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Mineralogy, geochemistry, porosity and redox properties of rocks from Forsmark

Compilation of data from the regional model volume for SR-Site

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Summary

This report is a compilation of the data acquired during the Forsmark site investigation programme on the mineralogy, geochemistry, redox properties and porosity of different rock types at Forsmark. The aim is to provide a final summary of the available data for use during the SR-Site modelling work. Data presented in this report represent the regional model volume and have previously been published in various SKB reports. The data have been extracted from the SKB database Sicada and are presented as calculated median values, data range and lower/upper quartile. The representativity of all samples used for the calculations have been evaluated and data from samples where there is insufficient control on the rock type have been omitted. Rock samples affected by alteration have been omitted from the unaltered samples and are presented separately based on type of alteration (e.g. oxidised or albitized rock).

Sammanfattning

I denna rapport presenteras en sammanställning av den data som samlats in under platsundersökningen i Forsmark med avseende på mineralogi, geokemi, redox-egenskaper och porositet hos de olika bergartstyperna. Syftet är att tillgängliggöra data för användning vid modelleringsarbetet inom SR-Site. Data som presenteras i denna rapport representerar den regionala modellvolymen och har tidigare publicerats i diverse SKB-rapporter. Data har plockats ut från SKBs databas Sicada och presenteras som beräknade medianvärden, dataintervall och undre/övre kvartil. Representerbarheten hos alla prover som har använts för beräkningarna har utvärderats och data från prover där bristfällig kontroll av bergartstyp föreligger har utelämnats. Data från bergartsprover som påverkats av omvandling har utelämnats från de oomvandlade proverna och presenteras separat utifrån omvandlingstyp (t ex oxiderat eller albitiserat bergart).

Contents

1 Introduction and scope of report

This report presents a compilation of the data that were acquired during the Forsmark site investigation programme on the mineralogy, geochemistry, redox properties and porosity of different rock types at Forsmark. Earlier compilations and evaluation of, for example, modal mineralogical data (quantitative mineralogical composition of a rock sample expressed as vol%) and porosity data have been presented at various stages during the site descriptive modelling work /e.g. SKB 2005, Stephens et al. 2007/, following the corresponding data freezes. The aim of this report is to provide a final summary compilation for use during the SR-Site modelling work. The geochemistry and redox capacity of fracture-filling minerals were addressed in /Sandström et al. 2008/ and are not presented within the scope of this report.

In order to obtain a sufficiently large statistical basis for all the different rock types at the Forsmark site, the data presented in this report have been extracted from the regional model volume. For this reason, there are some differences between the data used in the evaluation of modal mineralogical composition and porosity presented in this report and the data used in /Stephens et al. 2007/, where focus was placed on the local model volume (cf. Figure 1-1). However, the differences are minor (cf. Table 3-3 and 3-4 in /Stephens et al. 2007/). A list of the different rock types at Forsmark treated in the current compilation is presented in Table 1-1 and the spatial distribution of rock units dominated by a particular rock type, as addressed in this study, is shown in Figure 1-2. Quantitative estimates in volume % of the proportions of different rock types within the local model volume are presented in /Stephens et al. 2007/.

The total number of mineralogical analyses used in the compilation from the regional model volume is 181. By contrast, 133 analyses were used in /Stephens et al. 2007/ where the focus was on the local model volume. The total number of porosity measurements used for the data compilation for the regional model volume is 185. Once again, by contrast, 129 measurements were used in /Stephens et al. 2007/ where the focus was on the local model volume. In total, 158 whole rock geochemical analyses and 18 Mössbauer analyses are used here in the compilation from the regional volume model. These data have not been compiled specifically for the local model volume in any publication.

Table 1-1. Rock types inside the Forsmark regional model volume from which data of mineralogical and geochemical composition are available.

SKB code	SKB rock name
101004	Metamorphosed ultramafic rock
101033	Metamorphosed diorite, quartz diorite or gabbro
101051	Metamorphosed, fine- to medium-grained granitoid
101051_700	Metamorphosed and oxidised, fine- to medium-grained granitoid
101054	Metamorphosed tonalite to granodiorite
101056	Metamorphosed granodiorite
101057	Metamorphosed, medium-grained granite to granodiorite
101057_101058_104	Metamorphosed and albitized granite
101057_700	Metamorphosed and oxidised, medium-grained granite to granodiorite
101057_706	Vuggy metamorphosed granite (quartz dissolution, high porosity)
101058	Metamorphosed, aplitic granite
101061	Pegmatite or pegmatitic granite
102017	Amphibolite
103076	Metamorphosed, felsic to intermediate volcanic rock
111058	Fine- to medium-grained granite

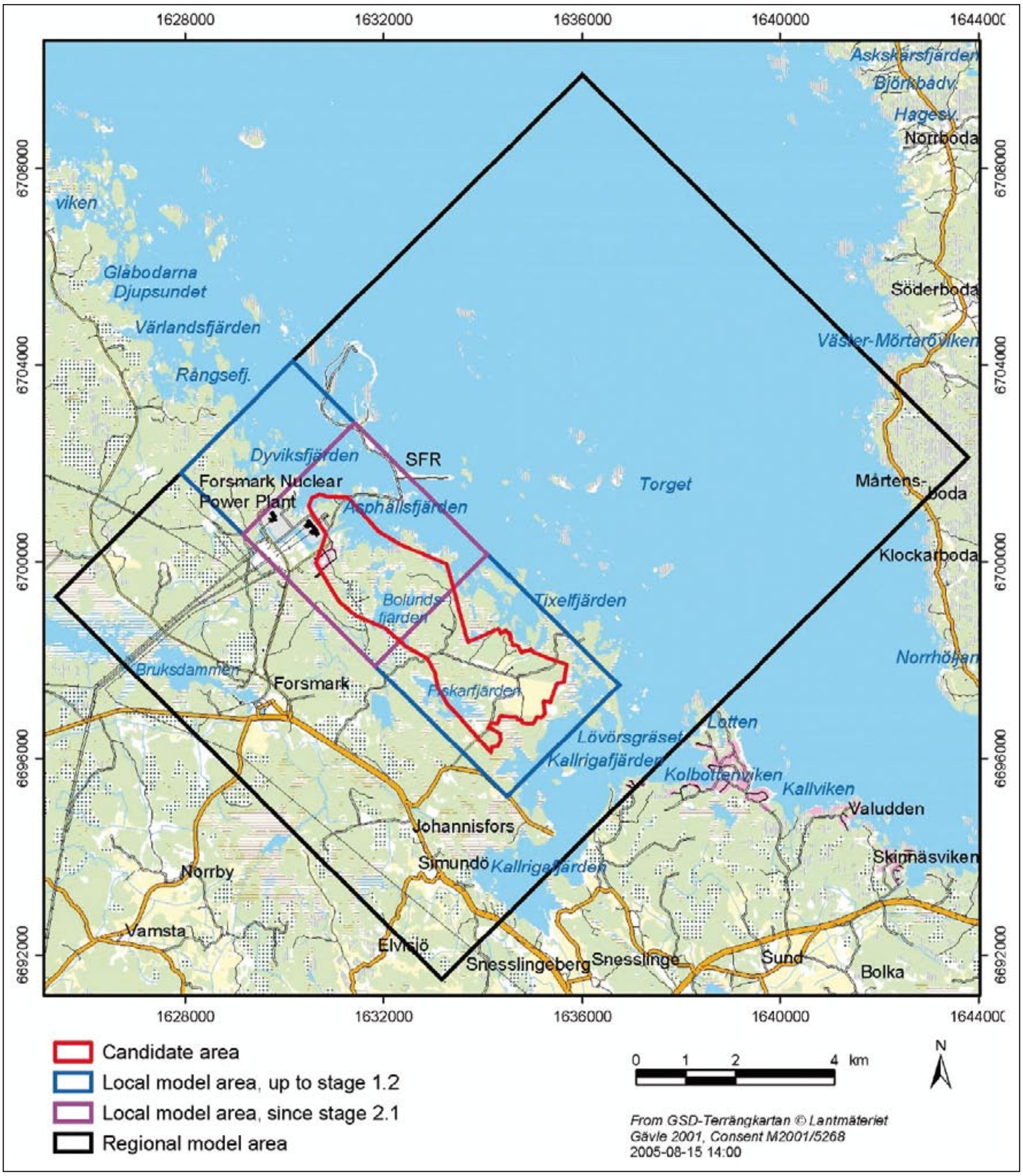

Figure 1-1. *Regional and local model areas at Forsmark. Adopted after /SKB 2008/.*

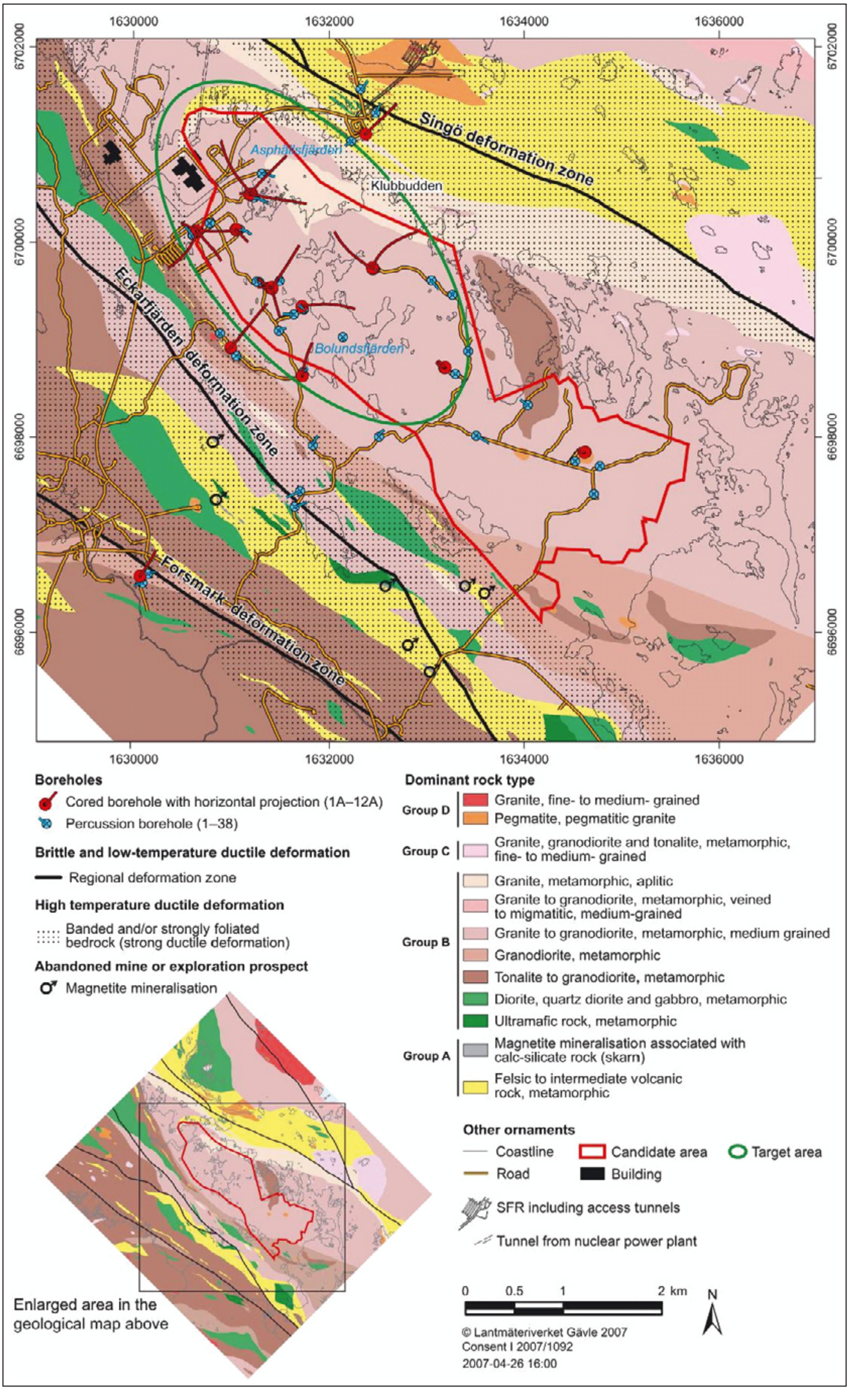

Figure 1-2. *Surface bedrock geological map of the Forsmark site showing the spatial distribution of rock units dominated by a particular rock type as addressed in this study. Adopted after /SKB 2008/.*

2 Data input

Data bearing on the modal mineralogical and geochemical composition of all sampled rocks within the Forsmark regional model volume have been extracted from the SKB database Sicada, using the following data deliveries: Sicada_08_172 dated 2008-09-15 and complementary delivery by Allan Stråhle dated 2008-09-18. The data have previously been presented in the P-reports listed in Table 2-1. Data from samples where there is insufficient control on the rock type analysed have been omitted before statistical analyses were carried out. Samples affected by alteration have been omitted from the unaltered samples and are presented separately based on type of alteration (e.g. oxidised, albitized or quartz dissolution as listed in Table 1-1).

Redox data of rocks, based on Mössbauer analyses, have been extracted from Sicada using the data delivery Sicada_08_201 dated 2008-10-17 and have previously been presented in /Sandström and Tullborg 2006/.

Porosity measurements have been performed within different activities during the site investigation work (e.g. the geology and transport programmes). The analytical results from the different programmes differ due to, for example, differences in sample selection, methodology and sample size. In this compilation, the data set obtained by the geology programme for the connected porosity measured by the water saturation technique is presented /Stephens et al. 2007/. This data set has been chosen since the sample selection criteria are comparable to those used for the selection of the samples for mineralogical and geochemical analyses. Since porosity measurements have been performed within different activities, more porosity data than those presented in this compilation are stored in the Sicada database. For example, the transport programme have carried out extensive porosity measurements and these data are summarised in /Selnert et al. 2008/.

The porosity data have been compiled from a table of petrophysical data supplied by Hans Isaksson (GeoVista AB) on 2008-11-17. This table contains the same data as those extracted from Sicada and presented in Table 3-4 in /Stephens et al. 2007/. However, data from the regional model volume are presented in the current compilation, whereas /Stephens et al. 2007/ focussed attention on data from the local model volume. As pointed out above, this leads to some differences between the different compilations. Porosity data from rock samples affected by the alteration referred to as oxidation (101051_700 and 101057_700) have been compiled from /Sandström and Tullborg 2006/.

2.1 Analytical methods, uncertainties and statistical handling

Analyses of the modal mineralogical composition of different rock types have been carried out by point counting, i.e. by determining the mineralogy at 500 or 1,000 evenly-spaced points in a thin section using a petrographic microscope and standard point counting equipment. The results are presented as volume %. The standard deviation of a set of measured values is given by:

$$\sigma = \sqrt{\frac{p(1-p)}{N}}$$

where σ is the standard deviation, p is the proportion of the selected mineral and N is the number of observations /Jones 1987/. In addition, difficulties in the distinction between, for example, quartz and different types of feldspar during microscopy as well as textural heterogeneities in the rock introduce uncertainties in the modal data which are difficult to quantify.

Geochemical analyses of whole rock samples were carried out using ICP-AES (Inductively Coupled Plasma – Atomic Emission Spectrometer) for major and minor oxides (SiO_2, Al_2O_3, Fe_2O_3, MgO, CaO, Na_2O, K_2O, TiO_2, P_2O_5, MnO and Cr_2O_3,) and some trace element compositions (Ba, Ni and Sc). The detection limits for the oxides are 0.01% (except Fe_2O_3 which is 0.04%) and for Ba 5 ppm, Ni 20 ppm and Sc 1 ppm. C and S were determined by the so-called Leco method (detection limit 0.02%) and the remaining analysed trace element concentrations were analysed by ICP-MS (Inductively Coupled Plasma – Mass Spectrometer). Detection limits for the ICP-MS analyses are between 0.5 ppb and 1 ppm. The reproducibility of the geochemical data is better than about 60% for concentrations up to six times the detection limit, about 25% for concentrations up to twelve times the detection limit, about 14% for concentrations up to 60 times the detection limit and better than 7% for higher concentrations /Petersson et al. 2004/. The crushing and pulverizing procedure is estimated to give rise to minor contamination of the elements Fe (c. 600 ppm), Mn (c. 9 ppm) and Cr (c. 1.5 ppm) in the powder extracted for analysis. Detailed analytical procedures are presented in /Stephens et al. 2003/.

The degree of oxidation of the rock (Fe^{3+}/Fe_{total}) was determined by Mössbauer spectrometry and the errors in the measured oxidation factors are within ±0.03. The method is described in /Drake and Tullborg 2006/.

Porosity measurements were carried out by the water saturation technique according to SKB MD 160.002. The uncertainty of the porosity measurements is ±0.09%.

Statistical handling of the data presented in this report have been carried out using Microsoft excel for calculating the median value, data range and lower/upper quartile. When only four or less analyses of a specific rock type were available, no median or quartile values were calculated and only the range is presented.

Table 2-1. List of the reports in the SKB P-series from which the mineralogical and geochemical composition of the rock types at Forsmark presented in this report have been compiled. More detailed descriptions of the samples are available in these reports.

P-03-75	**Stephens M B, Lundqvist S, Ekström M, Bergman T, Anderson J, 2003.** Forsmark site investigation. Bedrock mapping: Rock types, their petrographic and geochemical characteristics, and a structural analysis of the bedrock based on stage 1 (2002) surface data.
P-04-87	**Stephens M B, Lundqvist S, Bergman T, Ekström M, 2005.** Forsmark site investigation. Bedrock mapping. Petrographic and geochemical characteristics of rock types based on stage 1 (2002) and stage 2 (2003) surface data.
P-04-103	**Petersson J, Berglund J, Danielsson P, Wängnerud A, Tullborg E-L, Mattsson H, Thunehed H, Isaksson H, Lindroos H, 2004.** Forsmark site investigation. Petrography, geochemistry, petrophysics and fracture mineralogy of boreholes KFM01A, KFM02A and KFM03A+B.
P-05-156	**Petersson J, Berglund J, Danielsson P, Skogsmo G, 2005.** Forsmark site investigation. Petrographic and geochemical characteristics of bedrock samples from boreholes KFM04A–06A, and a whitened alteration rock.
P-06-209	**Sandström B, Tullborg E-L, 2006.** Forsmark site investigation. Mineralogy, geochemistry, porosity and redox capacity of altered rock adjacent to fractures.
P-06-233	**Adl-Zarrabi B, 2006.** Borehole KFM01A, KFM01C, KFM01D, KFM04A, KFM05A, KFM06A and KFM09A. Forsmark site investigation. Thermal properties of rocks using calorimeter and TPS method, and mineralogical composition by modal analysis.

3 Mineralogical composition

The modal mineralogical composition is based on point counting of thin sections (500 or 1,000 points per thin section). SKB rock codes are given in brackets. The number of samples analysed are listed as in the example N=2. The mineralogical composition is given as volume percentage and presented in Table 3-1 to 3-15 as calculated median value, data range and lower/upper quartile. The samples included in the calculations are listed in Appendix 1.

3.1 Metamorphosed ultramafic rock (101004)

Medium-grained and partly serpentinized pyroxenite partly affected by penetrative ductile deformation.

Table 3-1. Mineralogical composition of metamorphosed ultramafic rock (101004). N=2. *No calculation of median and quartile values has been carried out due to the small number of samples.

	Median vol%	Range vol%	Lower/upper quartile vol%
Quartz	*	<0.2	*
K-feldspar	*	<0.2	*
Plagioclase	*	<0.2–0.8	*
Biotite	*	<0.2–4.6	*
Amphibole	*	9.6–31.1	*
Muscovite	*	<0.2	*
Pyroxen	*	41.8–60.0	*
Olivin	*	<0.2–10.2	*
Serpentine	*	<0.2–25.0	*
Chlorite	*	<0.2	*
Epidote	*	<0.2–0.2	*
Titanite	*	<0.2	*
Calcite	*	<0.2–0.6	*
Allanite	*	<0.2	*
Opaque	*	1.4–8.2	*

3.2 Metamorphosed diorite, quartz diorite or gabbro (101033)

Medium-grained, intermediate to mafic rock partly affected by penetrative ductile deformation under amphibolite facies metamorphic conditions.

Table 3-2. Mineralogical composition of metamorphosed diorite, quartz diorite or gabbro (101033). N=11.

	Median vol%	Range vol%	Lower/upper quartile vol%
Quartz	7.0	<0.2–24.6	3.0/12.3
K-feldspar	<0.2	<0.2–0.2	<0.2/<0.2
Plagioclase	50.8	40.4–64.6	47.3/54.9
Biotite	7.6	<0.2–15.0	4.3/12.4
Amphibole	25.8	10.6–50.6	22.4/35.8
Muscovite	<0.2	<0.2	<0.2/<0.2
Pyroxen	<0.2	<0.2–3.2	<0.2/<0.2
Chlorite	0.2	<0.2–1.0	<0.2/<0.2
Epidote	0.2	<0.2–1.8	<0.2/1.4
Titanite	<0.2	<0.2–1.4	<0.2/0.9
Calcite	<0.2	<0.2	<0.2/<0.2
Allanite	<0.2	<0.2	<0.2/<0.2
Opaque	0.4	<0.2–3.6	0.2/1.0

3.3 Metamorphosed, fine- to medium-grained granitoid (101051)

Fine- to medium-grained granitoid affected by penetrative ductile deformation under lower amphibolite facies metamorphic conditions.

Table 3-3. Mineralogical composition of metamorphosed, fine- to medium grained granitoid (101051). N=29.

	Median vol%	Range vol%	Lower/upper quartile vol%
Quartz	28.0	15.4–35.4	25.0/31.2
K-feldspar	7.0	<0.2–38.0	2.2/16.6
Plagioclase	49.6	29.4–67.0	38.6/53.0
Biotite	9.4	1.8–19.4	6.0/13.2
Amphibole	<0.2	<0.2–25.2	<0.2/1.2
Muscovite	<0.2	<0.2–1.0	<0.2/<0.2
Chlorite	0.2	<0.2–1.2	<0.2/0.2
Epidote	1.4	<0.2–3.8	0.6/2.4
Titanite	0.2	<0.2–1.4	<0.2/0.4
Calcite	<0.2	<0.2–0.4	<0.2/<0.2
Allanite	<0.2	<0.2/0.4	<0.2/0.2
Opaque	<0.2	<0.2–1.4	<0.2/0.2

3.4 Metamorphosed and oxidised, fine- to medium-grained granitoid (101051_700)

Fine- to medium-grained granitoid affected by penetrative ductile deformation under lower amphibolite facies metamorphic conditions. The rock is red-stained (oxidised) due to post-metamorphic hydrothermal alteration.

Table 3-4. Mineralogical composition of metamorphosed and oxidised, fine- to medium grained granitoid (101051_700). N=2. *No calculation of median and quartile values have been carried out due to the small number of samples.

	Median vol%	Range vol%	Lower/upper quartile vol%
Quartz	*	30.8–34.5	*
K-feldspar	*	24.3–33.4	*
Plagioclase	*	<0.2	*
Saussuritised Plagioclase	*	33.7–36.7	*
Biotite	*	<0.2	*
Amphibole	*	<0.2	*
Muscovite	*	<0.2	*
Chlorite	*	0.8–2.6	*
Epidote	*	1.1–1.4	*
Titanite	*	<0.2	*
Calcite	*	0–0.1	*
Allanite	*	0–0.4	*
Opaque	*	<0.2	*

3.5 Metamorphosed tonalite to granodiorite (101054)

Medium-grained tonalite to granodiorite affected by penetrative ductile deformation under amphibolite facies metamorphic conditions.

Table 3-5. Mineralogical composition of metamorphosed tonalite to granodiorite (101054). N=23.

	Median vol%	Range vol%	Lower/upper quartile vol%
Quartz	22.2	13.6–45.4	19.0/25.6
K-feldspar	5.0	<0.2–11.4	2.2/6.8
Plagioclase	48.6	37.6–61.4	45.4/52.4
Biotite	10.6	<0.2–15.6	7.8/12.4
Amphibole	10.0	<0.2–19.4	3.7/14.4
Muscovite	<0.2	<0.2–0.4	<0.2/<0.2
Chlorite	<0.2	<0.2–9.8	<0.2/0.2
Epidote	1.0	<0.2–7.2	0.5/1.9
Titanite	0.4	<0.2–2.0	0.2/0.9
Calcite	<0.2	<0.2–0.2	<0.2/<0.2
Allanite	<0.2	<0.2–0.2	<0.2/<0.2
Opaque	<0.2	<0.2–1.2	<0.2/0.3

3.6 Metamorphosed granodiorite (101056)

Medium-grained granodiorite affected by penetrative ductile deformation under amphibolite-facies metamorphic conditions.

Table 3-6. Mineralogical composition of metamorphosed granodiorite (101056). N=9.

	Median vol%	Range vol%	Lower/upper quartile vol%
Quartz	30.0	15.6–44.4	25.0/33.6
K-feldspar	11.6	7.2–16.6	9.8/14.8
Plagioclase	44.4	28.8–51.4	39.0/49.6
Biotite	8.8	2.2–12.4	7.6/9.2
Amphibole	<0.2	<0.2–16.2	<0.2/1.2
Muscovite	<0.2	<0.2	<0.2
Chlorite	<0.2	<0.2–4.6	<0.2/0.2
Epidote	1.4	0.2–3.2	0.6/3.0
Titanite	0.2	<0.2–1.8	<0.2/0.4
Calcite	0.2	<0.2–0.2	<0.2/0.2
Allanite	<0.2	<0.2	<0.2
Opaque	0.2	<0.2–0.8	<0.2/0.2

3.7 Metamorphosed, medium-grained granite to granodiorite (101057)

Medium-grained granite to granodiorite affected by penetrative ductile deformation under amphibolite-facies metamorphic conditions.

Table 3-7. Mineralogical composition of metamorphosed, medium-grained granite to granodiorite (101057). N=49.

	Median vol%	Range vol%	Lower/upper quartile vol%
Quartz	34.6	19.0–46.4	32.4/39.0
K-feldspar	23.4	8.2–36.0	21.0/28.2
Plagioclase	33.8	24.0–52.0	30.6/36.4
Biotite	5.4	1.8–12.4	4.2/6.2
Muscovite	<0.2	<0.2–0.6	<0.2/<0.2
Amphibole	<0.2	<0.2–5.2	<0.2/<0.2
Chlorite	<0.2	<0.2–1.2	<0.1/0.1
Epidote	0.4	<0.2–2.6	0.2/0.6
Titanite	<0.2	<0.2–0.6	<0.2/0.2
Calcite	<0.2	<0.2–0.4	<0.2/<0.2
Allanite	<0.2	<0.2–0.6	<0.2/0.2
Opaque	0.2	<0.2–0.9	<0.2/0.4

3.8 Metamorphosed and albitized granite (101057_101058_104)

Granite affected by albitization prior to or during penetrative ductile deformation and amphibolite-facies metamorphism. Commonly fine-grained.

Table 3-8. Mineralogical composition of metamorphosed and albitized granite (101057_101058_104). N=12.

	Median vol%	Range vol%	Lower/upper quartile vol%
Quartz	37.4	34.4–50.0	35.4/44.2
K-feldspar	2.4	<0.2–14.6	0.4/7.6
Plagioclase	51.6	41.8–63.8	47.9/56.6
Biotite	1.0	<0.2–5.2	0.5/4.0
Amphibole	<0.2	<0.2–2.4	<0.2/<0.2
Muscovite	<0.2	<0.2–0.4	<0.2/<0.2
Chlorite	<0.2	<0.2–1.0	<0.2/0.2
Epidote	0.5	<0.2–3.2	0.2/0.9
Titanite	<0.2	<0.2–1.0	<0.2/0.5
Calcite	<0.2	<0.2–0.2	<0.2/<0.2
Allanite	<0.2	<0.2–0.4	<0.2/<0.2
Opaque	<0.2	<0.2–1.8	<0.2/0.2

3.9 Metamorphosed and oxidised, medium-grained granite to granodiorite (101057_700)

Medium-grained granite to granodiorite affected by penetrative ductile deformation under amphibolite-facies metamorphic conditions. The rock is red-stained (oxidised) due to post-metamorphic hydrothermal alteration.

Table 3-9. Mineralogical composition of metamorphosed and oxidised, medium-grained granite to granodiorite (101057_700). N=6.

	Median vol%	Range vol%	Lower/upper quartile vol%
Quartz	38.4	30.3–41.7	32.5/41.3
K-feldspar	17.8	10.5–33.1	14.1/20.5
Plagioclase	1.3	0–4.5	<0.2/2.4
Saussuritised Plagioclase	38.0	26.5–41.7	31.0/40.0
Biotite	<0.2	<0.2–0.2	<0.2/<0.2
Amphibole	<0.2	<0.2	<0.2
Chlorite	5.2	3.0–7.4	4.4/6.6
Epidote	1.2	0.6–3.1	0.8/1.5
Titanite	<0.2	<0.2	<0.2
Calcite	<0.2	<0.2	<0.2
Allanite	<0.2	<0.2–0.3	<0.2
Opaque	0.2	<0.2–0.3	<0.2/0.3

3.10 Vuggy metamorphosed granite (101057_706)

Medium-grained granite affected by penetrative ductile deformation under amphibolite-facies metamorphic conditions and subsequently by hydrothermal alteration. The alteration produced a vuggy rock, characterised by increased porosity and a decrease in silicate density due to quartz dissolution, and red-staining (oxidation).

Table 3-10. Mineralogical composition of vuggy metagranite (101057_706). N=1. Resilicified samples have been omitted. *No calculation of median and quartile values have been carried out since only one sample has been analysed.

	Median vol%	Range vol%	Lower/upper quartile vol%
Quartz	*	9.6	*
K-feldspar	*	20.0	*
Plagioclase	*	42.8	*
Vugs	*	21.8	*
Biotite	*	<0.2	*
Amphibole	*	<0.2	*
Chlorite	*	2.4	*
Epidote	*	<0.2	*
Titanite	*	3.0	*
Calcite	*	<0.2	*
Allanite	*	<0.2	*
Opaque	*	3.4	*

3.11 Metamorphosed, aplitic granite (101058)

Fine-grained and leucocratic granite (aplitic) affected by penetrative ductile deformation under amphibolite-facies metamorphic conditions.

Table 3-11. Mineralogical composition of metamorphosed, aplitic granite (101058). N=6.

	Median vol%	Range vol%	Lower/upper quartile vol%
Quartz	36.8	30.8–44.4	34.7/40.4
K-feldspar	29.2	23.0–47.0	26.6/34.4
Plagioclase	26.6	18.8–31.2	25.6/29.2
Biotite	2.0	0.6–7.4	1.9/5.7
Amphibole	<0.2	<0.2	<0.2
Muscovite	<0.2	<0.2–0.8	<0.2/<0.2
Chlorite	<0.2	<0.2–0.5	<0.2/<0.2
Epidote	<0.2	<0.2–0.7	<0.2/0.2
Titanite	<0.2	<0.2–0.2	<0.2/<0.2
Calcite	<0.2	<0.2–0.2	<0.2/<0.2
Allanite	<0.2	<0.2–0.2	<0.2/<0.2
Opaque	0.3	<0.2–0.8	<0.2/0.5

3.12 Pegmatite or pegmatitic granite (101061)

Coarse-grained granite (pegmatitic) only partly affected by ductile deformation and metamorphism.

Table 3-12. Mineralogical composition of pegmatite or pegmatitic granite (101061). N=5.

	Median vol%	Range vol%	Lower/upper quartile vol%
Quartz	33.6	29.2–38.1	31.8/37.1
K-feldspar	31.8	19.2–45.0	27.0/33.6
Plagioclase	31.8	20.6–39.0	28.4/37.2
Biotite	0.6	0.3–5.2	0.6/1.6
Amphibole	<0.2	<0.2	<0.2
Muscovite	<0.2	<0.2–1.6	<0.2/0.2
Chlorite	0.4	<0.2–1.6	<0.2/0.5
Epidote	0.4	<0.2–1.4	0.2/1.1
Titanite	<0.2	<0.2	<0.2
Calcite	0.2	<0.2–0.3	<0.2/0.2
Allanite	<0.2	<0.2	<0.2
Opaque	<0.2	<0.2–0.2	<0.2/<0.2

3.13 Amphibolite (102017)

Finely medium-grained mafic rock affected by penetrative ductile deformation under amphibolite-facies metamorphic conditions.

Table 3-13. Mineralogical composition of amphibolite (102017). N=4. *No calculation of median and quartile values have been carried out due to the small number of samples.

	Median vol%	Range vol%	Lower/upper quartile vol%
Quartz	*	<0.2–6.4	*
K-feldspar	*	<0.2–2.0	*
Plagioclase	*	39.2–53.0	*
Biotite	*	<0.2–9.0	*
Amphibole	*	40.6–55.6	*
Muscovite	*	<0.2	*
Chlorite	*	<0.2	*
Epidote	*	<0.2–3.0	*
Titanite	*	<0.2–2.2	*
Calcite	*	<0.2	*
Allanite	*	<0.2	*
Opaque	*	<0.2–0.6	*

3.14 Metamorphosed, felsic to intermediate volcanic rock (103076)

Fine-grained felsic to intermediate volcanic rock affected by penetrative ductile deformation under amphibolite-facies metamorphic conditions.

Table 3-14. Mineralogical composition of metamorphosed, felsic to intermediate volcanic rock (103076). N=17.

	Median vol%	Range vol%	Lower/upper quartile vol%
Quartz	27.6	5.2–39.2	24.4/33.6
K-feldspar	1.2	<0.2–17.0	0.8/7
Plagioclase	48.6	29.2–58.0	45.4/50.8
Biotite	12.6	<0.2–25.6	8.8/20.0
Amphibole	<0.2	<0.2–35.6	<0.2/10.0
Muscovite	<0.2	<0.2–1.6	<0.2/<0.2
Chlorite	<0.2	<0.2–0.8	<0.2/0.2
Epidote	0.2	<0.2–14.4	<0.2/0.6
Titanite	<0.2	<0.2–2.0	<0.2/0.2
Calcite	<0.2	<0.2–0.2	<0.2/<0.2
Allanite	<0.2	<0.2–0.2	<0.2/<0.2
Opaque	<0.2	<0.2–2.6	<0.2/0.2

3.15 Fine- to medium-grained granite (111058)

Fine- to medium-grained granite only partly affected by ductile deformation and metamorphism.

Table 3-15. Mineralogical composition of fine- to medium-grained granite (111058). N=5.

	Median vol%	Range vol%	Lower/upper quartile vol%
Quartz	30.6	25.4–42.8	30.2/33.0
K-feldspar	28.4	22.6–37.8	28.0/31.4
Plagioclase	33.2	22.0–46.2	27.0/36.8
Biotite	3.0	0.6–4.4	1.4/4.0
Amphibole	<0.2	<0.2	<0.2
Muscovite	<0.2	<0.2–0.8	<0.2/<0.2
Chlorite	0.2	<0.2–2.4	<0.2/1.2
Epidote	0.8	0.2–1.4	0.4/0.8
Titanite	<0.2	<0.2–0.2	<0.2/<0.2
Calcite	<0.2	<0.2	<0.2
Allanite	<0.2	<0.2	<0.2
Opaque	0.4	0.2–0.6	0.2/0.4

4 Whole rock geochemistry

Geochemical data of whole rock samples of the different rock types are presented in Table 4-1 to 4-15 as calculated median value, data range and lower/upper quartile. The samples included in the calculations are listed in Appendix 2. In the tables, element oxide concentrations, LOI (loss on ignition), TOT/C (total carbon), TOT/S (total sulphur) and SUM are given as weight %. Trace element concentrations are given as parts per million (ppm) except for the Au concentration which is given as parts per billion (ppb). Analytical procedures are presented in /Stephens et al. 2003/. The number of samples analysed are listed as in the example N=2.

4.1 Metamorphosed ultramafic rock (101004)

Table 4-1. Whole rock geochemistry of metamorphosed ultramafic rock (101004). N=2. *No calculation of median and quartile values have been carried out due to the small number of samples.

Element	Median	Range Min	Range Max	Quartile Lower	Quartile Upper
SiO_2 (wt%)	*	40.33	49.45	*	*
TiO_2	*	0.21	0.38	*	*
Al_2O_3	*	4.33	9.99	*	*
Fe_2O_3	*	12.36	13.33	*	*
MnO	*	0.22	0.24	*	*
MgO	*	13.07	26.95	*	*
CaO	*	9.09	11.12	*	*
Na_2O	*	0.25	0.63	*	*
K_2O	*	0.08	0.25	*	*
P_2O_5	*	0.03	0.05	*	*
LOI	*	1.50	5.80	*	*
TOT/C	n.a.	n.a.	n.a.	n.a.	n.a.
TOT/S	n.a.	n.a.	n.a.	n.a.	n.a.
SUM	*	100.01	100.06	*	*
Sc (ppm)	*	32.0	69.0	*	*
V	*	158.0	307.0	*	*
Cr	*	<7	<7	*	*
Co	*	62.9	99.2	*	*
Ni	*	15.8	630.0	*	*
Cu	*	10.1	84.2	*	*
Zn	*	15.0	27.0	*	*
Ga	*	5.4	10.6	*	*
As	*	<0.5	3.90	*	*
Se	*	<0.5	<0.5	*	*
Rb	*	3.5	9.7	*	*
Sr	*	90.8	149.9	*	*
Y	*	4.5	6.8	*	*
Zr	*	7.5	15.9	*	*
Nb	*	1.0	1.0	*	*
Mo	*	0.1	0.8	*	*

Element	Median	Range Min	Range Max	Quartile Lower	Quartile Upper
Ag	*	<0.1	<0.1	*	*
Sn	*	<1	<1	*	*
Cd	*	<0.1	<0.1	*	*
Sb	*	<0.1	0.2	*	*
Cs	*	0.5	0.5	*	*
Ba	*	26.0	62.0	*	*
Hf	*	<0.5	<0.5	*	*
Ta	*	<0.1	<0.1	*	*
W	*	0.3	0.4	*	*
Hg	*	<0.1	<0.1	*	*
Tl	*	<0.1	2.0	*	*
Pb	*	0.5	3.0	*	*
Bi	*	<0.1	0.2	*	*
Th	*	0.3	0.5	*	*
U	*	<0.1	0.3	*	*
La	*	1.5	3.4	*	*
Ce	*	2.2	7.5	*	*
Pr	*	0.5	0.95	*	*
Nd	*	3.0	5.1	*	*
Sm	*	0.9	1.2	*	*
Eu	*	0.30	0.35	*	*
Gd	*	0.90	1.05	*	*
Tb	*	0.17	0.20	*	*
Dy	*	0.90	0.95	*	*
Ho	*	0.20	0.24	*	*
Er	*	0.50	0.59	*	*
Tm	*	0.06	0.09	*	*
Yb	*	0.61	0.64	*	*
Lu	*	0.09	0.11	*	*
Au (ppb)	*	<0.5	0.80	*	*

4.2 Metamorphosed diorite, quartz diorite or gabbro (101033)

Table 4-2. Whole rock geochemistry of metamorphosed diorite, quartz diorite or gabbro (101033). N=8.

Element	Median	Range		Quartile		Element	Median	Range		Quartile	
		Min	Max	Lower	Upper			Min	Max	Lower	Upper
SiO_2 (wt%)	52.00	48.33	61.41	48.49	56.40	**Ag**	<0.1	<0.1	0.1	<0.1	<0.1
TiO_2	1.01	0.59	1.68	0.80	1.32	**Sn**	<1	<1	4.0	<1	2.3
Al_2O_3	18.48	16.18	20.36	17.60	19.84	**Cd**	<0.1	<0.1	0.1	<0.1	0.1
Fe_2O_3	10.00	6.25	13.28	8.98	11.34	**Sb**	<0.1	<0.1	0.1	<0.1	<0.1
MnO	0.17	0.10	0.24	0.15	0.17	**Cs**	1.4	0.6	4.4	1.2	1.8
MgO	2.84	2.48	3.38	2.66	3.03	**Ba**	376.0	278.0	637.0	298.0	491.8
CaO	8.20	5.98	10.80	7.48	9.66	**Hf**	1.6	0.9	3.4	1.0	2.6
Na_2O	3.13	2.33	3.27	2.52	3.21	**Ta**	0.5	0.3	0.8	0.4	0.6
K_2O	1.30	0.64	1.83	0.71	1.62	**W**	0.4	0.2	0.6	0.3	0.5
P_2O_5	0.39	0.22	0.64	0.29	0.48	**Hg**	<0.01	<0.01	<0.01	<0.01	<0.01
LOI	0.95	0.70	1.30	0.85	1.23	**Tl**	0.2	0.1	0.6	0.1	0.2
TOT/C	n.a.	n.a.	n.a.	n.a.	n.a.	**Pb**	3.0	1.1	3.2	1.9	3.1
TOT/S	n.a.	n.a.	n.a.	n.a.	n.a.	**Bi**	0.1	<0.1	0.2	<0.1	0.2
SUM	99.91	99.62	100.06	99.86	99.93	**Th**	3.6	1.1	6.6	1.7	5.3
Sc (ppm)	21.0	16.0	27.0	18.5	22.3	**U**	1.4	0.5	2.7	0.6	2.1
V	133.0	46.0	174.0	95.8	156.3	**La**	19.9	14.5	27.8	18.5	21.2
Cr	n.a.	n.a.	n.a.	n.a.	n.a.	**Ce**	41.2	30.5	56.6	38.0	47.5
Co	21.3	15.7	25.4	18.2	24.3	**Pr**	5.4	3.9	6.3	4.8	5.5
Ni	6.7	4.4	10.5	6.2	7.0	**Nd**	22.8	17.6	25.5	20.4	23.9
Cu	34.5	4.9	56.3	26.5	48.4	**Sm**	4.4	3.6	5.5	4.0	4.8
Zn	53.0	36.0	89.0	44.0	64.8	**Eu**	1.50	1.14	2.30	1.31	1.88
Ga	21.1	18.8	23.4	20.6	22.5	**Gd**	3.80	3.23	4.60	3.46	4.21
As	0.0	<0.5	0.7	<0.5	0.5	**Tb**	0.60	0.50	0.70	0.52	0.64
Se	<0.5	<0.5	<0.5	<0.5	<0.5	**Dy**	3.15	2.70	4.55	2.89	3.36
Rb	52.5	18.3	154.3	23.3	69.0	**Ho**	0.60	0.57	0.91	0.60	0.62
Sr	582.3	411.2	670.5	499.4	655.9	**Er**	1.76	1.47	2.64	1.68	1.89
Y	19.1	16.1	28.8	18.0	20.9	**Tm**	0.25	0.21	0.41	0.23	0.29
Zr	60.5	24.8	117.8	35.8	88.1	**Yb**	1.67	1.38	2.72	1.49	1.91
Nb	7.4	4.8	9.4	6.1	8.8	**Lu**	0.27	0.18	0.43	0.24	0.28
Mo	0.8	0.5	3.3	0.6	1.0	**Au (ppb)**	0.60	<0.5	1.10	<0.5	0.85

4.3 Metamorphosed, fine- to medium-grained granitoid (101051)

Table 4-3. Whole rock geochemistry of metamorphosed, fine- to medium-grained granitoid (101051). N=16.

Element	Median	Range		Quartile		Element	Median	Range		Quartile	
		Min	Max	Lower	Upper			Min	Max	Lower	Upper
SiO_2 (wt%)	69.34	55.93	73.63	59.99	72.27	Ag	<0.1	<0.1	<0.1	<0.1	<0.1
TiO_2	0.46	0.16	0.98	0.25	0.59	Sn	3.0	1.0	5.0	2.0	3.0
Al_2O_3	14.90	13.34	18.37	14.24	15.86	Cd	<0.1	<0.1	<0.1	<0.1	<0.1
Fe_2O_3	3.99	2.21	10.50	2.82	7.95	Sb	<0.1	<0.1	0.1	<0.1	0.1
MnO	0.05	0.04	0.18	0.05	0.13	Cs	0.9	0.5	2.7	0.8	1.2
MgO	1.19	0.28	2.84	0.68	1.56	Ba	713.4	372.0	1,147.0	586.0	888.1
CaO	3.41	1.58	7.30	2.53	6.10	Hf	5.3	2.7	7.0	3.0	5.8
Na_2O	3.68	2.94	4.91	3.51	4.12	Ta	0.6	0.4	2.3	0.6	1.0
K_2O	1.78	1.20	4.78	1.47	2.44	W	0.4	<0.1	0.9	0.3	0.5
P_2O_5	0.16	0.03	0.44	0.06	0.20	Hg	<0.01	<0.01	<0.01	<0.01	<0.01
LOI	0.70	0.30	1.10	0.60	0.90	Tl	0.3	0.1	0.4	0.2	0.3
TOT/C	n.a.	n.a.	n.a.	n.a.	n.a.	Pb	3.0	1.7	11.4	2.4	6.0
TOT/S	0.02	0.01	0.07	0.01	0.06	Bi	<0.1	<0.1	0.2	<0.1	<0.1
SUM	99.80	99.59	100.25	99.75	99.88	Th	9.5	4.5	32.3	6.6	19.6
Sc (ppm)	7.0	2.0	27.0	4.0	16.5	U	3.0	2.0	10.4	2.6	4.3
V	33.0	5.0	150.0	13.0	51.5	La	46.2	19.5	66.3	25.5	52.1
Cr	<7	<7	7.0	<7	<7	Ce	85.5	40.8	120.6	52.7	101.8
Co	7.0	2.0	19.0	3.8	12.7	Pr	8.6	4.2	12.1	5.8	10.8
Ni	2.4	0.2	46.0	1.7	5.1	Nd	32.8	13.0	43.5	21.9	37.0
Cu	6.4	1.4	30.3	3.2	10.6	Sm	5.0	1.9	8.5	4.3	5.4
Zn	48.0	27.0	98.0	41.0	70.0	Eu	1.10	0.60	1.57	0.83	1.24
Ga	19.9	15.5	22.2	18.0	21.5	Gd	3.68	1.23	7.60	3.10	4.87
As	<0.5	<0.5	0.9	<0.5	<0.5	Tb	0.57	0.17	1.21	0.40	0.76
Se	<0.5	<0.5	<0.5	<0.5	<0.5	Dy	3.06	1.05	7.09	2.48	4.38
Rb	82.3	36.9	140.0	54.9	102.6	Ho	0.53	0.24	1.47	0.40	0.92
Sr	341.4	92.0	914.7	246.3	447.7	Er	1.79	0.71	4.59	1.20	2.58
Y	19.8	7.6	47.7	12.3	26.9	Tm	0.34	0.13	0.73	0.19	0.41
Zr	158.1	87.7	238.5	105.5	209.5	Yb	2.16	0.90	4.97	1.20	2.57
Nb	10.0	5.6	20.9	7.9	12.3	Lu	0.34	0.14	0.79	0.21	0.45
Mo	0.3	0.2	2.2	0.2	0.6	Au (ppb)	0.80	<0.5	1.90	0.10	1.30

4.4 Metamorphosed and oxidised, fine- to medium-grained granitoid (101051_700)

Table 4-4. Whole rock geochemistry of metamorphosed and oxidised, fine- to medium-grained granitoid (101051_700). N=2. *No calculation of median and quartile values have been carried out due to the small number of samples.

Element	Median	Range		Quartile		Element	Median	Range		Quartile	
		Min	Max	Lower	Upper			Min	Max	Lower	Upper
SiO_2 (wt%)	*	74.65	74.67	*	*	Ag	*	<0.1	<0.1	*	*
TiO_2	*	0.03	0.06	*	*	Sn	*	<1	1.0	*	*
Al_2O_3	*	13.72	13.88	*	*	Cd	*	<1	<0.1	*	*
Fe_2O_3	*	0.64	1.04	*	*	Sb	*	<0.1	<0.1	*	*
MnO	*	0.01	0.02	*	*	Cs	*	0.5	0.9	*	*
MgO	*	0.09	0.16	*	*	Ba	*	436.0	565.7	*	*
CaO	*	0.79	1.26	*	*	Hf	*	2.6	2.9	*	*
Na_2O	*	3.66	3.89	*	*	Ta	*	0.3	0.6	*	*
K_2O	*	4.63	6.01	*	*	W	*	<0.1	0.4	*	*
P_2O_5	*	<0.01	0.02	*	*	Hg	*	<0.01	<0.01	*	*
LOI	*	0.50	0.80	*	*	Tl	*	<0.1	<0.1	*	*
TOT/C	*	n.a.	n.a.	*	*	Pb	*	5.0	7.8	*	*
TOT/S	*	0.01	0.01	*	*	Bi	*	<0.1	<0.1	*	*
SUM	*	100.26	100.31	*	*	Th	*	8.1	10.1	*	*
Sc (ppm)	*	2.0	2.0	*	*	U	*	11.6	18.3	*	*
V	*	<5	6.0	*	*	La	*	14.1	19.5	*	*
Cr	*	<7	0.0	*	*	Ce	*	27.5	37.8	*	*
Co	*	<0.5	0.7	*	*	Pr	*	2.8	3.8	*	*
Ni	*	0.6	0.8	*	*	Nd	*	9.4	12.3	*	*
Cu	*	0.5	0.6	*	*	Sm	*	1.8	2.4	*	*
Zn	*	12.0	24.0	*	*	Eu	*	0.45	0.47	*	*
Ga	*	16.5	19.4	*	*	Gd	*	1.81	2.06	*	*
As	*	<0.5	<0.5	*	*	Tb	*	0.34	0.36	*	*
Se	*	<0.5	<0.5	*	*	Dy	*	1.82	2.20	*	*
Rb	*	117.2	142.1	*	*	Ho	*	0.38	0.49	*	*
Sr	*	103.2	119.6	*	*	Er	*	1.15	1.53	*	*
Y	*	12.3	14.7	*	*	Tm	*	0.21	0.29	*	*
Zr	*	56.4	63.9	*	*	Yb	*	1.17	1.86	*	*
Nb	*	7.5	9.1	*	*	Lu	*	0.22	0.23	*	*
Mo	*	0.4	0.4	*	*	Au (ppb)	*	<0.5	2.30	*	*

4.5 Metamorphosed tonalite to granodiorite (101054)

Table 4-5. Whole rock geochemistry of metamorphosed tonalite to granodiorite (101054). N=12.

Element	Median	Range		Quartile		Element	Median	Range		Quartile	
		Min	Max	Lower	Upper			Min	Max	Lower	Upper
SiO_2 (wt%)	63.57	57.80	71.17	60.55	68.36	**Ag**	<0.1	<0.1	<0.1	<0.1	<0.1
TiO_2	0.57	0.28	0.82	0.40	0.66	**Sn**	1.0	<1	2.0	0.0	2.0
Al_2O_3	15.85	13.93	18.52	15.03	16.97	**Cd**	<0.1	<0.1	<0.1	<0.1	<0.1
Fe_2O_3	5.99	3.72	11.50	4.78	6.86	**Sb**	0.1	<0.1	0.2	<0.1	0.1
MnO	0.10	0.07	0.29	0.08	0.11	**Cs**	1.0	0.7	3.2	0.9	1.8
MgO	1.11	0.59	3.03	0.94	2.17	**Ba**	731.0	322.0	1,364.0	589.5	770.0
CaO	5.21	3.41	6.76	3.77	5.85	**Hf**	3.7	1.8	6.3	3.5	4.6
Na_2O	3.49	3.19	3.86	3.37	3.71	**Ta**	0.6	0.3	1.3	0.5	0.9
K_2O	1.86	1.02	2.57	1.63	2.16	**W**	0.4	0.1	0.7	0.3	0.5
P_2O_5	0.18	0.06	0.28	0.12	0.19	**Hg**	<0.01	<0.01	<0.01	<0.01	<0.01
LOI	0.60	0.50	1.20	0.60	0.85	**Tl**	0.2	0.1	0.4	0.2	0.2
TOT/C	n.a.	n.a.	n.a.	n.a.	n.a.	**Pb**	3.0	1.8	4.3	2.8	3.5
TOT/S	0.02	0.02	0.02	0.02	0.02	**Bi**	<0.1	<0.1	0.3	<0.1	0.1
SUM	99.87	99.57	100.06	99.83	99.94	**Th**	7.7	5.1	19.8	6.4	7.8
Sc (ppm)	13.0	6.0	22.0	10.0	17.5	**U**	3.0	1.4	8.0	2.3	4.0
V	55.0	<5	133.0	30.0	71.5	**La**	24.7	18.0	64.1	22.7	28.1
Cr	<7	<7	<7	<7	<7	**Ce**	47.1	33.4	98.5	40.1	55.2
Co	9.9	4.2	16.9	6.2	13.4	**Pr**	5.6	3.5	9.2	5.0	6.5
Ni	2.3	0.6	30.0	1.6	7.7	**Nd**	23.4	14.6	33.9	20.4	27.9
Cu	6.7	1.4	40.5	3.0	13.5	**Sm**	4.5	2.8	6.2	4.2	5.0
Zn	49.0	28.0	109.0	43.0	61.5	**Eu**	1.20	0.75	2.63	0.90	1.29
Ga	18.6	15.5	21.6	17.4	20.7	**Gd**	4.16	2.10	5.14	3.08	4.34
As	<0.5	<0.5	1.1	<0.5	0.7	**Tb**	0.70	0.32	0.82	0.48	0.72
Se	<0.5	<0.5	<0.5	<0.5	<0.5	**Dy**	4.10	1.96	4.80	2.67	4.62
Rb	58.5	37.4	96.4	48.4	80.1	**Ho**	0.87	0.43	1.10	0.55	0.92
Sr	345.4	233.2	621.8	287.2	423.9	**Er**	2.50	1.20	3.30	1.58	2.66
Y	26.2	12.5	31.0	15.6	28.2	**Tm**	0.38	0.21	0.46	0.25	0.42
Zr	127.0	48.5	232.9	115.3	154.4	**Yb**	2.42	1.24	3.62	1.79	2.76
Nb	8.2	4.2	14.1	7.1	9.7	**Lu**	0.37	0.20	0.57	0.30	0.43
Mo	0.5	0.1	1.4	0.3	0.5	**Au (ppb)**	0.60	<0.5	1.10	0.50	0.90

4.6 Metamorphosed granodiorite (101056)

Table 4-6. Whole rock geochemistry of metamorphosed granodiorite (101056). N=5.

Element	Median	Range Min	Range Max	Quartile Lower	Quartile Upper	Element	Median	Range Min	Range Max	Quartile Lower	Quartile Upper
SiO_2 (wt%)	68.88	62.45	69.19	68.61	68.94	**Ag**	<0.1	<0.1	<0.1	<0.1	<0.1
TiO_2	0.39	0.26	0.62	0.38	0.46	**Sn**	1.0	<0.1	2.0	1.0	1.0
Al_2O_3	14.84	14.32	15.24	14.64	15.10	**Cd**	<0.1	<0.1	0.1	<0.1	<0.1
Fe_2O_3	4.94	4.01	6.27	4.05	5.31	**Sb**	0.1	<0.1	0.1	0.1	0.1
MnO	0.09	0.07	0.10	0.09	0.09	**Cs**	1.0	0.8	2.6	0.9	1.6
MgO	0.97	0.78	2.65	0.90	1.39	**Ba**	891.0	618.8	1,270.0	803.0	1,065.0
CaO	3.33	3.25	5.36	3.25	3.72	**Hf**	4.4	3.7	5.6	4.2	5.2
Na_2O	3.48	3.39	3.72	3.47	3.68	**Ta**	0.6	0.5	0.8	0.5	0.8
K_2O	2.16	2.13	2.58	2.13	2.38	**W**	0.2	<0.1	0.4	0.1	0.3
P_2O_5	0.11	0.08	0.17	0.10	0.12	**Hg**	<0.01	<0.01	0.02	<0.01	<0.01
LOI	1.00	0.40	1.30	0.60	1.10	**Tl**	0.2	<0.1	0.3	0.1	0.2
TOT/C	n.a.	n.a.	n.a.	n.a.	n.a.	**Pb**	3.0	2.2	5.4	2.5	3.6
TOT/S	0.03	0.03	0.03	0.03	0.03	**Bi**	0.1	<0.1	0.3	<0.1	0.1
SUM	99.93	99.78	100.01	99.80	99.98	**Th**	8.5	6.3	11.7	7.6	11.1
Sc (ppm)	11.0	4.0	19.0	7.0	17.0	**U**	3.4	1.3	4.2	3.0	4.1
V	36.0	14.0	123.0	30.0	49.0	**La**	28.5	25.4	43.6	26.3	29.2
Cr	n.a.	n.a.	n.a.	n.a.	n.a.	**Ce**	53.3	50.8	88.0	52.4	56.2
Co	7.0	4.2	16.0	5.5	7.1	**Pr**	6.4	5.2	9.4	5.4	6.4
Ni	2.4	2.0	4.6	2.0	3.3	**Nd**	27.2	18.1	40.5	21.7	29.2
Cu	7.2	1.0	12.4	7.1	7.9	**Sm**	5.3	3.3	7.0	4.1	5.3
Zn	49.0	35.0	54.0	44.0	50.0	**Eu**	1.13	0.83	1.51	0.90	1.40
Ga	17.5	16.7	19.2	16.9	18.8	**Gd**	4.49	2.71	5.74	2.90	4.61
As	0.5	<0.5	1.7	0.5	1.1	**Tb**	0.63	0.47	0.88	0.50	0.86
Se	<5	<5	<5	<5	<0.5	**Dy**	3.84	2.80	4.98	2.99	4.14
Rb	79.4	55.6	104.6	63.5	79.4	**Ho**	0.70	0.52	0.96	0.60	0.86
Sr	305.5	277.7	375.7	298.2	353.1	**Er**	1.99	1.51	2.67	1.70	2.48
Y	22.5	16.5	28.4	17.8	25.9	**Tm**	0.32	0.27	0.41	0.28	0.39
Zr	151.8	128.8	191.6	142.7	165.5	**Yb**	2.08	1.86	2.54	1.91	2.52
Nb	8.4	8.3	11.2	8.3	10.4	**Lu**	0.34	0.28	0.39	0.34	0.38
Mo	0.6	0.1	1.3	0.4	0.7	**Au (ppb)**	0.80	<0.5	3.50	<0.5	1.40

4.7 Metamorphosed, medium-grained granite to granodiorite (101057)

Table 4-7. Whole rock geochemistry of metamorphosed, medium-grained granite to granodiorite (101057). N=46.

Element	Median	Range		Quartile		Element	Median	Range		Quartile	
		Min	Max	Lower	Upper			Min	Max	Lower	Upper
SiO_2 (wt%)	74.76	71.95	76.33	74.44	75.05	**Ag**	<0.1	<0.1	0.1	<0.1	<0.1
TiO_2	0.19	0.12	0.31	0.18	0.20	**Sn**	2.0	<1	4.0	2.0	2.0
Al_2O_3	12.75	12.13	13.55	12.62	12.85	**Cd**	<0.1	<1	0.1	<0.1	<0.1
Fe_2O_3	2.73	1.80	3.83	2.56	2.90	**Sb**	0.1	<0.1	0.2	<0.1	0.1
MnO	0.04	0.03	0.06	0.03	0.04	**Cs**	0.7	0.2	2.7	0.5	1.0
MgO	0.35	0.16	0.81	0.30	0.40	**Ba**	1,184.5	290.0	1,797.0	1,085.7	1,302.8
CaO	1.47	1.02	2.35	1.35	1.69	**Hf**	4.6	2.9	5.9	4.3	4.9
Na_2O	3.37	2.87	4.46	3.19	3.61	**Ta**	0.5	0.3	2.1	0.4	0.8
K_2O	3.66	1.30	4.76	3.34	3.97	**W**	0.4	<0.1	1.3	0.2	0.6
P_2O_5	0.04	<0.01	0.08	0.02	0.04	**Hg**	<0.01	<0.01	0.01	<0.01	<0.01
LOI	0.45	0.10	1.00	0.30	0.60	**Tl**	0.2	<0.1	0.3	0.2	0.2
TOT/C	n.a.	n.a.	n.a.	n.a.	n.a.	**Pb**	4.5	2.0	7.1	3.8	5.2
TOT/S	0.01	0.01	0.43	0.01	0.02	**Bi**	<0.1	<0.1	0.2	<0.1	<0.1
SUM	99.87	99.77	100.17	99.82	99.95	**Th**	15.3	11.3	23.8	14.4	16.2
Sc (ppm)	5.0	2.0	10.0	4.0	5.0	**U**	4.1	1.6	15.6	3.1	5.2
V	8.0	<5	18.0	7.0	10.0	**La**	37.1	25.5	79.4	34.9	39.2
Cr	<7	<7	21.0	<7	<7	**Ce**	70.5	42.1	136.8	67.2	73.9
Co	2.5	1.5	4.0	2.3	2.9	**Pr**	7.6	3.9	13.5	7.1	7.9
Ni	2.3	0.8	10.9	2.1	2.6	**Nd**	28.5	13.6	50.4	27.2	30.7
Cu	7.8	0.7	90.3	2.0	10.9	**Sm**	5.3	2.1	7.8	5.0	5.5
Zn	26.5	13.0	47.0	23.0	28.8	**Eu**	0.65	0.42	0.93	0.60	0.69
Ga	15.3	12.7	17.2	14.8	16.0	**Gd**	4.35	1.67	6.30	4.00	4.62
As	<0.5	<0.5	2.2	<0.5	0.6	**Tb**	0.70	0.23	1.07	0.63	0.75
Se	<0.5	<0.5	0.6	<0.5	<0.5	**Dy**	4.10	1.41	6.61	3.25	4.52
Rb	104.1	51.8	147.0	90.1	112.6	**Ho**	0.86	0.27	1.51	0.64	0.95
Sr	107.0	69.7	194.5	100.8	122.8	**Er**	2.34	0.73	4.65	1.71	2.81
Y	24.1	8.2	47.3	18.5	28.3	**Tm**	0.35	0.10	0.80	0.26	0.44
Zr	154.0	99.3	201.6	140.0	162.6	**Yb**	2.16	0.64	5.69	1.67	2.88
Nb	10.9	7.1	14.0	9.4	11.6	**Lu**	0.33	0.10	0.93	0.25	0.44
Mo	0.7	0.2	12.8	0.5	1.1	**Au (ppb)**	1.25	<0.5	15.30	0.90	2.25

4.8 Metamorphosed and albitized granite (101057_101058_104)

Table 4-8. Whole rock geochemistry of metamorphosed and albitized granite (101057_101058_104). N=12.

Element	Median	Range Min	Range Max	Quartile Lower	Quartile Upper	Element	Median	Range Min	Range Max	Quartile Lower	Quartile Upper
SiO_2 (wt%)	77.44	75.92	78.56	76.83	78.00	**Ag**	<0.1	<0.1	0.1	<0.1	<0.1
TiO_2	0.14	0.09	0.18	0.10	0.15	**Sn**	4.0	2.0	8.0	2.0	5.3
Al_2O_3	12.41	11.94	13.16	12.13	12.77	**Cd**	<0.1	<0.1	0.3	<0.1	<0.1
Fe_2O_3	1.54	1.01	2.02	1.22	1.65	**Sb**	0.1	<0.1	0.7	0.1	0.3
MnO	0.03	0.01	0.03	0.02	0.03	**Cs**	0.3	<0.1	0.7	0.1	0.4
MgO	0.25	0.03	0.81	0.18	0.45	**Ba**	173.5	39.0	709.0	114.5	487.8
CaO	1.64	0.98	2.40	1.18	1.90	**Hf**	5.5	3.9	6.2	5.2	5.9
Na_2O	5.01	4.09	5.68	4.78	5.30	**Ta**	1.1	0.8	1.8	1.0	1.2
K_2O	0.73	0.37	2.02	0.61	1.07	**W**	0.3	<0.1	1.2	0.2	0.3
P_2O_5	0.02	0.01	0.02	0.02	0.02	**Hg**	<0.01	<0.01	0.01	<0.01	<0.01
LOI	0.50	0.10	0.80	0.38	0.60	**Tl**	<0.1	<1	0.1	<0.1	0.1
TOT/C	n.a.	n.a.	n.a.	n.a.	n.a.	**Pb**	3.6	2.0	4.5	3.2	4.0
TOT/S	0.03	0.01	0.09	0.03	0.05	**Bi**	0.1	<0.1	0.2	<0.1	0.1
SUM	99.96	99.59	100.04	99.79	99.99	**Th**	16.4	12.9	25.6	15.2	18.2
Sc (ppm)	4.5	3.0	5.0	4.0	5.0	**U**	4.9	3.1	7.6	4.2	5.8
V	<5	<5	9.0	<5	<5	**La**	47.0	32.8	64.8	39.3	50.5
Cr	n.a.	n.a.	n.a.	n.a.	n.a.	**Ce**	94.3	57.9	142.3	79.2	100.2
Co	1.0	0.5	2.8	0.8	1.3	**Pr**	10.3	6.4	15.9	8.8	11.1
Ni	2.3	2.1	4.1	2.3	2.7	**Nd**	40.4	25.3	60.7	36.0	42.1
Cu	10.7	1.1	58.1	5.7	24.5	**Sm**	7.5	4.7	10.6	7.1	8.0
Zn	17.0	3.0	44.0	14.5	18.3	**Eu**	0.71	0.45	1.30	0.60	0.79
Ga	15.9	15.2	18.9	15.7	16.6	**Gd**	6.72	4.10	7.75	6.01	7.18
As	0.8	<0.5	92.0	0.3	15.7	**Tb**	1.15	0.60	1.35	1.07	1.24
Se	<0.5	<0.5	1.4	<0.5	0.9	**Dy**	7.02	3.50	8.10	6.25	7.60
Rb	26.8	3.3	54.2	12.9	34.7	**Ho**	1.45	0.80	1.70	1.36	1.59
Sr	127.5	72.1	203.8	88.5	159.3	**Er**	4.61	2.10	5.27	3.84	4.85
Y	46.7	19.3	52.1	38.2	48.9	**Tm**	0.75	0.32	0.85	0.70	0.78
Zr	161.5	130.9	179.0	149.6	168.7	**Yb**	4.84	1.99	5.92	4.52	4.99
Nb	15.0	9.8	18.3	13.9	16.2	**Lu**	0.72	0.37	0.87	0.68	0.81
Mo	0.6	0.1	0.9	0.4	0.7	**Au (ppb)**	1.30	0.70	10.90	1.05	3.60

4.9 Metamorphosed and oxidised, medium-grained granite to granodiorite (101057_700)

Table 4-9. Whole rock geochemistry of metamorphosed and oxidised, medium-grained granite to granodiorite (101057_700). N=9.

Element	Median	Range		Quartile		Element	Median	Range		Quartile	
		Min	Max	Lower	Upper			Min	Max	Lower	Upper
SiO_2 (wt%)	74.02	71.85	74.90	73.59	74.19	**Ag**	<0.1	<0.1	0.1	<0.1	<0.1
TiO_2	0.20	0.07	0.22	0.15	0.21	**Sn**	2.0	<1	2.0	2.0	2.0
Al_2O_3	13.41	12.90	14.13	13.00	13.69	**Cd**	<0.1	<0.1	<0.1	<0.1	<0.1
Fe_2O_3	2.24	1.34	2.99	1.71	2.51	**Sb**	<0.1	<0.1	0.1	<0.1	<0.1
MnO	0.03	0.02	0.04	0.02	0.04	**Cs**	0.7	0.5	1.2	0.5	0.8
MgO	0.34	0.19	0.55	0.28	0.39	**Ba**	1,069.9	723.8	1,896.4	1,012.9	1,142.8
CaO	1.29	0.85	2.11	1.25	1.54	**Hf**	4.6	3.3	5.8	4.2	4.9
Na_2O	3.83	3.63	4.23	3.69	4.04	**Ta**	0.7	0.3	1.0	0.7	0.7
K_2O	3.87	2.65	5.88	3.71	4.18	**W**	1.0	<0.1	2.3	0.6	1.4
P_2O_5	0.05	0.03	0.07	0.04	0.05	**Hg**	<0.01	<0.01	<0.01	<0.01	<0.01
LOI	0.80	0.50	1.40	0.60	0.90	**Tl**	<0.1	<0.1	0.2	<0.1	<0.1
TOT/C	n.a.	n.a.	n.a.	n.a.	n.a.	**Pb**	3.0	2.1	10.6	2.8	3.2
TOT/S	0.01	0.01	0.05	0.01	0.01	**Bi**	<0.1	<0.1	<0.1	<0.1	<0.1
SUM	100.08	99.77	100.28	99.96	100.10	**Th**	16.8	11.1	35.0	14.1	18.2
Sc (ppm)	5.0	3.0	7.0	3.0	6.0	**U**	3.7	2.9	14.6	3.2	5.9
V	11.0	10.0	20.0	10.0	15.0	**La**	34.4	23.9	47.3	30.2	37.2
Cr	n.a.	n.a.	n.a.	n.a.	n.a.	**Ce**	74.6	46.5	94.7	64.0	79.9
Co	2.4	1.1	2.7	2.1	2.7	**Pr**	7.4	4.6	9.1	6.7	8.0
Ni	1.2	0.7	1.4	0.8	1.3	**Nd**	25.0	15.3	31.8	22.9	28.0
Cu	0.7	0.4	12.8	0.6	0.9	**Sm**	5.0	2.6	5.7	4.6	5.2
Zn	23.0	14.0	46.0	21.0	25.0	**Eu**	0.58	0.47	0.68	0.54	0.62
Ga	15.2	13.2	17.4	14.2	15.3	**Gd**	4.31	2.16	5.10	3.99	5.00
As	<0.5	<0.5	<0.5	<0.5	<0.5	**Tb**	0.75	0.32	0.96	0.72	0.91
Se	<0.5	<0.5	<0.5	<0.5	<0.5	**Dy**	4.44	1.98	6.16	3.80	4.89
Rb	100.2	53.6	148.2	85.5	101.4	**Ho**	0.83	0.37	1.41	0.72	1.01
Sr	109.9	75.6	172.2	100.7	117.8	**Er**	2.37	1.05	4.84	1.77	2.93
Y	24.7	10.5	46.7	18.7	31.2	**Tm**	0.37	0.17	0.77	0.29	0.50
Zr	148.1	73.5	176.6	127.0	161.8	**Yb**	2.03	0.90	5.00	1.44	2.91
Nb	8.9	7.9	12.6	8.1	9.7	**Lu**	0.35	0.14	0.85	0.23	0.50
Mo	0.3	0.2	1.5	0.2	0.3	**Au (ppb)**	2.70	<0.5	3.20	2.20	2.90

4.10 Vuggy metamorphosed granite (101057_706)

Table 4-10. Whole rock geochemistry of vuggy metamorphosed granite (101057_706). N=2. Resilicified samples have been omitted. *No calculation of median and quartile values have been carried out due to the small number of samples.

Element	Median	Range		Quartile		Element	Median	Range		Quartile	
		Min	Max	Lower	Upper			Min	Max	Lower	Upper
SiO_2 (wt%)	*	63.89	69.43	*	*	**Ag**	*	<0.1	<0.1	*	*
TiO_2	*	0.22	0.23	*	*	**Sn**	*	3.0	4.0	*	*
Al_2O_3	*	15.23	17.29	*	*	**Cd**	*	<0.1	<0.1	*	*
Fe_2O_3	*	3.02	4.35	*	*	**Sb**	*	0.1	0.1	*	*
MnO	*	0.03	0.03	*	*	**Cs**	*	0.2	0.6	*	*
MgO	*	0.90	1.03	*	*	**Ba**	*	1,549	1,688	*	*
CaO	*	0.19	0.19	*	*	**Hf**	*	5.6	6.0	*	*
Na_2O	*	4.80	6.09	*	*	**Ta**	*	0.4	0.5	*	*
K2O	*	5.02	5.50	*	*	**W**	*	0.7	1.9	*	*
P_2O_5	*	0.03	0.04	*	*	**Hg**	*	<0.01	0.01	*	*
LOI	*	0.80	1.00	*	*	**Tl**	*	<0.1	0.1	*	*
TOT/C	n.a.	n.a.	n.a.	n.a.	n.a.	**Pb**	*	1.9	3.0	*	*
TOT/S	*	0.01	0.02	*	*	**Bi**	*	<0.1	0.1	*	*
SUM	*	99.83	99.84	*	*	**Th**	*	16.6	17.8	*	*
Sc (ppm)	*	5.0	6.0	*	*	**U**	*	4.5	5.0	*	*
V	*	7.0	8.0	*	*	**La**	*	3.5	7.5	*	*
Cr	*	<7	7	*	*	**Ce**	*	8.8	15.5	*	*
Co	*	3.0	4.2	*	*	**Pr**	*	0.9	1.72	*	*
Ni	*	2.4	3.8	*	*	**Nd**	*	3.6	6.0	*	*
Cu	*	12.3	13.7	*	*	**Sm**	*	1.5	2.1	*	*
Zn	*	39.0	43.0	*	*	**Eu**	*	0.29	0.38	*	*
Ga	*	16.7	20.5	*	*	**Gd**	*	2.06	2.59	*	*
As	*	<0.5	<0.5	*	*	**Tb**	*	0.54	0.64	*	*
Se	*	<0.5	<0.5	*	*	**Dy**	*	4.17	4.31	*	*
Rb	*	122.2	138.4	*	*	**Ho**	*	0.99	1.04	*	*
Sr	*	30.4	51.1	*	*	**Er**	*	3.04	3.05	*	*
Y	*	27.7	28.5	*	*	**Tm**	*	0.43	0.46	*	*
Zr	*	178.9	204.1	*	*	**Yb**	*	2.76	2.95	*	*
Nb	*	14.5	14.8	*	*	**Lu**	*	0.39	0.44	*	*
Mo	*	0.4	0.5	*	*	**Au (ppb)**	*	2.4	2.5	*	*

4.11 Metamorphosed, aplitic granite (101058)

Table 4-11. Whole rock geochemistry of metamorphosed, aplitic granite (101058). N=4. *No calculation of median and quartile values have been carried out due to the small number of samples.

Element	Median	Range Min	Max	Quartile Lower	Upper	Element	Median	Range Min	Quartile Max	Lower	Upper
SiO_2 (wt%)	*	75.97	76.97	*	*	Ag	*	<0.1	0.2	*	*
TiO_2	*	0.05	0.18	*	*	Sn	*	1.0	4.0	*	*
Al_2O_3	*	11.68	12.31	*	*	Cd	*	<0.1	0.2	*	*
Fe_2O_3	*	1.61	2.03	*	*	Sb	*	0.1	1.3	*	*
MnO	*	0.02	0.03	*	*	Cs	*	<0.1	0.6	*	*
MgO	*	0.10	0.63	*	*	Ba	*	243.0	2,603.5	*	*
CaO	*	0.47	0.99	*	*	Hf	*	4.8	5.1	*	*
Na_2O	*	2.35	3.58	*	*	Ta	*	0.5	1.0	*	*
K_2O	*	3.99	6.47	*	*	W	*	0.2	0.5	*	*
P_2O_5	*	<0.01	0.02	*	*	Hg	*	<0.01	0.02	*	*
LOI	*	0.40	0.70	*	*	Tl	*	<0.1	0.2	*	*
TOT/C	n.a.	n.a.	n.a.	n.a.	n.a.	Pb	*	4.1	8.8	*	*
TOT/S	*	0.04	0.04	*	*	Bi	*	<0.1	0.1	*	*
SUM	*	99.64	100.23	*	*	Th	*	15.2	27.1	*	*
Sc (ppm)	*	1.0	5.0	*	*	U	*	2.4	9.1	*	*
V	*	<5	9.0	*	*	La	*	32.2	59.6	*	*
Cr	*	n.a.	n.a.	*	*	Ce	*	66.7	110.7	*	*
Co	*	0.5	2.7	*	*	Pr	*	7.1	12.6	*	*
Ni	*	1.5	3.3	*	*	Nd	*	26.0	47.4	*	*
Cu	*	5.6	55.7	*	*	Sm	*	3.40	8.20	*	*
Zn	*	9.0	44.0	*	*	Eu	*	0.19	0.62	*	*
Ga	*	12.9	15.8	*	*	Gd	*	2.57	7.33	*	*
As	*	0.5	174.6	*	*	Tb	*	0.43	1.15	*	*
Se	*	<0.5	1.8	*	*	Dy	*	2.57	7.35	*	*
Rb	*	75.1	151.1	*	*	Ho	*	0.53	1.52	*	*
Sr	*	37.6	156.5	*	*	Er	*	1.66	4.27	*	*
Y	*	16.3	49.3	*	*	Tm	*	0.28	0.74	*	*
Zr	*	103.4	172.5	*	*	Yb	*	1.79	4.40	*	*
Nb	*	10.2	13.8	*	*	Lu	*	0.30	0.65	*	*
Mo	*	0.5	0.8	*	*	Au (ppb)	*	0.90	26.50	*	*

4.12 Pegmatite or pegmatitic granite (101061)

Table 4-12. Whole rock geochemistry of pegmatite or pegmatitic granite (101061). N=3. *No calculation of median and quartile values have been carried out due to the small number of samples.

Element	Median	Range		Quartile		Element	Median	Range		Quartile	
		Min	Max	Lower	Upper			Min	Max	Lower	Upper
SiO_2 (wt%)	*	68.34	74.68	*	*	**Ag**	*	<0.1	<0.1	*	*
TiO_2	*	0.06	0.09	*	*	**Sn**	*	1.0	2.0	*	*
Al_2O_3	*	13.48	16.72	*	*	**Cd**	*	<0.1	<0.1	*	*
Fe_2O_3	*	1.35	1.51	*	*	**Sb**	*	<0.1	0.1	*	*
MnO	*	0.02	0.03	*	*	**Cs**	*	0.7	0.9	*	*
MgO	*	0.17	0.23	*	*	**Ba**	*	915.0	1,980.0	*	*
CaO	*	0.48	1.30	*	*	**Hf**	*	1.3	6.4	*	*
Na_2O	*	2.27	3.16	*	*	**Ta**	*	0.2	1.2	*	*
K_2O	*	4.87	9.63	*	*	**W**	*	0.1	0.7	*	*
P_2O_5	*	<0.01	0.03	*	*	**Hg**	*	<0.01	<0.01	*	*
LOI	*	0.50	0.70	*	*	**Tl**	*	<0.1	0.1	*	*
TOT/C	n.a.	n.a.	n.a.	n.a.	n.a.	**Pb**	*	6.8	8.4	*	*
TOT/S	*	0.01	0.01	*	*	**Bi**	*	<0.1	0.1	*	*
SUM	*	99.80	100.14	*	*	**Th**	*	21.3	32.8	*	*
Sc (ppm)	*	1.0	3.0	*	*	**U**	*	2.4	10.8	*	*
V	*	<5	7.0	*	*	**La**	*	21.7	33.0	*	*
Cr	*	14.0	14.0	*	*	**Ce**	*	39.3	66.6	*	*
Co	*	0.9	1.3	*	*	**Pr**	*	4.4	7.5	*	*
Ni	*	1.8	23.0	*	*	**Nd**	*	17.5	28.1	*	*
Cu	*	0.9	7.5	*	*	**Sm**	*	4.1	5.4	*	*
Zn	*	13.0	18.0	*	*	**Eu**	*	0.70	0.72	*	*
Ga	*	12.9	16.4	*	*	**Gd**	*	3.33	4.00	*	*
As	*	<0.5	0.6	*	*	**Tb**	*	0.46	0.70	*	*
Se	*	<0.5	<0.5	*	*	**Dy**	*	1.81	3.40	*	*
Rb	*	125.9	254.3	*	*	**Ho**	*	0.30	0.80	*	*
Sr	*	122.3	151.9	*	*	**Er**	*	0.81	2.30	*	*
Y	*	7.7	20.4	*	*	**Tm**	*	0.09	0.35	*	*
Zr	*	41.5	177.7	*	*	**Yb**	*	0.69	2.74	*	*
Nb	*	6.3	9.6	*	*	**Lu**	*	0.11	0.49	*	*
Mo	*	0.1	0.7	*	*	**Au (ppb)**	*	1.30	2.00	*	*

4.13 Amphibolite (102017)

Table 4-13. Whole rock geochemistry of amphibolite (102017). N=19.

Element	Median	Range		Quartile		Element	Median	Range		Quartile	
		Min	Max	Lower	Upper			Min	Max	Lower	Upper
SiO_2 (wt%)	50.38	45.42	57.12	49.43	51.90	**Ag**	<0.1	<0.1	<0.1	<0.1	<0.1
TiO_2	0.71	0.49	1.21	0.65	0.84	**Sn**	2.0	<1	10.0	1.0	3.5
Al_2O_3	15.85	12.64	18.35	15.39	16.46	**Cd**	<0.1	<0.1	0.1	<0.1	<0.1
Fe_2O_3	10.96	9.12	13.51	10.51	11.47	**Sb**	<0.1	<0.1	0.1	<0.1	<0.1
MnO	0.20	0.15	0.26	0.18	0.22	**Cs**	0.6	0.1	3.6	0.5	1.4
MgO	5.78	2.83	8.77	4.74	6.95	**Ba**	256.0	77.0	486.0	169.0	369.9
CaO	9.59	5.79	12.48	8.70	10.32	**Hf**	1.4	0.9	2.6	1.1	2.1
Na_2O	3.11	1.08	4.60	2.73	3.57	**Ta**	0.3	<0.1	1.5	0.1	0.4
K2O	1.33	0.61	2.57	0.87	1.56	**W**	0.5	0.1	17.0	0.2	0.8
P_2O_5	0.18	0.10	0.47	0.15	0.20	**Hg**	<0.01	<0.01	0.01	<0.01	<0.01
LOI	1.00	0.50	2.50	0.80	1.10	**Tl**	0.1	<0.1	0.4	<0.1	0.1
TOT/C	n.a.	n.a.	n.a.	n.a.	n.a.	**Pb**	1.4	0.9	3.7	1.2	1.7
TOT/S	0.01	0.01	0.15	0.01	0.09	**Bi**	0.1	<0.1	0.3	0.1	0.1
SUM	99.89	99.58	100.26	99.78	100.03	**Th**	1.8	0.6	6.7	1.4	2.7
Sc (ppm)	37.0	15.0	46.0	26.5	41.5	**U**	1.3	0.7	2.8	0.9	1.9
V	242.0	156.0	338.0	225.0	271.5	**La**	11.3	5.4	20.1	8.1	14.4
Cr	41.0	41.0	116.0	41.0	78.5	**Ce**	23.3	10.3	43.0	17.3	29.7
Co	33.3	18.7	45.2	30.8	37.9	**Pr**	3.1	1.5	5.3	2.6	3.8
Ni	20.0	6.8	80.0	11.0	59.0	**Nd**	14.0	6.9	24.3	11.5	16.8
Cu	14.6	1.2	67.4	2.5	38.2	**Sm**	3.1	1.6	5.0	2.8	3.5
Zn	43.0	17.0	72.0	31.0	53.0	**Eu**	1.00	0.59	1.52	0.90	1.20
Ga	18.4	13.3	20.3	17.3	18.8	**Gd**	3.20	1.78	4.91	2.90	3.55
As	<0.5	<0.5	0.6	<0.5	<0.5	**Tb**	0.50	0.28	0.87	0.43	0.60
Se	<0.5	<5.0	0.6	<0.5	<0.5	**Dy**	3.00	1.52	4.51	2.73	3.45
Rb	39.7	8.4	158.6	21.1	71.2	**Ho**	0.60	0.35	0.99	0.57	0.75
Sr	273.3	149.8	758.0	238.7	366.1	**Er**	1.90	0.94	2.80	1.60	2.30
Y	18.3	9.3	28.9	16.1	22.9	**Tm**	0.28	0.14	0.49	0.23	0.38
Zr	46.1	18.4	92.0	35.8	63.3	**Yb**	1.76	0.91	3.51	1.48	2.27
Nb	4.0	0.9	10.7	2.8	5.7	**Lu**	0.28	0.13	0.65	0.23	0.41
Mo	0.5	0.1	11.7	0.2	0.8	**Au (ppb)**	<0.5	<0.5	1.80	<0.5	0.75

4.14 Metamorphosed, felsic to intermediate volcanic rock (103076)

Table 4-14. Whole rock geochemistry of metamorphosed, felsic to intermediate volcanic rock (103076). N=13.

Element	Median	Range		Quartile		Element	Median	Range		Quartile	
		Min	Max	Lower	Upper			Min	Max	Lower	Upper
SiO_2 (wt%)	71.76	54.73	76.02	63.43	75.01	Ag	<0.1	<0.1	<0.1	<0.1	<0.1
TiO_2	0.32	0.11	0.90	0.20	0.63	Sn	2.0	<1	5.0	2.0	3.0
Al_2O_3	13.96	12.03	16.65	12.64	15.61	Cd	<0.1	<1	0.1	<0.1	<0.1
Fe_2O_3	4.18	1.49	11.36	2.87	6.59	Sb	<0.1	<0.1	0.1	<0.1	0.1
MnO	0.06	0.03	0.17	0.05	0.14	Cs	1.0	<0.1	4.1	0.5	1.5
MgO	1.79	0.48	3.93	1.08	2.35	Ba	801.0	44.0	1,272.0	452.0	894.0
CaO	2.20	1.34	8.30	1.72	4.67	Hf	3.9	1.7	5.8	3.6	5.3
Na_2O	3.57	2.63	5.06	3.04	4.41	Ta	0.6	0.3	0.9	0.5	0.8
K2O	1.68	0.41	2.11	1.39	1.88	W	0.5	<0.1	2.6	<0.1	0.6
P_2O_5	0.05	<0.01	0.41	0.03	0.28	Hg	<0.01	<0.01	<0.01	<0.01	<0.01
LOI	0.60	0.10	1.10	0.50	0.70	Tl	0.2	<0.1	0.4	<0.1	0.2
TOT/C	n.a.	n.a.	n.a.	n.a.	n.a.	Pb	3.0	1.3	5.1	2.2	3.8
TOT/S	0.01	0.01	0.01	0.01	0.01	Bi	0.1	<0.1	1.4	<0.1	0.1
SUM	99.92	99.59	100.20	99.89	99.97	Th	9.6	3.8	16.7	8.4	12.6
Sc (ppm)	11.0	4.0	28.0	8.0	16.0	U	3.2	1.4	6.9	2.2	4.0
V	5.0	<5	230.0	<5	66.0	La	33.7	16.0	44.8	28.7	40.5
Cr	n.a.	n.a.	n.a.	n.a.	n.a.	Ce	59.9	31.3	80.1	54.0	74.7
Co	2.8	0.8	24.7	1.4	11.0	Pr	6.8	3.8	9.0	6.4	8.5
Ni	1.9	1.5	22.0	1.5	4.3	Nd	26.6	17.1	38.2	25.6	35.1
Cu	7.4	1.2	43.9	1.3	11.5	Sm	5.2	3.5	6.9	4.5	6.3
Zn	46.0	9.0	92.0	35.0	62.0	Eu	1.17	0.50	1.60	0.91	1.42
Ga	18.0	13.7	21.1	16.5	18.8	Gd	4.68	2.80	6.21	3.81	5.44
As	<0.5	<0.5	0.7	<0.5	0.6	Tb	0.70	0.44	1.01	0.60	0.80
Se	<0.5	<0.5	<0.5	<0.5	<0.5	Dy	4.20	2.50	6.26	3.60	5.20
Rb	59.1	3.4	110.3	45.8	68.7	Ho	0.90	0.53	1.31	0.70	1.10
Sr	198.8	102.2	704.1	153.2	306.5	Er	2.50	1.38	4.18	2.00	3.21
Y	23.9	15.3	41.1	18.5	29.1	Tm	0.39	0.23	0.63	0.30	0.51
Zr	143.5	49.8	212.1	116.8	177.6	Yb	2.49	1.39	4.23	2.21	3.40
Nb	8.4	4.1	14.8	7.7	9.7	Lu	0.38	0.23	0.71	0.32	0.58
Mo	0.6	0.1	1.7	0.4	0.8	Au (ppb)	0.50	<0.5	1.90	<0.5	1.30

4.15 Fine- to medium-grained granite (111058)

Table 4-15. Whole rock geochemistry of fine- to medium-grained granite (111058). N=5.

Element	Median	Range		Quartile		Element	Median	Range		Quartile	
		Min	Max	Lower	Upper			Min	Max	Lower	Upper
SiO_2 (wt%)	74.80	73.28	75.40	74.13	75.14	**Ag**	<0.1	<0.1	0.2	<0.1	<0.1
TiO_2	0.10	0.08	0.18	0.10	0.16	**Sn**	3.0	<1	4.0	2.0	3.0
Al_2O_3	12.97	12.48	14.31	12.97	13.52	**Cd**	<0.1	<0.1	0.1	<0.1	<0.1
Fe_2O_3	2.04	1.62	2.28	1.84	2.07	**Sb**	0.1	<0.1	0.1	<0.1	0.1
MnO	0.04	0.03	0.04	0.04	0.04	**Cs**	0.9	0.2	1.4	0.4	0.9
MgO	0.33	0.14	0.53	0.22	0.50	**Ba**	759.0	352.0	1,325.0	730.0	930.0
CaO	1.13	0.77	1.60	1.03	1.16	**Hf**	4.0	2.9	4.2	4.0	4.1
Na_2O	3.31	2.68	4.19	3.05	3.65	**Ta**	0.9	0.5	2.2	0.8	1.7
K2O	4.63	3.08	4.98	4.41	4.84	**W**	0.3	<0.1	4.1	<0.1	0.3
P_2O_5	0.02	<0.01	0.04	<0.01	0.04	**Hg**	<0.01	<0.01	0.01	<0.01	<0.01
LOI	0.80	0.30	1.00	0.40	0.90	**Tl**	0.1	<0.1	0.2	<0.1	0.1
TOT/C	n.a.	n.a.	n.a.	n.a.	n.a.	**Pb**	7.4	4.8	11.9	5.4	9.2
TOT/S	0.01	0.01	0.01	0.01	0.01	**Bi**	<0.1	<0.1	0.1	<0.1	<0.1
SUM	99.97	99.82	100.12	99.91	100.03	**Th**	16.2	13.6	29.1	15.3	18.4
Sc (ppm)	4.0	3.0	4.0	4.0	4.0	**U**	6.2	2.4	14.5	6.1	11.0
V	9.0	<5	10.0	<5	10.0	**La**	32.6	8.9	37.4	30.9	35.0
Cr	<7	<7	<7	<7	<7	**Ce**	55.6	18.1	71.6	52.1	71.2
Co	1.0	0.6	2.5	0.9	2.4	**Pr**	6.1	2.0	8.2	4.8	8.1
Ni	2.3	2.3	3.0	2.3	2.7	**Nd**	20.4	9.5	31.2	18.7	26.1
Cu	6.4	1.3	10.3	1.5	9.9	**Sm**	4.3	2.3	6.0	2.6	5.6
Zn	28.0	18.0	50.0	28.0	31.0	**Eu**	0.60	0.40	0.69	0.48	0.61
Ga	17.2	12.1	25.4	15.6	18.3	**Gd**	3.40	1.78	4.36	3.06	4.10
As	<0.5	<0.5	0.7	<0.5	<0.5	**Tb**	0.60	0.24	0.70	0.50	0.65
Se	<0.5	<0.5	<0.5	<0.5	<0.5	**Dy**	2.90	1.32	4.70	2.89	3.33
Rb	128.7	123.2	162.3	125.2	145.7	**Ho**	0.52	0.26	1.00	0.50	0.65
Sr	93.5	68.4	323.7	75.9	207.6	**Er**	1.67	0.74	3.30	1.50	1.73
Y	19.2	8.6	25.7	16.8	20.8	**Tm**	0.27	0.13	0.59	0.25	0.31
Zr	103.7	90.1	114.1	99.6	107.3	**Yb**	1.78	0.80	4.31	1.59	2.19
Nb	11.8	4.8	19.0	10.0	18.8	**Lu**	0.26	0.16	0.63	0.23	0.32
Mo	0.4	0.1	3.4	0.3	0.7	**Au (ppb)**	1.50	<0.5	4.00	1.20	2.40

5 Redox properties

Mössbauer analyses have been carried out on metamorphosed, fine- to medium-grained granitoid (101051), metamorphosed, medium-grained granite to granodiorite (101057) and the altered (oxidised) variants of these rocks (101051_700 and 101057_700, respectively). The redox properties are expressed as the total oxidation factor which is defined as:

$$Total\ oxidation\ factor = \frac{Fe^{3+} total}{(Fe^{3+} + Fe^{2+}) total}$$

The silicate oxidation factor represents the degree of oxidation of the silicate minerals:

$$silicate\ oxidation\ factor = \frac{Fe^{3+} silicate}{(Fe^{3+} + Fe^{2+}) silicate}$$

Biotite and chlorite are the major ferromagnesian minerals in the analysed rock types. Other Fe-bearing minerals detected during the Mössbauer analyses are epidote, magnetite and hematite and other Fe-bearing minerals confirmed by microscopy are amphibole, titanite and allanite. The most important Fe^{3+} bearing oxides are magnetite and hematite (magnetite has an oxidation factor of ~0.667 and hematite 1). Pyrite is an important Fe^{2+} bearing mineral but it is only found in very small amounts in the rock (<0.2 vol% in most rock types).

The calculated median silicate oxidation factor and total oxidation factor of the different rock types are presented in Table 5-1 to 5-4. Analytical procedures are described in /Sandström and Tullborg 2006/. The number of samples analysed are listed as in the example N=3. In four rock samples, no total oxidation factor could be obtained due to very low oxide contents, hence, the number of analyses available (N) is smaller for the total oxidation factor than for the silicate oxidation factor. The samples included in the calculations are listed in Appendix 3.

Table 5-1. Mössbauer data of metamorphosed, fine- to medium-grained granitoid (101051). *No calculation of median and quartile values have been carried out due to the small number of samples.

	Silicate oxidation factor (N=3)	Total oxidation factor (N=2)
Median	*	*
Range	0.18–0.33	0.24–0.40
Upper/lower quartile	*	*

Table 5-2. Mössbauer data of metamorphosed and oxidised, fine- to medium-grained granitoid (101051_700). *No calculation of median and quartile values have been carried out due to the small number of samples.

	Silicate oxidation factor (N=2)	Total oxidation factor (N=1)
Median	*	*
Range	0.16–0.43	0.23
Upper/lower quartile	*	*

Table 5-3. Mössbauer data of metamorphosed, medium-grained granite to granodiorite (101057).

	Silicate oxidation factor (N=5)	Total oxidation factor (N=4)
Median	0.18	0.21
Range	0.11–0.25	0.18–0.38
Upper/lower quartile	0.11/0.21	0.19/0.26

Table 5-4. Mössbauer data of metamorphosed and oxidised, medium-grained granite to granodiorite (101057_700).

	Silicate oxidation factor (N=8)	Total oxidation factor (N=7)
Median	0.18	0.29
Range	0.08–0.24	0.15–0.36
Upper/lower quartile	0.15/0.22	0.25/0.33

6 Porosity

The porosity data represent analyses of rock samples from the surface and drill cores. Due to release of stress during unloading and exhumation of the bedrock during different periods, the porosity values from the surface are probably too high. Drill core samples may also yield somewhat too high porosities due to release of stress when the drill cores are brought to the surface.

The porosity of the different rock types are given as volume %, presented as calculated median value, data range and upper and lower quartile, in Table 6-1. The samples included in the calculations are listed in Appendix 4.

Table 6-1. Connected porosity measured by the water saturation technique of the different rock types at the Forsmark site. *No calculation of median and quartile values have been carried out due to the small number of samples. N = number of analysed samples.

Rock code SKB	Rock type (IUGS/SGU)	Porosity	(%)		N
		Median	Range	Upper/lower quartile	
101004	Metamorhosed, ultramafic rock	*	0.88–1.04	*	2
101033	Metamorphosed diorite, quartz diorite or gabbro	0.37	0.25–0.54	0.35/0.39	14
101051	Metamorphosed, fine- to medium-grained granitoid	0.46	0.26–0.59	0.38/0.50	17
101051_700	Metamorphosed and oxidised, fine- to medium-grained granitoid	*	0.59–0.62	*	2
101054	Metamorphosed tonalite to granodiorite	0.40	0.31–0.53	0.34/0.45	21
101056	Metamorphosed granodiorite	0.40	0.38–0.55	0.38/0.48	6
101057	Metamorphosed, medium-grained granite to granodiorite	0.42	0.28–0.66	0.36/0.46	63
101057_101058_104	Metamorphosed and albitized granite	0.41	0.27–0.53	0.36/0.48	13
101057_700	Metamorphosed and oxidised, medium-grained granite to granodiorite	0.75	0.50–0.93	0.64/0.77	5
101057_706	Vuggy metamorphosed granite (resilicified samples omitted)	*	8.47–13.06	*	2
101058	Metamorphosed, aplitic granite	0.37	0.35–0.45	0.36/0.38	5
101061	Pegmatite or pegmatitic granite	0.58	0.46–0.64	0.49/0.60	7
102017	Amphibolite	0.30	0.24–0.47	0.25/0.32	5
103076	Metamorphosed, felsic to intermediate volcanic rock	0.34	0.20–0.62	0.31/0.41	20
111058	Fine- to medium-grained granite	*	0.48–0.69	*	3

7 Conclusions

This report presents a compilation of the data acquired during the Forsmark site investigations bearing on the mineralogy, geochemistry, redox properties and porosity of different rock types at Forsmark. The data have been compiled for use during the SR-Site modelling work. The data presented in this report represents the regional model volume. For this reason, there are some minor differences between the data presented in this report and the data used in /Stephens et al. 2007/, where focus was placed on the local model volume.

The data are presented as calculated median values, range and lower/upper quartile. All samples used for the calculations have been evaluated and data from samples where there is insufficient control on the rock type have been omitted. Samples affected by alteration have been omitted from the unaltered samples and are presented separately based on type of alteration (e.g. oxidised or albitized rock).

8 References

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Appendix 1

Rock samples used for calculation of quantitative mineralogical data

IDCODE	SECUP (m)	SECLOW (m)	ROCK CODE SKB
PFM000555			101004
PFM001205			101004
PFM000782			101033
PFM000825			101033
PFM000842			101033
PFM000858			101033
PFM000865			101033
PFM001158			101033
PFM001204			101033
PFM001579			101033
PFM001906			101033
PFM005206			101033
PFM005209			101033
KFM01A	242.44	242.44	101051
KFM01A	521.27	521.27	101051
KFM01A	838.06	838.06	101051
KFM01A	970.35	970.35	101051
KFM02A	500.32	500.35	101051
KFM02A	552.00	552.23	101051
KFM02A	916.83	916.85	101051
KFM03A	310.96	311.01	101051
KFM05A	686.94	686.99	101051
KFM05A	691.78	691.82	101051
KFM05A	708.40	708.45	101051
KFM06A	588.64	588.68	101051
PFM000466			101051
PFM000529			101051
PFM000656			101051
PFM000657			101051
PFM000670			101051
PFM000677			101051
PFM000712			101051
PFM001102			101051
PFM001161			101051
PFM001220			101051
PFM001246			101051
PFM001522			101051
PFM001535			101051
PFM001941			101051
PFM002206			101051
PFM002213			101051
PFM002214			101051
KFM02A	502.64	502.85	101051_700
KFM02A	503.78	503.97	101051_700
KFM03A	239.84	239.89	101054
KFM09A	797.98	798.01	101054
PFM000207			101054
PFM000465			101054
PFM000557			101054
PFM000621			101054
PFM000729			101054
PFM000730			101054

IDCODE	SECUP (m)	SECLOW (m)	ROCK CODE SKB
PFM000778			101054
PFM000794			101054
PFM000827			101054
PFM000837			101054
PFM001157			101054
PFM001162			101054
PFM001217			101054
PFM001253			101054
PFM001518			101054
PFM001573			101054
PFM001574			101054
PFM001582			101054
PFM001874			101054
PFM002217			101054
PFM005172			101054
KFM04A	117.70	117.74	101056
KFM09A	761.89	761.92	101056
PFM000614			101056
PFM000650			101056
PFM000692			101056
PFM001198			101056
PFM001255			101056
PFM001580			101056
PFM005282			101056
KFM01A	109.66	109.66	101057
KFM01A	317.79	317.79	101057
KFM01A	477.30	477.30	101057
KFM01A	705.88	705.88	101057
KFM01A	947.70	947.70	101057
KFM01B	397.41	397.76	101057
KFM02A	245.63	245.63	101057
KFM02A	317.26	317.26	101057
KFM02A	351.57	351.59	101057
KFM02A	712.45	712.48	101057
KFM02A	949.87	949.90	101057
KFM02A	953.45	953.48	101057
KFM03A	165.90	165.95	101057
KFM03A	433.27	433.32	101057
KFM03A	504.40	504.45	101057
KFM03A	620.20	620.25	101057
KFM03A	860.52	860.57	101057
KFM03A	957.60	957.65	101057
KFM04A	186.65	186.70	101057
KFM04A	271.40	271.44	101057
KFM05A	152.66	152.70	101057
KFM05A	272.11	272.15	101057
KFM05A	299.19	299.23	101057
KFM09A	582.92	582.95	101057
KFM09A	719.13	719.16	101057
PFM000197			101057
PFM000278			101057
PFM000289			101057
PFM000319			101057
PFM000320			101057
PFM000601			101057
PFM000658			101057

IDCODE	SECUP (m)	SECLOW (m)	ROCK CODE SKB
PFM000677			101057
PFM000685			101057
PFM000773			101057
PFM000994			101057
PFM001159			101057
PFM001159			101057
PFM001164			101057
PFM001180			101057
PFM001182			101057
PFM001216			101057
PFM001635			101057
PFM002149			101057
PFM002207			101057
PFM002214			101057
PFM002221			101057
PFM005193			101057
PFM005288			101057
KFM07A	183.13	183.41	101057_700
KFM08A	623.02	623.35	101057_700
KFM08B	91.36	91.58	101057_700
KFM08B	91.36	91.58	101057_700
KFM02A	495.64	495.88	101057_700
KFM02A	506.80	507.10	101057_700
KFM02A	295.82	295.89	101057_706
KFM06A	757.48	757.52	101057_albitized
PFM001224			101057_albitized
PFM001229			101057_albitized
PFM001864			101057_albitized
PFM002212			101057_albitized
PFM005197			101057_albitized
KFM06A	818.33	818.36	101058_albitized
KFM06A	850.79	850.82	101058_albitized
KFM06A	937.95	937.99	101058_albitized
PFM000530			101058_albitized
PFM001627			101058_albitized
PFM001636			101058_albitized
KFM06A	636.34	636.37	101058
KFM09A	443.32	443.35	101058
PFM000278			101058
PFM001106			101058
PFM001160			101058
PFM005205			101058
KFM03B	62.32	62.36	101061
PFM000198			101061
PFM000656			101061
PFM001163			101061
PFM001243			101061
KFM04A	737.61	737.65	102017
KFM05A	356.07	356.11	102017
PFM001010			102017
PFM001183			102017
KFM04A	124.56	124.60	103076
KFM09A	786.79	786.82	103076
PFM000350			103076
PFM000352			103076
PFM000352			103076

IDCODE	SECUP (m)	SECLOW (m)	ROCK CODE SKB
PFM000652			103076
PFM001156			103076
PFM001200			103076
PFM001222			103076
PFM001229			103076
PFM001236			103076
PFM001908			103076
PFM001956			103076
PFM002163			103076
PFM002163			103076
PFM005217			103076
PFM005236			103076
KFM03A	157.40	157.45	111058
PFM000530			111058
PFM000651			111058
PFM002210			111058
PFM005245			111058

Appendix 2

Rock samples used for calculation of whole rock geochemistry

IDCODE	SECUP (m)	SECLOW (m)	ROCK CODE SKB
PFM000555			101004
PFM001205			101004
PFM000782			101033
PFM000842			101033
PFM001906			101033
PFM002216			101033
PFM002216			101033
PFM002220			101033
PFM005206			101033
PFM005209			101033
KFM01A	521.10	521.40	101051
KFM01A	242.25	242.55	101051
KFM01A	970.10	970.50	101051
KFM02A	552.66	552.86	101051
KFM02A	916.85	917.05	101051
KFM02A	552.00	552.23	101051
KFM02A	915.80	915.90	101051
KFM03A	310.75	310.96	101051
KFM03A	311.33	311.43	101051
KFM05A	691.58	691.78	101051
PFM000529			101051
PFM001102			101051
PFM001941			101051
PFM002206			101051
PFM002213			101051
PFM002214			101051
KFM02A	502.64	502.85	101051_700
KFM02A	503.78	503.97	101051_700
KFM03A	239.64	239.84	101054
KFM03A	242.93	243.13	101054
PFM000557			101054
PFM000621			101054
PFM000729			101054
PFM000778			101054
PFM000837			101054
PFM001162			101054
PFM001217			101054
PFM002217			101054
PFM002218			101054
PFM005172			101054
KFM04A	116.51	116.70	101056
PFM000614			101056
PFM000650			101056
PFM000692			101056
PFM005282			101056
KFM01A	947.40	947.80	101057
KFM01A	109.60	110.06	101057
KFM01A	704.69	705.10	101057
KFM01A	315.85	316.25	101057
KFM01A	477.10	477.50	101057
KFM01B	397.41	397.76	101057
KFM02A	245.55	245.75	101057

IDCODE	SECUP (m)	SECLOW (m)	ROCK CODE SKB
KFM02A	317.05	317.45	101057
KFM02A	316.85	317.05	101057
KFM02A	317.05	317.45	101057
KFM02A	350.80	351.00	101057
KFM02A	351.45	351.85	101057
KFM02A	712.05	712.25	101057
KFM02A	953.25	953.45	101057
KFM02A	949.90	950.10	101057
KFM03A	165.70	165.90	101057
KFM03A	504.20	504.40	101057
KFM03A	433.07	433.27	101057
KFM03A	860.32	860.52	101057
KFM03A	620.00	620.20	101057
KFM03A	957.40	957.60	101057
KFM04A	271.64	271.84	101057
KFM04A	186.57	186.80	101057
KFM05A	152.46	152.66	101057
KFM05A	298.82	299.02	101057
KFM05A	271.90	272.11	101057
KFM07A	183.13	183.41	101057
KFM08A	623.02	623.35	101057
KFM08B	91.36	91.58	101057
PFM000197			101057
PFM000289			101057
PFM000319			101057
PFM000320			101057
PFM000601			101057
PFM000658			101057
PFM000994			101057
PFM001119			101057
PFM001159			101057
PFM001180			101057
PFM001182			101057
PFM001635			101057
PFM002149			101057
PFM002207			101057
PFM002221			101057
PFM005193			101057
PFM005288			101057
KFM06A	756.82	757.02	101057_101058_104
PFM001224			101057_101058_104
PFM001229			101057_101058_104
PFM001864			101057_101058_104
PFM002212			101057_101058_104
PFM005197			101057_101058_104
KFM06A	937.75	937.95	101057_101058_104
KFM06A	850.59	850.79	101057_101058_104
KFM06A	818.42	818.62	101057_101058_104
PFM000530			101057_101058_104
PFM001627			101057_101058_104
PFM001636			101057_101058_104
KFM01B	36.66	37.15	101057_700
KFM01B	41.89	42.05	101057_700
KFM02A	495.64	495.88	101057_700
KFM02A	483.64	483.97	101057_700
KFM02A	506.80	507.10	101057_700

IDCODE	SECUP (m)	SECLOW (m)	ROCK CODE SKB
KFM07A	183.13	183.41	101057_700
KFM08A	623.02	623.35	101057_700
KFM08B	91.36	91.58	101057_700
KFM01B	416.50	416.77	101057_700
KFM02A	295.64	295.81	101057_706
KFM02A	277.29	277.60	101057_706
KFM06A	636.14	636.34	101058
PFM000278			101058
PFM001106			101058
PFM005205			101058
KFM03B	62.09	62.28	101061
PFM000198			101061
PFM001191			101061
KFM01A	473.53	473.71	102017
KFM01A	355.30	355.50	102017
KFM01A	432.96	433.15	102017
KFM04A	737.41	737.61	102017
KFM05A	355.87	356.07	102017
PFM001010			102017
PFM001183			102017
PFM002209			102017
PFM002215			102017
PFM002218			102017
PFM002219			102017
PFM002239			102017
PFM002240			102017
PFM002241			102017
PFM002242			102017
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PFM002246			102017
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PFM000352			103076
PFM000352			103076
PFM000652			103076
PFM001156			103076
PFM001200			103076
PFM001222			103076
PFM001908			103076
PFM001956			103076
PFM002163			103076
PFM005217			103076
PFM005236			103076
KFM03A	157.20	157.40	111058
PFM000530			111058
PFM000651			111058
PFM002210			111058
PFM005245			111058

Rock samples used for calculation of Mössbauer data

IDCODE	SECUP (m)	SECLOW (m)	ROCK CODE SKB
KFM01A	521.10	521.40	101051
KFM09A	150.67	150.83	101051
KFM09A	172.82	172.97	101051
KFM02A	503.78	503.97	101051_700
KFM02A	502.64	502.85	101051_700
KFM02A	949.90	950.10	101057
KFM02A	712.05	712.25	101057
KFM07A	183.13	183.41	101057
KFM08A	623.02	623.35	101057
KFM08B	91.36	91.58	101057
KFM01B	416.50	416.77	101057_700
KFM01B	36.66	37.15	101057_700
KFM02A	483.64	483.97	101057_700
KFM02A	506.80	507.10	101057_700
KFM02A	495.64	495.88	101057_700
KFM07A	183.13	183.41	101057_700
KFM08A	623.02	623.35	101057_700
KFM08B	91.36	91.58	101057_700

Rock samples used for calculation of porosity data

IDCODE	SECUP (m)	SECLOW (m)	ROCK CODE SKB
KFM04A	124.81	125.01	103076
PFM000240			103076
PFM000351			103076
PFM000526			103076
PFM000725			103076
PFM001156			103076
PFM001200			103076
PFM001221			103076
PFM001221			103076
PFM001521			103076
PFM001524			103076
PFM001640			103076
PFM001654			103076
PFM001728			103076
PFM001729			103076
PFM001885			103076
PFM001904			103076
PFM002248			103076
PFM005204			103076
PFM005252			103076
PFM001205			101004
PFM001201			101004
PFM000229			101033
PFM000233			101033
PFM000243			101033
PFM000253			101033
PFM000518			101033
PFM000522			101033
PFM000780			101033
PFM000850			101033
PFM001235			101033
PFM001515			101033
PFM002087			101033
PFM005206			101033
PFM005215			101033
PFM005223			101033
PFM001169			102017
KFM01A	355.10	355.30	102017
KFM01A	474.00	474.20	102017
KFM04A	737.55	737.75	102017
KFM05A	356.52	356.72	102017
KFM03	239.44	239.64	101054
PFM000380			101054
PFM000433			101054
PFM000527			101054
PFM000557			101054
PFM000774			101054
PFM000777			101054
PFM000804			101054
PFM000808			101054
PFM000891			101054

IDCODE	SECUP (m)	SECLOW (m)	ROCK CODE SKB
PFM001022			101054
PFM001025			101054
PFM001109			101054
PFM001162			101054
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PFM001861			101054
PFM001898			101054
PFM002056			101054
PFM000692			101056
PFM001601			101056
PFM001616			101056
PFM001687			101056
PFM002057			101056
KFM04A	116.91	117.08	101056
PFM000168			101057
PFM000173			101057
PFM000197			101057
PFM000203			101057
PFM000206			101057
PFM000216			101057
PFM000259			101057
PFM000271			101057
PFM000276			101057
PFM000513			101057
PFM000515			101057
PFM000658			101057
PFM000680			101057
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PFM000698			101057
PFM000701			101057
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PFM001159			101057
PFM001173			101057
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PFM001183			101057
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PFM000214			101057
PFM000580			101057
PFM001043			101057
PFM001635			101057
PFM001666			101057
PFM001867			101057
PFM001870			101057
PFM001958			101057
PFM002221			101057
PFM005193			101057
PFM005226			101057
PFM005288			101057
PFM005602			101057

IDCODE	SECUP (m)	SECLOW (m)	ROCK CODE SKB
KFM01A	110.06	110.26	101057
KFM01A	317.80	318.00	101057
KFM01A	476.60	476.80	101057
KFM01A	706.00	706.20	101057
KFM01A	947.80	948.00	101057
KFM02A	244.40	244.60	101057
KFM02A	316.63	316.83	101057
KFM02A	317.45	317.65	101057
KFM02A	350.60	350.80	101057
KFM02A	351.00	351.20	101057
KFM02A	712.25	712.45	101057
KFM02A	949.67	949.87	101057
KFM02A	953.48	953.68	101057
KFM03A	165.50	165.70	101057
KFM03A	432.75	432.95	101057
KFM03A	504.00	504.20	101057
KFM03A	619.80	620.00	101057
KFM03A	856.82	857.02	101057
KFM03A	957.20	957.40	101057
KFM04A	186.83	187.03	101057
KFM04A	271.41	271.61	101057
KFM05A	152.28	152.48	101057
KFM05A	272.52	272.72	101057
KFM05A	298.62	298.82	101057
KFM01B	36.66	37.15	101057_700
KFM01B	37.41	37.80	101057_700
KFM01B	416.50	416.77	101057_700
KFM02A	495.64	495.88	101057_700
KFM02A	506.80	507.10	101057_700
PFM001623			101058
PFM001682			101058
PFM000687			101058
PFM000706			101058
KFM06A	637.33	637.54	101058
KFM06A	756.91	757.11	101057_101058_104
PFM000293			101057_101058_104
PFM000683			101057_101058_104
PFM000713			101057_101058_104
PFM000722			101057_101058_104
PFM001864			101057_101058_104
PFM001879			101057_101058_104
KFM06A	817.83	818.03	101057_101058_104
KFM06A	851.08	851.28	101057_101058_104
KFM06A	938.95	939.15	101057_101058_104
PFM000713			101057_101058_104
PFM000739			101057_101058_104
PFM001636			101057_101058_104
KFM02A	277.90	278.10	101057_706
KFM02A	295.45	295.64	101057_706
PFM000196			101051
PFM001888			101051
PFM005193			101051
PFM005196			101051
PFM005237			101051
KFM01A	241.90	242.10	101051
KFM01A	521.40	521.60	101051

IDCODE	SECUP (m)	SECLOW (m)	ROCK CODE SKB
KFM01A	969.90	970.10	101051
KFM02A	552.43	552.63	101051
KFM02A	915.90	916.10	101051
KFM03A	310.49	310.75	101051
KFM05A	691.34	691.54	101051
PFM000703			101051
PFM000718			101051
PFM000739			101051
PFM000822			101051
PFM001162			101051
KFM02A	500.35	500.55	101051_700
KFM02A	503.78	503.97	101051_700
PFM005245			111058
KFM03A	157.00	157.20	111058
PFM000713			111058
KFM03B	60.46	60.60	101061
PFM000198			101061
PFM000245			101061
PFM000680			101061
PFM000726			101061
PFM001618			101061
PFM001869			101061