ZFM)
Fracture domain (FFM)
0
50
100
150
200
250
300
350
400
450
500
550
600
650
700
750
800
850
900
950
1000
RU1a
RU2
RU3a
RU4
RU3b
RU1b
DZ1
Open / sealed fractures
Confidence level=3
DZ2
Sealed fractures
Confidence level=3
DZ3
Sealed / open fractures
Confidence level=3
DZ4
Open / sealed fractures
Confidence level=3
DZ5
Sealed / open fractures
Confidence level=3
RFM029
RFM017
RFM029
ZFMA4
ZFMA7
ZFMB1
ZFMA3
FFM03
FFM03
FFM03
FFM03
FFM03
FFM03
Legend for single hole interpretation
Brittle deformation zone, high confidence
Rock type
Group D
Pegmatitic granite, pegmatite
Group C
Granodiorite to tonalite, metamorphic, fine- to medium-grained
Group B
Tonalite to granodiorite, metamorphic, medium-grained
Granite (to granodiorite), metamorphic, medium-grained
*measured from Top of Casing
Deformation zone – orientation set or subset
Modelled deformation zone (ZFM)
Gentle
Possible deformation zone not modelled is not coloured


KFM03B
Borehole length (m.f.ToC)*
Single hole interpretation (SHI)
Geological model, stage 2.3
Rock unit (RU) / Possible deformation zone (DZ)
Rock domain (RFM)
Deformation zone (ZFM)
Fracture domain (FFM)
0
50
RU1
DZ1
Sealed / open fractures
Confidence level=2
DZ2
Sealed / open fractures
Confidence level=3
RFM029
ZFMA5
FFM03
FFM03
FFM03
Legend for single hole interpretation
Brittle deformation zone, medium confidence
Brittle deformation zone, high confidence
*measured from Top of Casing
Rock type
Group D
Pegmatitic granite, pegmatite
Group B
Granite (to granodiorite), metamorphic, medium-grained
Deformation zone – orientation set or subset
Modelled deformation zone (ZFM)
Gentle
Possible deformation zone not modelled is not coloured

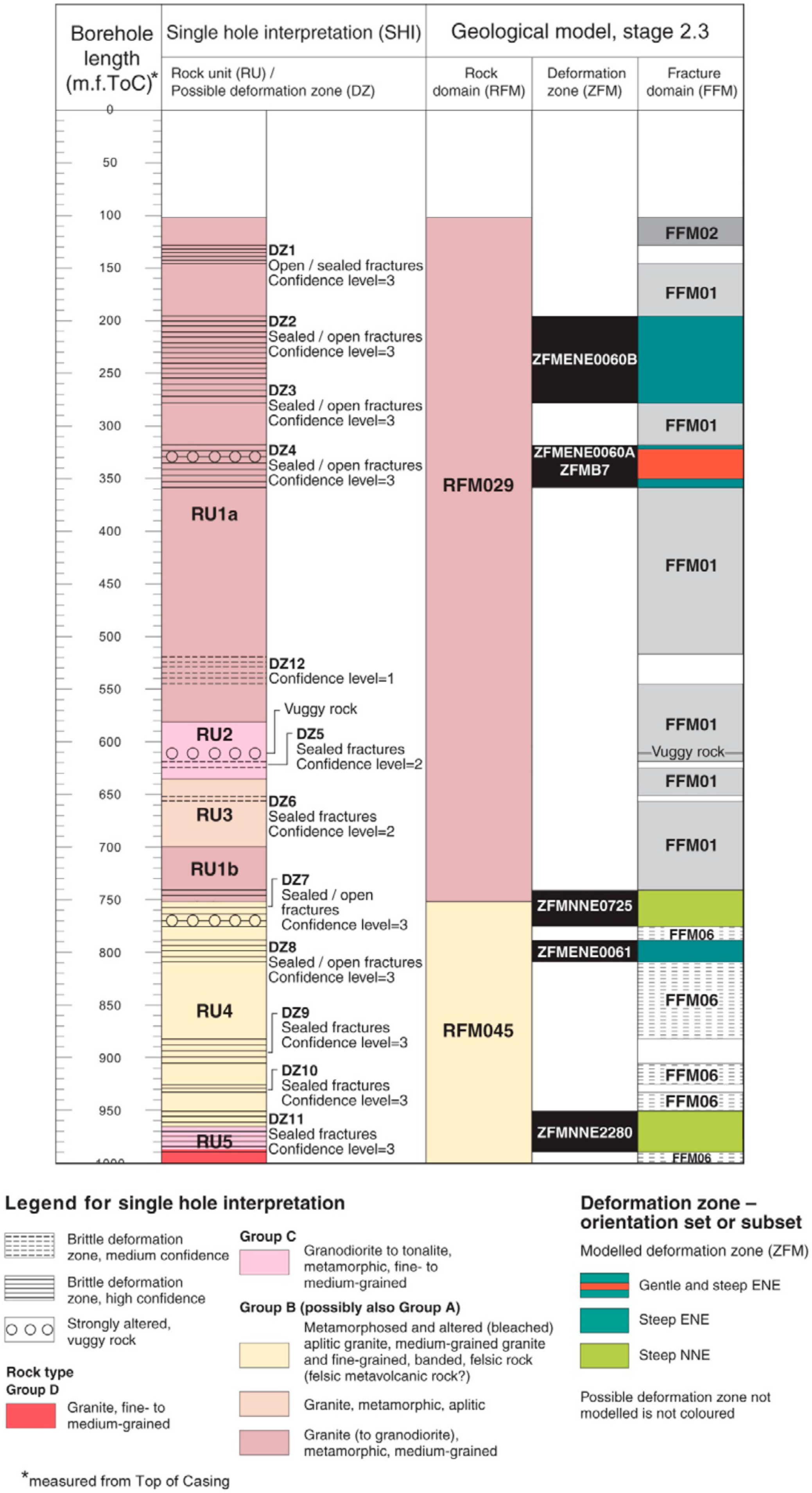
KFM04A

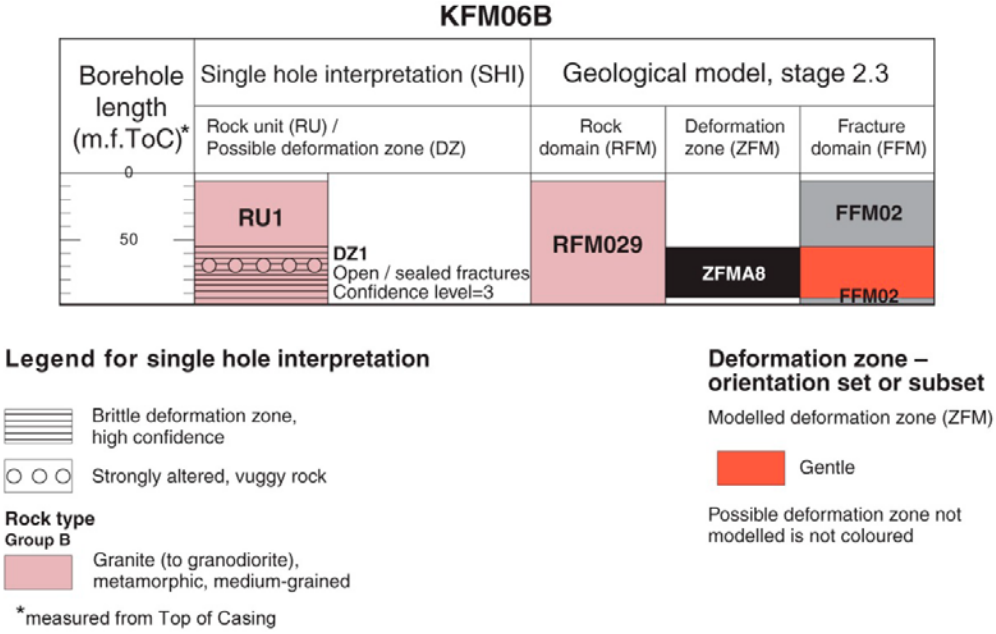


Borehole length (m.f.ToC)*
Single hole interpretation (SHI)
Geological model, stage 2.3
Rock unit (RU) / Possible deformation zone (DZ)
Rock domain (RFM)
Deformation zone (ZFM)
Fracture domain (FFM)
0
50
100
150
200
250
300
350
400
450
500
550
600
650
700
750
800
850
900
950
1000
RU1
RU2
RU3a
RU4
RU5
RU3b
RU6a
RU7a
RU6b
RU8
RU6c
RU7b
RU6d
Percussion drilling to 86 m
DZ1
Open / sealed fractures
Confidence level=2
DZ2
Sealed / open fractures
Confidence level=3
DZ3
Open / sealed fractures
Confidence level=3
DZ6
Confidence level=3
DZ4
Sealed / open fractures
Ductile deformation
Confidence level=3
DZ5
Sealed / open fractures
Brittle–ductile deformation
Confidence level=2
DZ7
Confidence level=2
?
Strong ductile deformation
RFM018
RFM012
RFM029
ZFMNW1200
ZFMA2
ZFMWNW0123
FFM04
FFM01
Legend for single hole interpretation
Increased frequency of fractures relative to other borehole sections outside deformation zones
Brittle deformation zone, medium confidence
Brittle deformation zone, high confidence
Rock type
Group C
Granodiorite to tonalite, metamorphic, fine- to medium-grained
Group B
Granite (to granodiorite), metamorphic
Granodiorite, metamorphic
Amphibolite
Group A
Felsic to intermediate metavolcanic rock
Deformation zone – orientation set or subset
Modelled deformation zone (ZFM)
Gentle
Steep NW
Steep WNW
Possible deformation zone not modelled is not coloured
*measured from Top of Casing

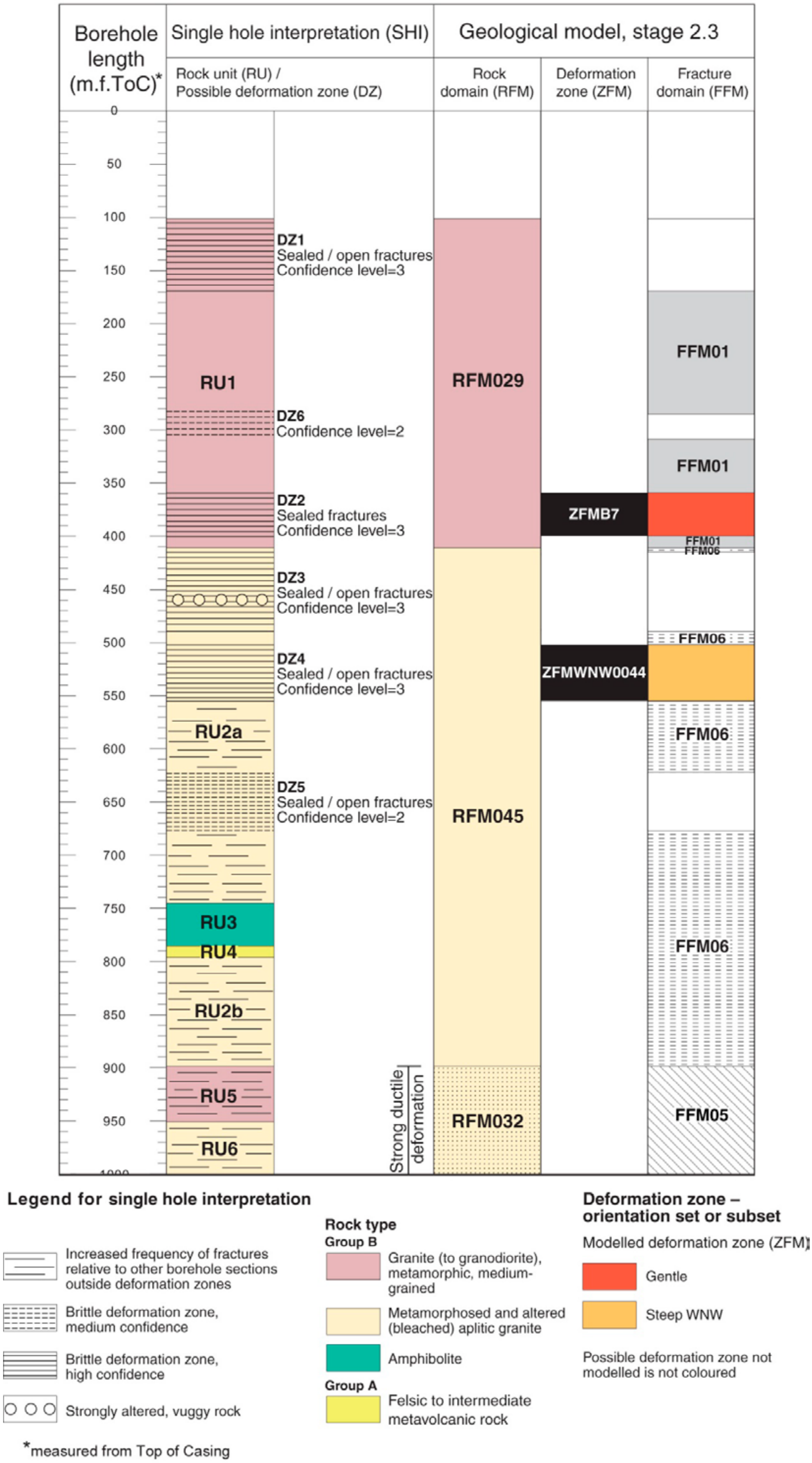

KFM05A
Borehole length (m.f.ToC)*
Single hole interpretation (SHI)
Rock unit (RU) / Possible deformation zone (DZ)
Geological model, stage 2.3
Rock domain (RFM)
Deformation zone (ZFM)
Fracture domain (FFM)
0
50
100
150
200
250
300
350
400
450
500
550
600
650
700
750
800
850
900
950
1000
RU1
RU2
RU3a
RU4
RU3b
RU5
RU3c
DZ1
Open fractures
Confidence level=3
DZ2
Sealed / open fractures
Confidence level=3
DZ3
Confidence level=1
DZ3
Sealed / open fractures
Confidence level=3
DZ3
Confidence level=1
DZ3
Sealed fractures
Confidence level=3
DZ3
Confidence level=1
DZ4
Sealed fractures
Confidence level=2
DZ5
Sealed fractures
Confidence level=2
RFM029
ZFMA2
ZFMNE2282
ZFMENE0401B
ZFMENE0401A
ZFMENE0103A
ZFMENE2383
FFM02
FFM01
FFM01
FFM01 affected by DZ
FFM01 affected by DZ
FFM01
FFM01
FFM01
Legend for single hole interpretation
Increased frequency of fractures relative to other borehole sections outside deformation zones
Brittle deformation zone, medium or low confidence
Brittle deformation zone, high confidence
Rock type
Group C
Granodiorite to tonalite, metamorphic, fine- to medium-grained
Group B
Granite (to granodiorite), metamorphic, fine- to medium-grained
Granite (to granodiorite), metamorphic, medium-grained
Amphibolite
Deformation zone – orientation set or subset
Modelled deformation zone (ZFM)
Gentle
Steep ENE
Steep NE
Possible deformation zone not modelled is not coloured
*measured from Top of Casing

KFM06A

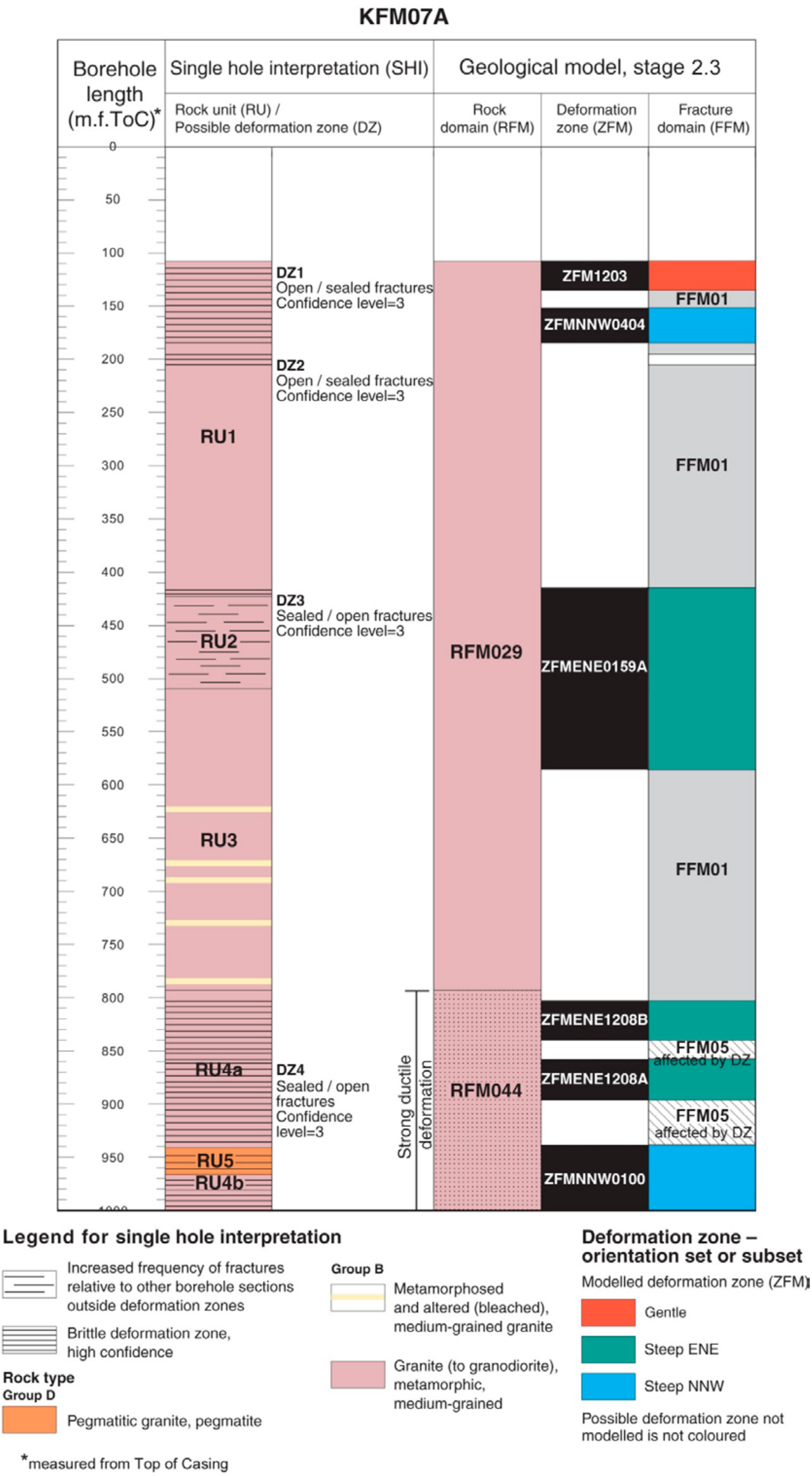

Borehole length (m.f.ToC)*
Single hole interpretation (SHI)
Rock unit (RU) / Possible deformation zone (DZ)
Geological model, stage 2.3
Rock domain (RFM)
Deformation zone (ZFM)
Fracture domain (FFM)
0
50
100
150
200
250
300
350
400
450
500
550
600
650
700
750
800
850
900
950
1000
DZ1
Open / sealed fractures
Confidence level=3
DZ2
Sealed / open fractures
Confidence level=3
DZ3
Sealed / open fractures
Confidence level=3
DZ4
Sealed / open fractures
Confidence level=3
RU1a
DZ12
Confidence level=1
Vuggy rock
RU2
DZ5
Sealed fractures
Confidence level=2
DZ6
Sealed fractures
Confidence level=2
RU3
RU1b
DZ7
Sealed / open fractures
Confidence level=3
DZ8
Sealed / open fractures
Confidence level=3
RU4
DZ9
Sealed fractures
Confidence level=3
DZ10
Sealed fractures
Confidence level=3
DZ11
Sealed fractures
Confidence level=3
RU5
RFM029
RFM045
ZFMENE0060B
ZFMENE0060A
ZFMB7
ZFMNNE0725
ZFMENE0061
ZFMNNE2280
FFM02
FFM01
FFM01
FFM01
FFM01
Vuggy rock
FFM01
FFM01
FFM06
FFM06
FFM06
FFM06
FFM06
Legend for single hole interpretation
Brittle deformation zone, medium confidence
Brittle deformation zone, high confidence
Strongly altered, vuggy rock
Rock type
Group D
Granite, fine- to medium-grained
Group C
Granodiorite to tonalite, metamorphic, fine- to medium-grained
Group B (possibly also Group A)
Metamorphosed and altered (bleached) aplitic granite, medium-grained granite and fine-grained, banded, felsic rock (felsic metavolcanic rock?)
Granite, metamorphic, aplitic
Granite (to granodiorite), metamorphic, medium-grained
Deformation zone – orientation set or subset
Modelled deformation zone (ZFM)
Gentle and steep ENE
Steep ENE
Steep NNE
Possible deformation zone not modelled is not coloured
*measured from Top of Casing

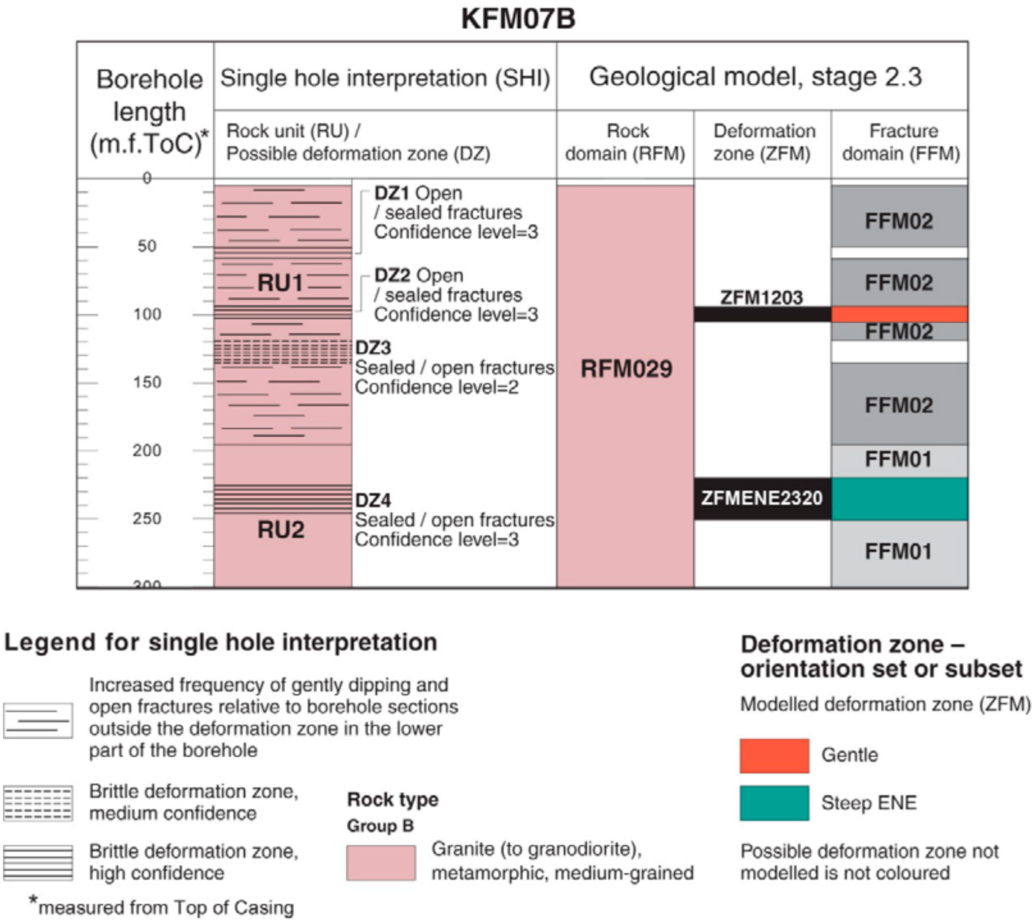

KFM06B
Borehole length (m.f.ToC)*
Single hole interpretation (SHI)
Geological model, stage 2.3
Rock unit (RU) / Possible deformation zone (DZ)
Rock domain (RFM)
Deformation zone (ZFM)
Fracture domain (FFM)
0
50
RU1
DZ1
Open / sealed fractures
Confidence level=3
RFM029
ZFMA8
FFM02
FFM02
Legend for single hole interpretation
Brittle deformation zone, high confidence
Strongly altered, vuggy rock
Rock type
Group B
Granite (to granodiorite), metamorphic, medium-grained
*measured from Top of Casing
Deformation zone – orientation set or subset
Modelled deformation zone (ZFM)
Gentle
Possible deformation zone not modelled is not coloured

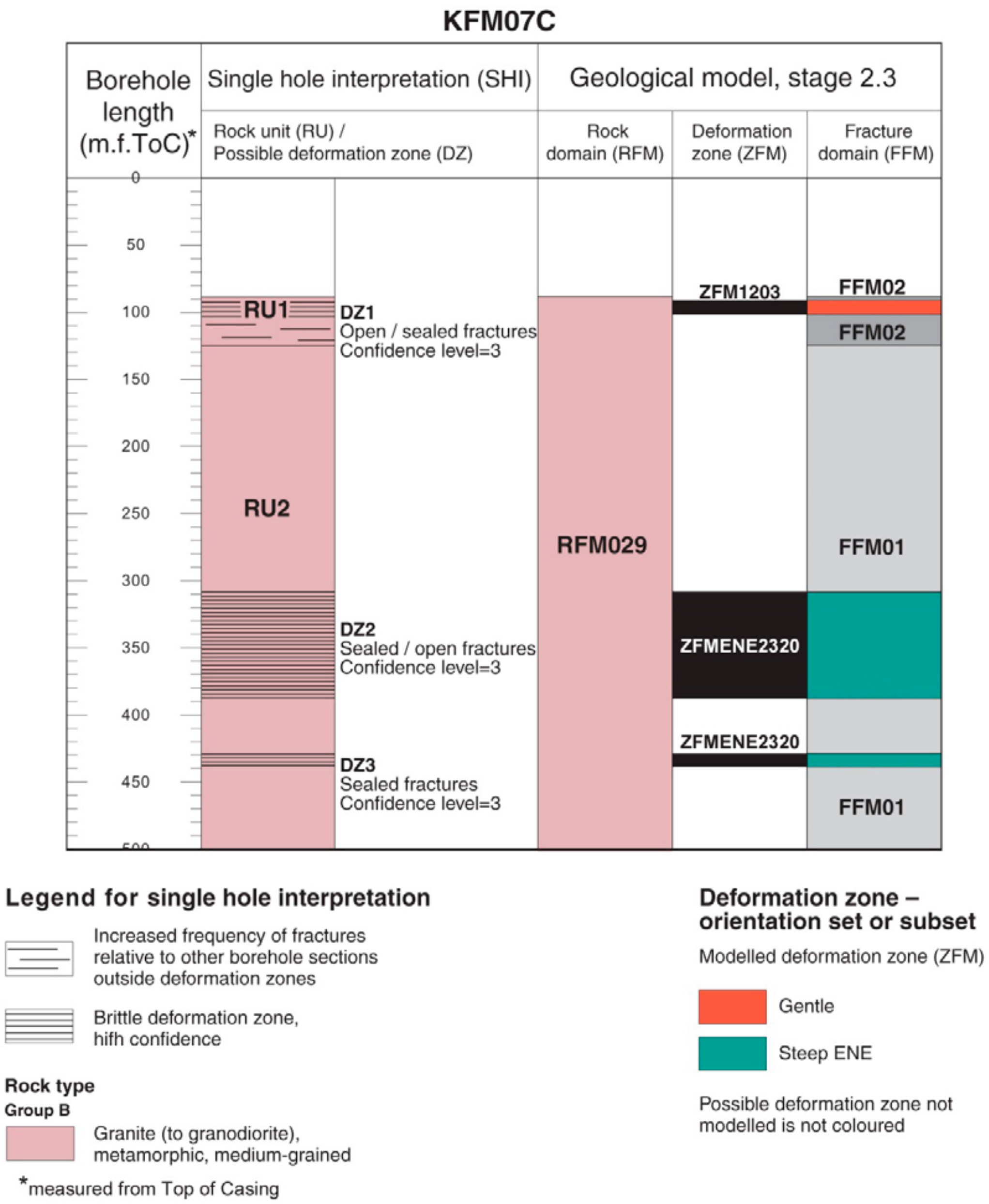
KFM06C



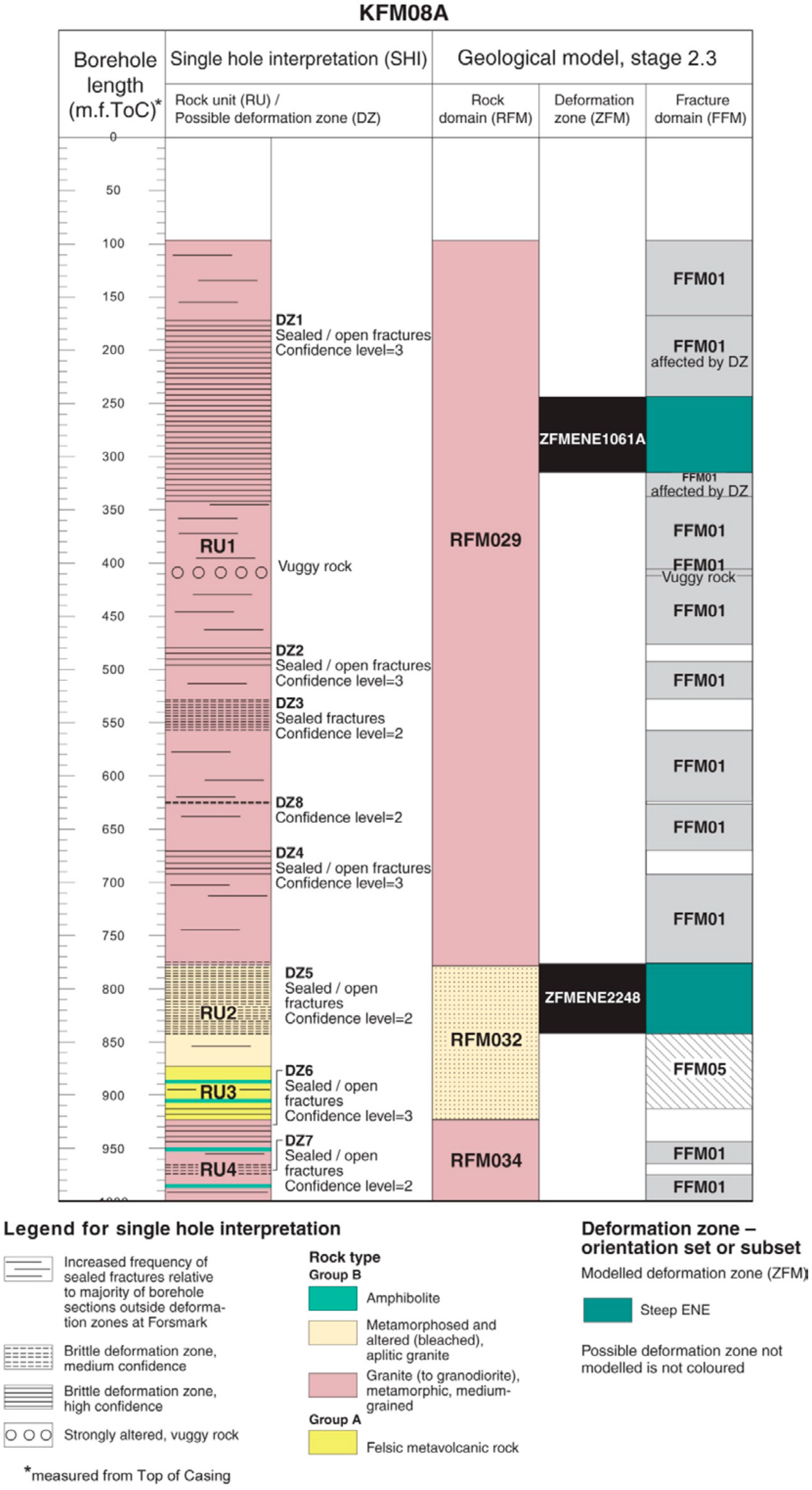
Borehole length (m.f.ToC)*
Single hole interpretation (SHI)
Rock unit (RU) / Possible deformation zone (DZ)
Geological model, stage 2.3
Rock domain (RFM)
Deformation zone (ZFM)
Fracture domain (FFM)
0
50
100
150
200
250
300
350
400
450
500
550
600
650
700
750
800
850
900
950
1000
DZ1
Sealed / open fractures
Confidence level=3
RU1
DZ6
Confidence level=2
DZ2
Sealed fractures
Confidence level=3
DZ3
Sealed / open fractures
Confidence level=3
DZ4
Sealed / open fractures
Confidence level=3
RU2a
DZ5
Sealed / open fractures
Confidence level=2
RU3
RU4
RU2b
RU5
RU6
Strong ductile deformation
RFM029
RFM045
RFM032
ZFMB7
ZFMWNW0044
FFM01
FFM01
FFM01
FFM06
FFM06
FFM06
FFM06
FFM05
Legend for single hole interpretation
Increased frequency of fractures relative to other borehole sections outside deformation zones
Brittle deformation zone, medium confidence
Brittle deformation zone, high confidence
Strongly altered, vuggy rock
*measured from Top of Casing
Rock type
Group B
Granite (to granodiorite), metamorphic, medium-grained
Metamorphosed and altered (bleached) aplitic granite
Amphibolite
Group A
Felsic to intermediate metavolcanic rock
Deformation zone – orientation set or subset
Modelled deformation zone (ZFM)
Gentle
Steep WNW
Possible deformation zone not modelled is not coloured


KFM07A
Borehole length (m.f.ToC)*
Single hole interpretation (SHI)
Geological model, stage 2.3
Rock unit (RU) / Possible deformation zone (DZ)
Rock domain (RFM)
Deformation zone (ZFM)
Fracture domain (FFM)
0
50
100
150
200
250
300
350
400
450
500
550
600
650
700
750
800
850
900
950
1000
DZ1
Open / sealed fractures
Confidence level=3
DZ2
Open / sealed fractures
Confidence level=3
RU1
DZ3
Sealed / open fractures
Confidence level=3
RU2
RU3
RU4a
DZ4
Sealed / open fractures
Confidence level=3
RU5
RU4b
Strong ductile deformation
RFM029
RFM044
ZFM1203
ZFMNNW0404
ZFMENE0159A
ZFMENE1208B
ZFMENE1208A
ZFMNNW0100
FFM01
FFM01
FFM01
FFM05 affected by DZ
FFM05 affected by DZ
Legend for single hole interpretation
Increased frequency of fractures relative to other borehole sections outside deformation zones
Brittle deformation zone, high confidence
Rock type
Group D
Pegmatitic granite, pegmatite
Group B
Metamorphosed and altered (bleached), medium-grained granite
Granite (to granodiorite), metamorphic, medium-grained
Deformation zone – orientation set or subset
Modelled deformation zone (ZFM)
Gentle
Steep ENE
Steep NNW
Possible deformation zone not modelled is not coloured
*measured from Top of Casing

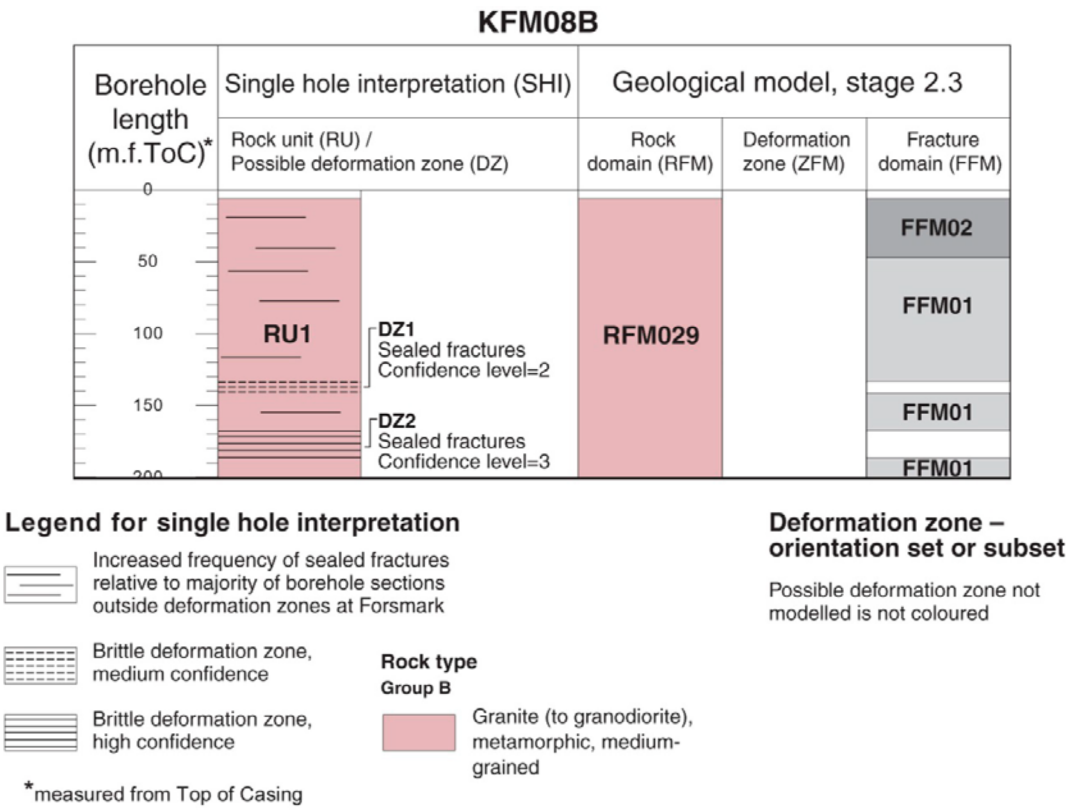

KFM07B
Borehole length (m.f.ToC)*
Single hole interpretation (SHI)
Geological model, stage 2.3
Rock unit (RU) / Possible deformation zone (DZ)
Rock domain (RFM)
Deformation zone (ZFM)
Fracture domain (FFM)
0
50
100
150
200
250
300
RU1
RU2
DZ1 Open / sealed fractures Confidence level=3
DZ2 Open / sealed fractures Confidence level=3
DZ3 Sealed / open fractures Confidence level=2
DZ4 Sealed / open fractures Confidence level=3
RFM029
ZFM1203
ZFMENE2320
FFM02
FFM02
FFM02
FFM02
FFM01
FFM01
Legend for single hole interpretation
Increased frequency of gently dipping and open fractures relative to borehole sections outside the deformation zone in the lower part of the borehole
Brittle deformation zone, medium confidence
Brittle deformation zone, high confidence
*measured from Top of Casing
Rock type
Group B
Granite (to granodiorite), metamorphic, medium-grained
Deformation zone – orientation set or subset
Modelled deformation zone (ZFM)
Gentle
Steep ENE
Possible deformation zone not modelled is not coloured

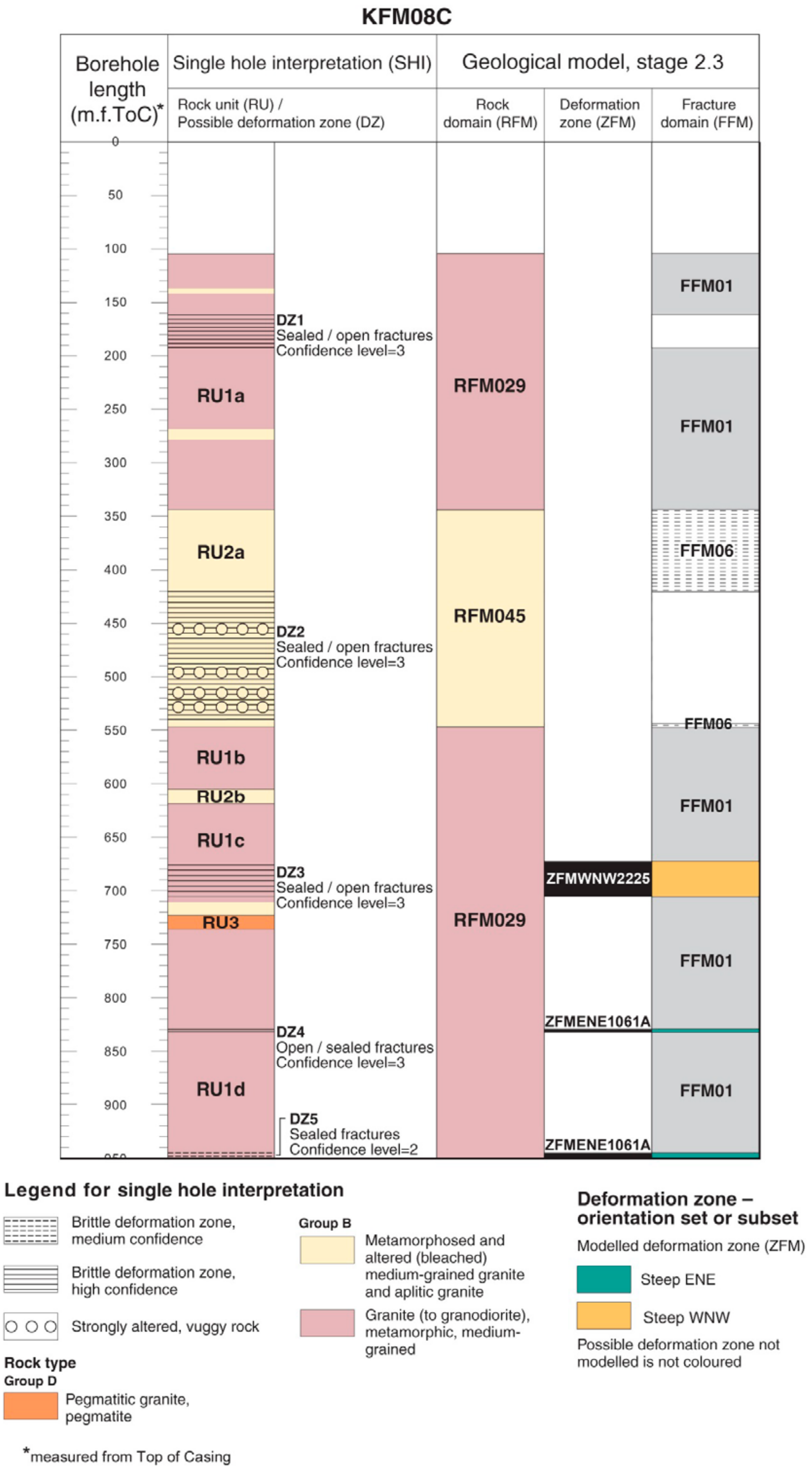


KFM07C
Borehole length (m.f.ToC)*
Single hole interpretation (SHI)
Geological model, stage 2.3
Rock unit (RU) / Possible deformation zone (DZ)
Rock domain (RFM)
Deformation zone (ZFM)
Fracture domain (FFM)
0
50
100
150
200
250
300
350
400
450
500
RU1
DZ1
Open / sealed fractures
Confidence level=3
RU2
DZ2
Sealed / open fractures
Confidence level=3
DZ3
Sealed fractures
Confidence level=3
RFM029
ZFM1203
ZFMENE2320
ZFMENE2320
FFM02
FFM02
FFM01
FFM01
Legend for single hole interpretation
Increased frequency of fractures relative to other borehole sections outside deformation zones
Brittle deformation zone, hifh confidence
Rock type
Group B
Granite (to granodiorite), metamorphic, medium-grained
*measured from Top of Casing
Deformation zone – orientation set or subset
Modelled deformation zone (ZFM)
Gentle
Steep ENE
Possible deformation zone not modelled is not coloured

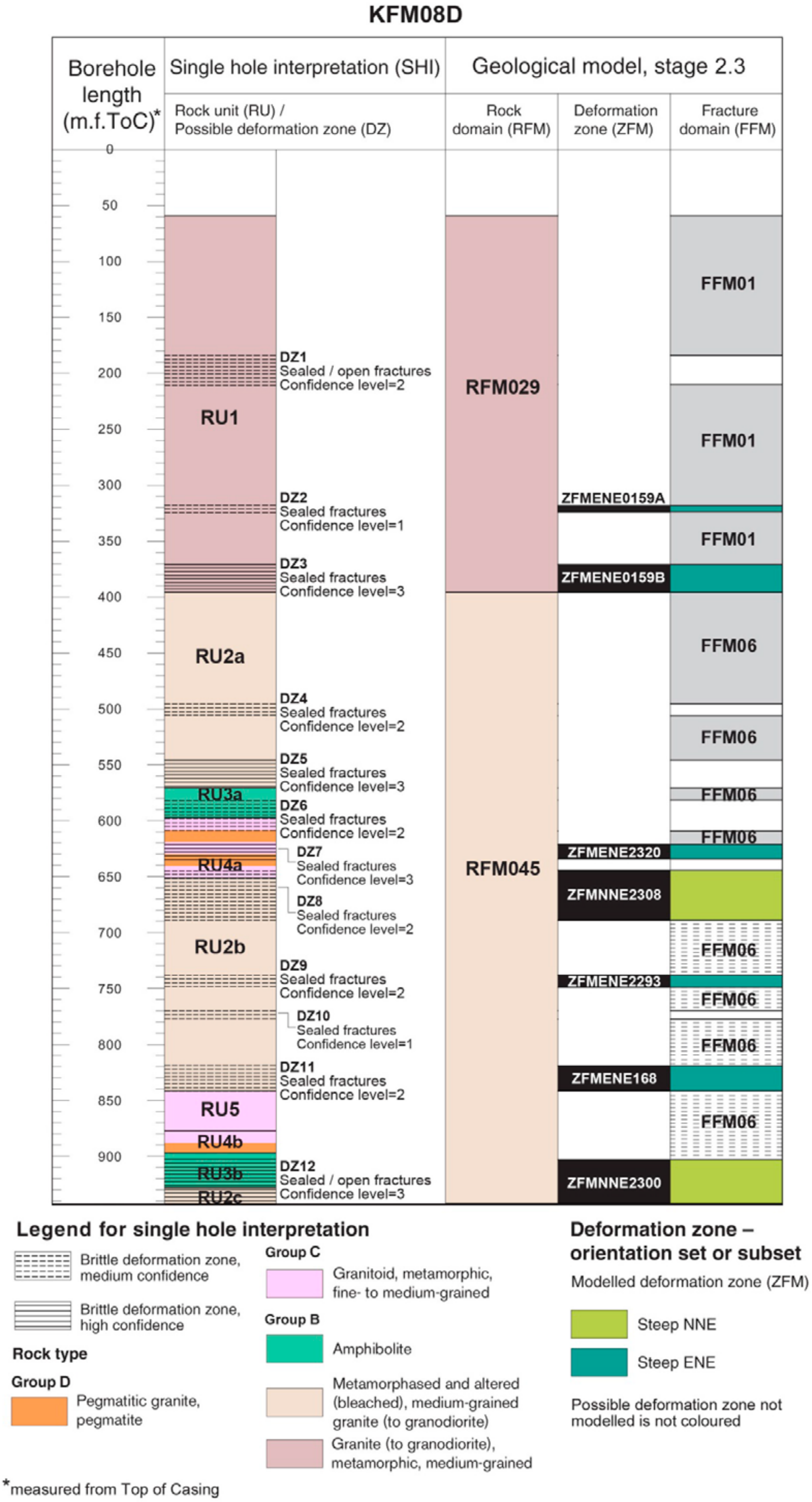


KFM08A
Borehole length (m.f.ToC)*
Single hole interpretation (SHI)
Geological model, stage 2.3
Rock unit (RU) / Possible deformation zone (DZ)
Rock domain (RFM)
Deformation zone (ZFM)
Fracture domain (FFM)
0
50
100
150
200
250
300
350
400
450
500
550
600
650
700
750
800
850
900
950
DZ1
Sealed / open fractures
Confidence level=3
RU1
Vuggy rock
DZ2
Sealed / open fractures
Confidence level=3
DZ3
Sealed fractures
Confidence level=2
DZ8
Confidence level=2
DZ4
Sealed / open fractures
Confidence level=3
DZ5
Sealed / open fractures
Confidence level=2
RU2
DZ6
Sealed / open fractures
Confidence level=3
RU3
DZ7
Sealed / open fractures
Confidence level=2
RU4
RFM029
RFM032
RFM034
ZFMENE1061A
ZFMENE2248
FFM01
FFM01 affected by DZ
FFM01 affected by DZ
FFM01
FFM01 Vuggy rock
FFM01
FFM01
FFM01
FFM01
FFM01
FFM05
FFM01
FFM01
Legend for single hole interpretation
Increased frequency of sealed fractures relative to majority of borehole sections outside deformation zones at Forsmark
Brittle deformation zone, medium confidence
Brittle deformation zone, high confidence
Strongly altered, vuggy rock
*measured from Top of Casing
Rock type
Group B
Amphibolite
Metamorphosed and altered (bleached), aplitic granite
Granite (to granodiorite), metamorphic, medium-grained
Group A
Felsic metavolcanic rock
Deformation zone – orientation set or subset
Modelled deformation zone (ZFM)
Steep ENE
Possible deformation zone not modelled is not coloured

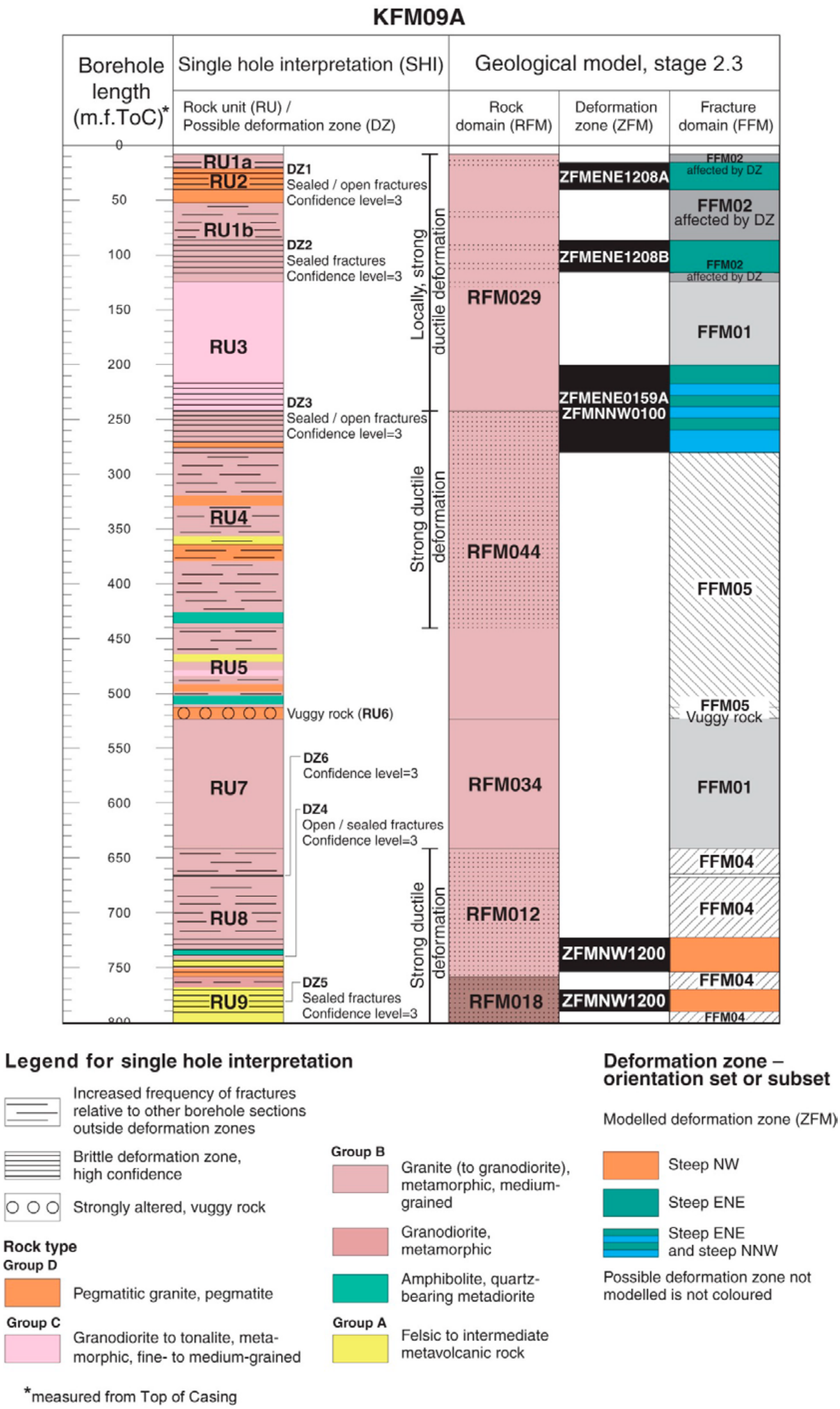

KFM08B
Borehole length (m.f.ToC)*
Single hole interpretation (SHI)
Geological model, stage 2.3
Rock unit (RU) / Possible deformation zone (DZ)
Rock domain (RFM)
Deformation zone (ZFM)
Fracture domain (FFM)
0
50
100
150
200
RU1
DZ1
Sealed fractures
Confidence level=2
DZ2
Sealed fractures
Confidence level=3
RFM029
FFM02
FFM01
FFM01
FFM01
Legend for single hole interpretation
Increased frequency of sealed fractures relative to majority of borehole sections outside deformation zones at Forsmark
Brittle deformation zone, medium confidence
Brittle deformation zone, high confidence
*measured from Top of Casing
Rock type
Group B
Granite (to granodiorite), metamorphic, medium-grained
Deformation zone – orientation set or subset
Possible deformation zone not modelled is not coloured



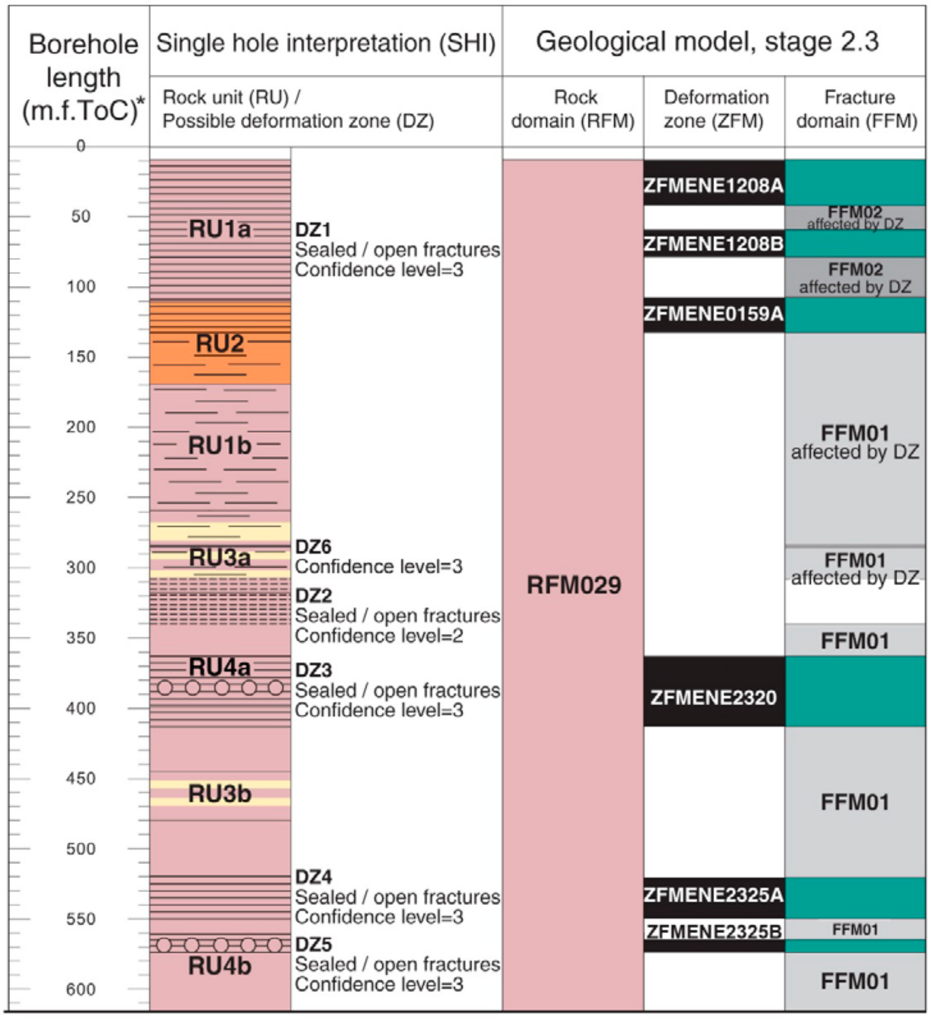
KFM08C
Borehole length (m.f.ToC)*
Single hole interpretation (SHI)
Geological model, stage 2.3
Rock unit (RU) / Possible deformation zone (DZ)
Rock domain (RFM)
Deformation zone (ZFM)
Fracture domain (FFM)
0
50
100
150
200
250
300
350
400
450
500
550
600
650
700
750
800
850
900
RU1a
DZ1 Sealed / open fractures Confidence level=3
RU2a
DZ2 Sealed / open fractures Confidence level=3
RU1b
RU2b
RU1c
DZ3 Sealed / open fractures Confidence level=3
RU3
DZ4 Open / sealed fractures Confidence level=3
RU1d
DZ5 Sealed fractures Confidence level=2
RFM029
RFM045
RFM029
ZFMWNW2225
ZFMENE1061A
ZFMENE1061A
FFM01
FFM01
FFM06
FFM06
FFM01
FFM01
FFM01
Legend for single hole interpretation
Brittle deformation zone, medium confidence
Brittle deformation zone, high confidence
Strongly altered, vuggy rock
Rock type
Group D
Pegmatitic granite, pegmatite
Group B
Metamorphosed and altered (bleached) medium-grained granite and aplitic granite
Granite (to granodiorite), metamorphic, medium-grained
Deformation zone – orientation set or subset
Modelled deformation zone (ZFM)
Steep ENE
Steep WNW
Possible deformation zone not modelled is not coloured
*measured from Top of Casing



KFM08D
Borehole length (m.f.ToC)*
Single hole interpretation (SHI)
Geological model, stage 2.3
Rock unit (RU) / Possible deformation zone (DZ)
Rock domain (RFM)
Deformation zone (ZFM)
Fracture domain (FFM)
0
50
100
150
200
250
300
350
400
450
500
550
600
650
700
750
800
850
900
RU1
RU2a
RU3a
RU4a
RU2b
RU5
RU4b
RU3b
RU2c
DZ1 Sealed / open fractures Confidence level=2
DZ2 Sealed fractures Confidence level=1
DZ3 Sealed fractures Confidence level=3
DZ4 Sealed fractures Confidence level=2
DZ5 Sealed fractures Confidence level=3
DZ6 Sealed fractures Confidence level=2
DZ7 Sealed fractures Confidence level=3
DZ8 Sealed fractures Confidence level=2
DZ9 Sealed fractures Confidence level=2
DZ10 Sealed fractures Confidence level=1
DZ11 Sealed fractures Confidence level=2
DZ12 Sealed / open fractures Confidence level=3
RFM029
RFM045
ZFMENE0159A
ZFMENE0159B
ZFMENE2320
ZFMNNE2308
ZFMENE2293
ZFMENE168
ZFMNNE2300
FFM01
FFM01
FFM01
FFM06
FFM06
FFM06
FFM06
FFM06
FFM06
FFM06
FFM06
Legend for single hole interpretation
Brittle deformation zone, medium confidence
Brittle deformation zone, high confidence
Rock type
Group D
Pegmatitic granite, pegmatite
Group C
Granitoid, metamorphic, fine- to medium-grained
Group B
Amphibolite
Metamorphosed and altered (bleached), medium-grained granite (to granodiorite)
Granite (to granodiorite), metamorphic, medium-grained
Deformation zone – orientation set or subset
Modelled deformation zone (ZFM)
Steep NNE
Steep ENE
Possible deformation zone not modelled is not coloured
*measured from Top of Casing


KFM09A
Borehole length (m.f.ToC)*
Single hole interpretation (SHI)
Rock unit (RU) / Possible deformation zone (DZ)
Geological model, stage 2.3
Rock domain (RFM)
Deformation zone (ZFM)
Fracture domain (FFM)
0
50
100
150
200
250
300
350
400
450
500
550
600
650
700
750
800
RU1a
RU2
RU1b
RU3
RU4
RU5
RU7
RU8
RU9
DZ1
Sealed / open fractures
Confidence level=3
DZ2
Sealed fractures
Confidence level=3
DZ3
Sealed / open fractures
Confidence level=3
Vuggy rock (RU6)
DZ6
Confidence level=3
DZ4
Open / sealed fractures
Confidence level=3
DZ5
Sealed fractures
Confidence level=3
Locally, strong ductile deformation
Strong ductile deformation
Strong ductile deformation
RFM029
RFM044
RFM034
RFM012
RFM018
ZFMENE1208A
ZFMENE1208B
ZFMENE0159A
ZFMNNW0100
ZFMNW1200
ZFMNW1200
FFM02 affected by DZ
FFM02 affected by DZ
FFM02 affected by DZ
FFM01
FFM05
FFM05 Vuggy rock
FFM01
FFM04
FFM04
FFM04
FFM04
Legend for single hole interpretation
Increased frequency of fractures relative to other borehole sections outside deformation zones
Brittle deformation zone, high confidence
Strongly altered, vuggy rock
Rock type
Group D
Pegmatitic granite, pegmatite
Group C
Granodiorite to tonalite, metamorphic, fine- to medium-grained
Group B
Granite (to granodiorite), metamorphic, medium-grained
Granodiorite, metamorphic
Amphibolite, quartz-bearing metadiorite
Group A
Felsic to intermediate metavolcanic rock
Deformation zone – orientation set or subset
Modelled deformation zone (ZFM)
Steep NW
Steep ENE
Steep ENE and steep NNW
Possible deformation zone not modelled is not coloured
*measured from Top of Casing

KFM09B



Legend for single hole interpretation

- Locally increased frequency of sealed fractures relative to lower half of borehole outside deformation zones
- Brittle deformation zone, medium confidence
- Brittle deformation zone, high confidence
- Strongly altered, vuggy rock

Rock type

Group D

- Pegmatitic granite, pegmatite

Group B

- Metamorphosed and altered (bleached) granite
- Granite (to granodiorite), metamorphic, medium-grained

Deformation zone – orientation set or subset

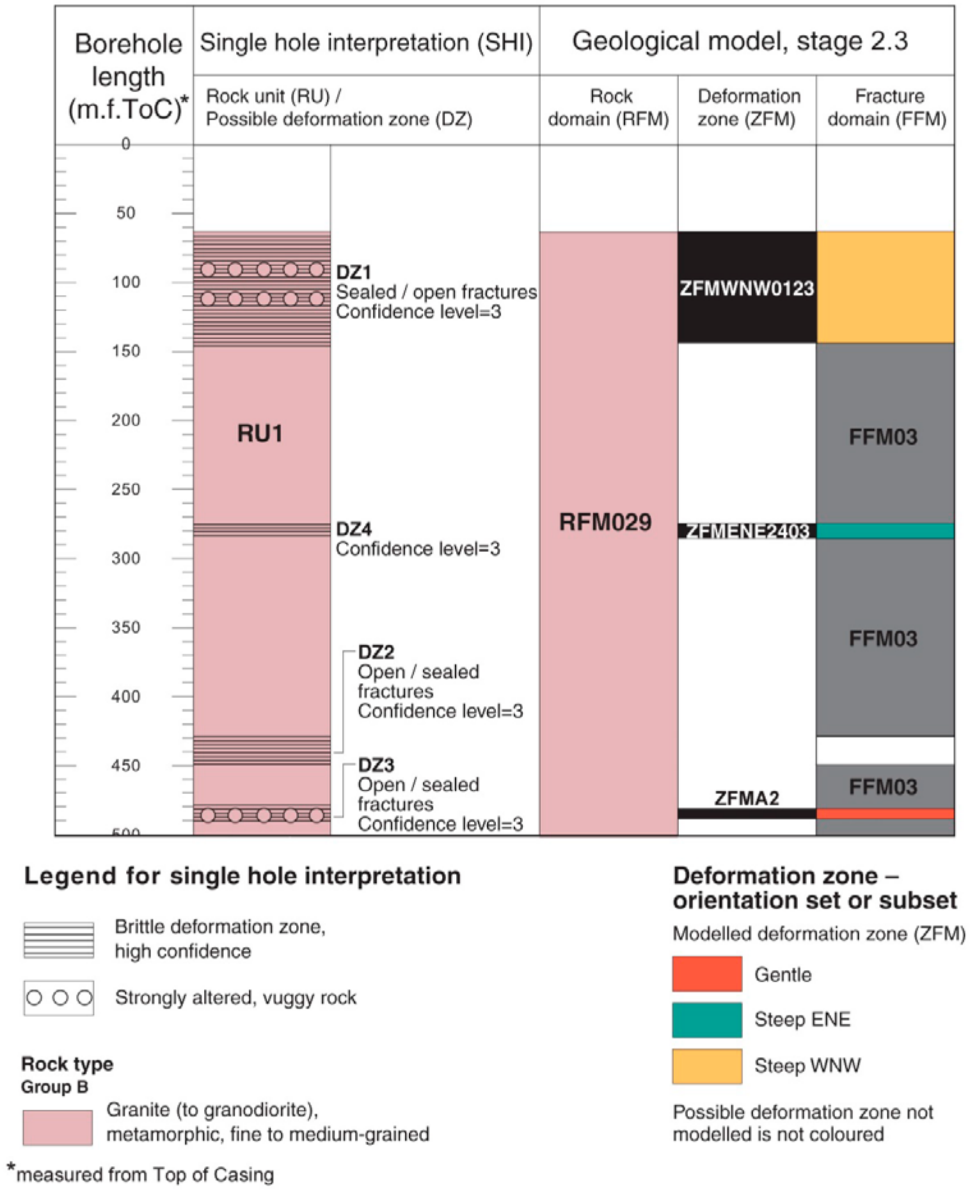
Modelled deformation zone (ZFM)

- Steep ENE

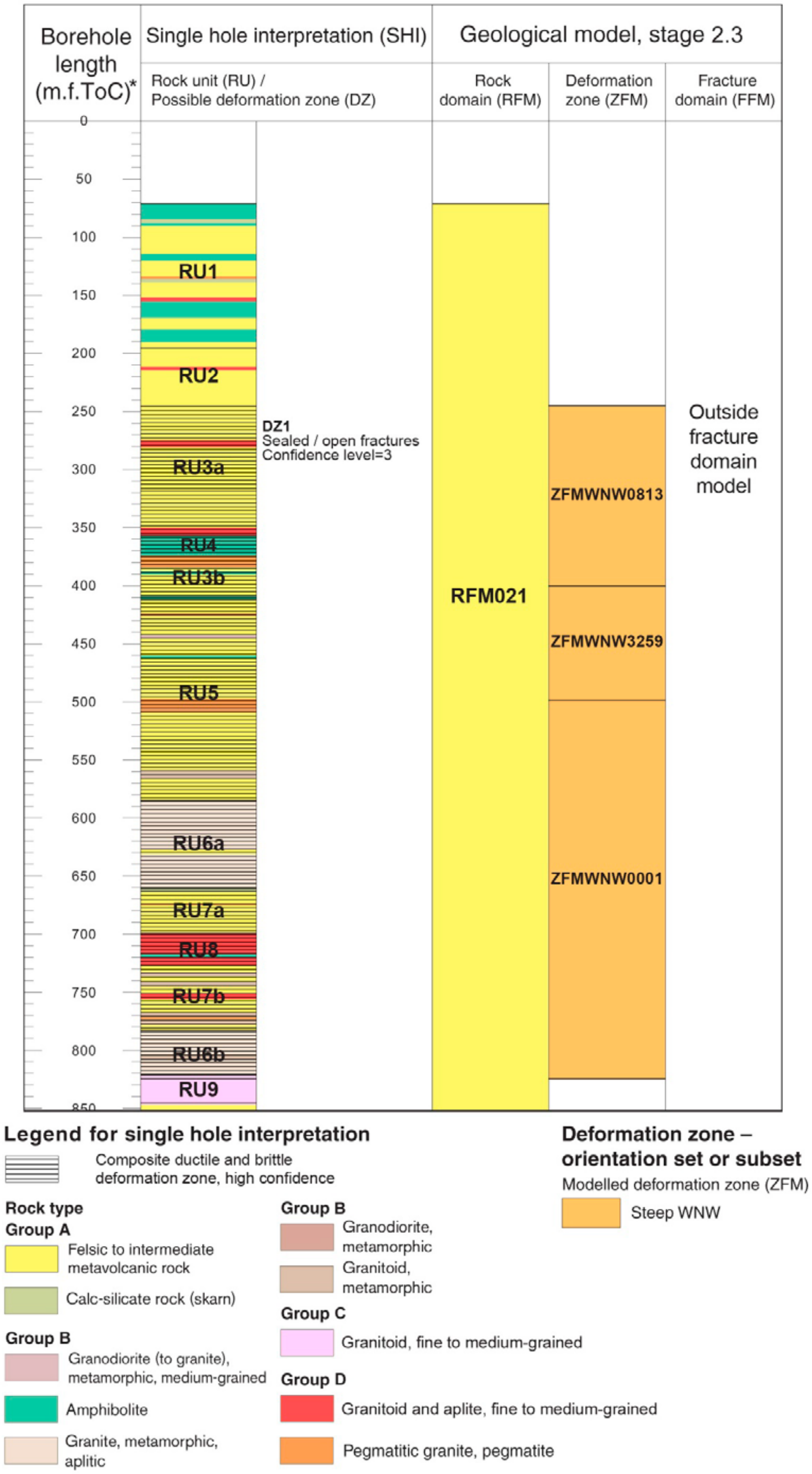
Possible deformation zone not modelled is not coloured

*measured from Top of Casing

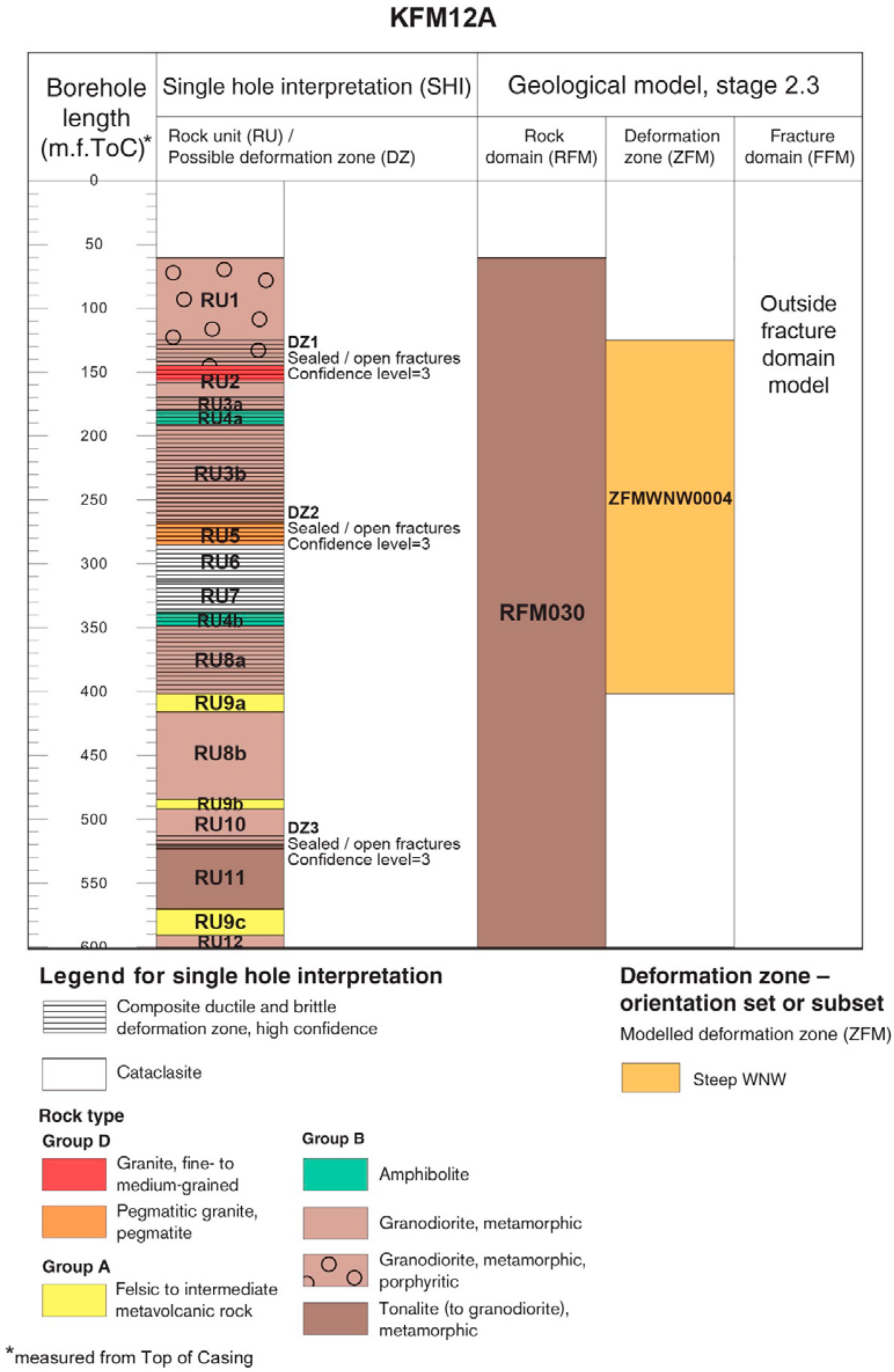
KFM10A


KFM10A
Borehole length (m.f.ToC)*
Single hole interpretation (SHI)
Geological model, stage 2.3
Rock unit (RU) / Possible deformation zone (DZ)
Rock domain (RFM)
Deformation zone (ZFM)
Fracture domain (FFM)
0
50
100
150
200
250
300
350
400
450
500
DZ1
Sealed / open fractures
Confidence level=3
RU1
DZ4
Confidence level=3
DZ2
Open / sealed fractures
Confidence level=3
DZ3
Open / sealed fractures
Confidence level=3
RFM029
ZFMWNW0123
ZFMENE2403
ZFMA2
FFM03
FFM03
FFM03
Legend for single hole interpretation
Brittle deformation zone, high confidence
Strongly altered, vuggy rock
Rock type
Group B
Granite (to granodiorite), metamorphic, fine to medium-grained
*measured from Top of Casing
Deformation zone – orientation set or subset
Modelled deformation zone (ZFM)
Gentle
Steep ENE
Steep WNW
Possible deformation zone not modelled is not coloured

KFM11A



*measured from Top of Casing



KFM12A
Borehole length (m.f.ToC)*
Single hole interpretation (SHI)
Geological model, stage 2.3
Rock unit (RU) / Possible deformation zone (DZ)
Rock domain (RFM)
Deformation zone (ZFM)
Fracture domain (FFM)
0
50
100
150
200
250
300
350
400
450
500
550
600
RU1
RU2
RU3a
RU4a
RU3b
RU5
RU6
RU7
RU4b
RU8a
RU9a
RU8b
RU9b
RU10
RU11
RU9c
RU12
DZ1
Sealed / open fractures
Confidence level=3
DZ2
Sealed / open fractures
Confidence level=3
DZ3
Sealed / open fractures
Confidence level=3
RFM030
ZFMWNW0004
Outside fracture domain model
Legend for single hole interpretation
Composite ductile and brittle deformation zone, high confidence
Cataclasite
Rock type
Group D
Granite, fine- to medium-grained
Pegmatitic granite, pegmatite
Group A
Felsic to intermediate metavolcanic rock
Group B
Amphibolite
Granodiorite, metamorphic
Granodiorite, metamorphic, porphyritic
Tonalite (to granodiorite), metamorphic
Deformation zone – orientation set or subset
Modelled deformation zone (ZFM)
Steep WNW
*measured from Top of Casing

Appendix 2

Properties of deformation zones included in the version 2.3 local and regional models with trace lengths longer than 1,000 m

Content and structure

The following tables present the modelling procedure, the confidence of existence, some comments concerning single-hole interpretation work and the geological properties of each deformation zone that has been modelled deterministically in Forsmark model version 2.3, and included in the local and regional models. These zones are observed or judged to be longer than 1,000 m in trace length at the ground surface. A few zones that are between 900 and 1,000 m in length and zones considerably shorter than 1,000 m, but which occur as attached branches to zones longer than 1,000 m, are also included in the models and in the property tables. 110 zones have been included in the version 2.3 model.

The zones are arranged in the property tables, firstly, in the order of the orientation set to which the zone belongs and, secondly, in numerical order according to ID number (ZFMxxxxxxx). The terminology used for orientation sets of zones or fracture clusters in stereographic projections is presented in Table A2-1. Four sets of vertical or steeply (≥ 45°) dipping zones with different strike are present in the models: WNW–ESE or NW–SE abbreviated to WNW or NW, respectively; NNW–SSE abbreviated to NNW; E–W abbreviated to EW; and ENE–WSW, NNE–SSW or NE–SW abbreviated to ENE, NNE or NE, respectively. A fifth orientation set where the dip is less than 45°, referred to as "Gently dipping", is also present. Table A2-2 summarises which of the zones occur in the local model, which occur in the local and regional models and which occur solely in the regional model.

Table A2-1. Terminology used for vertical or steeply (≥ 45°) dipping orientation sets in deformation zones and fracture clusters. If the structural feature dips less than 45°, the set is referred to as "Gently dipping".

Name of vertical or steeply (≥ 45°) dipping orientation set	Strike [º]
N	355–005
NNE	005–035
NE	035–055
ENE	055–085
E	085–095
ESE	095–125
SE	125–145
SSE	145–175
S	175–185
SSW	185–215
SW	215–235
WSW	235–265
W	265–275
WNW	275–305
NW	305–325
NNW	325–355

Table A2-2. Summary of deformation zones in the local and regional models, Forsmark version 2.3, presented in the same order as they occur in the property tables.

DZ orientation group	Zone ID code	DZ model
Vertical or steeply dipping, WNW or NW strike	ZFMWNW0001	Regional and local
Vertical or steeply dipping, WNW or NW strike	ZFMNW0002	Regional and local
Vertical or steeply dipping, WNW or NW strike	ZFMNW0003	Regional
Vertical or steeply dipping, WNW or NW strike	ZFMWNW0004	Regional
Vertical or steeply dipping, WNW or NW strike	ZFMWNW0016	Regional
Vertical or steeply dipping, WNW or NW strike	ZFMNW0017	Regional and local
Vertical or steeply dipping, WNW or NW strike	ZFMWNW0019	Regional
Vertical or steeply dipping, WNW or NW strike	ZFMWNW0023	Regional
Vertical or steeply dipping, WNW or NW strike	ZFMWNW0024	Regional
Vertical or steeply dipping, WNW or NW strike	ZFMNW0029	Regional
Vertical or steeply dipping, WNW or NW strike	ZFMWNW0035	Regional
Vertical or steeply dipping, WNW or NW strike	ZFMWNW0036	Regional
Vertical or steeply dipping, WNW or NW strike	ZFMWNW0044	Local
Vertical or steeply dipping, WNW or NW strike	ZFMWNW0123	Regional and local
Vertical or steeply dipping, WNW or NW strike	ZFMNW0805A	Regional
Vertical or steeply dipping, WNW or NW strike	ZFMNW0805B	Regional
Vertical or steeply dipping, WNW or NW strike	ZFMNW0806	Regional
Vertical or steeply dipping, WNW or NW strike	ZFMWNW0809A	Regional and local
Vertical or steeply dipping, WNW or NW strike	ZFMWNW0809B	Regional and local
Vertical or steeply dipping, WNW or NW strike	ZFMWNW0813	Local
Vertical or steeply dipping, WNW or NW strike	ZFMWNW0836	Regional
Vertical or steeply dipping, WNW or NW strike	ZFMWNW0851	Regional
Vertical or steeply dipping, WNW or NW strike	ZFMWNW0853	Regional
Vertical or steeply dipping, WNW or NW strike	ZFMNW0854	Regional
Vertical or steeply dipping, WNW or NW strike	ZFMWNW0974	Regional
Vertical or steeply dipping, WNW or NW strike	ZFMWNW1035	Local
Vertical or steeply dipping, WNW or NW strike	ZFMWNW1053	Local
Vertical or steeply dipping, WNW or NW strike	ZFMWNW1068	Local
Vertical or steeply dipping, WNW or NW strike	ZFMNW1173	Regional
Vertical or steeply dipping, WNW or NW strike	ZFMNW1200	Regional and local
Vertical or steeply dipping, WNW or NW strike	ZFMWNW2225	Local
Vertical or steeply dipping, WNW or NW strike	ZFMWNW3259	Local
Vertical or steeply dipping, NNW strike	ZFMNNW0100	Local
Vertical or steeply dipping, NNW strike	ZFMNNW0101	Local
Vertical or steeply dipping, NNW strike	ZFMNNW0404	Local
Vertical or steeply dipping, NNW strike	ZFMNNW0823	Regional
Vertical or steeply dipping, EW strike	ZFMEW0137	Regional and local
Vertical or steeply dipping, EW strike	ZFMEW1156	Regional
Vertical or steeply dipping, ENE, NNE or NE strike	ZFMENE0060A	Regional and local
Vertical or steeply dipping, ENE, NNE or NE strike	ZFMENE0060B	Regional and local
Vertical or steeply dipping, ENE, NNE or NE strike	ZFMENE0060C	Regional and local
Vertical or steeply dipping, ENE, NNE or NE strike	ZFMENE0061	Local
Vertical or steeply dipping, ENE, NNE or NE strike	ZFMENE0062A	Regional and local
Vertical or steeply dipping, ENE, NNE or NE strike	ZFMENE0062B	Regional and local
Vertical or steeply dipping, ENE, NNE or NE strike	ZFMENE0062C	Regional and local
Vertical or steeply dipping, ENE, NNE or NE strike	ZFMNE0065	Regional
Vertical or steeply dipping, ENE, NNE or NE strike	ZFMENE0103A	Local
Vertical or steeply dipping, ENE, NNE or NE strike	ZFMENE0103B	Local
Vertical or steeply dipping, ENE, NNE or NE strike	ZFMENE0159A	Local
Vertical or steeply dipping, ENE, NNE or NE strike	ZFMENE0159B	Local
Vertical or steeply dipping, ENE, NNE or NE strike	ZFMENE0168	Local
Vertical or steeply dipping, ENE, NNE or NE strike	ZFMENE0169	Local
Vertical or steeply dipping, ENE, NNE or NE strike	ZFMENE0401A	Local
Vertical or steeply dipping, ENE, NNE or NE strike	ZFMENE0401B	Local

DZ orientation group	Zone ID code	DZ model
Vertical or steeply dipping, ENE, NNE or NE strike	ZFMNNE0725	Local
Vertical or steeply dipping, ENE, NNE or NE strike	ZFMNE0808A	Regional
Vertical or steeply dipping, ENE, NNE or NE strike	ZFMNE0808B	Regional
Vertical or steeply dipping, ENE, NNE or NE strike	ZFMNE0808C	Regional and local
Vertical or steeply dipping, ENE, NNE or NE strike	ZFMENE0810	Local
Vertical or steeply dipping, ENE, NNE or NE strike	ZFMNNE0828	Regional
Vertical or steeply dipping, ENE, NNE or NE strike	ZFMNE0842	Regional
Vertical or steeply dipping, ENE, NNE or NE strike	ZFMNNE0860	Regional
Vertical or steeply dipping, ENE, NNE or NE strike	ZFMNNE0929	Regional
Vertical or steeply dipping, ENE, NNE or NE strike	ZFMENE1061A	Local
Vertical or steeply dipping, ENE, NNE or NE strike	ZFMENE1061B	Local
Vertical or steeply dipping, ENE, NNE or NE strike	ZFMNNE1132	Regional
Vertical or steeply dipping, ENE, NNE or NE strike	ZFMNNE1133	Regional
Vertical or steeply dipping, ENE, NNE or NE strike	ZFMNNE1134	Regional
Vertical or steeply dipping, ENE, NNE or NE strike	ZFMNNE1135	Regional
Vertical or steeply dipping, ENE, NNE or NE strike	ZFMENE1192A	Local
Vertical or steeply dipping, ENE, NNE or NE strike	ZFMENE1192B	Local
Vertical or steeply dipping, ENE, NNE or NE strike	ZFMENE1208A	Local
Vertical or steeply dipping, ENE, NNE or NE strike	ZFMENE1208B	Local
Vertical or steeply dipping, ENE, NNE or NE strike	ZFMENE2248	Local
Vertical or steeply dipping, ENE, NNE or NE strike	ZFMENE2254	Local
Vertical or steeply dipping, ENE, NNE or NE strike	ZFMNNE2280	Local
Vertical or steeply dipping, ENE, NNE or NE strike	ZFMNE2282	Local
Vertical or steeply dipping, ENE, NNE or NE strike	ZFMNNE2293	Local
Vertical or steeply dipping, ENE, NNE or NE strike	ZFMNNE2300	Local
Vertical or steeply dipping, ENE, NNE or NE strike	ZFMNNE2308	Local
Vertical or steeply dipping, ENE, NNE or NE strike	ZFMENE2320	Local
Vertical or steeply dipping, ENE, NNE or NE strike	ZFMENE2325A	Local
Vertical or steeply dipping, ENE, NNE or NE strike	ZFMENE2325B	Local
Vertical or steeply dipping, ENE, NNE or NE strike	ZFMNE2332	Local
Vertical or steeply dipping, ENE, NNE or NE strike	ZFMENE2383	Local
Vertical or steeply dipping, ENE, NNE or NE strike	ZFMENE2403	Local
Gently dipping	ZFMA1	Regional and local
Gently dipping	ZFMA2	Regional and local
Gently dipping	ZFMA3	Regional and local
Gently dipping	ZFMA4	Regional
Gently dipping	ZFMA5	Regional
Gently dipping	ZFMA6	Regional
Gently dipping	ZFMA7	Regional
Gently dipping	ZFMA8	Regional and local
Gently dipping	ZFMB1	Regional
Gently dipping	ZFMB23	Regional
Gently dipping	ZFMB4	Regional and local
Gently dipping	ZFMB5	Regional
Gently dipping	ZFMB6	Regional
Gently dipping	ZFMB7	Regional and local
Gently dipping	ZFMB8	Regional and local
Gently dipping	ZFME1	Regional
Gently dipping	ZFMF1	Regional and local
Gently dipping	ZFMJ1	Regional and local
Gently dipping	ZFMJ2	Regional
Gently dipping	ZFMK1	Regional
Gently dipping	ZFM866	Regional and local
Gently dipping	ZFM871	Regional and local
Gently dipping	ZFM1203	Regional and local
Steep alteration pipe between ZFMA2 and ZFMA3	ZFM1189	Regional

Geological properties

The geological properties assigned to each deformation zone are shown in Table A2-3. The base data used in the assignment of a particular property, as well as the level of confidence in the assignment (high, medium or low), are both presented in the property tables. The types of properties and the basis for the estimation of properties resemble all the earlier models for deformation zones at Forsmark (SKB 2008a).

Table A2-3. Properties assigned to deformation zones in the geological modelling work.

Property	Comment
Deformation zone ID code	ZFMxxxxxxx
Position	With numerical estimate of uncertainty
Orientation (strike/dip, right-hand-rule method)	With numerical estimate of uncertainty
Thickness	With numerical estimate of uncertainty
Length	With numerical estimate of uncertainty
Ductile deformation	Indicated if present along the zone
Brittle deformation	Indicated if present along the zone. Type of brittle deformation specified
Alteration	Indicated if present along the zone. Type of alteration specified
Fracture orientation (strike/dip, right-hand-rule method)	With numerical estimate of uncertainty
Fracture frequency	With numerical estimate of uncertainty
Fracture filling	Mineral coating or filling specified
Sense of displacement	Sense of displacement specified

Positional uncertainty is a critical issue in the modelling procedure and the uncertainty in the position of lineaments defined by magnetic minima at the surface as well as seismic reflectors and boreholes in 3D space are addressed. These uncertainties are also discussed in (Stephens et al. 2007, Section 5.6). Different uncertainties provided for surface magnetic data reflect a variation in the resolution of these data and the assignment of lineaments. Lineaments defined by magnetic minima that contain the letter "G" in their ID code emerged from the high-resolution ground magnetic data. Those without this letter come from the airborne data. The uncertainty in the position of intersection of a deformation zone along a borehole is documented in the form of three parameters, dx, dy and dz, in the directions EW horizontal, NS horizontal and vertical, respectively. The mean values of the uncertainties in the position of the upper and lower borehole intercepts of each deformation zone are provided for each of the three directions. This uncertainty has consequences for the positioning of borehole fixed points in 3D space, as well as for the estimates of both the dip and the thickness of a zone.

The orientation of each zone is recorded as strike and dip using the right-hand-rule method, i.e. a zone with orientation 118/77 means that the zone strikes N62°W and dips 77° to the SSW. Thickness refers to the total zone thickness, i.e. damage zone and fault core. If ductile deformation is present along the zone, this is also included in the thickness estimate. If there are data from boreholes, the modelled thickness reflects the value calculated from the borehole intersection (single intersection) or from the borehole intersection judged to be most reliable (more than one intersection). The modelling procedure in the RVS software has not permitted visual representation of the variation in thickness in 3D space. The thickness of steeply dipping deformation zones that lack data from borehole, tunnel or surface intersections has been estimated using a length-thickness correlation diagram (Stephens et al. 2007, Section 5.3.2). Length refers to the inferred total trace length of the deformation zone at the ground surface. No length is provided for the deformation zones that fail to intersect the ground surface. The parts of zones that intersect the ground surface outside the model volume are included in the length estimate.

Where data are available, the mean pole and Fisher κ value for each fracture set have been calculated and presented according to the procedure described in Stephens et al. (2007, Appendix 15). Fracture clusters are presented in an inferred, ranked order of interest and plotted consistently in the following colours: Primary cluster (red); Secondary cluster (blue); Third cluster (green); Fourth cluster (purple); Unassigned fractures (grey). The mean orientation of each set of fractures along a zone is recorded as strike and dip using the right-hand-rule method.

Sealed fracture networks and crush zones are included in the estimation of fracture frequency along each zone. The frequency of fractures in such structures is calculated on the basis of the size of the rock fragments inside the network or crush zone and the length of the borehole occupied by the structure, both of which have been recorded during the mapping work. A direct count of fractures has not been made. Due to the intrinsic limitations of the data on fractures from percussion boreholes, such data are generally only used when data on fractures from cored boreholes are lacking.

Confidence in a property

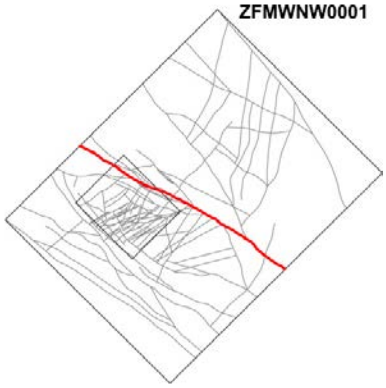
In many cases, data bearing on fracture characteristics (orientation, frequency and filling) and sense of displacement are lacking, since these zones have been defined solely on the basis of geophysical information and confirmatory geological data are absent. Where geological and geophysical data from borehole, tunnel or surface investigations are available, the properties of the zones are relatively well-constrained and, in many cases, a property is assigned a high level of confidence. However, properties more commonly emanate from a restricted number of borehole intersections and, in a few cases, from tunnel investigations, surface outcrops or a single surface excavation. For this reason, the estimates of properties need to be treated with extreme care when extrapolating to the bedrock between, for example, borehole intersections.

Bearing in mind the considerations above, some properties in virtually all zones are assigned a medium or low level of confidence, even if geological and geophysical data from borehole, tunnel or surface investigations are present. The adjustment from a high to a lower level of confidence, for a particular property, includes:

- Assignment of a medium level of confidence to the estimates of thickness, fracture orientation, fracture frequency and fracture filling in virtually all deformation zones, since these data emanate from a restricted number of borehole intersections;
- Assignment of a low level of confidence to the assessment of the style of deformation and fracture frequency in zones intersected solely by percussion boreholes, since particularly these data are of insufficient quality;
- Assignment of a low level of confidence to the estimates of thickness that are based on a comparative study or the use of a length-thickness correlation diagram, i.e. where borehole intersections are lacking;
- Assignment of a medium level of confidence to the estimates of length for zones that extend outside the regional model volume, or that are coupled to a lineament where some modifications have been made to the length of the lineament or other assumptions have been made in connection with the modelling work (see individual tables for details);
- Assignment of a medium level of confidence to the judgement that alteration is present along a zone, when this is based solely on the character of a magnetic lineament.
- Assignment of a low or medium level of confidence to the estimates of the sense of movement along zones, when shear striae data emanate from a restricted number of borehole intersections. In the cases where only a few data (< 9) are available from a borehole (or boreholes), a low level of confidence has been provided. Where there is a higher quantity of shear striae data from the borehole(s), a medium level of confidence has been assigned.

Vertical or steeply dipping deformation zones with WNW or NW strike

ZFMWNW0001 (Singö deformation zone; zone inherited from SFR geological model in SKB R-10-49)

Property	Quantitative estimate	Span	Confidence level	Basis for interpretation	Comments
Modelling procedure: At the surface, corresponds to the low magnetic lineaments MFM0803 and MFM0803G0. Zone ZFMWNW0001 forms the main structural component in a system of sub-parallel deformation zones with WNW-ESE or NW-SE strike and vertical or steep dip in the central part of the regional model volume. Modelling procedure and properties inherited from updated geological model for SFR presented in Appendix 11 in SKB R-10-49. The zone intersects tunnels 1-2, 3 and SFR, borehole KFM11A along interval 498-824 m (part of DZ1) and several older cored and percussion boreholes at SFR. Included in regional model and also present inside local model volume.					
Confidence of existence: High					

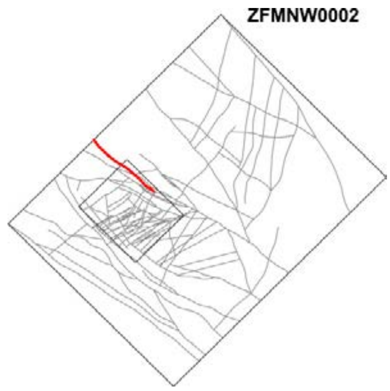
Single hole interpretation: For information along tunnels and borehole intersections, see Appendix 11 in SKB R-10-49. For identification and short description of DZ1 in KFM11A, see SKB P-07-109. For character and kinematics of the borehole interval 498-630 m along DZ1, corresponding to a part of zone ZFMWNW0001, see SKB P-07-111.

The larger part of the borehole interval 498-630 m in KFM11A (part of DZ1), which has been studied for the more detailed characterization and kinematics of zone ZFWNW0001, was classified as fault core; fault rocks (breccias and cataclasites) as well as crush zones were superimposed on rock affected by ductile deformation. Most fault slip data occur in the interval 510-540 m and close to the bottom of the studied interval at 625-629 m (see sense of shear below). The photographs below show abundant fault rocks in the upper part of the studied interval with laumontite-sealed breccias, cataclasite and crush zones.

After SKB P-07-111

Vertical or steeply dipping deformation zones with WNW or NW strike ZFMWNW0001 (Singö deformation zone; zone inherited from SFR geological model in SKB R-10-49)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Position		± 20 m (surface)	High	Intersections along tunnels 1-2, 3 and SFR, and boreholes, seismic refraction data, low magnetic lineaments MFM0803 and MFM0803G0	Span estimate refers to the uncertainty in the position of the central part of the zone. Lineament is also defined by a bathymetric depression along the boundary between the Quaternary cover and the crystalline bedrock
Orientation (strike/dip, right-hand-rule method)	120/90	± 5/± 10	High	Strike based on trend of lineaments MFM0803 and MFM0803G0. Dip based on linking lineaments with tunnel and borehole intersections (see also Appendix 11 in SKB R-10-49)	
Thickness	181 m	50-200 m	High	Intersection along part of DZ1 (498-824 m) in KFM11A. Span estimated on the basis of the range in thickness of steeply dipping zones greater than 10000 m in length	Thickness refers to both ductile and brittle components, and both damage zone and core in the brittle component.
Length	30 km		Medium	Low magnetic lineaments MFM0803 and MFM0803G0	Total trace length at ground surface. Extends outside regional model volume
Ductile deformation			High	Intersections along tunnels 1-2, 3 and SFR, and boreholes as documented in Appendix 11 in SKB R-10-49	Ductile deformation in the form of mylonite and ductile shear zones are present
Brittle deformation			High	Intersections along tunnels 1-2, 3 and SFR, and boreholes as documented in Appendix 11 in SKB R-10-49	Cataclasite, brittle-ductile shear zones, cohesive breccia, crush zones and an overall increased frequency of fractures including sealed fracture networks are present
Alteration			High	Intersections along tunnels 1-2, 3 and SFR, and boreholes as documented in Appendix 11 in SKB R-10-49, character of lineaments MFM0803 and MFM0803G0	Red-stained bedrock with fine-grained hematite dissemination. Locally muscovitization, argillization chloritization and, at 510-525 m, talc alteration
Fracture orientation (strike/dip, right-hand-rule method)			High	Intersections along tunnels 1-2, 3 and SFR, and boreholes as documented in Appendix 11 in SKB R-10-49	Steep sets with WNW-ESE to NW-SE and ENE strike are prominent. Fractures with other orientations, including gently dipping fractures, are also present

Vertical or steeply dipping deformation zones with WNW or NW strike ZFMWNW0001 (Singö deformation zone; zone inherited from SFR geological model in SKB R-10-49)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Fracture frequency	Mean 38 m^{-1}	Span 3-181 m^{-1}	Medium	Intersection along part of DZ1 (498-824 m) in KFM11A	Dominance of sealed fractures. Quantitative estimate and span include sealed fracture networks and crush zones
Fracture filling			High	Intersections along tunnels 1-2, 3 and SFR, and boreholes as documented in Appendix 11 in SKB R-10-49	Chlorite, calcite, laumontite, hematite/adularia, clay minerals, quartz, epidote
Sense of displacement			High	Intersection along part of DZ1 (498-630 m) in KFM11A. Fault striae on chlorite, hematite and clay minerals as well as steps defined by laumontite or calcite	*Steeply dipping faults with NW-SE or WNW-ESE strike (32).* Dextral strike-slip, oblique-slip with a reverse dip-slip component, sinistral strike-slip or normal dip-slip (19). Remainder strike-slip or oblique slip (13) *Steeply dipping faults with ENE-WSW or NE-SW strike (9).* Strike-slip, oblique-slip with dominant strike-slip component in part dextral, oblique-slip with dominant reverse dip-slip component or normal dip-slip *Steeply dipping faults with NNW strike (1).* Sinistral strike-slip *Gently dipping faults (4).* Dextral strike-slip, oblique-slip with dominant dextral strike-slip component or reverse dip-slip

<table>
<tr><th colspan="6">Vertical or steeply dipping deformation zones with WNW or NW strike
ZFMNW0002 (zone inherited from SFR geological model in SKB R-10-49; splay from Singö deformation zone through tunnel 3)</th></tr>
<tr><th>Property</th><th>Quantitative estimate</th><th>Span</th><th>Confidence level</th><th>Basis for interpretation</th><th>Comments</th></tr>
<tr><td colspan="4">Modelling procedure: At the surface, corresponds, after some modification during both the SFR (SKB R-10-49) and current modelling work, to the low magnetic lineaments MFM0804 and MFM0804G. Part of a complex system of deformation zones that includes the Singö deformation zone (ZFMWNW0001); the zone is inferred to be a R-Riedel splay from the Singö deformation zone. Modelling procedure and properties inherited from updated geological model for SFR presented in Appendix 11 in SKB R-10-49. Included in regional model and also present inside local model volume.</td><td colspan="2">
</td></tr>
<tr><td colspan="6">Confidence of existence: High</td></tr>
<tr><td colspan="6">Single hole interpretation: For information along tunnels and SFR borehole intersections, see Appendix 11 in SKB R-10-49</td></tr>
<tr><td>Position</td><td></td><td>± 20 m (surface)</td><td>High</td><td>Intersection along tunnels and SFR boreholes, seismic refraction data, modified low magnetic lineaments MFM0804 and MFM0804G</td><td>Span estimate refers to the uncertainty in the position of the central part of the zone. Lineament is also defined by a bathymetric depression along the boundary between the Quaternary cover and the crystalline bedrock</td></tr>
<tr><td>Orientation (strike/dip, right-hand-rule method)</td><td>130/90</td><td>± 5/± 10</td><td>High</td><td>Strike based on trend of modified lineaments MFM0804 and MFM0804G. Dip based on linking lineaments with tunnels and SFR borehole intersections as documented in Appendix 11 in SKB R-10-49</td><td></td></tr>
<tr><td>Thickness</td><td>50 m</td><td>50-200 m</td><td>High</td><td>Tunnels and SFR borehole intersections (see Appendix 11 in SKB R-10-49). Span estimated on the basis of the range in thickness of steeply dipping zones greater than 10000 m in length</td><td>Thickness refers to both ductile and brittle components, and both damage zone and core in the brittle component.</td></tr>
<tr><td>Length</td><td>18 km</td><td></td><td>Medium</td><td>Modified lineaments MFM0804 and MFM0804G. Terminated to the south-east against ZFMWNW0001</td><td>Total trace length at ground surface. Extends to the north-west outside regional model volume</td></tr>
<tr><td>Ductile deformation</td><td></td><td></td><td>High</td><td>Intersection along tunnel 3, surface data</td><td>Present. Zones of foliated rocks and chlorite schist documented during mapping of tunnel 3, low-temperature ductile shear structures observed in outcrop (see also sense of shear below)</td></tr>
<tr><td>Brittle deformation</td><td></td><td></td><td>High</td><td>Tunnels and SFR borehole intersections as documented in Appendix 11 in SKB R-10-49</td><td>Increased frequency of fractures including crush zones and sealed fracture networks</td></tr>
</table>

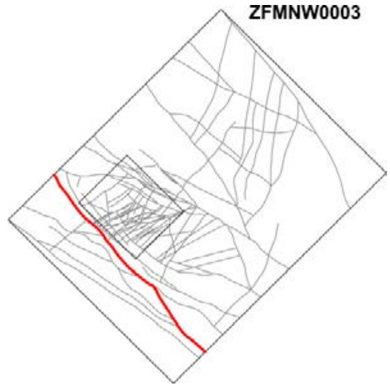
Vertical or steeply dipping deformation zones with WNW or NW strike ZFMNW0002 (zone inherited from SFR geological model in SKB R-10-49; splay from Singö deformation zone through tunnel 3)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Alteration			High	Intersection along tunnel 3, character of lineaments MFM0804 and MFM0804G	Chloritization, red-stained bedrock with fine-grained hematite dissemination
Fracture orientation (strike/dip, right-hand-rule method)	NW/70SE, NE/90, NNW/90 and gently dipping		High	Intersection along tunnel 3 and SFR borehole intersections as documented in Appendix 11 in SKB R-10-49	
Fracture frequency			Low	Intersection along tunnel 3 and SFR borehole intersections as documented in Appendix 11 in SKB R-10-49	Low fracture frequency along tunnel 3 (open fractures?). No reliable data from SFR boreholes (percussion drilling)
Fracture filling			Medium	Intersection along tunnel 3	Chlorite, calcite
Sense of displacement			Low	Surface data	Dextral strike-slip component of displacement during low-temperature ductile deformation  Shear bands in foliated pegmatite along segment of zone ZFMNW0002. Top surface on outcrop (small island, PFM001637)

Vertical or steeply dipping deformation zones with WNW or NW strike

ZFMNW0003 (Eckarfjärden deformation zone)

Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**

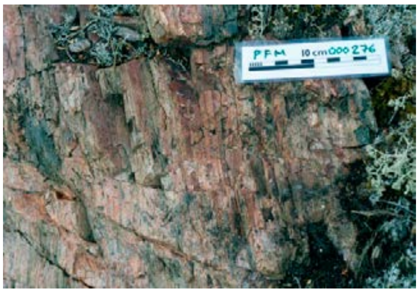
Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM0015. Modelled to base of regional model volume using dip estimated by connecting lineament MFM0015 at the surface with the borehole intersections 83-160 m in HFM11 (DZ1) and 91-179 m in HFM12 (DZ1 and extension). Deformation zone plane placed in the central part of the more highly fractured intervals in the upper part of DZ1 in HFM11 and in the lower part of DZ1 in HFM12, i.e. the south-western part of the zone. Included only in regional model. Not present inside local model volume.



Confidence of existence: High

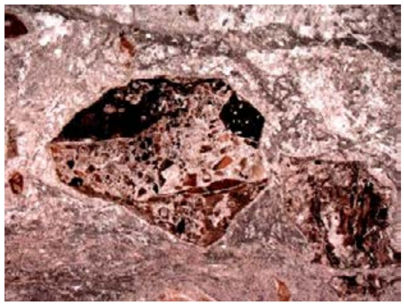
Surface mapping and single hole interpretation: For character and kinematics at the surface, see SKB R-05-18 and SKB P-06-212. For identification and short description of DZ1 in HFM11 and HFM12, see SKB P-04-120.

Deformation zone with low-temperature (greenschist facies) ductile deformation and later, multiple-stage reactivation in the brittle regime. Mylonite, cataclastic texture and fault breccia prominent at several outcrops along the zone. Fault-slip data documented along many fractures at the surface. Zone situated within a broad belt (c. 1200 m) of intense high-temperature (amphibolite facies) ductile deformation south-west of the tectonic lens at Forsmark. Hydraulic contact between HFM11 and HFM12 (see P-04-200).



Mylonite to ultramylonite transected by fractures at PFM000276 (after SKB R-05-18).

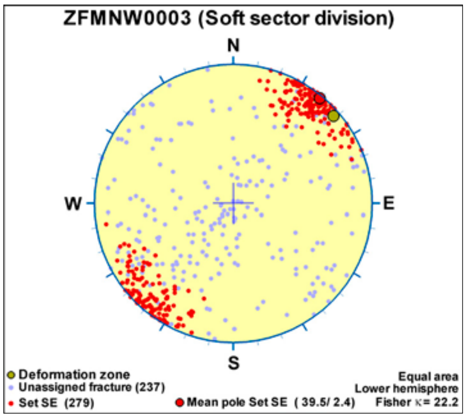
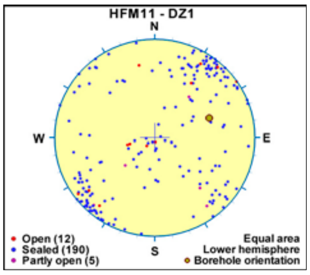
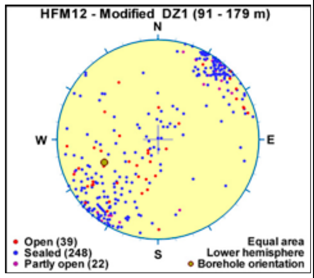
Reddish pink protocataclasite at PFM007095, transected by fractures and a 2 cm thick ultracataclasite (eroded) with orientation 320/88 sub-parallel to the orientation of the Eckarfjärden deformation zone (after SKB P-06-212).



Thin section of fault microbreccia at PFM007095, with angular clasts of different types of early-stage cataclasite set in a fine-grained fault rock matrix. Field of view is c. 3.5 mm (after SKB P-06-212). View provides evidence for multiple-stage reactivation.

Property	Quantitative estimate	Span	Confidence level	Basis for interpretation	Comments
Position		± 20 m (surface) **HFM11** dx (m) 5, dy (m) 7, dz (m) 6 **HFM12** dx (m) 6, dy (m) 8, dz (m) 8	High	Intersections along HFM11 (DZ1) and HFM12 (DZ1), low magnetic lineament MFM0015. Zone extended down to a borehole length of 179 m in HFM12	Span estimate refers to the uncertainty in the position of the central part of the zone

Vertical or steeply dipping deformation zones with WNW or NW strike ZFMNW0003 (Eckarfjärden deformation zone)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Orientation (strike/dip, right-hand-rule method)	139/85	± 10/± 10	High	Strike based on trend of lineament MFM0015. Dip based on linking MFM0015 at the surface with borehole intersections along HFM11 (DZ1) and HFM12 (DZ1 and extension down to 179 m borehole length)	
Thickness	Total thickness is 53 m. Thickness of more highly fractured section is 20 m	50-200 m	Medium	Intersections along HFM11 (DZ1) and HFM12 (DZ1 and extension down to 179 m borehole length). Span estimated on the basis of the range in thickness of steeply dipping zones greater than 10000 m in length	Thickness refers to both ductile and brittle components, and both damage zone and core in the brittle component.
Length	30 km		Medium	Low magnetic lineament MFM0015	Total trace length at ground surface. Extends outside regional model volume
Ductile deformation			High	Surface geology, intersections along HFM11 (DZ1) and HFM12 (DZ1 and extension down to 179 m borehole length)	Present and inferred to be an integral part of the deformation along the zone. Strong, low-temperature ductile deformation throughout the zone with the development of mylonite. Also situated in broader belt with strong, high-temperature ductile deformation
Brittle deformation			High	Surface geology, intersections along HFM11 (DZ1) and HFM12 (DZ1 and extension down to 179 m borehole length)	Increased frequency of fractures. Cohesive breccia, cataclasite and ultra-cataclasite observed at surface. No complementary data from percussion boreholes
Alteration			High	Surface geology, intersections along HFM11 (DZ1) and HFM12 (DZ1 and extension down to 179 m borehole length), character of lineament MFM0015	Red-stained bedrock with fine-grained hematite dissemination
Fracture orientation (strike/dip, right-hand-rule method)	Mean orientation of SE fracture set = 130/88	Fisher κ value of SE fracture set = 22	Medium	Intersections along HFM11 (DZ1) and HFM12 (DZ1 and extension down to 179 m borehole length), N=516	Steeply dipping fractures that strike SE dominate. Gently dipping and NE steeply-dipping fractures are also present

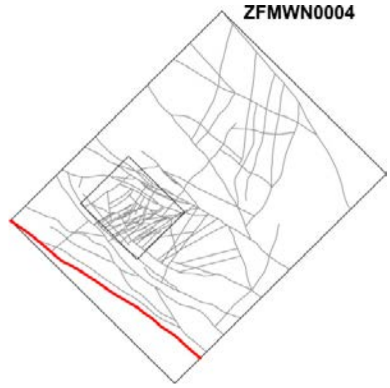
Vertical or steeply dipping deformation zones with WNW or NW strike ZFMNW0003 (Eckarfjärden deformation zone)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
					
Fracture frequency	Mean 4 m^{-1}	Span 0-81 m^{-1}	Low	Intersections along HFM11 (DZ1) and HFM12 (DZ1 and extension down to 179 m borehole length)	Dominance of sealed fractures. Quantitative estimate and span include sealed fracture networks. Generally higher fracture frequency in the 83-116 m interval in HFM11 and the 147-179 m interval in HFM12, i.e. the south-western side of the zone. Fracture frequency underestimated, only data from percussion boreholes
Fracture filling			High	Surface geology, intersections along HFM11 (DZ1) and HFM12 (DZ1 and extension down to 179 m borehole length)	Surface geology: Epidote, quartz, calcite, chlorite. Restricted information from percussion boreholes
Sense of displacement			High	Surface geology	Steeply dipping faults with NNW strike, epidote striae, sinistral strike-slip. NW compression Steeply dipping faults with NW strike, epidote striae, dextral reverse slip. NS compression. Epidote-filled tension gashes along steeply dipping fractures with NS strike indicate EW extension. A fault with gentle dip to SSE, epidote and chlorite striae, dip-slip. Younger, steeply dipping faults with 1. ENE and 2. NNE to NE strike offset steep NW structures. Inferred conjugate set with sinistral strike-slip and dextral strike-slip displacement, respectively. NE compression. No complementary data from percussion boreholes

Vertical or steeply dipping deformation zones with WNW or NW strike

ZFMWNW0004 (Forsmark deformation zone along DZ1, DZ2 and intermediate borehole interval in KFM12A)

Property	Quantitative estimate	Span	Confidence level	Basis for interpretation	Comments

Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM0014. Modelled to base of regional model volume using dip that has been inferred from intersection with borehole intersection in KFM12A (DZ1, DZ2 and intermediate borehole interval). Zone also intersects HFM37 (DZ1, DZ2 and DZ3). Included only in regional model. Not present inside local model volume.



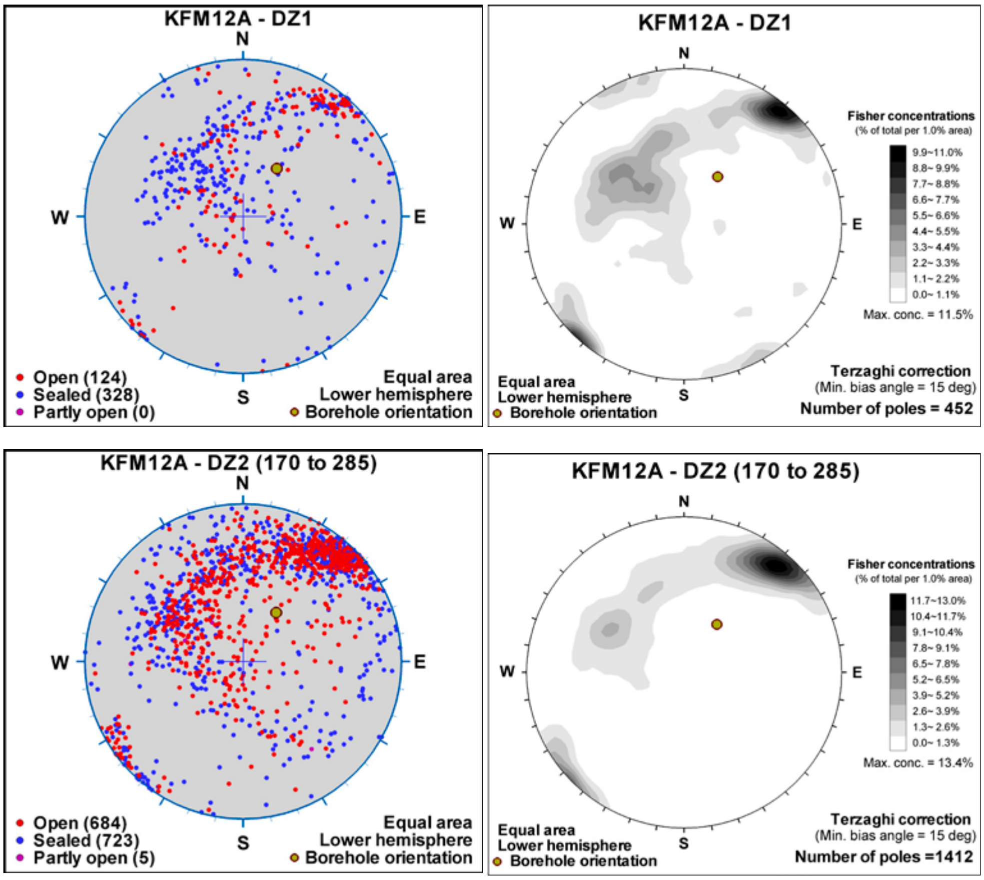
Confidence of existence: High

Single hole interpretation: For identification and short descriptions of DZ1 and DZ2 in KFM12A, and DZ1, DZ2 and DZ3 in HFM37, see SKB P-07-110. For character and kinematics of DZ1 and DZ2 in KFM12A, see SKB P-07-111.

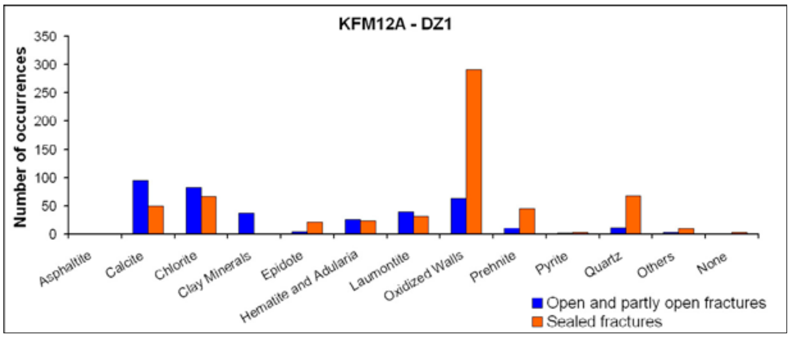
Several intervals of fault core identified composed of cataclasite (see photograph below), ultra-cataclasite, fault breccia, sealed fracture networks including epidote-sealed networks, and crush zones (see photograph below). The interval between 312 and 338 m is most conspicuous. Vuggy rock with dissolution of quartz is also present along borehole interval 230–240 m.

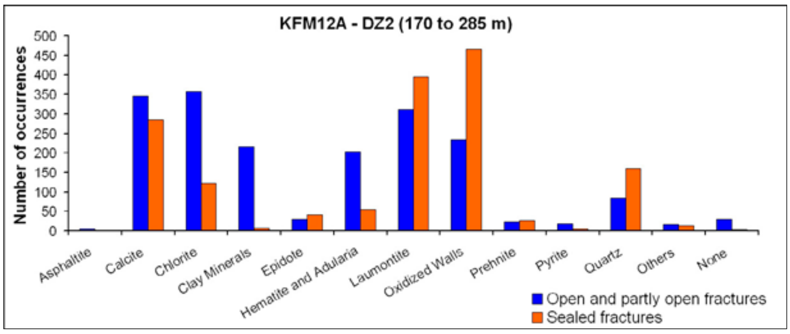
Photographs showing cataclastic rock (upper) and crush rock (lower) along separate fault core intervals. Cohesive fault breccia is also present in the lower photograph (after SKB P-07-111)

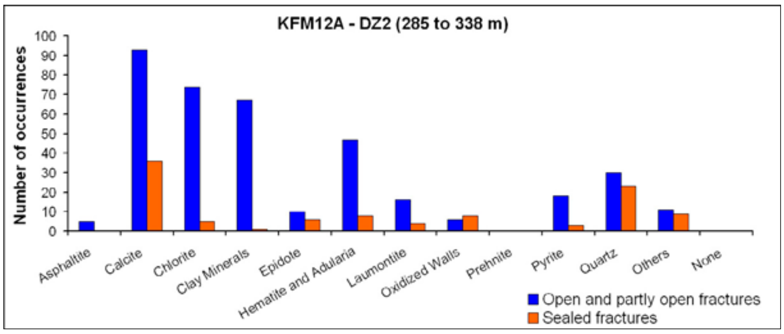
Position		± 20 m (surface)	High	Low magnetic lineament MFM0014, intersection along borehole KFM12A (DZ1 and DZ2 including intermediate borehole interval)	Span estimate refers to the uncertainty in the position of the central part of the zone
Orientation (strike/dip, right-hand-rule method)	125/90	± 5/± 10	High	Strike based on trend of lineament MFM0014. Dip based on linking MFM0014 at the surface with intersection along borehole KFM12A (DZ1 and DZ2 including intermediate borehole interval)	
Thickness	143 m	50-200 m	Medium	Intersection along borehole KFM12A (DZ1 and DZ2 including intermediate borehole interval). Span estimated on the basis of the range in thickness of steeply dipping zones greater than 10000 m in length	Thickness refers to both ductile and brittle components, and both damage zone and core in the brittle component.
Length	70 km		Medium	Low magnetic lineament MFM0014	Total trace length at ground surface. Extends outside regional model volume
Ductile deformation			High	Surface geology outside the regional model volume, intersection along borehole KFM12A (DZ1 and DZ2 including intermediate borehole interval)	Present and inferred to be an integral part of the deformation along the zone
Brittle deformation			High	Surface geology outside the regional model volume, intersection along borehole KFM12A (DZ1 and DZ2 including intermediate borehole interval)	Increased frequency of sealed and open fractures, including sealed networks and crush zones. Cataclasite, ultra-cataclasite and fault breccia present. Several fault core intervals.
Alteration			High	Character of lineament MFM0014, intersection along borehole KFM12A (DZ1 and DZ2 including intermediate borehole interval)	Red-stained bedrock with fine-grained hematite dissemination. Vuggy rock also present along one borehole interval
Fracture orientation			Medium	Intersection along borehole KFM12A (DZ1 and DZ2 including intermediate borehole interval)	Steeply dipping fractures with NW-SE strike and dip predominantly to the south-west and more gently dipping fractures dipping to the south-east are prominent. Fractures with other orientations (e.g. steep ENE-WSW) are also present

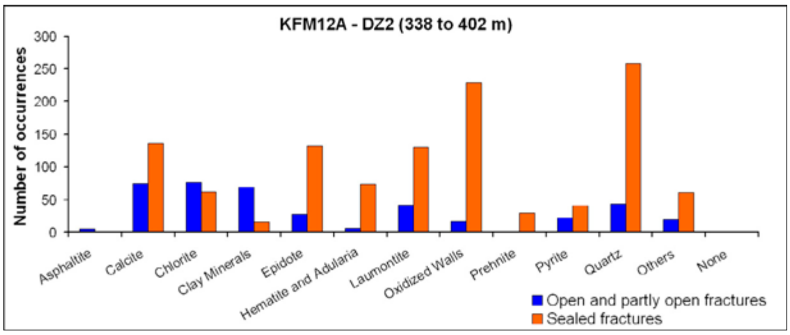


Fracture frequency	Mean = 79 m^{-1}	Span = 7-313 m^{-1}	Medium	Intersection along borehole KFM12A (DZ1 and DZ2 including intermediate borehole interval)	
Fracture filling			Medium	Intersection along borehole KFM12A (DZ1 and DZ2 including intermediate borehole interval)	Chlorite, calcite, laumontite, hematite/adularia, quartz, clay minerals, epidote, prehnite and pyrite. Note locally some asphaltite


KFM12A - DZ1
Number of occurrences
350
300
250
200
150
100
50
0
Asphaltite
Calcite
Chlorite
Clay Minerals
Epidote
Hematite and Adularia
Laumontite
Oxidized Walls
Prehnite
Pyrite
Quartz
Others
None
Open and partly open fractures
Sealed fractures


KFM12A - DZ2 (170 to 285 m)
Number of occurrences
500
450
400
350
300
250
200
150
100
50
0
Asphaltite
Calcite
Chlorite
Clay Minerals
Epidote
Hematite and Adularia
Laumontite
Oxidized Walls
Prehnite
Pyrite
Quartz
Others
None
Open and partly open fractures
Sealed fractures


KFM12A - DZ2 (285 to 338 m)
Number of occurrences
100
90
80
70
60
50
40
30
20
10
0
Asphaltite
Calcite
Chlorite
Clay Minerals
Epidote
Hematite and Adularia
Laumontite
Oxidized Walls
Prehnite
Pyrite
Quartz
Others
None
Open and partly open fractures
Sealed fractures


KFM12A - DZ2 (338 to 402 m)
Number of occurrences
300
250
200
150
100
50
0
Asphaltite
Calcite
Chlorite
Clay Minerals
Epidote
Hematite and Adularia
Laumontite
Oxidized Walls
Prehnite
Pyrite
Quartz
Others
None
Open and partly open fractures
Sealed fractures

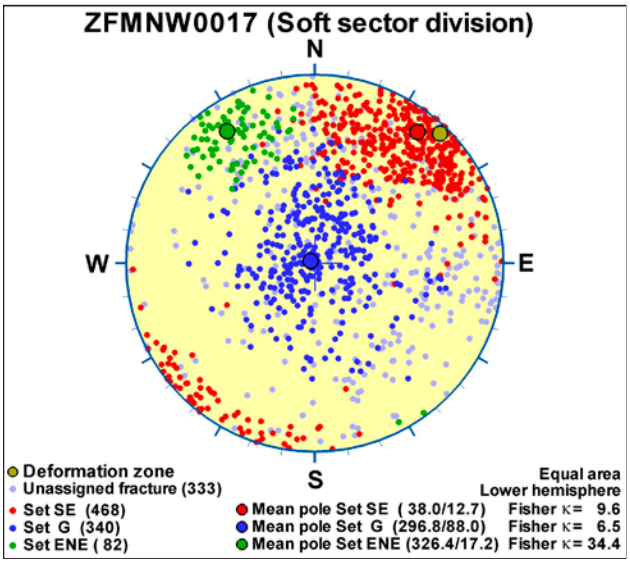
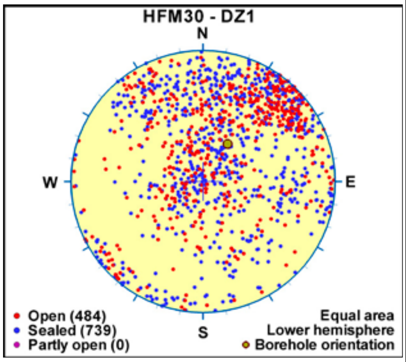
Sense of displacement			High	Intersection along borehole KFM12A (DZ1 and DZ2 including intermediate borehole interval). Fault striae on chlorite, hematite, laumontite, calcite and some clay minerals; calcite and laumontite steps	*Steeply dipping faults with NW-SE or WNW-ESE strike (28).* Strike-slip with sinistral or dextral displacement. Oblique-slip including dominant sinistral or dextral strike-slip component, dextral strike-slip, sinistral strike-slip, reverse dip-slip or normal dip-slip displacement. *Steeply dipping faults with ENE-WSW or NE-SW strike (7).* Sinistral strike-slip or uncertain sense of shear. *Steeply dipping faults with NNE-SSW strike (3).* Reverse dip-slip or oblique-slip with dominant strike-slip component. *Gently dipping faults (5).* Reverse dip-slip, oblique-slip with dominant strike-slip component or strike-slip with dextral or sinistral displacement

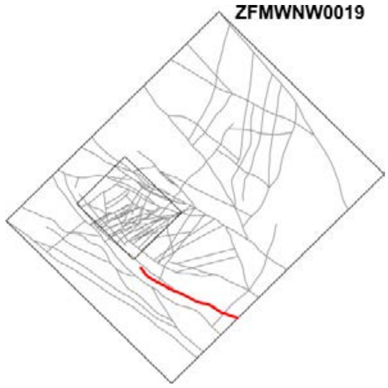
Vertical or steeply dipping deformation zones with WNW or NW strike

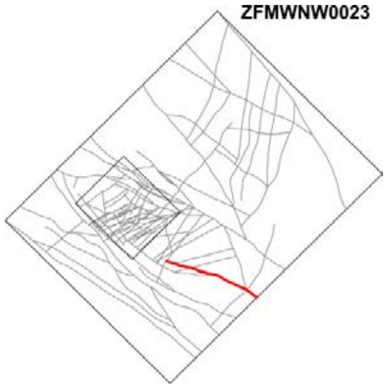
ZFMWNW0016

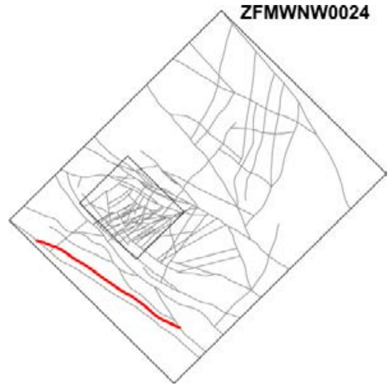
Property	Quantitative estimate	Span	Confidence level	Basis for interpretation	Comments
Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM0016. Modelled to base of regional model volume using an assumed dip of 90° based on a comparison with high confidence, vertical or steeply dipping zones with WNW or NW strike. Included only in regional model. Not present inside local model volume.					
Confidence of existence: Medium (not confirmed by direct geological observation)					
Position		± 20 m (surface)	High	Low magnetic lineament MFM0016	Span estimate refers to the uncertainty in the position of the central part of the zone
Orientation (strike/dip, right-hand-rule method)	123/90	± 5/± 10	High for strike, low for dip	Strike based on trend of lineament MFM0016. Dip based on comparison with high confidence, vertical or steeply dipping zones with WNW or NW strike	
Thickness	45 m	15-64 m	Low	Estimated on basis of length – thickness correlation diagram in SKB R-07-50. Span estimated on the basis of the range in thickness of steeply dipping zones between 3000 and 10000 m in length	Thickness refers to both ductile and brittle components, and both damage zone and core in the brittle component.
Length	8060 m		Medium	Low magnetic lineament MFM0016. Terminated to the north-west against ZFMNW0003	Total trace length at ground surface. Extends to the south-east outside regional model volume
Ductile deformation			Low	Comparison with majority of high confidence, vertical or steeply dipping zones with WNW or NW strike in regional model	Assumed to be present
Brittle deformation			Low	Comparison with high confidence, vertical or steeply dipping zones with WNW or NW strike	Assumed to be present
Alteration			Medium	Character of lineament MFM0016	Red-stained bedrock with fine-grained hematite dissemination
No more data					

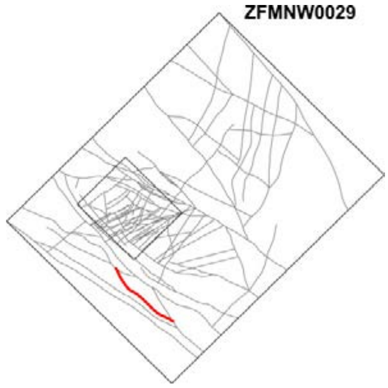
<table>
<tr><th colspan="6">Vertical or steeply dipping deformation zones with WNW or NW strike
ZFMNW0017 (DZ1 in HFM30)</th></tr>
<tr><th>Property</th><th>Quantitative estimate</th><th>Span</th><th>Confidence level</th><th>Basis for interpretation</th><th>Comments</th></tr>
<tr><td colspan="4">Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM0017. Modelled to base of regional model volume using the dip estimated by connecting lineament MFM0017 with the borehole intersection 79-201 m in HFM30 (DZ1). Deformation zone plane placed within core of zone that occurs along the borehole interval 158-167 m with a fixed point at 158 m. Decreased radar penetration along the borehole interval 158-167 m. Included in regional model and also present inside local model volume.</td><td colspan="2">
</td></tr>
<tr><td colspan="6">Confidence of existence: High</td></tr>
<tr><td colspan="6">Single hole interpretation: For identification and short description of DZ1 in HFM30, see SKB P-06-207. No cored borehole data</td></tr>
<tr><td>Position</td><td></td><td>± 20 m (surface)<table><tr><th colspan="3">HFM30</th></tr><tr><td>dx (m)</td><td>dy (m)</td><td>dz (m)</td></tr><tr><td>6</td><td>6</td><td>3</td></tr></table></td><td>High</td><td>Intersection along HFM30 (DZ1), low magnetic lineament MFM0017</td><td>Span estimate refers to the uncertainty in the position of the central part of the zone</td></tr>
<tr><td>Orientation (strike/dip, right-hand-rule method)</td><td>135/85</td><td>± 5/± 10</td><td>High</td><td>Strike based on trend of lineament MFM0017. Dip based on linking MFM0017 at the surface with borehole intersection along HFM30 (DZ1)</td><td></td></tr>
<tr><td>Thickness</td><td>64 m</td><td>15-64 m</td><td>Medium</td><td>Intersection along HFM30 (DZ1). Span estimated on the basis of the range in thickness of steeply dipping zones between 3000 and 10000 m in length</td><td>Thickness refers to both ductile and brittle components, and both damage zone and core in the brittle component.</td></tr>
<tr><td>Length</td><td>7924 m</td><td></td><td>High</td><td>Low magnetic lineament MFM0017. Terminated against ZFMWNW0019 and ZFMEW0137</td><td>Total trace length at ground surface</td></tr>
<tr><td>Ductile deformation</td><td></td><td></td><td>Low</td><td>Comparison with high confidence, vertical or steeply-dipping zones with WNW or NW strike</td><td>Assumed to be present. Difficult to determine on the basis of percussion drilling</td></tr>
<tr><td>Brittle deformation</td><td></td><td></td><td>High</td><td>Intersection along HFM30 (DZ1)</td><td>Increased frequency of fractures. Complementary data not provided from percussion borehole</td></tr>
</table>

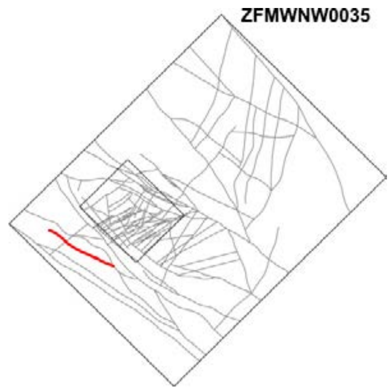
Alteration			High	Intersection along HFM30 (DZ1), character of lineament MFM0017	Red-stained bedrock with fine-grained hematite dissemination
Fracture orientation (strike/dip, right-hand-rule method)	Mean orientation of SE fracture set = 128/77 Mean orientation of gentle fracture set = 027/2 Mean orientation of ENE fracture set = 056/73	Fisher κ value of SE fracture set = 10 Fisher κ value of gentle fracture set = 7 Fisher κ value of ENE fracture set = 34	Medium	Intersection along HFM30 (DZ1), N=1223	Fractures that strike SE and dip steeply to the SW dominate. Gently dipping fractures as well as steeply dipping fractures that vary in strike between NE and E are also prominent
					
Fracture frequency	Mean 17 m^{-1} Mean along interval 158-167 m is 43 m^{-1}	Span 0-193 m^{-1} Span along interval 158-167 m is 15-193 m^{-1}	Low	Intersection along HFM30 (DZ1)	Dominance of sealed fractures. Quantitative estimate and span include sealed fracture networks and crush zones. Higher fracture frequency along the borehole interval 158-167 m. Fracture frequency probably underestimated, since data only from percussion borehole
Fracture filling				Intersection along HFM30 (DZ1)	No data from percussion borehole
Sense of displacement				Intersection along HFM30 (DZ1)	Complementary data not provided from percussion borehole

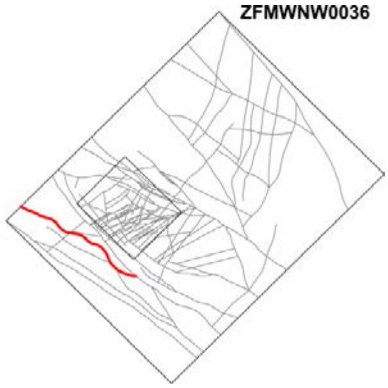
Vertical or steeply dipping deformation zones with WNW or NW strike ZFMWNW0019					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM0019. Modelled to base of regional model volume using an assumed dip of 85^{o} to the south-west based on a comparison with high confidence zone ZFMNW0017. Included only in regional model. Not present inside local model volume.					
Confidence of existence: Medium (not confirmed by direct geological observation)					
Position		± 20 m (surface)	High	Low magnetic lineament MFM0019	Span estimate refers to the uncertainty in the position of the central part of the zone
Orientation (strike/dip, right-hand-rule method)	116/85	± 5/± 10	High for strike, low for dip	Strike based on trend of lineament MFM0019. Dip based on comparison with high confidence zone ZFMNW0017	
Thickness	45 m	15-64 m	Low	Estimated on basis of length – thickness correlation diagram in SKB R-07-50. Span estimated on the basis of the range in thickness of steeply dipping zones between 3000 and 10000 m in length	Thickness refers to both ductile and brittle components, and both damage zone and core in the brittle component.
Length	8760 m		Medium	Low magnetic lineament MFM0019	Total trace length at ground surface. Extends to the south-east outside regional model volume
Ductile deformation			Low	Comparison with majority of high confidence, vertical and steeply dipping zones with WNW or NW strike in regional model	Assumed to be present
Brittle deformation			Low	Comparison with high confidence, vertical or steeply dipping zones with WNW or NW strike	Assumed to be present
Alteration			Medium	Character of lineament MFM0019	Red-stained bedrock with fine-grained hematite dissemination
No more data					

Vertical or steeply dipping deformation zones with WNW or NW strike **ZFMWNW0023**					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM0023. Modelled to base of regional model volume using an assumed dip of 82^{o} to the south-west based on a comparison with high confidence zone ZFMWNW0123. Included only in regional model. Not present inside local model volume.					
Confidence of existence: Medium (not confirmed by direct geological observation)					
Position		± 20 m (surface)	High	Low magnetic lineament MFM0023	Span estimate refers to the uncertainty in the position of the central part of the zone
Orientation (strike/dip, right-hand-rule method)	111/82	± 5/± 10	High for strike, low for dip	Strike based on trend of lineament MFM0023. Dip based on comparison with high confidence zone ZFMWNW0123	
Thickness	45 m	15-64 m	Low	Estimated on basis of length – thickness correlation diagram in SKB R-07-50. Span estimated on the basis of the range in thickness of steeply dipping zones between 3000 and 10000 m in length	Thickness refers to total zone thickness (damage zone and core)
Length	7665 m		Medium	Low magnetic lineament MFM0023. Terminated to the north-west against ZFMNE0065	Total trace length at ground surface. Extends to the south-east outside regional model volume
Ductile deformation			Low	Zone terminates against at least one zone with solely brittle deformation	Assumed not to be present.
Brittle deformation			Low	Comparison with high confidence, vertical or steeply dipping zones with WNW or NW strike	Assumed to be present
Alteration			Medium	Character of lineament MFM0023	Red-stained bedrock with fine-grained hematite dissemination
No more data					

Vertical or steeply dipping deformation zones with WNW or NW strike ZFMWNW0024					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM0024. Modelled to base of regional model volume using an assumed dip of 90° based on a comparison with high confidence, vertical or steeply dipping zones with WNW or NW strike. Included only in regional model. Not present inside local model volume.					
Confidence of existence: Medium (not confirmed by direct geological observation)					
Position		± 20 m (surface)	High	Low magnetic lineament MFM0024	Span estimate refers to the uncertainty in the position of the central part of the zone
Orientation (strike/dip, right-hand-rule method)	124/90	± 5/± 10	High for strike, low for dip	Strike based on trend of lineament MFM0024. Dip based on comparison with high confidence, vertical or steeply dipping zones with WNW or NW strike	
Thickness	45 m	15-64 m	Low	Estimated on basis of length – thickness correlation diagram in SKB R-07-50. Span estimated on the basis of the range in thickness of steeply dipping zones between 3000 and 10000 m in length	Thickness refers to both ductile and brittle components, and both damage zone and core in the brittle component.
Length	7986 m		High	Low magnetic lineament MFM0024. Terminated against ZFMNW0003 and ZFMWNW0004	Total trace length at ground surface
Ductile deformation			Low	Comparison with majority of high confidence, vertical or steeply-dipping zones with WNW or NW strike in regional model	Assumed to be present
Brittle deformation			Low	Comparison with high confidence, vertical or steeply-dipping zones with WNW or NW strike	Assumed to be present
Alteration			Medium	Character of lineament MFM0024	Red-stained bedrock with fine-grained hematite dissemination
No more data					

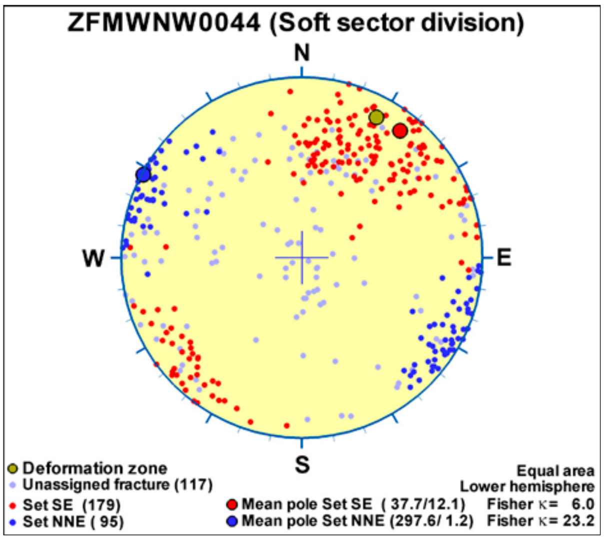
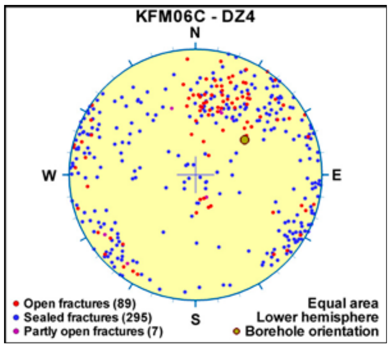
<table>
<tr><th colspan="6">Vertical or steeply dipping deformation zones with WNW or NW strike
ZFMNW0029</th></tr>
<tr><th>Property</th><th>Quantitative estimate</th><th>Span</th><th>Confidence level</th><th>Basis for interpretation</th><th>Comments</th></tr>
<tr><td colspan="4">Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM0029. Modelled to base of regional model volume using an assumed dip of 90° based on a comparison with high confidence, vertical or steeply dipping zones with WNW or NW strike. Included only in regional model. Not present inside local model volume.</td><td colspan="2">
</td></tr>
<tr><td colspan="6">Confidence of existence: Medium (not confirmed by direct geological observation)</td></tr>
<tr><td>Position</td><td></td><td>± 20 m (surface)</td><td>High</td><td>Low magnetic lineament MFM0029</td><td>Span estimate refers to the uncertainty in the position of the central part of the zone</td></tr>
<tr><td>Orientation (strike/dip, right-hand-rule method)</td><td>133/90</td><td>± 5/± 10</td><td>High for strike, low for dip</td><td>Strike based on trend of lineament MFM0029. Dip based on comparison with high confidence, vertical or steeply dipping zones with WNW or NW strike</td><td></td></tr>
<tr><td>Thickness</td><td>30 m</td><td>15-64 m</td><td>Low</td><td>Estimated on basis of length – thickness correlation diagram in SKB R-07-50. Span estimated on the basis of the range in thickness of steeply dipping zones between 3000 and 10000 m in length</td><td>Thickness refers to both ductile and brittle components, and both damage zone and core in the brittle component.</td></tr>
<tr><td>Length</td><td>3792 m</td><td></td><td>High</td><td>Low magnetic lineament MFM0029. Terminated against ZFMNW0003 and ZFMWNW0036</td><td>Total trace length at ground surface</td></tr>
<tr><td>Ductile deformation</td><td></td><td></td><td>Low</td><td>Comparison with majority of high confidence, vertical or steeply-dipping zones with WNW or NW strike in regional model</td><td>Assumed to be present</td></tr>
<tr><td>Brittle deformation</td><td></td><td></td><td>Low</td><td>Comparison with high confidence, vertical or steeply-dipping zones with WNW or NW strike</td><td>Assumed to be present</td></tr>
<tr><td>Alteration</td><td></td><td></td><td>Medium</td><td>Character of lineament MFM0029</td><td>Red-stained bedrock with fine-grained hematite dissemination</td></tr>
<tr><td colspan="6">No more data</td></tr>
</table>

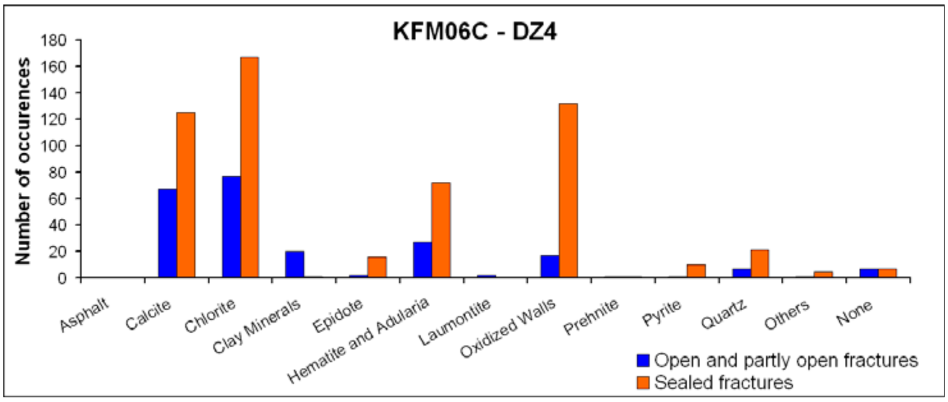
<table>
<tr><th colspan="6">Vertical or steeply dipping deformation zones with WNW or NW strike
ZFMWNW0035</th></tr>
<tr><th>Property</th><th>Quantitative estimate</th><th>Span</th><th>Confidence level</th><th>Basis for interpretation</th><th>Comments</th></tr>
<tr><td colspan="4">Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM0035. Modelled to base of regional model volume using an assumed dip of 90° based on a comparison with high confidence, vertical or steeply dipping zones with WNW or NW strike. Included only in regional model. Not present inside local model volume.</td><td colspan="2">
</td></tr>
<tr><td colspan="6">Confidence of existence: Medium (not confirmed by direct geological observation)</td></tr>
<tr><td>Position</td><td></td><td>± 20 m (surface)</td><td>High</td><td>Low magnetic lineament MFM0035</td><td>Span estimate refers to the uncertainty in the position of the central part of the zone</td></tr>
<tr><td>Orientation (strike/dip, right-hand-rule method)</td><td>120/90</td><td>± 5/± 10</td><td>High for strike, low for dip</td><td>Strike based on trend of lineament MFM0035. Dip based on comparison with high confidence, vertical or steeply dipping zones with WNW or NW strike</td><td></td></tr>
<tr><td>Thickness</td><td>25 m</td><td>15-64 m</td><td>Low</td><td>Estimated on basis of length – thickness correlation diagram in SKB R-07-50. Span estimated on the basis of the range in thickness of steeply dipping zones between 3000 and 10000 m in length</td><td>Thickness refers to both ductile and brittle components, and both damage zone and core in the brittle component.</td></tr>
<tr><td>Length</td><td>3507 m</td><td></td><td>High</td><td>Low magnetic lineament MFM0035. Terminated to the south-east against ZFMWNW0036</td><td>Total trace length at ground surface</td></tr>
<tr><td>Ductile deformation</td><td></td><td></td><td>Low</td><td>Comparison with majority of high confidence, vertical or steeply-dipping zones with WNW or NW strike in regional model</td><td>Assumed to be present</td></tr>
<tr><td>Brittle deformation</td><td></td><td></td><td>Low</td><td>Comparison with high confidence, vertical or steeply-dipping zones with WNW or NW strike</td><td>Assumed to be present</td></tr>
<tr><td>Alteration</td><td></td><td></td><td>Medium</td><td>Character of lineament MFM0035</td><td>Red-stained bedrock with fine-grained hematite dissemination</td></tr>
<tr><td colspan="6">No more data</td></tr>
</table>

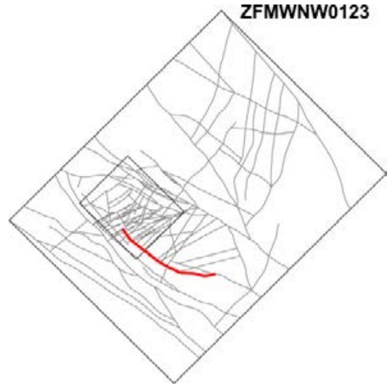
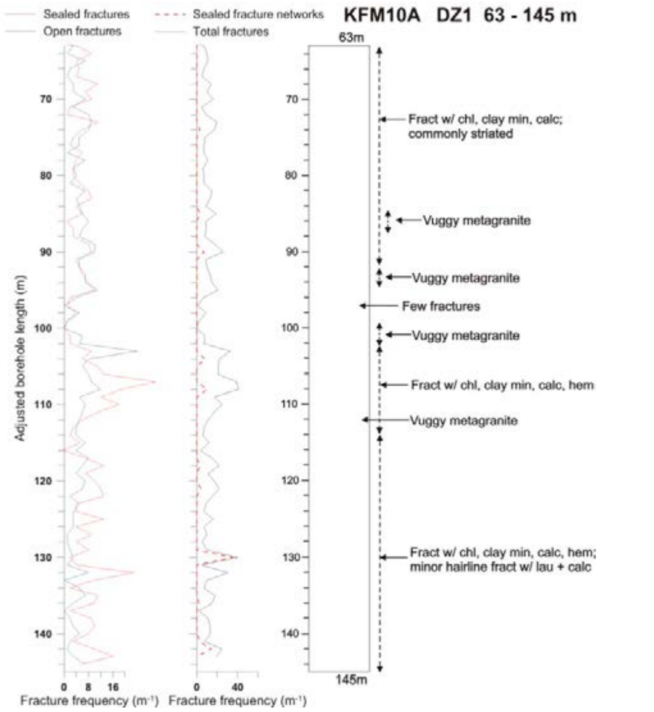
Vertical or steeply dipping deformation zones with WNW or NW strike ZFMWNW0036					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM0036. Modelled to base of regional model volume using an assumed dip of 90° based on a comparison with high confidence, vertical or steeply dipping zones with WNW or NW strike. Included only in regional model. Not present inside local model volume.			 		
Confidence of existence: Medium (not confirmed by direct geological observation)					
Position		± 20 m (surface)	High	Low magnetic lineament MFM0036	Span estimate refers to the uncertainty in the position of the central part of the zone
Orientation (strike/dip, right-hand-rule method)	123/90	± 10/± 10	High for strike, low for dip	Strike based on trend of lineament MFM0036. Dip based on comparison with high confidence, vertical or steeply dipping zones with WNW or NW strike	
Thickness	55 m	50-200 m	Low	Estimated on basis of length – thickness correlation diagram in SKB R-07-50. Span estimated on the basis of the range in thickness of steeply dipping zones greater than 10000 m in length	Thickness refers to both ductile and brittle components, and both damage zone and core in the brittle component.
Length	11 km		Medium	Low magnetic lineament MFM0036. Terminated to the south-east against ZFMNW0003	Total trace length at ground surface. Extends to the north-west outside regional model volume
Ductile deformation			Low	Comparison with majority of high confidence, vertical or steeply-dipping zones with WNW or NW strike in regional model	Assumed to be present
Brittle deformation			Low	Comparison with high confidence, vertical or steeply-dipping zones with WNW or NW strike	Assumed to be present
Alteration			Medium	Character of lineament MFM0036	Red-stained bedrock with fine-grained hematite dissemination
No more data					

<table>
<tr><th colspan="6">Vertical or steeply dipping deformation zones with WNW or NW strike
ZFMWNW0044 (DZ4 in KFM06C)</th></tr>
<tr><th>Property</th><th>Quantitative estimate</th><th>Span</th><th>Confidence level</th><th>Basis for interpretation</th><th>Comments</th></tr>
<tr><td colspan="4">Modelling procedure: At the surface, corresponds to the low magnetic lineaments MFM0044 and MFM0044G0. Modelled down to 850 m depth, using the dip estimated by connecting the lineament segments with the borehole intersection 502-555 m in KFM06C (DZ4). Deformation zone plane placed at fixed point 536 m where both a crush zone and a sealed fracture network are present. Decreased radar penetration also along the borehole interval 532-540 m. Included in local model.</td><td colspan="2">
</td></tr>
<tr><td colspan="6">Confidence of existence: High</td></tr>
<tr><td colspan="6">Single-hole interpretation: For identification and short description of DZ4 in KFM06C, see SKB P-06-83. Zone is situated along and directly beneath the contact between fine-grained, albitised metagranite (altered Group B rock) and fine- to medium-grained metagranitoid (Group C rock) along DZ4 in KFM06C. For character and kinematics, see P-07-101.

</td></tr>
<tr><td>Position</td><td></td><td>± 20 m (surface close to MFM0044)
± 10 m (surface close to MFM0044G0)
<table><tr><th colspan="3">KFM06C</th></tr><tr><td>dx (m)</td><td>dy (m)</td><td>dz (m)</td></tr><tr><td>5</td><td>6</td><td>4</td></tr></table></td><td>High</td><td>Intersection along DZ4 in KFM06C, low magnetic lineaments MFM0044 and MFM0044G0.</td><td>Span estimate refers to the uncertainty in the position of the central part of the zone</td></tr>
<tr><td>Orientation (strike/dip, right-hand-rule method)</td><td>113/77</td><td>± 5/± 10</td><td>High</td><td>Strike based on trend of lineaments MFM0040 MFM0044G0. Dip based on linking MFM0044 and MFM0044G0 at the surface with borehole intersection along KFM06C (DZ4)</td><td></td></tr>
</table>

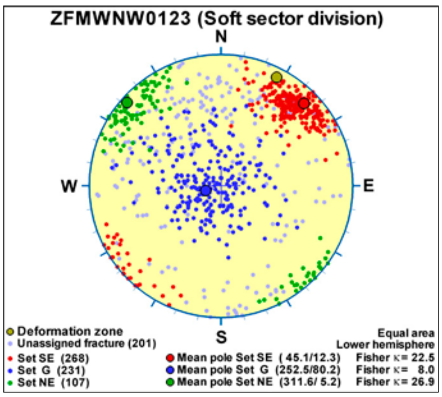
Vertical or steeply dipping deformation zones with WNW or NW strike ZFMWNW0044 (DZ4 in KFM06C)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Thickness	40 m	3-50 m	Medium	Intersection along KFM06C (DZ4). Span estimated on the basis of the range in thickness of steeply dipping zones between 1000 and 3000 m in length	Thickness refers to total zone thickness (damage zone and core)
Length	1179 m		High	Low magnetic lineaments MFM0044 and MFM0044G0. Terminated by ZFMENE0062A and ZFMWNW2225	Total trace length at ground surface
Ductile deformation			High	Intersection along KFM06C (DZ4)	Not present
Brittle deformation			High	Intersection along KFM06C (DZ4)	Increased frequency of fractures. Fault core with sealed fractures in network and open fractures along crush zone at 535-538 m
Alteration			High	Intersection along KFM06C (DZ4), character of lineaments MFM0044 and MFM0044G0	Red-stained bedrock with fine-grained hematite dissemination
Fracture orientation (strike/dip, right-hand-rule method)	Mean orientation of SE fracture set = 128/78 Mean orientation of NNE fracture set = 028/89	Fisher κ value of SE fracture set = 6 Fisher κ value of NNE fracture set = 23	Medium	Intersection along KFM06C (DZ4), N=391	Fractures that strike ESE to SE and dip steeply to the SSW to SW as well as sub-vertical fractures that strike NNE-SSW form conspicuous fracture sets
					
Fracture frequency	Mean 14 m^{-1}	Span 2-74 m^{-1}	Medium	Intersection along KFM06C (DZ4)	Dominance of sealed fractures. Quantitative estimate and span include sealed fracture networks and crush zones

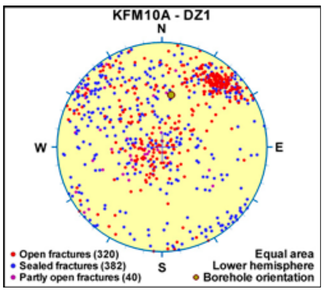
<table>
<tr><th colspan="6">Vertical or steeply dipping deformation zones with WNW or NW strike
ZFMWNW0044 (DZ4 in KFM06C)</th></tr>
<tr><th>Property</th><th>Quantitative estimate</th><th>Span</th><th>Confidence level</th><th>Basis for interpretation</th><th>Comments</th></tr>
<tr><td rowspan="2">Fracture filling</td><td></td><td></td><td>Medium</td><td>Intersection along KFM06C (DZ4)</td><td>Chlorite, calcite, hematite/adularia, quartz, clay minerals, epidote</td></tr>
<tr><td colspan="5">
</td></tr>
<tr><td>Sense of displacement</td><td></td><td></td><td></td><td>Intersection along KFM06C (DZ4). Minor faults with shear striae on chlorite, hematite and clay minerals and calcite steps</td><td>Steep faults with N, SSW or NNE strike (5) show strike-slip displacement, one of which is sinistral. A moderately S-dipping fault (1) shows dip-slip displacement</td></tr>
</table>

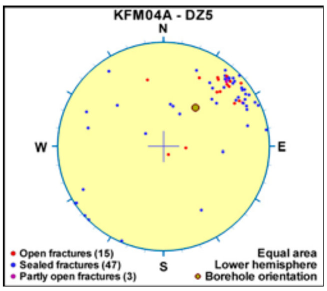
<table>
<tr><th colspan="6">Vertical or steeply dipping deformation zones with WNW or NW strike
ZFMWNW0123 (DZ1 in KFM10A, DZ1, DZ2 and DZ3 in HFM24, DZ1, DZ2 and DZ3 in HFM29 and DZ5 in KFM04A; vuggy rock)</th></tr>
<tr><th>Property</th><th>Quantitative estimate</th><th>Span</th><th>Confidence level</th><th>Basis for interpretation</th><th>Comments</th></tr>
<tr><td colspan="4">Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM0123. Modelled to base of regional model volume using the dip estimated by connecting lineament MFM0123 with the borehole intersections 63-145 m in KFM10A (DZ1), 18-32 m, 42-63 m and 67-103 m in HFM24 (DZ1, DZ2 and DZ3), 19-25 m, 62-81 m and 146-150 m in HFM29 (DZ1, DZ2 and DZ3), and 654-661 m in KFM04A (DZ5). Deformation zone plane passes through fixed points 108 m in KFM10A, 69 m in HFM29 and 656 m in KFM04A. Decreased radar penetration along the borehole interval 85-120 m in KFM10A. Included in regional model and also present inside local model volume.</td><td colspan="2">
</td></tr>
<tr><td colspan="6">Confidence of existence: High</td></tr>
<tr><td colspan="4">Single hole interpretation: For identification and short description of deformation zones in boreholes, see SKB P-04-119, SKB P-06-207 and SKB P-06-210. For character and kinematics of DZ1 in KFM10A, see SKB P-07-101. Such data are lacking along DZ5 in KFM04A

</td><td colspan="2">KFM10A DZ1

KFM04A DZ5
</td></tr>
<tr><td>Position</td><td></td><td>± 20 m (surface)
KFM04A
dx (m) / dy (m) / dz (m)
5 / 5 / 3
KFM10A
1 / 1 / 1</td><td>High</td><td>Intersections along DZ5 in KFM04A and DZ1 in KFM10A, low magnetic lineament MFM0123</td><td>Span estimate refers to the uncertainty in the position of the central part of the zone</td></tr>
</table>

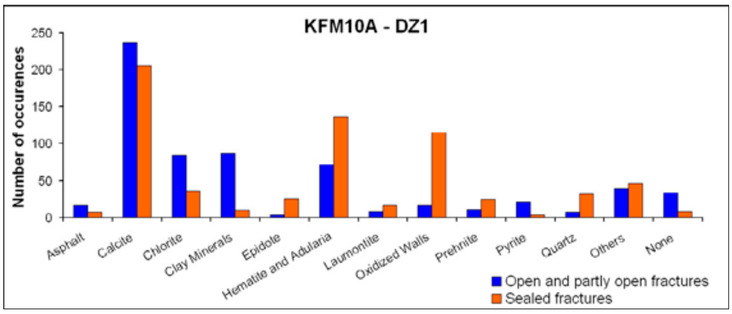
Orientation (strike/dip, right-hand-rule method)	117/82	± 5/± 10	High	Strike based on trend of lineament MFM0123. Dip based on linking MFM0123 at the surface with borehole intersections along KFM10A (DZ1), HFM24 (DZ1, DZ2 and DZ3), HFM29 (DZ1, DZ2 and DZ3) and KFM04A (DZ5)	
Thickness	52 m	15-64 m	Medium	Intersection along DZ1 in KFM10A. Span estimated on the basis of the range in thickness of steeply dipping zones between 3000 and 10000 m in length	Thickness refers to both ductile and brittle components, and both damage zone and core in the brittle component. Borehole intersection in KFM04A is not included since close to the north-western termination of the zone
Length	5086 m		High	Low magnetic lineament MFM0123. Terminated against ZFMWNW0023 and ZFMENE0060A	Total trace length at ground surface
Ductile deformation			High	Intersections along DZ1 in KFM10A and DZ5 in KFM04A	Strongly foliated bedrock present. Inferred to be an integral part of the deformation along the zone
Brittle deformation			High	Intersections along DZ1 in KFM10A and DZ5 in KFM04A	Increased frequency of fractures. No fault core identified along DZ1 in KFM10A. However, sealed fracture networks, fault breccias and crush zones are present along the zone. No complementary data from DZ5 in KFM04A
Alteration			High	Intersections along DZ1 in KFM10A and DZ5 in KFM04A, character of lineament MFM0123	Red-stained bedrock with fine-grained hematite dissemination, epidotization, short intervals of altered vuggy rock along borehole interval 90-120 m in KFM10A (DZ1)
Fracture orientation (strike/dip, right-hand-rule method)	Mean orientation of SE fracture set = 135/78 Mean orientation of NE fracture set = 042/85 Mean orientation of SE fracture set = 342/10	Fisher κ value of SE fracture set = 23 Fisher κ value of SE fracture set = 27 Fisher κ value of SE fracture set = 8	Medium	Intersections along DZ1 in KFM10A and DZ5 in KFM04A, N=807	Fractures that strike SE and dip steeply to the SW dominate. Gently dipping fractures and steeply dipping fractures that strike NE are also conspicuous along DZ1 in KFM10A

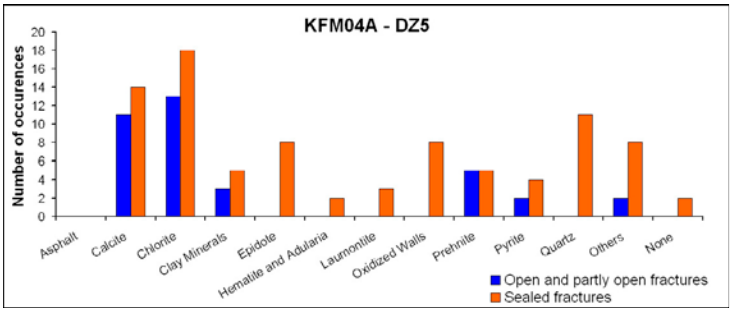




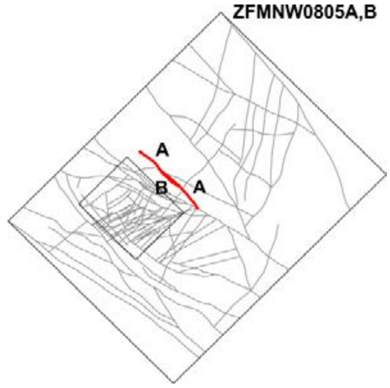


Fracture frequency	Mean 14 m^{-1}	Span 0-56 m^{-1}	Medium	Intersections along DZ1 in KFM10A and DZ5 in KFM04A	Open fractures that both dip steeply to the SW and are gently dipping are prominent along DZ1 in KFM10A. Crush zones also present. Dominance of sealed fractures along DZ5 in KFM04A. Quantitative estimate and span include sealed fracture networks and crush zones
Fracture filling			Medium	Intersections along DZ1 in KFM10A and DZ5 in KFM04A	DZ1, KFM10A: Calcite, hematite/adularia, chlorite, clay minerals, quartz, prehnite, epidote, DZ5, KFM04A: Chlorite, calcite, quartz, prehnite, epidote, clay minerals

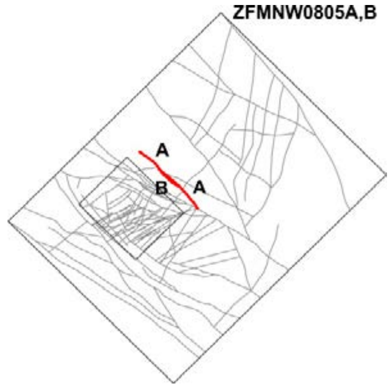




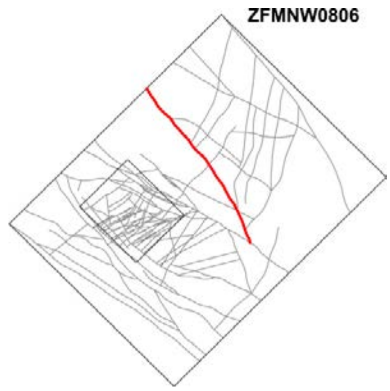
Sense of displacement				Intersections along DZ1 in KFM10A. Minor faults with chlorite, calcite and clay minerals shear striae and steps	Steep faults with SE, ESE and WNW strike (34) show strike-slip displacement, eight of which with distinctive sinistral strike-slip. One steeply fracture with SSE strike (1) also shows strike-slip displacement. Two gently dipping faults (2) show dip-slip displacement, one of which with reverse dip-slip. No complementary data from DZ5 in KFM04A

Vertical or steeply dipping deformation zones with WNW or NW strike ZFMNW0805A (Zone 8, SFR; splay from Singö deformation zone; vuggy rock)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Modelling procedure: Modelling procedure and properties inherited from updated geological model for SFR as presented in Appendix 11 in SKB R-10-49. Included only in regional model.			 		
Confidence of existence: High					
Single-hole interpretation: For information along SFR borehole intersections, see Appendix 11 in SKB R-10-49					
Position		± 20 m (surface)	High	Borehole intersections and seismic refraction data at SFR, low magnetic lineaments documented in Appendix 11 in SKB R-10-49	Span estimate refers to the uncertainty in the position of the central part of the zone. Lineament is also defined by a bathymetric depression along the boundary between the Quaternary cover and the crystalline bedrock
Orientation (strike/dip, right-hand-rule method)	315/82	± 5/± 10	High	Strike based on trend of low magnetic lineaments documented in Appendix 11 in SKB R-10-49. Dip based on linking lineaments with borehole intersections at SFR as documented in Appendix 11 in SKB R-10-49	
Thickness	60 m	30-70 m	Medium	Borehole intersections at SFR (see Appendix 11 in SKB R-10-49)	Thickness refers to both ductile and brittle components, and both damage zone and core in the brittle component.
Length	3921 m		High	Low magnetic lineaments documented in Appendix 11 in SKB R-10-49. Terminated to the south-east against ZFMWNW0001	Total trace length at ground surface
Ductile deformation			High	Borehole intersections at SFR (see Appendix 11 in SKB R-10-49)	Ductile deformation in the form of mylonite and ductile shear zones are present
Brittle deformation			High	Borehole intersections at SFR (see Appendix 11 in SKB R-10-49)	Cataclasite, brittle-ductile shear zones, cohesive breccia, some crush zones and an overall increased frequency of fractures including sealed fracture networks are present

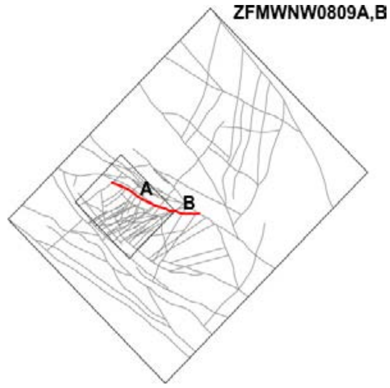
Alteration			High	Character of lineaments and borehole intersections at SFR (see Appendix 11 in SKB R-10-49)	Red-stained bedrock with fine-grained hematite dissemination. Vuggy rock with quartz dissolution
Fracture orientation			Medium	Borehole intersection at SFR (see Appendix 11 in SKB R-10-49)	Steeply dipping fractures with strike in the NW-SE quadrant and with ENE-WSW strike as well as gently dipping fractures are present
Fracture frequency	Open 10 m^{-1} Sealed 31 m^{-1}		Medium	Appendix 11 in SKB R-10-49	
Fracture filling			Medium	Borehole intersections at SFR (see Appendix 11 in SKB R-10-49)	Calcite, chlorite, hematite/adularia, clay minerals, laumontite, quartz, epidote
Sense of displacement				Borehole intersections at SFR (see Appendix 11 in SKB R-10-49)	No data

Vertical or steeply dipping deformation zones with WNW or NW strike ZFMNW0805B (zone sub-parallel to and terminated against zone 8 at SFR)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Modelling procedure: Modelling procedure and properties inherited from updated geological model for SFR as presented in Appendix 11 in SKB R-10-49. Included only in regional model.					
Confidence of existence: High					
Single-hole interpretation: For information along SFR borehole intersections, see Appendix 11 in SKB R-10-49					
Position		± 20 m (surface)	High	Borehole intersections at SFR, low magnetic lineaments documented in Appendix 11 in SKB R-10-49	Span estimate refers to the uncertainty in the position of the central part of the zone
Orientation (strike/dip, right-hand-rule method)	315/75	± 5/± 10	High	Strike based on trend of low magnetic lineaments documented in Appendix 11 in SKB R-10-49. Dip based on linking lineaments with borehole intersections at SFR as documented in Appendix 11 in SKB R-10-49	
Thickness	30 m	5-30 m	Medium	Borehole intersections at SFR (see Appendix 11 in SKB R-10-49)	Thickness refers to both ductile and brittle components, and both damage zone and core in the brittle component.
Length	1774 m		High	Low magnetic lineaments documented in Appendix 11 in SKB R-10-49. Terminated to the south-east against ZFMNW0805A	Total trace length at ground surface
Ductile deformation			High	Borehole intersections at SFR (see Appendix 11 in SKB R-10-49)	Ductile deformation in the form of mylonite and ductile shear zones are present
Brittle deformation			High	Borehole intersections at SFR (see Appendix 11 in SKB R-10-49)	Cataclasite, brittle-ductile shear zones, cohesive breccia, some crush zones and an overall increased frequency of fractures including sealed fracture networks are present

Alteration			High	Character of lineaments and borehole intersections at SFR (see Appendix 11 in SKB R-10-49)	Red-stained bedrock with fine-grained hematite dissemination. Chloritization of amphibolite
Fracture orientation			Medium	Borehole intersection at SFR (see Appendix 11 in SKB R-10-49)	Steeply dipping fractures with WNW-ESE strike and gently dipping fractures are present
Fracture frequency	Open 13 m^{-1} Sealed 57 m^{-1}		Medium	Appendix 11 in SKB R-10-49	
Fracture filling			Medium	Borehole intersections at SFR (see Appendix 11 in SKB R-10-49)	Calcite, chlorite, clay minerals, hematite/adularia, pyrite, quartz, epidote, laumontite
Sense of displacement				Borehole intersections at SFR (see Appendix 11 in SKB R-10-49)	No data

Vertical or steeply dipping deformation zones with WNW or NW strike ZFMNW0806 (splay from Singö deformation zone)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM0806. Modelled to base of regional model volume using an assumed dip of 90° based on a comparison with high confidence, vertical or steeply dipping zones with WNW or NW strike. Included only in regional model. Not present inside local model volume.					
Confidence of existence: Medium (not confirmed by direct geological observation)					
Position		± 20 m (surface)	High	Low magnetic lineament MFM0806	Span estimate refers to the uncertainty in the position of the central part of the zone
Orientation (strike/dip, right-hand-rule method)	145/90	± 10/± 10	High for strike, low for dip	Strike based on trend of low magnetic lineament MFM0806. Dip based on comparison with high confidence, vertical or steeply dipping zones with WNW or NW strike	
Thickness	80 m	50-200 m	Low	Estimated on basis of length – thickness correlation diagram in SKB R-07-50. Span estimated on the basis of the range in thickness of steeply dipping zones greater than 10000 m in length	Thickness refers to both ductile and brittle components, and both damage zone and core in the brittle component.
Length	22 km		Medium	Low magnetic lineament MFM0806. Terminated to the south-east against ZFMWNW0001	Total trace length at ground surface. Extends to the north-west outside regional model volume
Ductile deformation			Low	Comparison with majority of high confidence, vertical and steeply dipping zones with WNW or NW strike in regional model	Assumed to be present
Brittle deformation			Low	Comparison with high confidence, vertical and steeply dipping zones with WNW or NW strike	Assumed to be present
Alteration			Medium	Character of lineament MFM0806	Red-stained bedrock with fine-grained hematite dissemination
No more data					

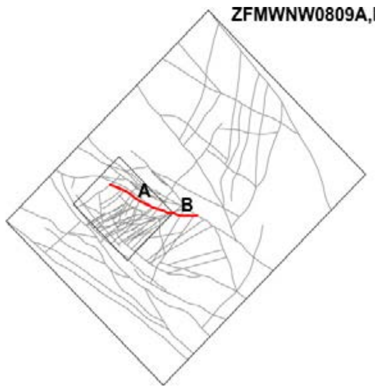
<table>
<tr><th colspan="6">Vertical or steeply dipping deformation zones with WNW or NW strike
ZFMWNW0809A, ZFMWNW0809B</th></tr>
<tr><th>Property</th><th>Quantitative estimate</th><th>Span</th><th>Confidence level</th><th>Basis for interpretation</th><th>Comments</th></tr>
<tr><td colspan="5">Modelling procedure: Zone ZFMWNW0809 consists of two segments separated by zone ZFMENE0062A. The more prominent segment, to the west, is denoted ZFMWNW0809A and the subordinate segment to the east ZFMWNW0809B. These two segments are judged to constitute elements of one and the same structure.

At the surface, zone ZFMWNW0809A corresponds to the low magnetic lineaments MFM0809 and MFM0809G, and zone ZFMWNW0809B corresponds to the eastern part of the low magnetic lineament MFM1056. Both segments modelled to base of regional model volume using an assumed dip of 90^{o}, based on a comparison with high confidence, vertical or steeply dipping zones with WNW or NW strike. Included in regional model and also present inside local model volume.</td><td>
</td></tr>
<tr><td colspan="6">Confidence of existence: Medium (not confirmed by direct geological observation)</td></tr>
<tr><td>Position</td><td></td><td>± 20 m (surface, MFM0809 and MFM1056)

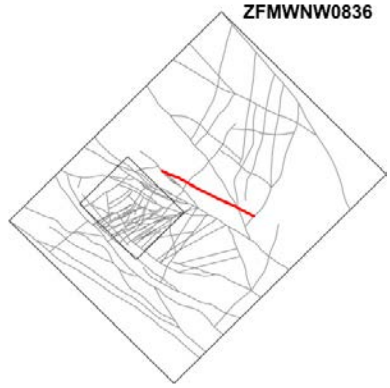
± 10 m (surface, MFM0809G)</td><td>High</td><td>Low magnetic lineaments MFM0809, MFM0809G and MFM1056</td><td>Span estimate refers to the uncertainty in the position of the central part of the zone</td></tr>
<tr><td>Orientation (strike/dip, right-hand-rule method)</td><td>ZFMWNW0809A = 116/90

ZFMWNW0809B = 109/90</td><td>± 5/± 10</td><td>High for strike, low for dip</td><td>Strike based on trend of low magnetic lineaments MFM0809, MFM0809G and MFM1056. Dip based on comparison with high confidence, vertical and steeply-dipping zones with WNW or NW strike</td><td></td></tr>
<tr><td>Thickness</td><td>ZFMWNW0809A is 25 m and ZFMWNW0809B is 15 m</td><td>ZFMWNW0809A is 15-64 m and ZFMWNW0809B is 3-50 m</td><td>Low</td><td>Estimated on basis of length – thickness correlation diagram in SKB R-07-50. Span estimated on the basis of the range in thickness of steeply dipping zones between 3000 and 10000 m and 1000 and 3000 m in length, respectively</td><td>Thickness refers to total zone thickness (damage zone and core)</td></tr>
<tr><td>Length</td><td>ZFMWNW0809A is 3347 m and ZFMWNW0809B is 1255 m</td><td></td><td>High</td><td>Low magnetic lineaments MFM0809, MFM0809G and MFM1056. Zone ZFMWNW0809A terminated against ZFMENE062A and ZFMENE0810. Zone ZFMWNW0809B terminated against ZFMENE0062A and ZFMWNW0001</td><td>Total trace length at ground surface</td></tr>
<tr><td>Ductile deformation</td><td></td><td></td><td>Low</td><td>Zone terminates against at least one zone with solely brittle deformation</td><td>Assumed not to be present.</td></tr>
</table>

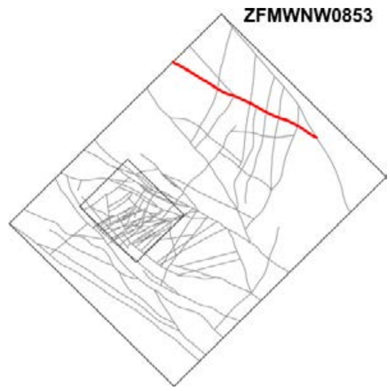
Brittle deformation			Low	Comparison with high confidence, vertical or steeply dipping zones with WNW or NW strike	Assumed to be present
Alteration			Medium	Character of lineaments MFM0809, MFM0809G and MFM1056	Red-stained bedrock with fine-grained hematite dissemination
No more data					

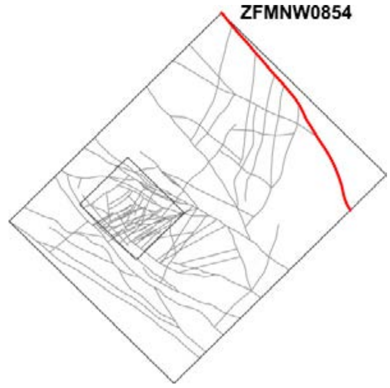
Vertical or steeply dipping deformation zones with WNW or NW strike ZFMWNW0813 (zone inherited from SFR geological model in SKB R-10-49; sub-parallel to Singö deformation zone)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM0813G with some adjustments carried out during the SFR modelling work (SKB R-10-49). Part of a system of sub-parallel deformation zones that includes the Singö deformation zone (ZFMWNW0001). Modelling procedure and properties inherited from updated geological model for SFR presented in Appendix 11 in SKB R-10-49. Included only in local model					
Confidence of existence: High					
Single hole interpretation: For identification and short description of DZ1 in KFM11A, see SKB P-07-109. No more complementary data for the borehole interval 245-400 m along DZ1 corresponding to zone ZFMWNW0813. For information along SFR tunnel intersections, see Appendix 11 in SKB R-10-49.					
Position		± 20 m (surface)	High	Low magnetic lineament MFM0813G, intersection along SFR tunnels and part of DZ1 (245-400 m) in KFM11A (see Appendix 11 in SKB R-10-49)	Span estimate refers to the uncertainty in the position of the central part of the zone
Orientation (strike/dip, right-hand-rule method)	115/90	± 5/± 10	High	Strike based on trend of low magnetic lineament MFM0813G. Dip based on combining this lineament with SFR tunnels and intersection along part of DZ1 (245-400 m) in KFM11A (see Appendix 11 in SKB R-10-49)	
Thickness	75 m		Medium	Intersection along part of DZ1 (245-400 m) in KFM11A (see Appendix 11 in SKB R-10-49)	Thickness refers to both ductile and brittle components, and both damage zone and core in the brittle component.
Length	2715 m		High	Low magnetic lineament MFM0813G. Terminated against ZFMWNW0001	Total trace length at ground surface
Ductile deformation			High	Intersection along part of DZ1 (245-400 m) in KFM11A (see Appendix 11 in SKB R-10-49)	Ductile deformation in the form of mylonite and ductile shear zones are present
Brittle deformation			High	Intersection along part of DZ1 (245-400 m) in KFM11A (see Appendix 11 in SKB R-10-49)	Cataclasite, brittle-ductile shear zones, cohesive breccia, some crush zones and an overall increased frequency of fractures including sealed fracture networks are present

Alteration			High	Character of lineament MFM0813G, intersection along part of DZ1 (245-400 m) in KFM11A (see Appendix 11 in SKB R-10-49)	Red-stained bedrock with fine-grained hematite dissemination. Locally chloritization and muscovitization
Fracture orientation			Medium	Intersection along part of DZ1 (245-400 m) in KFM11A (see Appendix 11 in SKB R-10-49)	Steep sets with WNW-ESE and SSE strike as well as a set consisting of gently dipping fractures are prominent. Fractures with other orientations are also present
Fracture frequency	Mean 26 m^{-1}	Span 1-176 m^{-1}	Medium	Intersection along part of DZ1 (245-400 m) in KFM11A	Dominance of sealed fractures. Quantitative estimate and span include several sealed fracture networks and some crush zones
Fracture filling			Medium	Intersection along part of DZ1 (245-400 m) in KFM11A (see Appendix 11 in SKB R-10-49)	Chlorite, calcite, hematite/adularia, epidote, quartz, laumontite and clay minerals
Sense of movement				Intersection along part of DZ1 (245-400 m) in KFM11A (see Appendix 11 in SKB R-10-49)	No complementary data from borehole interval 245-400 m along DZ1 in KFM11A

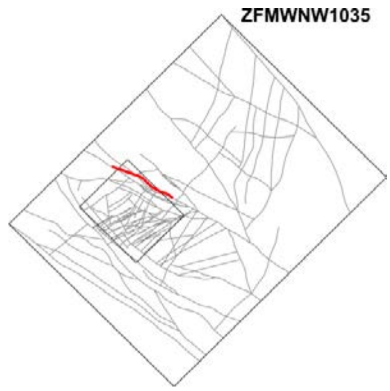
Vertical or steeply dipping deformation zones with WNW or NW strike ZFMWNW0836					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM0836. Modelled to base of regional model volume using an assumed dip of 90° based on a comparison with high confidence, vertical or steeply dipping zones with WNW or NW strike. Included only in regional model. Not present inside local model volume.				 	
Confidence of existence: Medium (not confirmed by direct geological observation)					
Position		± 20 m (surface)	High	Low magnetic lineament MFM0836	Span estimate refers to the uncertainty in the position of the central part of the zone
Orientation (strike/dip, right-hand-rule method)	117/90	± 5/± 10	High for strike, low for dip	Strike based on trend of lineament MFM0836. Dip based on comparison with high confidence, vertical or steeply dipping zones with WNW or NW strike	
Thickness	50 m	15-64 m	Low	Estimated on basis of length – thickness correlation diagram in SKB R-07-50. Span estimated on the basis of the range in thickness of steeply dipping zones between 3000 and 10000 m in length	Thickness refers to total zone thickness (damage zone and core)
Length	4872 m		High	Low magnetic lineament MFM0836. Terminated against ZFMNW0805A and ZFMNNE1134	Total trace length at ground surface
Ductile deformation			Low	Zone terminates against one zone with solely brittle deformation	Assumed not to be present.
Brittle deformation			Low	Comparison with high confidence, vertical or steeply-dipping zones with WNW or NW strike	Assumed to be present
Alteration			Medium	Character of lineament MFM0836	Red-stained bedrock with fine-grained hematite dissemination
No more data					

Vertical or steeply dipping deformation zones with WNW or NW strike ZFMWNW0851					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM0851. Modelled to base of regional model volume using an assumed dip of 90° based on a comparison with high confidence, vertical or steeply dipping zones with WNW or NW strike. Included only in regional model. Not present inside local model volume.			 		
Confidence of existence: Medium (not confirmed by direct geological observation)					
Position		± 20 m (surface)	High	Low magnetic lineament MFM0851	Span estimate refers to the uncertainty in the position of the central part of the zone
Orientation (strike/dip, right-hand-rule method)	126/90	± 10/± 10	High for strike, low for dip	Strike based on trend of lineament MFM0851. Dip based on comparison with high confidence, vertical or steeply dipping zones with WNW or NW strike	
Thickness	25 m	15-64 m	Low	Estimated on basis of length – thickness correlation diagram in SKB R-07-50. Span estimated on the basis of the range in thickness of steeply dipping zones between 3000 and 10000 m in length	Thickness refers to total zone thickness (damage zone and core)
Length	3080 m		High	Low magnetic lineament MFM0851. Terminated by ZFMNE0808A and ZFMNNE1134	Total trace length at ground surface
Ductile deformation			Low	Zone is terminated against solely brittle deformation zones	Assumed not to be present.
Brittle deformation			Low	Comparison with high confidence, vertical or steeply dipping zones with WNW or NW strike	Assumed to be present
Alteration			Medium	Character of lineament MFM0851	Red-stained bedrock with fine-grained hematite dissemination
No more data					

<table>
<tr><th colspan="6">Vertical or steeply dipping deformation zones with WNW or NW strike
ZFMWNW0853</th></tr>
<tr><th>Property</th><th>Quantitative estimate</th><th>Span</th><th>Confidence level</th><th>Basis for interpretation</th><th>Comments</th></tr>
<tr><td colspan="4">Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM0853. Modelled to base of regional model volume using an assumed dip of 90° based on a comparison with high confidence, vertical or steeply dipping zones with WNW or NW strike. Included only in regional model. Not present inside local model volume.</td><td colspan="2">
</td></tr>
<tr><td colspan="6">Confidence of existence: Medium (not confirmed by direct geological observation)</td></tr>
<tr><td>Position</td><td></td><td>± 20 m (surface)</td><td>High</td><td>Low magnetic lineament MFM0853</td><td>Span estimate refers to the uncertainty in the position of the central part of the zone</td></tr>
<tr><td>Orientation (strike/dip, right-hand-rule method)</td><td>117/90</td><td>± 10/± 10</td><td>High for strike, low for dip</td><td>Strike based on trend of lineament MFM0853. Dip based on comparison with high confidence, vertical and steeply-dipping zones with WNW or NW strike</td><td></td></tr>
<tr><td>Thickness</td><td>60 m</td><td>50-200 m</td><td>Low</td><td>Estimated on basis of length – thickness correlation diagram in SKB R-07-50. Span estimated on the basis of the range in thickness of steeply dipping zones greater than 10000 m in length</td><td>Thickness refers to both ductile and brittle components, and both damage zone and core in the brittle component.</td></tr>
<tr><td>Length</td><td>13 km</td><td></td><td>Medium</td><td>Low magnetic lineament MFM0853. Terminated to the south-east against ZFMNW0854</td><td>Total trace length at ground surface. Extends to the north-west outside regional model volume.</td></tr>
<tr><td>Ductile deformation</td><td></td><td></td><td>Low</td><td>Comparison with majority of high confidence, vertical or steeply dipping zones with WNW or NW strike in regional model</td><td>Assumed to be present</td></tr>
<tr><td>Brittle deformation</td><td></td><td></td><td>Low</td><td>Comparison with high confidence, vertical or steeply dipping zones with WNW or NW strike</td><td>Assumed to be present</td></tr>
<tr><td>Alteration</td><td></td><td></td><td>Medium</td><td>Character of lineament MFM0853</td><td>Red-stained bedrock with fine-grained hematite dissemination</td></tr>
<tr><td colspan="6">No more data</td></tr>
</table>

Vertical or steeply dipping deformation zones with WNW or NW strike ZFMNW0854					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM0854. Modelled to base of regional model volume using an assumed dip of 90° based on a comparison with high confidence, vertical or steeply dipping zones with WNW or NW strike. Included only in regional model. Not present inside local model volume.					
Confidence of existence: Medium (not confirmed by direct geological observation)					
Position		± 20 m (surface)	High	Low magnetic lineament MFM0854	Span estimate refers to the uncertainty in the position of the central part of the zone
Orientation (strike/dip, right-hand-rule method)	146/90	±10/± 10	High for strike, low for dip	Strike based on trend of lineament MFM0854. Dip based on comparison with high confidence, vertical or steeply dipping zones with WNW or NW strike	
Thickness	95 m	50-200 m	Low	Estimated on basis of length – thickness correlation diagram in SKB R-07-50. Span estimated on the basis of the range in thickness of steeply dipping zones greater than 10000 m in length	Thickness refers to both ductile and brittle components, and both damage zone and core in the brittle component.
Length	29 km		Medium	Low magnetic lineament MFM0854	Total trace length at ground surface. Extends both to the north-west and to the south-east outside regional model volume
Ductile deformation			Low	Comparison with majority of high confidence, vertical or steeply dipping zones with WNW or NW strike in regional model	Assumed to be present
Brittle deformation			Low	Comparison with high confidence, vertical or steeply dipping zones with WNW or NW strike	Assumed to be present
Alteration			Medium	Character of lineament MFM0854	Red-stained bedrock with fine-grained hematite dissemination
No more data					

Vertical or steeply dipping deformation zones with WNW or NW strike ZFMWNW0974					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM0974. Modelled to base of regional model volume using an assumed dip of 90° based on a comparison with high confidence, vertical or steeply dipping zones with WNW or NW strike. Included only in regional model. Not present inside local model volume.					
Confidence of existence: Medium (not confirmed by direct geological observation)					
Position		± 20 m (surface)	High	Low magnetic lineament MFM0974	Span estimate refers to the uncertainty in the position of the central part of the zone
Orientation (strike/dip, right-hand-rule method)	125/90	± 10/± 10	High for strike, low for dip	Strike based on trend of lineament MFM0974. Dip based on comparison with high confidence, vertical or steeply dipping zones with WNW or NW strike	
Thickness	30 m	15-64 m	Low	Estimated on basis of length – thickness correlation diagram in SKB R-07-50. Span estimated on the basis of the range in thickness of steeply dipping zones between 3000 and 10000 m in length	Thickness refers to total zone thickness (damage zone and core)
Length	4098 m		High	Low magnetic lineament MFM0974. Terminated against ZFMNW0806 and ZFMNNE1132	Total trace length at ground surface
Ductile deformation			Low	Zone terminates to the south-east against a solely brittle deformation zone	Assumed not to be present
Brittle deformation			Low	Comparison with high confidence, vertical or steeply dipping zones with WNW or NW strike	Assumed to be present
Alteration			Medium	Character of lineament MFM0974	Red-stained bedrock with fine-grained hematite dissemination
No more data					

Vertical or steeply dipping deformation zones with WNW or NW strike ZFMWNW1035 (zone inherited from SFR geological model in SKB R-10-49; splay from Singö deformation zone)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM1035G with some adjustments carried out during both the SFR modelling work (SKB R-10-49) and the current work. Part of a complex system of deformation zones that includes the Singö deformation zone (ZFMWNW0001). Modelling procedure and properties inherited from updated geological model for SFR presented in Appendix 11 in SKB R-10-49. Included only in local model					
Confidence of existence: High					
Single hole interpretation: For information along SFR tunnel intersections and percussion boreholes, see Appendix 11 in SKB R-10-49					
Position		± 20 m (surface)	High	Low magnetic lineament MFM1035G and modification, intersections along SFR tunnels and percussion boreholes (see Appendix 11 in SKB R-10-49)	Span estimate refers to the uncertainty in the position of the central part of the zone
Orientation (strike/dip, right-hand-rule method)	121/80	± 5/± 10	High	Strike based on trend of low magnetic lineament MFM1035G and modification. Dip based on combining this lineament with intersections along SFR tunnels and a percussion borehole (see Appendix 11 in SKB R-10-49)	
Thickness	15 m	5-20 m	Medium	Intersections along SFR tunnels and a percussion borehole (see Appendix 11 in SKB R-10-49)	Thickness refers to both ductile and brittle components, and both damage zone and core in the brittle component.
Length	3200 m		High	Low magnetic lineament MFM1035G and modification. Terminated against ZFMWNW0001	Total trace length at ground surface
Ductile deformation			High	Intersections along SFR tunnels and percussion boreholes (see Appendix 11 in SKB R-10-49)	Mylonite is present
Brittle deformation			High	Intersections along SFR tunnels and percussion boreholes (see Appendix 11 in SKB R-10-49)	Cataclasite, cohesive breccia, some crush zones and an overall increased frequency of fractures including sealed fracture networks are present

Alteration			High	Character of lineament MFM3259G, intersections along SFR tunnels and percussion boreholes (see Appendix 11 in SKB R-10-49)	Red-stained bedrock with fine-grained hematite dissemination
Fracture orientation			Medium	Intersection along SFR tunnels and percussion boreholes (see Appendix 11 in SKB R-10-49)	Steep fractures with WNW-ESE strike and gently dipping fractures are prominent. Steeply dipping fractures with a SE strike are also present
Fracture frequency				Intersection along SFR tunnels and percussion boreholes (see Appendix 11 in SKB R-10-49)	No numerical data presented in Appendix 11 in SKB R-10-49
Fracture filling				Intersection along SFR tunnels and percussion boreholes (see Appendix 11 in SKB R-10-49)	No data available in Appendix 11 in SKB R-10-49
Sense of movement				Intersection along SFR tunnels and percussion boreholes (see Appendix 11 in SKB R-10-49)	No data available in Appendix 11 in SKB R-10-49

Vertical or steeply dipping deformation zones with WNW or NW strike ZFMWNW1053					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM1094G. Modelled to base of regional model volume using an assumed dip of 90° based on a comparison with high confidence, vertical and steeply dipping zones with WNW or NW strike. Included only in local model.					
Confidence of existence: Medium (not confirmed by direct geological observation)					
Position		± 20 m (surface, MFM1053 and MFM1094) ± 10 m (surface, MFM1053G)	High	Low magnetic lineament MFM1094G	Span estimate refers to the uncertainty in the position of the central part of the zone
Orientation (strike/dip, right-hand-rule method)	119/90	± 5/± 10	High for strike, low for dip	Strike based on trend of lineament MFM1094G. Dip based on comparison with high confidence, vertical and steeply-dipping zones with WNW or NW strike	
Thickness	25 m	3-50 m	Low	Estimated on basis of length – thickness correlation diagram in SKB R-07-50. Span estimated on the basis of the range in thickness of steeply dipping zones between 1000 and 3000 m in length	Thickness refers to both ductile and brittle components, and both damage zone and core in the brittle component.
Length	2681 m		High	Low magnetic lineament MFM1094G. Terminated by ZFMWNW0809A and ZFMEW0137	Total trace length at ground surface
Ductile deformation			Low	Comparison with majority of high confidence, vertical and steeply-dipping zones with WNW or NW strike in regional model	Assumed to be present
Brittle deformation			Low	Comparison with high confidence, vertical and steeply-dipping zones with WNW or NW strike	Assumed to be present
Alteration			Medium	Character of lineament MFM1094G	Red-stained bedrock with fine-grained hematite dissemination
No more data					

Vertical or steeply dipping deformation zones with WNW or NW strike ZFMWNW1068					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Modelling procedure: At the surface, corresponds to the lineament MFM1068. This lineament is defined by a depression in the bedrock surface, the form of which has been recognised on the basis of an analysis of old refraction seismic data /Isaksson and Keisu, 2005/. Possible correlation also with a low velocity seismic refraction anomaly (/Isaksson and Keisu, 2005/, RSLV02 in Figure 5-33 in /SKB, 2005/). Modelled to a depth of 1000 m using an assumed dip of 90°, based on a comparison with high confidence, vertical and steeply dipping zones with WNW or NW strike. Included only in local model.					
Confidence of existence: Medium (not confirmed by direct geological observation)					
Position		± 20 m (surface)	High	Bedrock surface lineament MFM1068, seismic refraction data	Span estimate refers to the uncertainty in the position of the central part of the zone
Orientation (strike/dip, right-hand-rule method)	119/90	± 5/± 10	High for strike, low for dip	Strike based on trend of bedrock surface lineament MFM1068. Dip based on comparison with high confidence, vertical and steeply-dipping zones with WNW or NW strike	
Thickness	15 m	3-50 m	Low	Estimated on basis of length – thickness correlation diagram in SKB R-07-50. Span estimated on the basis of the range in thickness of steeply dipping zones between 1000 and 3000 m in length	Thickness refers to total zone thickness (damage zone and core)
Length	999 m		High	Bedrock surface lineament MFM1068. Terminated against ZFMNNW0100, ZFMENE0159A and ZFMENE0810	Total trace length at ground surface
Ductile deformation			Low	Zone terminates to the north-west against solely brittle deformation zone	Assumed not to be present
Brittle deformation			Medium	Seismic refraction data, comparison with high confidence, vertical and steeply-dipping zones with WNW or NW strike	Assumed to be present
No more data					

Vertical or steeply dipping deformation zones with WNW or NW strike ZFMNW1173					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM1173. Modelled to base of regional model volume using an assumed dip of 90° based on a comparison with high confidence, vertical or steeply dipping zones with WNW or NW strike. Included only in regional model. Not present inside local model volume.				 	
Confidence of existence: Medium (not confirmed by direct geological observation)					
Position		± 20 m (surface)	High	Low magnetic lineament MFM1173	Span estimate refers to the uncertainty in the position of the central part of the zone
Orientation (strike/dip, right-hand-rule method)	138/90	± 10/± 10	High for strike, low for dip	Strike based on trend of lineament MFM1173. Dip based on comparison with high confidence, vertical or steeply dipping zones with WNW or NW strike	
Thickness	60 m	50-200 m	Low	Estimated on basis of length – thickness correlation diagram. In SKB R-07-50. Span estimated on the basis of the range in thickness of steeply dipping zones greater than 10000 m in length	Thickness refers to both ductile and brittle components, and both damage zone and core in the brittle component.
Length	14 km		Medium	Low magnetic lineament MFM1173. Terminated against ZFMWNW0853	Total trace length at ground surface. Extends to the north-west outside regional model volume
Ductile deformation			Low	Comparison with majority of high confidence, vertical or steeply dipping zones with WNW or NW strike in regional model	Assumed to be present
Brittle deformation			Low	Comparison with high confidence, vertical or steeply dipping zones with WNW or NW strike	Assumed to be present
Alteration			Medium	Character of lineament MFM1173	Red-stained bedrock with fine-grained hematite dissemination
No more data					

Vertical or steeply dipping deformation zones with WNW or NW strike ZFMNW1200 (Surface; DZ1 and extension along 110-169 m in KFM04A; DZ4 and DZ5 in KFM09A)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**

Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM1200. Zone extended to the north-west, where it corresponds to the linked lineament with NW trend, XFM0789A0, as well as the brittle deformation zone recognised at the surface observation point PFM007096. Modelled to base of regional model volume using dip estimated by connecting lineament MFM1200 at the surface with the borehole intersections 110-176 m in KFM04A (DZ1 and extension in interval 110-169 m), 723-754 m (DZ4) in KFM09A and 770-790 m (DZ5) in KFM09A. Borehole interval 754-770 m in KFM09A also inferred to be affected by this zone. Deformation zone plane passes through fixed points 159 m in KFM04A and 731 m in KFM09A. Decreased radar penetration also along the borehole interval 731-754 m in KFM09A. Included in regional model and also present inside local model volume.

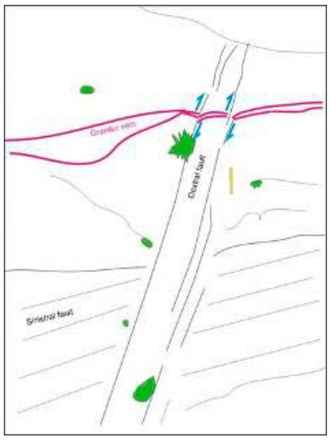
Confidence of existence: High

Surface data and single hole interpretation: For identification and short description of DZ1 in KFM04A and DZ4 and DZ5 in KFM09A, see SKB P-04-119 and SKB P-06-134, respectively. For character and kinematics at the surface at observation point PFM007096, close to nuclear power plant 3, see SKB P-06-212. For character and kinematics along DZ4 and DZ5 in KFM09A, see SKB P-07-101.

Mylonitic rocks observed at the surface along lineament MFM1200 (e.g. observation point PFM001257). Dark, chlorite-rich cataclasite and carbonate-cemented fault breccia present at observation point PFM007096 at the surface. Conjugate and R-Riedel shear fractures also inferred to be present. Abundant fault-slip data observed. Zone is situated along the contact between rock domains RFM012 and RFM018 along DZ4 and DZ5 in KFM09A but within rock domain RFM018 at the surface. "Damage zone" character along DZ4 and DZ5 in KFM09A; no fault core identified. Elevated frequency of sealed fractures, mainly as sealed fracture networks, near the base of DZ4. Laumontite+calcite-sealed networks and fault breccia also occur sporadically higher up along the zone.

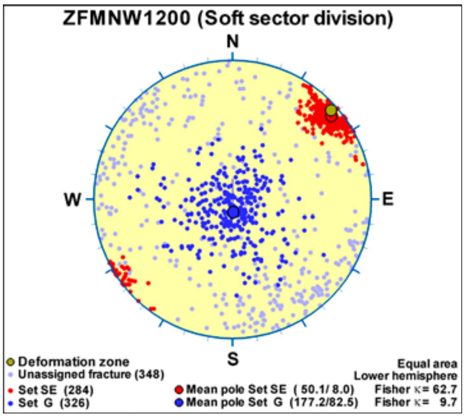
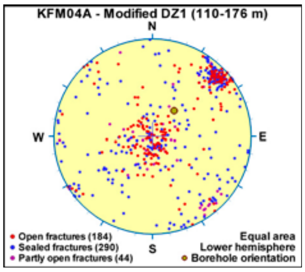
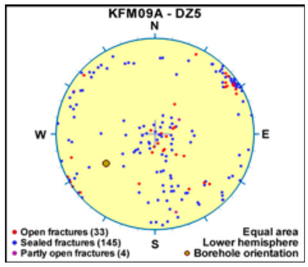
Steeply dipping fault plane with NW strike that outcrops at observation point PFM007096 close to nuclear power plant 3 (after SKB P-06-212).

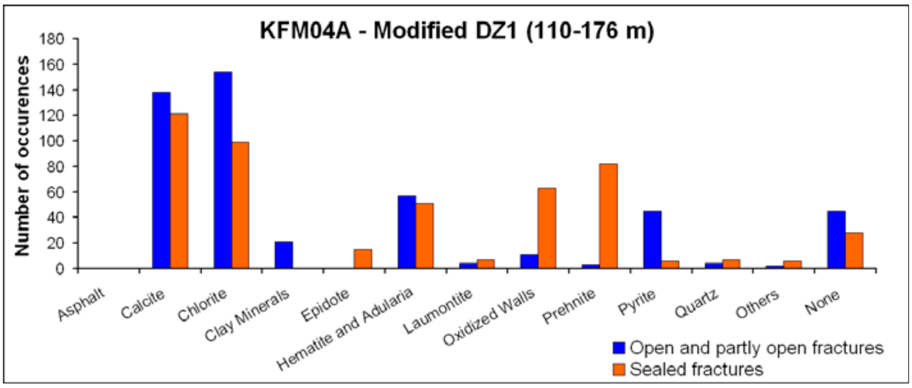
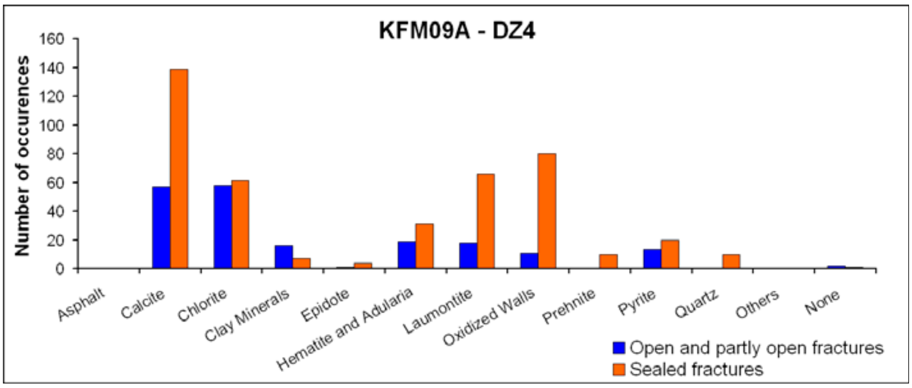
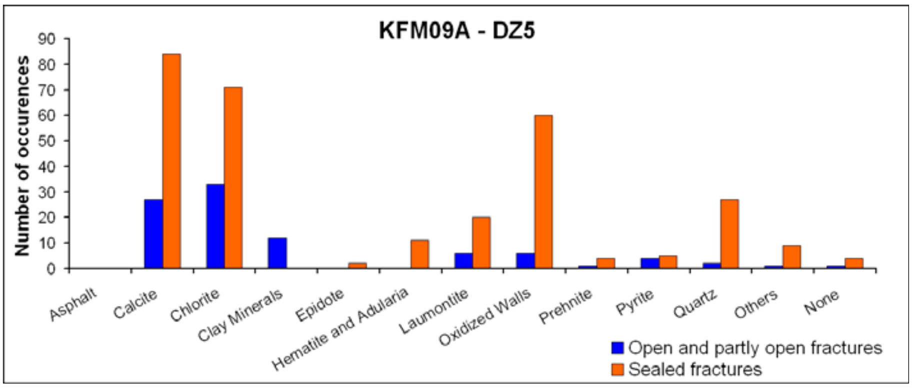
Part of outcrop at observation point PFM007096, and line drawing (to right), showing the main fault with NW strike that shows sinistral strike-slip displacement, and conjugate faults with ENE strike that show dextral displacement of a granite vein. View to SW (after SKB P-06-212).



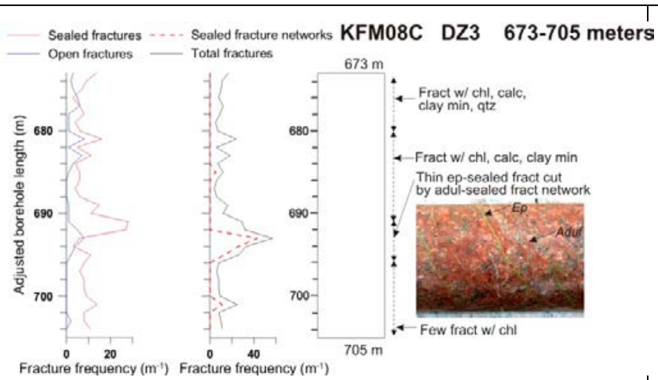
Line drawing (interpretation) of view to left (after SKB P-06-212)

<table>
<tr><th colspan="6">Vertical or steeply dipping deformation zones with WNW or NW strike
ZFMNW1200 (Surface; DZ1 and extension along 110-169 m in KFM04A; DZ4 and DZ5 in KFM09A)</th></tr>
<tr><th>Property</th><th>Quantitative estimate</th><th>Span</th><th>Confidence level</th><th>Basis for interpretation</th><th>Comments</th></tr>
<tr><td>Position</td><td></td><td>± 20 m (surface)<table><tr><th colspan="3">KFM04A</th></tr><tr><td>dx (m)</td><td>dy (m)</td><td>dz (m)</td></tr><tr><td>1</td><td>1</td><td>0</td></tr><tr><th colspan="3">KFM09A</th></tr><tr><td>11</td><td>14</td><td>11</td></tr></table></td><td>High</td><td>Intersections along KFM04A (DZ1 and extension 110-169 m) and KFM09A (DZ4 and DZ5), low magnetic lineament MFM1200 and its extension to the north-west</td><td>Span estimate refers to the uncertainty in the position of the central part of the zone</td></tr>
<tr><td>Orientation (strike/dip, right-hand-rule method)</td><td>138/85</td><td>± 5/± 10</td><td>High</td><td>Strike based on trend of lineament MFM1200. Dip based on linking MFM1200 at the surface with borehole intersections along KFM04A (DZ1 and extension 110-169 m) and KFM09A (DZ4 and DZ5)</td><td></td></tr>
<tr><td>Thickness</td><td>46 m</td><td>15-64 m</td><td>Medium</td><td>Intersection along KFM04A (DZ1 and extension 110-169 m) Span estimated on the basis of the range in thickness of steeply dipping zones between 3000 and 10000 m in length</td><td>Thickness refers to both ductile and brittle components, and both damage zone and core in the brittle component.</td></tr>
<tr><td>Length</td><td>3281 m</td><td></td><td>High</td><td>Low magnetic lineament MFM1200 and its extension to the north-west</td><td>Total trace length at ground surface</td></tr>
<tr><td>Ductile deformation</td><td></td><td></td><td>High</td><td>Surface geology and intersections along KFM04A (DZ1 and extension 110-169 m) and KFM09A (DZ4 and DZ5)</td><td>Present and inferred to be an integral part of the deformation along the zone</td></tr>
<tr><td>Brittle deformation</td><td></td><td></td><td>High</td><td>Surface geology and intersections along KFM04A (DZ1 and extension 110-169 m) and KFM09A (DZ4 and DZ5)</td><td>Increased frequency of fractures. No fault core identified in KFM09A. No complementary data from KFM04A</td></tr>
<tr><td>Alteration</td><td></td><td></td><td>High</td><td>Intersections along KFM04A (DZ1 and extension 110-169 m) and KFM09A (DZ4 and DZ5), character of lineament MFM1200</td><td>Red-stained bedrock with fine-grained hematite dissemination</td></tr>
</table>

Vertical or steeply dipping deformation zones with WNW or NW strike ZFMNW1200 (Surface; DZ1 and extension along 110-169 m in KFM04A; DZ4 and DZ5 in KFM09A)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Fracture orientation (strike/dip, right-hand-rule method)	Mean orientation of SE fracture set = 140/82 Mean orientation of gentle fracture set = 267/7	Fisher κ value of SE fracture set = 63 Fisher κ value of gentle fracture set = 10	Medium	Intersections along KFM04A (DZ1 and extension 110-169 m) and KFM09A (DZ4 and DZ5), N=958	Fractures that strike SE and dip steeply to the SW dominate. Gently dipping fractures as well as steeply dipping fractures with NE strike are also present
					
Fracture frequency	Mean along DZ1 and extension (110-169 m), KFM04A = 9 m^{-1} Mean along DZ4 and DZ5, KFM09A = 17 m^{-1}	Span 1-35 m^{-1} Span 3-44 m^{-1}	Medium	Intersections along KFM04A (DZ1 and extension 110-169 m) and KFM09A (DZ4 and DZ5)	Sealed fractures dominate, especially in KFM09A. Quantitative estimate and span include sealed fracture networks
Fracture filling			Medium	Intersections along KFM04A (DZ1 and extension) and KFM09A (DZ4 and DZ5)	DZ1 and extension, KFM04A: Chlorite, calcite, prehnite, hematite/adularia, clay minerals, epidote DZ4 and DZ5, KFM09A: Calcite, chlorite, laumontite, hematite/adularia, quartz, clay minerals

Vertical or steeply dipping deformation zones with WNW or NW strike ZFMNW1200 (Surface; DZ1 and extension along 110-169 m in KFM04A; DZ4 and DZ5 in KFM09A)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
	  				

Vertical or steeply dipping deformation zones with WNW or NW strike ZFMNW1200 (Surface; DZ1 and extension along 110-169 m in KFM04A; DZ4 and DZ5 in KFM09A)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Sense of displacement			High	Surface geology and KFM09A (DZ4 and DZ5). 14 minor faults along KFM09A with striae on chlorite, quartz, calcite and clay minerals, and steps along calcite and less commonly laumontite	*Surface geology:* Two different episodes of displacement along fault with NW-SE strike. Sinistral strike-slip displacement dominates. Oblique-slip shear with dextral normal displacement is also present *KFM09A (DZ4 and DZ5):* Kinematic consistent with the surface data. Sinistral strike-slip faults with steep NW-SE strike dominate (11) and dextral strike-slip along a fault (1) with WSW strike is also present. Inferred conjugate set. One steeply dipping fault (1) with a SE strike shows oblique slip with a strong dextral strike-slip component and subordinate normal displacement; one steeply dipping fault (1) with a NE strike shows reverse dip-slip. No complementary data from KFM04A

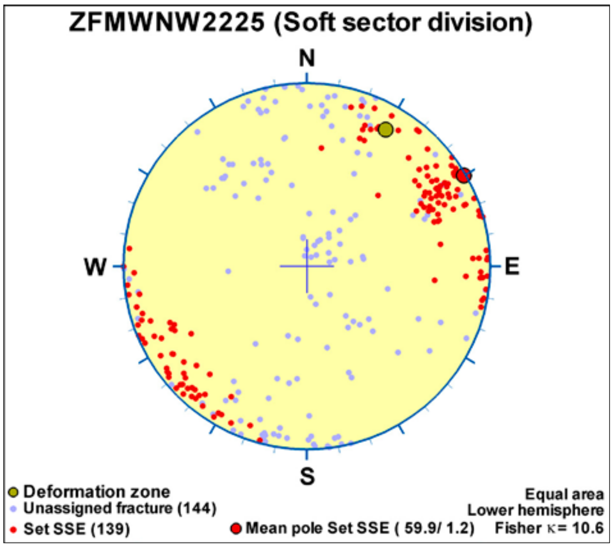
<table>
<tr><th colspan="6">Vertical or steeply dipping deformation zones with WNW or NW strike
ZFMWNW2225 (DZ3 in KFM08C)</th></tr>
<tr><th>Property</th><th>Quantitative estimate</th><th>Span</th><th>Confidence level</th><th>Basis for interpretation</th><th>Comments</th></tr>
<tr><td colspan="4">Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM2225G and the north-western part of the low magnetic lineament MFM0044G0, which have been combined. Modelled down to 1600 m depth using the dip estimated by connecting these lineament segments with the borehole intersection 673-705 m in KFM08C (DZ3). Deformation zone plane placed at fixed point 693 m where a sealed fracture network is present. Decreased radar penetration also along the borehole interval 692-696 m. Included only in local model.</td><td colspan="2">
</td></tr>
<tr><td colspan="6">Confidence of existence: High</td></tr>
<tr><td colspan="6">Single hole interpretation: For identification and short description of DZ3 in KFM08C, see SKB P-06-207. For character and kinematics, see SKB P-07-101.</td></tr>
<tr><td colspan="6">

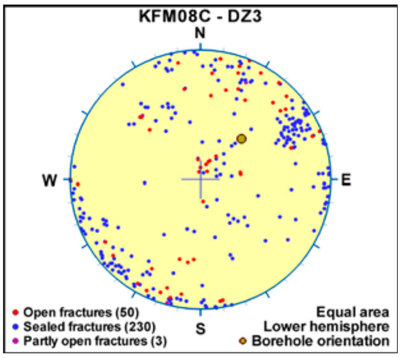
KFM08C DZ3
</td></tr>
<tr><td>Position</td><td></td><td>± 20 m (surface)<table><tr><th colspan="3">KFM08C</th></tr><tr><td>dx (m)</td><td>dy (m)</td><td>dz (m)</td></tr><tr><td>5</td><td>5</td><td>3</td></tr></table></td><td>High</td><td>Intersection along KFM08C (DZ3), low magnetic lineaments MFM2225G and MFM0044G</td><td>Span estimate refers to the uncertainty in the position of the central part of the zone</td></tr>
<tr><td>Orientation (strike/dip, right-hand-rule method)</td><td>120/78</td><td>± 5/± 10</td><td>High</td><td>Strike based on trend of lineaments MFM2225G and MFM0044G. Dip based on linking MFM2225G and MFM0044G at the surface with borehole intersection along KFM08C (DZ3)</td><td></td></tr>
<tr><td>Thickness</td><td>26 m</td><td>3-50 m</td><td>Medium</td><td>Intersection along KFM08C (DZ3). Span estimated on the basis of the range in thickness of steeply dipping zones between 1000 and 3000 m in length</td><td>Thickness refers to total zone thickness (damage zone and core)</td></tr>
</table>

Vertical or steeply dipping deformation zones with WNW or NW strike

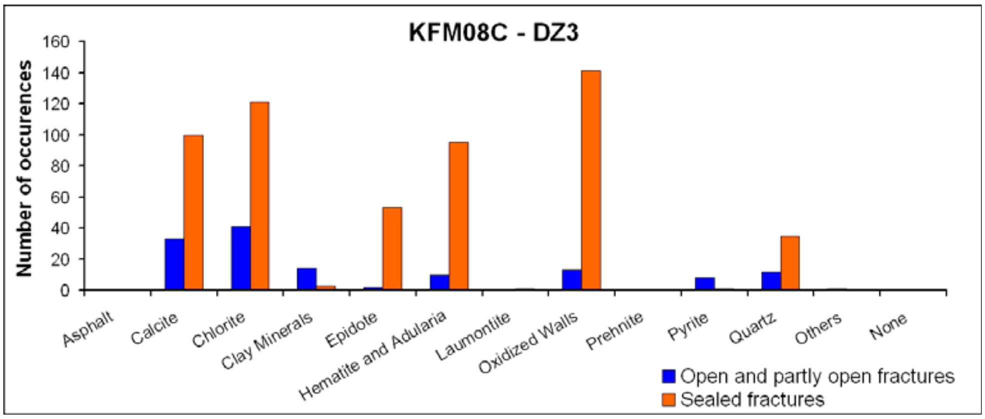
ZFMWNW2225 (DZ3 in KFM08C)

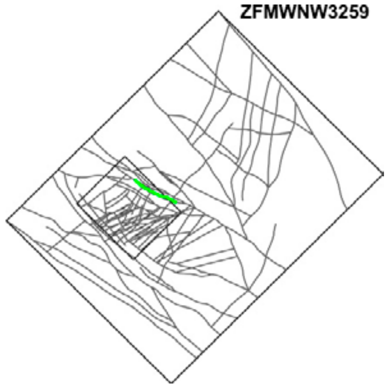
Property	Quantitative estimate	Span	Confidence level	Basis for interpretation	Comments
Length	1532 m		High	Low magnetic lineaments MFM2225G and MFM0044G. Terminated against ZFMENE0060A	Total trace length at ground surface
Ductile deformation			High	Intersection along KFM08C (DZ3)	Not present
Brittle deformation			High	Intersection along KFM08C (DZ3)	Increased frequency of fractures. Predominantly "damage zone" character. Fault core with epidote- and adularia-filled fractures at 691-695.7 m
Alteration			High	Intersection along KFM08C (DZ3), character of lineaments MFM2225G and MFM0044G0	Red-stained bedrock with fine-grained hematite dissemination
Fracture orientation (strike/dip, right-hand-rule method)	Mean orientation of SSE fracture set = 150/89	Fisher κ value of SSE fracture set = 11	Medium	Intersection along KFM08C (DZ3), N=283	Steeply dipping fractures that strike in NW and SE sectors dominate. Fractures with other orientations, including gently dipping fractures, are also present





Property	Quantitative estimate	Span	Confidence level	Basis for interpretation	Comments
Fracture frequency	Mean 14 m^{-1}	Span 4-57 m^{-1}	Medium	Intersection along KFM08C (DZ3)	Dominance of sealed fractures. Quantitative estimate and span include sealed fracture networks
Fracture filling			Medium	Intersection along KFM08C (DZ3)	Chlorite, calcite, hematite/adularia, epidote, quartz, clay minerals

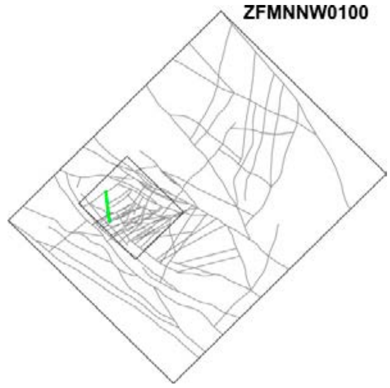
Vertical or steeply dipping deformation zones with WNW or NW strike ZFMWNW2225 (DZ3 in KFM08C)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
					
Sense of displacement				Intersection along KFM08C (DZ3). Shear striae on quartz and calcite steps along a vertical fault with WNW-ESE strike; shear striae on chlorite and calcite steps along a gently S-dipping fault	*Vertical fault with WNW-ESE strike:* Sinistral strike-slip. *Gently S-dipping fault:* Dextral strike-slip

Vertical or steeply dipping deformation zones with WNW or NW strike ZFMWNW3259 (zone inherited from SFR geological model in SKB R-10-49; sub-parallel to Singö deformation zone)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM3259G. Minor extension of lineament MFM3259G completed so that the zone terminates against ZFMWNW0813 and ZFMWNW0001. Part of a system of sub-parallel deformation zones that includes the Singö deformation zone (ZFMWNW0001). Modelling procedure and properties inherited from updated geological model for SFR presented in Appendix 11 in SKB R-10-49. Included only in local model			 		
Confidence of existence: High					
Single hole interpretation: For identification and short description of DZ1 in KFM11A, see SKB P-07-109. No more complementary data for the borehole interval 400-498 m along DZ1 corresponding to zone ZFMWNW3259. For information along SFR tunnel intersections, see Appendix 11 in SKB R-10-49.					
Position		± 20 m (surface)	High	Low magnetic lineament MFM3259G, intersection along SFR tunnels and part of DZ1 (400-498 m) in KFM11A (see Appendix 11 in SKB R-10-49)	Span estimate refers to the uncertainty in the position of the central part of the zone
Orientation (strike/dip, right-hand-rule method)	117/90	± 5/± 10	High	Strike based on trend of low magnetic lineament MFM3259G. Dip based on combining this lineament with intersection along SFR tunnels and part of DZ1 (400-498 m) in KFM11A (see Appendix 11 in SKB R-10-49)	
Thickness	50 m	20-60 m	Medium	Intersection along SFR tunnels and part of DZ1 (400-498 m) in KFM11A (see Appendix 11 in SKB R-10-49)	Thickness refers to both ductile and brittle components, and both damage zone and core in the brittle component.
Length	2173 m		High	Low magnetic lineament MFM3259G. Terminated against ZFMWNW0813 and ZFMWNW0001	Total trace length at ground surface
Ductile deformation			High	Intersection along SFR tunnels and part of DZ1 (400-498 m) in KFM11A (see Appendix 11 in SKB R-10-49)	Ductile deformation in the form of mylonite and ductile shear zones are present

Brittle deformation			High	Intersection along SFR tunnels and part of DZ1 (400-498 m) in KFM11A (see Appendix 11 in SKB R-10-49)	Cataclasite, brittle-ductile shear zones, cohesive breccia, some crush zones and an overall increased frequency of fractures including sealed fracture networks are present
Alteration			High	Character of lineament MFM3259G, intersection along SFR tunnels and part of DZ1 (400-498 m) in KFM11A (see Appendix 11 in SKB R-10-49)	Red-stained bedrock with fine-grained hematite dissemination. Locally chloritization, muscovitization, epidotization and argillization
Fracture orientation			Medium	Intersection along part of DZ1 (400-498 m) in KFM11A (see Appendix 11 in SKB R-10-49)	Steep sets with NW-SE and E strike as well as a set consisting of gently dipping fractures are prominent. Fractures with other orientations are also present
Fracture frequency	Mean 37 m^{-1}	Span 9-111 m^{-1}	Medium	Intersection along part of DZ1 (400-498 m) in KFM11A	Dominance of sealed fractures. Quantitative estimate and span include several sealed fracture networks and some crush zones
Fracture filling			Medium	Intersection along part of DZ1 (400-498 m) in KFM11A (see Appendix 11 in SKB R-10-49)	Chlorite, calcite, hematite/adularia, epidote, quartz, laumontite and clay minerals
Sense of movement				Intersection along part of DZ1 (400-498 m) in KFM11A (see Appendix 11 in SKB R-10-49)	No complementary data from borehole interval 400-498 m along DZ1 in KFM11A

Vertical or steeply-dipping brittle deformation zones with NNW strike ZFMNNW0100 (borehole interval 920-999 m along part of DZ4 in KFM07A and DZ3 in KFM09A)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**

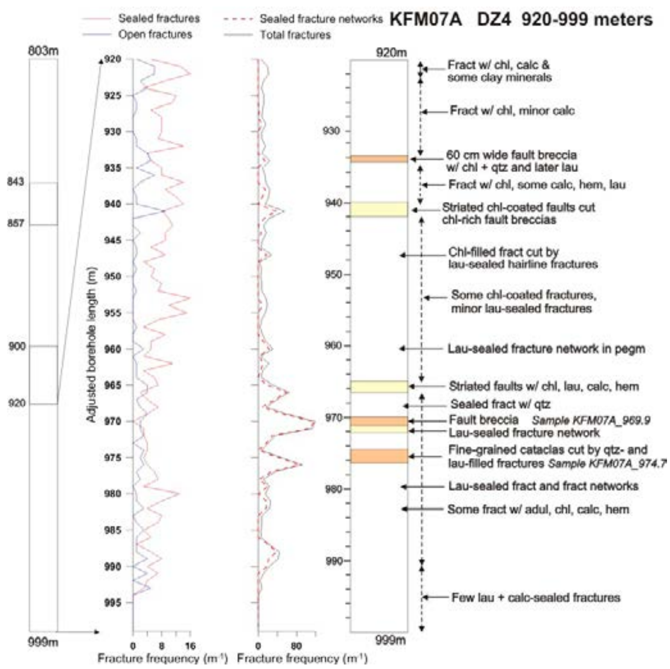
Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM0100 and low velocity seismic refraction anomalies (Isaksson and Keisu 2005; RSLV01 in Figure 5-33 in SKB 2005). Modelled to a depth of 1650 m using dip estimated by connecting lineament MFM0100 at the surface with the borehole intervals 920-999 m in KFM07A (part of DZ4) and 217-280 m in KFM09A (DZ3). Zone ZFMB8 also modelled to intersect borehole interval 920-999 m along part of DZ4 in KFM07A and zone ZFMENE0159A also modelled to intersect DZ3 in KFM09A. Deformation zone plane placed at fixed points 970 m in KFM07A and 244 m in KFM09A. Decreased radar penetration also along the borehole interval 960-972 m in KFM07A. Zone ZFMNNW0100 also intersects borehole interval 82-95 m in HFM23 (DZ2). Included only in local model.



Confidence of existence: High

Single hole interpretation: For identification and short description of DZ4 in KFM07A and DZ3 in KFM09A, see SKB P-05-157 and P-06-134, respectively. For character and kinematics of part of DZ4 (920-999 m) in KFM07A, see SKB P-06-212.

The zone is situated along the contact between two rock units in KFM09A. In borehole interval 920-999 m in DZ4 (KFM07A), the zone is predominantly "damage zone" in character, with sporadic intervals of zone core associated with a high fracture frequency. Laumontite-sealed fractures and fracture networks associated with fault breccias are present between 968 and 979 m. At c. 975 m, along part of a fault core, dark green cataclasite is transected by quartz- and laumontite-sealed fractures and fracture networks, locally with calcite (see picture to right below). Along DZ4 in KFM07A, fracturing occurs both along (see picture to right below) and discordant to the intense ductile fabric. The former observation provides evidence for reactivation of ductile structures. Fault-slip data along several chlorite-striated fractures.



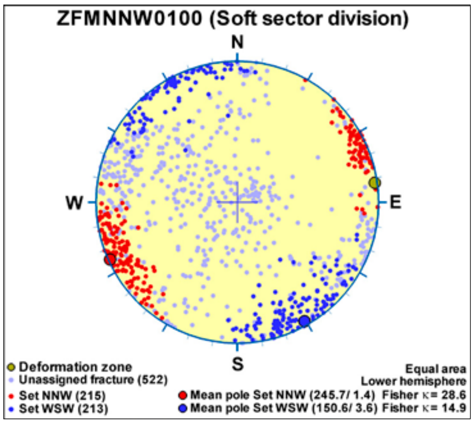
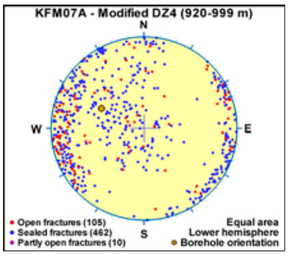
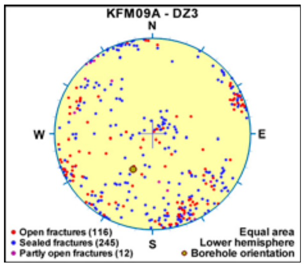
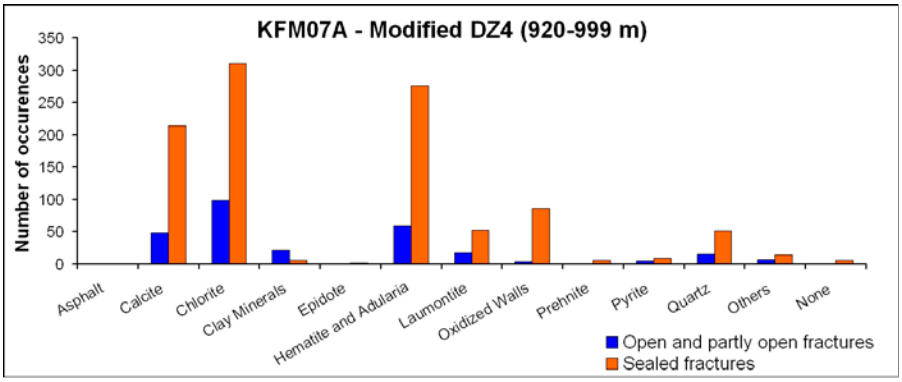
After P-06-212

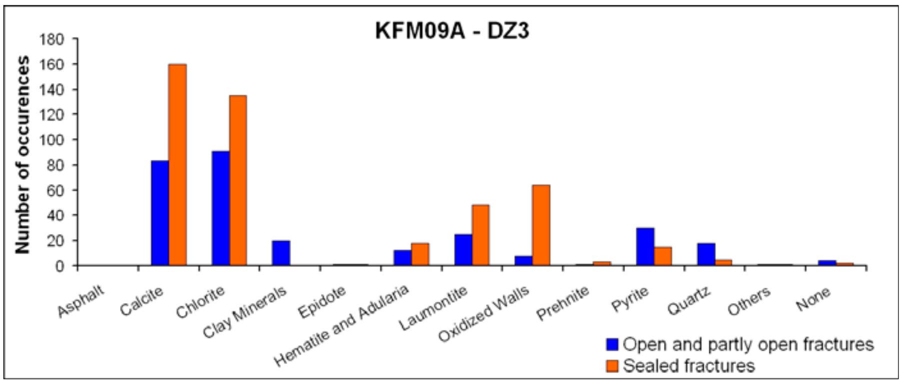
Cataclasite along strong tectonic foliation. The cataclasite is post-dated in its footwall (to the right) by a network of quartz-, laumontite- and calcite-filled fractures. Picture provides evidence for multiple reactivation along the ductile fabric (after P-06-212)

<table>
<tr><th colspan="6">Vertical or steeply-dipping brittle deformation zones with NNW strike
ZFMNNW0100 (borehole interval 920-999 m along part of DZ4 in KFM07A and DZ3 in KFM09A)</th></tr>
<tr><th>Property</th><th>Quantitative estimate</th><th>Span</th><th>Confidence level</th><th>Basis for interpretation</th><th>Comments</th></tr>
<tr><td>Position</td><td></td><td>± 20 m (surface)<table><tr><th colspan="3">KFM07A</th></tr><tr><td>dx (m)</td><td>dy (m)</td><td>dz (m)</td></tr><tr><td>4</td><td>5</td><td>4</td></tr><tr><th colspan="3">KFM09A</th></tr><tr><td>4</td><td>4</td><td>2</td></tr></table></td><td>High</td><td>Intersections along borehole interval 920-999 m in KFM07A (part of DZ4) and DZ3 in KFM09A, low magnetic lineament MFM0100, seismic refraction data</td><td>Span estimate refers to the uncertainty in the position of the central part of the zone</td></tr>
<tr><td>Orientation (strike/dip, right-hand-rule method)</td><td>172/88</td><td>± 5/± 10</td><td>High</td><td>Strike based on trend of lineament MFM0100. Dip based on linking MFM0100 at the surface with borehole intersections 920-999 m in KFM07A (part of DZ4) and DZ3 in KFM09A</td><td></td></tr>
<tr><td>Thickness</td><td>22 m</td><td>3-50 m</td><td>Medium</td><td>Intersection along borehole interval 217-280 m in KFM09A (DZ3). Span estimated on the basis of the range in thickness of steeply dipping zones between 1000 and 3000 m in length</td><td>Thickness refers to both ductile and brittle components, and both damage zone and core in the brittle component.</td></tr>
<tr><td>Length</td><td>1423 m</td><td></td><td>High</td><td>Low magnetic lineament MFM0100. Terminated against ZFMENE2320 and ZFMENE0810</td><td>Total trace length at ground surface</td></tr>
<tr><td>Ductile deformation</td><td></td><td></td><td>Medium</td><td>Intersections along borehole interval 920-999 m in KFM07A (part of DZ4) and DZ3 in KFM09A</td><td>Present along borehole interval 920-999 m in KFM07A (part of DZ4). Some uncertainty concerning whether integral part of the deformation along the zone</td></tr>
<tr><td>Brittle deformation</td><td></td><td></td><td>High</td><td>Intersections along borehole interval 920-999 m in KFM07A (part of DZ4) and DZ3 in KFM09A</td><td>Increased frequency of fractures. Fault cores with elevated fracture frequency including sealed fracture networks, cohesive breccia and cataclasite</td></tr>
<tr><td>Alteration</td><td></td><td></td><td>High</td><td>Intersections along borehole interval 920-999 m in KFM07A (part of DZ4) and DZ3 in KFM09A, character of lineament MFM0100</td><td>Red-stained bedrock with fine-grained hematite dissemination</td></tr>
<tr><td>Fracture orientation (strike/dip, right-hand-rule method)</td><td>Mean orientation of NNW set = 336/89

Mean orientation of WSW set = 241/86</td><td>Fisher κ value of NNW set = 29

Fisher κ value of WSW set = 15</td><td>Medium</td><td>Intersections along borehole interval 920-999 m in KFM07A (part of DZ4) and DZ3 in KFM09A, N=950</td><td>Variable orientation of fractures. Steeply dipping fractures that strike NNW and WSW are conspicuous. Gently dipping fractures are also present</td></tr>
</table>

<table>
<tr><th colspan="6">Vertical or steeply-dipping brittle deformation zones with NNW strike
ZFMNNW0100 (borehole interval 920-999 m along part of DZ4 in KFM07A and DZ3 in KFM09A)</th></tr>
<tr><th>Property</th><th>Quantitative estimate</th><th>Span</th><th>Confidence level</th><th>Basis for interpretation</th><th>Comments</th></tr>
<tr><td></td><td colspan="3">
</td><td>
</td><td>
</td></tr>
<tr><td>Fracture frequency</td><td>Mean 22 m^{-1}</td><td>Span 3-119 m^{-1}</td><td>Medium</td><td>Intersection along borehole interval 920-999 m in KFM07A (part of DZ4)</td><td>Dominance of sealed fractures. Quantitative estimate and span include several sealed fracture networks and a crush zone</td></tr>
<tr><td rowspan="2">Fracture filling</td><td></td><td></td><td>Medium</td><td>Intersection along borehole interval 920-999 m in KFM07A (part of DZ4) and DZ3 in KFM09A</td><td>Chlorite, calcite, hematite/adularia, laumontite, quartz, pyrite, clay minerals</td></tr>
<tr><td colspan="5">


</td></tr>
</table>

Vertical or steeply-dipping brittle deformation zones with NNW strike ZFMNNW0100 (borehole interval 920-999 m along part of DZ4 in KFM07A and DZ3 in KFM09A)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Sense of displacement			High	Faults along borehole interval 920-999 m in KFM07A (part of DZ4) and DZ3 in KFM09A. Shear striae along chlorite with steps composed of calcite. Occasional striations on clay minerals and hematite	Dominant set of fault-slip data consists of steeply dipping faults with NNW-SSE strike, strike-slip displacement, both sinistral and dextral. Subordinate sets include: 1. Steeply dipping faults with ENE strike, strike-slip displacement. 2. Steeply dipping faults with NNW and ENE strike, highly oblique-slip or dip-slip displacement. 3. Gently dipping faults, dip-slip or strike-slip displacement

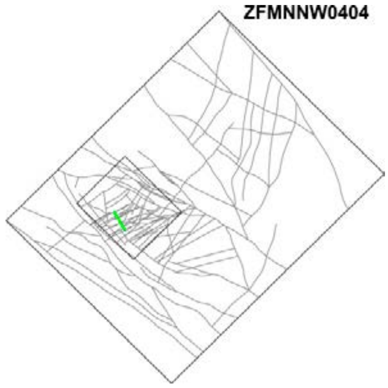
<table>
<tr><th colspan="6">Vertical or steeply-dipping brittle deformation zones with NNW strike
ZFMNNW0101</th></tr>
<tr><th>Property</th><th>Quantitative estimate</th><th>Span</th><th>Confidence level</th><th>Basis for interpretation</th><th>Comments</th></tr>
<tr><td colspan="4">Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM0101. Modelled to a depth of 1750 m using an assumed dip of 90^o based on a comparison with high confidence, vertical and steeply dipping zones with NNW strike. Included only in local model.</td><td colspan="2">
</td></tr>
<tr><td colspan="6">Confidence of existence: Medium (not confirmed by direct geological observation)</td></tr>
<tr><td>Position</td><td></td><td>± 20 m (surface)</td><td>High</td><td>Low magnetic lineament MFM0101</td><td>Span estimate refers to the uncertainty in the position of the central part of the zone</td></tr>
<tr><td>Orientation (strike/dip, right-hand-rule method)</td><td>169/90</td><td>± 5/± 10</td><td>High for strike, low for dip</td><td>Strike based on trend of lineament MFM0101. Dip based on comparison with high confidence, vertical and steeply-dipping zones with NNW strike</td><td></td></tr>
<tr><td>Thickness</td><td>20 m</td><td>3-50 m</td><td>Low</td><td>Estimated on basis of length – thickness correlation diagram in SKB R-07-50. Span estimated on the basis of the range in thickness of steeply dipping zones between 1000 and 3000 m in length</td><td>Thickness refers to total zone thickness (damage zone and core)</td></tr>
<tr><td>Length</td><td>1726 m</td><td></td><td>High</td><td>Low magnetic lineament MFM0101. Terminated against ZFMENE0062A and ZFMNE0065</td><td>Total trace length at ground surface</td></tr>
<tr><td>Ductile deformation</td><td></td><td></td><td>Low</td><td>Comparison with high confidence, vertical and steeply-dipping zones with NNW strike</td><td>Assumed not to be present</td></tr>
<tr><td>Brittle deformation</td><td></td><td></td><td>Low</td><td>Comparison with high confidence, vertical and steeply-dipping zones with NNW strike</td><td>Assumed to be present</td></tr>
<tr><td>Alteration</td><td></td><td></td><td>Medium</td><td>Character of lineament MFM0101</td><td>Red-stained bedrock with fine-grained hematite dissemination</td></tr>
<tr><td colspan="6">No more data</td></tr>
</table>

Vertical or steeply-dipping brittle deformation zones with NNW strike

ZFMNNW0404 (DZ3 in KFM01B, DZ1 in KFM07A and HFM27)

Property	Quantitative estimate	Span	Confidence level	Basis for interpretation	Comments

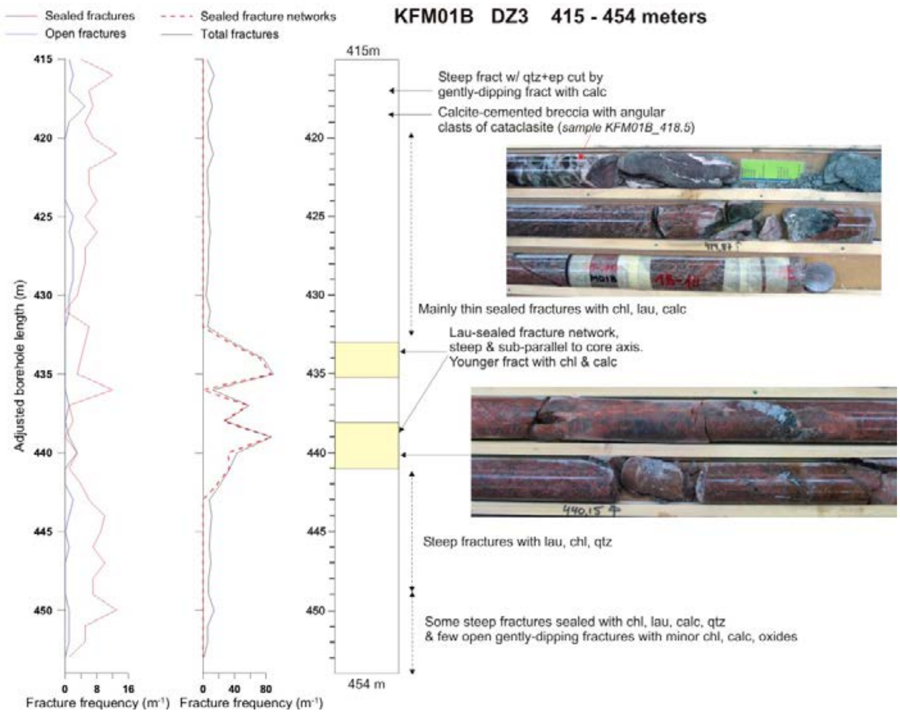
Modelling procedure: At the surface, corresponds to the low magnetic lineaments MFM1196 and 1196G. Modelled down to 1000 m using dip estimated by connecting these lineaments at the surface with the borehole intersections 415-504 m (DZ3) in KFM01B and 108-185 m (DZ1) in KFM07A, with fixed points at 440 m in KFM01B and 165 m in KFM07A. Decreased radar penetration also along the borehole interval 150-170 m in KFM07A. The gently dipping zone ZFM1203 is also modelled to intersect KFM07A along DZ1. For this reason, there are difficulties to separate the influence of zones ZFMNNW0404 and ZFM1203 along DZ1 in KFM07A. Only the lower part of DZ1 in KFM07A is considered to belong to this zone. Included only in local model. Zone ZFMNNW0404 also intersects HFM27.



Confidence of existence: High

Single hole interpretation: For identification and short description of DZ3 in KFM01B and DZ1 in KFM07A, see SKB P-04-116 and P-05-157. For character and kinematics of DZ3 in KFM01B, see SKB P-06-212.

Zone is predominantly "damage zone" in character. Core of zone with laumontite-sealed fracture networks at 433-441 m. Calcite-cemented breccia with angular clasts of cataclasite at 418.5 m (see picture below). Fault-slip data documented along four fractures.

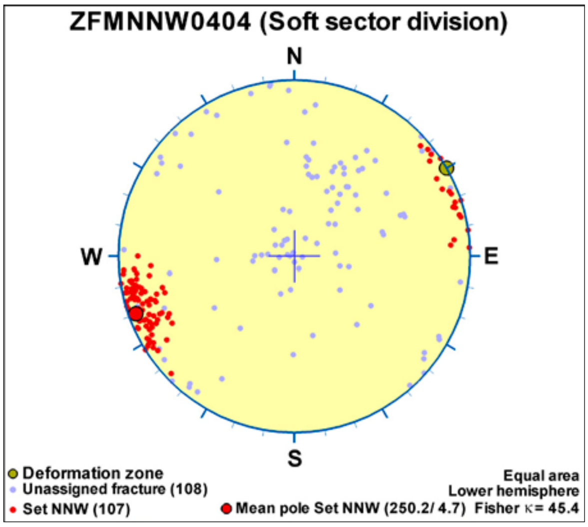
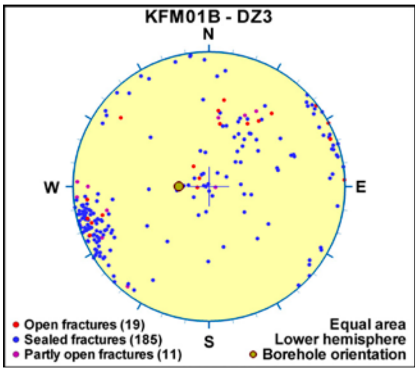
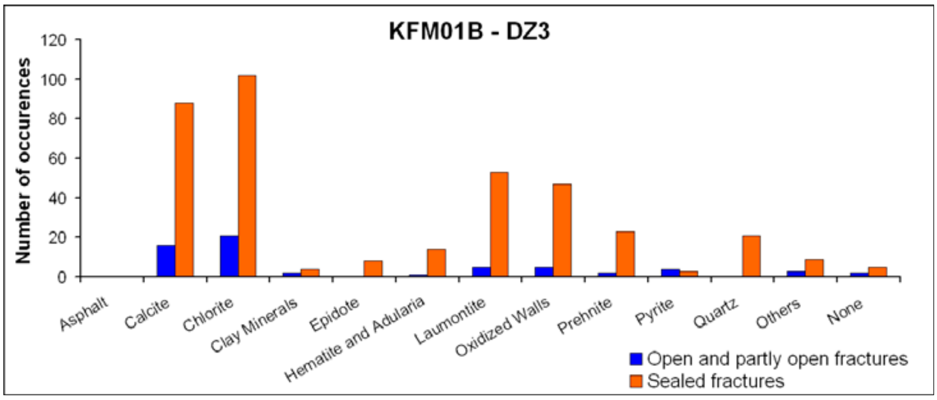


After P-06-212

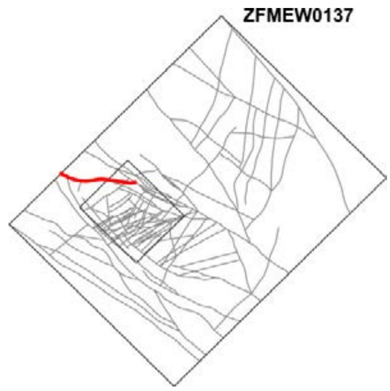
Vertical or steeply-dipping brittle deformation zones with NNW strike ZFMNNW0404 (DZ3 in KFM01B, DZ1 in KFM07A and HFM27)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Position		± 20 m (surface, MFM1196) ± 10 m (surface, MFM1196G) **KFM01B** dx (m) / dy (m) / dz (m) 13 / 14 / 4 **KFM07A** 1 / 1 / 0	High	Intersections along DZ3 in KFM01B and DZ1 in KFM07A, magnetic lineaments MFM1196 and MFM1196G	Span refers to the uncertainty in the position of the zone core
Orientation (strike/dip, right-hand-rule method)	150/90	± 5/± 10	High	Intersections along DZ3 in KFM01B and DZ1 in KFM07A, magnetic lineaments MFM1196 and MFM1196G	
Thickness	10 m	3-50 m	Medium	Intersection along DZ3 in KFM01B. Span estimated on the basis of the range in thickness of steeply dipping zones between 1000 and 3000 m in length	Thickness refers to total zone thickness (damage zone and core)
Length	947 m		High	magnetic lineaments MFM1196 and MFM1196G. Terminated against ZFMENE0060A and ZFMENE0159A	Total trace length at ground surface
Ductile deformation			High	Intersections along DZ3 in KFM01B and DZ1 in KFM07A	Not present
Brittle deformation			High	Intersections along DZ3 in KFM01B and DZ1 in KFM07A	Increased frequency of fractures. Along DZ3 In KFM01B, there are fault core intervals with sealed fracture networks. Brecciated cataclasite also present.
Alteration			High	Intersections along DZ3 in KFM01B and DZ1 in KFM07A	Oxidized bedrock with fine-grained hematite dissemination
Fracture orientation (strike/dip, right-hand-rule method)	Mean orientation of NNW fracture set = 340/85	Fisher κ value of NNW fracture set = 45	Medium	Intersection along DZ3 in KFM01B, N=215	Fracture set with NNW strike and steep dip to the east is dominant. A subordinate fracture set that is sub-horizontal and fractures with steeper, more variable orientation are also present

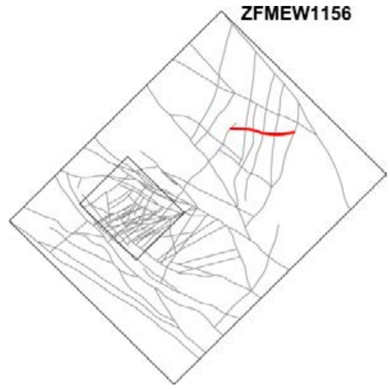
Vertical or steeply-dipping brittle deformation zones with NNW strike

ZFMNNW0404 (DZ3 in KFM01B, DZ1 in KFM07A and HFM27)

Property	Quantitative estimate	Span	Confidence level	Basis for interpretation	Comments
	 			 	
Fracture frequency	Mean 18 m^{-1}	Span 1-89 m^{-1}	Medium	Intersection along DZ3 in KFM01B	Dominance of sealed fractures. Quantitative estimate and span include sealed fracture networks and crush zones, especially in the borehole interval 431-443 m
Fracture filling			Medium	Intersection along DZ3 in KFM01B	Chlorite, calcite, laumontite, prehnite, quartz, hematite/adularia, epidote
	 				
Sense of displacement			Low	Intersection along DZ3 in KFM01B.	Steeply dipping faults with NNW strike (4): 1. chlorite±epidote striae, sinistral strike-slip. 2. chlorite±calcite striae, dip-slip, both normal and reverse

Vertical or steeply-dipping brittle deformation zones with NNW strike ZFMNNW0823					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM0823. Modelled to base of regional model volume using an assumed dip of 90^{o} based on a comparison with high confidence, vertical or steeply dipping zones with NNW strike. Included only in regional model. Not present inside local model volume.				 	
Confidence of existence: Medium (not confirmed by direct geological observation)					
Position		± 20 m (surface)	High	Low magnetic lineament MFM0823	Span estimate refers to the uncertainty in the position of the central part of the zone
Orientation (strike/dip, right-hand-rule method)	160/90	± 5/± 10	High for strike, low for dip	Strike based on trend of lineament MFM0823. Dip based on comparison with high confidence, vertical or steeply dipping zones with NNW strike	
Thickness	25 m	15-64 m	Low	Estimated on basis of length – thickness correlation diagram in SKB R-07-50. Span estimated on the basis of the range in thickness of steeply dipping zones between 3000 and 10000 m in length	Thickness refers to total zone thickness (damage zone and core)
Length	3238 m		High	Low magnetic lineament MFM0823. Terminated against ZFMWNW0001, ZFMWNW0023 and ZFMNNE0828	Total trace length at ground surface
Ductile deformation			Low	Comparison with high confidence, vertical or steeply dipping zones with NNW strike	Assumed not to be present
Brittle deformation			Low	Comparison with high confidence, vertical or steeply dipping zones with NNW strike	Assumed to be present
Alteration			Medium	Character of lineament MFM0823	Red-stained bedrock with fine-grained hematite dissemination
No more data					

Vertical deformation zones with EW strike ZFMEW0137					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM0137A0. Modelled to base of regional model volume using an assumed dip of 90° based on comparison with high confidence, vertical or steeply dipping zones with WNW or NW strike. Included in regional model and present inside local model volume.					
Confidence of existence: Medium (not confirmed by direct geological observation)					
Position		± 20 m (surface)	High	Low magnetic lineament MFM0137A0	Span estimate refers to the uncertainty in the position of the central part of the zone
Orientation (strike/dip, right-hand-rule method)	095/90	± 5/± 10	High for strike, low for dip	Strike based on trend of lineament MFM0137A0. Dip based on comparison with high confidence, vertical or steeply-dipping zones with WNW or NW strike	
Thickness	30 m	15-64 m	Low	Estimated on basis of length – thickness correlation diagram in SKB R-07-50. Span estimated on the basis of the range in thickness of steeply dipping zones between 3000 and 10000 m in length	Thickness refers to both ductile and brittle components, and both damage zone and core in the brittle component.
Length	4300 m		High	Low magnetic lineament MFM0137A0. Terminated to east against ZFMWNW0001	Total trace length at ground surface. Extends to the west and to the south-east outside regional model volume
Ductile deformation			Low	Comparison with majority of high confidence, vertical or steeply dipping zones with WNW or NW strike in regional model	Assumed to be present
Brittle deformation			Low	Comparison with high confidence, vertical or steeply dipping zones with WNW or NW strike	Assumed to be present
Alteration			Medium	Character of lineament MFM0137A0	Red-stained bedrock with fine-grained hematite dissemination
No more data					

Vertical deformation zones with EW strike ZFMEW1156					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM1156. Modelled to base of regional model volume using an assumed dip of 90°, based on a comparison with high confidence, vertical or steeply dipping zones with WNW or NW strike. Included only in regional model. Not present inside local model volume.					
Confidence of existence: Medium (not confirmed by direct geological observation)					
Position		± 20 m (surface)	High	Low magnetic lineament MFM1156	Span estimate refers to the uncertainty in the position of the central part of the zone
Orientation (strike/dip, right-hand-rule method)	096/90	± 5/± 10	High for strike, low for dip	Strike based on trend of lineament MFM1156. Dip based on comparison with high confidence, vertical or steeply dipping zones with WNW or NW strike	
Thickness	25 m	15-64 m	Low	Estimated on basis of length – thickness correlation diagram in SKB R-07-50. Span estimated on the basis of the range in thickness of steeply dipping zones between 3000 and 10000 m in length	Thickness refers to total zone thickness (damage zone and core)
Length	3025 m		High	Low magnetic lineament MFM1156. Terminated against ZFMNE0808A and ZFMNNE1135	Total trace length at ground surface
Ductile deformation			Low	Zone terminates against solely brittle deformation zones	Assumed not to be present
Brittle deformation			Low	Comparison with high confidence, vertical or steeply dipping zones with WNW or NW strike	Assumed to be present
Alteration			Medium	Character of lineament MFM1156	Red-stained bedrock with fine-grained hematite dissemination
No more data					

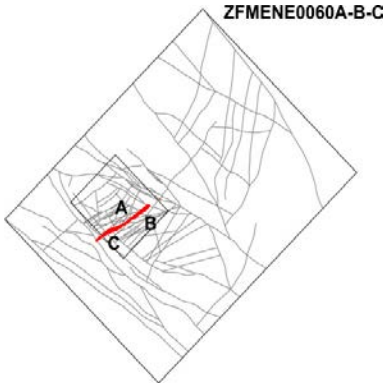
Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike

ZFMENE0060A (part of DZ3 in KFM01C, DZ4 in KFM06A and DZ1 in HFM09; vuggy rock)

Property	Quantitative estimate	Span	Confidence level	Basis for interpretation	Comments

Modelling procedure: Zone ZFMENE0060 consists of different branches, the most prominent of which is denoted ZFMENE0060A. Though the branches are described separately in subsequent property sheets, it should be noted that these constitute elements of one and the same structure.

At the surface, zone ZFMENE0060A corresponds to the low magnetic lineaments MFM0060 and MFM0060G0. Modelled to base of regional model volume using the dip estimated by connecting these lineament segments with the borehole intersections 235-252 m in KFM01C (part of DZ3) and 318-358 m in KFM06A (DZ4). Deformation zone plane placed at fixed points 247 m and 324 m in KFM01C and KFM06A, respectively. Model implies that this zone also intersects DZ1 in HFM09. The gently dipping zone ZFMB7 is also modelled to intersect borehole KFM06A along DZ4. For this reason, there are some difficulties to separate the influence of zones ZFMENE0060A and ZFMB7 along this borehole interval. Included in regional model and also present inside local model volume.

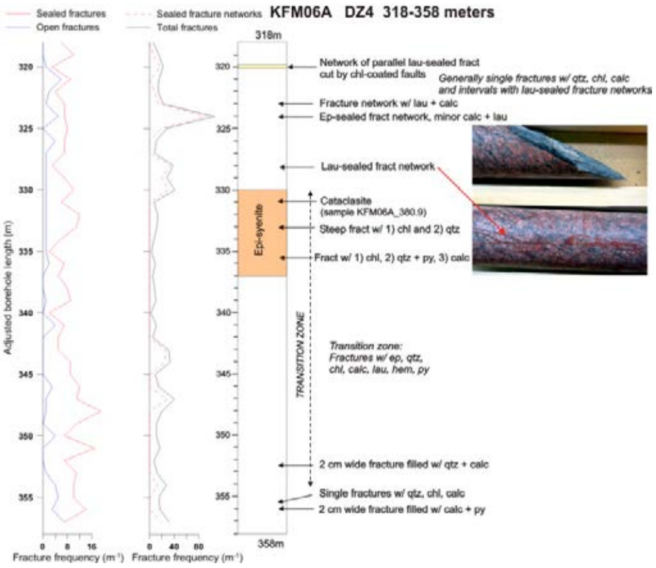


Confidence of existence: High

Single hole interpretation: For identification and short description of deformation zones in boreholes, see SKB P-05-132, SKB P-06-135 and P-04-119. For character and kinematics of DZ4 in KFM06A, see SKB P-06-212.

Damage zone dominates with intervals of zone core in upper and lower parts. Thin intervals with strong grain size reduction and cataclastic textures are present (e.g. 330.9 m). Fault-slip data documented along some fractures

KFM01C (part of DZ3)

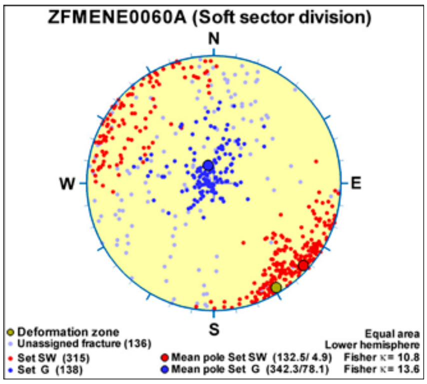


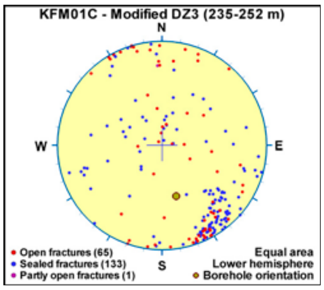
After SKB P-06-212

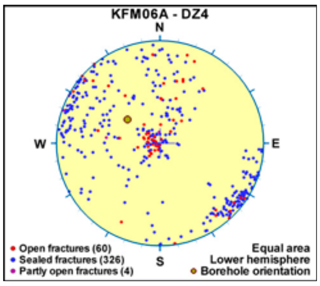
Scanned thin-section showing cataclasite and ultracataclasite at borehole length 330.9 m (after SKB P-06-212)

Position		± 20 m (surface, MFM0060) ± 10 m (surface, MFM0060G0) **KFM01C** dx (m) 1, dy (m) 1, dz (m) 1 **KFM06A** dx (m) 3, dy (m) 3, dz (m) 2	High	Intersections along part of DZ3 in KFM01C and DZ4 in KFM06A, low magnetic lineaments MFM0060 and MFM0060G0	Span estimate refers to the uncertainty in the position of the central part of the zone
Orientation (strike/dip, right-hand-rule method)	239/85	± 5/± 10	High	Strike based on trend of lineaments MFM0060 and MFM0060G0. Dip based on linking these lineaments at the surface with borehole intersections along KFM01C (part of DZ3) and KFM06A (DZ4)	
Thickness	17 m	15-64 m	Medium	Intersection along KFM06A (DZ4). Span estimated on the basis of the range in thickness of steeply dipping zones between 1000 and 3000 m in length	Thickness refers to total zone thickness (damage zone and core).
Length	3120 m		High	Low magnetic lineaments MFM0060 and MFM0060G0. Terminated against ZFMWNW0809A and ZFMNW0003	Total trace length at ground surface
Ductile deformation			High	Intersections along KFM01C (part of DZ3) and KFM06A (DZ4)	Not present

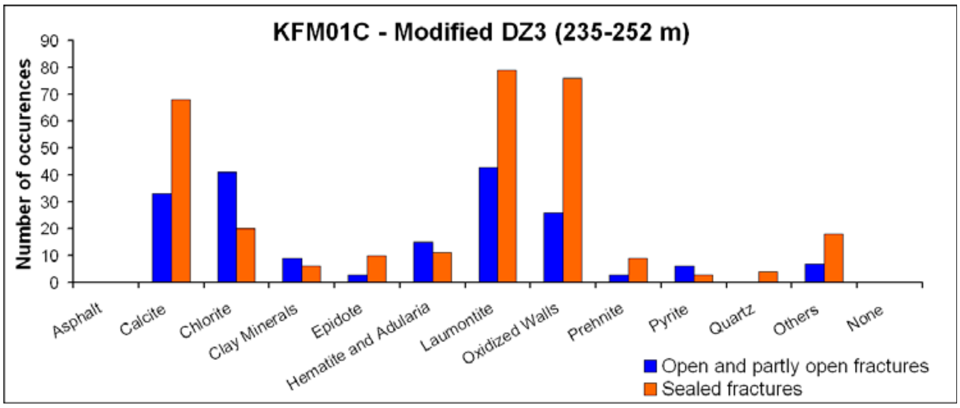
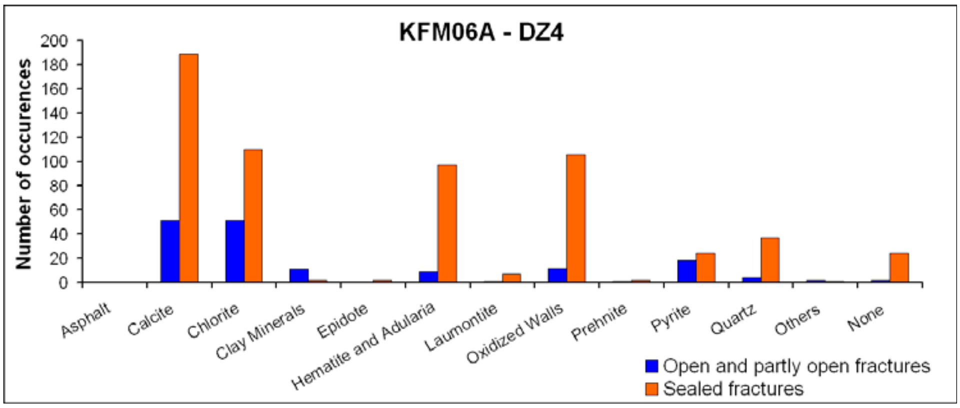
Brittle deformation			High	Intersections along KFM01C (part of DZ3) and KFM06A (DZ4)	Increased frequency of fractures. Fault core interval along DZ4 in KFM06A with sealed fracture network. Cataclasite also present along the zone in this borehole. Several fault core intervals with sealed fracture networks, cohesive breccias and locally cataclasite along DZ3 in KFM01C
Alteration			High	Intersections along KFM01C (part of DZ3) and KFM06A (DZ4), character of lineaments MFM0060 and MFM0060G0	Red-stained bedrock with fine-grained hematite dissemination. Vuggy rock with quartz dissolution conspicuous between 332-333 m along DZ4 in KFM06A
Fracture orientation (strike/dip, right-hand-rule method)	Mean orientation of SW fracture set = 223/85 Mean orientation of gentle fracture set = 072/12	Fisher κ value of ENE to NNE fracture set = 11 Fisher κ value of gentle fracture set = 14	Medium	Intersections along KFM01C (part of DZ3) and KFM06A (DZ4), N = 589	Two sets of fractures are conspicuous, especially in KFM06A. One of these sets strikes WSW to SSW and dips steeply, the other is gently dipping. Note that open and partly open fractures are predominantly steeply dipping in KFM01C and gently dipping in KFM06A. Some problem regarding interference with ZFMB7 in KFM06A





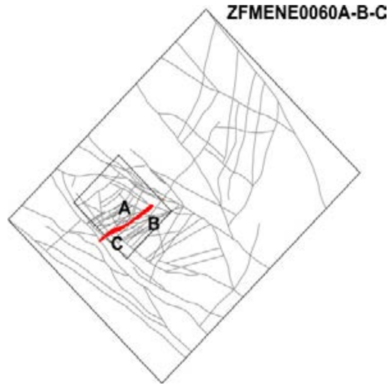


Fracture frequency	Mean = 29 m^{-1}	2-163 m^{-1}	Medium	Intersections along KFM01C (part of DZ3) and KFM06A (DZ4)	Dominance of sealed fractures. Mean value and span include sealed fracture networks
Fracture filling			Medium	Intersections along KFM01C (part of DZ3) and KFM06A (DZ4)	Calcite and chlorite common in both steeply dipping and gently dipping fractures, in both boreholes Part of DZ3 (KFM01C): Laumontite, prehnite, hematite/adularia, quartz, epidote predominantly in steeply dipping fractures but also in gently dipping fractures. Clay minerals in both steeply and gently dipping fractures DZ4 (KFM06A): Hematite/adularia, quartz and laumontite predominantly in steeply dipping fractures but also in gently dipping fractures. Clay minerals predominantly in gently dipping fractures but also in steeply dipping fractures.

	 				
Sense of displacement			Medium	Minor faults along DZ4 in KFM06A. Striations or steps of chlorite and some calcite 16 striated minor faults along DZ3 in KFM01C. Striations or steps of chlorite, hematite, calcite and clay minerals	DZ4 along KFM06A Two steeply dipping faults with SW strike show oblique movement with dominant strike-slip component Sub-horizontal fault shows dip-slip movement DZ3 along KFM01C *Steep NE-SW faults (11).* Strike-slip, dip-slip or oblique-slip. One fault shows dextral strike-slip. *Fault with moderate dip to north (1).* Reverse dip-slip *Faults with steep dip to south (2).* Dip-slip or dextral strike-slip *Steep NNW faults (2).* Reverse dip-slip or oblique-slip

Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike ZFMENE0060B (DZ2, DZ3 and borehole interval 245-260 m in KFM06A)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**

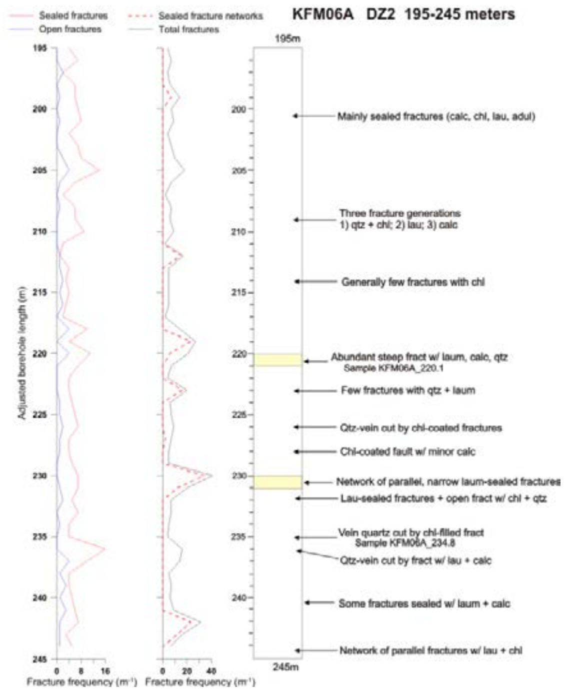
Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM0060G1 and its inferred continuation to the ENE close to MFM0060. Modelled to the base of the regional model volume as a splay from ZFMENE0060A. Dip estimated by connecting these lineament segments with the borehole intersection 195-278 m in KFM06A (DZ2, DZ3 and less fractured rock between these two zones along borehole interval 245-260 m). Deformation zone plane placed at fixed point 221 m in KFM06A. Decreased radar penetration also along the borehole interval 267-270 m. Included in regional model and also present inside local model volume.



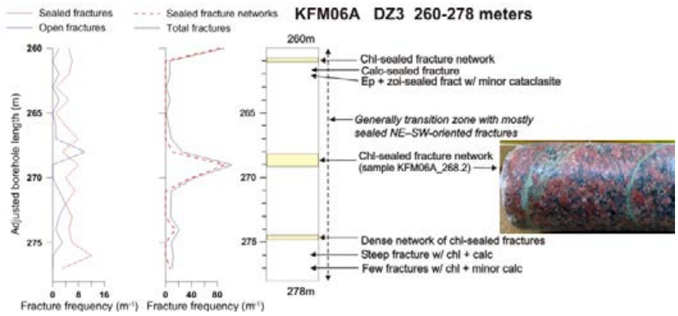
Confidence of existence: High

Single hole interpretation: For identification and short description of DZ2 and DZ3 in KFM06A, see SKB P-05-132. For character and kinematics of DZ2 and DZ3 in KFM06A, see SKB P-06-212.

Damage zone dominates with short intervals of zone core with laumontite- and chlorite-sealed fractures (yellow in figures below). Some epidote group minerals present along DZ3 in KFM06A. Fault-slip data documented along fractures with different orientations.



After SKB P-06-212

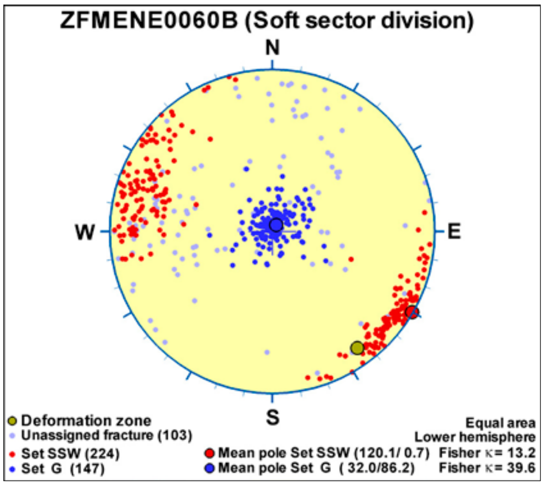
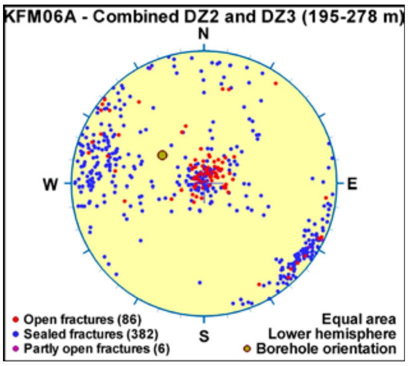
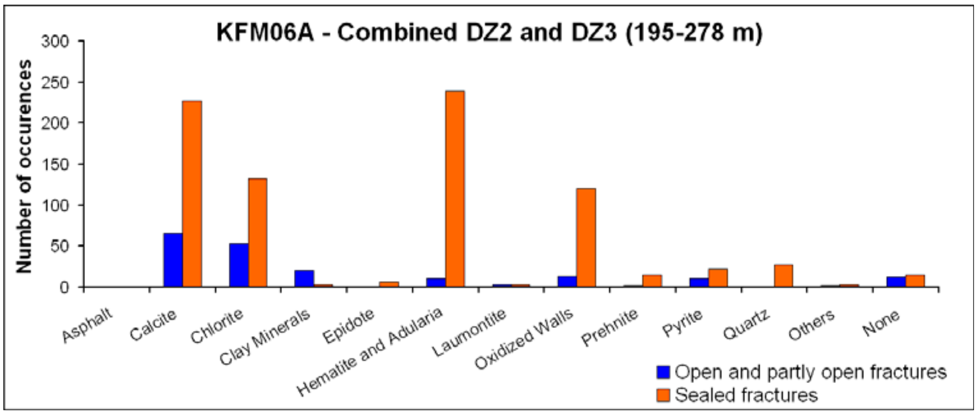


After SKB P-06-212

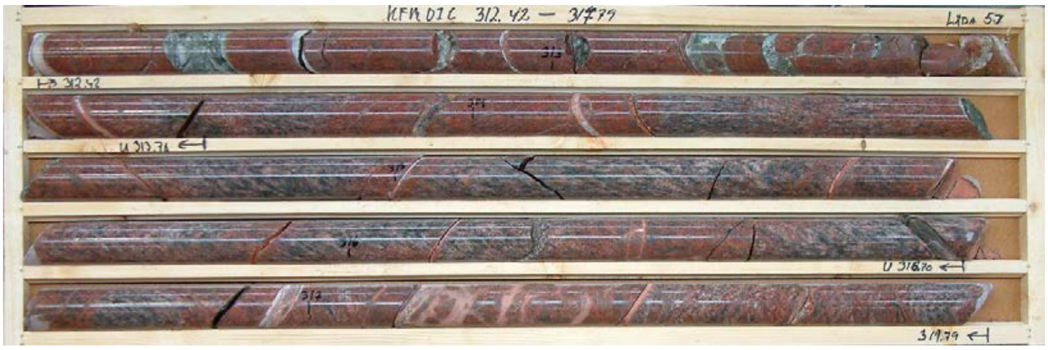
Scanned thin-section of fracture network in core segment at 268.2 m. Chlorite and epidote group minerals fill the space between the angular fragments (after SKB P-06-212)

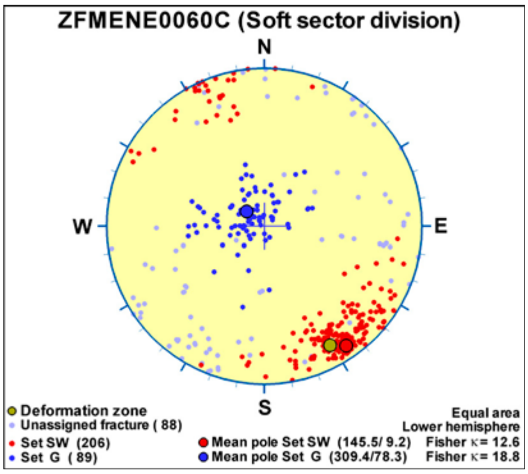
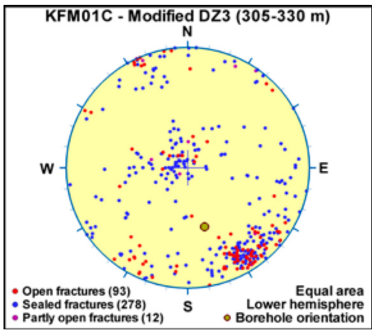
Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike ZFMENE0060B (DZ2, DZ3 and borehole interval 245-260 m in KFM06A)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
 KFM06A (DZ3). Strong alteration (red-stained bedrock with hematite dissemination) and abundant sealed fractures are present					
Position		± 20 m (surface, close to MFM0060) ± 10 m (surface, MFM0060G1) **KFM06A** dx (m): 2, dy (m): 2, dz (m): 1	High	Intersection along KFM06A (DZ2, DZ3 and less fractured rock along 245-260 m), low magnetic lineament MFM0060G1 and inferred continuation to the ENE close to MFM0060	Span estimate refers to the uncertainty in the position of the central part of the zone
Orientation (strike/dip, right-hand-rule method)	234/78	± 5/± 10	High	Strike based on trend of lineament MFM0060G1 and inferred continuation to the ENE close to MFM0060. Dip based on linking this lineament at the surface with borehole intersection along KFM06A (DZ2, DZ3 and less fractured rock along 245-260 m)	

Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike ZFMENE0060B (DZ2, DZ3 and borehole interval 245-260 m in KFM06A)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Thickness	15 m	3-50 m	Medium	Intersection along KFM06A (DZ2, DZ3 and less fractured rock along 245-260 m). Span estimated on the basis of the range in thickness of steeply dipping zones between 1000 and 3000 m in length	Thickness refers to total zone thickness (damage zone and core)
Length	1070 m		Medium	Low magnetic lineament MFM0060G1 and inferred continuation to the ENE close to MFM0060. Terminated against ZFMWNW0809A and ZFMENE0060A	Total trace length at ground surface
Ductile deformation			High	Intersection along KFM06A (DZ2, DZ3 and less fractured rock along 245-260 m)	Not present
Brittle deformation			High	Intersection along KFM06A (DZ2, DZ3 and less fractured rock along 245-260 m)	Increased frequency of fractures. Fault core intervals with elevated fracture frequency, including sealed fracture networks and local crush zone
Alteration			High	Intersection along KFM06A (DZ2, DZ3 and less fractured rock along 245-260 m), character of lineament MFM0060G1	Red-stained bedrock with fine-grained hematite dissemination
Fracture orientation (strike/dip, right-hand-rule method)	Mean orientation of SSW fracture set = 210/89 Mean orientation of SSW fracture set = 122/4	Fisher κ value of SSW fracture set = 13 Fisher κ value of SSW fracture set = 40	Medium	Intersection along KFM06A (DZ2, DZ3 and less fractured rock along 245-260 m), N = 474	Two sets of fractures are conspicuous. One of these sets strikes SSW and dips steeply to the WNW, the other is sub-horizontal. Fractures that strike NS and dip steeply to the east are also present

Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike ZFMENE0060B (DZ2, DZ3 and borehole interval 245-260 m in KFM06A)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
					
Fracture frequency	Mean = 13 m^{-1}	1-103 m^{-1}	Medium	Intersection along KFM06A (DZ2, DZ3)	Dominance of sealed fractures. Open fractures significant in the sub-horizontal set. Mean value and span include sealed fracture networks and crushed rock
Fracture filling			Medium	Intersection along KFM06A (DZ2, DZ3 and less fractured rock along 245-260 m)	Calcite and chlorite in both steeply and gently dipping fractures. Hematite/adularia, quartz and prehnite predominantly in steeply dipping fractures but also in gently dipping fractures. Clay minerals predominantly in gently dipping fractures but also in steeply dipping fractures
					

Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike ZFMENE0060B (DZ2, DZ3 and borehole interval 245-260 m in KFM06A)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Sense of displacement			Low	Minor faults along DZ2 and DZ3 in KFM06A. Striations or steps of chlorite and some calcite	Steeply dipping fault with WSW strike shows strike-slip movement. Steeply dipping fault with SSW strike shows reverse dip-slip displacement. Two steeply dipping faults with ESE strike show strike slip and oblique slip (sinistral strike-slip, reverse dip-slip) movement. Sub-horizontal fault shows normal dip slip movement

<table>
<tr><th colspan="6">Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike
ZFMENE0060C (part of DZ3 in KFM01C)</th></tr>
<tr><th>Property</th><th>Quantitative estimate</th><th>Span</th><th>Confidence level</th><th>Basis for interpretation</th><th>Comments</th></tr>
<tr><td colspan="4">Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM2281G and its inferred continuation to the WSW. Modelled to the base of the regional model volume as a splay from ZFMENE0060A. Dip estimated by connecting lineament segment MFM2281G and its extension with the borehole intersection 305-330 m in KFM01C (part of DZ3). Deformation zone plane placed at fixed point 312 m in KFM01C. Included in regional model and also present inside local model volume.</td><td colspan="2">
</td></tr>
<tr><td colspan="6">Confidence of existence: High</td></tr>
<tr><td colspan="6">Single hole interpretation: For identification and short description of DZ3 in KFM01C, see SKB P-06-135.
KFM01C (part of DZ3)
</td></tr>
<tr><td>Position</td><td></td><td>± 10 m (surface)<table><tr><th colspan="3">KFM01C</th></tr><tr><td>dx (m)</td><td>dy (m)</td><td>dz (m)</td></tr><tr><td>1</td><td>1</td><td>1</td></tr></table></td><td>High</td><td>Intersection along KFM01C (part of DZ3), low magnetic lineament MFM2281G and its inferred continuation to the WSW</td><td>Span estimate refers to the uncertainty in the position of the central part of the zone</td></tr>
<tr><td>Orientation (strike/dip, right-hand-rule method)</td><td>241/75</td><td>± 5/± 10</td><td>High</td><td>Strike based on trend of lineament MFM2281G and its inferred continuation to the WSW. Dip based on linking this lineament at the surface with borehole intersection along KFM01C (part of DZ3)</td><td></td></tr>
<tr><td>Thickness</td><td>21 m</td><td>3-50 m</td><td>Medium</td><td>Intersection along KFM01C (part of DZ3). Span estimated on the basis of the range in thickness of steeply dipping zones between 1000 and 3000 m in length</td><td>Thickness refers to total zone thickness (damage zone and core)</td></tr>
</table>

Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike ZFMENE0060C (part of DZ3 in KFM01C)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Length	1161 m		Medium	Low magnetic lineament MFM2281G and its inferred continuation to the WSW. Terminated against ZFMENE0060A	Total trace length at ground surface
Ductile deformation			High	Intersection along KFM01C (part of DZ3)	Not present
Brittle deformation			High	Intersection along KFM01C (part of DZ3)	Increased frequency of fractures. Several fault core intervals with sealed fracture networks, cohesive breccias and locally cataclasite along DZ3 in KFM01C
Alteration			High	Intersection along KFM01C (part of DZ3), character of lineament MFM2281G	Red-stained bedrock with fine-grained hematite dissemination
Fracture orientation (strike/dip, right-hand-rule method)	Mean orientation of WSW fracture set = 236/81 Mean orientation of gentle fracture set = 039/12	Fisher κ value of WSW fracture set = 13 Fisher κ value of gentle fracture set = 19	Medium	Intersection along KFM01C (part of DZ3), N = 383	Two sets of fractures are conspicuous. One of these sets strikes WSW and dips steeply to the NNW, the other is sub-horizontal
					
Fracture frequency	Mean = 31 m^{-1}	6-64 m^{-1}	Medium	Intersection along KFM01C (part of DZ3)	Dominance of sealed fractures. Mean value and span include sealed fracture networks

<table>
<tr><th colspan="6">Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike
ZFMENE0060C (part of DZ3 in KFM01C)</th></tr>
<tr><th>Property</th><th>Quantitative estimate</th><th>Span</th><th>Confidence level</th><th>Basis for interpretation</th><th>Comments</th></tr>
<tr><td rowspan="2">Fracture filling</td><td></td><td></td><td>Medium</td><td>Intersection along KFM01C (part of DZ3)</td><td>Calcite and chlorite common in both steeply dipping and gently dipping fractures.
Laumontite, prehnite, hematite/adularia, quartz, epidote predominantly in steeply dipping fractures but also in gently dipping fractures.
Clay minerals in both steeply and gently dipping fractures</td></tr>
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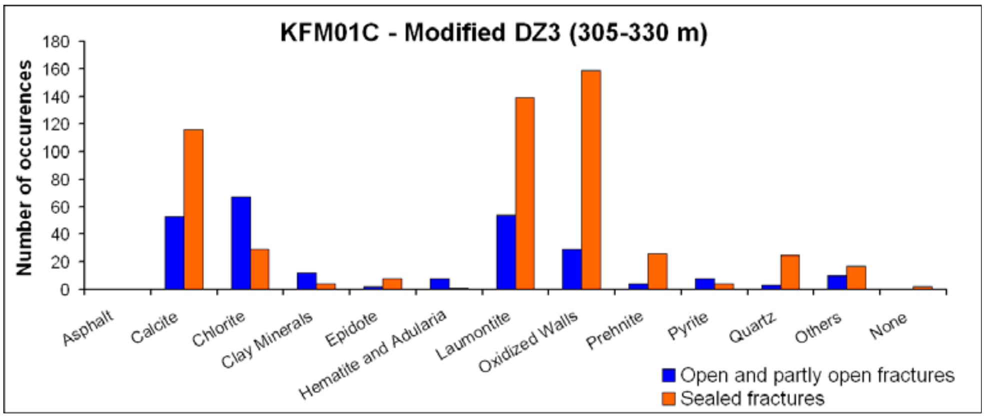


</td></tr>
<tr><td>Sense of displacement</td><td></td><td></td><td>Medium</td><td>16 striated minor faults along DZ3 in KFM01C. Striations or steps of chlorite, hematite, calcite and clay minerals</td><td>Steep NE-SW faults (11). Strike-slip, dip-slip or oblique-slip. One fault shows dextral strike-slip.
Fault with moderate dip to north (1). Reverse dip-slip
Faults with steep dip to south (2). Dip-slip or dextral strike-slip
Steep NNW faults (2). Reverse dip-slip or oblique-slip</td></tr>
</table>

<table>
<tr><th colspan="6">Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike
ZFMENE0061 (DZ4 in KFM01D and DZ8 in KFM06A)</th></tr>
<tr><th>Property</th><th>Quantitative estimate</th><th>Span</th><th>Confidence level</th><th>Basis for interpretation</th><th>Comments</th></tr>
<tr><td colspan="4">Modelling procedure: At the surface, corresponds to the low magnetic lineaments MFM0061 and MFM0061G. Modelled to the base of the regional model volume using dip estimated by connecting lineaments MFM0061 and MFM0061G with the borehole intersections 670-700 m in KFM01D (DZ4) and 788-810 m in KFM06A (DZ8). Deformation zone plane placed at fixed points 683 m and 797 m in KFM01D and KFM06A, respectively. Included only in local model.</td><td colspan="2">
</td></tr>
<tr><td colspan="6">Confidence of existence: High</td></tr>
</table>

Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike

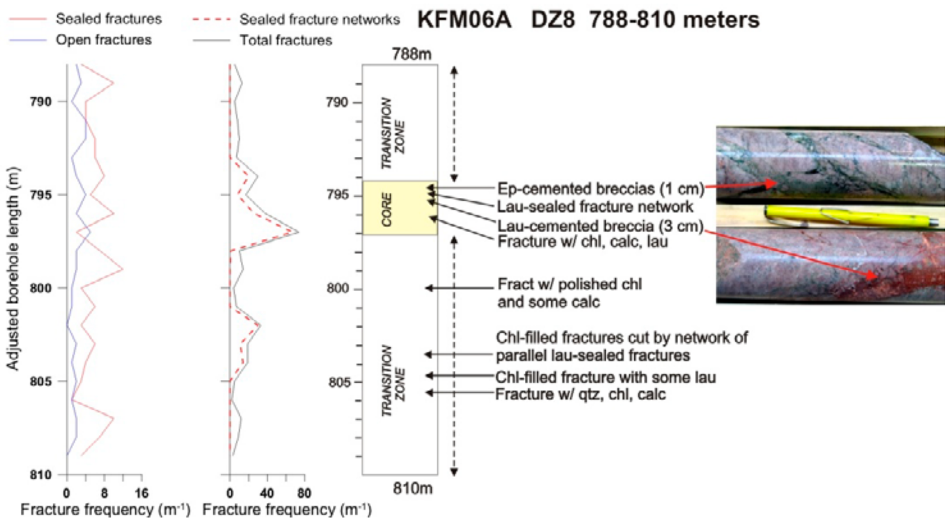
ZFMENE0061 (DZ4 in KFM01D and DZ8 in KFM06A)

Property	Quantitative estimate	Span	Confidence level	Basis for interpretation	Comments

Single hole interpretation: For identification and short description of DZ4 in KFM01D and DZ8 in KFM06A, see SKB P-06-210 and SKB P-05-132. For character and kinematics of DZ8 in KFM06A, see SKB P-06-212.

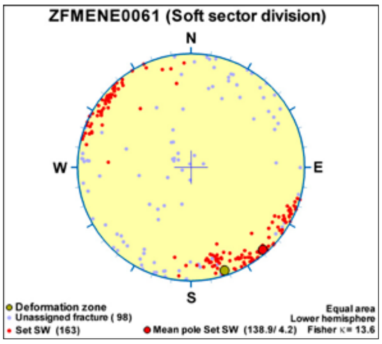
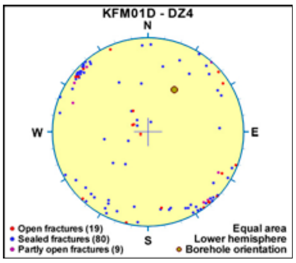
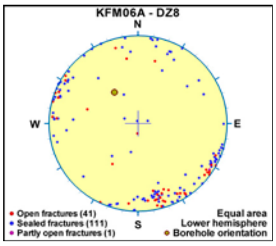
Damage zone dominates with an interval of zone core with fault breccia or cataclasite in the upper part (marked in yellow below). Laumontite-sealed network post-dates chlorite-sealed fractures. Fault-slip data documented along fractures with different orientations.

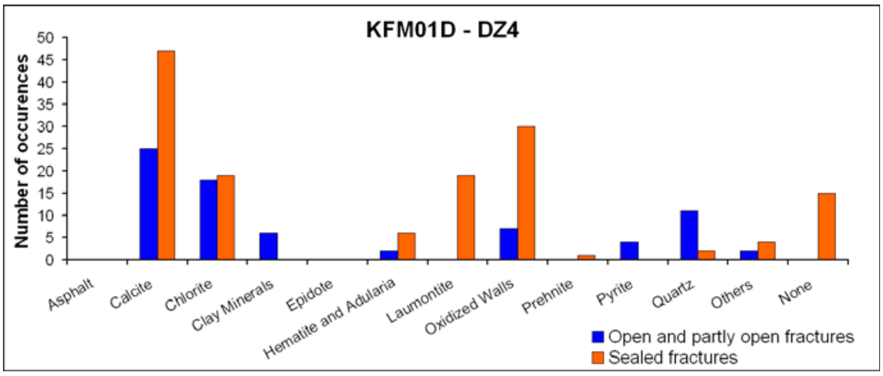
KFM01D (DZ4)

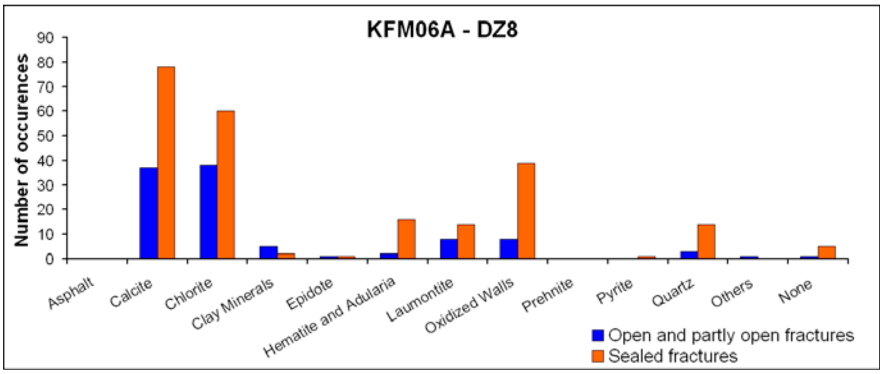


After SKB P-06-212

<table>
<tr><th colspan="6">Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike
ZFMENE0061 (DZ4 in KFM01D and DZ8 in KFM06A)</th></tr>
<tr><th>Property</th><th>Quantitative estimate</th><th>Span</th><th>Confidence level</th><th>Basis for interpretation</th><th>Comments</th></tr>
<tr><td>Position</td><td></td><td>± 20 m (surface, MFM0061)
± 10 m (surface, MFM0061G0)
<table><tr><th colspan="3">KFM01D</th></tr><tr><td>dx (m)</td><td>dy (m)</td><td>dz (m)</td></tr><tr><td>5</td><td>5</td><td>4</td></tr><tr><th colspan="3">KFM06A</th></tr><tr><td>8</td><td>7</td><td>5</td></tr></table></td><td>High</td><td>Intersections along KFM01D (DZ4) and KFM06A (DZ8), low magnetic lineaments MFM0061 and MFM0061G</td><td>Span estimate refers to the uncertainty in the position of the central part of the zone</td></tr>
<tr><td>Orientation (strike/dip, right-hand-rule method)</td><td>248/85</td><td>± 5/± 10</td><td>High</td><td>Strike based on trend of lineaments MFM0061 and MFM0061G. Dip based on linking these lineaments at the surface with borehole intersections along KFM01D (DZ4) and KFM06A (DZ8)</td><td></td></tr>
<tr><td>Thickness</td><td>11 m</td><td>3-50 m</td><td>Medium</td><td>Intersections along KFM01D (DZ4) and KFM06A (DZ8). Span estimated on the basis of the range in thickness of steeply dipping zones between 1000 and 3000 m in length</td><td>Thickness refers to total zone thickness (damage zone and core)</td></tr>
<tr><td>Length</td><td>2430 m</td><td></td><td>High</td><td>Low magnetic lineaments MFM0061 and MFM0061G. Terminated by ZFMENE0060A and ZFMNW0017</td><td>Total trace length at ground surface</td></tr>
<tr><td>Ductile deformation</td><td></td><td></td><td>High</td><td>Intersections along KFM01D (DZ4) and KFM06A (DZ8)</td><td>Not present</td></tr>
<tr><td>Brittle deformation</td><td></td><td></td><td>High</td><td>Intersections along KFM01D (DZ4) and KFM06A (DZ8)</td><td>Increased frequency of fractures. Fault core interval with sealed fracture network, cohesive breccia and cataclasite along DZ4 in KFM06A. Complementary data from KFM01D not yet assembled</td></tr>
</table>

Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike ZFMENE0061 (DZ4 in KFM01D and DZ8 in KFM06A)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Alteration			High	Intersections along KFM01D (DZ4) and KFM06A (DZ8), character of lineaments MFM0061 and MFM0061G	Red-stained bedrock with fine-grained hematite dissemination. Alteration in borehole restricted to DZ4 in KFM01D
Fracture orientation (strike/dip, right-hand-rule method)	Mean orientation of SW fracture set = 229/86	Fisher κ value of SW fracture set = 14	Medium	Intersections along KFM01D (DZ4) and KFM06A (DZ8), N = 261	Steeply dipping fractures with WSW and SSW strike dominate
					
Fracture frequency	Mean 10 m^{-1}	Span 1-74 m^{-1}	Medium	Intersections along KFM01D (DZ4) and KFM06A (DZ8)	Dominance of sealed fractures. Mean value and span include sealed fracture networks
Fracture filling			Medium	Intersections along KFM01D (DZ4) and KFM06A (DZ8)	Calcite, chlorite, laumontite, quartz, hematite/adularia

<table>
<tr><th colspan="6">Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike
ZFMENE0061 (DZ4 in KFM01D and DZ8 in KFM06A)</th></tr>
<tr><th>Property</th><th>Quantitative estimate</th><th>Span</th><th>Confidence level</th><th>Basis for interpretation</th><th>Comments</th></tr>
<tr><td></td><td colspan="5">




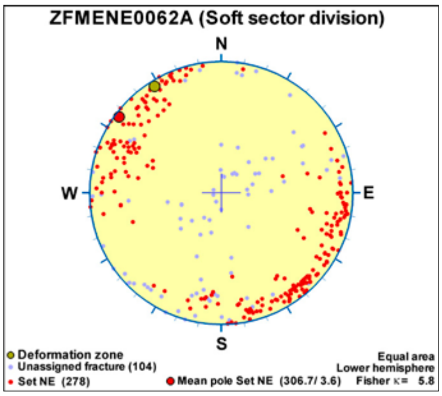
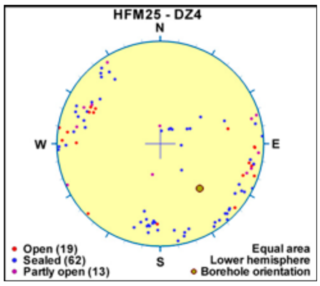
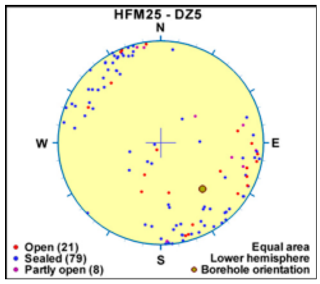
</td></tr>
<tr><td>Sense of displacement</td><td></td><td></td><td>Low</td><td>Minor faults along DZ8 KFM06A. Striations or steps of chlorite and some calcite</td><td>Steeply dipping faults with WSW, ESE and SW strike all show strike-slip displacement. Steeply dipping fault with NNW strike shows dip-slip displacement.

No fault-slip data observed along DZ4 in KFM01D</td></tr>
</table>

<table>
<tr><th colspan="6">Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike
ZFMENE0062A (surface excavation, DZ4 and DZ5 in HFM25)</th></tr>
<tr><th>Property</th><th>Quantitative estimate</th><th>Span</th><th>Confidence level</th><th>Basis for interpretation</th><th>Comments</th></tr>
<tr><td colspan="4">Modelling procedure: Zone ZFMENE0062 consists of different branches, the most prominent of which is denoted ZFMENE0062A. Though the branches are described separately in subsequent property sheets, it should be noted that these constitute elements of one and the same structure.

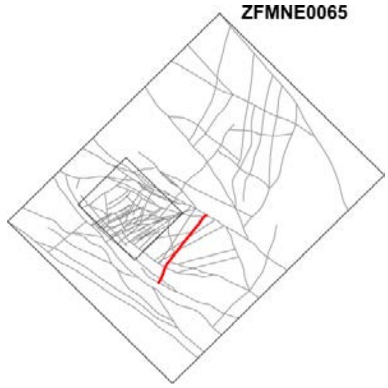
At the surface, corresponds to the low magnetic lineaments MFM0062 and MFM0062G0, and excavation AFM001243. Modelled to the base of the regional model volume using dip estimated by connecting lineaments MFM0062 and MFM0062G0 with the borehole intersections 143-155 m and 169-187 m in HFM25 (DZ4 and DZ5, respectively). Included in regional model and also present inside local model volume.</td><td colspan="2">
</td></tr>
<tr><td colspan="6">Confidence of existence: High</td></tr>
<tr><td colspan="6">Surface mapping and single hole interpretation: For description of surface excavation AFM001243, see SKB P-04-88. For identification and short description of DZ4 and DZ5 in HFM25, see SKB P-06-210.</td></tr>
<tr><td colspan="3">Surface excavation AFM001243
</td><td colspan="3"></td></tr>
<tr><td>Position</td><td></td><td>± 20 m (surface, MFM0062)
± 10 m (surface, MFM0062G0)

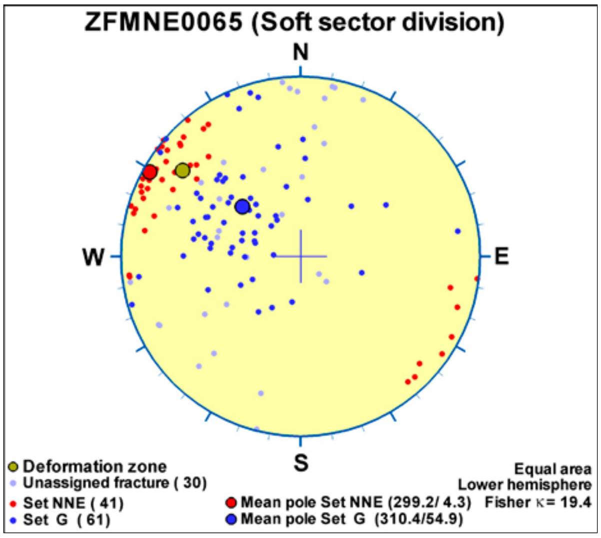
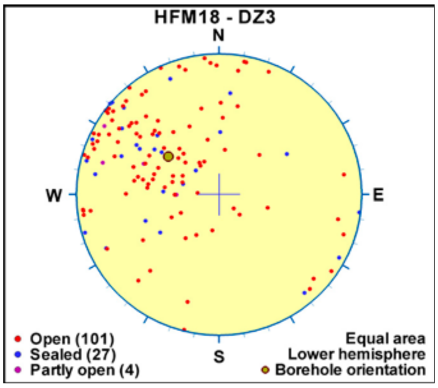
HFM25
dx (m) | dy (m) | dz (m)
7 | 7 | 6</td><td>High</td><td>Intersection along HFM25 (DZ4, DZ5), low magnetic lineaments MFM0062 and MFM0062G0</td><td>Span estimate refers to the uncertainty in the position of the central part of the zone</td></tr>
<tr><td>Orientation (strike/dip, right-hand-rule method)</td><td>058/85</td><td>± 5/± 10</td><td>High</td><td>Strike based on trend of lineaments MFM0062 and MFM0062G0. Dip based on linking lineaments MFM0062 and MFM0062G0 at the surface with borehole intersection along HFM25 (DZ4 and DZ5)</td><td></td></tr>
</table>

Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike ZFMENE0062A (surface excavation, DZ4 and DZ5 in HFM25)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Thickness	44 m	15-64 m	Low	Intersection along HFM25 (DZ4, DZ5). Span estimated on the basis of the range in thickness of steeply dipping zones between 3000 and 10000 m in length	Thickness refers to total zone thickness (damage zone and core). Surface data not used due to incomplete documentation of fractures at the excavation site
Length	3438 m		High	Low magnetic lineaments MFM0062 and MFM0062G0. ZFMENE0062A terminated against ZFMWNW0001 and ZFMWNW0123	Total trace length at ground surface
Ductile deformation			High	Surface excavation, intersection along HFM25 (DZ4, DZ5)	Not present
Brittle deformation			High	Surface excavation, intersection along HFM25 (DZ4, DZ5)	Increased frequency of fractures and cohesive breccia
Alteration			High	Surface excavation, intersection along HFM25 (DZ4, DZ5), character of lineaments MFM0062 and MFM0062G0	Red-stained bedrock with fine-grained hematite dissemination
Fracture orientation (strike/dip, right-hand-rule method)	Mean orientation of NE fracture set = 037/86	Fisher κ value of NE fracture set = 6	Medium	Surface excavation, intersection along HFM25 (DZ4, DZ5), N = 382	Steeply dipping fractures that vary in strike in the NE quadrant dominate. Gently dipping fractures are also present
					
Fracture frequency	Mean = 11 m^{-1}	1-77 m^{-1}	Low	Intersection along HFM25 (DZ4, DZ5)	Dominance of sealed fractures. Quantitative estimate and span include sealed fracture networks. Fracture frequency underestimated due to use of percussion borehole data. Surface data not used due to incomplete documentation of fractures at the excavation site
Fracture filling			Medium	Surface excavation	Chlorite, calcite, adularia, laumontite
Sense of displacement					No data available

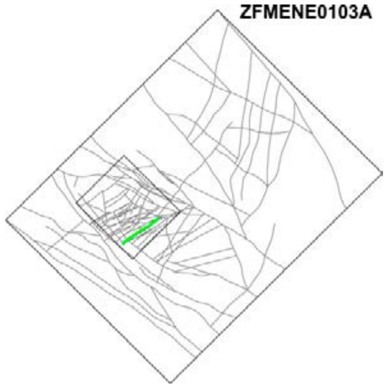
<table>
<tr><th colspan="6">Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike
ZFMENE0062B</th></tr>
<tr><th>Property</th><th>Quantitative estimate</th><th>Span</th><th>Confidence level</th><th>Basis for interpretation</th><th>Comments</th></tr>
<tr><td colspan="4">Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM0062G1. Modelled to a maximum depth of 780 m as a splay from zone ZFMENE0062A with a dip of 82° to the NNW. Included in regional model and also present inside local model volume.</td><td colspan="2">
</td></tr>
<tr><td colspan="6">Confidence of existence: Medium (not confirmed by direct geological observation)</td></tr>
<tr><td>Position</td><td></td><td>± 10 m (surface)</td><td>High</td><td>Low magnetic lineament MFM0062G1</td><td>Span estimate refers to the uncertainty in the position of the central part of the zone</td></tr>
<tr><td>Orientation (strike/dip, right-hand-rule method)</td><td>057/82</td><td>± 5/± 10</td><td>High for strike, low for dip</td><td>Strike based on trend of lineament MFM0062G1. Dip calculated after truncating projection of lineament MFM0062G1 at depth along ZFMENE0062A</td><td></td></tr>
<tr><td>Thickness</td><td>10 m</td><td>3-14 m</td><td>Low</td><td>Estimated on basis of length – thickness correlation diagram in SKB R-07-50. Span estimated on the basis of the range in thickness of steeply dipping zones between 500 and 1000 m in length</td><td>Thickness refers to total zone thickness (damage zone and core)</td></tr>
<tr><td>Length</td><td>616 m</td><td></td><td>High</td><td>Low magnetic lineament MFM0062G1. Terminated against ZFMENE0062A</td><td>Total trace length at ground surface</td></tr>
<tr><td>Ductile deformation</td><td></td><td></td><td>Low</td><td>Comparison with high confidence, steeply dipping zones with ENE strike</td><td>Assumed not to be present</td></tr>
<tr><td>Brittle deformation</td><td></td><td></td><td>Low</td><td>Comparison with high confidence, steeply dipping zones with ENE strike</td><td>Assumed to be present</td></tr>
<tr><td>Alteration</td><td></td><td></td><td>Medium</td><td>Character of lineament MFM0062G1</td><td>Red-stained bedrock with fine-grained hematite dissemination</td></tr>
</table>

Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike ZFMENE0062C					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM0062G2. Modelled to a maximum depth of 320 m as a splay from zone ZFMENE0062A with a dip of 80° to the NNW. Included in regional model and also present inside local model volume.					
Confidence of existence: Medium (not confirmed by direct geological observation)					
Position		± 10 m (surface)	High	Low magnetic lineament MFM0062G2	Span estimate refers to the uncertainty in the position of the central part of the zone
Orientation (strike/dip, right-hand-rule method)	064/80	± 5/± 10	High for strike, low for dip	Strike based on trend of lineament MFM0062G2. Dip calculated after truncating projection of lineament MFM0062G2 at depth along ZFMENE0062A	
Thickness	5 m	1-13 m	Low	Estimated on basis of length – thickness correlation diagram in SKB R-07-50. Span estimated on the basis of the range in thickness of steeply dipping zones between 0 and 500 m in length	Thickness refers to total zone thickness (damage zone and core)
Length	346 m		High	Low magnetic lineament MFM0062G2. Terminated against ZFMENE0062A	Total trace length at ground surface
Ductile deformation			Low	Comparison with high confidence, steeply dipping zones with ENE strike	Assumed not to be present
Brittle deformation			Low	Comparison with high confidence, steeply dipping zones with ENE strike	Assumed to be present
Alteration			Medium	Character of lineament MFM0062G2	Red-stained bedrock with fine-grained hematite dissemination
No more data					

Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike ZFMNE0065 (DZ3 in HFM18 and RU2 in HFM26)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM0065. Modelled to base of regional model volume, using the dip estimated by connecting lineament MFM0065 with the borehole intersections 119-148 m in HFM18 (DZ3) and 161-203 m in HFM26 (RU2 with altered, red-stained bedrock). Deformation zone plane placed at fixed points 144 m in HFM18 and 165 m in HFM26. The gently dipping zone ZFMA7 is also modelled to intersect borehole HFM18 along DZ3. For this reason, there are difficulties to separate the influence of zones ZFMNE0065 and ZFMA7 along this borehole interval. Included only in regional model. Not present inside local model volume.					
Confidence of existence: High					
Single hole interpretation: For identification and short description of DZ3 in HFM18 and RU2 in HFM26, see SKB P-04-120 and SKB P-06-208.					
Position		± 20 m (surface) **HFM18** dx (m) / dy (m) / dz (m) 6 / 6 / 4 **HFM26** 8 / 10 / 8	High	Intersections along HFM18 (DZ3) and HFM26 (RU2), low magnetic lineament MFM0065	Span estimate refers to the uncertainty in the position of the central part of the zone
Orientation (strike/dip, right-hand-rule method)	036/70	± 5/± 10	High	Strike based on trend of lineament MFM0065. Dip based on linking MFM0065 at the surface with borehole intersections along HFM18 (DZ3) and HFM26 (RU2)	
Thickness	26 m	15-64 m	Medium	Intersection along HFM18 (DZ3). Span estimated on the basis of the range in thickness of steeply dipping zones between 3000 and 10000 m in length	Thickness refers to total zone thickness (damage zone and core).
Length	4000 m		High	Low magnetic lineament MFM0065. Terminated against ZFMWNW0001 and ZFMWNW0019	Total trace length at ground surface
Ductile deformation			Medium	Intersection along HFM18 (DZ3)	Not present
Brittle deformation			High	Intersection along HFM18 (DZ3)	Increased frequency of fractures. Complementary data not provided from percussion borehole

Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike ZFMNE0065 (DZ3 in HFM18 and RU2 in HFM26)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Alteration			High	Intersections along HFM18 (DZ3) and HFM26 (RU2), character of lineament MFM0065	Red-stained bedrock with fine-grained hematite dissemination beneath 130 m borehole length in HFM18 (part of DZ3) and along HFM26 (RU2)
Fracture orientation (strike/dip, right-hand-rule method)	Mean orientation of NNE fracture set = 029/86 Mean orientation of gentle fracture set = 040/35	Fisher κ value of NNE fracture set = 19 Fisher κ value of gentle fracture set is <5	Medium	Intersection along HFM18 (DZ3), N = 132	Fractures with both steep and gentle dips to the south-east dominate. Gently dipping fractures are highly variable in orientation
					
Fracture frequency	Mean 5 m^{-1}	Span 1-15 m^{-1}	Low	Intersection along HFM18 (DZ3)	Open and sealed fractures. Quantitative estimate and span include sealed fracture networks. Fracture frequency underestimated due to use of percussion borehole data
Fracture filling			Low	Intersection along HFM18 (DZ3)	Chlorite, calcite, quartz. Few data from percussion borehole
Sense of displacement				Intersection along HFM18 (DZ3)	No complementary data from percussion borehole

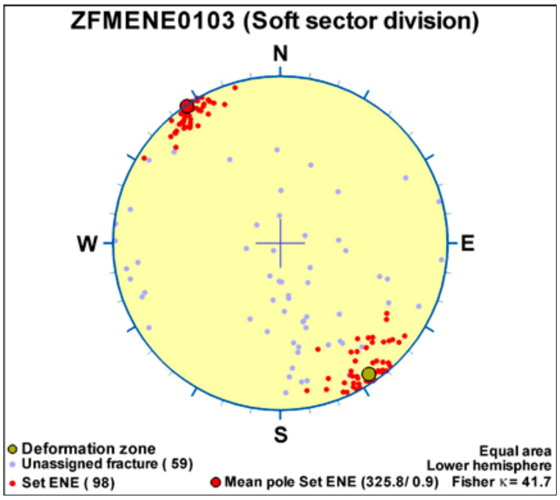
<table>
<tr><th colspan="6">Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike
ZFMENE0103A (DZ4 in KFM05A)</th></tr>
<tr><th>Property</th><th>Quantitative estimate</th><th>Span</th><th>Confidence level</th><th>Basis for interpretation</th><th>Comments</th></tr>
<tr><td colspan="4">Modelling procedure: Zone ZFMENE0103 consists of two segments, the most prominent of which is denoted ZFMENE0103A. The subordinate component is an extension to the north-east with slightly different strike and is denoted ZFMENE0103B. These two segments are judged to constitute elements of one and the same structure.

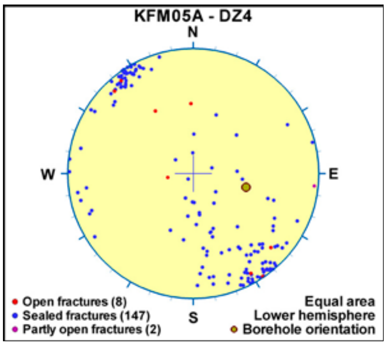
Zone ZFMENE01013A corresponds at the surface to the low magnetic lineaments MFM0103 and MFM0103G0. Modelled down to c.1400 m depth, using the dip estimated by connecting these lineaments with the borehole intersection 892-916 m in KFM05A (DZ4). Deformation zone plane placed at fixed point 906 m in KFM05A. Decreased radar penetration also along the borehole interval 905-912 m. Included only in local model.</td><td colspan="2"></td></tr>
<tr><td colspan="6">Confidence of existence: High</td></tr>
<tr><td colspan="6">Single hole interpretation: For identification and short description of DZ4 in KFM05A, see SKB P-04-296.
</td></tr>
<tr><td>Position</td><td></td><td>± 20 m (surface, MFM0103)

± 10 m (surface, MFM0103G)

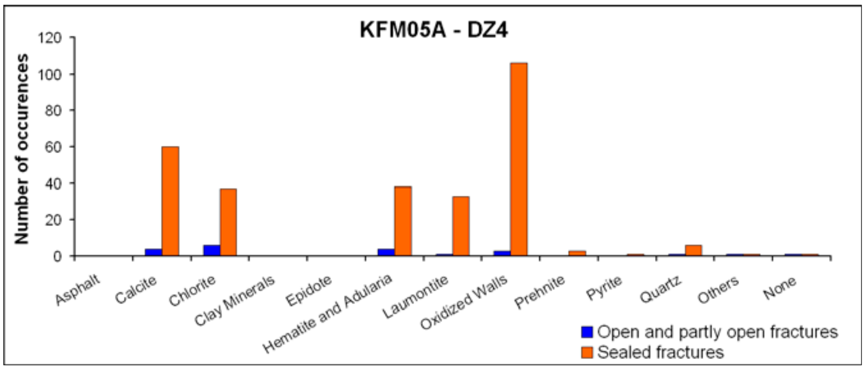
<table><tr><th colspan="3">KFM05A</th></tr><tr><td>dx (m)</td><td>dy (m)</td><td>dz (m)</td></tr><tr><td>12</td><td>15</td><td>9</td></tr></table></td><td>High</td><td>Intersection along KFM05A (DZ4), low magnetic lineaments MFM0103, MFM0103G0</td><td>Span estimate refers to the uncertainty in the position of the central part of the zone</td></tr>
<tr><td>Orientation (strike/dip, right-hand-rule method)</td><td>236/84</td><td>± 5/± 10</td><td>High</td><td>Strike based on trend of lineaments MFM0103 and MFM0103G. Dip based on linking these lineaments at the surface with borehole intersection along KFM05A (DZ4)</td><td></td></tr>
<tr><td>Thickness</td><td>13 m</td><td>3-50 m</td><td>Medium</td><td>Intersection along KFM05A (DZ4). Span estimated on the basis of the range in thickness of steeply dipping zones between 1000 and 3000 m in length</td><td>Thickness refers to total zone thickness (damage zone and core)</td></tr>
</table>

Length	2044 m		Medium	Low magnetic lineaments MFM0103 and MFM01013G0. Terminated against ZFMWNW1200	Total trace length at ground surface
Ductile deformation			High	Intersection along KFM05A (DZ4)	Not present
Brittle deformation			High	Intersection along KFM05A (DZ4)	Increased frequency of fractures. No complementary data
Alteration			High	Intersection along KFM05A (DZ4), character of lineaments MFM0103 and MFM0103G	Red-stained bedrock with fine-grained hematite dissemination
Fracture orientation (strike/dip, right-hand-rule method)	Mean orientation of ENE fracture set = 056/89	Fisher κ value of ENE fracture set = 42	Medium	Intersection along KFM05A (DZ4), N = 157	Steeply dipping fractures with ENE strike dominate

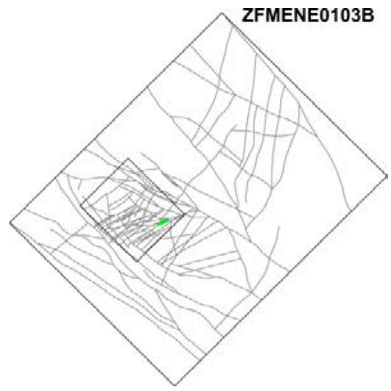




Fracture frequency	Mean = 11 m^{-1}	Span = 0-36 m^{-1}	Medium	Intersection along KFM05A (DZ4)	Dominance of sealed fractures. Quantitative estimate and span include sealed fracture networks
Fracture filling			Medium	Intersection along KFM05A (DZ4)	Calcite, chlorite, hematite/adularia, laumontite, quartz



Sense of displacement				Intersection along KFM05A (DZ4)	No complementary data

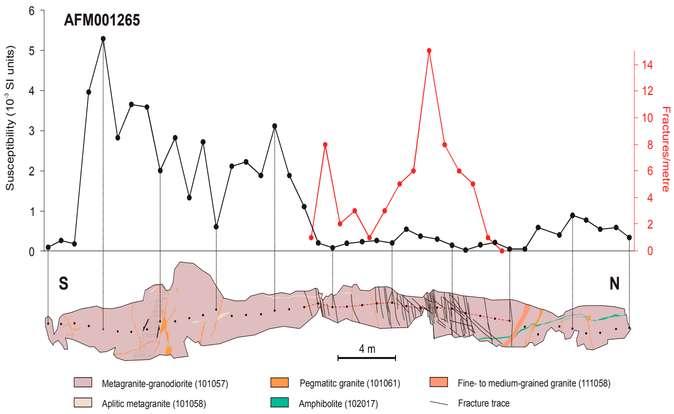
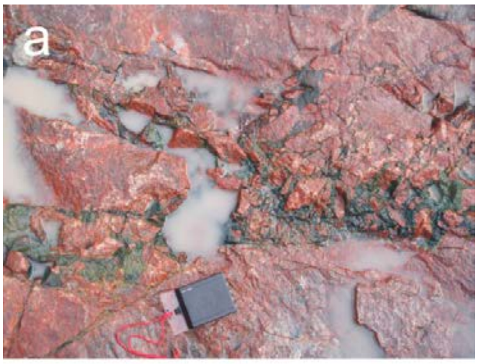
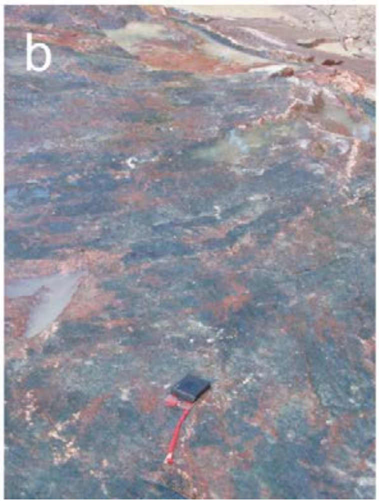
Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike ZFMENE0103B (inferred extension of ZFMENE0103A)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Modelling procedure: Zone ZFMENE0103 consists of two segments, the most prominent of which is denoted ZFMENE0103A. The subordinate component is an extension to the north-east with slightly different strike and is denoted ZFMENE0103B. These two segments are judged to constitute elements of one and the same structure. At the surface, corresponds to the low magnetic lineament MFM0103G1. Modelled with the same dip, the same thickness and to the same depth (c.1400 m) as ZFMENE0103A. Included only in local model.					
Confidence of existence: Medium (not confirmed by direct geological observation)					
Position		± 10 m (surface)	High	Low magnetic lineament MFM0103G1	Span estimate refers to the uncertainty in the position of the central part of the zone
Orientation (strike/dip, right-hand-rule method)	246/84	± 5/± 10	High for strike, low for dip	Strike based on trend of lineament MFM0103G1. Dip assumed to be the same as zone ZFMENE0103A	
Thickness	13 m	1-13 m	Low	Assumed to be the same as zone ZFMENE0103A. Span estimated on the basis of the range in thickness of steeply dipping zones between 0 and 500 m in length	Thickness refers to total zone thickness (damage zone and core)
Length	432 m		High	Low magnetic lineament MFM0103G1. Terminated against ZFMENE0103A	Total trace length at ground surface
Ductile deformation			Low	Comparison with zone ZFMENE0103A	Assumed not to be present
Brittle deformation			Low	Comparison with zone ZFMENE0103A	Assumed to be present
Alteration			Medium	Character of lineament MFM0103G1	Red-stained bedrock with fine-grained hematite dissemination
No more data					

<table>
<tr><th colspan="6">Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike
ZFMENE0159A (surface excavation, borehole interval 415-585 m (including DZ3) in KFM07A, DZ2 in KFM08D, DZ3 in KFM09A and borehole interval 106-132 m along DZ1 in KFM09B)</th></tr>
<tr><th>Property</th><th>Quantitative estimate</th><th>Span</th><th>Confidence level</th><th>Basis for interpretation</th><th>Comments</th></tr>
<tr><td colspan="4">Modelling procedure: Zone ZFMENE0159 consists of two branches. The most prominent branch is denoted ZFMENE0159A and an inferred splay from this branch is denoted ZFMENE0159B. Though the branches are described separately in the property sheets, these branches are inferred to constitute elements of one and the same structure.

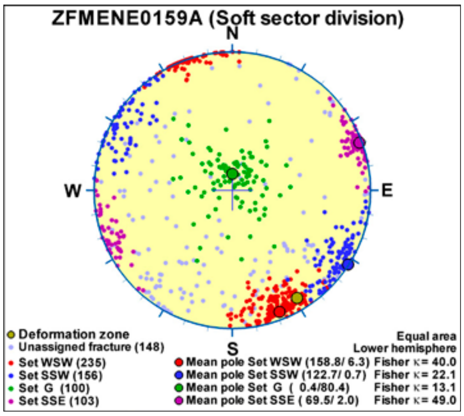
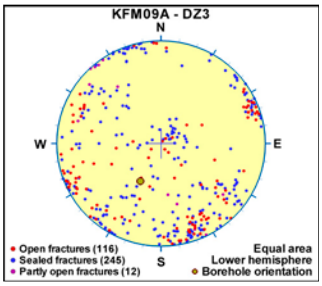
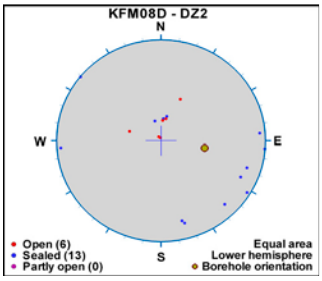
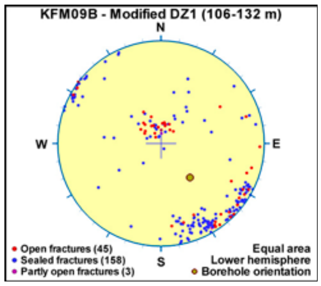
At the surface, corresponds to the low magnetic lineaments MFM0159 and MFM0159G, and excavation AFM001265. Modelled down to base of local model volume, using the dip estimated by connecting these lineaments with the borehole intersections 415-585 m in KFM07A (DZ3), 318-324 m in KFM08D (DZ2), 217-280 m in KFM09A (DZ3) and 106-132 m in KFM09B (part of DZ1). Zone ZFMNNW0100 also modelled to intersect DZ3 along KFM09A. Deformation zone plane placed at fixed points 419 m in KFM07A, 322 m in KFM08D, 244 m in KM09A and 121 m in KFM09B. Decreased radar penetration also along the borehole intervals 418-422 m in KFM07A and 119-122 m in KFM09B. Included only in local model.</td><td colspan="2">
</td></tr>
<tr><td colspan="6">Confidence of existence: High</td></tr>
<tr><td colspan="6">Surface mapping and single hole interpretation: For description of surface excavation AFM001265, see SKB P-06-136. For identification and short description of deformation zones in boreholes, see SKB P-05-157, SKB P-06-134, SKB P-06-135 and SKB P-07-108. For character and kinematics of fractures along surface excavation and DZ3 in KFM07A, see SKB P-06-212. For character and kinematics of fractures along DZ3 in KFM09A and DZ1 in KFM09B, see SKB P-07-101.No complementary data from DZ2 in KFM08D.

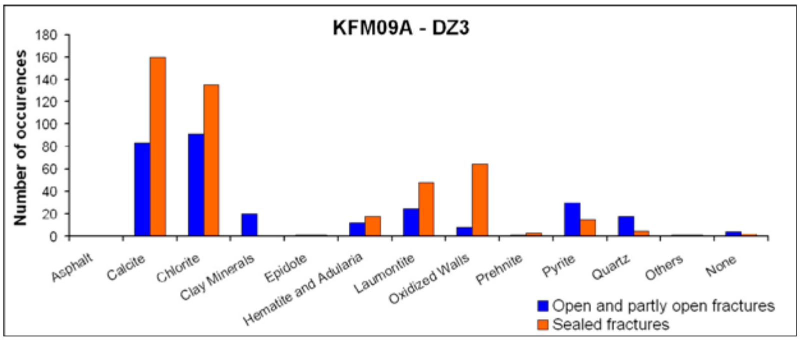
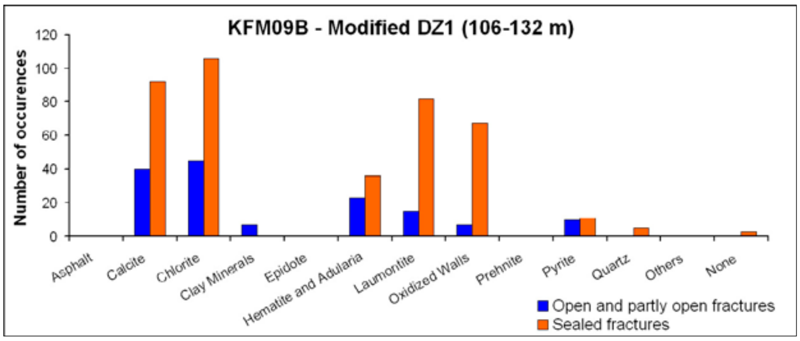
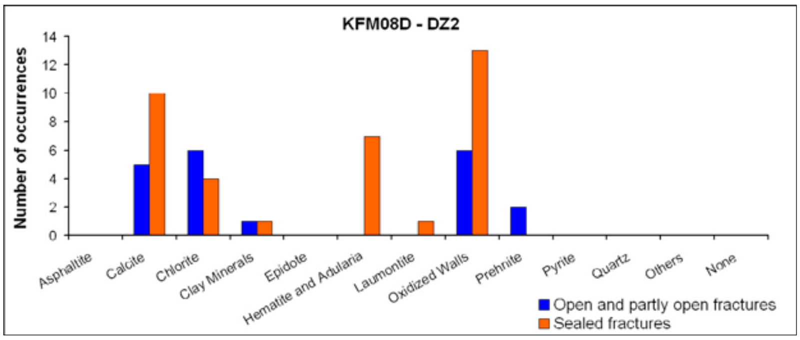
No fault core identified along DZ3 in KFM07A. Intervals with abundant sealed fracture networks and fault breccia filled by laumontite and calcite are inferred to be faults cores along DZ3 in KFM09A. Uncertain whether related to ZFMENE0159A or ZFMNNW0100. Sealed networks with some breccia and cataclasite define a fault core around 120-122 m along DZ1 in KFM09B.</td></tr>
</table>

<table>
<tr><th colspan="6">Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike
ZFMENE0159A (surface excavation, borehole interval 415-585 m (including DZ3) in KFM07A, DZ2 in KFM08D, DZ3 in KFM09A and borehole interval 106-132 m along DZ1 in KFM09B)</th></tr>
<tr><th>Property</th><th>Quantitative estimate</th><th>Span</th><th>Confidence level</th><th>Basis for interpretation</th><th>Comments</th></tr>
<tr><td colspan="4">KFM09A (DZ3)

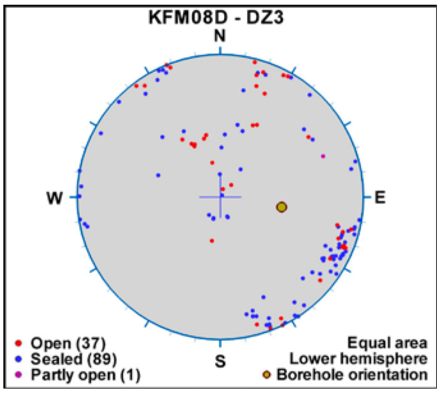

Magnetic susceptibility and fracture frequency measurements along surface excavation AFM001265. Note the occurrence of the brittle deformation zone ZFMENE0159A along an interval of c. 15 m in the north-central part of the section (after P-06-136).</td><td colspan="2">Surface excavation AFM001265. (a) Chlorite- and epidote-sealed breccia at intersection between NNE-SSW and ENE – WSW fractures. (b) Sub-horizontal fracture surface with coating of calcite and chlorite. Note the strong wall-rock alteration (red-staining) in both photographs (after P-06-136).

</td></tr>
<tr><td>Position</td><td></td><td>± 20 m (surface, MFM0159)
± 10 m (surface, MFM0159G)
<table><tr><th colspan="3">KFM07A</th></tr><tr><td>dx (m)</td><td>dy (m)</td><td>dz (m)</td></tr><tr><td>2</td><td>2</td><td>1</td></tr><tr><th colspan="3">KFM09A</th></tr><tr><td>4</td><td>4</td><td>2</td></tr><tr><th colspan="3">KFM09B</th></tr><tr><td>3</td><td>2</td><td>2</td></tr></table></td><td>High</td><td>Surface excavation, borehole intersections along KFM07A (DZ3 in KFM07A), KFM08D (DZ2), KFM09A (DZ3) and KFM09B (part of DZ1), low magnetic lineaments MFM0159 and MFM0159G</td><td>Span estimate refers to the uncertainty in the position of the central part of the zone</td></tr>
</table>

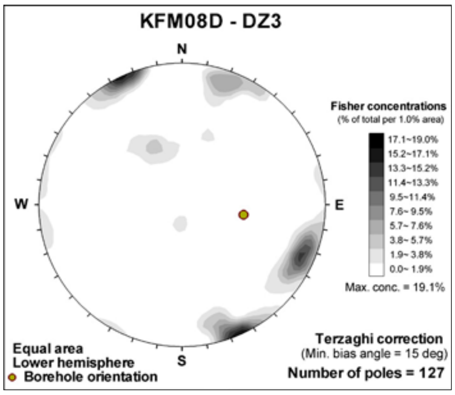
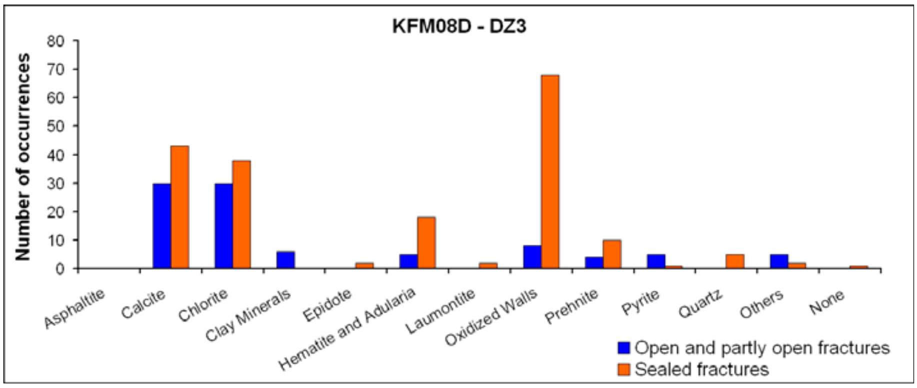
Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike ZFMENE0159A (surface excavation, borehole interval 415-585 m (including DZ3) in KFM07A, DZ2 in KFM08D, DZ3 in KFM09A and borehole interval 106-132 m along DZ1 in KFM09B)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Orientation (strike/dip, right-hand-rule method)	239/80	± 5/± 10	High	Strike based on trend of lineaments MFM0159 and MFM0159G. Dip based on linking these lineaments at the surface with borehole intersections along KFM07A (415-585 m including DZ3), KFM08D (DZ2), KFM09A (DZ3) and KFM9B (part of DZ1)	
Thickness	18 m	4-22 m	Medium	Intersection along part of DZ1 (106-132 m) in KFM09B. Span based on variation in thickness at the surface excavation (c. 15 m) and along the borehole intersections 415-585 m including DZ3 in KFM07A (11 m), DZ2 in KFM08D (4 m) and DZ3 in KFM09A (22 m)	Thickness refers to total zone thickness (damage zone and core)
Length	1833 m		Medium	Low magnetic lineaments MFM0159 and MFM0159G. Terminated against ZFMNW0017	Total trace length at ground surface
Ductile deformation			High	Surface excavation, borehole intersections along KFM07A (415-585 m including DZ3), KFM08D (DZ2), KFM09A (DZ3) and KFM9B (part of DZ1)	Present along KFM09A. NNW-SSE strike. Deformation older than and inferred not to be related to zone
Brittle deformation			High	Surface excavation, borehole intersections along KFM07A (415-585 m including DZ3), KFM08D (DZ2), KFM09A (DZ3) and KFM9B (part of DZ1)	Increased frequency of fractures including sealed fracture networks; some crush zones in KFM09A. Fault cores observed in KFM09A and KFM09B composed of sealed fracture networks, fault breccia and cataclasite
Alteration			High	Surface excavation, borehole intersections along KFM07A (415-585 m including DZ3), KFM08D (DZ2), KFM09A (DZ3) and KFM9B (part of DZ1)	Red-stained bedrock with fine-grained hematite dissemination
Fracture orientation (strike/dip, right-hand-rule method)	Mean orientation of WSW fracture set = 250/84 Mean orientation of SSW fracture set = 213/89 Mean orientation of gentle fracture set = 090/10 Mean orientation of SSE fracture set = 160/88	Fisher κ value of WSW fracture set = 40 Fisher κ value of SSW fracture set = 22 Fisher κ value of gentle fracture set = 13 Fisher κ value of SSE fracture set = 49	Medium	Surface excavation, intersections along KFM07A (DZ3), KFM09A (DZ3) and KFM09B (part of DZ1), N = 742	Steeply dipping fractures with WSW, SSW and SSE strike are conspicuous. A fourth fracture set composed of gently dipping fractures is also present, especially close to surface in KFM09B (part of DZ1). Fractures along DZ2 in KFM08D are relatively few (19) and are either steeply dipping with variable strike in the NE-SW quadrant or are gently dipping

Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike ZFMENE0159A (surface excavation, borehole interval 415-585 m (including DZ3) in KFM07A, DZ2 in KFM08D, DZ3 in KFM09A and borehole interval 106-132 m along DZ1 in KFM09B)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
				 	
Fracture frequency	Boreholes. Mean = 21 m^{-1}	Boreholes. Span = 2-80 m^{-1} Surface. Span = 0-15 m^{-1}	Medium	Surface excavation, borehole intersections along KFM07A (415-585 m including DZ3), KFM08D (DZ2), KFM09A (DZ3) and KFM9B (part of DZ1)	Dominance of sealed fractures. Quantitative estimate and span include sealed fracture networks and crush zones
Fracture filling			Medium	Surface excavation, borehole intersections along KFM07A (415-585 m including DZ3), KFM08D (DZ2), KFM09A (DZ3) and KFM9B (part of DZ1)	Calcite, chlorite, laumontite, hematite/adularia, pyrite, quartz, clay minerals. In addition, epidote in surface excavation

Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike ZFMENE0159A (surface excavation, borehole interval 415-585 m (including DZ3) in KFM07A, DZ2 in KFM08D, DZ3 in KFM09A and borehole interval 106-132 m along DZ1 in KFM09B)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
	  				
Sense of displacement			Medium	Surface excavation (en echelon tension gashes, steps in quartz veins). Faults coated with chlorite striae along intersection in KFM07A (DZ3). Faults with striae on chlorite, hematite, clay minerals and calcite with steps composed of calcite occur along DZ1 in KFM09B	Sinistral strike-slip displacement along ENE-WSW faults in surface excavation. Steeply dipping faults with NNW strike in KFM07A (DZ3), KFM09A (DZ3) and KFM09B (DZ1) show strike-slip displacement, both sinistral and dextral. No complementary data from DZ2 along KFM08D

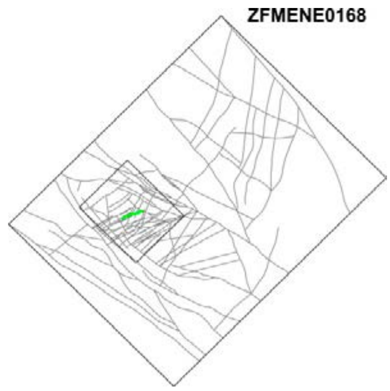
<table>
<tr><th colspan="6">Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike
ZFMENE0159B (splay from ZFMENE0159A)</th></tr>
<tr><th>Property</th><th>Quantitative estimate</th><th>Span</th><th>Confidence level</th><th>Basis for interpretation</th><th>Comments</th></tr>
<tr><td colspan="4">Modelling procedure: Zone ZFMENE0159 consists of two branches. The most prominent branch is denoted ZFMENE0159A and an inferred splay from this branch is denoted ZFMENE0159B. Though the branches are described separately in subsequent property sheets, these branches are inferred to constitute elements of one and the same structure.
At the surface, corresponds to the low magnetic lineament MFM2326G0. Modelled to the base of the local model volume as a splay from zone ZFMENE0159A by connecting this lineament to the borehole intersection 371-396 m along KFM08D (DZ3). Deformation zone plane placed at fixed point 384 m (sealed fracture network). Included only in local model.</td><td colspan="2">
</td></tr>
<tr><td colspan="6">Confidence of existence: High</td></tr>
<tr><td colspan="6">Single hole interpretation: For identification and short description of DZ3 in KFM08D, see SKB P-07-108. Zone occurs at the contact between two rock units. For character and kinematics of fractures DZ3 in KFM08D, see SKB P-07-111. “Damage zone” character; no fault core identified. Some sealed fracture networks are present.</td></tr>
<tr><td>Position</td><td></td><td>± 10 m (surface)</td><td>High</td><td>Intersection along borehole KFM08D (DZ3), low magnetic lineament MFM2326G0</td><td>Span estimate refers to the uncertainty in the position of the central part of the zone</td></tr>
<tr><td>Orientation (strike/dip, right-hand-rule method)</td><td>238/80</td><td>± 5/± 10</td><td>High</td><td>Strike based on trend of lineament MFM2326G0. Dip based on linking this lineament at the surface with borehole intersection along KFM08D (DZ3)</td><td></td></tr>
<tr><td>Thickness</td><td>14 m</td><td>3-50 m</td><td>Medium</td><td>Intersection along borehole KFM08D (DZ3). Span estimated on the basis of the range in thickness of steeply dipping zones between 1000 and 3000 m in length</td><td>Thickness refers to total zone thickness (damage zone and core)</td></tr>
<tr><td>Length</td><td>672 m</td><td></td><td>High</td><td>Low magnetic lineament MFM2324G0. Terminated against ZFMENE0159A</td><td>Total trace length at ground surface</td></tr>
<tr><td>Ductile deformation</td><td></td><td></td><td>High</td><td>Intersection along borehole KFM08D (DZ3)</td><td>Not present</td></tr>
<tr><td>Brittle deformation</td><td></td><td></td><td>High</td><td>Intersection along borehole KFM08D (DZ3)</td><td>Increased frequency of predominantly sealed fractures</td></tr>
<tr><td>Alteration</td><td></td><td></td><td>High</td><td>Intersection along borehole KFM08D (DZ3)</td><td>Red-stained bedrock with fine-grained hematite dissemination</td></tr>
</table>

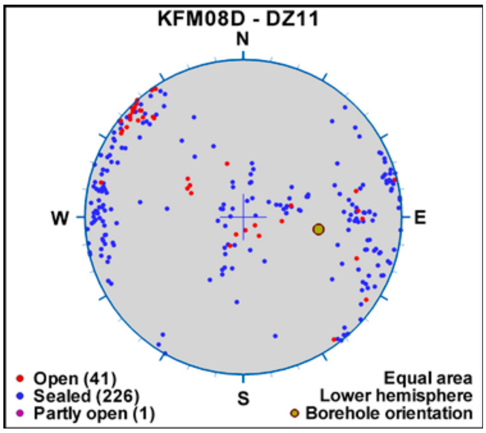
<table>
<tr><td rowspan="2">Fracture orientation</td><td></td><td></td><td>Medium</td><td>Intersection along borehole KFM08D (DZ3)</td><td>Steeply dipping fractures with ENE-WSW and SSW strike are prominent. Steeply dipping fractures with NNW-SSE and ESE strike and gently dipping fractures are also present</td></tr>
<tr><td colspan="5">

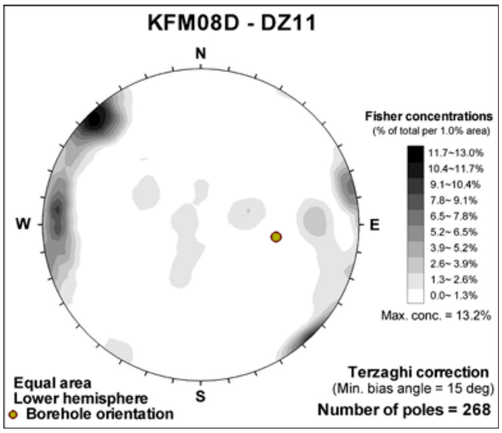
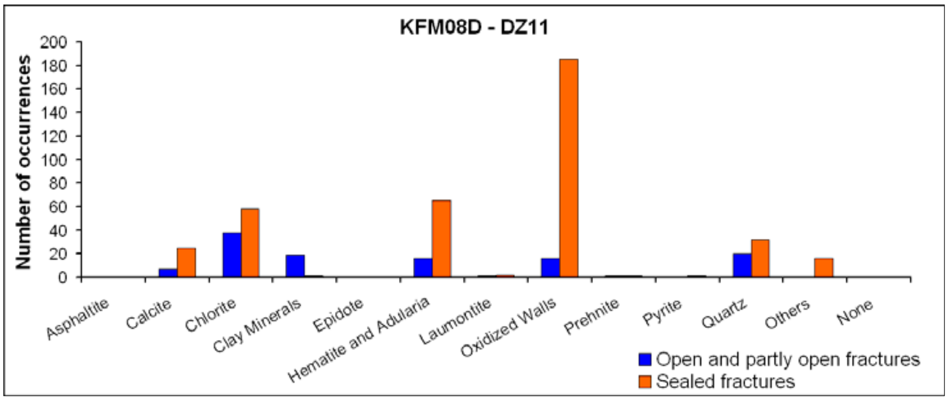

</td></tr>
<tr><td>Fracture frequency</td><td>Mean = 11 m^{-1}</td><td>Span = 2-28 m^{-1}</td><td>Medium</td><td>Intersection along borehole KFM08D (DZ3)</td><td>Dominance of sealed fractures. Quantitative estimate and span include sealed fracture networks</td></tr>
<tr><td rowspan="2">Fracture filling</td><td></td><td></td><td>Medium</td><td>Intersection along borehole KFM08D (DZ3)</td><td>Calcite, chlorite, hematite/adularia, prehnite and other minerals</td></tr>
<tr><td colspan="5">
</td></tr>
<tr><td>Sense of displacement</td><td></td><td></td><td>Low</td><td>Intersection along borehole KFM08D (DZ3).Hematite and chlorite striae along a single fault</td><td>Steep fault with ENE strike shows dextral strike-slip displacement.</td></tr>
</table>

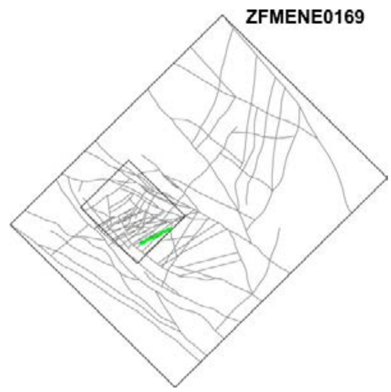
Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike

ZFMENE0168 (DZ11 in KFM08D)

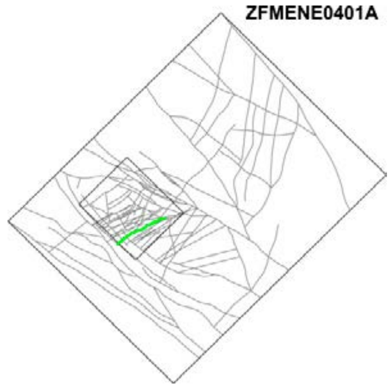
Property	Quantitative estimate	Span	Confidence level	Basis for interpretation	Comments
Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM0168G and its probable continuation along MFM2324G. Modelled at depth using the dip estimated by connecting these lineaments with the borehole intersection 819-842 m along KFM08D (DZ11). Deformation zone plane placed at fixed point 838 m (sealed fracture network). Included only in local model.					
Confidence of existence: High					
Single hole interpretation: For identification and short description of DZ11 in KFM08D, see SKB P-07-108. Zone occurs at the contact between two rock units. No more complementary data.					
Position		± 10 m (surface)	High	Intersection along borehole KFM08D (DZ11), low magnetic lineaments MFM0168G and MFM2324G	Span estimate refers to the uncertainty in the position of the central part of the zone
Orientation (strike/dip, right-hand-rule method)	253/77	± 5/± 10	High	Strike based on trend of lineaments MFM0168G and MFM2324G. Dip based on linking these lineaments at the surface with borehole intersection along KFM08D (DZ11)	
Thickness	11 m	3-50 m	Medium	Intersection along borehole KFM08D (DZ11). Span estimated on the basis of the range in thickness of steeply dipping zones between 1000 and 3000 m in length	Thickness refers to total zone thickness (damage zone and core)
Length	984 m		High	Low magnetic lineaments MFM0168G and MFM2324G. Terminated against ZFMWNW2225	Total trace length at ground surface
Ductile deformation			High	Intersection along borehole KFM08D (DZ11)	Not present
Brittle deformation			High	Intersection along borehole KFM08D (DZ11)	Increased frequency of predominantly sealed fractures
Alteration			High	Intersection along borehole KFM08D (DZ11)	Red-stained bedrock with fine-grained hematite dissemination

<table>
<tr><td>Fracture orientation</td><td></td><td></td><td>Medium</td><td>Intersection along borehole KFM08D (DZ11)</td><td>Steeply dipping fractures with NE-SW to NNE-SSW strike and NNW-SSE strike dominate. Gently dipping fractures are also present</td></tr>
<tr><td></td><td colspan="5">

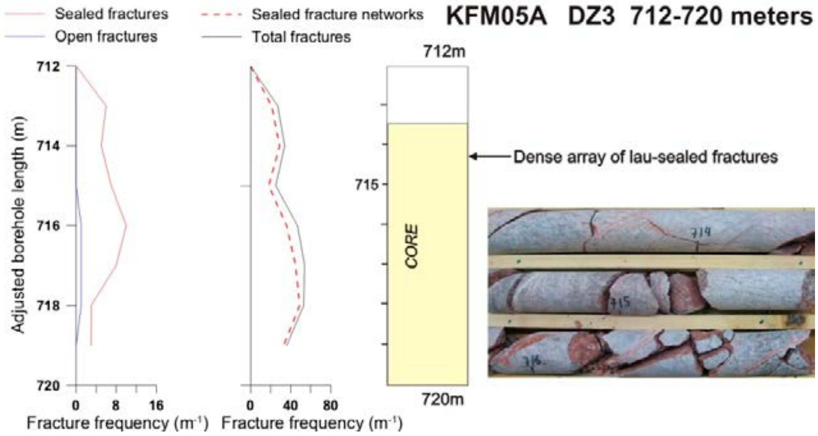

</td></tr>
<tr><td>Fracture frequency</td><td>Mean = 19 m^{-1}</td><td>Span = 5-41 m^{-1}</td><td>Medium</td><td>Intersection along borehole KFM08D (DZ11)</td><td>Dominance of sealed fractures. Quantitative estimate and span include sealed fracture networks</td></tr>
<tr><td>Fracture filling</td><td></td><td></td><td>Medium</td><td>Intersection along borehole KFM08D (DZ11)</td><td>Chlorite, hematite/adularia, quartz, calcite and clay minerals</td></tr>
<tr><td></td><td colspan="5">
</td></tr>
<tr><td>Sense of displacement</td><td></td><td></td><td></td><td>Intersection along borehole KFM08D (DZ11)</td><td>No complementary data</td></tr>
</table>

Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike **ZFMENE0169**					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Modelling procedure: At the surface, corresponds to the low magnetic lineaments MFM0169 and MFM0169G, and their inferred continuation towards the north-east with termination against ZFMNNW0101. Modelled at depth using an assumed dip of 90° based on a comparison with high confidence, vertical and steeply-dipping zones with ENE strike. Included only in local model.					
Confidence of existence: Medium (not confirmed by direct geological observation)					
Position		± 20 m (surface, MFM0169) ± 10 m (surface, MFM0169G)	High	Low magnetic lineaments MFM0169 and MFM0169G	Span estimate refers to the uncertainty in the position of the central part of the zone
Orientation (strike/dip, right-hand-rule method)	063/90	± 5/± 10	High for strike, low for dip	Strike based on trend of lineaments MFM0169 and MFM0169G. Dip based on comparison with high confidence, vertical and steeply-dipping zones with ENE strike	
Thickness	15 m	3-50 m	Low	Estimated on basis of length – thickness correlation diagram. Span estimated on the basis of the range in thickness of steeply dipping zones between 1000 and 3000 m in length	Thickness refers to total zone thickness (damage zone and core)
Length	1600 m		Medium	Low magnetic lineaments MFM0169 and MFM0169G. Terminated by ZFMENE0062A and ZFMNNW0101	Total trace length at ground surface
Ductile deformation			Low	Comparison with high confidence, vertical and steeply-dipping zones with ENE strike	Assumed not to be present
Brittle deformation			Low	Comparison with high confidence, vertical and steeply-dipping zones with ENE strike	Assumed to be present
Alteration			Medium	Character of lineaments MFM0169 and MFM0169G	Red-stained bedrock with fine-grained hematite dissemination
No more data					

<table>
<tr><th colspan="6">Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike
ZFMENE0401A (borehole interval 685-720 m along part of DZ3 in KFM05A, DZ1 in HFM13)</th></tr>
<tr><th>Property</th><th>Quantitative estimate</th><th>Span</th><th>Confidence level</th><th>Basis for interpretation</th><th>Comments</th></tr>
<tr><td colspan="4">Modelling procedure: Zone ZFMENE0401 consists of two branches, the most prominent of which is denoted ZFMENE0401A. Although the branches are described separately in subsequent property sheets, they are inferred to constitute elements of one and the same structure.

At the surface, corresponds to the low magnetic lineaments MFM0401 and MFM0401G0, and their inferred continuation towards the north-east. Terminated against zone ZFMNW0017 to the south-west. Modelled at depth using the dip estimated by connecting these lineaments with the borehole intersections 685-720 m in KFM05A (part of DZ3) and 162-176 m in HFM13 (DZ1). Deformation zone plane placed at fixed points 717 m in KFM05A and 170 m in HFM13. Decreased radar penetration also along the borehole interval 714-723 m in KFM05A. Included only in local model.</td><td colspan="2">
</td></tr>
<tr><td colspan="6">Confidence of existence: High</td></tr>
<tr><td colspan="6">Single hole interpretation: For identification and short description of DZ3 in KFM05A, see SKB P-04-296. For character and kinematics of part of DZ3 (712-720 m) in KFM05A, see SKB P-06-212.

Zone core with dense arrays of mainly laumontite-sealed fractures and locally fault breccias are inferred to be present from c. 713.5 to 720 m. One minor fault with fault-slip data observed.

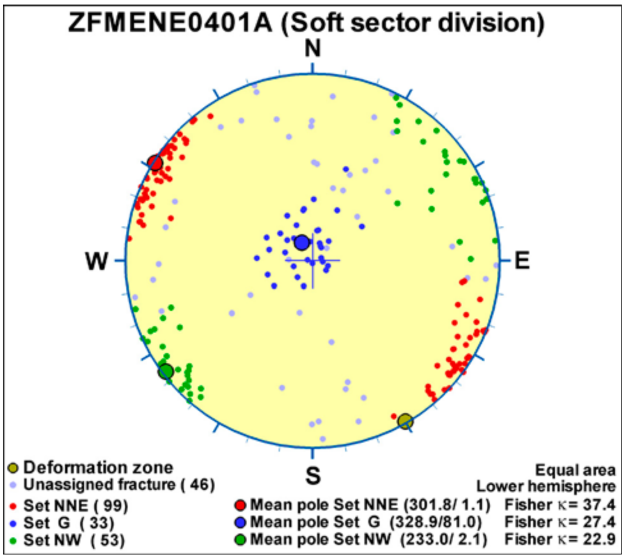
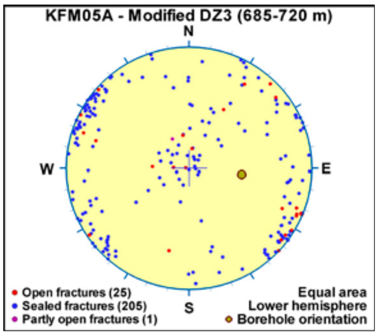
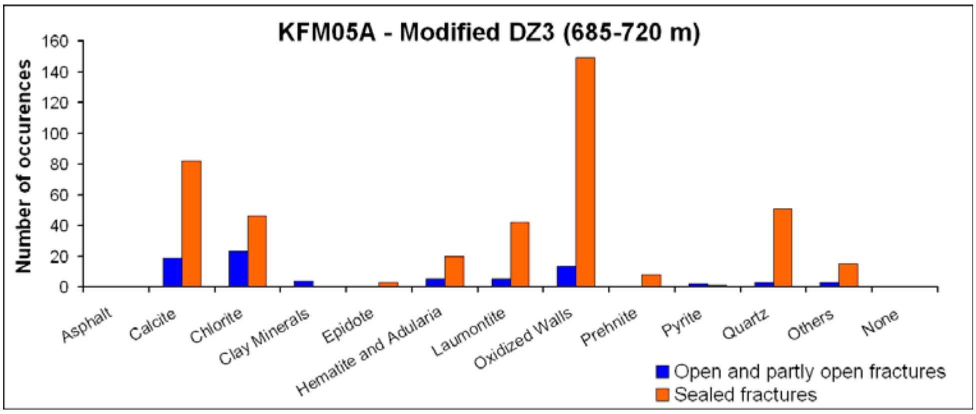


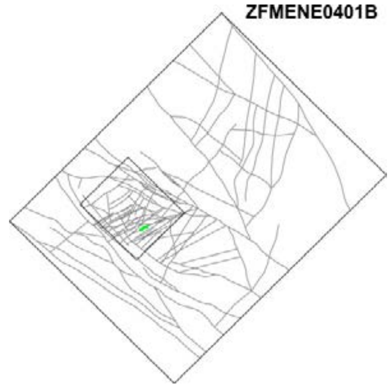
After SKB P-06-212</td></tr>
<tr><td>Position</td><td></td><td>± 20 m (surface, MFM0401)

± 10 m (surface, MFM0401G0)

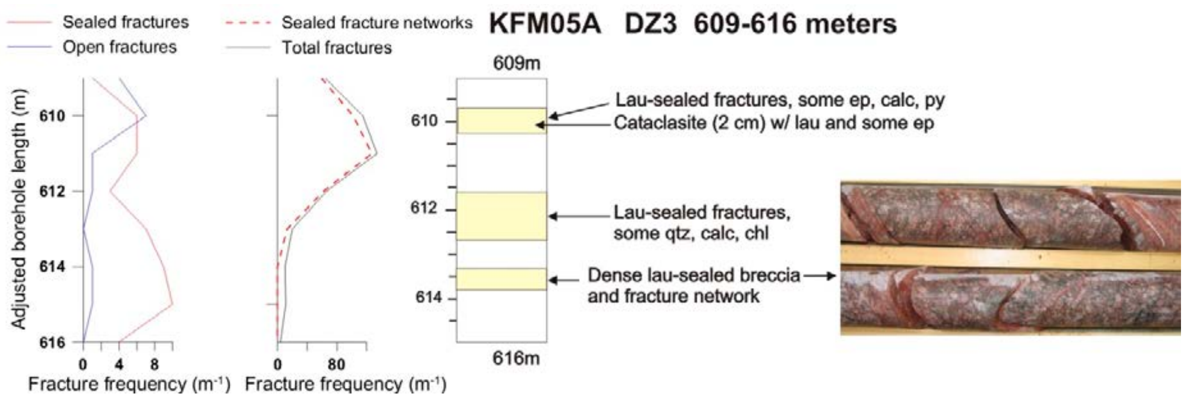
<table><tr><th colspan="3">KFM05A</th></tr><tr><td>dx (m)</td><td>dy (m)</td><td>dz (m)</td></tr><tr><td>9</td><td>11</td><td>4</td></tr><tr><th colspan="3">HFM13</th></tr><tr><td>6</td><td>7</td><td>4</td></tr></table></td><td>High</td><td>Intersections along KFM05A (part of DZ3) and HFM13 (DZ1), low magnetic lineaments MFM0401 and MFM0401G0 and their inferred continuation towards the north-east</td><td>Span estimate refers to the uncertainty in the position of the central part of the zone</td></tr>
</table>

Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike ZFMENE0401A (borehole interval 685-720 m along part of DZ3 in KFM05A, DZ1 in HFM13)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Orientation (strike/dip, right-hand-rule method)	241/89	± 5/± 10	High	Strike based on trend of lineaments MFM0401 and MFM0401G0 and their inferred continuation towards the north-east. Dip based on linking these lineaments at the surface with borehole intersections along KFM05A (part of DZ3) and HFM13 (DZ1)	
Thickness	10 m	3-50 m	Medium	Intersection along KFM05A (part of DZ3). Span estimated on the basis of the range in thickness of steeply dipping zones between 1000 and 3000 m in length	Thickness refers to total zone thickness (damage zone and core)
Length	2566 m		Medium	Low magnetic lineaments MFM0401 and MFM0401G and their inferred continuation towards the north-east. Terminated against ZFMNW0017	Total trace length at ground surface
Ductile deformation			High	Intersections along KFM05A (part of DZ3) and HFM13 (DZ1)	Not present
Brittle deformation			High	Intersections along KFM05A (part of DZ3) and HFM13 (DZ1)	Increased frequency of fractures. Fault core interval in KFM05A with elevated fracture frequency, including sealed fracture networks, and cohesive breccia
Alteration			High	Intersection along KFM05A (part of DZ3) and HFM13 (DZ1), character of lineaments MFM0401 and MFM0401G0	Red-stained bedrock with fine-grained hematite dissemination
Fracture orientation (strike/dip, right-hand-rule method)	Mean orientation of NNE fracture set = 032/89 Mean orientation of gentle fracture set = 059/9 Mean orientation of NW fracture set = 323/88	Fisher κ value of NNE fracture set = 37 Fisher κ value of gentle fracture set = 27 Fisher κ value of NW fracture set = 23	Medium	Intersection along KFM05A (part of DZ3), N = 231	Steeply dipping fractures with NNE strike dominate. Fractures with more gentle dips as well as steeply dipping fractures that strike NW are also present

Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike ZFMENE0401A (borehole interval 685-720 m along part of DZ3 in KFM05A, DZ1 in HFM13)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
					
Fracture frequency	Mean = 14 m^{-1}	Span = 0-54 m^{-1}	Medium	Intersection along KFM05A (part of DZ3)	Dominance of sealed fractures. Quantitative estimate and span include sealed fracture networks
Fracture filling			Medium	Intersection along KFM05A (part of DZ3)	Calcite, chlorite, quartz, laumontite, hematite/adularia. Only calcite, chlorite and some prehnite observed in percussion borehole HFM13 (DZ1)
					
Sense of displacement			Low	Minor fault along part of DZ3 in KFM05A. Shear striae along chlorite	Steeply dipping fault with SW strike shows oblique-slip displacement with a strong strike-slip component

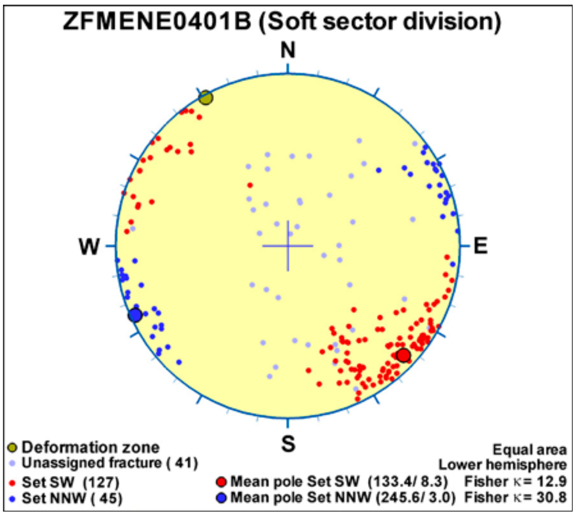
<table>
<tr><th colspan="6">Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike
ZFMENE0401B (borehole interval 590-616 m along part of DZ3 in KFM05A)</th></tr>
<tr><th>Property</th><th>Quantitative estimate</th><th>Span</th><th>Confidence level</th><th>Basis for interpretation</th><th>Comments</th></tr>
<tr><td colspan="4">Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM0401G1. Modelled as a splay from zone ZFMENE0401A, using the dip estimated by connecting lineament MFM0401G1 with the borehole intersection 590-616 m in KFM05A (part of DZ3). Deformation zone plane placed at fixed point 611 m in KFM05A. Included only in local model.</td><td colspan="2">
</td></tr>
<tr><td colspan="6">Confidence of existence: High</td></tr>
<tr><td colspan="6">Single hole interpretation: For identification and short description of DZ3 in KFM05A, see SKB P-04-296. For character and kinematics of part of DZ3 (609-616 m) in KFM05A, see SKB P-06-212.

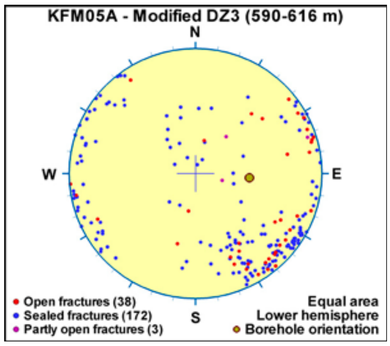
Strong fracturing with local brecciation in several intervals between c. 610 and 614 m. Cataclasite also present at c. 610 m. Laumontite is conspicuous and epidote is also present in the inferred zone core between c. 610 and 614 m. Remainder of borehole interval in KFM05A inferred to form a damage zone. One minor fault with fault-slip data observed.



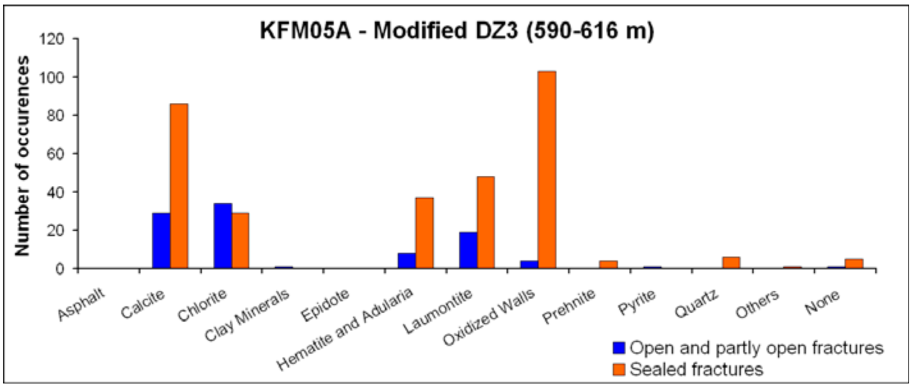
After SKB P-06-212</td></tr>
<tr><td>Position</td><td></td><td>± 10 m (surface, MFM0401G1)
<table><tr><th colspan="3">KFM05A</th></tr><tr><td>dx (m)</td><td>dy (m)</td><td>dz (m)</td></tr><tr><td>8</td><td>10</td><td>6</td></tr></table></td><td>High</td><td>Intersection along KFM05A (part of DZ3), low magnetic lineament MFM0401G1</td><td>Span estimate refers to the uncertainty in the position of the central part of the zone</td></tr>
<tr><td>Orientation (strike/dip, right-hand-rule method)</td><td>061/88</td><td>± 5/± 10</td><td>High</td><td>Strike based on trend of lineament MFM0401G1. Dip based on linking MFM0401G1 at the surface with borehole intersection along KFM05A (part of DZ3)</td><td></td></tr>
<tr><td>Thickness</td><td>8 m</td><td>1-13 m</td><td>Medium</td><td>Intersection along KFM05A (part of DZ3). Span estimated on the basis of the range in thickness of steeply dipping zones between 0 and 500 m in length</td><td>Thickness refers to total zone thickness (damage zone and core)</td></tr>
</table>

Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike ZFMENE0401B (borehole interval 590-616 m along part of DZ3 in KFM05A)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Length	361 m		High	Low magnetic lineament MFM0401G1. Terminated against ZFMENE0401A both at the surface and at depth	Total trace length at ground surface
Ductile deformation			High	Intersection along KFM05A (part of DZ3)	Not present
Brittle deformation			High	Intersection along KFM05A (part of DZ3)	Increased frequency of fractures. Fault core intervals with elevated fracture frequency, including sealed fracture networks, cohesive breccia and cataclasite
Alteration			High	Intersection along KFM05A (part of DZ3), character of lineament MFM0401G1	Red-stained bedrock with fine-grained hematite dissemination
Fracture orientation (strike/dip, right-hand-rule method)	Mean orientation of SW fracture set = 223/82 Mean orientation of NNW fracture set = 336/87	Fisher κ value of SW fracture set = 13 Fisher κ value of NNW fracture set = 31	Medium	Intersection along KFM05A (part of DZ3), N = 213	Steeply dipping fractures with SW strike dominate. Fractures with more gentle dips as well as steeply dipping fractures that strike NNW are also present



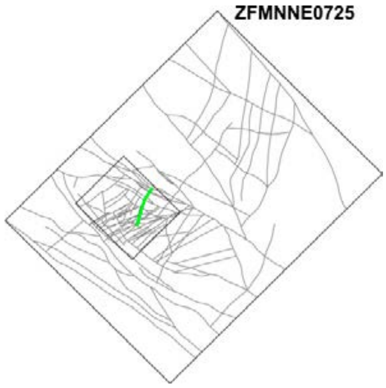


Fracture frequency	Mean = 24 m^{-1}	Span = 2-134 m^{-1}	Medium	Intersection along KFM05A (part of DZ3)	Dominance of sealed fractures. Quantitative estimate and span include sealed fracture networks
Fracture filling			Medium	Intersection along KFM05A (part of DZ3)	Calcite, chlorite, laumontite, hematite/adularia

Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike ZFMENE0401B (borehole interval 590-616 m along part of DZ3 in KFM05A)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
					
Sense of displacement			Low	Minor fault along part of DZ3 in KFM05A. Shear striae along chlorite	Steeply dipping fault with SSE strike shows strike-slip displacement

Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike ZFMNNE0725 (DZ7 in KFM06A; vuggy rock)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**

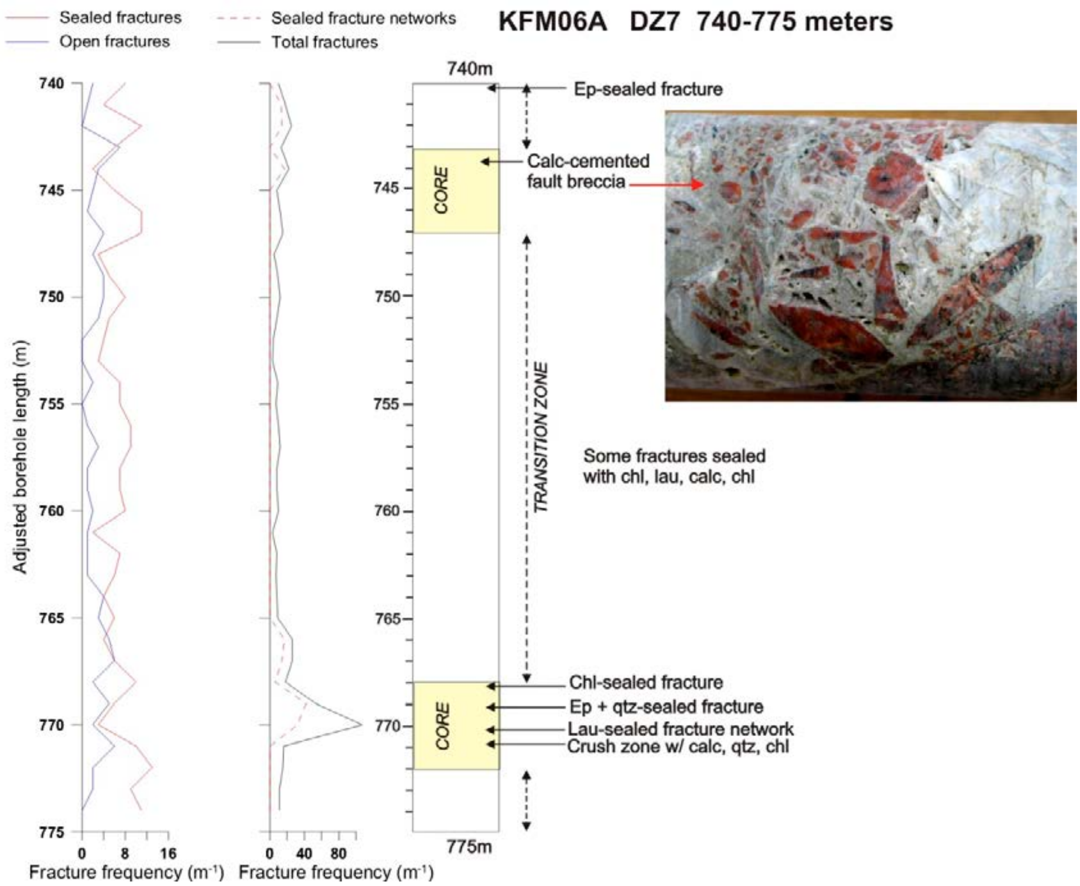
Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM0725G. Modelled down to 1250 m depth, using the dip estimated by connecting lineament MFM0725G with the borehole intersection 740-775 m in KFM06A (DZ7). Deformation zone plane placed at fixed point 770 m in KFM06A. This point is also situated along an interval of low radar amplitude (768-773 m). Included only in local model.



Confidence of existence: High

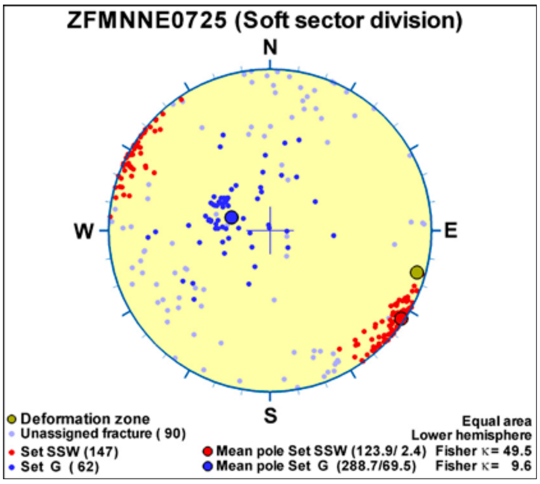
Single hole interpretation: For identification and short description of DZ7 in KFM06A, see SKB P-05-132. For character and kinematics of DZ7 in KFM06A, see SKB P-06-212.

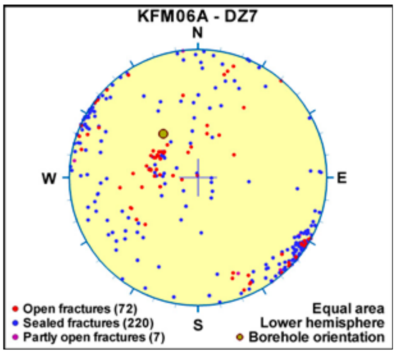
Two intervals around 745 m and 770 m contain a calcite-cemented fault breccia with angular, rotated rock fragments (see below), sealed fracture networks and a crush zone. These intervals are considered to form zone cores. Remainder of zone is "damage zone" in character. Fault-slip data documented along several fractures with variable orientation.

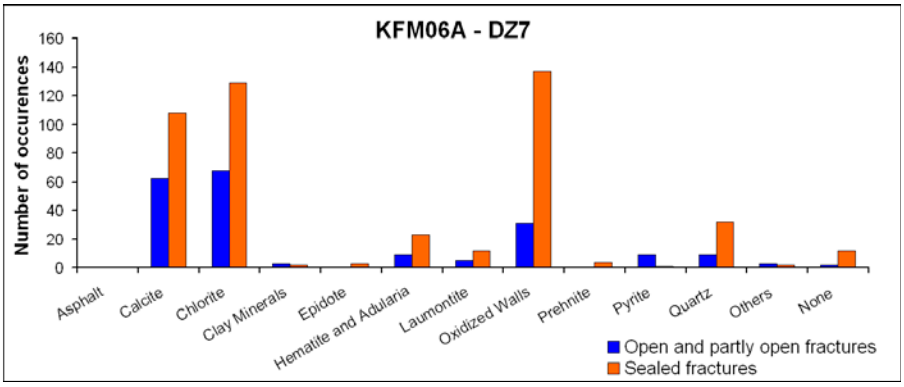


After SKB P-06-212

<table>
<tr><th colspan="6">Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike
ZFMNNE0725 (DZ7 in KFM06A; vuggy rock)</th></tr>
<tr><th>Property</th><th>Quantitative estimate</th><th>Span</th><th>Confidence level</th><th>Basis for interpretation</th><th>Comments</th></tr>
<tr><td>Position</td><td></td><td>± 10 m (surface, MFM0725G)<table><tr><th colspan="3">KFM06A</th></tr><tr><td>dx (m)</td><td>dy (m)</td><td>dz (m)</td></tr><tr><td>7</td><td>7</td><td>5</td></tr></table></td><td>High</td><td>Intersection along KFM06A (DZ7), low magnetic lineament MFM0725G</td><td>Span estimate refers to the uncertainty in the position of the central part of the zone</td></tr>
<tr><td>Orientation (strike/dip, right-hand-rule method)</td><td>200/83</td><td>± 5/± 10</td><td>High</td><td>Strike based on trend of lineament MFM0725G. Dip based on linking lineament MFM0725G at the surface with borehole intersection along KFM06A (DZ7)</td><td></td></tr>
<tr><td>Thickness</td><td>13 m</td><td>3-50 m</td><td>Medium</td><td>Intersection along KFM06A (DZ7). Span estimated on the basis of the range in thickness of steeply dipping zones between 1000 and 3000 m in length</td><td>Thickness refers to total zone thickness (damage zone and core)</td></tr>
<tr><td>Length</td><td>1914 m</td><td></td><td>High</td><td>Low magnetic lineament MFM0725G. Terminated against ZFMWNW0001</td><td>Total trace length at ground surface</td></tr>
<tr><td>Ductile deformation</td><td></td><td></td><td>High</td><td>Intersection along KFM06A (DZ7)</td><td>Not present</td></tr>
<tr><td>Brittle deformation</td><td></td><td></td><td>High</td><td>Intersection along KFM06A (DZ7)</td><td>Increased frequency of fractures. Fault core intervals with elevated fracture frequency, including sealed fracture networks, and cohesive breccia</td></tr>
<tr><td>Alteration</td><td></td><td></td><td>High</td><td>Intersection along KFM06A (DZ7), character of lineament MFM0725G</td><td>Red-stained bedrock with fine-grained hematite dissemination. Vuggy rock with quartz dissolution at 770.8-770.9 m in KFM06A (DZ7)</td></tr>
<tr><td>Fracture orientation (strike/dip, right-hand-rule method)</td><td>Mean orientation of SSW fracture set = 214/88
Mean orientation of gentle fracture set = 019/20</td><td>Fisher κ value of SSW fracture set = 50
Fisher κ value of gentle fracture set = 10</td><td>Medium</td><td>Intersection along KFM06A (DZ7), N = 299</td><td>Steeply dipping fractures that strike SSW dominate. Gently dipping fractures as well as steeply dipping fractures with ESE or NW strike are also present</td></tr>
</table>

<table>
<tr><th colspan="6">Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike
ZFMNNE0725 (DZ7 in KFM06A; vuggy rock)</th></tr>
<tr><th>Property</th><th>Quantitative estimate</th><th>Span</th><th>Confidence level</th><th>Basis for interpretation</th><th>Comments</th></tr>
<tr><td></td><td colspan="5">




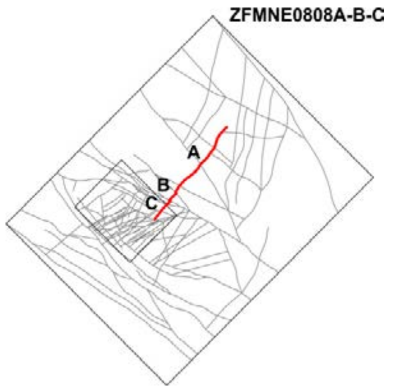
</td></tr>
<tr><td>Fracture frequency</td><td>Mean = 16 m^{-1}</td><td>Span = 3-107 m^{-1}</td><td>Medium</td><td>Intersection along KFM06A (DZ7)</td><td>Dominance of sealed fractures. Quantitative estimate and span include sealed fracture networks</td></tr>
<tr><td rowspan="2">Fracture filling</td><td></td><td></td><td>Medium</td><td>Intersection along KFM06A (DZ7)</td><td>Chlorite, calcite, quartz, hematite/adularia, laumontite</td></tr>
<tr><td colspan="5">


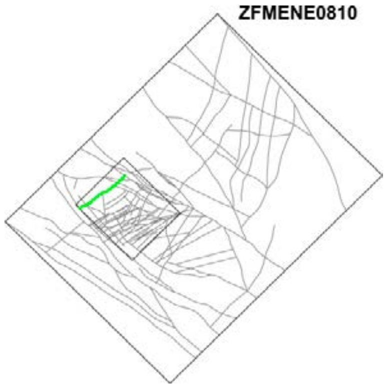
</td></tr>
<tr><td>Sense of displacement</td><td></td><td></td><td>Medium</td><td>Minor faults along DZ7 in KFM06A. Shear striae along chlorite and locally laumontite; calcite steps</td><td>Steeply dipping faults with ENE and ESE strike characterised by oblique-slip displacement with strong, yet variable strike-slip component.

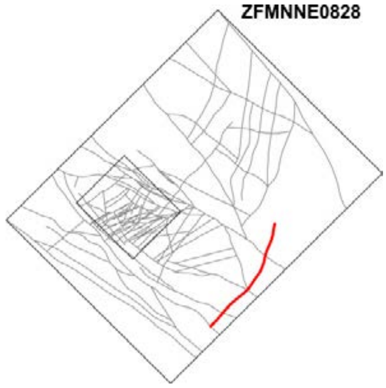
Dextral strike-slip component dominant on a steeply dipping fault with NW strike (chlorite and calcite).

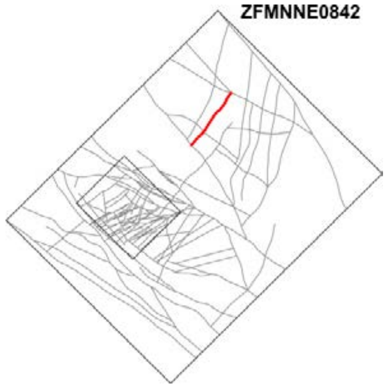
Sinistral strike-slip component dominant on a steeply dipping fault with WSW strike (calcite)

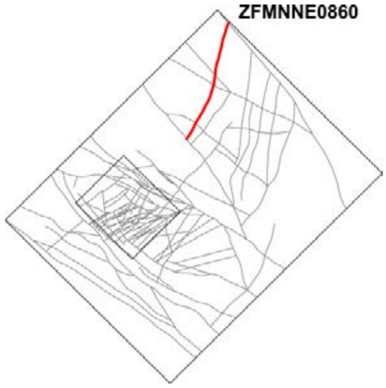
Dextral strike-slip component dominant on a steeply dipping fault with NNE strike (chlorite and laumontite)</td></tr>
</table>

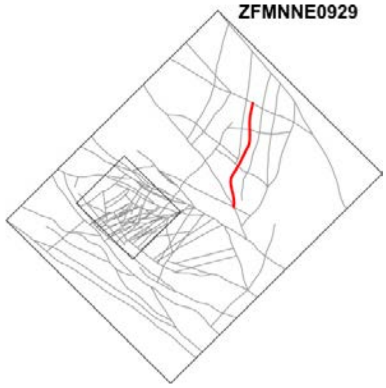
Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike ZFMNE0808A, ZFMNE0808B, ZFMNE0808C					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Modelling procedure: Zone ZFMNE0808 consists of different segments, the most prominent of which is denoted ZFMNE0808A. These segments are judged to constitute elements of one and the same structure. At the surface, corresponds to the low magnetic lineaments MFM0808A0, MFM0808B0 and MFM0808C0. Modelled to base of regional model volume with a dip of 80° to the NW based on comparison with high confidence, steeply dipping zones with NNE strike. Included in regional model. Zone ZFMNE0808C is also present inside local model volume.					
Confidence of existence: Medium (not confirmed by direct geological observation)					
Position		± 20 m (surface)	High	Low magnetic lineaments MFM0808A0, -0808B0 and -0808C0	Span estimate refers to the uncertainty in the position of the central part of the zone
Orientation (strike/dip, right-hand-rule method)	ZFMNE0808A = 218/80, ZFMNE0808B = 226/80, ZFMNE0808C = 220/80	± 10/± 10	High for strike, low for dip	Strike based on trend of lineaments MFM0808A0, -0808B0 and -0808C0. Dip based on comparison with high confidence, steeply dipping zones with NNE strike	
Thickness	ZFMNE0808A 30 m, ZFMNE0808B 10 m, ZFMNE0808C 15 m	ZFMNE0808A 15-64 m, ZFMNE0808B 1-13 m, ZFMNE0808C 3-50 m	Low	Estimated on basis of length – thickness correlation diagram in SKB R-07-50. Span estimated on the basis of the range in thickness of steeply dipping zones 3000–10000 m, 0–500 m and 1000–3000 m in length, respectively	Thickness refers to total zone thickness (damage zone and core)
Length	ZFMNE0808A 4080 m, ZFMNE0808B 486 m, ZFMNE0808C 1180 m		High	Low magnetic lineaments MFM0808A0, -0808B0 and -0808C0. ZFMNE0808A terminated against ZFMNW0805A. ZFMNE0808B terminated against ZFMWNW0805A and ZFMWNW0001. ZFMNE0808C terminated against ZFMWNW0001	Total trace length of all components at the ground surface exceeds 5000 m
Ductile deformation			Low	Comparison with high confidence, vertical or steeply dipping zones with NNE strike	Assumed not to be present
Brittle deformation			Low	Comparison with high confidence, steeply dipping zones with NNE strike	Assumed to be present
Alteration			Medium	Character of lineaments MFM0808A0, -0808B0 and -0808C0	Red-stained bedrock with fine-grained hematite dissemination
No more data					

Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike ZFMENE0810					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM0810. This lineament is defined partly by a magnetic minimum and partly by a depression in the bedrock surface, the form of which has been recognised on the basis of an analysis of old refraction seismic data /Isaksson and Keisu 2005/. Modelled to base of regional model volume with a dip of 80° to the north-west based on comparison with high-confidence zone ZFMENE2254, which lies to the south-east. Included only in local model.					
Confidence of existence: Medium (not confirmed by direct geological observation)					
Position		± 20 m (surface)	High	Lineament MFM0810	Span estimate refers to the uncertainty in the position of the central part of the zone
Orientation (strike/dip, right-hand-rule method)	223/80	± 5/± 10	High for strike, low for dip	Strike based on trend of lineament MFM0810. Dip based on comparison with high-confidence zone ZFMENE2254 to the south-east	
Thickness	25 m	3-50 m	Low	Estimated on basis of length – thickness correlation diagram in SKB R-07-50. Span estimated on the basis of the range in thickness of steeply dipping zones between 1000 and 3000 m in length	Thickness refers to total zone thickness (damage zone and core)
Length	2671 m		High	Lineament MFM0810. Terminated against ZFMWNW0001 and ZFMNW0017	Total trace length at ground surface
Ductile deformation			Low	Comparison with high confidence, vertical or steeply dipping zones with ENE, NNE or NE strike	Assumed not to be present
Brittle deformation			Low	Comparison with high confidence, vertical or steeply dipping zones with ENE, NNE or NE strike	Assumed to be present
Alteration			Medium	Character of lineament MFM0810	Red-stained bedrock with fine-grained hematite dissemination
No more data					

Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike ZFMNNE0828					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM0828. Modelled to base of regional model volume with a dip of 80° to the WNW based on comparison with high confidence, steeply-dipping zones with NNE strike. Included only in regional model. Not present inside local model volume.					
Confidence of existence: Medium (not confirmed by direct geological observation)					
Position		± 20 m (surface)	High	Low magnetic lineament MFM0828	Span estimate refers to the uncertainty in the position of the central part of the zone
Orientation (strike/dip, right-hand-rule method)	213/80	± 5/± 10	High for strike, low for dip	Strike based on trend of lineament MFM0828. Dip based on comparison with high confidence, steeply dipping zones with NNE strike	
Thickness	35 m	15-64 m	Low	Estimated on basis of length – thickness correlation diagram in SKB R-07-50. Span estimated on the basis of the range in thickness of steeply dipping zones between 3000 and 10000 m in length	Thickness refers to total zone thickness (damage zone and core)
Length	5929 m		High	Low magnetic lineament MFM0828. Terminated against ZFMWNW0016	Total trace length at ground surface
Ductile deformation			Low	Comparison with high confidence, steeply dipping zones with NNE strike	Assumed not to be present
Brittle deformation			Low	Comparison with high confidence, steeply dipping zones with NNE strike	Assumed to be present
Alteration			Medium	Character of lineament MFM0828	Red-stained bedrock with fine-grained hematite dissemination
No more data					

<table>
<tr><th colspan="6">Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike
ZFMNE0842</th></tr>
<tr><th>Property</th><th>Quantitative estimate</th><th>Span</th><th>Confidence level</th><th>Basis for interpretation</th><th>Comments</th></tr>
<tr><td colspan="4">Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM0842. Modelled to base of regional model volume with a dip of 80° to the WNW based on comparison with high confidence, steeply dipping zones with NNE strike. Included only in regional model. Not present inside local model volume.</td><td colspan="2">
</td></tr>
<tr><td colspan="6">Confidence of existence: Medium (not confirmed by direct geological observation)</td></tr>
<tr><td>Position</td><td></td><td>± 20 m (surface)</td><td>High</td><td>Low magnetic lineament MFM0842</td><td>Span estimate refers to the uncertainty in the position of the central part of the zone</td></tr>
<tr><td>Orientation (strike/dip, right-hand-rule method)</td><td>217/80</td><td>± 10/± 10</td><td>High for strike, low for dip</td><td>Strike based on trend of lineament MFM0842. Dip based on comparison with high confidence, steeply dipping zones with NNE strike</td><td></td></tr>
<tr><td>Thickness</td><td>25 m</td><td>15-64 m</td><td>Low</td><td>Estimated on basis of length – thickness correlation diagram in SKB R-07-50. Span estimated on the basis of the range in thickness of steeply dipping zones between 3000 and 10000 m in length</td><td>Thickness refers to total zone thickness (damage zone and core)</td></tr>
<tr><td>Length</td><td>3157 m</td><td></td><td>High</td><td>Low magnetic lineament MFM0842. Terminated against ZFMNW0806 and ZFMWNW0853</td><td>Total trace length at ground surface</td></tr>
<tr><td>Ductile deformation</td><td></td><td></td><td>Low</td><td>Comparison with high confidence, steeply dipping zones with NNE strike</td><td>Assumed not to be present</td></tr>
<tr><td>Brittle deformation</td><td></td><td></td><td>Low</td><td>Comparison with high confidence, steeply dipping zones with NNE strike</td><td>Assumed to be present</td></tr>
<tr><td>Alteration</td><td></td><td></td><td>Medium</td><td>Character of lineament MFM0842</td><td>Red-stained bedrock with fine-grained hematite dissemination</td></tr>
<tr><td colspan="6">No more data</td></tr>
</table>

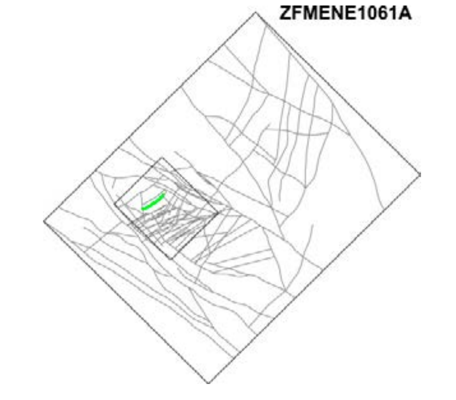
Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike **ZFMNNE0860**					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM0860. Modelled to base of regional model volume with a dip of 80° to the WNW based on comparison with high confidence, steeply dipping zones with NNE strike. Included only in regional model. Not present inside local model volume.	 				
Confidence of existence: Medium (not confirmed by direct geological observation)					
Position		± 20 m (surface)	High	Low magnetic lineament MFM0860	Span estimate refers to the uncertainty in the position of the central part of the zone
Orientation (strike/dip, right-hand-rule method)	198/80	± 10/± 10	High for strike, low for dip	Strike based on trend of lineament MFM0860. Dip based on comparison with high confidence, steeply dipping zones with NNE strike	
Thickness	35 m	15-64 m	Low	Estimated on basis of length – thickness correlation diagram in SKB R-07-50. Span estimated on the basis of the range in thickness of steeply dipping zones between 3000 and 10000 m in length	Thickness refers to total zone thickness (damage zone and core)
Length	5922 m		High	Low magnetic lineament MFM0860. Terminated against ZFMNW0806 and ZFMNW0854	Total trace length at ground surface
Ductile deformation			Low	Comparison with high confidence, steeply dipping zones with NNE strike	Assumed not to be present
Brittle deformation			Low	Comparison with high confidence, steeply dipping zones with NNE strike	Assumed to be present
Alteration			Medium	Character of lineament MFM0860	Red-stained bedrock with fine-grained hematite dissemination
No more data					

<table>
<tr><th colspan="6">Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike
ZFMNNE0929</th></tr>
<tr><th>Property</th><th>Quantitative estimate</th><th>Span</th><th>Confidence level</th><th>Basis for interpretation</th><th>Comments</th></tr>
<tr><td colspan="4">Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM0929. Modelled to base of regional model volume with a dip of 80° to the WNW based on comparison with high confidence, steeply dipping zones with NNE strike. Included only in regional model. Not present inside local model volume.</td><td colspan="2"></td></tr>
<tr><td colspan="6">Confidence of existence: Medium (not confirmed by direct geological observation)</td></tr>
<tr><td>Position</td><td></td><td>± 20 m (surface)</td><td>High</td><td>Low magnetic lineament MFM0929</td><td>Span estimate refers to the uncertainty in the position of the central part of the zone</td></tr>
<tr><td>Orientation (strike/dip, right-hand-rule method)</td><td>193/80</td><td>± 10/± 10</td><td>High for strike, low for dip</td><td>Strike based on trend of lineament MFM0929. Dip based on comparison with high confidence, steeply dipping zones with NNE strike</td><td></td></tr>
<tr><td>Thickness</td><td>35 m</td><td>15-64 m</td><td>Low</td><td>Estimated on basis of length – thickness correlation diagram in SKB R-07-50. Span estimated on the basis of the range in thickness of steeply dipping zones between 3000 and 10000 m in length</td><td>Thickness refers to total zone thickness (damage zone and core)</td></tr>
<tr><td>Length</td><td>5203 m</td><td></td><td>High</td><td>Low magnetic lineament MFM0929. Terminated against ZFMNW0806 and ZFMWNW0853</td><td>Total trace length at ground surface</td></tr>
<tr><td>Ductile deformation</td><td></td><td></td><td>Low</td><td>Comparison with high confidence, steeply dipping zones with NNE strike</td><td>Assumed not to be present</td></tr>
<tr><td>Brittle deformation</td><td></td><td></td><td>Low</td><td>Comparison with high confidence, steeply dipping zones with NNE strike</td><td>Assumed to be present</td></tr>
<tr><td>Alteration</td><td></td><td></td><td>Medium</td><td>Character of lineament MFM0929</td><td>Red-stained bedrock with fine-grained hematite dissemination</td></tr>
<tr><td colspan="6">No more data</td></tr>
</table>

Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike ZFMENE1061A (borehole interval 244-315 m along part of DZ1 in KFM08A, DZ4 and DZ5 in KFM08C)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**

Modelling procedure: Zone ZFMENE1061 consists of two segments with slightly different orientations, the most prominent of which is denoted ZFMENE1061A. These segments are judged to constitute elements of one and the same structure.

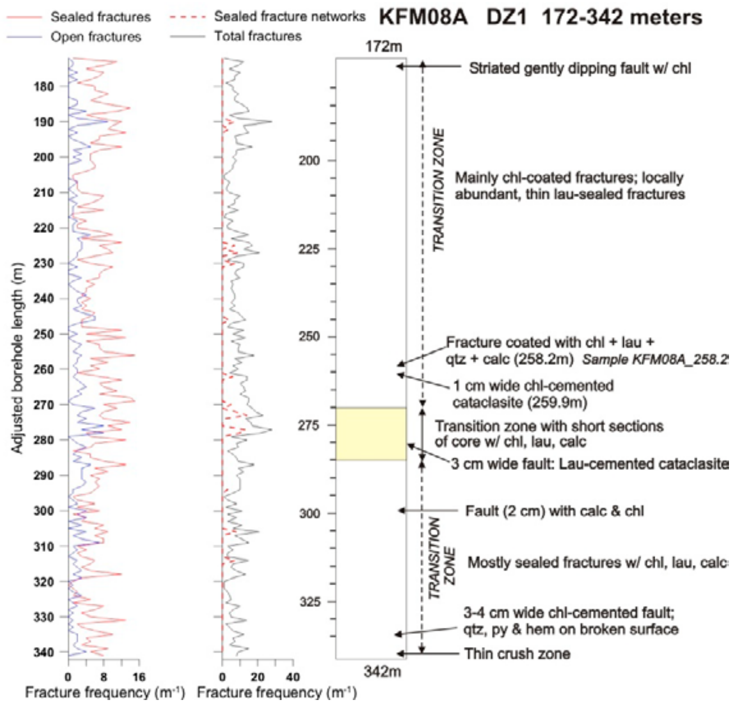
At the surface, corresponds to the low magnetic lineament MFM2054G0 and its inferred continuation to the south-west. This lineament lies in the vicinity of a topographic lineament defined by a depression in the bedrock surface, the form of which has been recognised on the basis of an analysis of old refraction seismic data /Isaksson and Keisu 2005/. Possible correlation also with a low velocity seismic refraction anomaly (see /Isaksson and Keisu 2005/ and Figure 5-33 in /SKB 2005/). Modelled using the dip estimated by connecting lineament MFM2054G0 and its extension to the south-west with the borehole intersection 244-315 m in KFM08A (part of DZ1). Deformation zone plane placed at fixed point 277 m in KFM08A. Decreased radar penetration also along the borehole interval 272-276 m in KFM08A. Zone also intersects borehole intervals 829-832 m and 946-949 m in KFM08C (DZ4 and DZ5, respectively), close to its north-eastern termination. Included only in local model.



Confidence of existence: High

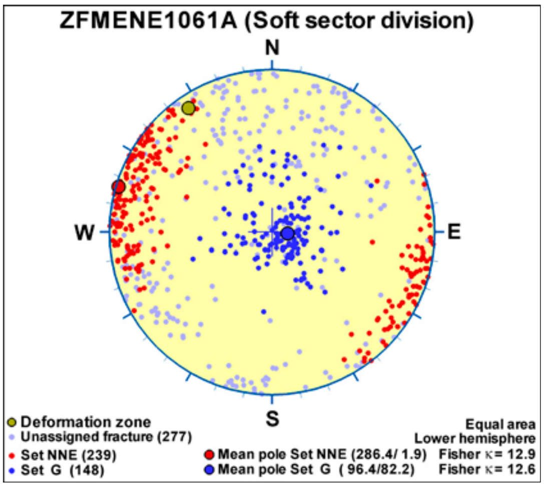
Single hole interpretation: For identification and short description of DZ1 in KFM08A and DZ4 and DZ5 in KFM08C, see SKB P-05-262 and SKB P-06-207. For character and kinematics of DZ1 (172-342 m) in KFM08A, see SKB P-06-212. For character and kinematics of DZ4 in KFM08C, see SKB P-07-101; information presented under zone ZFMENE1061B.

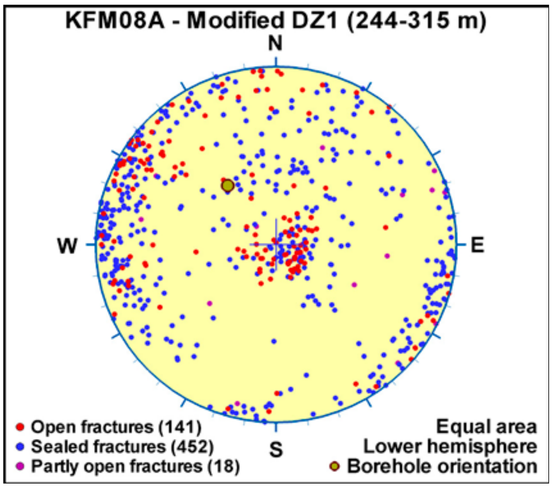
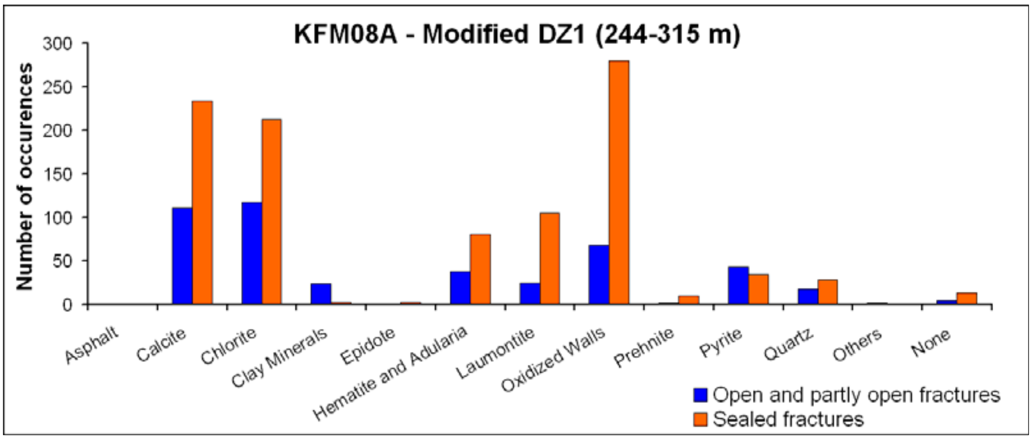
The interval 274-287 m along DZ1 in KFM08A is characterized by a high frequency of laumontite-sealed fractures, including a 3 cm wide cataclasite sealed with laumontite and euhedral calcite at 281.7 m. This interval is inferred to include short sections of zone core. The remainder of zone DZ1 shows “damage zone” in character (previously referred to as “transition zone”). Fault-slip data documented along several fractures with variable orientation.



After P-06-212

<table>
<tr><th colspan="6">Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike
ZFMENE1061A (borehole interval 244-315 m along part of DZ1 in KFM08A, DZ4 and DZ5 in KFM08C)</th></tr>
<tr><th>Property</th><th>Quantitative estimate</th><th>Span</th><th>Confidence level</th><th>Basis for interpretation</th><th>Comments</th></tr>
<tr><td>Position</td><td></td><td>± 20 m (surface, continuation of lineament MFM2054G0 to the south-west)
± 10 m (surface, MFM2054G0)<table><tr><th colspan="3">KFM08A</th></tr><tr><td>dx (m)</td><td>dy (m)</td><td>dz (m)</td></tr><tr><td>4</td><td>4</td><td>2</td></tr><tr><th colspan="3">KFM08C</th></tr><tr><td>6</td><td>6</td><td>4</td></tr></table></td><td>High</td><td>Intersections along borehole interval 244-315 m in KFM08A (part of DZ1) and KFM08C (DZ4 and DZ5), low magnetic lineament MFM2054G0 and its continuation to the south-west, seismic refraction data</td><td>Span estimate refers to the uncertainty in the position of the central part of the zone</td></tr>
<tr><td>Orientation (strike/dip, right-hand-rule method)</td><td>056/81</td><td>± 5/± 10</td><td>High</td><td>Strike based on trend of lineament MFM2054G0 and its inferred continuation to the south-west. Dip based on linking this lineament with borehole interval 244-315 m in KFM08A (part of DZ1)</td><td></td></tr>
<tr><td>Thickness</td><td>48 m</td><td>3-50 m</td><td>Medium</td><td>Intersection along borehole interval 244-315 m in KFM08A (part of DZ1). Span estimated on the basis of the range in thickness of steeply dipping zones between 1000 and 3000 m in length</td><td>Thickness refers to total zone thickness (damage zone and core). Borehole intersections in KFM08C are not included since close to the north-eastern termination of the zone</td></tr>
<tr><td>Length</td><td>1192 m</td><td></td><td>Medium</td><td>Low magnetic lineament MFM2054G0 and its inferred continuation to the south-west. Terminated against ZFMNNW0100</td><td>Total trace length at ground surface</td></tr>
<tr><td>Ductile deformation</td><td></td><td></td><td>High</td><td>Intersections along borehole interval 244-315 m in KFM08A (part of DZ1)</td><td>Not present</td></tr>
<tr><td>Brittle deformation</td><td></td><td></td><td>High</td><td>Intersections along borehole interval 244-315 m in KFM08A (part of DZ1)</td><td>Increased frequency of fractures. Sections of fault core along an interval with elevated fracture frequency, including sealed fracture networks, and cataclasite</td></tr>
<tr><td>Alteration</td><td></td><td></td><td>High</td><td>Intersections along borehole interval 244-315 m in KFM08A (part of DZ1), character of lineament MFM2054G0</td><td>Oxidized bedrock with fine-grained hematite dissemination</td></tr>
</table>

<table>
<tr><th colspan="6">Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike
ZFMENE1061A (borehole interval 244-315 m along part of DZ1 in KFM08A, DZ4 and DZ5 in KFM08C)</th></tr>
<tr><th>Property</th><th>Quantitative estimate</th><th>Span</th><th>Confidence level</th><th>Basis for interpretation</th><th>Comments</th></tr>
<tr><td rowspan="2">Fracture orientation (strike/dip, right-hand-rule method)</td><td>Mean orientation of NNE fracture set = 016/88
Mean orientation of gentle fracture set = 186/8</td><td>Fisher κ value of NNE fracture set = 13
Fisher κ value of gentle fracture set = 13</td><td>Medium</td><td>Intersections along borehole interval 244-315 m in KFM08A (part of DZ1) and DZ4 and DZ5 in KFM08C, N = 664</td><td>Variable fracture orientation. Steeply dipping NNE as well as gently dipping fractures dominate</td></tr>
<tr><td colspan="5">


</td></tr>
<tr><td>Fracture frequency</td><td>Mean = 10 m^{-1}</td><td>Span = 1-28 m^{-1}</td><td>Medium</td><td>Intersection along borehole interval 244-315 m in KFM08A (part of DZ1)</td><td>Dominance of sealed fractures. Quantitative estimate and span include sealed fracture networks</td></tr>
<tr><td rowspan="2">Fracture filling</td><td></td><td></td><td>Medium</td><td>Intersection along borehole interval 244-315 m in KFM08A (part of DZ1)</td><td>Calcite, chlorite, laumontite, hematite/adularia, pyrite, quartz, clay minerals</td></tr>
<tr><td colspan="5">
</td></tr>
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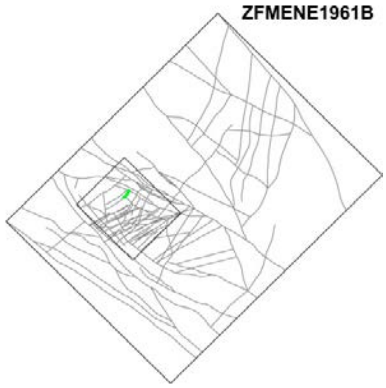
Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike ZFMENE1061A (borehole interval 244-315 m along part of DZ1 in KFM08A, DZ4 and DZ5 in KFM08C)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Sense of displacement			Medium	Minor faults along DZ1 in KFM08A. Shear striae along chlorite and, in some cases, along calcite and laumontite.	Steeply dipping faults with NNW strike (6) show strike-slip displacement, some of which can be determined to be sinistral. Steeply dipping fault with SSW strike (1) shows sinistral strike-slip displacement. Gently dipping fault (1) with NNE strike shows reverse dip-slip displacement and a sub-horizontal fault (1) shows dextral displacement. Data from DZ4 along KFM08C presented with ZFMENE1061B. No data from DZ5 in KFM08C

Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike

ZFMENE1061B (DZ4 in KFM08C)

Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM2054G1. Modelled using the dip estimated by connecting lineament MFM2054G1 with the borehole intersection 829-832 m (DZ4) in KFM08C. Deformation zone plane placed at fixed point 829 m in KFM08C. Decreased radar penetration also along the borehole interval 827-832 m. Included only in local model.



Confidence of existence: High

Single hole interpretation: For identification and short description of DZ4 in KFM08C, see SKB P-06-207. For character and kinematics of DZ4 in KFM08C, see SKB P-07-101. Fault core with elevated fracture frequency and a 10 cm wide crush zone identified along DZ4 in KFM08C at 830-830.5 m close to contact between metagranite-granodiorite and amphibolite.

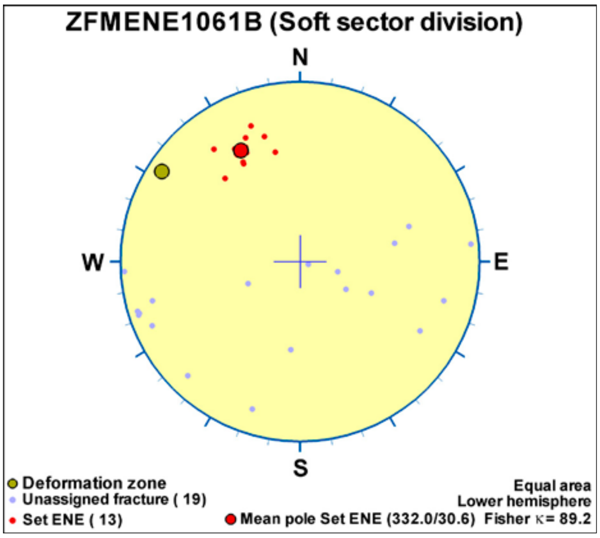
KFM08C (DZ4)

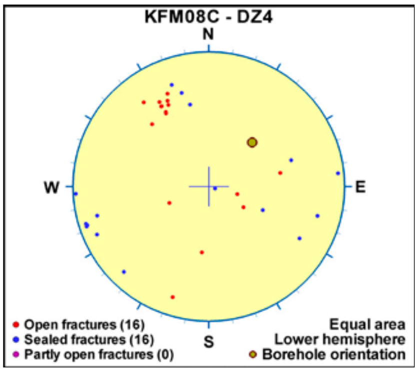
Property	Quantitative estimate	Span	Confidence level	Basis for interpretation	Comments
Position		± 10 m (surface, MFM2054G0) **KFM08C** dx (m): 6 dy (m): 6 dz (m): 4	High	Intersection along DZ4 in KFM08C, low magnetic lineament MFM2054G1	Span estimate refers to the uncertainty in the position of the central part of the zone
Orientation (strike/dip, right-hand-rule method)	033/81	± 5/± 10	High	Strike based on trend of lineament MFM2054G1. Dip based on linking this lineament with DZ4 in KFM08C	
Thickness	1 m	1-13 m	Medium	Intersection along DZ4 in KFM08C. Span estimated on the basis of the range in thickness of steeply dipping zones between 0 and 500 m in length	Thickness refers to total zone thickness (damage zone and core)
Length	436 m		High	Lineament MFM2054G1. Terminated against ZFMENE1061A and ZFMWNW0809A	Total trace length at ground surface
Ductile deformation			High	Intersection along DZ4 in KFM08C	Not present

Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike

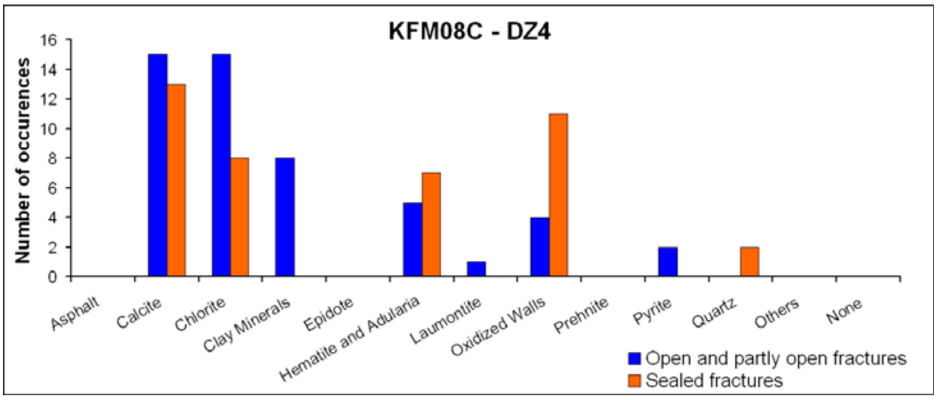
ZFMENE1061B (DZ4 in KFM08C)

Property	Quantitative estimate	Span	Confidence level	Basis for interpretation	Comments
Brittle deformation			High	Intersection along DZ4 in KFM08C	Increased frequency of fractures. Complementary data from KFM08C not yet assembled
Alteration			High	Intersection along DZ4 in KFM08C, character of lineament MFM2054G1	Oxidized bedrock with fine-grained hematite dissemination
Fracture orientation (strike/dip, right-hand-rule method)	Mean orientation of ENE fracture set = 052/59	Fisher κ value of NNE fracture set = 89	Low	Intersection along DZ4 in KFM08C, N = 32	Few fractures. Fractures with ENE strike that dip moderately to steeply to the SSE are conspicuous

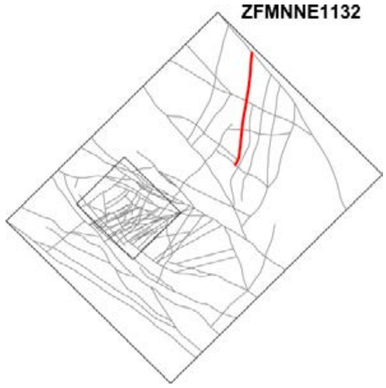


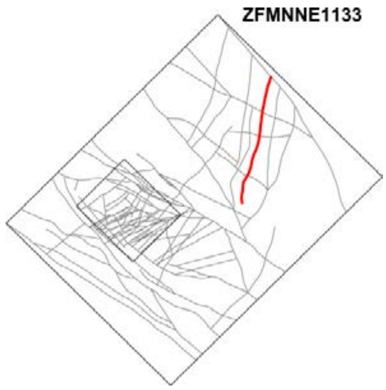


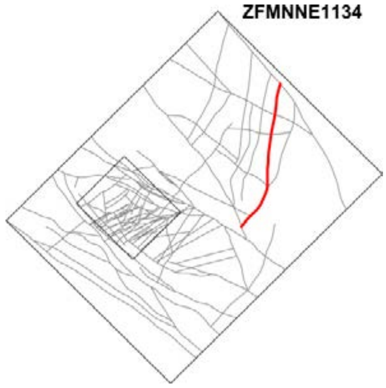
Property	Quantitative estimate	Span	Confidence level	Basis for interpretation	Comments
Fracture frequency	Mean = 28 m^{-1}	Span = 14-47 m^{-1}	Low	Intersection along DZ4 in KFM08C	Open and sealed fractures. Quantitative estimate and span include crush zones along a single, short borehole interval
Fracture filling			Low	Intersection along DZ4 in KFM08C	Single, short borehole interval. Calcite, chlorite, hematite/adularia, clay minerals

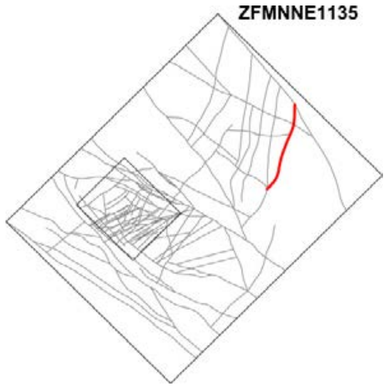


Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike ZFMENE1061B (DZ4 in KFM08C)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Sense of displacement				Intersection along DZ4 in KFM08C. Shear striae along chlorite, calcite and hematite	Steeply dipping fault with ENE strike shows oblique slip

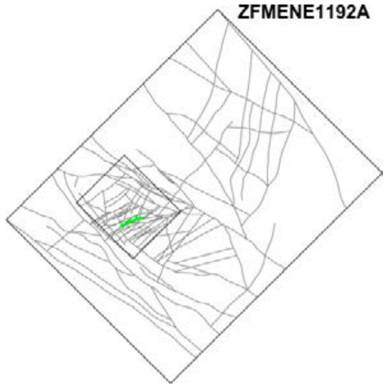
Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike ZFMNNE1132					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM1132. Modelled to base of regional model volume with a dip of 80° to the WNW based on comparison with high confidence, steeply dipping zones with NNE strike. Included only in regional model. Not present inside local model volume.					
Confidence of existence: Medium (not confirmed by direct geological observation)					
Position		± 20 m (surface)	High	Low magnetic lineament MFM1132	Span estimate refers to the uncertainty in the position of the central part of the zone
Orientation (strike/dip, right-hand-rule method)	188/80	± 10/± 10	High for strike, low for dip	Strike based on trend of lineament MFM1132. Dip based on comparison with high confidence, steeply dipping zones with NNE strike	
Thickness	35 m	15-64 m	Low	Estimated on basis of length – thickness correlation diagram in SKB R-07-50. Span estimated on the basis of the range in thickness of steeply dipping zones between 3000 and 10000 m in length	Thickness refers to total zone thickness (damage zone and core)
Length	5478 m		High	Low magnetic lineament MFM1132. Terminated against ZFMWNW0851 and ZFMNW0854	Total trace length at ground surface
Ductile deformation			Low	Comparison with high confidence, steeply dipping zones with NNE strike	Assumed not to be present
Brittle deformation			Low	Comparison with high confidence, steeply dipping zones with NNE strike	Assumed to be present
Alteration			Medium	Character of lineament MFM1132	Red-stained bedrock with fine-grained hematite dissemination
No more data					

Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike ZFMNNE1133					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM1133. Modelled to base of regional model volume with a dip of 80° to the WNW based on comparison with high confidence, steeply dipping zones with NNE strike. Included only in regional model. Not present inside local model volume.					
Confidence of existence: Medium (not confirmed by direct geological observation)					
Position		± 20 m (surface)	High	Low magnetic lineament MFM1133	Span estimate refers to the uncertainty in the position of the central part of the zone
Orientation (strike/dip, right-hand-rule method)	193/80	± 10/± 10	High for strike, low for dip	Strike based on trend of lineament MFM1133. Dip based on comparison with high confidence, steeply dipping zones with NNE strike	
Thickness	40 m	15-64 m	Low	Estimated on basis of length – thickness correlation diagram in SKB R-07-50. Span estimated on the basis of the range in thickness of steeply dipping zones between 3000 and 10000 m in length	Thickness refers to total zone thickness (damage zone and core)
Length	6284 m		High	Low magnetic lineament MFM1133. Terminated against ZFMNW0854	Total trace length at ground surface
Ductile deformation			Low	Comparison with high confidence, steeply dipping zones with NNE strike	Assumed not to be present
Brittle deformation			Low	Comparison with high confidence, steeply dipping zones with NNE strike	Assumed to be present
Alteration			Medium	Character of lineament MFM1133	Red-stained bedrock with fine-grained hematite dissemination
No more data					

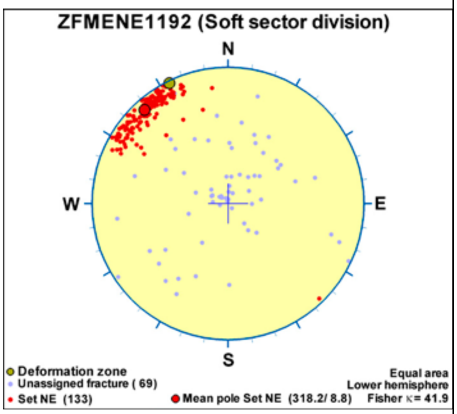
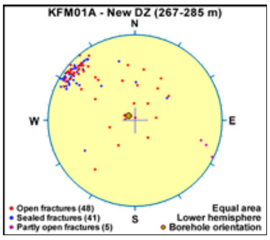
<table>
<tr><th colspan="6">Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike
ZFMNNE1134</th></tr>
<tr><th>Property</th><th>Quantitative estimate</th><th>Span</th><th>Confidence level</th><th>Basis for interpretation</th><th>Comments</th></tr>
<tr><td colspan="4">Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM1134. Modelled to base of regional model volume with a dip of 80° to the WNW based on comparison with high confidence, steeply-dipping zones with NNE strike. Included only in regional model. Not present inside local model volume.</td><td colspan="2">
</td></tr>
<tr><td colspan="6">Confidence of existence: Medium (not confirmed by direct geological observation)</td></tr>
<tr><td>Position</td><td></td><td>± 20 m (surface)</td><td>High</td><td>Low magnetic lineament MFM1134</td><td>Span estimate refers to the uncertainty in the position of the central part of the zone</td></tr>
<tr><td>Orientation (strike/dip, right-hand-rule method)</td><td>191/90</td><td>± 10/± 10</td><td>High for strike, low for dip</td><td>Strike based on trend of lineament MFM1134. Dip based on comparison with high confidence, steeply-dipping zones with NNE strike</td><td></td></tr>
<tr><td>Thickness</td><td>40 m</td><td>15-64 m</td><td>Low</td><td>Estimated on basis of length – thickness correlation diagram in SKB R-07-50. Span estimated on the basis of the range in thickness of steeply dipping zones between 3000 and 10000 m in length</td><td>Thickness refers to total zone thickness (damage zone and core)</td></tr>
<tr><td>Length</td><td>7284 m</td><td></td><td>High</td><td>Low magnetic lineament MFM1134. Terminated against ZFMNW0806 and ZFMNW0854</td><td>Total trace length at ground surface</td></tr>
<tr><td>Ductile deformation</td><td></td><td></td><td>Low</td><td>Comparison with high confidence, steeply-dipping zones with NNE strike</td><td>Assumed not to be present</td></tr>
<tr><td>Brittle deformation</td><td></td><td></td><td>Low</td><td>Comparison with high confidence, steeply-dipping zones with NNE strike</td><td>Assumed to be present</td></tr>
<tr><td>Alteration</td><td></td><td></td><td>Medium</td><td>Character of lineament MFM1134</td><td>Red-stained bedrock with fine-grained hematite dissemination</td></tr>
<tr><td colspan="6">No more data</td></tr>
</table>

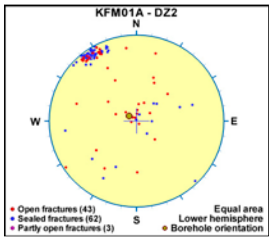
Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike ZFMNNE1135					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM1135. Modelled to base of regional model volume with a dip of 80° to the WNW based on comparison with high confidence, steeply-dipping zones with NNE strike. Included only in regional model. Not present inside local model volume.					
Confidence of existence: Medium (not confirmed by direct geological observation)					
Position		± 20 m (surface)	High	Low magnetic lineament MFM1135	Span estimate refers to the uncertainty in the position of the central part of the zone
Orientation (strike/dip, right-hand-rule method)	194/90	± 10/± 10	High for strike, low for dip	Strike based on trend of lineament MFM1135. Dip based on comparison with high confidence, steeply-dipping zones with NNE strike	
Thickness	30 m	15-64 m	Low	Estimated on basis of length – thickness correlation diagram in SKB R-07-50. Span estimated on the basis of the range in thickness of steeply dipping zones between 3000 and 10000 m in length	Thickness refers to total zone thickness (damage zone and core)
Length	4361 m		High	Low magnetic lineament MFM1135. Terminated against ZFMNW0854 and ZFMNNE1134	Total trace length at ground surface
Ductile deformation			Low	Comparison with high confidence, steeply-dipping zones with NNE strike	Assumed not to be present
Brittle deformation			Low	Comparison with high confidence, steeply-dipping zones with NNE strike	Assumed to be present
Alteration			Medium	Character of lineament MFM1135	Red-stained bedrock with fine-grained hematite dissemination
No more data					

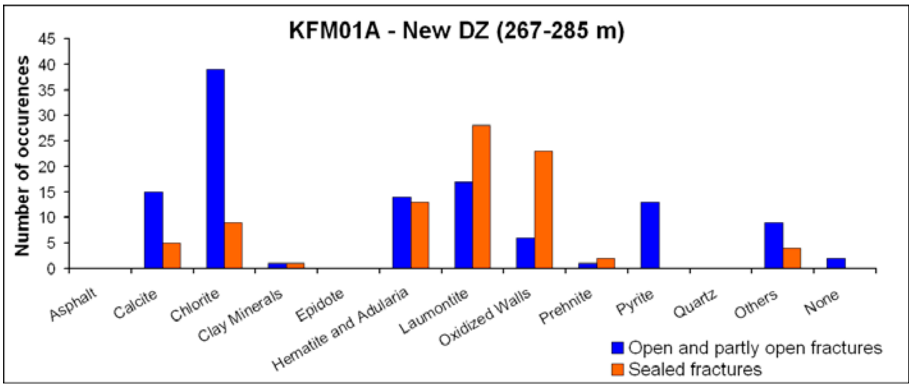
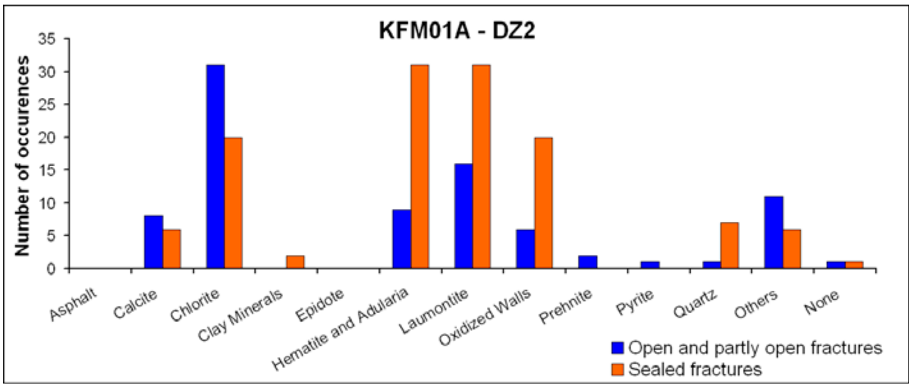
<table>
<tr><th colspan="6">Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike
ZFMENE1192A (DZ2 and DZ5 in KFM01A, DZ1 in KFM01C)</th></tr>
<tr><th>Property</th><th>Quantitative estimate</th><th>Span</th><th>Confidence level</th><th>Basis for interpretation</th><th>Comments</th></tr>
<tr><td colspan="4">Modelling procedure: Zone ZFMENE1192 consists of two segments, labelled ZFMENE1192A and ZFMENE1192B, following lineaments with slightly different trends. These two segments are judged to constitute elements of one and the same structure.

Zone ZFMENE1192A corresponds at the surface to the low magnetic lineament MFM2253G0. Modelled using the dip estimated by connecting lineament MFM2253G0 with the borehole intervals 267-285 m (DZ5) and 386-412 m (DZ2) in KFM01A. Deformation zone plane placed at fixed points 277 m and 402 m in KFM01A. Decreased radar penetration also along the borehole interval 390-400 m. Zone also intersects borehole interval 23-48 m (DZ1) in KFM01C. However, the gently dipping zone ZFMA2 is also modelled to intersect borehole KFM01C along DZ1. For this reason, there are difficulties to separate the influence of zones ZFMENE1192A and ZFMA2 along this borehole interval. Included only in local model.</td><td colspan="2">
</td></tr>
<tr><td colspan="6">Confidence of existence: High</td></tr>
<tr><td colspan="6">Single hole interpretation: For identification and short description of DZ2 in KFM01A and DZ1 in KFM01C, see SKB P-04-116 and SKB P-06-135, respectively. For character and kinematics of DZ1 in KFM01C, see information under zone ZFMA2.</td></tr>
<tr><td colspan="6">KFM01A (DZ)

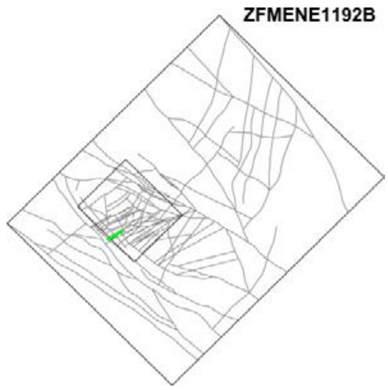
</td></tr>
<tr><td>Position</td><td></td><td>± 10 m (surface)
<table><tr><th colspan="3">KFM01A</th></tr><tr><th>dx (m)</th><th>dy (m)</th><th>dz (m)</th></tr><tr><td>9</td><td>9</td><td>2</td></tr><tr><th colspan="3">KFM01C</th></tr><tr><td>0</td><td>0</td><td>0</td></tr></table></td><td>High</td><td>Intersections along KFM01A (DZ2 and DZ5) and KFM01C (DZ1), low magnetic lineament MFM2253G0</td><td>Span estimate refers to the uncertainty in the position of the central part of the zone</td></tr>
<tr><td>Orientation (strike/dip, right-hand-rule method)</td><td>64/88</td><td>± 5/± 10</td><td>High</td><td>Strike based on trend of lineament MFM2253G0. Dip based on linking this lineament with DZ2 and DZ5 in KFM01A</td><td></td></tr>
<tr><td>Thickness</td><td>3 m</td><td>3-50 m</td><td>Medium</td><td>Intersection along KFM01A (DZ2). Span estimated on the basis of the range in thickness of steeply dipping zones between 1000 and 3000 m in length</td><td>Thickness refers to total zone thickness. Borehole intersection in KFM01C (DZ1) is not included due to interference with ZFMA2</td></tr>
</table>

<table>
<tr><th colspan="6">Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike
ZFMENE1192A (DZ2 and DZ5 in KFM01A, DZ1 in KFM01C)</th></tr>
<tr><th>Property</th><th>Quantitative estimate</th><th>Span</th><th>Confidence level</th><th>Basis for interpretation</th><th>Comments</th></tr>
<tr><td>Length</td><td>1100 m</td><td></td><td>High</td><td>Low magnetic lineament MFM2253G0. Terminated against ZFMNE0060A</td><td>Total trace length at ground surface</td></tr>
<tr><td>Ductile deformation</td><td></td><td></td><td>High</td><td>Intersection along KFM01A (DZ2 and DZ5)</td><td>Not present</td></tr>
<tr><td>Brittle deformation</td><td></td><td></td><td>High</td><td>Intersection along KFM01A (DZ2 and DZ5)</td><td>Increased frequency of fractures. No complementary data</td></tr>
<tr><td>Alteration</td><td></td><td></td><td>High</td><td>Intersection along KFM01A (DZ2 and DZ5), character of lineament MFM2253G</td><td>Oxidized bedrock with fine-grained hematite dissemination</td></tr>
<tr><td rowspan="2">Fracture orientation (strike/dip, right-hand-rule method)</td><td>Mean orientation of NE fracture set = 048/81</td><td>Fisher κ value of NE fracture set = 42</td><td>Medium</td><td>Intersection along KFM01A (DZ2 and DZ5), N = 202</td><td>Fracture set with NE strike and steep dip to the SE is prominent. Possibly different sub-sets present in the different borehole intersections. Gently dipping fractures are also present</td></tr>
<tr><td colspan="3">
</td><td colspan="2">

Currently labelled DZ5</td><td>
</td></tr>
<tr><td>Fracture frequency</td><td>Mean 5 m^{-1}</td><td>Span 1-10 m^{-1}</td><td>Medium</td><td>Intersection along KFM01A (DZ2 and DZ5)</td><td>Sealed and open fractures</td></tr>
<tr><td>Fracture filling</td><td></td><td></td><td>Medium</td><td>Intersection along KFM01A (DZ2 and DZ5)</td><td>Chlorite, laumontite, hematite/adularia, calcite, quartz, pyrite</td></tr>
</table>

Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike ZFMENE1192A (DZ2 and DZ5 in KFM01A, DZ1 in KFM01C)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
	 				
Sense of displacement				Intersection along KFM01A (DZ2 and DZ5)	No complementary data

<table>
<tr><th colspan="6">Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike
ZFMENE1192B</th></tr>
<tr><th>Property</th><th>Quantitative estimate</th><th>Span</th><th>Confidence level</th><th>Basis for interpretation</th><th>Comments</th></tr>
<tr><td colspan="4">Modelling procedure: Zone ZFMENE1192 consists of two segments, labelled ZFMENE1192A and ZFMENE1192B, following lineaments with slightly different trends. These two segments are judged to constitute elements of one and the same structure.

Zone ZFMENE1192B corresponds at the surface to the low magnetic lineament MFM2253G1. Modelled with the same dip, the same thickness and to the same depth as ZFMENE1192A. Included only in local model.</td><td colspan="2">
</td></tr>
<tr><td colspan="6">Confidence of existence: Medium (not confirmed by direct geological observation)</td></tr>
<tr><td>Position</td><td></td><td>± 10 m (surface)</td><td>High</td><td>Lineament MFM2253G1</td><td>Span estimate refers to the uncertainty in the position of the central part of the zone</td></tr>
<tr><td>Orientation (strike/dip, right-hand-rule method)</td><td>58/88</td><td>± 5/± 10</td><td>High for strike, low for dip</td><td>Strike based on trend of lineament MFM2253G1. Dip assumed to be same as zone ZFMENE1192A</td><td></td></tr>
<tr><td>Thickness</td><td>3 m</td><td>3-14 m</td><td>Low</td><td>Assumed to be the same as zone ZFMENE1192A. Span estimated on the basis of the range in thickness of steeply dipping zones between 500 and 1000 m in length</td><td>Thickness refers to total zone thickness (damage zone and core)</td></tr>
<tr><td>Length</td><td>758 m</td><td></td><td>High</td><td>Lineament MFM2253G1. Terminated against ZFMENE0060A and ZFMNW0017</td><td>Total trace length at ground surface</td></tr>
<tr><td>Ductile deformation</td><td></td><td></td><td>Low</td><td>Comparison with zone ZFMENE1192A</td><td>Assumed not to be present</td></tr>
<tr><td>Brittle deformation</td><td></td><td></td><td>Low</td><td>Comparison with zone ZFMENE1192A</td><td>Assumed to be present</td></tr>
<tr><td>Alteration</td><td></td><td></td><td>Medium</td><td>Character of lineament MFM2253G1</td><td>Red-stained bedrock with fine-grained hematite dissemination</td></tr>
<tr><td colspan="6">No more data</td></tr>
</table>

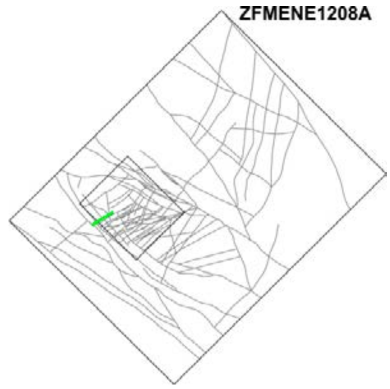
Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike

ZFMENE1208A (borehole interval 857-897 m along part of DZ4 in KFM07A, DZ1 in KFM09A, borehole interval 9-43 m along part of DZ1 in KFM09B, DZ1 in HFM23 and DZ1 in HFM28)

Property	Quantitative estimate	Span	Confidence level	Basis for interpretation	Comments

Modelling procedure: Zone ZFMENE1208 consists of two sub-parallel segments. Though these two segments with identity codes ZFMENE1208A and ZFMENE1208B are described separately in the property sheets, they are inferred to constitute elements of one and the same structure.

Magnetic data are absent or of poor quality close to the residence area and magnetic lineaments are not present. Zone modelled by connecting borehole intervals 857-897 m in KFM07A (part of DZ4), 15-40 m in KFM09A (DZ1) and 9-43 m in KFM09B (part of DZ1) and, with the assistance of fracture orientation data, assuming an orientation parallel to zone ZFMENE0159A. Deformation zone plane placed at fixed points 883 m in KFM07A, 30 m in KFM09A and 28 m in KFM09B. Decreased radar penetration also along the borehole intervals 880-886 m in KFM07A, 30-32 m in KFM09A and 26-50 m in KFM09B. Zone also intersects borehole intervals 26-42 m in HFM23 (DZ1) and 12-65 m in HFM28 (DZ1). Inferred termination against ZFMNW0003 and blind, so as to avoid intersection along HFM20. Included only in local model.

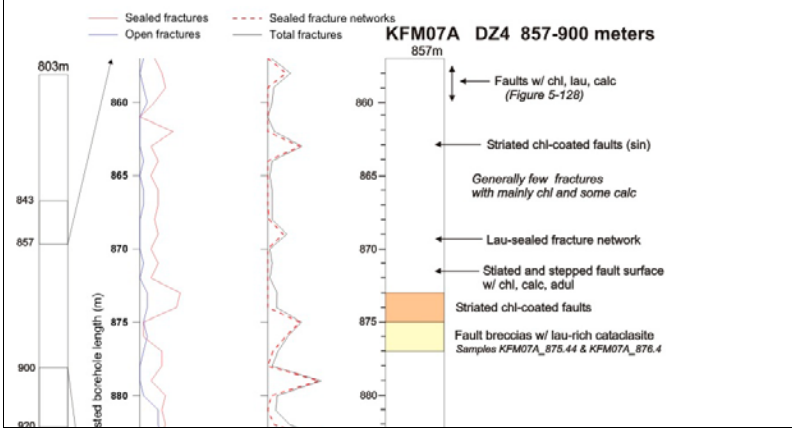


Confidence of existence: High

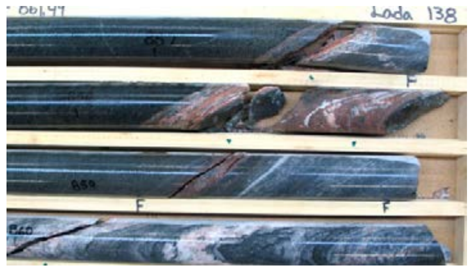
Single hole interpretation: For identification and short description of deformation zones in boreholes, see SKB P-05-157, SKB P-06-134, SKB P-06-135 and P-06-207. For character and kinematics of part of DZ4 (857-900 m) in KFM07A, see SKB P-06-212. For character and kinematics of part of DZ1 in KFM09A and DZ1 in KFM09B, see SKB P-07-101.

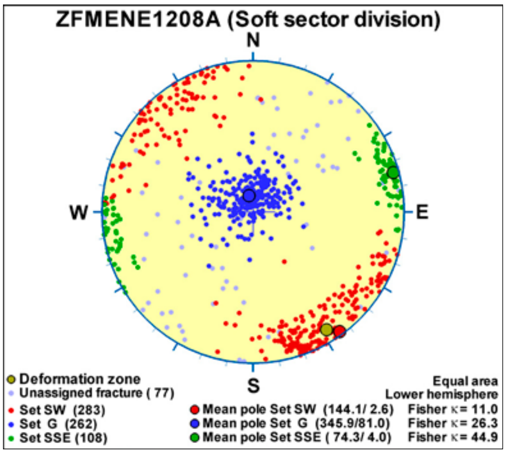
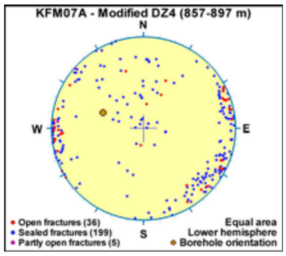
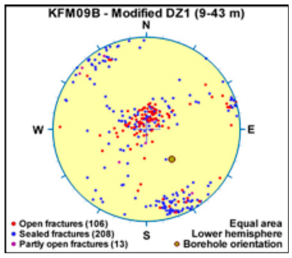
Zone is predominantly "damage zone" in character. A core part with cemented fault breccia and several sealed fracture networks is present along the interval 873-883 m in DZ4 in KFM07A. The fault breccia consists of sub-rounded to angular rock fragments embedded in a cataclasite to ultracataclasite that is partly laumontite-rich (see picture to right below). Chlorite and epidote group minerals are also present in the cataclasite, suggesting movement at different times. Along DZ4 in KFM07A, the brittle deformation occurs both along (see picture to right below) and discordant to the intense ductile fabric. The former observation provides evidence for reactivation of ductile structures. Abundant fault-slip data documented along DZ4 in KFM07A.

No fault core identified along DZ1 in KFM09A but there is an elevated fracture frequency with sealed fracture networks at two intervals and fixed point place at the lower interval (30 m). Cohesive breccia, cataclasite and proto-cataclasite close to lower occurrence. Crush zones at two intervals, both above and beneath the elevated sealed fracture intervals. Fault core with elevated fracture frequency in sealed fracture network and crush zone at 20 m along DZ1 in KFM09B. Elevated fracture frequency in sealed networks and cohesive breccia are also present both above and beneath the fault core. Fixed point placed at the lower sealed fracture network (28 m).

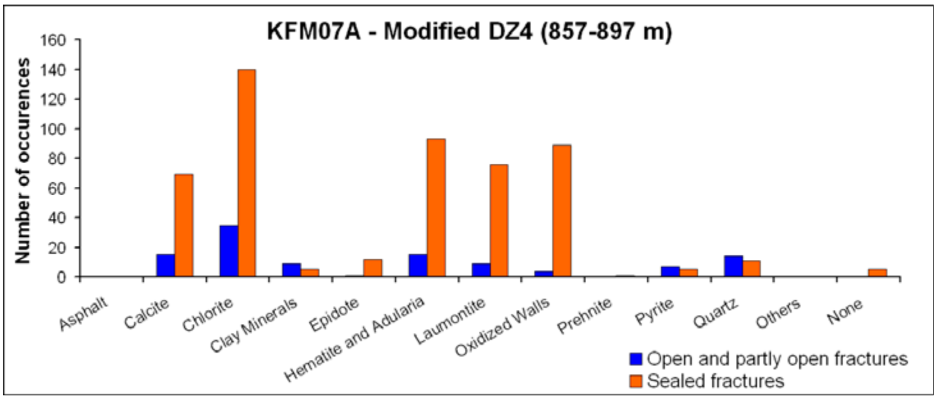


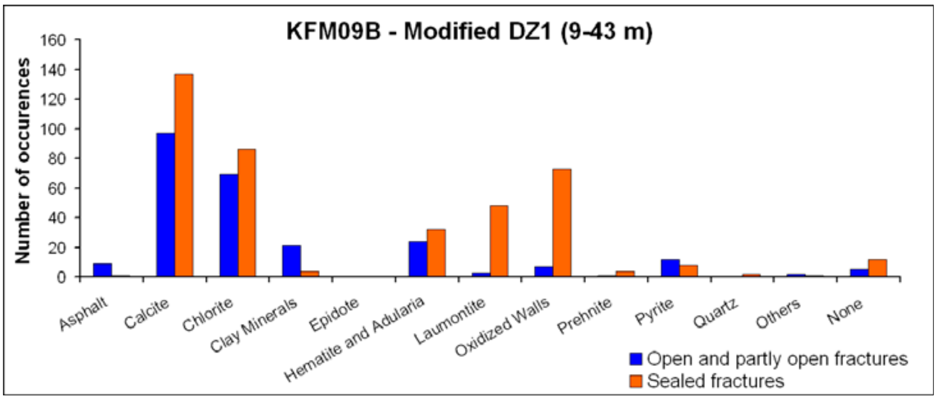
Fault breccia at 874-876 m along DZ4 in KFM07A, with rock fragments embedded in a cataclasite to ultracataclasite that is in part laumontite-rich (after P-06-212)

Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike ZFMENE1208A (borehole interval 857-897 m along part of DZ4 in KFM07A, DZ1 in KFM09A, borehole interval 9-43 m along part of DZ1 in KFM09B, DZ1 in HFM23 and DZ1 in HFM28)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
After P-06-212					 Laumontite-sealed fractures sub-parallel to the intense ductile fabric (after P-06-212)
Position		**KFM07A** dx (m) / dy (m) / dz (m) 4 / 5 / 3 **KFM09A** 0 / 0 / 0 **KFM09B** 1 / 1 / 0 **HFM23** 0 / 0 / 0 **HFM28** 1 / 1 / 0	High	Intersections along KFM07A (part of DZ4), KFM09A (DZ1), KFM09B (part of DZ1), HFM23 (DZ1) and HFM28 (DZ1)	Span estimate refers to the uncertainty in the position of the central part of the zone
Orientation (strike/dip, right-hand-rule method)	238/81	± 5/± 10	Medium	Assumed parallel to ZFMENE0159A with intersections along KFM07A (part of DZ4), KFM09A (DZ1), KFM09B (part of DZ1), HFM23 (DZ1) and HFM28 (DZ1)	
Thickness	10 m	3-50 m	Medium	Intersection along KFM09A (DZ1). Zone less well constrained in the other two boreholes (thickness of 16m in KFM07A (part of DZ4) and 24 m in KFM09B (part of DZ1)). Span estimated on the basis of the range in thickness of steeply dipping zones between 1000 and 3000 m in length	Thickness refers to total zone thickness (damage zone and core)
Length	1083 m		Low	Intersections along KFM07A (part of DZ4), KFM09A (DZ1), KFM09B (part of DZ1), HFM23 (DZ1) and HFM28 (DZ1), and inferred termination against ZFMNW0003 and blind, so as to avoid intersection along HFM20	Total trace length at ground surface

Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike **ZFMENE1208A (borehole interval 857-897 m along part of DZ4 in KFM07A, DZ1 in KFM09A, borehole interval 9-43 m along part of DZ1 in KFM09B, DZ1 in HFM23 and DZ1 in HFM28)**					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Ductile deformation			High	Intersections along KFM07A (part of DZ4), KFM09A (DZ1) and KFM09B (part of DZ1)	Not present
Brittle deformation			High	Intersections along KFM07A (part of DZ4), KFM09A (DZ1) and KFM09B (part of DZ1)	Increased frequency of fractures. Fault core with elevated fracture frequency in sealed fracture network, cohesive breccia and cataclasite in KFM07A. No fault core identified in KFM09A. Fault core with crush zones present in KFM09B
Alteration			High	Intersections along KFM07A (part of DZ4), KFM09A (DZ1) and KFM09B (part of DZ1)	Red-stained bedrock with fine-grained hematite dissemination
Fracture orientation (strike/dip, right-hand-rule method)	Mean orientation of SW set = 234/87 Mean orientation of gentle set = 076/9 Mean orientation of SSE set = 233/86	Fisher κ value of SW set = 11 Fisher κ value of gentle set = 26 Fisher κ value of SSE set = 45	Medium	Intersections along KFM07A (part of DZ4), KFM09A (DZ1) and KFM09B (part of DZ1), N = 730	Steeply dipping fractures that strike WSW, SSW and SSE, and gently dipping fractures, especially in KFM09A (DZ1) and KFM09B (part of DZ1), dominate
					
Fracture frequency	Mean 21 m^{-1}	Span 0-82 m^{-1}	Medium	Intersections along KFM07A (part of DZ4), KFM09A (DZ1) and KFM09B (part of DZ1)	Sealed and open fractures, with a dominance of open fractures in the gently dipping set. Quantitative estimate and span include sealed fracture networks and crush zones
Fracture filling			Medium	Intersections along KFM07A (part of DZ4), KFM09A (DZ1) and KFM09B (part of DZ1)	Calcite, chlorite, hematite/adularia, laumontite, quartz, clay minerals. Epidote also present in KFM07A (part of DZ4)

<table>
<tr><th colspan="6">Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike

ZFMENE1208A (borehole interval 857-897 m along part of DZ4 in KFM07A, DZ1 in KFM09A, borehole interval 9-43 m along part of DZ1 in KFM09B, DZ1 in HFM23 and DZ1 in HFM28)</th></tr>
<tr><th>Property</th><th>Quantitative estimate</th><th>Span</th><th>Confidence level</th><th>Basis for interpretation</th><th>Comments</th></tr>
<tr><td></td><td colspan="5">




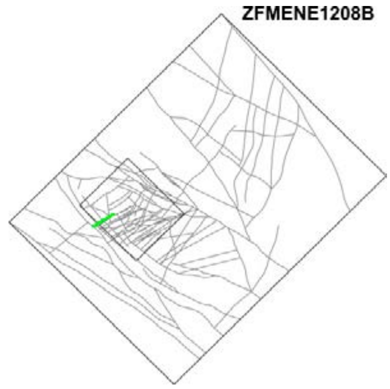
</td></tr>
<tr><td>Sense of displacement</td><td></td><td></td><td>Medium</td><td>Minor faults along part of DZ4 in KFM07A, DZ1 in KFM09A and DZ1 in KFM09B. Shear striae along chlorite, calcite, hematite and, less, commonly, adularia, laumontite and clay minerals</td><td>Steeply dipping faults with NNW-SSE strike show evidence for strike-slip displacement. Both sinistral strike-slip and dextral strike-slip, i.e. more than one phase of reactivation under different stress regimes after ductile deformation in the area. One steeply dipping fault with ENE strike also shows a strike-slip displacement.</td></tr>
</table>

Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike

ZFMENE1208B (borehole interval 803-840 m along part of DZ4 in KFM07A, DZ2 in KFM09A, borehole interval 59-78 m along part of DZ1 in KFM09B and HFM28)

Property	Quantitative estimate	Span	Confidence level	Basis for interpretation	Comments

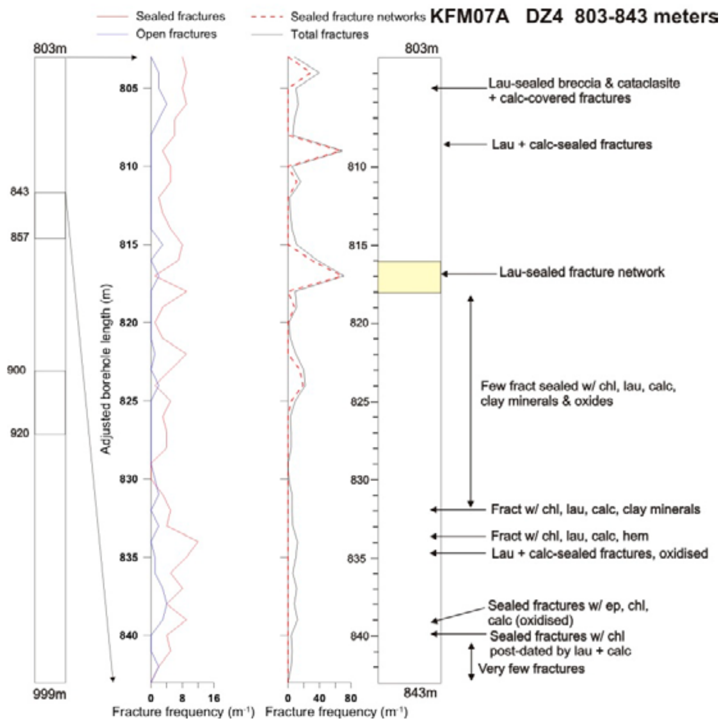
Modelling procedure: Magnetic data are absent or of poor quality close to the residence area and magnetic lineaments are not present. Zone modelled by connecting borehole intervals 803-840 m in KFM07A (part of DZ4), 86-116 m in KFM09A (DZ2) and 59-78 m in KFM09B (part of DZ1) and, with the assistance of fracture orientation data, assuming an orientation parallel to zone ZFMENE0159A. Deformation zone plane placed at fixed points 817 m in KFM07A, 94 m in KFM09A and 66 m in KFM09B. Decreased radar penetration also along the borehole interval 92-106 m in KFM09A. Zone also intersects borehole HFM28. Inferred termination against ZFMNW0003 and blind, so as to avoid intersection along HFM20. Included only in local model.



Confidence of existence: High

Single hole interpretation: For identification and short description of deformation zones in boreholes, see SKB P-05-157, SKB P-06-134 and SKB P-06-135. For character and kinematics of part of DZ4 (803-843 m) in KFM07A, see SKB P-06-212. For character and kinematics of part of DZ2 in KFM09A and DZ1 in KFM09B, see SKB P-07-101.

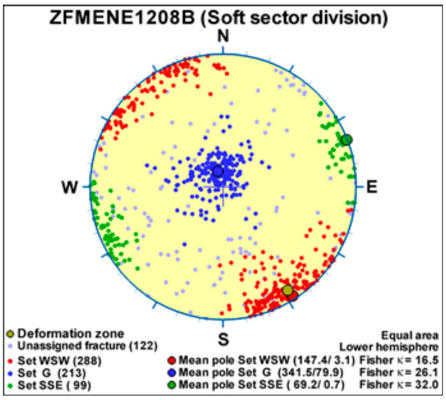
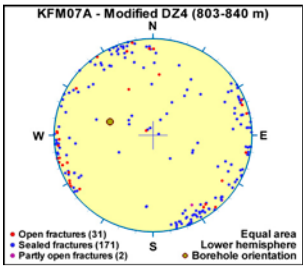
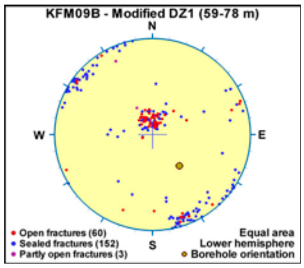
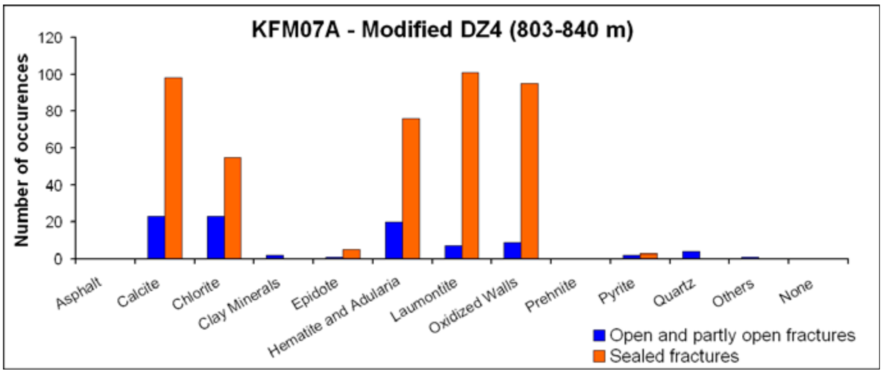
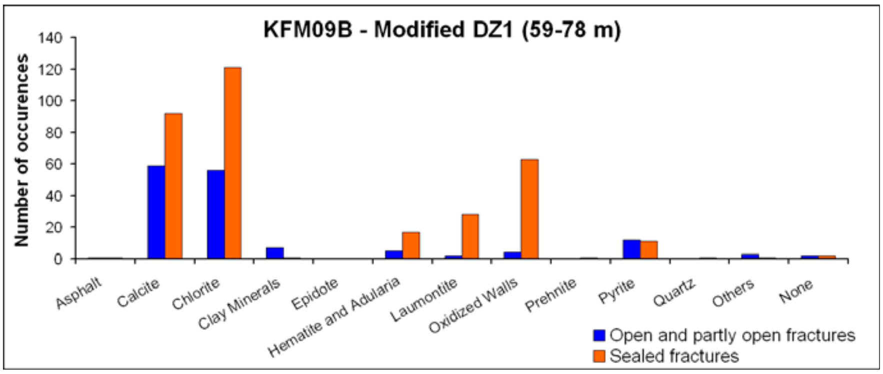
Zone is predominantly "damage zone" in character. Short intervals of higher fracture frequency, for example at 816-818 m along DZ4 in KFM07A, represent core parts. Along DZ4 in KFM07A, the brittle deformation occurs both along and discordant to the intense ductile fabric. The former observation provides evidence for reactivation of ductile structures. Fault-slip data documented along DZ4 in KFM07A. No fault cores identified in KFM09A and KFM09B. However, there is an elevated frequency of sealed fractures, mainly as sealed fracture networks, at two intervals along DZ2 in KFM09A. Cohesive breccia present in the upper interval



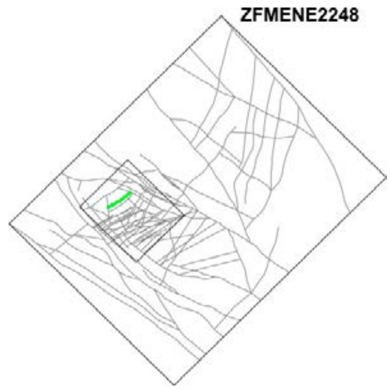
After P-06-212

Property	Quantitative estimate	Span	Confidence level	Basis for interpretation	Comments
Position		**KFM07A** 4 5 3 **KFM09A** 2 1 1 **KFM09B** 1 1 1	High	Intersections along KFM07A (part of DZ4), KFM09A (DZ2) and KFM09B (part of DZ1)	Span estimate refers to the uncertainty in the position of the central part of the zone

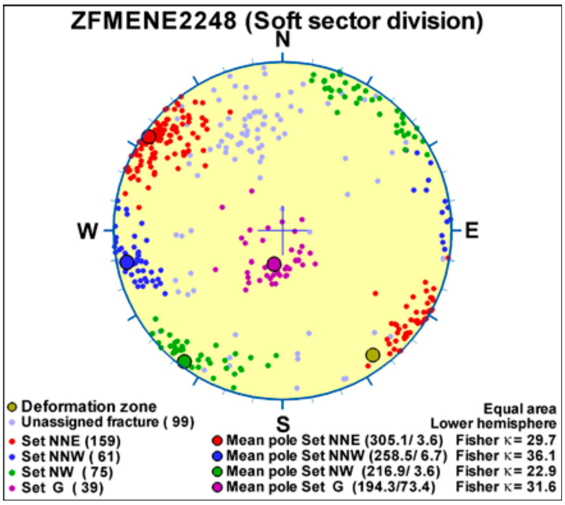
Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike ZFMENE1208B (borehole interval 803-840 m along part of DZ4 in KFM07A, DZ2 in KFM09A, borehole interval 59-78 m along part of DZ1 in KFM09B and HFM28)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Orientation (strike/dip, right-hand-rule method)	238/81	± 5/± 10	Medium	Assumed parallel to ZFMENE0159A with intersections along KFM07A (part of DZ4), KFM09A (DZ2) and KFM09B (part of DZ1)	
Thickness	13 m	3-50 m	Medium	Intersection along KFM09A (DZ2). Zone less well constrained in the other two boreholes (thickness of 13m in KFM07A (part of DZ4) and 14 m in KFM09B (part of DZ1)). Span estimated on the basis of the range in thickness of steeply dipping zones between 1000 and 3000 m in length	Thickness refers to total zone thickness (damage zone and core)
Length	1112 m		Low	Intersections along KFM07A (part of DZ4), KFM09A (DZ2) and KFM09B (part of DZ1), and inferred truncation against ZFMNW0003 and blind, so as to avoid intersection along HFM20	Total trace length at ground surface
Ductile deformation			High	Intersections along KFM07A (part of DZ4), KFM09A (DZ2) and KFM09B (part of DZ1)	Not present
Brittle deformation			High	Intersections along KFM07A (part of DZ4), KFM09A (DZ2) and KFM09B (part of DZ1)	Increased frequency of fractures. Fault core with elevated fracture frequency in sealed fracture network and marked grain-size reduction along KFM07A. Cohesive breccia and cataclasite also observed along the zone in this borehole. No fault cores identified along KFM09A and KFM09B
Alteration			High	Intersections along KFM07A (part of DZ4), KFM09A (DZ2) and KFM09B (part of DZ1)	Red-stained bedrock with fine-grained hematite dissemination
Fracture orientation (strike/dip, right-hand-rule method)	Mean orientation of WSW set = 237/87 Mean orientation of gentle set = 072/10 Mean orientation of NNW set = 159/89	Fisher κ value of WSW set = 17 Fisher κ value of gentle set = 26 Fisher κ value of NNW set = 32	Medium	Intersections along KFM07A (part of DZ4), KFM09A (DZ2) and KFM09B (part of DZ1), N = 722	Steeply dipping fractures that strike WSW, NE and NNW, and gently dipping fractures, especially in KFM09A (DZ2) and KFM09B (part of DZ1), dominate

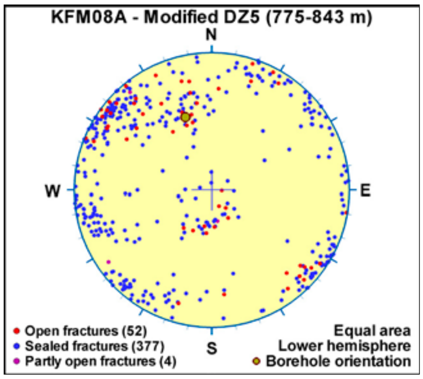
Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike ZFMENE1208B (borehole interval 803-840 m along part of DZ4 in KFM07A, DZ2 in KFM09A, borehole interval 59-78 m along part of DZ1 in KFM09B and HFM28)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
					
Fracture frequency	Mean 17 m^{-1}	Span 0-93 m^{-1}	Medium	Intersections along KFM07A (part of DZ4), KFM09A (DZ2) and KFM09B (part of DZ1)	Sealed and open fractures, with a dominance of open fractures in the gently dipping set. Quantitative estimate and span include sealed fracture networks and crush zones
Fracture filling			Medium	Intersections along KFM07A (part of DZ4), KFM09A (DZ2) and KFM09B (part of DZ1)	Calcite, chlorite, laumontite, hematite/adularia, quartz, clay minerals. Epidote also present in KFM07A (part of DZ4)
	 				

Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike ZFMENE1208B (borehole interval 803-840 m along part of DZ4 in KFM07A, DZ2 in KFM09A, borehole interval 59-78 m along part of DZ1 in KFM09B and HFM28)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Sense of displacement			Medium	Minor faults along part of DZ4 in KFM07A, DZ2 in KFM09A and DZ1 in KFM09B. Shear striae along chlorite, calcite, hematite and, less, commonly, adularia, laumontite and clay minerals. Calcite steps	Steeply dipping faults with NNW SSE strike, sub-parallel to the tectonic foliation, show strike-slip displacement. Both sinistral and dextral displacement observed. One steeply dipping fault with W strike along DZ2 in KFM09A shows dextral strike-slip displacement, possibly conjugate to the sinistral displacement along the NNW-SSE faults

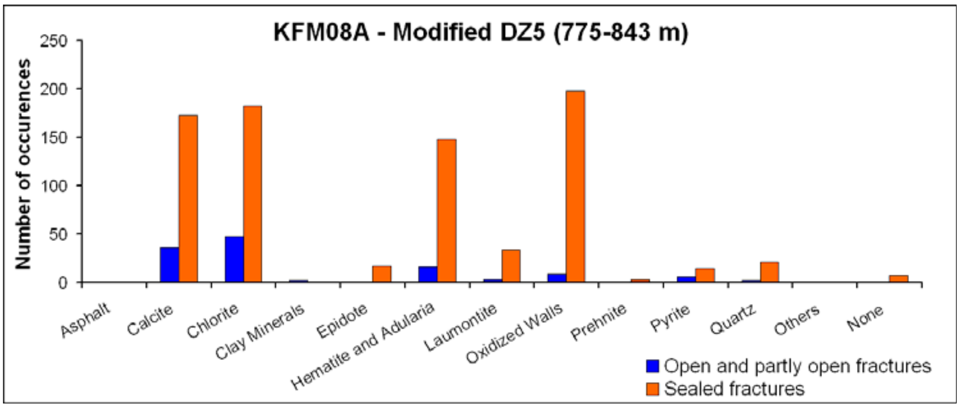
<table>
<tr><th colspan="6">Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike
ZFMENE2248 (DZ5 and extension along borehole interval 840-843 m in KFM08A)</th></tr>
<tr><th>Property</th><th>Quantitative estimate</th><th>Span</th><th>Confidence level</th><th>Basis for interpretation</th><th>Comments</th></tr>
<tr><td colspan="4">Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM2248G and its inferred continuation to the south-west. Modelled down to 1300 m depth, using the dip estimated by connecting lineament MFM2248G with the borehole intersection 775-843 m in KFM08A (DZ5 and extension along borehole interval 840-843 m). Deformation zone plane placed at fixed point 789 m in KFM08A. Included only in local model.</td><td colspan="2">
</td></tr>
<tr><td colspan="6">Confidence of existence: High</td></tr>
<tr><td colspan="6">Single hole interpretation: For identification and short description of DZ5 in KFM08A, see SKB P-05-262.</td></tr>
<tr><td colspan="6">KFM08A (DZ5)
</td></tr>
<tr><td>Position</td><td></td><td>± 10 m (surface)
KFM08A
11 | 8 | 8</td><td>High</td><td>Intersection along KFM08A (DZ5 and extension), low magnetic lineament MFM2248G and its inferred continuation to the south-west</td><td>Span estimate refers to the uncertainty in the position of the central part of the zone</td></tr>
<tr><td>Orientation (strike/dip, right-hand-rule method)</td><td>234/80</td><td>± 5/± 10</td><td>High</td><td>Strike based on trend of lineament MFM2248G and its inferred continuation to the south-west. Dip based on linking this lineament at the surface with DZ5 and extension in KFM08A</td><td></td></tr>
<tr><td>Thickness</td><td>37 m</td><td>3-50 m</td><td>Medium</td><td>Intersection along KFM08A (DZ5 and extension). Span estimated on the basis of the range in thickness of steeply dipping zones between 1000 and 3000 m in length</td><td>Thickness refers to total zone thickness (damage zone and core)</td></tr>
</table>

Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike ZFMENE2248 (DZ5 and extension along borehole interval 840-843 m in KFM08A)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Length	1298 m		Medium	Low magnetic lineament MFM2248G and its inferred continuation to the south-west. Terminated against ZFMNNW0100 and ZFMWNW0809A	Total trace length at ground surface
Ductile deformation			High	Intersection along KFM08A (DZ5 and extension)	Not present
Brittle deformation			High	Intersection along KFM08A (DZ5 and extension)	Increased frequency of fractures. No complementary data
Alteration			High	Intersection along KFM08A (DZ5 and extension), character of lineament MFM2248G	Red-stained bedrock with fine-grained hematite dissemination
Fracture orientation (strike/dip, right-hand-rule method)	Mean orientation of NE fracture set = 035/86 Mean orientation of NNW fracture set = 349/83 Mean orientation of NW fracture set = 307/86 Mean orientation of gentle fracture set = 284/17	Fisher κ value of NE fracture set = 30 Fisher κ value of NNW fracture set = 36 Fisher κ value of NE fracture set = 23 Fisher κ value of NE fracture set = 32	Medium	Intersection along KFM08A (DZ5 and extension), N = 433	Three sets of steeply dipping fractures as well as gently dipping fractures are present. Steeply dipping fractures strike NE, NNW and NW





Fracture frequency	Mean 11 m^{-1}	Span 2-42 m^{-1}	Medium	Intersection along KFM08A (DZ5 and extension)	Sealed fractures dominate. Quantitative estimate and span include sealed fracture networks

Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike ZFMENE2248 (DZ5 and extension along borehole interval 840-843 m in KFM08A)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Fracture filling			Medium	Intersection along KFM08A (DZ5 and extension)	Chlorite, calcite, hematite/adularia, laumontite, quartz. Epidote along fractures with gentle to moderate dips to the SE and steep dips with NW strike
	 				
Sense of displacement				Intersection along KFM08A (DZ5 and extension)	No complementary data

Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike

ZFMENE2254 (DZ3 in KFM01A)

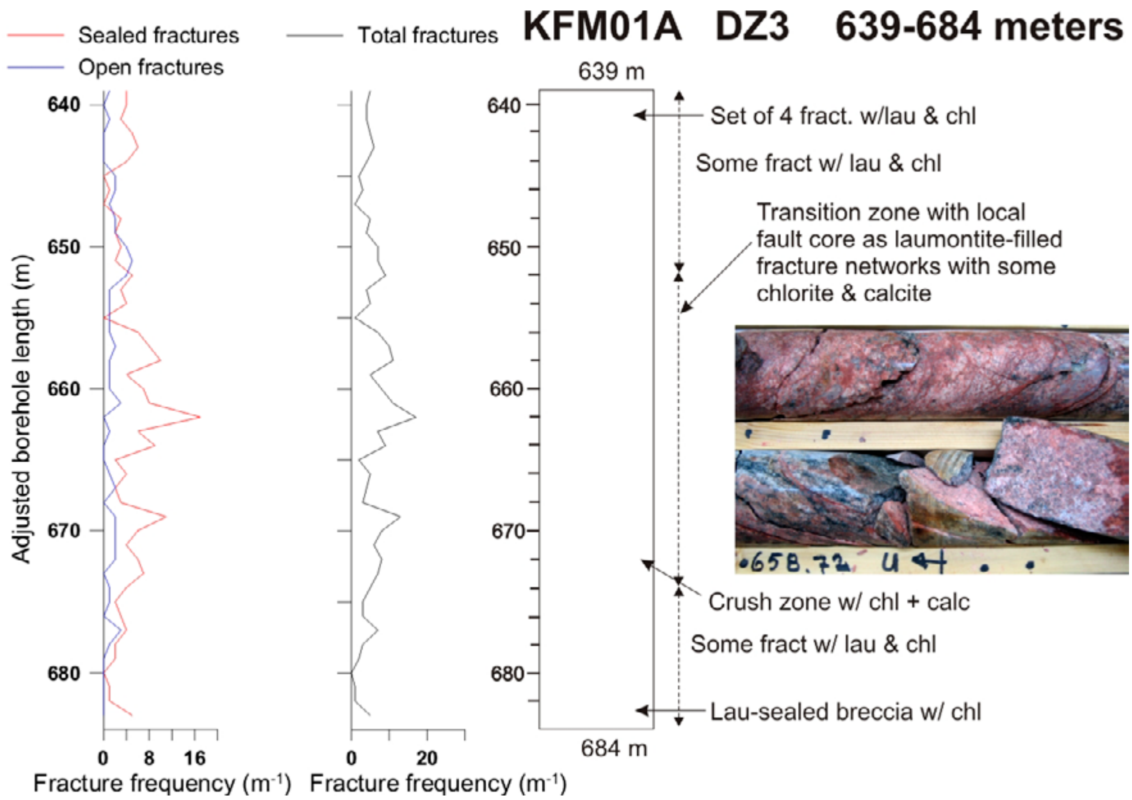
Property	Quantitative estimate	Span	Confidence level	Basis for interpretation	Comments

Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM2254G. Modelled down to 1000 m depth, using the dip estimated by connecting lineament MFM2254G with the borehole intersection 639-684 m in KFM01A (DZ3). Deformation zone plane placed at fixed point 662 m in KFM01A. Included only in local model.

Confidence of existence: High

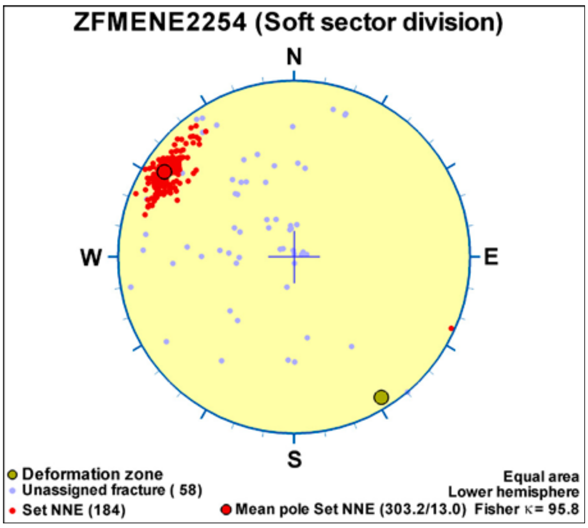
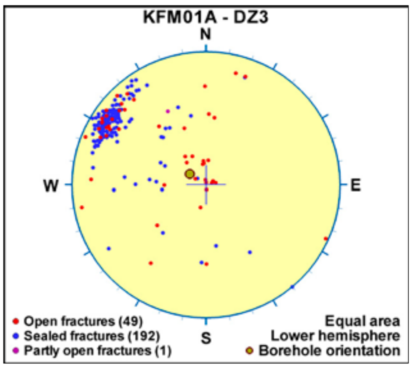
Single hole interpretation: For identification and short description of DZ3 in KFM01A, see SKB P-04-116. For character and kinematics of DZ3 in KFM01A, see SKB P-06-212.

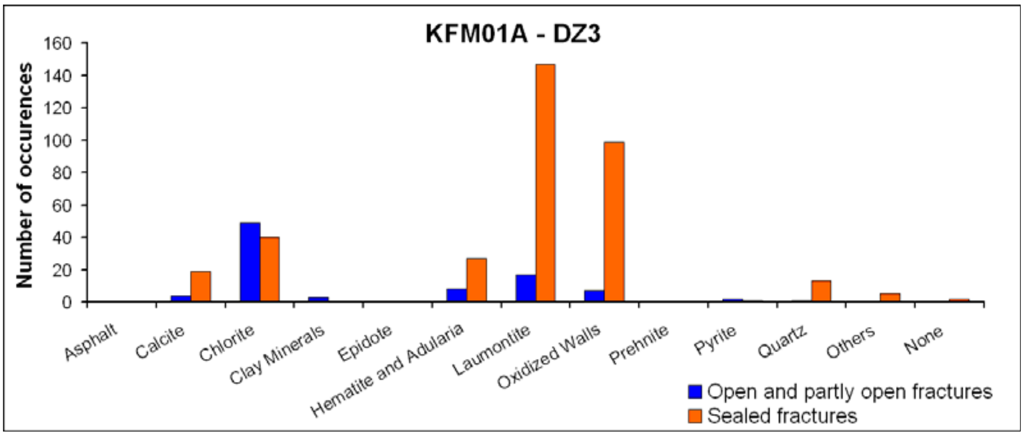
Zone is predominantly “damage zone” in character. Possible core part, indicated by higher fracture frequency in combination with alteration (red-stained bedrock with fine-grained hematite dissemination), in the central part of the zone between c. 655 and 665 m. Fault-slip data along two minor faults in the central part of the zone.

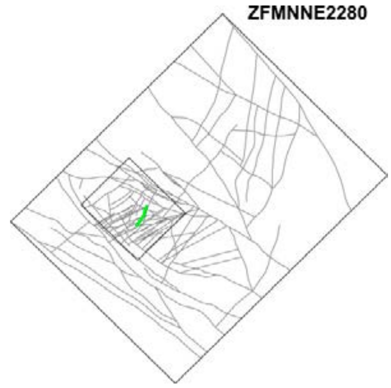


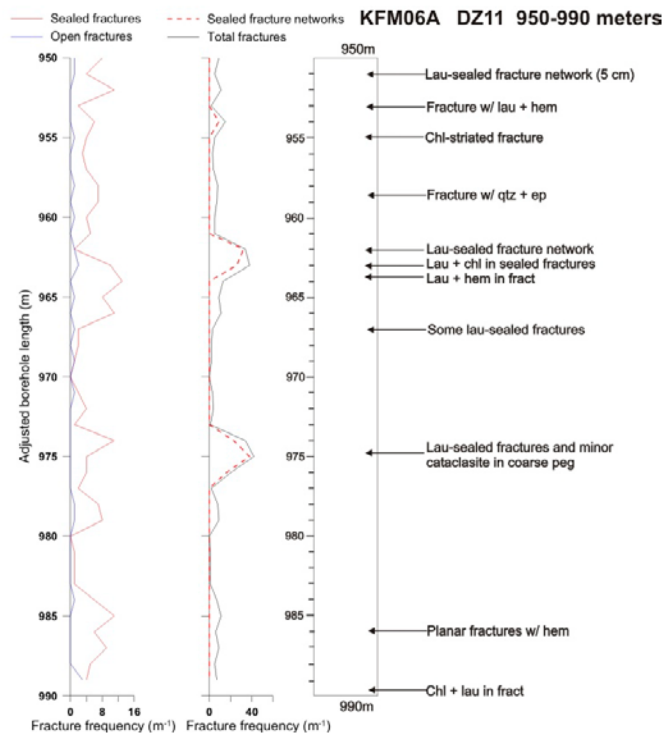
After P-06-212

Property	Quantitative estimate	Span	Confidence level	Basis for interpretation	Comments
Position		± 10 m (surface) **KFM01A** 20 21 4	High	Intersection along KFM01A (DZ3), low magnetic lineament MFM2254G	Span estimate refers to the uncertainty in the position of the central part of the zone

Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike ZFMENE2254 (DZ3 in KFM01A)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Orientation (strike/dip, right-hand-rule method)	238/83	± 5/± 10	High	Strike based on trend of lineament MFM2254G. Dip based on linking MFM2254G at the surface with DZ3 in KFM01A	
Thickness	3 m	3-50 m	Medium	Intersection along KFM01A (DZ3). Span estimated on the basis of the range in thickness of steeply dipping zones between 1000 and 3000 m in length	Thickness refers to total zone thickness (damage zone and core)
Length	974 m		High	Low magnetic lineament MFM2254G. Terminated against ZFMENE0061 and ZFMNNW0404	Total trace length at ground surface
Ductile deformation			High	Intersection along KFM01A (DZ3)	Not present
Brittle deformation			High	Intersection along KFM01A (DZ3)	Increased frequency of fractures. Fault core intervals with elevated fracture frequency, including local sealed fracture networks
Alteration			High	Intersection along KFM01A (DZ3), character of lineament MFM2254G	Red-stained bedrock with fine-grained hematite dissemination
Fracture orientation (strike/dip, right-hand-rule method)	Mean orientation of NNE fracture set = 033/77	Fisher κ value of NNE fracture set = 96	Medium	Intersection along KFM01A (DZ3), N = 242	Fractures with steep dip to the ESE dominate
					
Fracture frequency	Mean 6 m^{-1}	Span 0-17 m^{-1}	Medium	Intersection along KFM01A (DZ3)	Sealed fractures dominate
Fracture filling			Medium	Intersection along KFM01A (DZ3)	Laumontite, chlorite, hematite/adularia, calcite

Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike ZFMENE2254 (DZ3 in KFM01A)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
	 				
Sense of displacement			Low	Two minor faults along DZ3 in KFM01A. Shear striae on laumontite and chlorite	Steeply dipping faults with NE strike show oblique-slip displacement. One fault shows both normal and dextral strike-slip components of movement

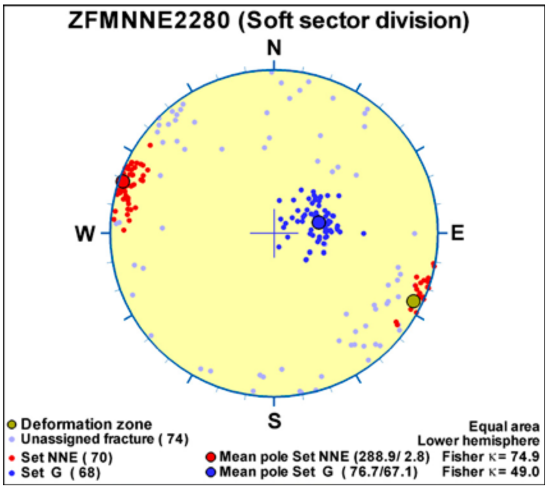
<table>
<tr><th colspan="6">Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike
ZFMNNE2280 (DZ11 in KFM06A)</th></tr>
<tr><th>Property</th><th>Quantitative estimate</th><th>Span</th><th>Confidence level</th><th>Basis for interpretation</th><th>Comments</th></tr>
<tr><td colspan="4">Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM2280G. Modelled down to 1050 m depth, using the dip estimated by connecting lineament MFM2280G with the borehole intersection 950-990 m in KFM06A (DZ11). Deformation zone plane placed at fixed point 976 m in KFM06A. Included only in local model.</td><td colspan="2">
</td></tr>
<tr><td colspan="6">Confidence of existence: High</td></tr>
<tr><td colspan="6">Single hole interpretation: For identification and short description of DZ11 in KFM06A, see SKB P-05-132. For character and kinematics of DZ11 in KFM06A, see SKB P-06-212.

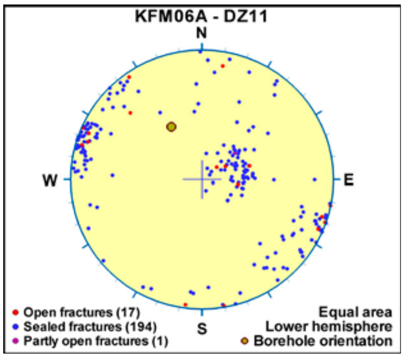
Zone is predominantly “damage zone” in character. Short intervals of distinctly higher fracture frequency with sealed fracture networks and minor cataclasite occur in the upper and lower parts. Represent core segments. Fault-slip data documented five minor faults.


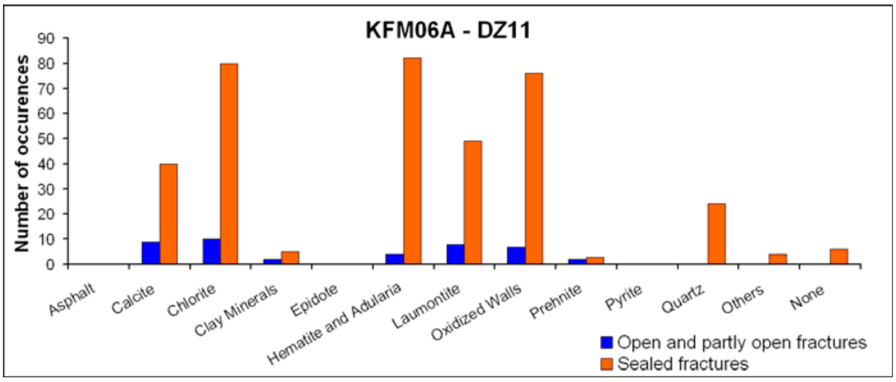
After SKB P-06-212</td></tr>
<tr><td>Position</td><td></td><td>± 10 m (surface)

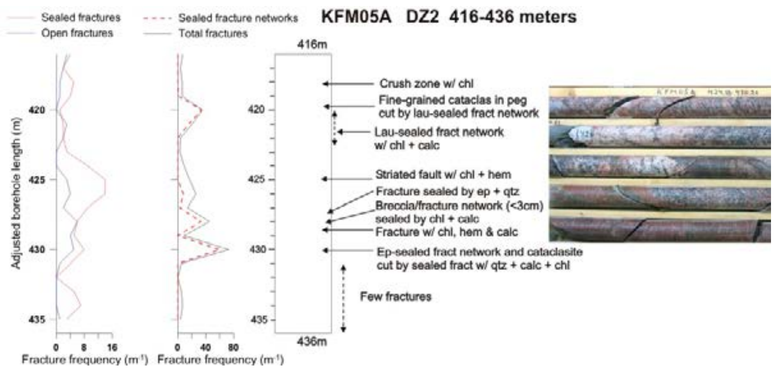
KFM06A
dx (m) | dy (m) | dz (m)
10 | 8 | 6</td><td>High</td><td>Intersection along KFM06A (DZ11), low magnetic lineament MFM2280G</td><td>Span estimate refers to the uncertainty in the position of the central part of the zone</td></tr>
</table>

Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike ZFMNNE2280 (DZ11 in KFM06A)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Orientation (strike/dip, right-hand-rule method)	206/84	± 5/± 10	High	Strike based on trend of lineament MFM2280G. Dip based on linking MFM2280G at the surface with DZ11 in KFM06A	
Thickness	17 m	3-50 m	Medium	Intersection along KFM06A (DZ11). Span estimated on the basis of the range in thickness of steeply dipping zones between 1000 and 3000 m in length	Thickness refers to total zone thickness (damage zone and core)
Length	1035 m		High	Low magnetic lineament MFM2280G	Total trace length at ground surface
Ductile deformation			High	Intersection along KFM06A (DZ11)	Not present
Brittle deformation			High	Intersection along KFM06A (DZ11)	Increased frequency of fractures. Fault core intervals with elevated fracture frequency, including sealed fracture networks, and cataclasite
Alteration			High	Intersection along KFM06A (DZ11), character of lineament MFM2280G	Red-stained bedrock with fine-grained hematite dissemination
Fracture orientation (strike/dip, right-hand-rule method)	Mean orientation of NNE fracture set = 019/87 Mean orientation of gentle fracture set = 167/23	Fisher κ value of NNE fracture set = 75 Fisher κ value of gentle fracture set = 49	Medium	Intersection along KFM06A (DZ11), N = 212	Steeply dipping fractures with NNE strike and gently dipping fractures dominate



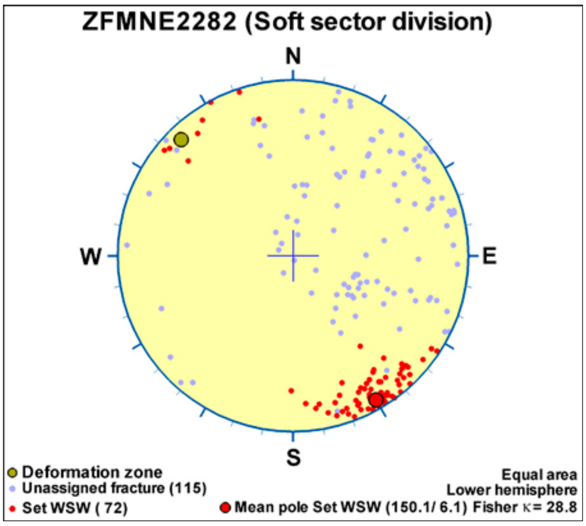
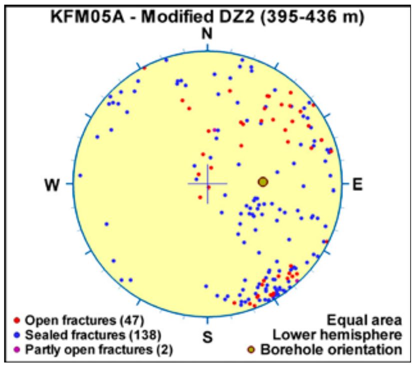


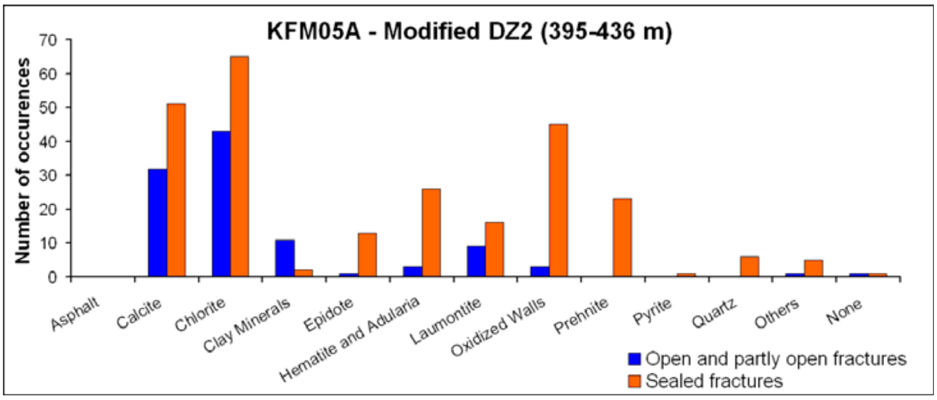
Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike ZFMNNE2280 (DZ11 in KFM06A)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Fracture frequency	Mean 9 m^{-1}	Span 0-42 m^{-1}	Medium	Intersection along KFM06A (DZ11)	Sealed fractures dominate. Quantitative estimate and span include sealed fracture networks
Fracture filling			Medium	Intersection along KFM06A (DZ11)	Chlorite, calcite, hematite/adularia, laumontite, quartz
					
Sense of displacement			Low	Minor faults along DZ11 in KFM06A. Shear striae on chlorite, laumontite and hematite,	Steeply dipping fault with NNE strike shows dominant strike-slip movement. Steeply dipping fault with SW strike shows normal dip-slip movement. Gently dipping faults with variables dips to the west and south show oblique movement with dominant dextral strike-slip and subordinate normal dip-slip components

Vertical and steeply-dipping brittle deformation zones with ENE, NNE (and NE) strike ZFMNE2282 (DZ2 and its extension along borehole interval 395-416 m in KFM05A)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM2282G. Modelled down to 850 m depth, using the dip estimated by connecting lineament MFM2282G with the borehole intersection 395-436 m in KFM05A (DZ2 and its extension along borehole interval 395-416 m). Deformation zone plane placed at fixed point 430 m in KFM05A. Decreased radar penetration also along the borehole interval 426-433 m. Included in the local model.			 		
Confidence of existence: High					
Single hole interpretation: For identification and short description of DZ2 in KFM05A, see SKB P-04-296. For character and kinematics of DZ2 in KFM05A, see SKB P-06-212. Zone with predominantly "damage zone" characteristics zone with increased frequency of sealed fractures, including sealed fracture networks, at several intervals between c. 420 and 430 m. Thin occurrences of breccia and cataclasite also present along this interval represents the core of the zone. Epidote-sealed network and cataclasite post-dated by laumontite (adularia?) and quartz-sealed fractures. Fault-slip data documented along two fractures.					
 Photograph shows interval c. 425 to 430 m. After SKB P-06-212				 DZ2 at 419.8 m (after SKB P-06-212). Cataclasite with fragments of the host granitic rock, transected in its lower part by a fracture filled with hematite-stained laumontite (or adularia?)	
Position		± 10 m (surface) **KFM05A** dx (m): 5 dy (m): 6 dz (m): 4	High	Intersection along KFM05A (DZ2 and its extension), low magnetic lineament MFM2282G	Span estimate refers to the uncertainty in the position of the central part of the zone
Orientation (strike/dip, right-hand-rule method)	046/81	± 5/± 10	High	Strike based on trend of lineament MFM2282G. Dip based on linking MFM2282G at the surface with DZ2 and its extension in KFM05A	
Thickness	10 m	3-50 m	Medium	Intersection along KFM05A (DZ2 and its extension). Span estimated on the basis of the range in thickness of steeply dipping zones between 1000 and 3000 m in length	Thickness refers to total zone thickness (damage zone and core)

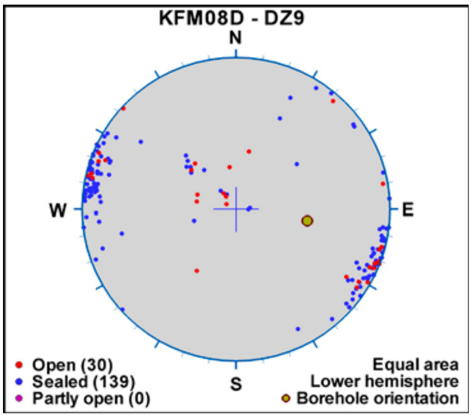
Vertical and steeply-dipping brittle deformation zones with ENE, NNE (and NE) strike

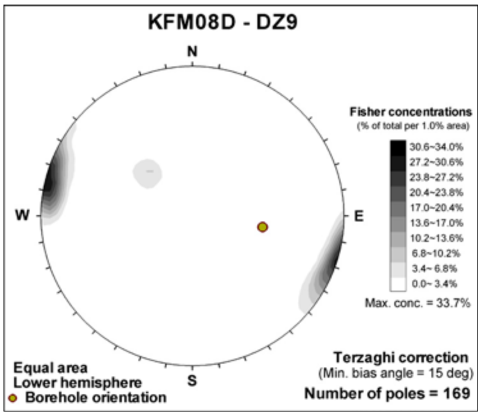
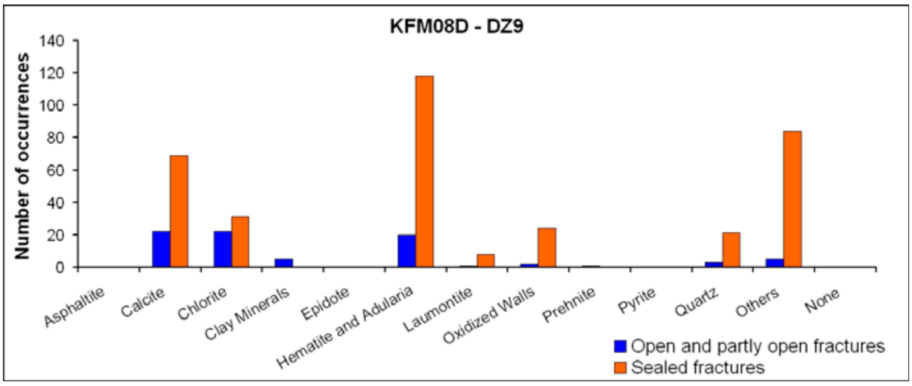
ZFMNE2282 (DZ2 and its extension along borehole interval 395-416 m in KFM05A)

Property	Quantitative estimate	Span	Confidence level	Basis for interpretation	Comments
Length	917 m		High	Low magnetic lineament MFM2282G. Terminated against ZFMENE0060A, ZFMWNW0123 and ZFMENE0401A	Total trace length at ground surface
Ductile deformation			High	Intersection along KFM05A (DZ2 and its extension)	Not present
Brittle deformation			High	Intersection along KFM05A (DZ2 and its extension)	Increased frequency of fractures. Fault core intervals with sealed fracture networks, cohesive breccia and cataclasite occur at a few places along the zone
Alteration			High	Intersection along KFM05A (DZ2 and its extension), character of lineament MFM2282G	Red-stained bedrock with fine-grained hematite dissemination
Fracture orientation (strike/dip, right-hand-rule method)	Mean orientation of WSW fracture set = 240/84	Fisher κ value of WSW fracture set = 29	Medium	Intersection along KFM05A (DZ2 and its extension), N = 187	Fracture set with WSW strike and steep dip is prominent. Fractures with other orientations, including gently dipping fractures, are also present
					
Fracture frequency	Mean 12 m^{-1}	Span 0-73 m^{-1}	Medium	Intersection along KFM05A (DZ2 and its extension)	Sealed fractures dominate. Quantitative estimate and span include sealed fracture networks
Fracture filling			Medium	Intersection along KFM05A (DZ2 and its extension)	Chlorite, calcite, hematite/adularia, laumontite, prehnite, clay minerals, epidote

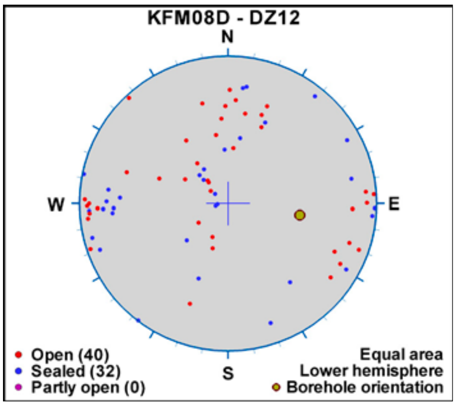
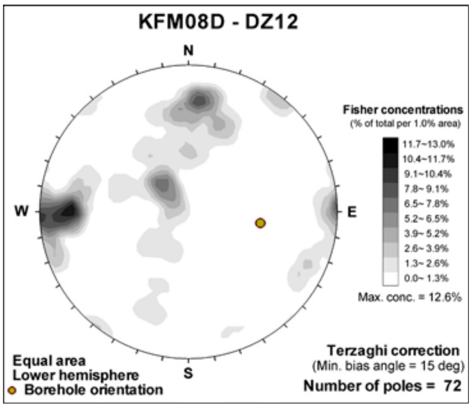
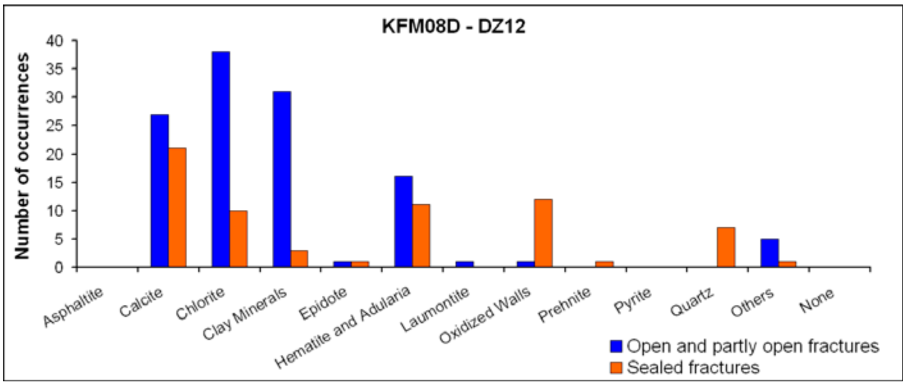
Vertical and steeply-dipping brittle deformation zones with ENE, NNE (and NE) strike ZFMNE2282 (DZ2 and its extension along borehole interval 395-416 m in KFM05A)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
					
Sense of displacement			Low	Two minor faults along DZ2 in KFM05A. Fault striae along chlorite, hematite and some calcite	Steeply dipping fault with SW strike shows strike-slip displacement. Steeply dipping fault that strikes SE shows oblique-slip displacement

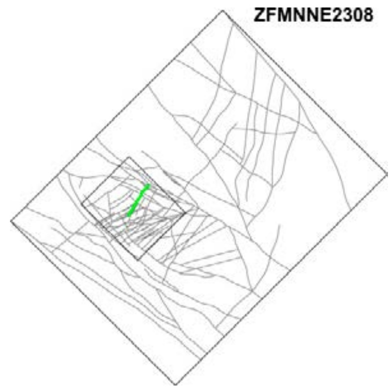
<table>
<tr><th colspan="6">Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike
ZFMNNE2293 (DZ9 in KFM08D)</th></tr>
<tr><th>Property</th><th>Quantitative estimate</th><th>Span</th><th>Confidence level</th><th>Basis for interpretation</th><th>Comments</th></tr>
<tr><td colspan="4">Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM2300G. Modelled to a depth of 1000 m using the dip estimated by connecting lineament MFM2293G with the borehole intersection 737-749 m in KFM08D (DZ9). Deformation zone plane placed at fixed point 746 m in KFM08D. Included only in local model.</td><td colspan="2">
</td></tr>
<tr><td colspan="6">Confidence of existence: High</td></tr>
<tr><td colspan="6">Single hole interpretation: For identification and short description of DZ9 in KFM08D, see SKB P-07-108. No more complementary data.</td></tr>
<tr><td>Position</td><td></td><td>± 10 m (surface)</td><td>High</td><td>Intersection along KFM08D (DZ9), low magnetic lineament MFM2293G</td><td>Span estimate refers to the uncertainty in the position of the central part of the zone</td></tr>
<tr><td>Orientation (strike/dip, right-hand-rule method)</td><td>208/80</td><td>± 5/± 10</td><td>High</td><td>Strike based on trend of lineament MFM2293G. Dip based on linking this lineament at the surface with DZ9 in KFM08D</td><td></td></tr>
<tr><td>Thickness</td><td>8 m</td><td>3-50 m</td><td>Medium</td><td>Intersection along KFM08D (DZ9). Span estimated on the basis of the range in thickness of steeply dipping zones between 1000 and 3000 m in length</td><td>Thickness refers to total zone thickness (damage zone and core)</td></tr>
<tr><td>Length</td><td>946 m</td><td></td><td>High</td><td>Low magnetic lineament MFM2293G. Terminated against ZFMWNW2225 and ZFMENE0061</td><td>Total trace length at ground surface</td></tr>
<tr><td>Ductile deformation</td><td></td><td></td><td>High</td><td>Intersection along KFM08D (DZ9)</td><td>Not present</td></tr>
<tr><td>Brittle deformation</td><td></td><td></td><td>High</td><td>Intersection along KFM08D (DZ9)</td><td>Increased frequency of predominantly sealed fractures. Some sealed fracture networks</td></tr>
<tr><td>Alteration</td><td></td><td></td><td>High</td><td>Intersection along KFM08D (DZ9), character of lineament MFM2293G</td><td>Red-stained bedrock with fine-grained hematite dissemination</td></tr>
<tr><td>Fracture orientation</td><td></td><td></td><td>Medium</td><td>Intersection along KFM08D (DZ9)</td><td>Steeply dipping fractures that strike NNE-SSW are prominent. Gently dipping fractures are also present</td></tr>
</table>

<table>
<tr><td></td><td colspan="5">

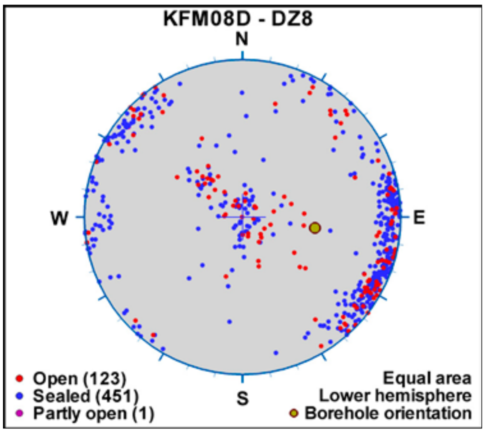

</td></tr>
<tr><td>Fracture frequency</td><td>Mean 18 m^{-1}</td><td>Span 9-29 m^{-1}</td><td>Medium</td><td>Intersection along KFM08D (DZ9)</td><td>Quantitative estimate and span include sealed fracture networks</td></tr>
<tr><td rowspan="2">Fracture filling</td><td></td><td></td><td>Medium</td><td>Intersection along KFM08D (DZ9)</td><td>Calcite, chlorite, hematite/adularia, quartz and other minerals</td></tr>
<tr><td colspan="5">
</td></tr>
<tr><td>Sense of displacement</td><td></td><td></td><td></td><td>Intersection along KFM08D (DZ9)</td><td>No complementary data</td></tr>
</table>

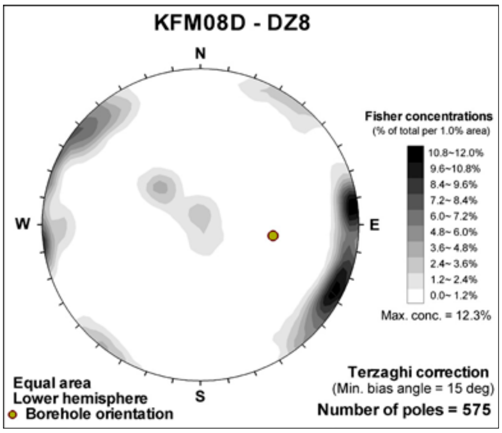
<table>
<tr><th colspan="6">Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike
ZFMNNE2300 (DZ12 in KFM08D; vuggy rock)</th></tr>
<tr><th>Property</th><th>Quantitative estimate</th><th>Span</th><th>Confidence level</th><th>Basis for interpretation</th><th>Comments</th></tr>
<tr><td colspan="4">Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM2300G. Modelled to a depth of 1000 m using the dip estimated by connecting lineament MFM2308G with the borehole intersection 903 m to base of borehole in KFM08D (DZ12). Deformation zone plane placed at fixed point 926 m in KFM08D. Borehole interval 924-929 m also corresponds to a prominent low amplitude section in the radar data. Included only in local model.</td><td colspan="2">
</td></tr>
<tr><td colspan="6">Confidence of existence: High</td></tr>
<tr><td colspan="6">Single hole interpretation: For identification and short description of DZ12 in KFM08D, see SKB P-07-108. For character and kinematics in KFM08D, see P-07-111.
Sealed fracture network and crush zone with clay mineral coating at c. 925-926 m inferred to be a fault core, close to contact between amphibolite and metagranite-granodiorite generally affected by earlier stage of more regional alteration (albitization). Sealed fracture network and possible crush zone also present at c. 906 m higher up in the zone.</td></tr>
<tr><td>Position</td><td></td><td>± 10 m (surface)</td><td>High</td><td>Intersection along KFM08D (DZ12), low magnetic lineament MFM2300G</td><td>Span estimate refers to the uncertainty in the position of the central part of the zone</td></tr>
<tr><td>Orientation (strike/dip, right-hand-rule method)</td><td>208/79</td><td>± 5/± 10</td><td>High</td><td>Strike based on trend of lineament MFM2300G. Dip based on linking this lineament at the surface with DZ12 in KFM08D</td><td></td></tr>
<tr><td>Thickness</td><td>28 m</td><td>3-50 m</td><td>Medium</td><td>Intersection along KFM08D (DZ12). Span estimated on the basis of the range in thickness of steeply dipping zones between 1000 and 3000 m in length</td><td>Thickness refers to total zone thickness (damage zone and core)</td></tr>
<tr><td>Length</td><td>942 m</td><td></td><td>High</td><td>Low magnetic lineament MFM2300G. Terminated against ZFMWNW0809A</td><td>Total trace length at ground surface</td></tr>
<tr><td>Ductile deformation</td><td></td><td></td><td>High</td><td>Intersection along KFM08D (DZ12)</td><td>Not present</td></tr>
<tr><td>Brittle deformation</td><td></td><td></td><td>High</td><td>Intersection along KFM08D (DZ12)</td><td>Increased frequency of fractures. Some sealed fracture networks and a crush zone</td></tr>
<tr><td>Alteration</td><td></td><td></td><td>High</td><td>Intersection along KFM08D (DZ12), character of lineament MFM2300G</td><td>Red-stained bedrock with fine-grained hematite dissemination. Quartz dissolution documented at around 933 m</td></tr>
</table>

Fracture orientation			Medium	Intersection along KFM08D (DZ12)	Steeply dipping fractures that strike NNE-SSW as well as fractures that dip gently to moderately southwards are present
	 				
Fracture frequency	Mean 20 m^{-1}	Span 0-73 m^{-1}	Medium	Intersection along KFM08D (DZ12)	Quantitative estimate and span include sealed fracture networks
Fracture filling			Medium	Intersection along KFM08D (DZ12)	Chlorite, calcite, clay minerals, hematite/adularia, quartz and other minerals
					
Sense of displacement			Low	Intersection along KFM08D (DZ12) Fault striae on chlorite and chlorite steps	Gently to moderately south-dipping faults (2) show reverse displacement. A steeply dipping fault with SSW strike (1) shows strike-slip displacement

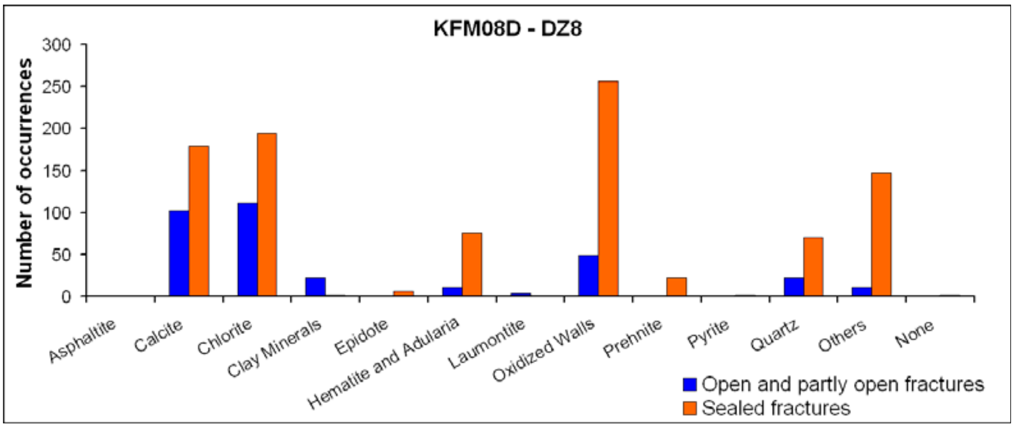
<table>
<tr><th colspan="6">Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike
ZFMNNE2308 (DZ8 in KFM08D)</th></tr>
<tr><th>Property</th><th>Quantitative estimate</th><th>Span</th><th>Confidence level</th><th>Basis for interpretation</th><th>Comments</th></tr>
<tr><td colspan="4">Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM2308G and its inferred continuation to the north-east. Modelled using the dip estimated by connecting lineament MFM2308G with the borehole intersection 644-689 m in KFM08D (DZ8). Deformation zone plane placed at fixed point 660 m in KFM08D. Included only in local model.</td><td colspan="2">
</td></tr>
<tr><td colspan="6">Confidence of existence: High</td></tr>
<tr><td colspan="6">Single hole interpretation: For identification and short description of DZ8 in KFM08D, see SKB P-07-108. No more complementary data</td></tr>
<tr><td>Position</td><td></td><td>± 10 m (surface)</td><td>High</td><td>Intersection along KFM08D (DZ8), low magnetic lineament MFM2308G and inferred continuation to the north-east</td><td>Span estimate refers to the uncertainty in the position of the central part of the zone</td></tr>
<tr><td>Orientation (strike/dip, right-hand-rule method)</td><td>214/84</td><td>± 5/± 10</td><td>High</td><td>Strike based on trend of lineament MFM2308G and inferred continuation to the north-east. Dip based on linking this lineament at the surface with DZ8 in KFM08D</td><td></td></tr>
<tr><td>Thickness</td><td>30 m</td><td>3-50 m</td><td>Medium</td><td>Intersection along KFM08D (DZ8). Span estimated on the basis of the range in thickness of steeply dipping zones between 1000 and 3000 m in length</td><td>Thickness refers to total zone thickness (damage zone and core)</td></tr>
<tr><td>Length</td><td>1696 m</td><td></td><td>High</td><td>Low magnetic lineament MFM2308G and inferred continuation to the north-east. Terminated against ZFMWNW0001</td><td>Total trace length at ground surface</td></tr>
<tr><td>Ductile deformation</td><td></td><td></td><td>High</td><td>Intersection along KFM08D (DZ8)</td><td>Not present</td></tr>
<tr><td>Brittle deformation</td><td></td><td></td><td>High</td><td>Intersection along KFM08D (DZ8)</td><td>Increased frequency of fractures with some sealed fracture networks</td></tr>
<tr><td>Alteration</td><td></td><td></td><td>High</td><td>Intersection along KFM08D (DZ8), character of lineament MFM2308G</td><td>Red-stained bedrock with fine-grained hematite dissemination</td></tr>
</table>

<table>
<tr><td>Fracture orientation</td><td></td><td></td><td>Medium</td><td>Intersection along KFM08D (DZ8)</td><td>Steeply dipping fractures that strike NE-SW to NNE-SSW and NNW-SSE as well as gently dipping fractures are conspicuous. Steeply dipping fractures with NW-SE strike are also present</td></tr>
<tr><td></td><td colspan="5">





</td></tr>
<tr><td>Fracture frequency</td><td>Mean 19 m^{-1}</td><td>Span 5-77 m^{-1}</td><td>Medium</td><td>Intersection along KFM08D (DZ8)</td><td>Quantitative estimate and span include sealed fracture networks</td></tr>
<tr><td>Fracture filling</td><td></td><td></td><td>Medium</td><td>Intersection along KFM08D (DZ8)</td><td>Chlorite, calcite, hematite/adularia, quartz and other minerals. Some clay minerals and epidote are also present</td></tr>
<tr><td></td><td colspan="5">



</td></tr>
<tr><td>Sense of displacement</td><td></td><td></td><td></td><td>Intersection along KFM08D (DZ8)</td><td>No complementary data</td></tr>
</table>

Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike

ZFMENE2320 (DZ4 in KFM07B, DZ2 and DZ3 in KFM07C, DZ6, DZ7 and intermediate borehole interval in KFM08D, and DZ3 in KFM09B; vuggy rock)

Property	Quantitative estimate	Span	Confidence level	Basis for interpretation	Comments

Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM2320G and its inferred continuation to the south-west. Modelled down to 1700 m depth, using the dip estimated by connecting lineament MFM2320G and its inferred continuation to the south-west with the borehole intersections 225-245 m in KFM07B (DZ4), 308-388 m and 429-439 m in KFM07C (DZ2 and DZ3, respectively), 582-634 m in KFM08D (DZ6, DZ7 and intermediate borehole interval) and 363-413 m in KFM09B (DZ3). Deformation zone plane placed at fixed points 236 m in KFM07B, 352 m in KFM07C, 598 m in KFM08D and 387 m in KFM09B. Decreased radar penetration also along the borehole interval 232-240 m in KFM07B. Included only in local model.

Confidence of existence: High

Single hole interpretation: For identification and short description of deformation zones in boreholes, see SKB P-06-134, SKB P-06-135 and SKB P-06-208. For character and kinematics in KFM07B, KFM07C and KFM09B, see P-07-101. For character and kinematics in KFM08D, see P-07-111.

Sealed fracture networks and fine-grained cataclasite with epidote and chlorite cut by younger fractures and veins sealed with laumontite and calcite are prominent in the central part of DZ4 in KFM07B (234-238 m); inferred to include a fault core. Sealed fracture networks, cataclasite and fault breccia are also present along especially DZ2 in KFM07C and fault cores have been identified in both the central (346-358 m) and lower (379-381 m) parts. Similar brittle deformational features are present along DZ3 in KFM09B and a minor fault core has been identified around 390 m. DZ7 along KFM08D has a “damage zone” character but sealed fracture networks are present in the lower part.

KFM07C (DZ2)

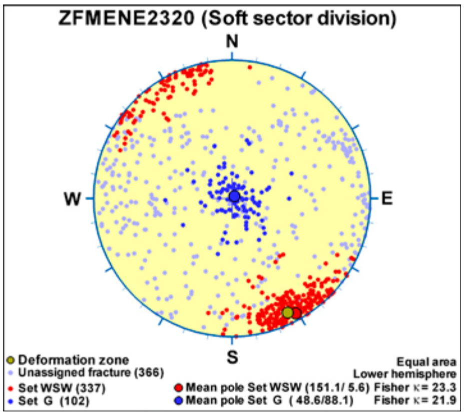
KFM07C (DZ3)

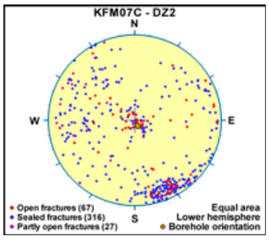
Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike

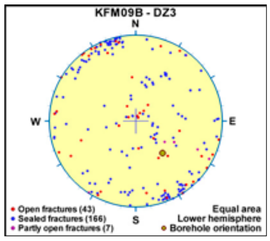
ZFMENE2320 (DZ4 in KFM07B, DZ2 and DZ3 in KFM07C, DZ6, DZ7 and intermediate borehole interval in KFM08D, and DZ3 in KFM09B; vuggy rock)

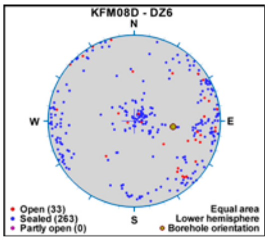
Property	Quantitative estimate	Span	Confidence level	Basis for interpretation	Comments
Position		± 10 m (surface) **KFM07B** 6 | 6 | 4 **KFM07C** 3 | 3 | 0 **KFM09B** 8 | 8 | 6	High	Intersections along KFM07B (DZ4), KFM07C (DZ2 and DZ3), KFM08D (DZ6, DZ7 and intermediate borehole interval) and KFM09B (DZ3), low magnetic lineament MFM2320G and its inferred continuation to the south-west	Span estimate refers to the uncertainty in the position of the central part of the zone
Orientation (strike/dip, right-hand-rule method)	240/81	± 5/± 10	High	Strike based on trend of lineament MFM2320G and its inferred continuation to the south-west. Dip based on linking this lineament at the surface with the borehole intersections (see above)	
Thickness	25 m	16-51 m	Medium	Intersection along KFM08D (DZ6, DZ7 and intermediate borehole interval). Span based on range of thickness in the borehole intersections (see above)	Thickness refers to total zone thickness (damage zone and core)
Length	1714 m		High	Low magnetic lineament MFM2320G and its inferred continuation to the south-west. Terminated against ZFMNW0017 and ZFMNNE2308	Total trace length at ground surface
Ductile deformation			High	Intersections along KFM07B (DZ4), KFM07C (DZ2 and DZ3), KFM08D (DZ6, DZ7 and intermediate borehole interval) and KFM09B (DZ3)	Not present
Brittle deformation			High	Intersections along KFM07B (DZ4), KFM07C (DZ2 and DZ3), KFM08D (DZ6, DZ7 and intermediate borehole interval) and KFM09B (DZ3),	Increased frequency of fractures. Fault cores observed with sealed fracture networks, cataclasite and fault breccia in several of the borehole intersections
Alteration			High	Intersections along KFM07B (DZ4), KFM07C (DZ2 and DZ3), KFM08D (DZ6, DZ7 and intermediate borehole interval) and KFM09B (DZ3), character of lineament MFM2320G	Red-stained bedrock with fine-grained hematite dissemination. Chloritised amphibolite along DZ3 in KFM07C. Vuggy rock with quartz dissolution at 382 m along DZ3 in KFM09B

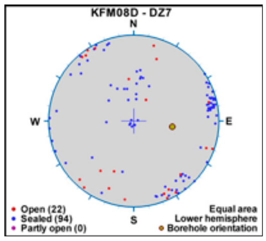
Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike ZFMENE2320 (DZ4 in KFM07B, DZ2 and DZ3 in KFM07C, DZ6, DZ7 and intermediate borehole interval in KFM08D, and DZ3 in KFM09B; vuggy rock)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Fracture orientation (strike/dip, right-hand-rule method)	Mean orientation of WSW fracture set = 241/84 Mean orientation of gentle fracture set = 139/2	Fisher κ value of WSW fracture set = 23 Fisher κ value of WSW fracture set = 22	Medium	Intersections along KFM07B (DZ4), KFM07C (DZ2 and DZ3) and KFM09B (DZ3), N = 805	In KFM07C (DZ2 and DZ3) and KFM09B (DZ3), steeply dipping fractures with WSW strike dominate. In KFM07B (DZ4), steeply dipping fractures with NNE strike and SE strike are conspicuous. Steeply dipping fractures with NNW-SSE and ENE-WSW strike and gently dipping fractures are present in KFM08D (DZ6 and DZ7)



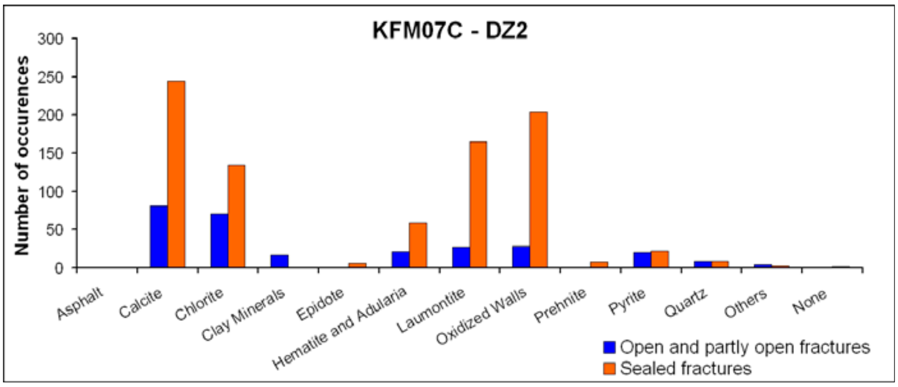
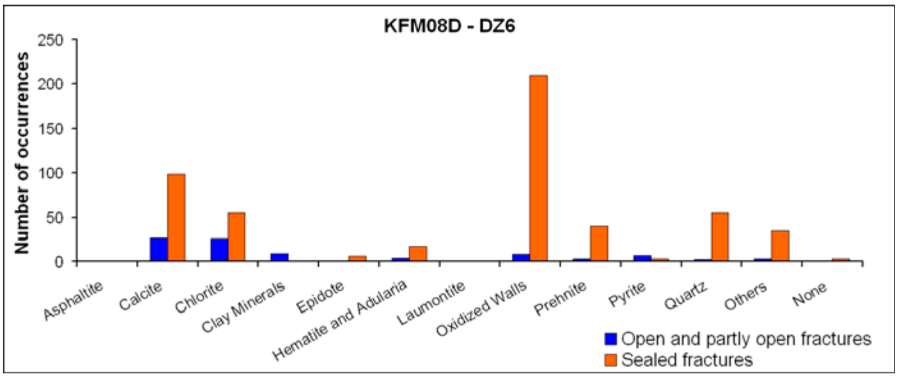
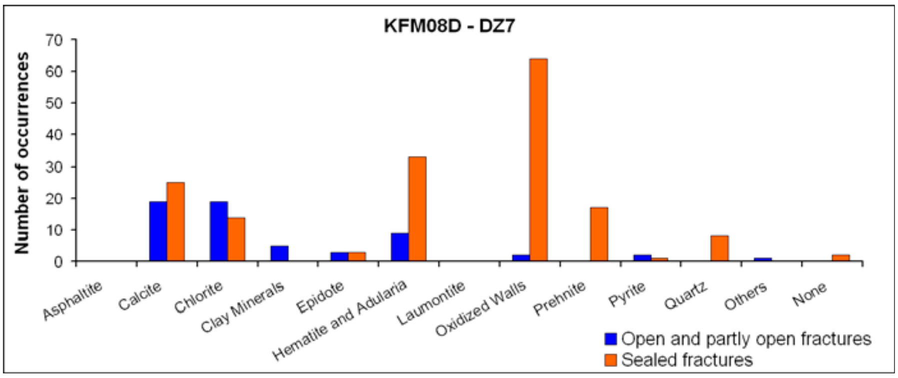
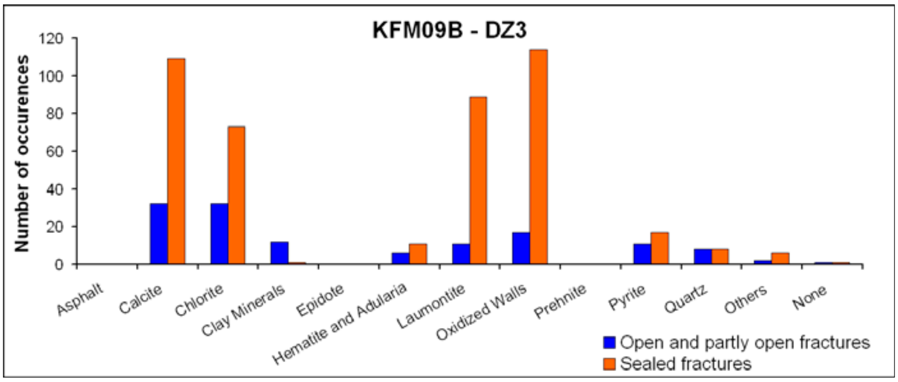








Fracture frequency	Mean 16 m^{-1}	Span 0-151 m^{-1}	Medium	Intersections along KFM07B (DZ4), KFM07C (DZ2 and DZ3), KFM08D (DZ6, DZ7 and intermediate borehole interval) and KFM09B (DZ3),	Sealed fractures dominate. Quantitative estimate and span include sealed fracture networks and a crush zone
Fracture filling			Medium	Intersections along KFM07B (DZ4), KFM07C (DZ2 and DZ3), KFM08D (DZ6, DZ7 and intermediate borehole interval) and KFM09B (DZ3),	Calcite, chlorite, laumontite, hematite/adularia, prehnite, pyrite, quartz, clay minerals

Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike ZFMENE2320 (DZ4 in KFM07B, DZ2 and DZ3 in KFM07C, DZ6, DZ7 and intermediate borehole interval in KFM08D, and DZ3 in KFM09B; vuggy rock)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
	   				

Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike ZFMENE2320 (DZ4 in KFM07B, DZ2 and DZ3 in KFM07C, DZ6, DZ7 and intermediate borehole interval in KFM08D, and DZ3 in KFM09B; vuggy rock)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Sense of displacement			Medium	Intersections along KFM07C (DZ2), KFM08D (DZ7) and KFM09B (DZ3). Fault striae on chlorite, hematite and calcite with calcite and chlorite steps	Steep NNW-SSE faults (7) show strike slip displacement, four of which with sinistral strike-slip. Steep faults with ENE-WSW strike (4) show strike-slip displacement, one of which with dextral strike-slip. A steep fault with SE strike (1) shows dextral strike-slip displacement. Gently dipping faults (3) show dip-slip or oblique-slip movement, the latter with a dominant strike-slip component No fault-slip data along DZ4 in KFM07B and DZ3 in KFM07C. Complementary data from DZ6 in KFM08D not present

Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike

ZFMENE2325A (DZ4 in KFM09B)

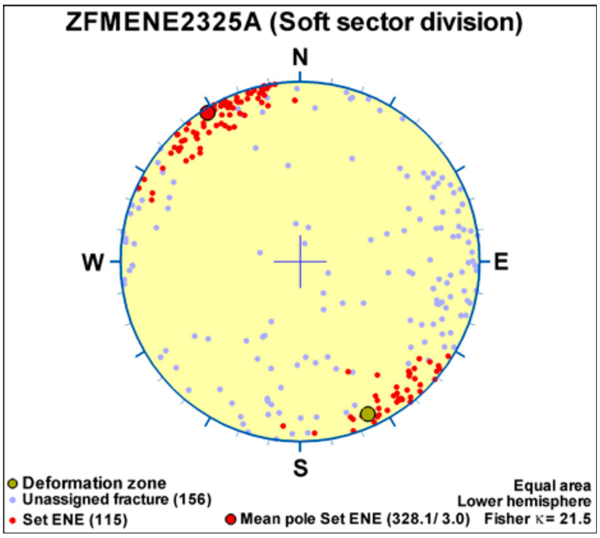
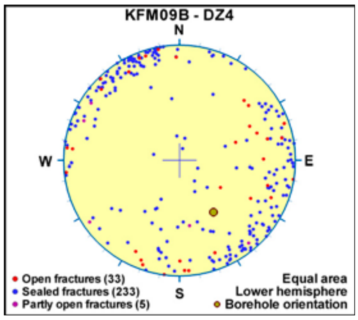
Property	Quantitative estimate	Span	Confidence level	Basis for interpretation	Comments

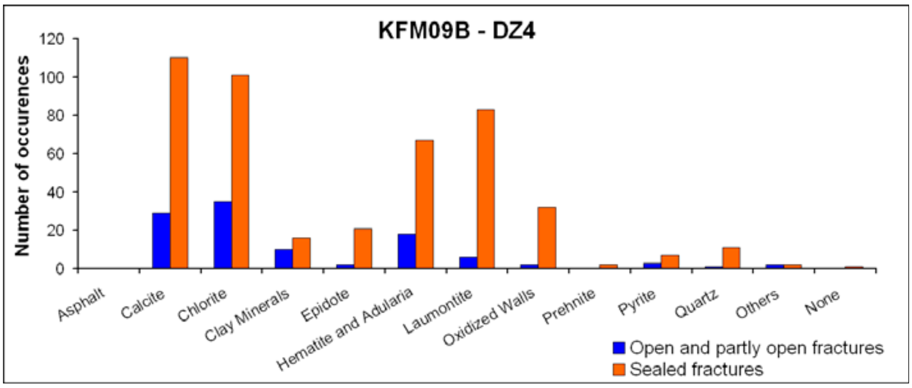
Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM2325G and its inferred continuation to the south-west. Modelled down to 1400 m depth, using the dip estimated by connecting lineament MFM2325G and its inferred continuation to the south-west with the borehole intersection 520-550 m in KFM09B (DZ5). Deformation zone plane placed at fixed point 528 m in KFM09B. Decreased radar penetration also along the borehole interval 522-529 m. Included only in local model.

Confidence of existence: High

Single hole interpretation: For identification and short description of DZ4 in KFM09B, see SKB P-06-135; for character and kinematics, see P-07-101. Fracture frequency and brittle deformation features indicate that zone ZFMENE2325A has a predominantly "damage zone" character. Short interval (528-530 m) with sealed fracture network and breccia is inferred to define the fault core.

Property	Quantitative estimate	Span	Confidence level	Basis for interpretation	Comments
Position		± 10 m (surface) **KFM09B** dx (m): 11, dy (m): 10, dz (m): 9	High	Intersection along KFM09B (DZ4), low magnetic lineament MFM2325G and its inferred continuation to the south-west	Span estimate refers to the uncertainty in the position of the central part of the zone
Orientation (strike/dip, right-hand-rule method)	237/82	± 5/± 10	High	Strike based on trend of lineament MFM2325G and its inferred continuation to the south-west. Dip based on linking this lineament at the surface with DZ4 in KFM09B	
Thickness	23 m	3-50 m	Medium	Intersection along KFM09B (DZ4). Span estimated on the basis of the range in thickness of steeply dipping zones between 1000 and 3000 m in length	Thickness refers to total zone thickness (damage zone and core)

<table>
<tr><th colspan="6">Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike
ZFMENE2325A (DZ4 in KFM09B)</th></tr>
<tr><th>Property</th><th>Quantitative estimate</th><th>Span</th><th>Confidence level</th><th>Basis for interpretation</th><th>Comments</th></tr>
<tr><td>Length</td><td>1496 m</td><td></td><td>High</td><td>Low magnetic lineament MFM2325G and its inferred continuation to the south-west. Terminated against ZFMNNE2308 and ZFMNW0017</td><td>Total trace length at ground surface (damage zone and core)</td></tr>
<tr><td>Ductile deformation</td><td></td><td></td><td>High</td><td>Intersection along KFM09B (DZ4)</td><td>Not present</td></tr>
<tr><td>Brittle deformation</td><td></td><td></td><td>High</td><td>Intersection along KFM09B (DZ4)</td><td>Increased frequency of fractures. Fault core present</td></tr>
<tr><td>Alteration</td><td></td><td></td><td>High</td><td>Intersection along KFM09B (DZ4), character of lineament MFM2325G</td><td>Red-stained bedrock with fine-grained hematite dissemination</td></tr>
<tr><td rowspan="2">Fracture orientation (strike/dip, right-hand-rule method)</td><td>Mean orientation of poorly defined ENE fracture set = 058/87</td><td>Fisher κ value of poorly defined ENE fracture set = 22</td><td>Medium</td><td>Intersection along KFM09B (DZ4), N = 271</td><td>Steeply dipping fractures that vary in strike from ENE to NE to SSE are prominent</td></tr>
<tr><td colspan="4">
</td><td>
</td></tr>
<tr><td>Fracture frequency</td><td>Mean 26 m^{-1}</td><td>Span 2-97 m^{-1}</td><td>Medium</td><td>Intersection along KFM09B (DZ4)</td><td>Sealed fractures dominate. Quantitative estimate and span include sealed fracture networks</td></tr>
<tr><td>Fracture filling</td><td></td><td></td><td>Medium</td><td>Intersection along KFM09B (DZ4)</td><td>Calcite, chlorite, laumontite, hematite/adularia, clay minerals, epidote, quartz</td></tr>
</table>

Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike ZFMENE2325A (DZ4 in KFM09B)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
					
Sense of displacement			Low	Intersection along KFM09B (DZ4). Fault striations on chlorite, hematite and calcite	Steeply dipping faults with SSE strike show sinistral strike-slip (1), oblique-slip (2) with both normal-dextral and reverse-sinistral displacements, and dip-slip displacement (1)

Vertical and steeply-dipping brittle deformation zones with ENE, NNE (and NE) strike

ZFMENE2325B (DZ5 in KFM09B; splay from ZFMENE2325A with vuggy rock)

Property	Quantitative estimate	Span	Confidence level	Basis for interpretation	Comments

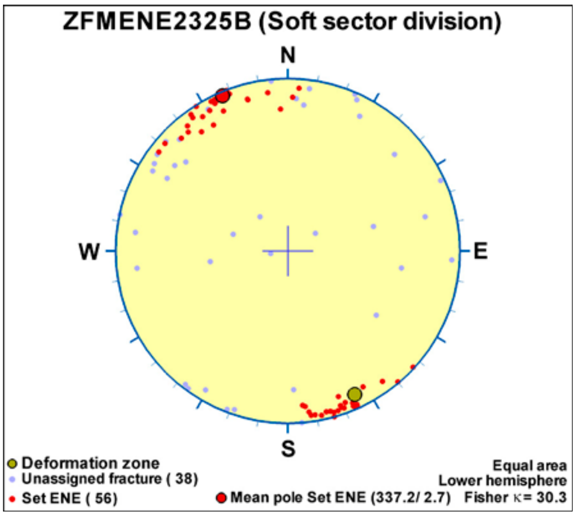
Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM2056G and its inferred continuation to the south-west. Modelled as a splay from zone ZFMENE2325A, using the dip estimated by connecting lineament MFM2056G and its inferred continuation to the south-west with the borehole intersection 561-574 m in KFM09B (DZ5). Deformation zone plane placed at fixed point 567 m in KFM09B. Decreased radar penetration also along the borehole interval 566-573 m. Included only in local model.

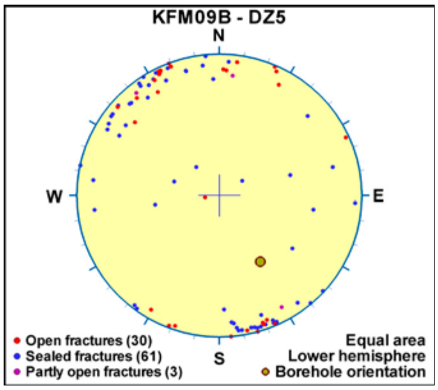
Confidence of existence: High

Single hole interpretation: For identification and short description of DZ5 in KFM09B, see SKB P-06-135; for character and kinematics, see P-07-101. Zone ZFMENE2325B has a "damage zone" character along DZ5 in KFM09B

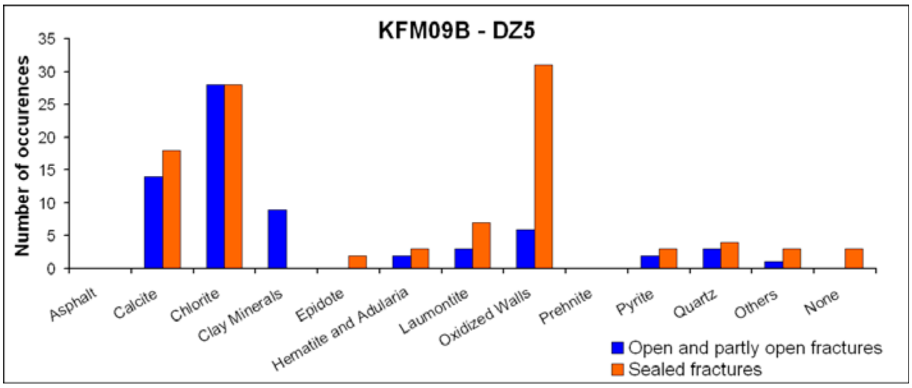
Property	Quantitative estimate	Span	Confidence level	Basis for interpretation	Comments
Position		± 10 m (surface) **KFM09B** dx (m): 12 dy (m): 10 dz (m): 9	High	Intersection along KFM09B (DZ5), low magnetic lineament MFM2056G and its inferred extension to the south-west	Span estimate refers to the uncertainty in the position of the central part of the zone
Orientation (strike/dip, right-hand-rule method)	245/81	± 5/± 10	High	Strike based on trend of lineament MFM2056G and its inferred continuation to the south-west. Dip based on linking this lineament at the surface with DZ5 in KFM09B	
Thickness	6 m	3-14 m	Medium	Intersection along KFM09B (DZ5). Span estimated on the basis of the range in thickness of steeply dipping zones between 500 and 1000 m in length	Thickness refers to total zone thickness
Length	517 m		High	Low magnetic lineament MFM2325G and its inferred continuation to the south-west. Terminated against ZFMENE2325A	Total trace length at ground surface

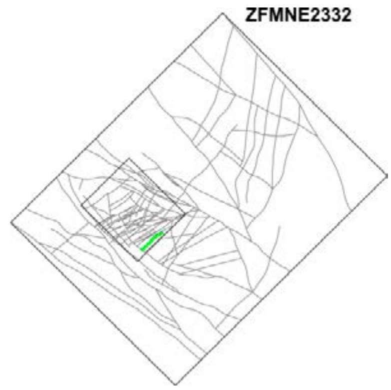
Vertical and steeply-dipping brittle deformation zones with ENE, NNE (and NE) strike ZFMENE2325B (DZ5 in KFM09B; splay from ZFMENE2325A with vuggy rock)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Ductile deformation			High	Intersection along KFM09B (DZ5)	Not present
Brittle deformation			High	Intersection along KFM09B (DZ5)	Increased frequency of fractures. No fault core identified
Alteration			High	Intersection along KFM09B (DZ5), character of lineament MFM2056G	Red-stained bedrock with fine-grained hematite dissemination. Vuggy rock with quartz dissolution between 568 and 574 m along DZ5 in KFM09B
Fracture orientation (strike/dip, right-hand-rule method)	Mean orientation of ENE fracture set = 067/87	Fisher κ value of ENE fracture set = 30	Medium	Intersection along KFM09B (DZ5), N = 94	Steeply dipping fractures with ENE strike are prominent





Fracture frequency	Mean 11 m^{-1}	Span 1-22 m^{-1}	Medium	Intersection along KFM09B (DZ5)	Sealed fractures dominate. Quantitative estimate and span include sealed fracture networks
Fracture filling			Medium	Intersection along KFM09B (DZ5)	Chlorite, calcite, laumontite, clay minerals, hematite/adularia, quartz, pyrite. Epidote on gently dipping fractures

Vertical and steeply-dipping brittle deformation zones with ENE, NNE (and NE) strike ZFMENE2325B (DZ5 in KFM09B; splay from ZFMENE2325A with vuggy rock)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
					
Sense of displacement			Low	Intersection along KFM09B (DZ5). Faults with calcite steps and striae along chlorite	Steeply dipping faults (2) with ENE-WSW strike show strike-slip displacement; one shows dextral strike-slip

Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike ZFMNE2332					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM2332G0 and its inferred continuation to the north-east. Modelled to a depth of 1450 m with a dip of 85^{o} based on a comparison with zone ZFMENE0062A that is situated to the north-west. Included only in local model.					
Confidence of existence: Medium (not confirmed by direct geological observation)					
Position		± 10 m (surface)	High	Low magnetic lineament MFM2332G0 and its inferred continuation to the north-east	Span estimate refers to the uncertainty in the position of the central part of the zone
Orientation (strike/dip, right-hand-rule method)	047/85	± 5/± 10	High for strike, low for dip	Strike based on trend of lineament MFM2332G0 and its inferred continuation to the north-east. Dip based on comparison with high confidence, steeply-dipping zone ZFMENE0062A that is situated to the north-west	
Thickness	15 m	3-50 m	Low	Estimated on basis of length – thickness correlation diagram in SKB R-07-50. Span estimated on the basis of the range in thickness of steeply dipping zones between 1000 and 3000 m in length	Thickness refers to total zone thickness (damage zone and core)
Length	1270 m		Medium	Low magnetic lineament MFM2332G0 and its inferred continuation to the north-east. Terminated against ZFMWNW0123	Total trace length at ground surface
Ductile deformation			Low	Comparison with high confidence, vertical and steeply-dipping zones with NE strike	Assumed not to be present
Brittle deformation			Low	Comparison with high confidence, vertical and steeply-dipping zones with NE strike	Assumed to be present
Alteration			Medium	Character of lineament MFM2332G0	Red-stained bedrock with fine-grained hematite dissemination
No more data					

Vertical or steeply dipping brittle deformation zones with ENE, NNE or NE strike

ZFMENE2383 (DZ5 and its extension along borehole length 950-992 m in KFM05A)

Property	Quantitative estimate	Span	Confidence level	Basis for interpretation	Comments

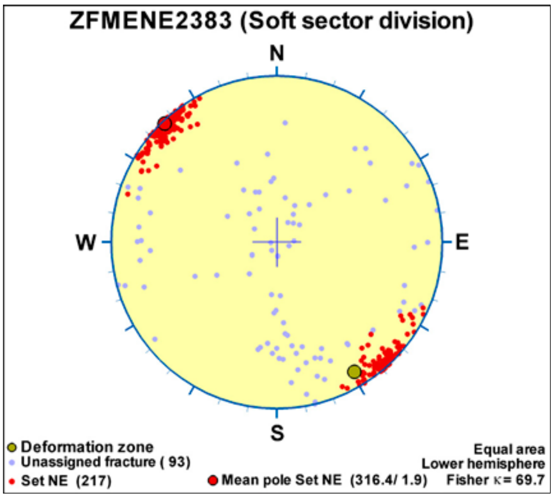
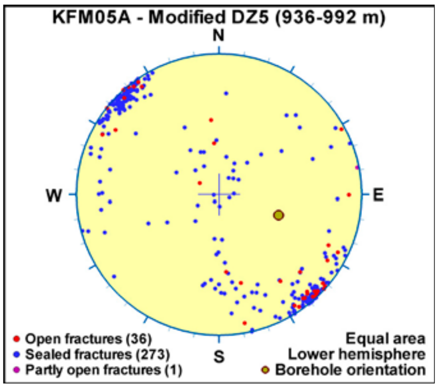
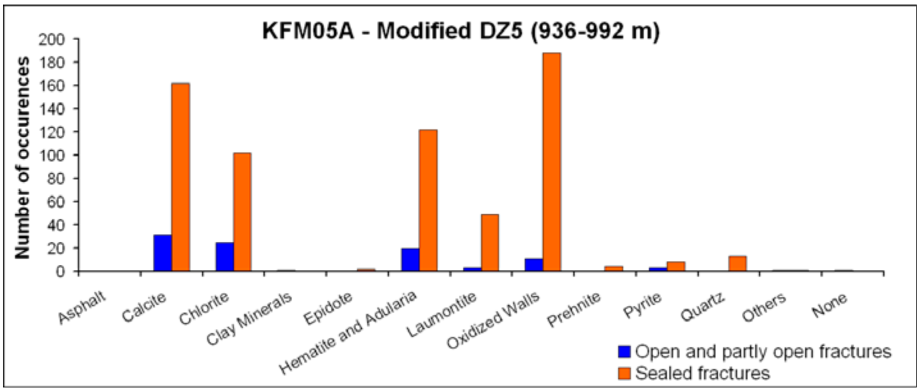
Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM2383G. Modelled down to 1000 m depth, using the dip estimated by connecting lineament MFM2383G with the borehole intersection 936-992 m in KFM05A (DZ5 and extension along borehole interval 950-992 m). Deformation zone plane placed at fixed point 959 m in KFM05A. Included only in local model.

Confidence of existence: High

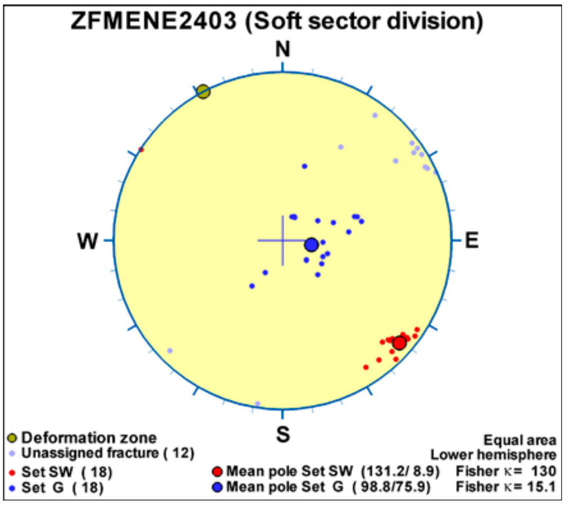
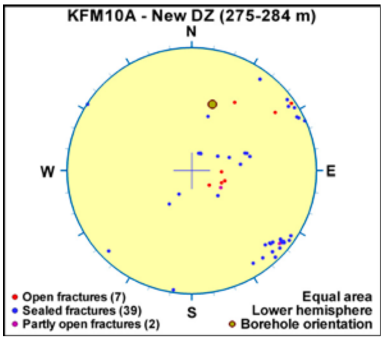
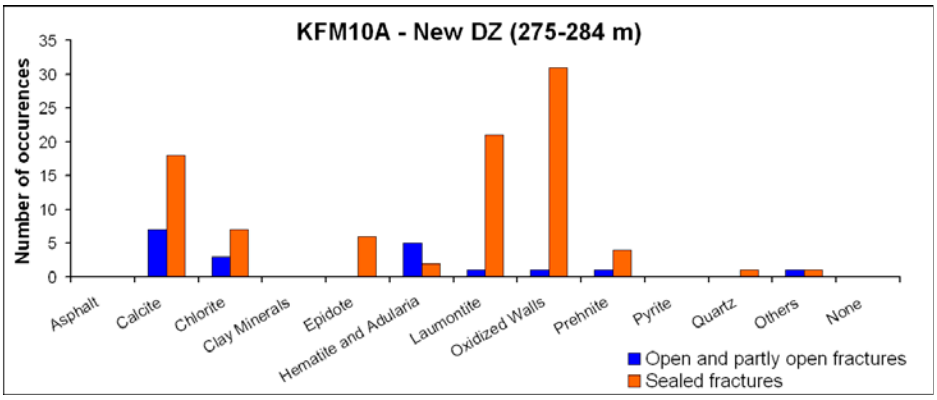
Single hole interpretation: For identification and short description of DZ5 in KFM05A, see SKB P-04-296.

KFM05A (DZ5)

Property	Quantitative estimate	Span	Confidence level	Basis for interpretation	Comments
Position		± 10 m (surface) KFM05A 13 | 16 | 9	High	Intersection along KFM05A (DZ5 and its extension), low magnetic lineament MFM2383G	Span estimate refers to the uncertainty in the position of the central part of the zone
Orientation (strike/dip, right-hand-rule method)	239/80	± 5/± 10	High	Strike based on trend of lineament MFM2383G. Dip based on linking MFM2383G at the surface with DZ5 and its extension in KFM05A	
Thickness	36 m	3-50 m	Medium	Intersection along KFM05A (DZ5 and its extension). Span estimated on the basis of the range in thickness of steeply dipping zones between 1000 and 3000 m in length	Thickness refers to total zone thickness (damage zone and core)
Length	954 m		High	Low magnetic lineament MFM2383G. Terminated against ZFMENE0103A	Total trace length at ground surface
Ductile deformation			High	Intersection along KFM05A (DZ5 and its extension)	Not present
Brittle deformation			High	Intersection along KFM05A (DZ5 and its extension)	Increased frequency of fractures. No complementary data

Alteration			High	Intersection along KFM05A (DZ5 and its extension), character of lineament MFM2383G	Red-stained bedrock with fine-grained hematite dissemination
Fracture orientation (strike/dip, right-hand-rule method)	Mean orientation of NE fracture set = 046/88	Fisher κ value of NE fracture set = 70	Medium	Intersection along KFM05A (DZ5 and its extension), N = 310	Steeply dipping fractures with NE strike dominate
					
Fracture frequency	Mean 10 m^{-1}	Span 0-37 m^{-1}	Medium	Intersection along KFM05A (DZ5 and its extension)	Sealed fractures dominate. Quantitative estimate and span include sealed fracture networks
Fracture filling			Medium	Intersection along KFM05A (DZ5 and its extension)	Calcite, chlorite, hematite/adularia, laumontite, quartz, pyrite
					
Sense of displacement				Intersection along KFM05A (DZ5 and its extension)	No complementary data

Vertical and steeply-dipping brittle deformation zones with ENE, NNE (and NE) strike ZFMENE2403 (borehole interval 275-284 m in KFM10A)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Modelling procedure: At the surface, corresponds to the low magnetic lineament MFM2403G. Modelled down to 950 m depth, using the dip estimated by connecting lineament MFM2403G with the borehole intersection 275-284 m in KFM10A. Deformation zone plane placed at fixed point 281 m in KFM10A. Included in local model.				 	
Confidence of existence: High					
Position		± 10 m (surface) KFM10A: dx (m) 2, dy (m) 2, dz (m) 2	High	Intersection along borehole interval 275-284 m in KFM10A, low magnetic lineament MFM2403G	Span estimate refers to the uncertainty in the position of the central part of the zone
Orientation (strike/dip, right-hand-rule method)	242/90	± 5/± 10	High	Strike based on trend of lineament MFM2403G. Dip based on linking MFM2403G at the surface with borehole interval 275-284 m in KFM10A	
Thickness	4 m	3-50 m	Medium	Intersection along borehole interval 275-284 m in KFM10A. Span estimated on the basis of the range in thickness of steeply dipping zones between 1000 and 3000 m in length	Thickness refers to total zone thickness (damage zone and core)
Length	959 m		High	Low magnetic lineament MFM2403G. Terminated against ZFMWNW0123	Total trace length at ground surface
Ductile deformation			High	Intersection along borehole interval 275-284 m in KFM10A	Not present
Brittle deformation			High	Intersection along borehole interval 275-284 m in KFM10A	Increased frequency of fractures. No complementary data from KFM10A
Alteration			High	Intersection along borehole interval 275-284 m in KFM10A, character of lineament MFM2403G	Red-stained bedrock with fine-grained hematite dissemination

Vertical and steeply-dipping brittle deformation zones with ENE, NNE (and NE) strike ZFMENE2403 (borehole interval 275-284 m in KFM10A)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Fracture orientation (strike/dip, right-hand-rule method)	Mean orientation of SW fracture set = 221/81 Mean orientation of gentle fracture set = 189/14	Fisher κ value of SW fracture set = 130 Fisher κ value of gentle fracture set = 15	Low	Intersection along borehole interval 275-284 m in KFM10A, N = 48	Few data. Steeply dipping fractures that strike SW and SE, as well as gently dipping fractures are present
					
Fracture frequency	Mean 28 m^{-1}	Span 5-65 m^{-1}	Medium	Intersection along borehole interval 275-284 m in KFM10A	Sealed fractures dominate. Quantitative estimate and span include sealed fracture networks
Fracture filling			Medium	Intersection along borehole interval 275-284 m in KFM10A	Calcite, laumontite, chlorite, epidote, hematite/adularia prehnite
					
Sense of displacement				Intersection along borehole interval 275-284 m in KFM10A	No complementary data available from this borehole interval

Gently dipping brittle deformation zones ZFMA1					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Modelling procedure: Corresponds to seismic reflector A1/A0, the position of which in 3D space has been attained from Cosma et al. (2003). Modelled to base of regional model volume with termination against ZFMWNW0001, ZFMNW0017 and ZFMENE0810. An alternative interpretation of the seismic reflector A1/A0 is that it is related, wholly or partly, to compositional variations in the bedrock inside rock domain RFM032. Included in regional model and also present inside local model volume.					Does not intersect the surface
Confidence of existence: Medium (not confirmed by direct geological observation)					
Position		± 15 m (general)	High	Seismic reflector A1/A0	Span estimate refers to the uncertainty in the position of the central part of the zone. General estimate for seismic reflector based on Cosma et al. (2003)
Orientation (strike/dip, right-hand-rule method)	082/45	- 7/± 5	High	Seismic reflector A1/A0	Strike and dip based on Cosma et al. (2003). Span estimate makes use of both Juhlin et al. (2002) and Cosma et al. (2003)
Thickness	40 m	9-45 m	Low	Comparison with estimates for ZFMA2 made in Forsmark model stage 2.2 (SKB R-07-45) and adopted in SFR model version 1.0 (Appendix 11 in SKB R-10-49)	Thickness refers to total zone thickness (damage zone and core)
Length					ZFMNE00A1 is modelled so that it does not intersect the surface, since it has proven difficult to follow seismic reflector A1/A0 to the surface. Terminated against ZFMWNW0001, ZFMNW0017 and ZFMENE0810
Ductile deformation			Low	Comparison with high confidence, gently dipping zones	Assumed not to be present
Brittle deformation			Low	Comparison with high confidence, gently dipping zones	Assumed to be present
No more data					

Gently-dipping brittle deformation zones

ZFMA2 (DZ1 and extension along 53-64 m in KFM01B, DZ1 and DZ2 in KFM01C, upper part of DZ6 in KFM02A, DZ3 in KFM02B, DZ2 with extension and DZ3 in KFM04A, DZ1 in KFM05A, DZ2 and DZ3 in KFM10A; vuggy rock)

Property	Quantitative estimate	Span	Confidence level	Basis for interpretation	Comments

Modelling procedure: Corresponds to seismic reflector A2, the position of which in 3D space has been attained from Cosma et al. (2003). Modelling takes account of: 1) Ground and borehole reflection seismic data. 2) Intersections along the borehole intervals 16-64 m in KFM01B with fixed point at 40 m (DZ1 and extension at 53-64 m), 23-48 m and 62-99 m in KFM01C with fixed point at 85 m (DZ1, and DZ2), 417-442 m in KFM02A with fixed point at 423 m (part of DZ6), 411-431 m in KFM02B with fixed point at 413 m (DZ3), 202-242 m in KFM04A with fixed point at 234 m (DZ2 and extension 213-232 m, DZ3), 102-114 m with fixed point at 102 m in KFM05A (DZ1), and 430-449 m and 478-490 m in KFM10A with fixed point at 485 m (DZ2 and DZ3). Zone ZFMA2 also intersects percussion boreholes HFM01 (DZ1), HFM14 (DZ1 and DZ2), HFM15 (DZ1), HFM19 (DZ1 and DZ2), HFM27 (DZ1) and KFM01A percussion (DZ1). Probable interference in KFM04A with ZFMNE1188, which is situated close to and strikes sub-parallel to the borehole, and with fracturing related to stress-release processes along the borehole intersections close to the surface. Low radar amplitudes also observed, for example, at 38-42 m in KFM01B, 232-242 m in KFM04A and 483-488 m in KFM10A. Modelled so as to splay from ZFMF1 at depth up to the surface, and to terminate along strike against ZFMNW0017 and ZFMA3. Included in regional model and also present inside local model volume.

Confidence of existence: High

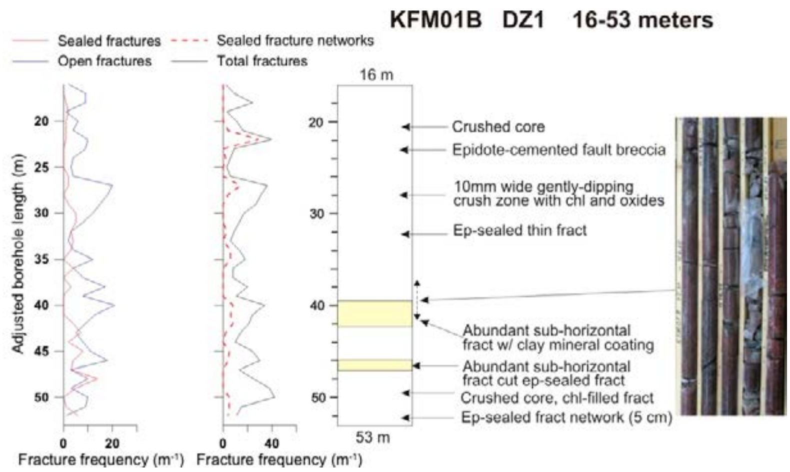
Single hole interpretation: For identification and short description of of inferred borehole intersections in cored boreholes, see P-04-116 (DZ1 in KFM01B), P-06-135 (DZ1 and DZ2 in KFM01C), P-04-117 (DZ6 in KFM02A), P-07-107 (DZ3 in KFM02B), P-04-119 (DZ2 and DZ3 in KFM04A), P-04-296 (DZ1 in KFM05A) and P-06-207 (DZ2 and DZ3 in KFM10A). For character and kinematics of DZ1 in KFM01B, DZ6 in KFM02A, DZ2 and DZ3 in KFM04A and DZ1 in KFM05A, see SKB P-06-212. For character and kinematics of DZ3 in KFM02B, see SKB P-07-111. For character and kinematics of DZ1 and DZ2 in KFM01C as well as DZ2 and DZ3 in KFM10A, see P-07-101.

Zone ZFMA2 consists of narrower, highly fractured segments (cores) that enclose less fractured rock (damage zone) in a complex network. In KFM01B (see below), epidote-cemented fault breccia post-dated by hydrothermal vein quartz is present at c. 23 m (see lower picture in KFM01B below) and, at c. 28 m, a gently dipping crush fault rock is present. The high frequency of sub-horizontal open fractures, at high angles to the borehole axis, is illustrated in the picture to the right of the borehole log below. These fractures cut steeper epidote-sealed fractures. The changeover from less altered and little deformed bedrock downwards into strongly altered (hematite dissemination) and more strongly fractured bedrock, including a crush zone, along the upper part of DZ6 in KFM02A is also shown in a photograph below. Fault-slip data present along both gently and steeply dipping fractures in different boreholes. Hydraulic contact between KFM02A, HFM16 and HFM19 (see SKB P-05-37, SKB P-05-78) is inferred to occur via ZFMA2 and highly fractured bedrock close to the surface.

Gently-dipping brittle deformation zones

ZFMA2 (DZ1 and extension along 53-64 m in KFM01B, DZ1 and DZ2 in KFM01C, upper part of DZ6 in KFM02A, DZ3 in KFM02B, DZ2 with extension and DZ3 in KFM04A, DZ1 in KFM05A, DZ2 and DZ3 in KFM10A; vuggy rock)

Property	Quantitative estimate	Span	Confidence level	Basis for interpretation	Comments



After SKB P-06-212

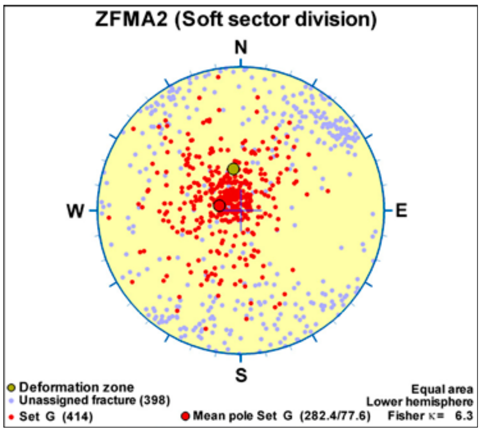
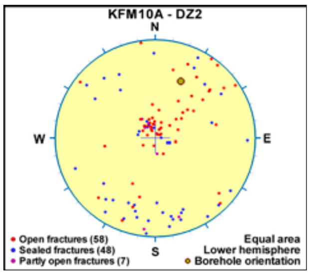
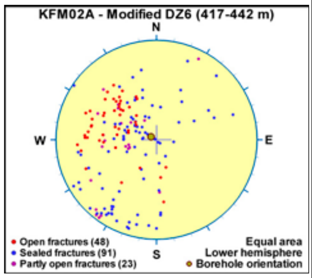
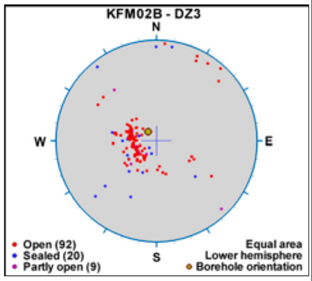
KFM02A (upper part of DZ6)

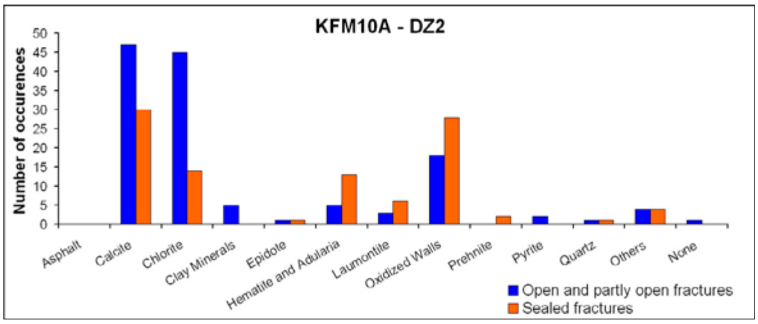
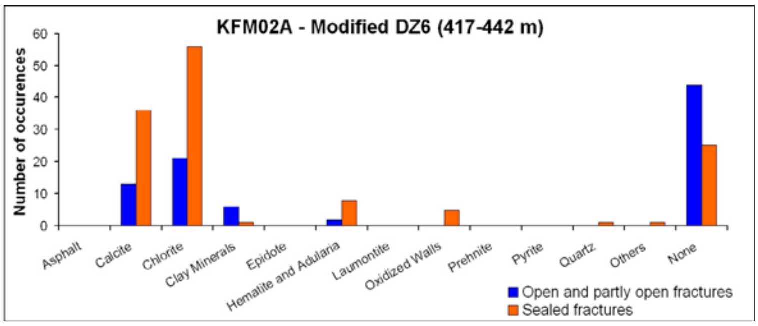
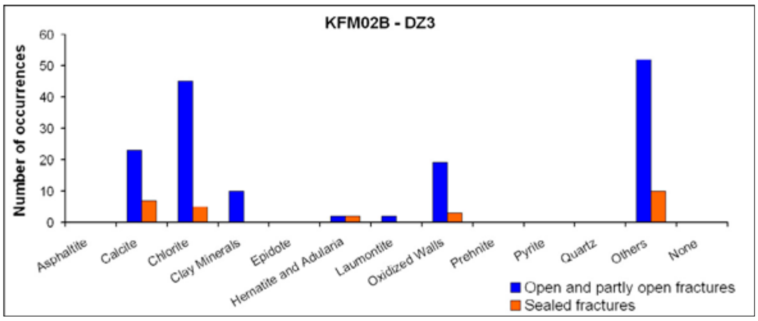
<table>
<tr><th colspan="6">Gently-dipping brittle deformation zones

ZFMA2 (DZ1 and extension along 53-64 m in KFM01B, DZ1 and DZ2 in KFM01C, upper part of DZ6 in KFM02A, DZ3 in KFM02B, DZ2 with extension and DZ3 in KFM04A, DZ1 in KFM05A, DZ2 and DZ3 in KFM10A; vuggy rock)</th></tr>
<tr><th>Property</th><th>Quantitative estimate</th><th>Span</th><th>Confidence level</th><th>Basis for interpretation</th><th>Comments</th></tr>
<tr><td>Position</td><td></td><td>± 15 m (general)<table>
<tr><th colspan="3">KFM01B</th></tr>
<tr><td>dx (m)</td><td>dy (m)</td><td>dz (m)</td></tr>
<tr><td>1</td><td>1</td><td>0</td></tr>
<tr><th colspan="3">KFM01C</th></tr>
<tr><td>0</td><td>0</td><td>0</td></tr>
<tr><th colspan="3">KFM02A</th></tr>
<tr><td>3</td><td>3</td><td>0</td></tr>
<tr><th colspan="3">KFM04A</th></tr>
<tr><td>1</td><td>1</td><td>1</td></tr>
<tr><th colspan="3">KFM05A</th></tr>
<tr><td>1</td><td>2</td><td>1</td></tr>
<tr><th colspan="3">KFM10A</th></tr>
<tr><td>4</td><td>3</td><td>3</td></tr>
</table></td><td>High</td><td>Borehole intersections (see above), seismic reflector A2, seismic data from KFM02A</td><td>Span estimate refers to the uncertainty in the position of the central part of the zone. General estimate for seismic reflector based on Cosma et al. (2003)</td></tr>
<tr><td>Orientation (strike/dip, right-hand-rule method)</td><td>080/24</td><td>+ 15/- 10</td><td>High</td><td>Seismic reflector A2 in combination with borehole intersections (see above)</td><td>Strike and dip after Juhlin et al. (2002). Span estimate based on both Juhlin et al. (2002) and Cosma et al. (2003)</td></tr>
<tr><td>Thickness</td><td>34 m</td><td>20-50 m</td><td>High</td><td>Borehole intersections along KFM1C (DZ1, DZ2), KFM02A (upper part of DZ6), KFM02B (DZ3), KFM04A (DZ2 with extension and DZ3) and KFM10A (DZ2, DZ3). Span selected bearing in mind minimum thickness along KFM01B</td><td>Thickness refers to total zone thickness (damage zone and core). Upper boundary of zone ZFMA2 not constrained in KFM01B and KFM05A.</td></tr>
<tr><td>Length</td><td>4008 m</td><td></td><td>Low</td><td>Seismic reflector A2 and borehole intersections (see above). Terminated against ZFMNW0017, ZFMA3 and ZFMF1</td><td>Total trace length at ground surface</td></tr>
<tr><td>Ductile deformation</td><td></td><td></td><td>High</td><td>Borehole intersections (see above)</td><td>Not present</td></tr>
<tr><td>Brittle deformation</td><td></td><td></td><td>High</td><td>Borehole intersections (see above)</td><td>Increased frequency of fractures. Fault core intervals with elevated fracture frequency, cohesive breccia/cataclasite and crush zones</td></tr>
<tr><td>Alteration</td><td></td><td></td><td>High</td><td>Borehole intersections (see above)</td><td>Red-stained bedrock with fine-grained hematite dissemination. Altered vuggy rock with quartz dissolution between 483 and 488 m along DZ3 in KFM10A</td></tr>
</table>

Gently-dipping brittle deformation zones

ZFMA2 (DZ1 and extension along 53-64 m in KFM01B, DZ1 and DZ2 in KFM01C, upper part of DZ6 in KFM02A, DZ3 in KFM02B, DZ2 with extension and DZ3 in KFM04A, DZ1 in KFM05A, DZ2 and DZ3 in KFM10A; vuggy rock)

Property	Quantitative estimate	Span	Confidence level	Basis for interpretation	Comments
Fracture orientation (strike/dip, right-hand-rule method)	Mean orientation of gently-dipping fracture set = 012/12	Fisher κ value of gently-dipping fracture set = 6	High	Borehole intersections along KFM02A (upper part of DZ6), KFM04A (DZ2 with extension and DZ3) and KFM10A (DZ2 and DZ3), N = 812. Orientation of fractures in KFM02B (DZ3) are also shown	Three fracture sets are conspicuous, a gently-dipping fracture set and steeply-dipping NE and NW sets. Data only from deeper borehole intersections to avoid influence of sub-horizontal sheet joints in the uppermost part of the bedrock, close to drill sites 1 and 5.
	 			 Examples of fracture data along ZFMA2 at depths beneath 200 m are shown and were used in the calculations, so as to avoid interference with gently dipping fractures not necessarily related to this zone (e.g. sheet joints) close to the ground surface	 
Fracture frequency	Mean 17 m^{-1}	Span 0-71 m^{-1}	High	Borehole intersections along KFM02A (upper part of DZ6), KFM04A (DZ2 with extension and DZ3) and KFM10A (DZ2 and DZ3)	Open and sealed fractures. Quantitative estimate and span include a crush zone and sealed fracture networks. Data only from deeper borehole intersections to avoid influence of sub-horizontal sheet joints in the uppermost part of the bedrock, close to drill sites 1 and 5
Fracture filling			High	Borehole intersections along KFM02A (part of DZ6), KFM02B (DZ3), KFM04A (DZ2 with extension and DZ3) and KFM10A (DZ2 and DZ3)	Chlorite, calcite, hematite/adularia, prehnite, clay minerals, laumontite, quartz. Note high frequency of fractures with no mineral coating/filling in KFM02A. Data only from deeper borehole intersections to avoid influence of sub-horizontal sheet joints in the uppermost part of the bedrock, close to drill sites 1 and 5.

Gently-dipping brittle deformation zones ZFMA2 (DZ1 and extension along 53-64 m in KFM01B, DZ1 and DZ2 in KFM01C, upper part of DZ6 in KFM02A, DZ3 in KFM02B, DZ2 with extension and DZ3 in KFM04A, DZ1 in KFM05A, DZ2 and DZ3 in KFM10A; vuggy rock)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
	  				

Gently-dipping brittle deformation zones **ZFMA2 (DZ1 and extension along 53-64 m in KFM01B, DZ1 and DZ2 in KFM01C, upper part of DZ6 in KFM02A, DZ3 in KFM02B, DZ2 with extension and DZ3 in KFM04A, DZ1 in KFM05A, DZ2 and DZ3 in KFM10A; vuggy rock)**					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Sense of displacement			Medium	Minor faults along DZ1 in KFM01B. Chlorite and hematite striae Minor faults along DZ1 and DZ2 in KFM01C. Calcite, clay minerals, hematite and chlorite striae Minor faults along DZ6 in KFM02A. Note mostly in lower part along ZFMF1. Chlorite striae Minor faults along DZ2 and DZ3 in KFM04A. Chlorite, hematite and calcite striae Minor faults along DZ2 and DZ3 in KFM10A. Calcite steps in DZ2; chlorite and prehnite striae in DZ3	*DZ1 in KFM01B.* Two steep NNE-SSW faults show strike-slip displacement. *DZ1and DZ2 in KFM01C.* Steeply dipping faults with WSW, SW, ESE or NNW-SSE strike show predominantly strike-slip displacement. One of the faults with NNW-SSE strike is sinistral. The gently dipping faults show dip-slip or oblique strike-slip displacement, one with reverse dip-slip. *DZ6 in KFM02A.* Strike-slip or reverse dip-slip displacements on the dominant gently dipping faults. Both dextral and sinistral strike-slip movement observed. *DZ2 and DZ3 in KFM04A.* Steep WSW faults show strike-slip and oblique-slip movement. Steep SSW faults show strike-slip and dip-slip movement. Steep SW fault shows dip-slip movement. Gently dipping faults show predominantly strike-slip movement. *DZ2 and DZ3 in KFM10A.* Gently south-dipping faults show reverse-sinistral strike-slip or dip-slip displacement No fault-slip data were observed along DZ3 in KFM02B or DZ1 in KFM05A

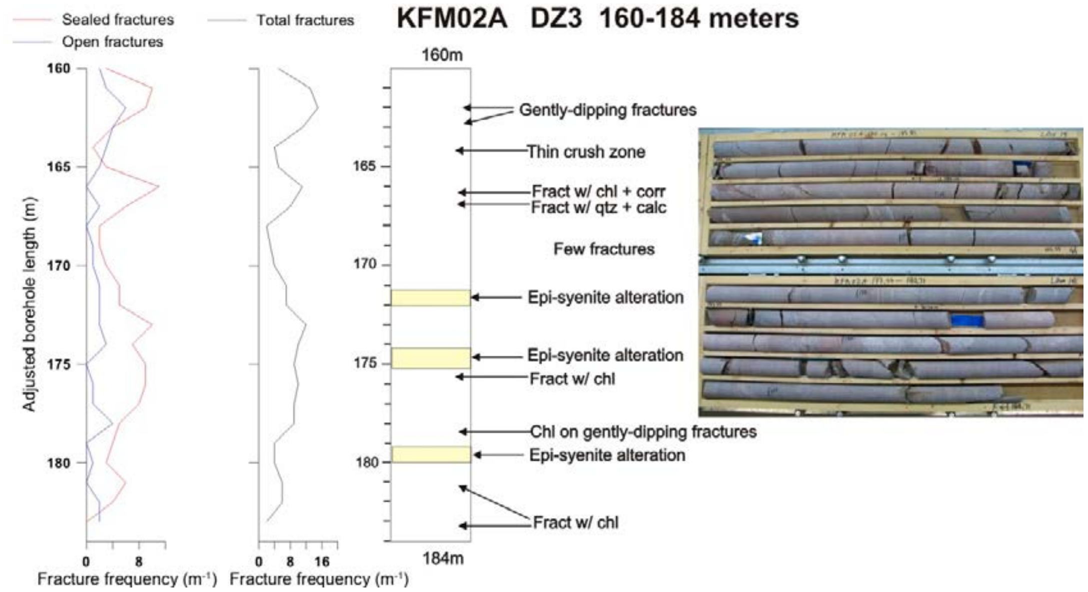
Gently-dipping brittle deformation zones ZFMA3 (DZ3 in KFM02A, DZ2 in KFM02B, DZ4 in KFM03A and DZ2 in HFM04; vuggy rock)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**

Modelling procedure: Corresponds to seismic reflector A3, the position of which in 3D space has been attained from Cosma et al. (2003). Terminated against ZFMWNW0001, ZFMWNW0023, ZFMWNW0123, ZFMNNW0823 and ZFMNNE0828. Fixed point intersections at 163 m along DZ3 (160-184 m) in KFM02A, at 158 m along DZ2 (145-204 m) in KFM02B, at 814 m along DZ4 (803-816 m) in KFM03A and at 185 m along DZ2 (183-187 m) in HFM04. Modelled zone also fringes on the lower part of HFM29. Low radar amplitude also observed at 160-184 m in KFM02A and at 813-817 m in KFM03A. Included in regional model and also present inside local model volume.

Confidence of existence: High

Single hole interpretation: For identification and short description of deformation zones in boreholes, see SKB P-04-117, SKB P-04-118 and P-07-107. For character and kinematics of DZ3 in KFM02A and DZ4 in KFM03A, see SKB P-06-212; for character and kinematics of DZ2 in KFM02B, see SKB P-07-111.

DZ3 in KFM02A occurs in heterogeneous rock unit with fine-grained metagranitoid, medium-grained metagranite and amphibolite. Damage zone dominates. Thin interval of crush rock in the upper part of the zone and three intervals of strong alteration with development of vuggy rock (epi-syenite alteration in figure below) between 171 and 180 m. Similar vuggy rock alteration is present at 167-169 m in KFM02B, where sealed fracture networks are prevalent in the lower part of the zone in pegmatite. Several fractures display fault-slip in KFM02A and KFM02B. DZ4 in KFM03A is a narrow zone with a higher frequency of fractures in the upper and lower parts. No fault-slip data are present. Hydraulic contact between KFM02A and KFM03A (see SKB P-06-09) is inferred to occur via ZFMB1 that splays off ZFMA3.



After SKB P-06-212

Property	Quantitative estimate	Span	Confidence level	Basis for interpretation	Comments
Position		± 15 m (general) **KFM02A** dx (m) / dy (m) / dz (m) 1 / 1 / 0 **KFM03A** 25 / 25 / 3	High	Intersections along KFM02A (DZ3), KFM02B (DZ2), KFM03A (DZ4) and HFM04 (DZ2), seismic reflector A3	Span estimate refers to the uncertainty in the position of the central part of the zone. General estimate for seismic reflector based on Cosma et al. (2003)

Gently-dipping brittle deformation zones ZFMA3 (DZ3 in KFM02A, DZ2 in KFM02B, DZ4 in KFM03A and DZ2 in HFM04; vuggy rock)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Orientation (strike/dip, right-hand-rule method)	047/22	± 10 /± 2	High	Intersections along KFM02A (DZ3), KFM02B (DZ2), KFM03A (DZ4) and HFM04 (DZ2), seismic reflector A3	Consistent with orientation estimates in both Juhlin et al. (2002) and Cosma et al. (2003)
Thickness	23 m	11-58 m	Medium	Intersection along KFM02A (DZ3). 11 m along KFM03A (DZ4) and 58 m along KFM02B (DZ2)	Thickness refers to total zone thickness (damage zone and core)
Length	3184 m		Low	Intersections along KFM02A (DZ3), KFM02B (DZ2), KFM03A (DZ4) and HFM04 (DZ2), seismic reflector A3. Terminated against ZFMWNW0001, ZFMWNW0023, ZFMWNW0123, ZFMNNW0823 and ZFMNNE0828	Total trace length at ground surface
Ductile deformation			High	Intersections along KFM02A (DZ3), KFM02B (DZ2), KFM03A (DZ4) and HFM04 (DZ2)	Not present
Brittle deformation			High	Intersections along KFM02A (DZ3), KFM02B (DZ2), KFM03A (DZ4) and HFM04 (DZ2)	Increased frquency of fractures. Along DZ3 in KFM02A and DZ2 in KFM02B, there are fault core intervals with altered vuggy rock. Elevated fracture frequency in fault core along DZ4 in KFM03A.
Alteration			Medium	Intersections along KFM02A (DZ3), KFM02B (DZ2), KFM03A (DZ4) and HFM04 (DZ2)	Red-stained bedrock with fine-grained hematite dissemination in KFM02A and locally along KFM02B. Vuggy rock with quartz dissolution between 171 and 180 m in KFM02A and between 167-169 m in KFM02B
Fracture orientation (strike/dip, right-hand-rule method)	Mean orientation of gently dipping fracture set = 152/16	Fisher κ value of gently dipping fracture set = 6	Medium	Intersections along KFM02A (DZ3) and KFM03A (DZ4), N = 177. Orientation of fractures along DZ2 in KFM02B is also shown	Gently dipping fractures with variable orientation dominate. Sealed fractures dipping steeply to the south-east are also conspicuous along DZ2 in KFM02B (see below)

<table>
<tr><th colspan="6">Gently-dipping brittle deformation zones
ZFMA3 (DZ3 in KFM02A, DZ2 in KFM02B, DZ4 in KFM03A and DZ2 in HFM04; vuggy rock)</th></tr>
<tr><th>Property</th><th>Quantitative estimate</th><th>Span</th><th>Confidence level</th><th>Basis for interpretation</th><th>Comments</th></tr>
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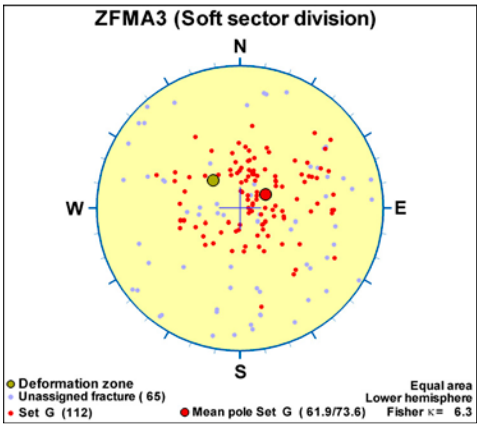

Based on data from KFM02A and KFM03A (N=177)

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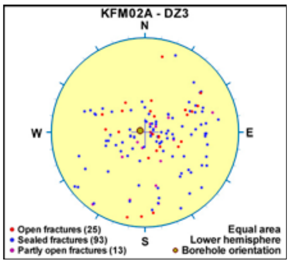

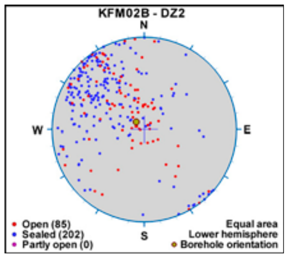

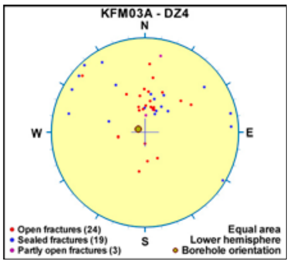

</td></tr>
<tr><td>Fracture frequency</td><td>Mean 10 m^{-1}</td><td>Span 0-87 m^{-1}</td><td>Medium</td><td>Intersections along KFM02A (DZ3), KFM02B (DZ2) and KFM03A (DZ4)</td><td>Sealed and open fractures. Quantitative estimate and span include crush zone in the upper part of the zone in KFM02A and sealed fracture networks in KFM02B</td></tr>
<tr><td>Fracture filling</td><td></td><td></td><td>Medium</td><td>Intersections along KFM02A (DZ3), KFM02B (DZ2) and KFM03A (DZ4)</td><td>Calcite, chlorite, quartz, hematite/adularia, pyrite, clay minerals, prehnite. Note high frequency of fractures with no mineral coating/filling</td></tr>
</table>

<table>
<tr><th colspan="6">Gently-dipping brittle deformation zones
ZFMA3 (DZ3 in KFM02A, DZ2 in KFM02B, DZ4 in KFM03A and DZ2 in HFM04; vuggy rock)</th></tr>
<tr><th>Property</th><th>Quantitative estimate</th><th>Span</th><th>Confidence level</th><th>Basis for interpretation</th><th>Comments</th></tr>
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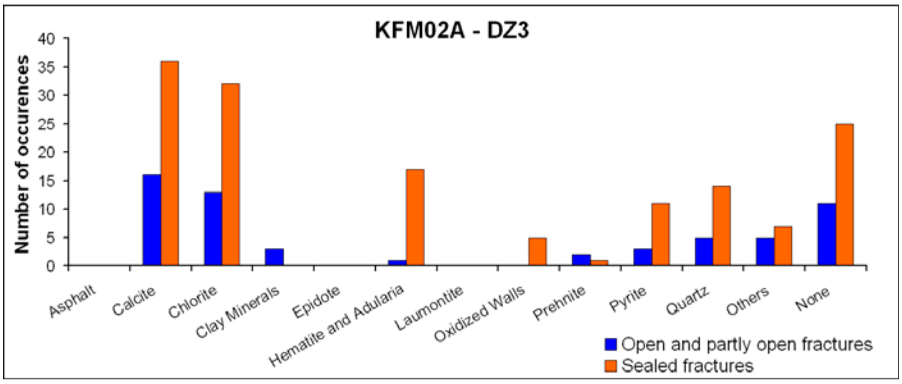
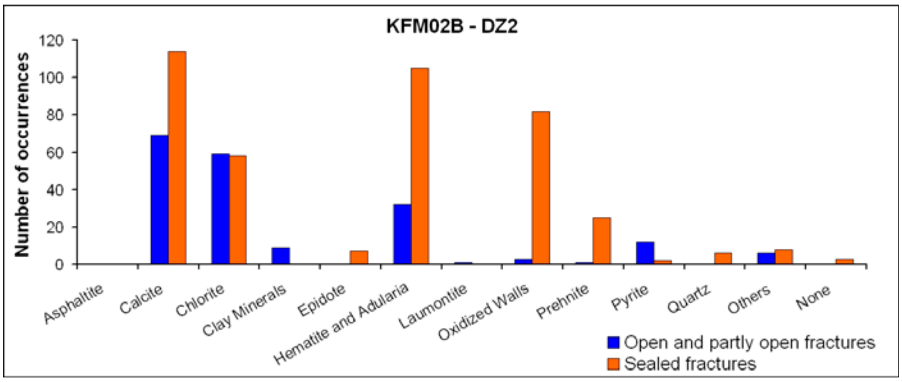
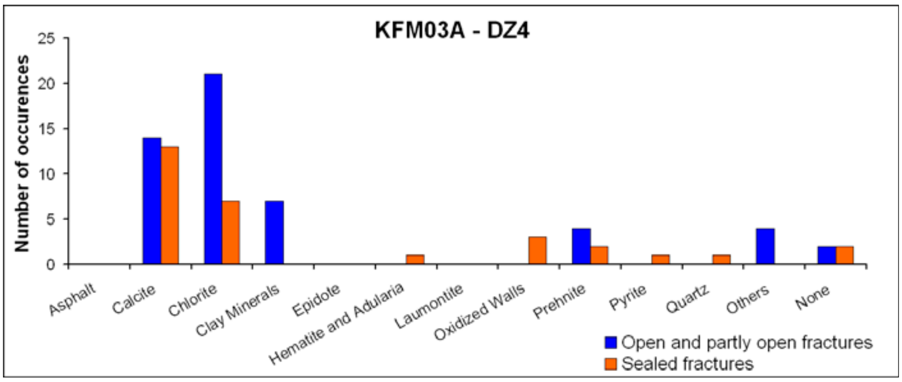




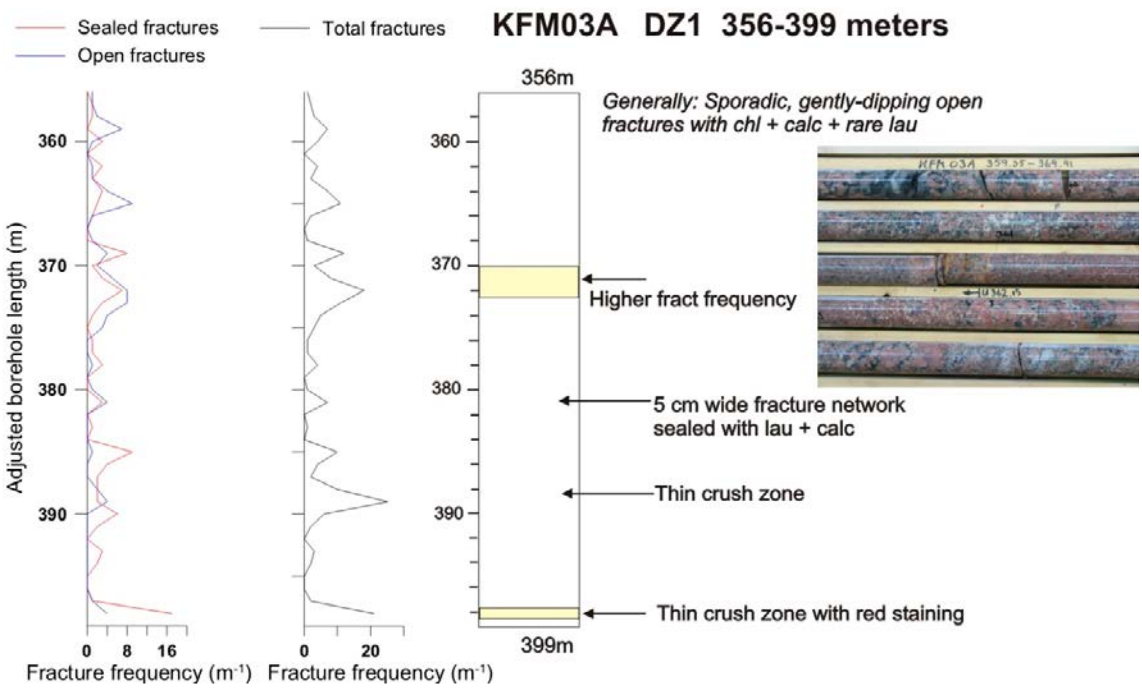


</td></tr>
<tr><td>Sense of displacement</td><td></td><td></td><td>Medium</td><td>Minor faults along DZ3 in KFM02A. Faults with chlorite, calcite and hematite striae

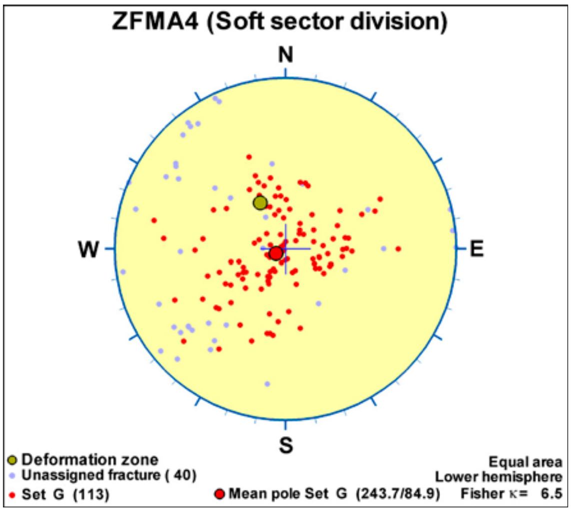
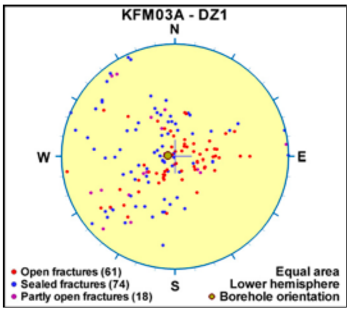
Minor, gently dipping faults along DZ2 in KFM02B. Faults with calcite striae</td><td>DZ3, KFM02A. Dip-slip reverse faults in possible conjugate system. Oblique to strike-slip striae present on faults with the same strike.

DZ2, KFM02B. Dip-slip movement. Sense of shear not determined.

No fault-slip data observed along DZ4 in KFM03A</td></tr>
</table>

Gently-dipping brittle deformation zones **ZFMA4 (DZ1 in KFM03A, DZ2 in HFM18 and DZ1, DZ2 in HFM26)**					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Modelling procedure: Corresponds to seismic reflector A4, the position of which in 3D space has been attained from Cosma et al. (2003). Terminated against ZFMWNW0001, ZFMWNW0023, ZFMWNW0123, ZFMNNW0823 and ZFMNNE0828. Fixed point intersections at 389 m along DZ1 (356-399 m) in KFM03A, at 46 m along DZ2 (36-49 m) in HFM18 and at 70 m along DZ2 (60-95 m) in HFM26. Low radar amplitude also observed at 386-390 m along DZ1 in KFM03A. Zone also intersects DZ1 (12-46 m) in HFM26. Included only in regional model. Not present inside local model volume.					
Confidence of existence: High					
Single hole interpretation: For identification and short description of deformation zones in boreholes, see SKB P-04-118, SKB P-04-120 and SKB P-06-208. For character and kinematics of DZ1 in KFM03A, see SKB P-06-212. DZ1 in KFM03A occurs in heterogeneous rock interval with pegmatitic granite, fine- to medium metatonalite (Group C rock) and medium-grained metagranite. A few narrow intervals along DZ1 in KFM03A show stronger crushing and hematite alteration (e.g. close to the base of the zone 398 m). Otherwise the zone is characterised by an increase in fracture frequency over some short intervals. Fault-slip data present along two fractures, both gently and steeply dipping. Hydraulic contact between KFM03A and HFM18 (see P-04-307) is inferred to occur via ZFMB1 that splays off ZFMA3.  After SKB P-06-212					
Position		± 15 m (general) KFM03A: dx (m) 12, dy (m) 12, dz (m) 1	High	Intersections along KFM03A (DZ1), HFM18 (DZ2) and HFM26 (DZ1, DZ2), seismic reflector A4	Span estimate refers to the uncertainty in the position of the central part of the zone. General estimate for seismic reflector based on Cosma et al. (2003)

Gently-dipping brittle deformation zones ZFMA4 (DZ1 in KFM03A, DZ2 in HFM18 and DZ1, DZ2 in HFM26)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Orientation (strike/dip, right-hand-rule method)	061/25	± 4 /± 1	High	Seismic reflector A4	Strike from Cosma et al. (2003), dip from Juhlin et al. (2002). Span from both sources
Thickness	26 m	13-39 m	Medium	Intersections along KFM03A (DZ1), HFM18 (DZ2) and HFM26 (DZ2). Modelled thickness is mean value and span is the range in thickness in the three boreholes	Zone consists of several, narrower high-strain segments (sub-zones) that are inferred to diverge and converge in a complex pattern. These sub-zones separate less deformed bedrock segments. In KFM03A, sections with a higher fracture frequency occur along <5 m thick intervals at c. 370 m, at c. 390 m and at 399 m borehole lengths. Thickness refers to total zone thickness (damage zones and cores)
Length	3623 m		Low	Intersections along KFM03A (DZ1), HFM18 (DZ2) and HFM26 (DZ1, DZ2), seismic reflector A4. Terminated against ZFMWNW0001, ZFMWNW0023, ZFMWNW0123, ZFMNNW0823 and ZFMNNE0828	Total trace length at ground surface
Ductile deformation			High	Intersections along KFM03A (DZ1), HFM18 (DZ2) and HFM26 (DZ1, DZ2)	Not present
Brittle deformation			High	Intersections along KFM03A (DZ1), HFM18 (DZ2) and HFM26 (DZ1, DZ2)	Increased frequency of fractures. Fault core intervals with elevated fracture frequency and crush zone along DZ1 in KFM03A. Complementary data not provided from percussion boreholes
Alteration			Medium	Intersections along KFM03A (DZ1), HFM18 (DZ2) and HFM26 (DZ1, DZ2)	Red-stained bedrock with fine-grained hematite dissemination. Little alteration in KFM03A (DZ1) and alteration in the lower part of the zone in HFM18 (beneath 42 m borehole length)
Fracture orientation (strike/dip, right-hand-rule method)	Mean orientation of gently dipping fracture set = 334/5	Fisher κ value of gently dipping fracture set = 7	Medium	Intersection along KFM03A (DZ1), N = 153	Gently dipping fractures dominate. Variable orientation

<table>
<tr><th colspan="6">Gently-dipping brittle deformation zones
ZFMA4 (DZ1 in KFM03A, DZ2 in HFM18 and DZ1, DZ2 in HFM26)</th></tr>
<tr><th>Property</th><th>Quantitative estimate</th><th>Span</th><th>Confidence level</th><th>Basis for interpretation</th><th>Comments</th></tr>
<tr><td></td><td colspan="3">
</td><td colspan="2">
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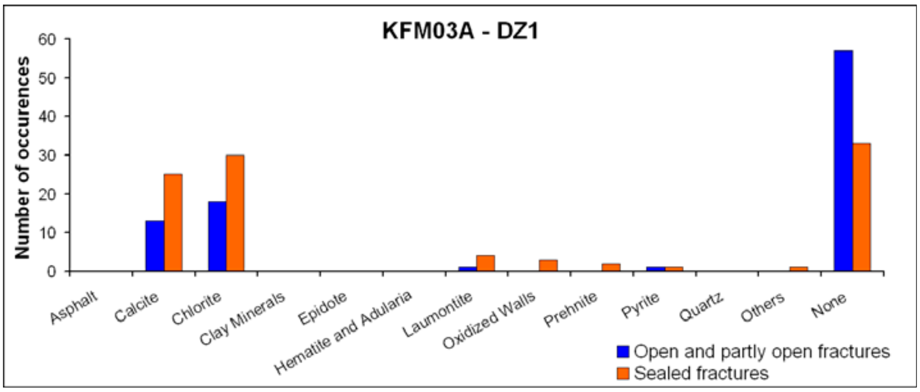
<tr><td>Fracture frequency</td><td>Mean 9 m^{-1}</td><td>Span 0-104 m^{-1}</td><td>Medium</td><td>Intersection along KFM03A (DZ1)</td><td>Open and sealed fractures. Quantitative estimate and span include crush zones and sealed fracture networks</td></tr>
<tr><td rowspan="2">Fracture filling</td><td></td><td></td><td>Medium</td><td>Intersection along KFM03A (DZ1)</td><td>Chlorite, calcite. Laumontite present along steeply dipping fractures (strike ENE) and along a gently dipping fracture. Note high frequency of fractures with no mineral coating/filling</td></tr>
<tr><td colspan="5">
</td></tr>
<tr><td>Sense of displacement</td><td></td><td></td><td>Low</td><td>Two minor faults along DZ1 in KFM03A. Faults with chlorite striae</td><td>Dip-slip movement along minor fault that dips gently to the SSE. Strike-slip movement along minor fault that is steeply dipping and strikes NS.
Complementary data not provided from percussion boreholes</td></tr>
</table>

Gently-dipping brittle deformation zones

ZFMA5 (DZ1 in KFM03B, DZ1 in HFM06 and DZ1 in HFM08)

Property	Quantitative estimate	Span	Confidence level	Basis for interpretation	Comments

Modelling procedure: Corresponds to seismic reflector A5, the position of which in 3D space has been attained from Cosma et al. (2003). Termination against ZFMWNW0023, ZFMNNW823 and ZFMNNE0828. Fixed point intersections at 40 m along DZ1 (24-42 m) in KFM03B, at 70 m along DZ1 (61-71 m) in HFM06 and at 137 m along DZ1 (136-141 m) in HFM08. Included only in regional model. Not present inside local model volume.

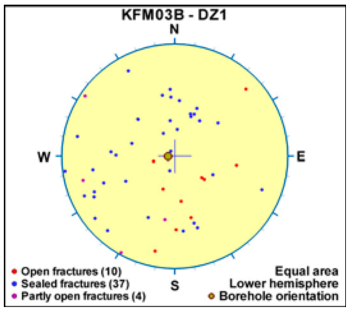
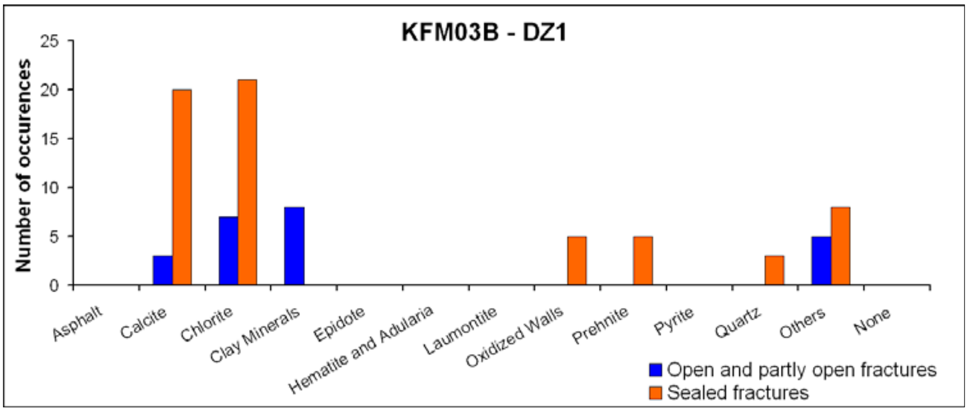
Confidence of existence: Medium (based on low fracture frequency and limited bedrock alteration)

Single hole interpretation: For identification and short description of deformation zones in boreholes, see SKB P-04-118. For character and kinematics of DZ2 in KFM03B (note comment below), see SKB P-06-212.

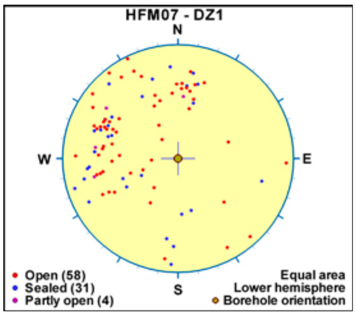
DZ1 in KFM03B occurs along and close to the contact between pegmatitic granite and amphibolite. DZ2 along borehole section 62-67 m in KFM03B is c. 4 m thick and is situated c. 20 m beneath the base of DZ1 in this borehole. It is possibly a separate sub-zone to ZFMA5. Only DZ2 in KFM03B has been inspected for fault-slip data. Evidence for shear displacement is absent.

KFM03B (DZ1)

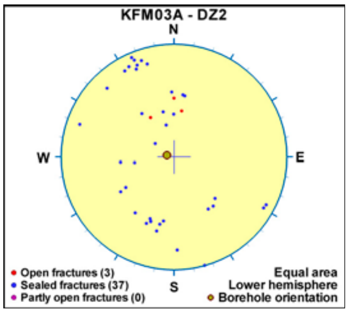
Property	Quantitative estimate	Span	Confidence level	Basis for interpretation	Comments
Position		± 15 m (general) **KFM03B** dx (m): 1, dy (m): 1, dz (m): 0	High	Intersections along KFM03B (DZ1), HFM06 (DZ1) and HFM08 (DZ1), seismic reflector A5	Span estimate refers to the uncertainty in the position of the central part of the zone. General estimate for seismic reflector based on Cosma et al. (2003).
Orientation (strike/dip, right-hand-rule method)	075/31	± 1/± 2	High	Seismic reflector A5	Mean value and span based on Juhlin et al. (2002) and Cosma et al. (2003)
Thickness	16 m	5-16 m	Medium	Intersection along the cored borehole KFM03B (DZ1). Span is the range in thickness in the three boreholes	Thickness refers to total zone thickness (damage zone and core)
Length	2839 m		Low	Intersections along KFM03B (DZ1), HFM06 (DZ1) and HFM08 (DZ1). Terminated against ZFMWNW0023, ZFMNNW0823 and ZFMNNE0828	Total trace length at ground surface

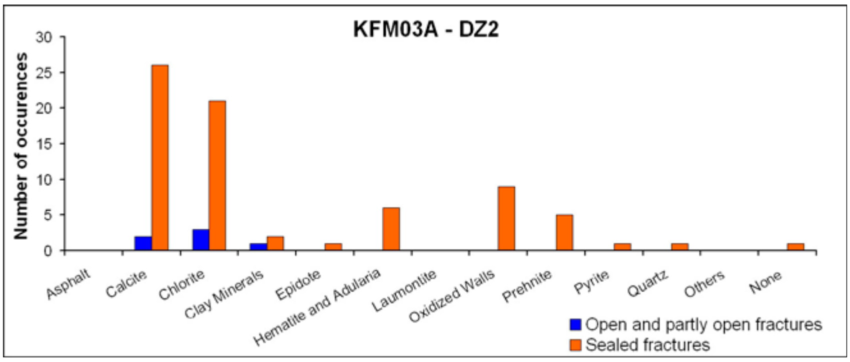
Gently-dipping brittle deformation zones ZFMA5 (DZ1 in KFM03B, DZ1 in HFM06 and DZ1 in HFM08)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Ductile deformation			High	Intersections along KFM03B (DZ1), HFM06 (DZ1) and HFM08 (DZ1)	Not present
Brittle deformation			Medium	Intersections along KFM03B (DZ1), HFM06 (DZ1) and HFM08 (DZ1)	Note only slight increase in frequency of fractures. Complementary data not provided from percussion boreholes
Alteration			Medium	Intersections along KFM03B (DZ1), HFM06 (DZ1) and HFM08 (DZ1)	Red-stained bedrock with fine-grained hematite dissemination. Only limited occurrence in KFM03B (DZ1)
Fracture orientation (strike/dip, right-hand-rule method)				Intersections along KFM03B (DZ1), N = 51	Gently dipping fractures dominate. Variable orientation. No mean value estimated 
Fracture frequency	Mean 3 m^{-1}	Span 0-8 m^{-1}	Medium	Intersection along KFM03B (DZ1)	Sealed and open fractures. Quantitative estimate and span include crush zones
Fracture filling			Medium	Intersection along KFM03B (DZ1)	Chlorite, calcite, clay minerals. Quartz and prehnite along more steeply dipping fractures
	 				
Sense of displacement				Intersection along KFM03B (DZ1)	No complementary data from DZ1 in KFM03B (and from percussion boreholes). Furthermore, no fault-slip data observed along DZ2 in KFM03B (see comment above)

Gently-dipping brittle deformation zones ZFMA6 (DZ1 in HFM07)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Modelling procedure: Corresponds to seismic reflector A6, the position of which in 3D space has been attained from Cosma et al. (2003). The zone has been divided into two separate segments with different terminations. The eastern part is terminated against ZFMWNW0023, ZFMNNW0823 and ZFMNNE0828, while the western part is terminated against ZFMWNW0023 and ZFMWNW0123. Fixed point intersection at 59 m along DZ1 (54-66 m) in HFM07. Included only in regional model. Not present inside local model volume.					
Confidence of existence: High					
Single hole interpretation: For identification and short description of deformation zone in HFM07, see SKB P-04-118.					
Position		± 15 m (general) **HFM07** dx (m): 2 dy (m): 2 dz (m): 0	High	Intersection along HFM07 (DZ1), seismic reflector A6	Span estimate refers to the uncertainty in the position of the central part of the zone. General estimate for seismic reflector based on Cosma et al. (2003).
Orientation (strike/dip, right-hand-rule method)	075/31	± 2/± 1	High	Seismic reflector A6	Strike from Juhlin et al. (2002), dip from Cosma et al. (2003). Span from both sources
Thickness	10 m	6-32 m	Medium	Intersection along HFM07 (DZ1). Span based on comparison with estimated thickness of other gently dipping zones excluding ZFMA2, ZFMA3 and ZFMF1	Thickness refers to total zone thickness (damage zone and core).
Length	3020 m		Low	Intersection along HFM07 (DZ1), seismic reflection A6. Terminated against ZFMWNW0023, ZFMWNW0123, ZFMNNW0823 and ZFMNNE0828	Total trace length at ground surface
Ductile deformation			High	Intersection along HFM07 (DZ1)	Not present
Brittle deformation			High	Intersection along HFM07 (DZ1)	Increased frequency of fractures. Complementary data not provided from percussion borehole
Alteration			Medium	Intersection along HFM07 (DZ1)	Red-stained bedrock with fine-grained hematite dissemination, chloritization

Gently-dipping brittle deformation zones ZFMA6 (DZ1 in HFM07)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Fracture orientation (strike/dip, right-hand-rule method)				Intersection along HFM07 (DZ1), N = 93	Fractures that dip to the south and east dominate. Variable orientation. No mean value estimated 
Fracture frequency	Mean 8 m^{-1}	Span 4-11 m^{-1}	Low	Intersection along HFM07 (DZ1)	Open and sealed fractures
Fracture filling			Low	Intersection along HFM07 (DZ1)	Chlorite, calcite
Sense of displacement				Intersection along HFM07 (DZ1)	No complementary data from percussion borehole

Gently-dipping brittle deformation zones ZFMA7 (DZ2 in KFM03A and DZ3 in HFM18)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Modelling procedure: Corresponds to seismic reflector A7, the position of which in 3D space has been attained from Balu and Cosma (2005). Terminated against ZFMWNW0001, ZFMWNW0023, ZFMWNW0123, ZFMNNW0823 and ZFMNNE0828. Fixed point intersections at 450 m along DZ2 (448-505 m) in KFM03A and at 144 m along DZ3 (119-148 m) in HFM18. Low radar amplitude also observed at 450-505 m along DZ2 in KFM03A. The steeply dipping zone ZFMNE0065 is also modelled to intersect DZ3 in HFM18. Included only in regional model. Not present inside local model volume.					
Confidence of existence: High					
Single hole interpretation: For identification and short description of deformation zones in boreholes, see SKB P-04-118 and SKB P-04-120. For character and kinematics of DZ2 in KFM03A, see SKB P-06-212. DZ2 in KFM03A occurs in close spatial association with a thicker amphibolite body. Fine fracture network with quartz and epidote cut by open fracture with chlorite and corrensite occurs at 450-501 m. Apart from this narrow interval, which defines the fault core, the zone shows a “damage zone” character. Fault-slip data only observed on one steeply dipping fracture. The gently dipping fractures do not show evidence for shear deformation.					
KFM03A (DZ2) 					
Position		± 15 m (general) **KFM03A** dx (m) / dy (m) / dz (m) 14 / 14 / 1 **HFM18** 6 / 6 / 4	High	Intersections along KFM03A (DZ2) and HFM18 (DZ3), seismic reflector A7	Span estimate refers to the uncertainty in the position of the central part of the zone. General estimate for seismic reflector based on Cosma et al. (2003)
Orientation (strike/dip, right-hand-rule method)	055/23	- 10 /- 7	High	Seismic reflector A7	Strike and dip based on Juhlin et al. (2004). Span based on Juhlin et al. (2004) and Balu and Cosma (2005)

Gently-dipping brittle deformation zones ZFMA7 (DZ2 in KFM03A and DZ3 in HFM18)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Thickness	7 m	6-32 m	Medium	Intersection along cored borehole KFM03A (DZ2). Span based on comparison with estimated thickness of other gently dipping zones excluding ZFMA2, ZFMA3 and ZFMF1	Thickness refers to total zone thickness (damage zone and core)
Length	3483 m		Low	Intersections along KFM03A (DZ2) and HFM18 (DZ3), seismic reflector A7. Terminated against ZFMWNW0001, ZFMWNW0023, ZFMWNW0123, ZFMNNW0823 and ZFMNNE0828	Total trace length at ground surface
Ductile deformation			High	Intersections along KFM03A (DZ2) and HFM18 (DZ3)	Not present
Brittle deformation			High	Intersections along KFM03A (DZ2) and HFM18 (DZ3)	Increased frequency of fractures. Fault core interval with sealed fracture network along DZ2 in KFM03A. No complementary data from percussion borehole
Alteration			Medium	Intersections along KFM03A (DZ2) and HFM18 (DZ3)	Red-stained bedrock with fine-grained hematite dissemination
Fracture orientation (strike/dip, right-hand-rule method)		Fisher κ value		Intersection along KFM03A (DZ2), N = 40	Gently dipping fractures are conspicuous. Variable orientation. No mean value estimated 
Fracture frequency	7 m^{-1}	Span 3-13 m^{-1}	Medium	Intersection along KFM03A (DZ2)	Open and sealed fractures. Quantitative estimate and span exclude sealed fracture network at 144-145 m depth interval in HFM18, due to uncertainty in the estimation of fracture frequency in such structures
Fracture filling			Medium	Intersection along KFM03A (DZ2)	Calcite, chlorite, hematite/adularia, prehnite, clay minerals

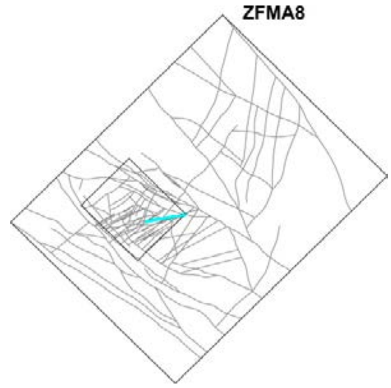
Gently-dipping brittle deformation zones ZFMA7 (DZ2 in KFM03A and DZ3 in HFM18)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
					
Sense of displacement			Low	Minor fault along DZ2 in KFM03A. Fault with chlorite and calcite striae	Strike-slip movement along steeply dipping fault that strikes ENE. No fault-slip data observed from the gently dipping fractures. No complementary data from percussion borehole

Gently-dipping brittle deformation zones

ZFMA8 (DZ1 in KFM06B and DZ1 in HFM16; vuggy rock)

Property	Quantitative estimate	Span	Confidence level	Basis for interpretation	Comments

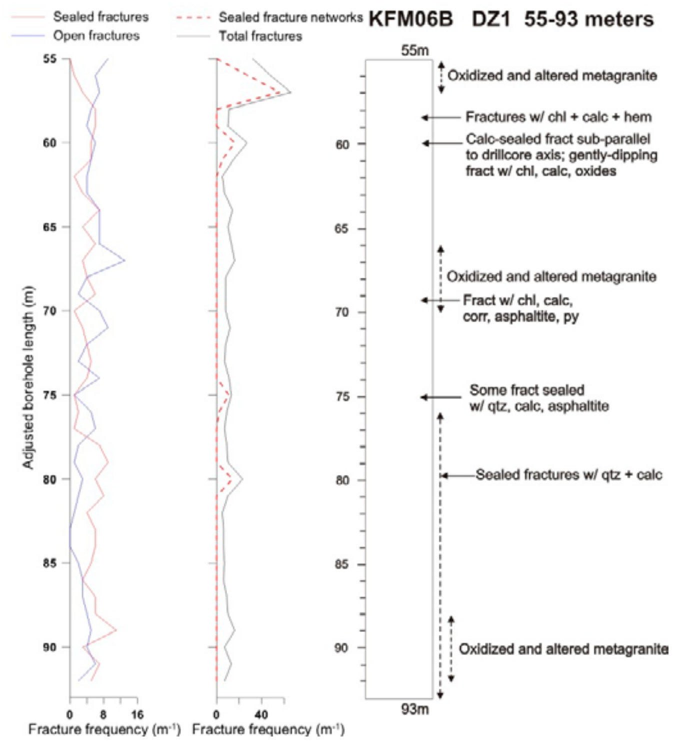
Modelling procedure: Corresponds to seismic reflector A8 identified by Juhlin in Stephens and Skagius (2007). Termination against ZFMA3 and ZFMENE0060A. Reflector is not observed along profiles 1 and 4 (Juhlin in Stephens and Skagius 2007) and is, therefore, restricted in extent to the west. Inferred to intersect borehole intervals 55-93 m in KFM06B (DZ1) and 12-71 m in HFM16 (DZ1). Fixed point intersection placed at 57 m along KFM06B, where there is both a sealed fracture network and a crush zone. Included in regional model and also present inside local model volume.



Confidence of existence: High

Single hole interpretation: For identification and short description of deformation zones in boreholes, see SKB P-05-132 and SKB P-04-120. For character and kinematics of DZ1 in KFM06B, see SKB P-06-212.

Open and sealed, gently dipping fractures dominate in the upper part of DZ1 in KFM06B, which marks the fracture core. Remainder of the zone is "damage zone" in character. Fault-slip data along two fractures.



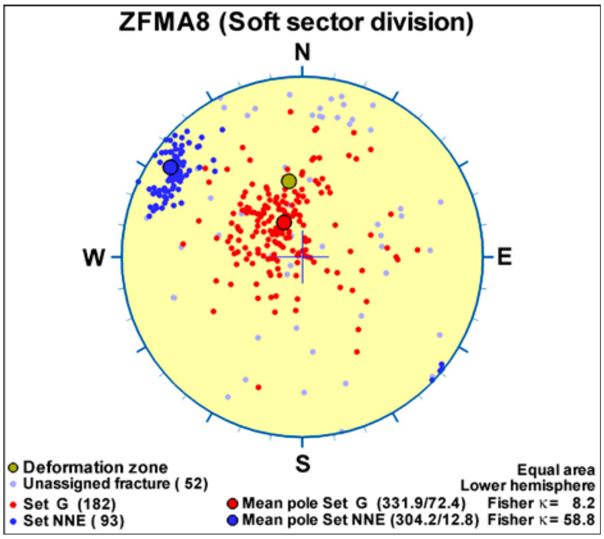
After SKB P-06-212

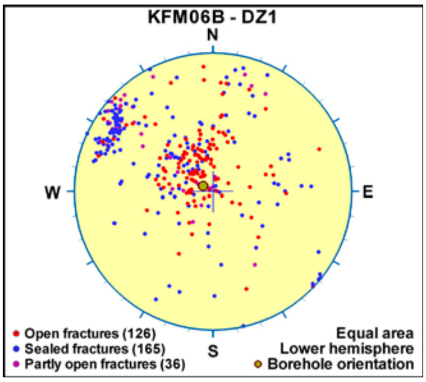
Strong hematite alteration and small fractures filled with quartz and calcite that has been partly dissolved away (after SKB P-06-212)

<table>
<tr><td rowspan="6">Position</td><td rowspan="6"></td><td colspan="3">± 15 m (general)</td><td rowspan="6">High</td><td rowspan="6">Intersections along KFM06B (DZ1) and HFM16 (DZ1), seismic reflector A8</td><td rowspan="6">Span estimate refers to the uncertainty in the position of the central part of the zone. General estimate for seismic reflector based on Cosma et al. (2003)</td></tr>
<tr><td colspan="3">KFM06B</td></tr>
<tr><td>dx (m)</td><td>dy (m)</td><td>dz (m)</td></tr>
<tr><td>2</td><td>2</td><td>0</td></tr>
<tr><td colspan="3">HFM16</td></tr>
<tr><td>1</td><td>1</td><td>0</td></tr>
</table>

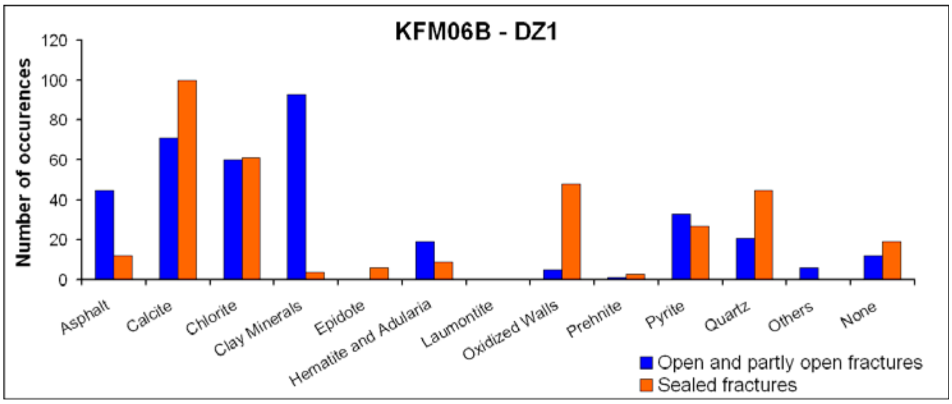
Gently-dipping brittle deformation zones ZFMA8 (DZ1 in KFM06B and DZ1 in HFM16; vuggy rock)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Orientation (strike/dip, right-hand-rule method)	080/35		High	Seismic reflector A8	Juhlin in Stephens and Skagius (2007)
Thickness	32 m	6-32 m	High	Intersection along KFM06B (DZ1). Span based on comparison with estimated thickness of other gently dipping zones excluding ZFMA2, ZFMA3 and ZFMF1	Thickness refers to total zone thickness (damage zone and core)
Length	1860 m		Medium	Seismic reflector A8 and borehole intersections along KFM06B (DZ1) and HFM16 (DZ1). Terminated against ZFMA3 and ZFMENE0060A	Total trace length at ground surface
Ductile deformation			High	Intersections along KFM06B (DZ1) and HFM16 (DZ1)	Not present
Brittle deformation			High	Intersections along KFM06B (DZ1) and HFM16 (DZ1)	Increased frequency of fractures. Sealed fracture network, abundant open fractures and core loss are conspicuous at top of zone in KFM06B. No complementary data from percussion borehole
Alteration			High	Intersections along KFM06B (DZ1) and HFM16 (DZ1)	Red-stained bedrock with fine-grained hematite dissemination. Altered vuggy rock with quartz dissolution between 66 and 70 m along DZ1 in KFM06B
Fracture orientation (strike/dip, right-hand-rule method)	Mean orientation of gently dipping fracture set = 062/18 Mean orientation of NNE fracture set = 034/77	Fisher κ value of gently dipping fracture set = 8 Fisher κ value of NNE fracture set = 59	Medium	Intersection along KFM06B (DZ1), N = 327	Gently dipping fractures and steeply dipping fractures that strike NNE dominate

Gently-dipping brittle deformation zones ZFMA8 (DZ1 in KFM06B and DZ1 in HFM16; vuggy rock)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**





Property	Quantitative estimate	Span	Confidence level	Basis for interpretation	Comments
Fracture frequency	Mean 13 m^{-1}	Span 5-66 m^{-1}	Medium	Intersection along KFM06B (DZ1)	Open and sealed fractures. Quantitative estimate and span include crush zones and sealed fracture networks especially in the upper part of DZ1 in KFM06B
Fracture filling			Medium	Intersection along KFM06B (DZ1)	Calcite, chlorite, clay minerals, pyrite, asphaltite, hematite/adularia, clay minerals. Quartz is common along fractures that dip steeply to the ESE and epidote is present along fractures with gentle dips to the NW. Note also high frequency of fractures with no mineral coating/filling



Property	Quantitative estimate	Span	Confidence level	Basis for interpretation	Comments
Sense of movement			Low	Two minor faults along DZ1 in KFM06B. Faults with chlorite striae	Fault with moderate dip to the west shows a strong, reverse dip-slip component of movement. Strike-slip movement along steeply dipping fault that strikes SSE. No complementary data from percussion borehole

Genty-dipping brittle deformation zones

ZFMB1 (DZ3 in KFM03A)

Property	Quantitative estimate	Span	Confidence level	Basis for interpretation	Comments

Modelling procedure: Corresponds to seismic reflector B1, the position of which in 3D space has been attained from Cosma et al. (2003). Terminated against ZFMWNW0001, ZFMWNW0023, ZFMWNW0123 and ZFMA3. Fixed point intersection at 643 m along DZ3 (638-646 m) in KFM03A. Low radar amplitude also observed at 645-650 m along DZ3 in KFM03A. Included only in regional model. Not present inside local model volume.

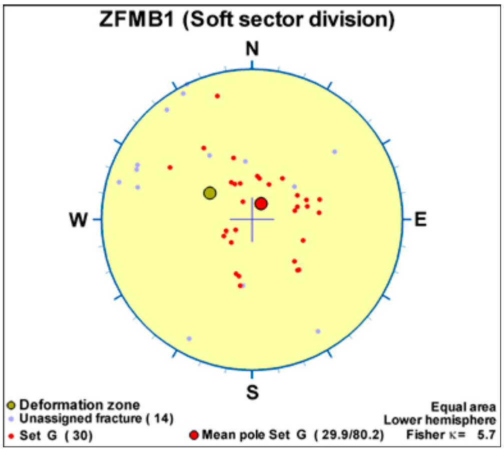
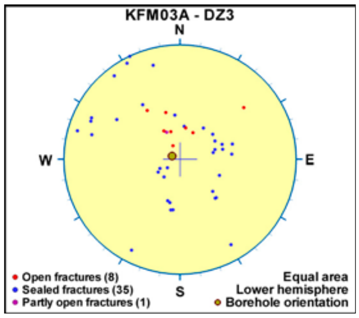
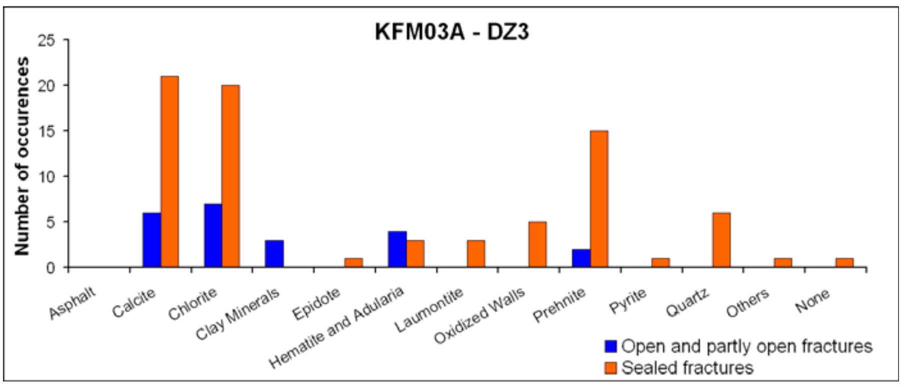
Confidence of existence: High

Single hole interpretation: For identification and short description of deformation zones in boreholes, see SKB P-05-132. For character and kinematics, see SKB P-06-212.

DZ3 in KFM03A occurs in close spatial association with a thicker amphibolite body. Damage zone. No fault-slip data along the fractures.

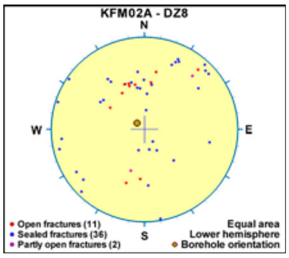
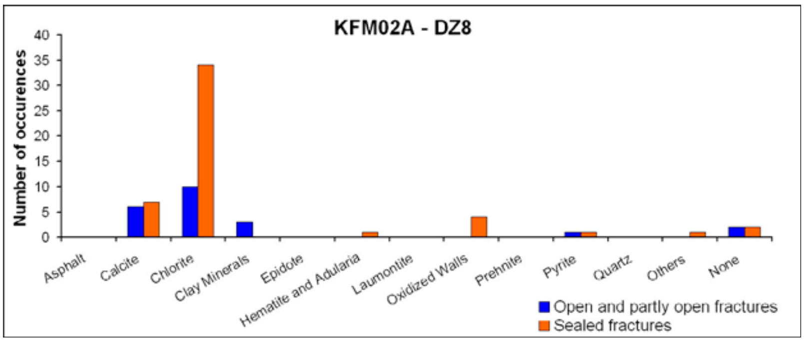
KFM03A (DZ3)

Property	Quantitative estimate	Span	Confidence level	Basis for interpretation	Comments
Position		± 15 m (general) KFM03A: dx (m) 20, dy (m) 20, dz (m) 2	High	Intersection along KFM03A (DZ3), seismic reflector B1	Span estimate refers to the uncertainty in the position of the central part of the zone. General estimate for seismic reflector based on Cosma et al. (2003)
Orientation (strike/dip, right-hand-rule method)	032/27	± 2 /± 2	High	Seismic reflector B1	Strike and dip after Cosma et al. (2003). Span based on Juhlin et al. (2002) and Cosma et al. (2003)
Thickness	7 m	6-32 m	Medium	Intersection along KFM03A (DZ3). Span based on comparison with estimated thickness of other gently dipping zones excluding ZFMA2, ZFMA3 and ZFMF1	Thickness refers to total zone thickness (damage zone and core).
Length	3152		Low	Intersection along KFM03A (DZ3), seismic reflection B1. Terminated against ZFMWNW0001, ZFMWNW0023, ZFMWNW0123 and ZFMA3	Total trace length at ground surface

Genty-dipping brittle deformation zones ZFMB1 (DZ3 in KFM03A)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Ductile deformation			High	Intersection along KFM03A (DZ3)	Not present
Brittle deformation			High	Intersection along KFM03A (DZ3)	Increased frequency of fractures
Alteration			Medium	Intersection along KFM03A (DZ3)	Red-stained bedrock with fine-grained hematite dissemination
Fracture orientation (strike/dip, right-hand-rule method)	Mean orientation of gently dipping fracture set = 120/10	Fisher κ value of gently dipping fracture set = 6	Medium	Intersection along KFM03A (DZ3), N = 44	Gently dipping fractures dominate. Variable orientation
					
Fracture frequency	Mean 6 m^{-1}	Span 1-10 m^{-1}	Medium	Intersection along KFM03A (DZ3)	Sealed and open fractures
Fracture filling			Medium	Intersection along KFM03A (DZ3)	Chlorite, calcite, prehnite, hematite/adularia, quartz, clay minerals. Epidote also present along one gently dipping fracture
					
Sense of displacement				Intersection along KFM03A (DZ3)	No fault-slip data observed

Gently-dipping brittle deformation zones ZFMB23					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Modelling procedure: Corresponds to seismic reflectors B2 and B3, which have been combined into a single zone with two separate segments east and west of zone ZFMNE0065. The positions of these reflectors in 3D space have been attained from Cosma et al. (2003). Modelled to base of regional model volume with termination against ZFMWNW0001, ZFMWNW0023, ZFMNE0065 and ZFMNNW0823 in the eastern segment; and ZFMWNW0001, ZFMNNW0101 and ZFMNE0065 in the western segment. Included only in regional model. Not present inside local model volume.				Does not intersect the surface	
Single hole interpretation: Medium (not confirmed by direct geological observation)					
Position		± 15 m (general)	High	Seismic reflectors B2 and B3	Seismic reflectors B2 and B3 have been combined into a single zone. Span estimate refers to the uncertainty in the position of the central part of the zone. General estimate for seismic reflector based on Cosma et al. (2003)
Orientation (strike/dip, right-hand-rule method)	028/25	± 3/ ± 3	High	Seismic reflectors B2 and B3	Cosma et al. (2003). Consistent with Juhlin et al. (2002)
Thickness	15 m	6-32 m	Low	Span based on comparison with estimated thickness of other gently dipping zones excluding ZFMA2, ZFMA3 and ZFMF1	Thickness refers to total zone thickness (damage zone and core)
Length					ZFMB23 does not intersect the surface. Eastern segment terminated against ZFMWNW0001, ZFMWNW0023, ZFMNE0065 and ZFMNNW0823; western segment terminated against ZFMWNW0001, ZFMNNW0101 and ZFMNE0065
Ductile deformation			Low	Comparison with high confidence, gently dipping zones	Assumed not to be present
Brittle deformation			Low	Comparison with high confidence, gently dipping zones	Assumed to be present
No more data					

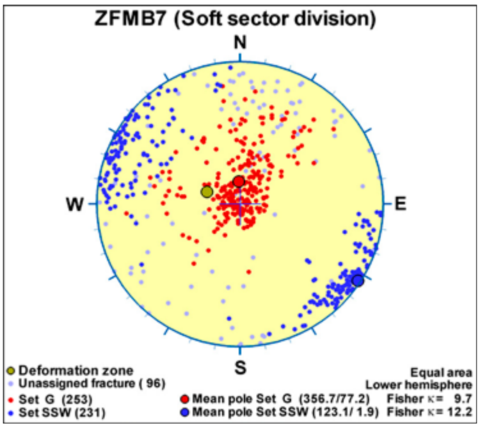
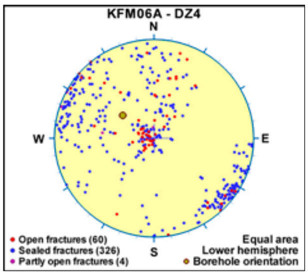
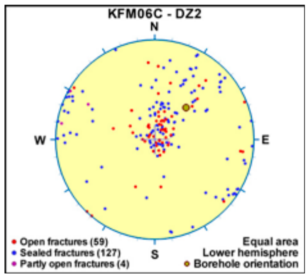
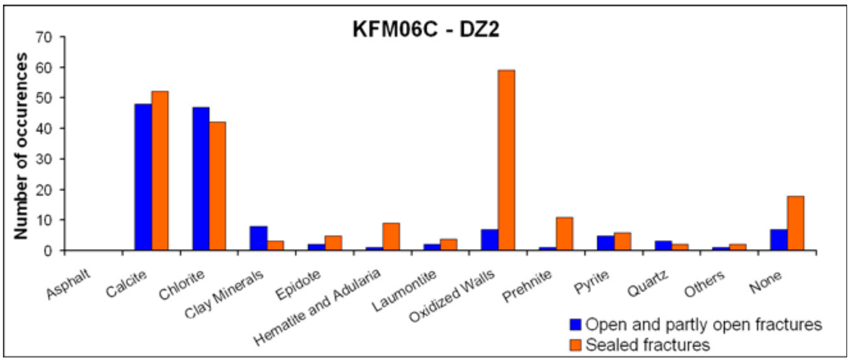
Gently-dipping brittle deformation zones ZFMB4 (DZ8 in KFM02A)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Modelling procedure: Corresponds to seismic reflector B4, the position of which in 3D space has been attained from Cosma et al. (2003). Terminated against ZFMWNW0001, ZFMENE0062A, ZFMNE0065 and ZFMWNW0123. Deformation zone plane placed at fixed point 903 m along DZ8 (893-905 m) in KFM02A. Included in regional model and also present inside local model volume.				Does not intersect the surface	
Confidence of existence: High					
Single hole interpretation: For identification and short description of deformation zones in boreholes, see SKB P-04-117; for character and kinematics, see SKB P-06-212. The fixed point along DZ8 in KFM02A, in the lowermost part of the zone, corresponds to a rock unit boundary between Group B metagranite (lower density) and Group C metatonalite (higher density). There is also a marked increase in the frequency of fractures in the lowermost part of the zone. DZ9 along borehole section 922-925 m in KFM02A is situated c. 15 m beneath the base of DZ8 in this borehole. Fractures with similar orientation in both DZ8 and DZ9 show similar sense of movement. DZ9 is possibly a separate sub-zone related to ZFMB4.					
KFM02A (DZ8)  					
Position		± 15 m (general) **KFM02A** dx (m): 8 dy (m): 8 dz (m): 1	High	Intersection along KFM02A (DZ8), seismic reflector B4	Span estimate refers to the uncertainty in the position of the central part of the zone. General estimate for seismic reflector based on Cosma et al. (2003)
Orientation (strike/dip, right-hand-rule method)	050/29		High	Seismic reflector B4	Strike and dip after Cosma et al. (2003). Consistent with Juhlin et al. (2002). Only 1^{o} difference in dip value in these two contributions
Thickness	12 m	6-32 m	Medium	Intersection along KFM02A (DZ8). Span based on comparison with estimated thickness of other gently dipping zones excluding ZFMA2, ZFMA3 and ZFMF1	Thickness refers to total zone thickness (damage zone and core).
Length					ZFMNE00B4 does not intersect the surface. Terminated against ZFMWNW0001, ZFMENE0062A, ZFMNE0065 and ZFMWNW0123. Termination to the north-west takes account of recommendation in Juhlin et al. (2004)
Ductile deformation			High	Intersection along KFM02A (DZ8)	Not present

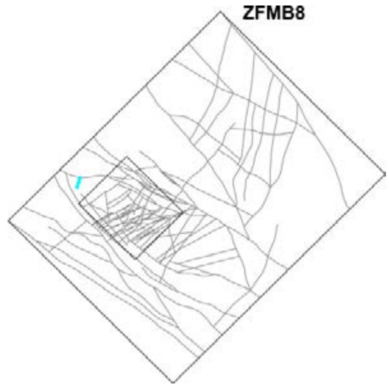
<table>
<tr><th colspan="6">Gently-dipping brittle deformation zones
ZFMB4 (DZ8 in KFM02A)</th></tr>
<tr><th>Property</th><th>Quantitative estimate</th><th>Span</th><th>Confidence level</th><th>Basis for interpretation</th><th>Comments</th></tr>
<tr><td>Brittle deformation</td><td></td><td></td><td>High</td><td>Intersection along KFM02A (DZ8)</td><td>Increased frequency of fractures</td></tr>
<tr><td>Alteration</td><td></td><td></td><td>Medium</td><td>Intersection along KFM02A (DZ8)</td><td>Not present</td></tr>
<tr><td>Fracture orientation (strike/dip, right-hand-rule method)</td><td></td><td></td><td></td><td>Intersection along KFM02A (DZ8), N = 49</td><td>Fractures show variable orientation. No mean value calculated

</td></tr>
<tr><td>Fracture frequency</td><td>5 m^{-1}</td><td>Span 0-20 m^{-1}</td><td>Medium</td><td>Intersection along KFM02A (DZ8)</td><td>Sealed and open fractures</td></tr>
<tr><td rowspan="2">Fracture filling</td><td></td><td></td><td>Medium</td><td>Intersection along KFM02A (DZ8)</td><td>Chlorite, calcite, clay minerals</td></tr>
<tr><td colspan="5">
</td></tr>
<tr><td>Sense of displacement</td><td></td><td></td><td>Medium</td><td>Five minor faults along DZ8 in KFM02A. Four minor faults along DZ9 in KFM02A (see discussion above). Faults with striae on chlorite (DZ8), and calcite and laumontite (DZ9)</td><td>Gently south-east and south-dipping faults (7) show dip-slip sense of movement. Reverse dip-slip movement along two of these faults</td></tr>
</table>

Gently-dipping brittle deformation zones ZFMB5					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Modelling procedure: Corresponds to seismic reflector B5, which has been divided into two separate segments east and west of zone ZFMNE0065. The position of the reflector in 3D space has been attained from Cosma et al. (2003). Modelled to base of regional model volume with termination against ZFMWNW0001, ZFMWNW0023, ZFMNE0065, ZFMNNW0823 and ZFMNNW0101 in the eastern segment; and ZFMNNW0101 and ZFMNE0065 in the western segment. Included only in regional model. Not present inside local model volume.				Does not intersect the surface	
Confidence of existence: Medium (not confirmed by direct geological observation)					
Position		± 15 m (general)	High	Seismic reflector B5	Span estimate refers to the uncertainty in the position of the central part of the zone. General estimate for seismic reflector based on Cosma et al. (2003)
Orientation (strike/dip, right-hand-rule method)	056/18	± 6/ ± 9	High	Seismic reflector B5	Strike and dip after Cosma et al. (2003). Consistent with Juhlin et al. (2002)
Thickness	15 m	6-32 m	Low	Span based on comparison with estimated thickness of other gently dipping zones excluding ZFMA2, ZFMA3 and ZFMF1	Thickness refers to total zone thickness (damage zone and core)
Length					ZFMB5 does not intersect the surface. Eastern segment terminated against ZFMWNW0001, ZFMWNW0023, ZFMNE0065, ZFMNNW0823 and ZFMNNW0101; western segment terminated against ZFMNNW0101 and ZFMNE0065
Ductile deformation			Low	Comparison with high confidence, gently dipping zones	Assumed not to be present
Brittle deformation			Low	Comparison with high confidence, gently dipping zones	Assumed to be present
No more data					

Gently-dipping brittle deformation zones ZFMB6					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Modelling procedure: Corresponds to seismic reflector B6, the position of which in 3D space has been attained from Balu and Cosma (2005). Modelled to base of regional model volume with termination against ZFMWNW0001, ZFMWNW0023, ZFMNE0065 and ZFMNNW0823. Included only in regional model. Not present inside local model volume.				Does not intersect the surface	
Confidence of existence: Medium (not confirmed by direct geological observation)					
Position		± 15 m (general)	High	Seismic reflector B6	Span estimate refers to the uncertainty in the position of the central part of the zone. General estimate for seismic reflector based on Cosma et al. (2003)
Orientation (strike/dip, right-hand-rule method)	030/32		High	Seismic reflector B6	Balu and Cosma (2005). Consistent with Juhlin et al. (2004)
Thickness	15 m	6-32 m	Low	Span based on comparison with estimated thickness of other gently dipping zones excluding ZFMA2, ZFMA3 and ZFMF1	Thickness refers to total zone thickness (damage zone and core)
Length					ZFMB6 does not intersect the surface. Terminated against ZFMWNW0001, ZFMWNW0023, ZFMNE0065 and ZFMNNW0823
Ductile deformation			Low	Comparison with high confidence, gently dipping zones	Assumed not to be present
Brittle deformation			Low	Comparison with high confidence, gently dipping zones	Assumed to be present
No more data					

<table>
<tr><th colspan="6">Gently-dipping brittle deformation zones
ZFMB7 (DZ4 in KFM06A and DZ2 in KFM06C; vuggy rock)</th></tr>
<tr><th>Property</th><th>Quantitative estimate</th><th>Span</th><th>Confidence level</th><th>Basis for interpretation</th><th>Comments</th></tr>
<tr><td colspan="4">Modelling procedure: Corresponds to seismic reflector B7, the position of which in 3D space has been attained from Balu and Cosma (2005). Terminated against ZFMWNW0809A, ZFMNNE0725 and ZFMENE0401A. Deformation zone plane placed at fixed point 324 m along DZ4 (318-358 m) in KFM06A and at 361 m along DZ2 (359-400 m) in KFM06C. The steeply dipping zone ZFMENE0060A is also modelled to intersect DZ4 in KFM06A. Zone ZFMB7 included in regional model and also present inside local model volume.</td><td colspan="2">Does not intersect the surface</td></tr>
<tr><td colspan="6">Confidence of existence: High</td></tr>
<tr><td colspan="6">Single hole interpretation: For identification and short description of deformation zones in boreholes, see SKB P-05-132 and SKB P-06-83. For character and kinematics of DZ4 in KFM06A, see SKB P-06-212; for character and kinematics of DZ2 in KFM06C, see SKB P-07-101.
Since the steeply dipping zone ZFMENE0060A is also modelled to intersect DZ4 in KFM06A, a more detailed description based on the information in SKB P-06-212 is provided in the property table for ZFMENE0060A. In general, fracture frequencies along DZ2 in KFM06C are moderate and the zone has a “damage zone” character. Conspicuous sealed fracture network and crush zone are present in the lower part (394-395 m) of the intersection along borehole KFM06C. However, no fault cores were identified in this borehole.</td></tr>
<tr><td>Position</td><td></td><td>± 15 m (general)<table><tr><th colspan="3">KFM06A</th></tr><tr><td>dx (m)</td><td>dy (m)</td><td>dz (m)</td></tr><tr><td>3</td><td>3</td><td>2</td></tr><tr><th colspan="3">KFM06C</th></tr><tr><td>4</td><td>4</td><td>3</td></tr></table></td><td>High</td><td>Intersections along KFM06A (DZ4) and KFM06C (DZ2), seismic reflector B7</td><td>Span estimate refers to the uncertainty in the position of the central part of the zone. General estimate for seismic reflector based on Cosma et al. (2003)</td></tr>
<tr><td>Orientation (strike/dip, right-hand-rule method)</td><td>020/20</td><td>± 5/ + 2</td><td>High</td><td>Seismic reflector B7</td><td>Strike after Juhlin et al. (2004) and Balu and Cosma (2005). Dip after Juhlin et al. (2004)</td></tr>
<tr><td>Thickness</td><td>28 m</td><td>6-32 m</td><td>Medium</td><td>Intersection along KFM06C (DZ2). Span based on comparison with estimated thickness of other gently dipping zones excluding ZFMA2, ZFMA3 and ZFMF1</td><td>Thickness refers to total zone thickness (damage zone and core). Borehole intersection in KFM06A (DZ4) not included due to interference with ZFMENE0060A</td></tr>
<tr><td>Length</td><td></td><td></td><td></td><td></td><td>ZFMB7 does not intersect the surface. Terminated against ZFMWNW0809A, ZFMWNNE0725 and ZFMENE0401A</td></tr>
<tr><td>Ductile deformation</td><td></td><td></td><td>High</td><td>Intersections along KFM06A (DZ4) and KFM06C (DZ2)</td><td>Not present</td></tr>
<tr><td>Brittle deformation</td><td></td><td></td><td>High</td><td>Intersections along KFM06A (DZ4) and KFM06C (DZ2)</td><td>Increased frequency of fractures. Fault core interval along DZ4 in KFM06A with sealed fracture network. Cataclasite also present along the zone in this borehole. No fault cores identified along DZ2 in KFM06C but sealed fracture network and crush zone in lower part</td></tr>
<tr><td>Alteration</td><td></td><td></td><td>High</td><td>Intersections along KFM06A (DZ4) and KFM06C (DZ2)</td><td>Red-stained bedrock with fine-grained hematite dissemination. Vuggy rock with quartz dissolution at 332-333 m along DZ4 in KFM06A</td></tr>
</table>

Gently-dipping brittle deformation zones ZFMB7 (DZ4 in KFM06A and DZ2 in KFM06C; vuggy rock)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Fracture orientation (strike/dip, right-hand-rule method)	Mean orientation of gently dipping fracture set = 087/13 Mean orientation of SSW fracture set = 213/88	Fisher κ value of gently dipping fracture set = 10 Fisher κ value of SSW fracture set = 12	Medium	Intersections along KFM06A (DZ4) and KFM06C (DZ2), N = 580	Two sets of fractures are conspicuous. One of these sets strikes SSW and dips steeply to the WNW, the other is gently dipping
					
Fracture frequency	14 m^{-1}	0-97 m^{-1}	Medium	Intersection along KFM06C (DZ2)	Dominance of sealed fractures. Mean value and span include sealed fracture networks and crush zones
Fracture filling			Medium	Intersection along KFM06C (DZ2)	Calcite and chlorite. Clay minerals, pyrite, prehnite, hematite/adularia, epidote and laumontite are also locally present. Note also fractures with no mineral coating/filling
					
Sense of displacement			Low	Minor faults along DZ4 in KFM06A. Striations or steps of chlorite and some calcite Minor faults along DZ2 in KFM06C. Striations or steps of chlorite	*DZ4 along KFM06A*. Sub-horizontal fault shows dip-slip movement. Two steeply dipping faults with SW strike show oblique movement with dominant strike-slip component. *DZ2 along KFM06C*. Dip-slip or oblique-slip with a reverse component of displacement along gently dipping faults. Dextral strike-slip along steeply dipping fault with NW strike

Gently-dipping brittle deformation zones ZFMB8 (316-322 m interval in DBT1/KFK001)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Modelling procedure: Corresponds to seismic reflector B8, the position of which in 3D space has been attained from Cosma et al. (2006). Termination against ZFMNW1200, ZFMNNW0100, ZFMEW0137, ZFMENE2320 and boundary to rock domain RFM025. Modelling takes account of a fixed point intersection at 317 m along borehole interval 316-322 m in DBT1/KFK001 and the results from the drilling of HFM31, where the zone was not intersected. Zone is modelled to lie close to the base of borehole KFM07A. The position of borehole DBT1/KFK001 is uncertain. Zone ZFMB8 is included in regional model and also present inside local model volume.					
Confidence of existence: High					
Single hole interpretation: For identification and short description of DZ4 in KFM07A, see P-05-157. For character and kinematics of part of DZ4 (920-999 m) in KFM07A, see SKB P-06-212. Since the steeply dipping zone ZFMNNW0100 is also modelled to intersect the 920-999 m interval along DZ4 in KFM07A, a more detailed description based on the information in SKB P-06-212 is provided in the property table for ZFMNNW0100.					
Position		± 15 m (general)	High	Intersections along borehole interval 316-322 m in DBT1/KFK001, seismic reflector B8	Span estimate refers to the uncertainty in the position of the central part of the zone. General estimate for seismic reflector based on Cosma et al. (2003)
Orientation (strike/dip, right-hand-rule method)	015/25		High	Seismic reflector B8	Juhlin and Palm (2005). Consistent with Cosma et al. (2006)
Thickness	6 m	6-32 m	Medium	Intersection along borehole interval 316-322 m in DBT1/KFK001. Span based on comparison with estimated thickness of other gently dipping zones excluding ZFMA2, ZFMA3 and ZFMF1	Thickness refers to total zone thickness (damage zone and core)
Length	515 m		Low	Intersection along borehole interval 316-322 m in DBT1/KFK001, seismic reflector B8. Terminated against ZFMNW1200, ZFMNNW0100, ZFMEW0137, ZFMENE2320 and boundary to rock domain RFM025	Total trace length at ground surface
Ductile deformation			High	Intersection along borehole interval 316-322 m in DBT1/KFK001	Not present
Brittle deformation			High	Intersection along borehole interval 316-322 m in DBT1/KFK001	Present
No more data					

Gently-dipping brittle deformation zones ZFME1					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Modelling procedure: Corresponds to seismic reflector E1, the position of which in 3D space has been attained from Cosma et al. (2003). Modelled to base of regional model volume with termination against ZFMWNW0123, ZFMNE0065 and ZFMENE0062A. Included only in regional model. Not present inside local model volume.				Does not intersect the surface	
Confidence of existence: Medium (not confirmed by direct geological observation)					
Position		± 15 m (general)	High	Seismic reflector E1	Span estimate refers to the uncertainty in the position of the central part of the zone. General estimate for seismic reflector based on Cosma et al. (2003)
Orientation (strike/dip, right-hand-rule method)	297/12	- 27/- 3	High	Seismic reflector E1	Strike and dip after Cosma et al. (2003). Span estimate makes use of both Juhlin et al. (2002) and Cosma et al. (2003)
Thickness	15 m	6-32 m	Low	Span based on comparison with estimated thickness of other gently dipping zones excluding ZFMA2, ZFMA3 and ZFMF1	Thickness refers to total zone thickness (damage zone and core)
Length					ZFME1 does not intersect the surface. Terminated against ZFMWNW0123, ZFMNE0065 and ZFMENE0062A
Ductile deformation			Low	Comparison with high confidence, gently dipping zones	Assumed not to be present
Brittle deformation			Low	Comparison with high confidence, gently dipping zones	Assumed to be present
No more data					

Gently-dipping brittle deformation zones

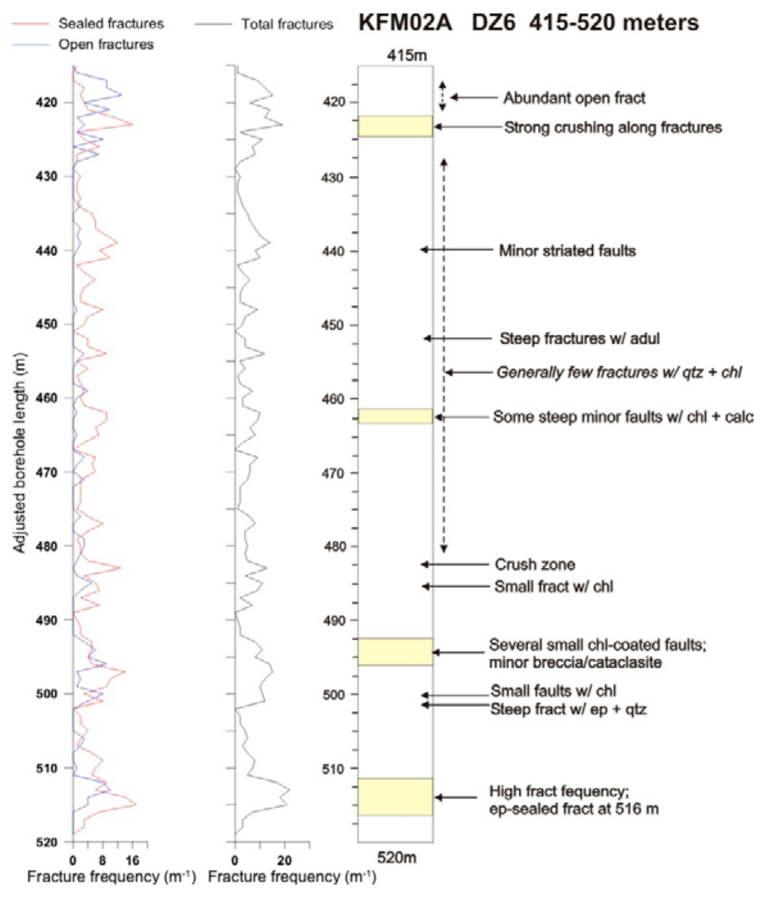
ZFMF1 (borehole interval 476-520 m along part of DZ6 in KFM02A; interval 462-512 m including DZ5 and DZ6 in KFM02B)

Property	Quantitative estimate	Span	Confidence level	Basis for interpretation	Comments
Modelling procedure: Corresponds to seismic reflector F1, the position of which in 3D space has been attained from Cosma et al. (2003). Modelled as a splay from ZFMA3 with termination also against ZFMWNW0001, ZFMENE0062A and ZFMWNW0123. Termination towards the north-west steered by the absence of this zone in especially borehole KFM05A. Deformation zone plane placed at fixed point 513 m along part of DZ6 (476-520 m) in KFM02A. The modelled zone also intersects KFM02B along the lower part of DZ5, along DZ6 and along the rock interval between these two inferred zones. Low radar amplitude also observed at 514-518 m in KFM02A. Included in regional model and also present inside local model volume.				Does not intersect the surface	

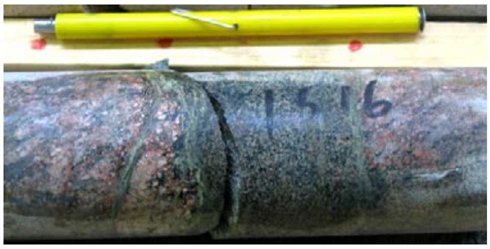
Confidence of existence: High

Single hole interpretation: For identification and short description of zones in boreholes, see SKB P-04-117 for DZ6 in KFM02A and SKB P-07-107 for DZ5 and DZ6 in KFM02B. For character and kinematics, see SKB P-06-212 for DZ6 in KFM02A and SKB P-07-111 for DZ5 and DZ6 in KFM02B.

Zone ZFMF1 in KFM02A occurs along an heterogeneous rock unit (RU2b) composed of fine- to medium-grained metagranitoid, medium-grained metagranite and pegmatitic granite. As for zone ZFMA2, zone ZFMF1 consists of narrower, highly fractured segments (cores) that enclose less fractured segments (damage zone). Fault cores with breccia, cataclasite and higher fracture frequency inferred to be present at 492-498 m and 512-517 m. Fault-slip data common. The bedrock c. 75 m beneath ZFMF1 contains a high frequency of sealed fractures that dip moderately to the north-west and are welded by chlorite, prehnite, epidote, and calcite (DZ7 in the single-hole interpretation of KFM02A). Bedrock in this borehole interval (520-600 m) also possibly affected by zone ZFMF1. No fault core intervals identified in KFM02B. However, some sealed fracture networks, crush zones and fault-slip data are present.



After SKB P-06-212



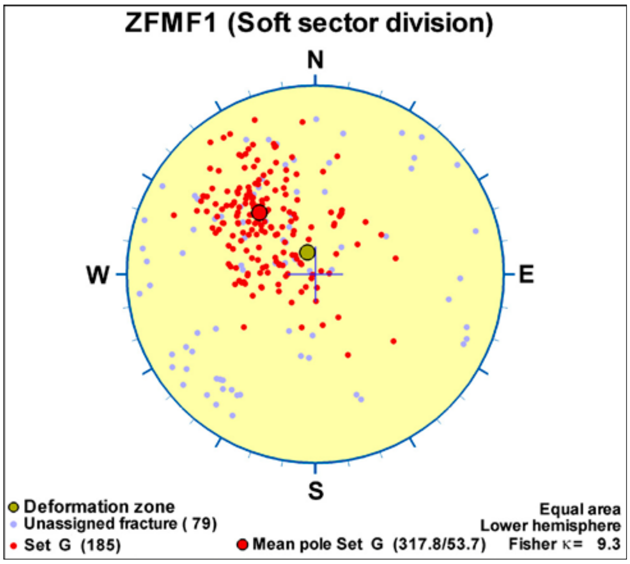
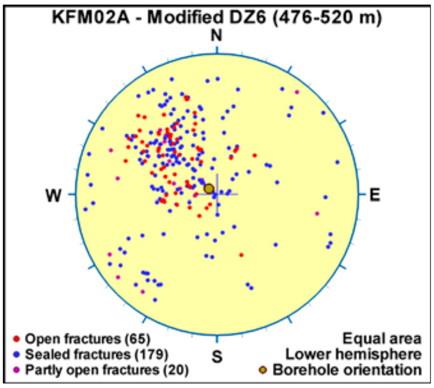
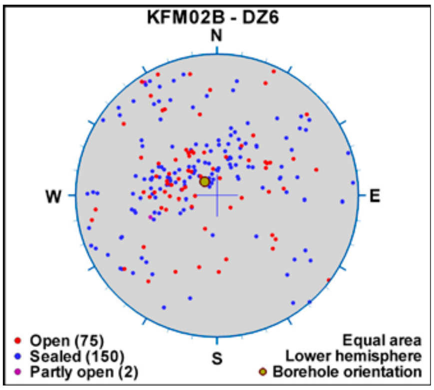
Network of gently dipping, epidote-sealed fractures that are present in a metadiorite and altered metagranite at 516 m(after SKB P-06-212)

Gently-dipping brittle deformation zones

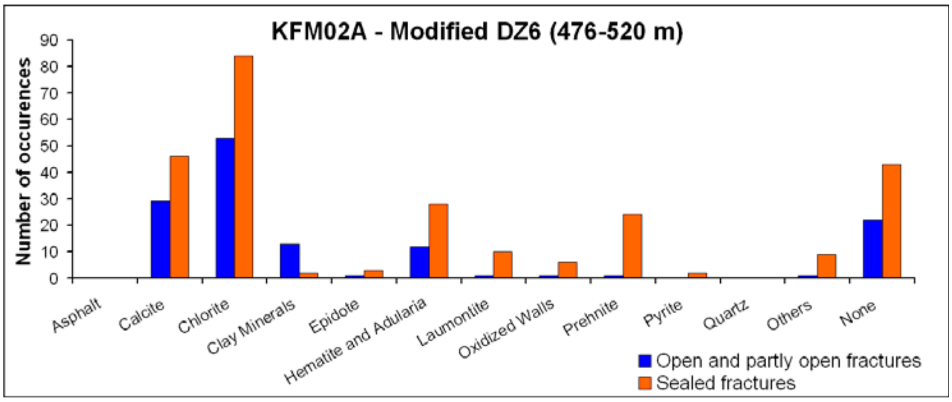
ZFMF1 (borehole interval 476-520 m along part of DZ6 in KFM02A; interval 462-512 m including DZ5 and DZ6 in KFM02B)

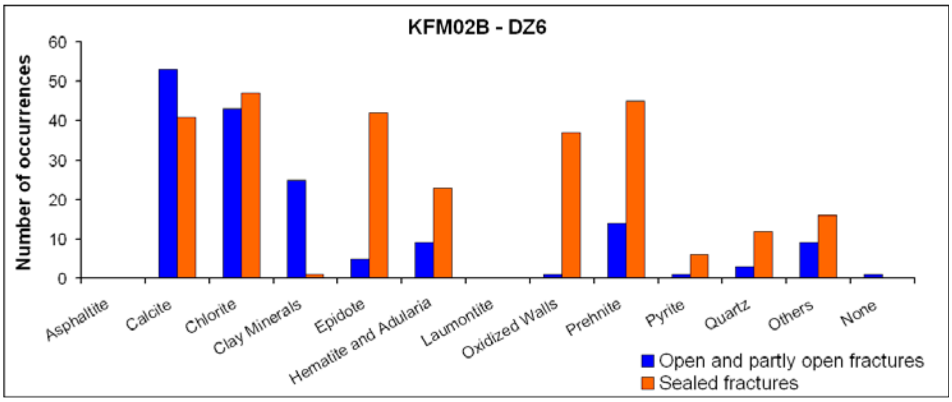
KFM02A (lower part of DZ6)

Property	Quantitative estimate	Span	Confidence level	Basis for interpretation	Comments
Position		± 15 m (general) KFM02A 3 | 3 | 0	High	Intersection along KFM02A (lower part of DZ6) and KFM02B (DZ5, DZ6 and intermediate borehole interval), seismic reflector F1	Span estimate refers to the uncertainty in the position of the central part of the zone. General estimate for seismic reflector based on Cosma et al. (2003)
Orientation (strike/dip, right-hand-rule method)	070/10	± 10 m (dip)	Medium	Seismic reflector F1 in combination with intersection along KFM02A (lower part of DZ6) and KFM02B (DZ5, DZ6 and intermediate borehole interval)	Variable, sub-horizontal to gentle dip to the south-east indicated in Juhlin et al. (2002) and Cosma et al. (2003). Orientation value chosen that tries to match both the reflector segments and the borehole intersection
Thickness	44 m	20-50 m	Medium	Intersection along KFM02A (lower part of DZ6). Span based on comparison with ZFMA2	Thickness refers to total zone thickness (damage zone and core)
Length					ZFMF1 does not intersect the surface. Terminated against ZFMWNW0001, ZFMENE0062A, ZFMWNW0123 and ZFMA3
Ductile deformation			High	Intersection along KFM02A (lower part of DZ6) and KFM02B (DZ5, DZ6 and intermediate borehole interval)	Not present
Brittle deformation			High	Intersection along KFM02A (lower part of DZ6) and KFM02B (DZ5, DZ6 and intermediate borehole interval)	Increased frequency of fractures. Fault core intervals with elevated fracture frequency and cohesive breccia/cataclasite along DZ6 in KFM02A. No fault core intervals identified in KFM02B
Alteration			High	Intersection along KFM02A (lower part of DZ6) and KFM02B (DZ5, DZ6 and intermediate borehole interval)	Oxidized bedrock with fine-grained hematite dissemination

Gently-dipping brittle deformation zones **ZFMF1 (borehole interval 476-520 m along part of DZ6 in KFM02A; interval 462-512 m including DZ5 and DZ6 in KFM02B)**					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Fracture orientation (strike/dip, right-hand-rule method)	Mean orientation of gently-dipping fracture set = 048/36	Fisher κ value of gently-dipping fracture set = 9	Medium	Intersection along KFM02A (lower part of DZ6), N = 264	Fractures that dip gently to the south-east and south dominate in both KFM02A (part of DZ6) and KFM02B (DZ5 and DZ6)
	 Based on data from KFM02A (N=264)			  	
Fracture frequency	Mean 14 m^{-1}	Span 0-103 m^{-1}	Medium	Intersection along KFM02A (lower part of DZ6) and KFM02B (DZ5, DZ6 and intermediate borehole interval)	Both sealed and open fractures are present. Values Include sealed fracture networks and crush zones
Fracture filling			Medium	Intersection along KFM02A (lower part of DZ6) and KFM02B (DZ5, DZ6 and intermediate borehole interval)	Chlorite, calcite, hematite/adularia, prehnite, epidote, clay minerals, laumontite. Note also high frequency of fractures with no mineral coating/filling (in KFM02A)

<table>
<tr><th colspan="6">Gently-dipping brittle deformation zones
ZFMF1 (borehole interval 476-520 m along part of DZ6 in KFM02A; interval 462-512 m including DZ5 and DZ6 in KFM02B)</th></tr>
<tr><th>Property</th><th>Quantitative estimate</th><th>Span</th><th>Confidence level</th><th>Basis for interpretation</th><th>Comments</th></tr>
<tr><td></td><td colspan="5">





</td></tr>
<tr><td>Sense of displacement</td><td></td><td></td><td>Medium</td><td>Minor faults along lower part of DZ6 in KFM02A. Chlorite striae

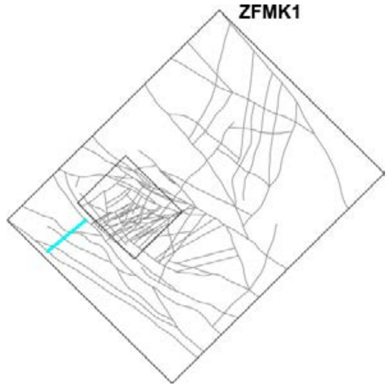
Minor faults along DZ5 and DZ6 in KFM02B. Chlorite striae and calcite steps along gently dipping faults; chlorite and epidote striae, and calcite and clay mineral steps along steeply dipping faults</td><td>Lower part of DZ6 in KFM02A. Strike-slip or reverse dip slip displacements on the dominant gently dipping faults. Both dextral and sinistral strike-slip movement observed.

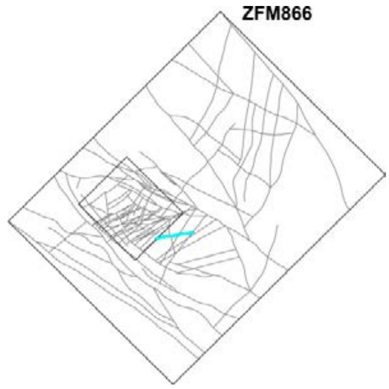
Gently dipping faults along DZ5 in KFM02B. Dip-slip displacement (1) or oblique-slip displacement with significant reverse dip-slip component (1).

Steeply dipping faults along DZ5 and DZ6 in KFM02B. Strike-slip (2), sinistral strike-slip (1) or oblique-slip with dextral normal (1) displacement</td></tr>
</table>

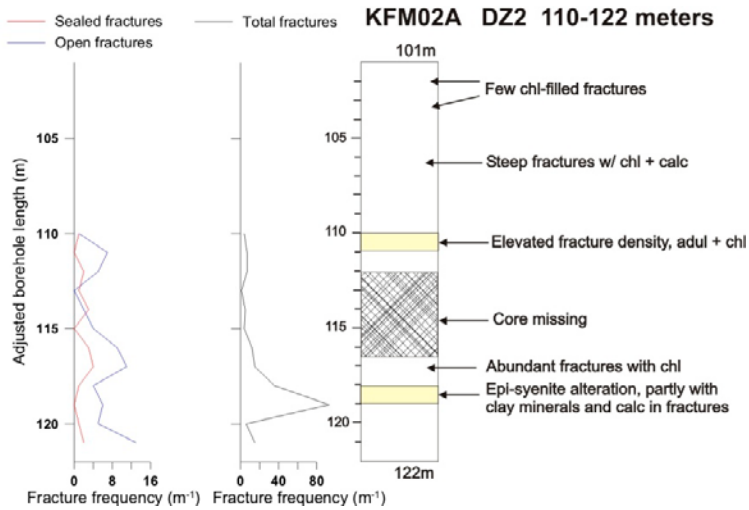
Gently-dipping brittle deformation zones ZFMJ1					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Modelling procedure: Corresponds to seismic reflector J1, the position of which in 3D space has been attained from Cosma et al. (2006). Terminated against ZFMNW0017, ZFMNW0029 and ZFMWNW0036. Included in regional model and also present inside local model volume.				Does not intersect the surface	
Confidence of existence: Medium (not confirmed by direct geological observation)					
Position		± 15 m (general)	High	Seismic reflector J1	Span estimate refers to the uncertainty in the position of the central part of the zone. General estimate for seismic reflector based on Cosma et al. (2003)
Orientation (strike/dip, right-hand-rule method)	118/45	± 5/ ± 5	High	Seismic reflector J1	Strike and dip after Juhlin and Palm (2005). Span estimate makes use of both Juhlin and Palm (2005) and Cosma et al. (2006)
Thickness	15 m	6-32 m	Low	Span based on comparison with estimated thickness of other gently dipping zones excluding ZFMA2, ZFMA3 and ZFMF1	Thickness refers to total zone thickness (damage zone and core)
Length					ZFMNE00J1 does not intersect the surface. Terminated against ZFMNW0017, ZFMNW0029 and ZFMWNW0036
Ductile deformation			Low	Comparison with high confidence, gently dipping zones	Assumed not to be present
Brittle deformation			Low	Comparison with high confidence, gently dipping zones	Assumed to be present
No more data					

Gently-dipping brittle deformation zones ZFMJ2					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Modelling procedure: Corresponds to seismic reflector J2, the position of which in 3D space has been attained from Cosma et al. (2006). Terminated against ZFMNW0003, ZFMWNW0004 and ZFMK1. Included only in regional model. Not present inside local model volume.					
Confidence of existence: Medium (not confirmed by direct geological observation)					
Position		± 15 m (general)	High	Seismic reflector J2	Span estimate refers to the uncertainty in the position of the central part of the zone. General estimate for seismic reflector based on Cosma et al. (2003)
Orientation (strike/dip, right-hand-rule method)	100/37		High	Seismic reflector J2	Juhlin and Palm (2005). Consistent with Cosma et al. (2006)
Thickness	15 m	6-32 m	Low	Span based on comparison with estimated thickness of other gently dipping zones excluding ZFMA2, ZFMA3 and ZFMF1	Thickness refers to total zone thickness (damage zone and core)
Length	1428 m		Low	Seismic reflector J2. Terminated against ZFMNW0003, ZFMWNW0004 and ZFMK1	Total trace length at ground surface
Ductile deformation			Low	Comparison with high confidence, gently dipping zones	Assumed not to be present
Brittle deformation			Low	Comparison with high confidence, gently dipping zones	Assumed to be present
No more data					

Gently-dipping brittle deformation zones ZFMK1					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Modelling procedure: Corresponds to seismic reflector K1, the position of which in 3D space has been attained from Cosma et al. (2006). Modelled to base of regional model volume with termination against ZFMNW003 and ZFMWNW0004. Included only in regional model. Not present inside local model volume.					
Confidence of existence: Medium (not confirmed by direct geological observation)					
Position		± 15 m (general)	High	Seismic reflector K1	Span estimate refers to the uncertainty in the position of the central part of the zone. General estimate for seismic reflector based on Cosma et al. (2003)
Orientation (strike/dip, right-hand-rule method)	050/40		High	Seismic reflector K1	Juhlin and Palm (2005). Consistent with Cosma et al. (2006)
Thickness	15 m	6-32 m	Low	Span based on comparison with estimated thickness of other gently dipping zones excluding ZFMA2, ZFMA3 and ZFMF1	Thickness refers to total zone thickness (damage zone and core)
Length	2331 m		Low	Seismic reflector K1. Terminated against ZFMNW003 and ZFMWNW0004	Total trace length at ground surface
Ductile deformation			Low	Comparison with high confidence, gently dipping zones	Assumed not to be present
Brittle deformation			Low	Comparison with high confidence, gently dipping zones	Assumed to be present
No more data					

<table>
<tr><th colspan="6">Gently-dipping brittle deformation zones
ZFM866 (DZ2 in KFM02A, DZ1 in KFM02B, DZ1 in HFM04 and DZ1 in HFM05)</th></tr>
<tr><th>Property</th><th>Quantitative estimate</th><th>Span</th><th>Confidence level</th><th>Basis for interpretation</th><th>Comments</th></tr>
<tr><td colspan="4">Modelling procedure: Modelled by combining borehole intervals 110-122 m (DZ2) in KFM02A, 98-115 m (DZ1) in KFM02B, 61-64 m (DZ1) in HFM04 and 153-154 m (DZ1) in HFM05. Deformation zone plane modelled to pass through fixed points 119 m in KFM02A, 113 m in KFM02B, 62 m in HFM04 and 154 m in HFM05; gently dipping structure. Terminated against ZFMA3 and ZFMNE0065. Crush zone and clay alteration present at 119 m in KFM02A; low radar amplitude also observed at 116-121 m in KFM02A. Zone ZFM866 is included in regional model and is also present inside local model volume.</td><td colspan="2">
</td></tr>
<tr><td colspan="6">Confidence of existence: High</td></tr>
<tr><td colspan="6">Single hole interpretation: For identification and short description of DZ2 in KFM02A, see SKB P-04-117, and for DZ1 in KFM02B, see SKB P-07-107. For character and kinematics of DZ2 in KFM02A, see SKB P-06-212, and for DZ1 in KFM02B, see P-07-111.

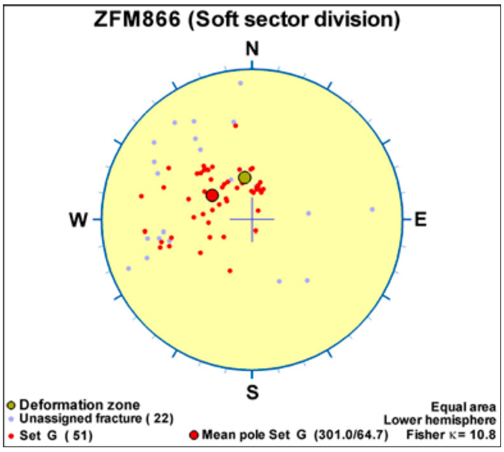
Zone ZFM866 in KFM02A occurs directly above amphibolite. Zone is inferred to be mainly “damage zone” in character with short intervals (e.g. at 110-111 m and 118-119 m) of core development. Fault-slip data are present. Zone ZFM866 in KFM02B shows a “damage zone” character and lacks striated faults.



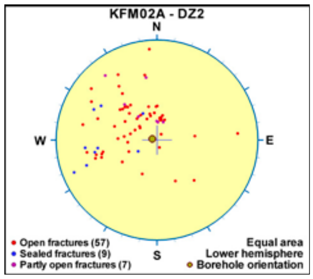
After SKB P-06-212

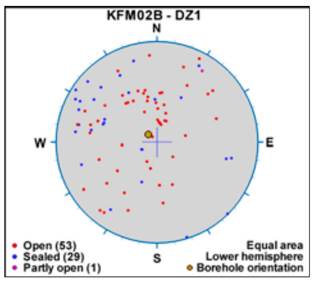
KFM02A (DZ2)</td></tr>
<tr><td>Position</td><td></td><td><table><tr><th colspan="3">KFM02A</th></tr><tr><th>dx (m)</th><th>dy (m)</th><th>dz (m)</th></tr><tr><td>1</td><td>1</td><td>0</td></tr></table></td><td>High</td><td>Intersections along KFM02A (DZ2), KFM02B (DZ1), HFM04 (DZ1) and HFM05 (DZ1)</td><td>Span estimate refers to the uncertainty in the position of the central part of the zone</td></tr>
<tr><td>Orientation (strike/dip, right-hand-rule method)</td><td>080/23</td><td>± 5/± 5</td><td>High</td><td>Intersections along KFM02A (DZ2), KFM02B (DZ1), HFM04 (DZ1) and HFM05 (DZ1)</td><td></td></tr>
</table>

Gently-dipping brittle deformation zones ZFM866 (DZ2 in KFM02A, DZ1 in KFM02B, DZ1 in HFM04 and DZ1 in HFM05)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Thickness	11 m	11-17 m	Medium	Intersection along KFM02A (DZ2). Span based on thickness range along both KFM02A (DZ2) and KFM02B (DZ1)	Thickness refers to total zone thickness (damage zone and core)
Length	1728 m		Low	Intersections along KFM02A (DZ2), KFM02B (DZ1), HFM04 (DZ1) and HFM05 (DZ1). Terminated against ZFMA3 and ZFMNE0065	Total trace length at ground surface
Ductile deformation			High	Intersections along KFM02A (DZ2), KFM02B (DZ1), HFM04 (DZ1) and HFM05 (DZ1)	Not present
Brittle deformation			High	Intersections along KFM02A (DZ2), KFM02B (DZ1), HFM04 (DZ1) and HFM05 (DZ1)	Increased frequency of fractures. Two fault core intervals with elevated fracture frequency along DZ2 in KFM02A. No core interval inferred in KFM02B
Alteration			High	Intersections along KFM02A (DZ2), KFM02B (DZ1), HFM04 (DZ1) and HFM05 (DZ1)	Red-stained bedrock with fine-grained hematite dissemination, clay alteration
Fracture orientation (strike/dip, right-hand-rule method)	Mean orientation of gently dipping fracture set = 031/25	Fisher κ value of gently dipping fracture set = 11	Medium	Intersection along KFM02A (DZ2), N = 73	Gently dipping fractures dominate. Variable orientation of fractures in KFM02B

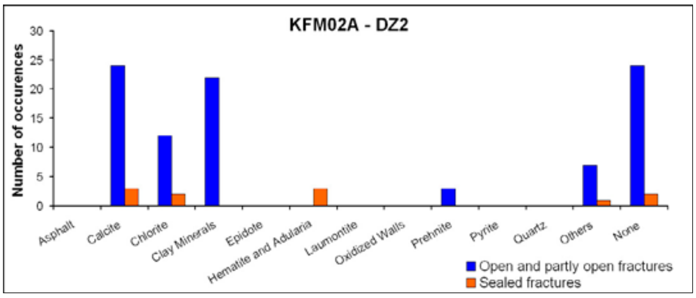
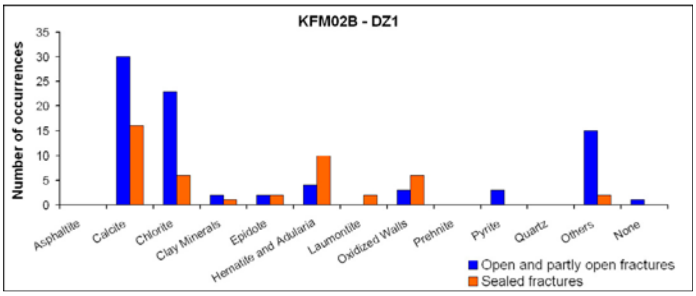


Based on data from KFM02A (N=73)





Fracture frequency	Mean 11 m^{-1}	Span 1-94 m^{-1}	Medium	Intersections along KFM02A (DZ2) and KFM02B (DZ1)	Sealed and open fractures. Quantitative estimate and span include crush zones near the base of DZ2 in KFM02A

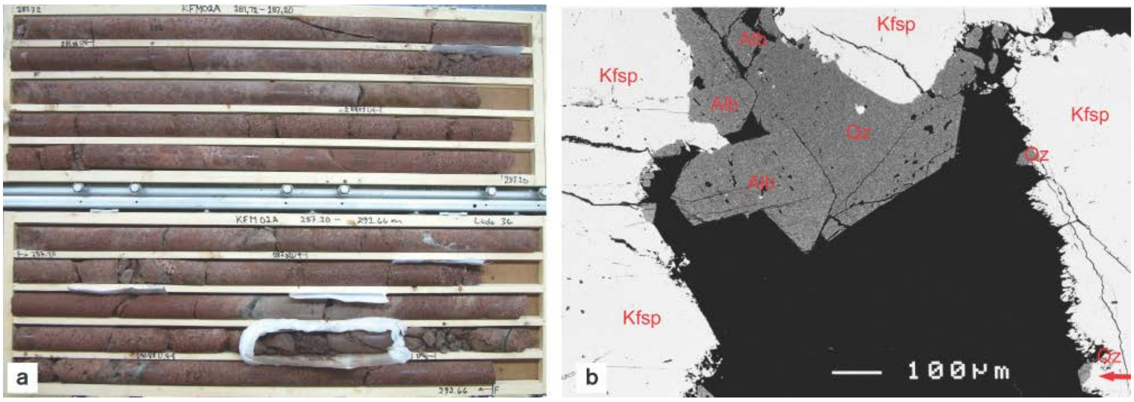
Gently-dipping brittle deformation zones ZFM866 (DZ2 in KFM02A, DZ1 in KFM02B, DZ1 in HFM04 and DZ1 in HFM05)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Fracture filling			Medium	Intersections along KFM02A (DZ2) and KFM02B (DZ1)	Calcite, clay minerals, chlorite. Note high frequency of fractures with no mineral coating/filling
	 				
Sense of displacement			Medium	Minor faults along DZ2 in KFM02A. Chlorite striae	Reverse dip-slip displacement along several gently dipping faults that dip to the north-east and south-east. Striated faults not present in KFM02B (DZ1) No complementary data from percussion boreholes

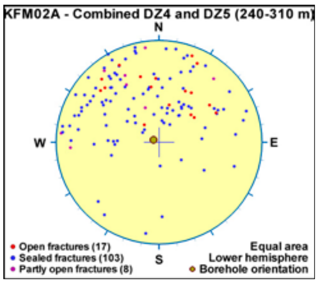
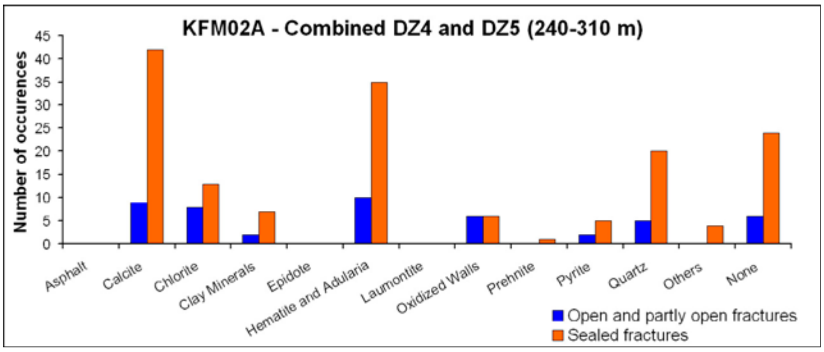
Gently-dipping brittle deformation zones

ZFM871 (Zone H2, SFR)

Property	Quantitative estimate	Span	Confidence level	Basis for interpretation	Comments
Modelling procedure: Modelling procedure and properties inherited from updated geological model for SFR as presented in Appendix 11 in SKB R-10-49. Modification made so as to terminate against ZFMNW0002, ZFMWNW1035, ZFMNW0805A, ZFMNW0805B and ZFMENE3115 (only in SFR model), i.e. not terminated against ZFMNNE0869 as in SKB R-10-49 but continued up to ground surface. Proposed here as an alternative model for ZFM871. Included in regional model and is also present inside local model.					
Confidence of existence: High					
Single hole interpretation: For information along SFR tunnel intersections and boreholes, see Appendix 11 in SKB R-10-49					
Position			Medium	Intersection along SFR tunnels and boreholes (see Appendix 11 in SKB R-10-49)	Extension up to surface involving an alternative interpretation relative to SKB R-10-49. Possible correlation with low magnetic lineament MFM0137B0. Bathymetric anomaly also along this lineament.
Orientation (strike/dip, right-hand-rule method)	074/19	± 10/± 5	Medium	Intersection along SFR tunnels and boreholes (see Appendix 11 in SKB R-10-49)	
Thickness	20 m	1-22 m	High	Intersection along SFR tunnels and boreholes (see Appendix 11 in SKB R-10-49)	Thickness refers to total zone thickness (damage zone and core)
Length	1141 m		Low	Intersection along SFR tunnels and boreholes (see Appendix 11 in SKB R-10-49). Terminated against ZFMNW0002, ZFMWNW1035, ZFMNW0805A, ZFMNW0805B and ZFMENE3115 (present only in SFR model)	Total trace length at ground surface
Ductile deformation			High	Intersection along SFR tunnels and boreholes (see Appendix 11 in SKB R-10-49)	Not present
Brittle deformation			High	Intersection along SFR tunnels and boreholes (see Appendix 11 in SKB R-10-49)	Present
Alteration			High	Intersection along SFR tunnels and boreholes (see Appendix 11 in SKB R-10-49)	Generally red-stained bedrock with fine-grained hematite dissemination, along with local argillization

Fracture orientation				Intersection along SFR tunnels and boreholes (see Appendix 11 in SKB R-10-49)	No oriented fracture data are available. Construction reports generally include the description of two dominantly gently dipping fracture sets as well as an increase in frequency of steeply dipping fractures
Fracture frequency				Intersection along SFR tunnels and boreholes (see Appendix 11 in SKB R-10-49)	No orientation-corrected fracture frequencies are available
Fracture filling			Medium	Intersection along SFR tunnels and boreholes (see Appendix 11 in SKB R-10-49)	Clay minerals, chlorite and calcite dominate. Hematite/adularia, laumontite, epidote, pyrite and quartz are also present. Note also high frequency of fractures with no mineral coating/filling
Sense of movement					No data

Alteration pipe between gently-dipping brittle deformation zones ZFMA2 and ZFMA3 ZFM1189 (borehole interval 240-310 m including DZ4 and DZ5 in KFM02A; vuggy rock)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Modelling procedure: Modelled as a steeply plunging alteration pipe that occurs between the two gently dipping zones ZFMA2 and ZFMA3 beneath drill site 2. Fixed point placed at 256 m along DZ4. Model supported by the occurrence of a borehole radar reflector that is parallel to KFM02A along 180-240 m borehole length and an analysis of surface and borehole seismic reflection data. These data indicate that the altered vuggy rock associated with DZ4 and DZ5 in KFM02A (borehole interval 240-302 m) is steeply inclined and more or less parallel with the borehole. Pipe-like geometry supported by the lack of identification in KFM02B. Included only in regional model. Not present inside local model volume.				Does not extend to the surface	
Confidence of existence: High					
Single hole interpretation: For identification and short description of RU3, DZ4 and DZ5 in KFM02A, see P-04-117. For character and origin of altered vuggy rock along KFM02A, see SKB P-03-77. Strong alteration, including quartz dissolution and hematite dissemination, along the borehole interval 240-310 m in KFM02A (RU3). This alteration is associated with an increased frequency of fractures along borehole intervals 266-267 m (DZ4) and 303-310 m (DZ5).  a) Strongly altered and vuggy metagranite in borehole KFM02A. The incoherent section (in plastic casing) is a strongly altered amphibolite that has been modified to a rock composed of chlorite, albite, hematite, Ti-oxide and quartz. b) Back-scatter electron (BSE) image that shows euhedral crystals of albite and quartz (medium grey) on a vug wall (black = cavity). The thin rims on K-feldspar grains (light grey) along the vug walls are irregular fringes of K-feldspar (resorbed grains) and small, euhedral crystals of albite and quartz. Scale bar is 0.1 mm. Figures adopted from SKB P-03-77 and SKB R-05-18.					
Position		**KFM02A** dx (m): 2 dy (m): 2 dz (m): 0	High	Intersection along borehole interval 240-310 m in KFM02A, including DZ4 and DZ5	Span estimate refers to the uncertainty in the position of the central part of the zone
Orientation (trend/plunge)	208/83	± 10/± 10	Low	Orientation of borehole radar reflector	Orientation refers to plunge and trend of alteration pipe. Dip direction and dip of borehole radar reflector is 208/73
Thickness	7 m		Medium	Intersection along borehole interval 240-310 m in KFM02A, including DZ4 and DZ5	Short axis of the elliptical cross-section
Length					ZFM1189 does not extend to the surface. Terminated against ZFMA2 and ZFMA3. Long axis of the elliptical cross-section is c. 60 m in the geological model

Alteration pipe between gently-dipping brittle deformation zones ZFMA2 and ZFMA3 ZFM1189 (borehole interval 240-310 m including DZ4 and DZ5 in KFM02A; vuggy rock)					
Property	**Quantitative estimate**	**Span**	**Confidence level**	**Basis for interpretation**	**Comments**
Ductile deformation			High	Intersection along borehole interval 240-310 m in KFM02A, including DZ4 and DZ5	Not present
Brittle deformation			High	Intersection along borehole interval 240-310 m in KFM02A, including DZ4 and DZ5	Increased frequency of fractures. No complementary data
Alteration			High	Intersection along borehole interval 240-310 m in KFM02A, including DZ4 and DZ5	Quartz dissolution and development of vuggy rock in combination with red-stained bedrock with fine-grained hematite dissemination and albitisation /Möller et al. 2003/
Fracture orientation (strike/dip, right-hand-rule method)				Intersection along borehole interval 240-310 m in KFM02A, including DZ4 and DZ5, N = 128	Fractures show variable orientation. No mean value estimated 
Fracture frequency	Mean 3 m^{-1}	Span 0-10 m^{-1}	Medium	Intersection along borehole interval 240-310 m in KFM02A, including DZ4 and DZ5	Fracture frequency in crush zone at 266-267 m (DZ4) is 10 m^{-1} and along DZ5 is 5 m^{-1} (span 3-8 m^{-1})
Fracture filling			Medium	Intersection along borehole interval 240-310 m in KFM02A, including DZ4 and DZ5	Calcite, hematite, chlorite, quartz, clay minerals, pyrite. Note high frequency of fractures with no mineral coating/filling
	 				
Sense of displacement					No complementary data along intersection in borehole interval 240-310 m in KFM02A, including DZ4 and DZ5

Gently-dipping brittle deformation zones

ZFM1203 (DZ1 and extension along 183-185 m in KFM07A, DZ2 in KFM07B, DZ1 in KFM07C and DZ1 in HFM21)

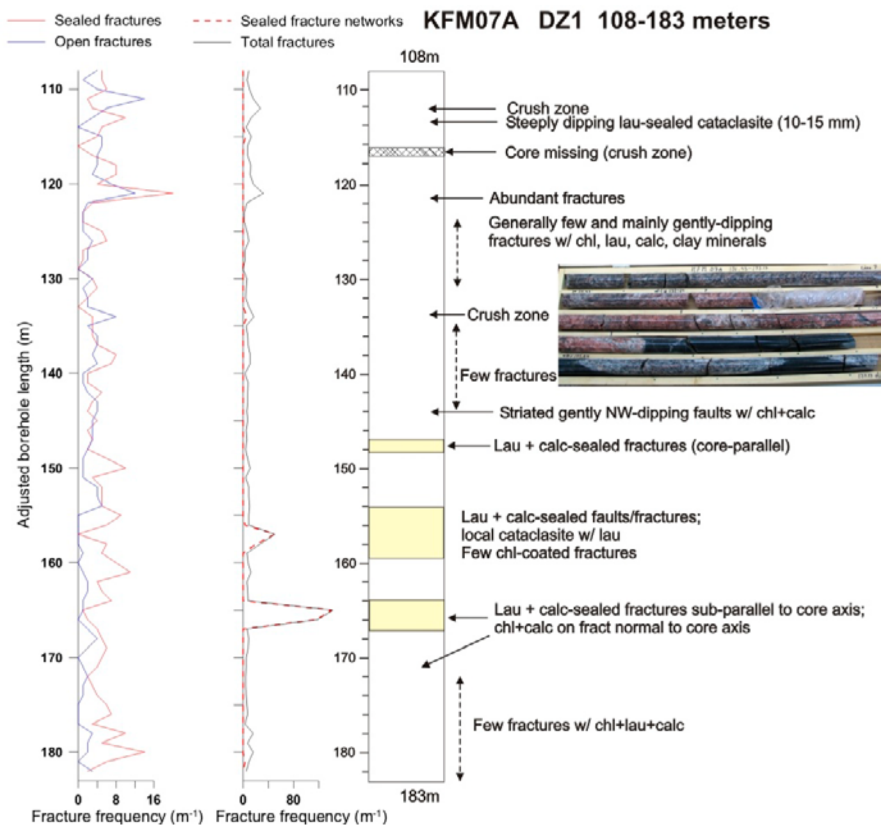
Property	Quantitative estimate	Span	Confidence level	Basis for interpretation	Comments

Modelling procedure: Modelled by combining the upper part of DZ1 and its extension (108-185 m) in KFM07A with a fixed point at 122 m, with the borehole intervals 93-102 m in KFM07B with a fixed point at 95 m (DZ2), 92-103 m in KFM07C with a fixed point at 93 m (DZ1) and 94-102 m in HFM21 with a fixed point at 96 m (DZ1). Low radar amplitudes also observed at 118-121 m in KFM07A and 95-102 m in KFM07B. Modelled as a near-surface, sub-horizontal fracture zone with support from the orientation of near-surface fractures in the borehole intersections.Termination against ZFMENE0159A, ZFMNNW0404, ZFMNNE2309, ZFMWNW2225 and ZFMNNE2280. However, zone ZFMNNW0404 also intersects DZ1 and its extension in KFM07A (lower part). Can explain the complex interference between gently and steeply dipping structures (see P-06-212). Included in regional model and is also present inside local model volume.

Confidence of existence: High

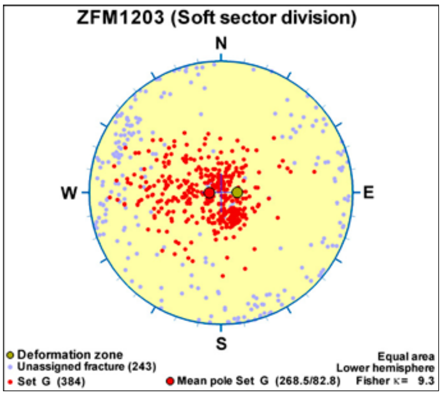
Single hole interpretation: For identification and short description of inferred borehole intersections, see SKB P-05-157 (DZ1 in KFM07A and DZ1 in HFM21), SKB P-06-134 (DZ2 in KFM07B) and SKB P-06-208 (DZ1 in KFM07C). For character and kinematics, see SKB P-06-212 (DZ1 in KFM07A) and SKB P-07-101 (DZ2 in KFM07B and DZ1 in KFM07C)

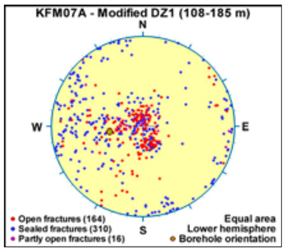
Characterisation work along DZ1 in KFM07A indicates that the zone is composed of intervals of variable length with elevated fracture frequency, defined as fault core, interleaved with longer intervals where the fracture frequency is lower. Interference between gently dipping fractures with a thin coating of epidote and chlorite, and steeply dipping structures sealed by laumontite and calcite including laumontite-sealed cataclasite. Fault-slip data present along both gently and steeply dipping fractures. Frequent occurrence along the gently dipping fractures. The zone shows a “damage zone” character in both KFM07B and KFM07C. Open fractures are predominantly gently dipping.

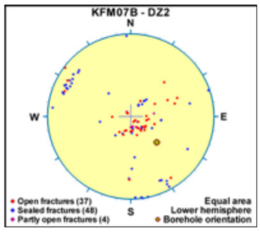


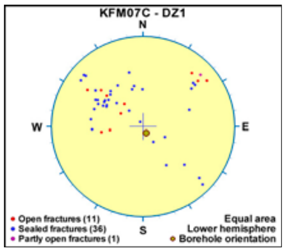
After SKB P-06-212

<table>
<tr><td>Position</td><td></td><td><table><tr><td colspan="3">KFM07A</td></tr><tr><td>dx (m)</td><td>dy (m)</td><td>dz (m)</td></tr><tr><td>1</td><td>1</td><td>0</td></tr><tr><td colspan="3">KFM07B</td></tr><tr><td>3</td><td>3</td><td>2</td></tr><tr><td colspan="3">KFM07C</td></tr><tr><td>1</td><td>1</td><td>0</td></tr></table></td><td>High</td><td>Intersections along KFM07A (DZ1 and extension), KFM07B (DZ2), KFM07C (DZ1) and HFM21 (DZ1)</td><td>Span estimate refers to the uncertainty in the position of the central part of the zone</td></tr>
<tr><td>Orientation (strike/dip, right-hand-rule method)</td><td>240/19</td><td>± 5/± 5</td><td>Low</td><td>Intersections along KFM07A (DZ1 and extension), KFM07B (DZ2), KFM07C (DZ1) and HFM21 (DZ1)</td><td></td></tr>
<tr><td>Thickness</td><td>10 m</td><td>8-10 m</td><td>Medium</td><td>Intersection along KFM07C (DZ1). Span based on thickness along both KFM07B (DZ2) and KFM07C (DZ1</td><td>Thickness refers to total zone thickness (damage zone and core). Borehole intersection along KFM07A is not included due to interference with ZFMNNW0404</td></tr>
<tr><td>Length</td><td>1142 m</td><td></td><td>Low</td><td>Length on ground surface following termination against ZFMENE0159A, ZFMNNW0404, ZFMNNE2309, ZFMWNW2225 and ZFMNNE2280</td><td>Total trace length at ground surface</td></tr>
<tr><td>Ductile deformation</td><td></td><td></td><td>High</td><td>Intersections along KFM07A (DZ1 and extension), KFM07B (DZ2), KFM07C (DZ1) and HFM21 (DZ1)</td><td>Not present</td></tr>
<tr><td>Brittle deformation</td><td></td><td></td><td>High</td><td>Intersections along KFM07A (DZ1 and extension), KFM07B (DZ2), KFM07C (DZ1) and HFM21 (DZ1)</td><td>Increased frequency of fractures. Fault core intervals along DZ1 in KFM07A with elevated fracture frequency, including sealed fracture network, and locally cataclasite. Crush zones also present in the upper part of DZ1 in KFM07A. No fault core observed in KFM07B and KFM07C. No complementary data from percussion boreholes</td></tr>
<tr><td>Alteration</td><td></td><td></td><td>High</td><td>Intersections along KFM07A (DZ1 and extension), KFM07B (DZ2), KFM07C (DZ1) and HFM21 (DZ1)</td><td>Red-stained bedrock with fine-grained hematite dissemination</td></tr>
<tr><td>Fracture orientation (strike/dip, right-hand-rule method)</td><td>Mean orientation of gently dipping fracture set = 359/7</td><td>Fisher κ value of gently dipping fracture set = 9</td><td>Medium</td><td>Intersections along KFM07A (DZ1 and extension), KFM07B (DZ2) and KFM07C (DZ1), N = 627</td><td>Gently dipping fractures dominate. Steeply dipping fractures are also present.</td></tr>
</table>

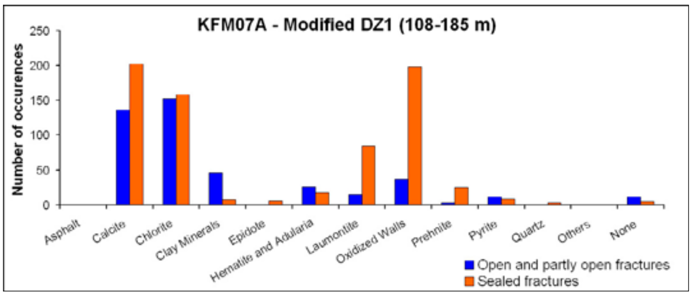


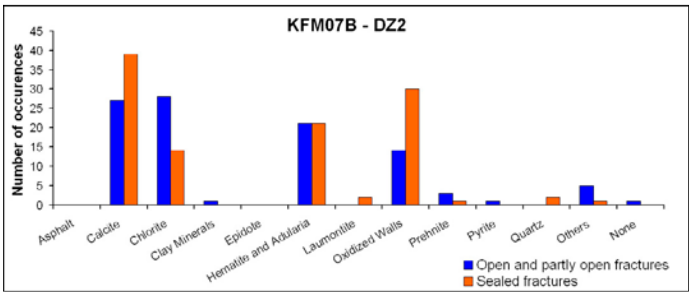


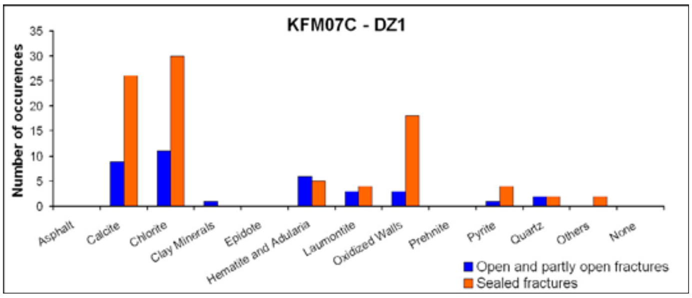




Fracture frequency	Mean 13 m^{-1}	Span 0-51 m^{-1}	Medium	Intersections along KFM07B (DZ2) and KFM07C (DZ1)	Open and sealed fractures. Quantitative estimate and span include crush zones and sealed fracture networks.
Fracture filling			Medium	Intersections along KFM07A (DZ1 and extension), KFM07B (DZ2) and KFM07C (DZ1)	DZ2 (KFM07B) and DZ1 (KFM07C): Calcite, chlorite, hematite/adularia. DZ1 (KFM07A): Calcite, chlorite, clay minerals, hematite/adularia, laumontite, prehnite and epidote in sub-horizontal and gently dipping fractures. Note also some gently dipping fractures with no mineral coating/filling







Sense of movement			Medium	Minor faults along DZ1 in KFM07A. Chlorite and calcite striae	Faults dipping gently to the north show reverse dip-slip or reverse sinistral strike-slip components of movement. Steep WSW faults show strike-slip movement, both dextral and sinistral. A steep NNW fault shows a predominantly dextral sense of shear. No faults with shear striae in KFM07B (DZ2) and KFM07C (DZ1)