P-09-43

Oskarshamn site investigation

Hydrogeochemical monitoring programme for core and percussion drilled boreholes 2008

Summary of ground water chemistry results from spring and autumn sampling

Claes Regander, Petra Nordling, Bo Bergman
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ISSN 1651-4416
SKB P-09-43

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Keywords: Groundwater, Borehole, Chemical analysis, Isotope determinations, Major elements, Trace elements, Rare earth elements, Sulphide, Electric conductivity, AP PS 400-08-009, AP PS 400-08-018.

Abstract

This report summarises the results obtained in 2008 from the hydrogeochemical monitoring programme for core and percussion drilled boreholes. During 2008 groundwater sampling has been performed in monitored (permanently installed) boreholes in two sampling periodes, spring (February–March), and autumn (October–November). In the spring groundwater sampling was carried out in totally 14 sections; KLX04:2, KLX04:5, KLX05:7, KLX07A:2, KLX08:3, KLX08:4, KLX10A:2, KLX10A:5, KLX12A:2, KLX15A:3, KLX15A:6, KLX18A:3, KLX19A:3 and KLX20A:2. In the autumn the field work included sampling of groundwater from 11 sections; KLX08:4, KLX10A:2, KLX10A:5, KLX12A:2, KLX15A:3, KLX15A:6, KLX18A:3, KLX19A:3, HLX35:2, HLX37:1 and HLX39:1.

The programme started in 2005 and since then water sampling has been performed twice every year. The objective of the hydrogeochemical monitoring programme is to determine the groundwater composition in selected sections chosen for this purpose. Sampling of core drilled borehole sections has been made in time series, each sample series consisted of six sample occasions. Percussion drilled borehole sections has been sampled at one occasion, when electric conductivity was stable.

Obtained results from the activities presented here include groundwater chemistry data in accordance with SKB chemistry class 5 including options and SKB chemistry reduced class 5. Options for SKB chemistry class 5 include lanthanoids and other trace elements, As, In, environmental metals, TOC and the isotopes ^{34}S, ^{37}Cl, $^{87}Sr/^{86}Sr$, $^{10}B/^{11}B$, ^{13}C, ^{226}Ra, ^{222}Rn, ^{238}U, ^{234}U and ^{230}Th. SKB chemistry reduced class 5 includes analysis of pH, electric conductivity, alkalinity, density, drill water, main components, F^-, Br^-, Cl^-, SO_4^{2-}, Fe(II)/Fe(tot), HS^-, DOC, TOC and the isotopes δ^2H, $\delta^{18}O$ and ^3H.

All data from the activity are stored in the SICADA database.

Sammanfattning

Denna rapport sammanfattar resultaten från det hydrogeokemiska moniteringsprogrammet för kärn- och hammarborrhål år 2008. Grundvattenprovtagning har genomförts i moniterade (permanent installerade) borrhål under en våromgång, februari–mars, samt en höstomgång, oktober–november. Under våromgången provtogs 14 sektioner; KLX04:2, KLX04:5, KLX05:7, KLX07A:2, KLX08:3, KLX08:4, KLX10A:2, KLX10A:5, KLX12A:2, KLX15A:3, KLX15A:6, KLX18A:3, KLX19A:3 och KLX20A:2. Höstomgången omfattade provtagning i 11 sektioner; KLX08:4, KLX10A:2, KLX10A:5, KLX12A:2, KLX15A:3, KLX15A:6, KLX18A:3, KLX19A:3, HLX35:2, HLX37:1 och HLX39:1.

Moniteringsprogrammet startade 2005 och provtagning har genomförts två gånger per år. Syftet med provtagningen är att dokumentera grundvattensammansättningen för de i programmet ingående borrhålssektionerna. 2008 års provtagning i kärnborrhål har genomförts i tidsserier omfattande sex provtagningstillfällen. Provtagning av hammarborrhål har genomförts vid ett provtagningstillfälle, när elektrisk konduktivitet stabiliserats.

Resultat från denna aktivitet inkluderar vattenkemidata enligt SKB kemiklass 5 med tillval och SKB reducerad kemiklass 5. Tillval till SKB kemiklass 5 utgörs av spårelement, As, In, miljömetaller, TOC samt isotoperna ^{34}S, ^{37}Cl, ^{87}Sr, $^{10}B/^{11}B$, ^{13}C, ^{226}Ra, ^{222}Rn, ^{238}U, ^{234}U och ^{230}Th. SKB reducerad kemiklass 5 utgörs av pH, elektrisk konduktivitet, alkalinitet, densitet, spolvatten, huvudkomponenter, F^-, Br^-, Cl^-, SO_4^{2-}, Fe(II)/Fe(tot), HS^-, DOC, TOC samt isotoperna δ^2H, $\delta^{18}O$ and ^3H.

All data från aktivitetens genomförande återfinns i databasen SICADA.

Contents

1 Introduction

This document presents the data collected during 2008 within the hydrogeochemical monitoring programme for core and percussion drilled boreholes.

The work was carried out in accordance with the activity plans AP PS 400-08-009 (spring sampling) and AP PS 400-08-018 (autumn sampling). Documents controlling the performance of this activity are listed in Table 1-1. Both the activity plan and the method descriptions are SKB internal controlling documents.

The field work was carried out in February–March and in October–November 2008. During the spring groundwater sampling was carried out in 14 borehole sections, while the autumn field work included sampling of groundwater from 11 borehole sections.

Data from the field work, as well as analytical results, are traceable by the number of the activity plans in the SICADA database.

A map showing the investigation site at Oskarshamn including the boreholes sampled in the hydrogeochemical monitoring programme for core and percussion drilled boreholes 2008, is presented in Figure 1-1.

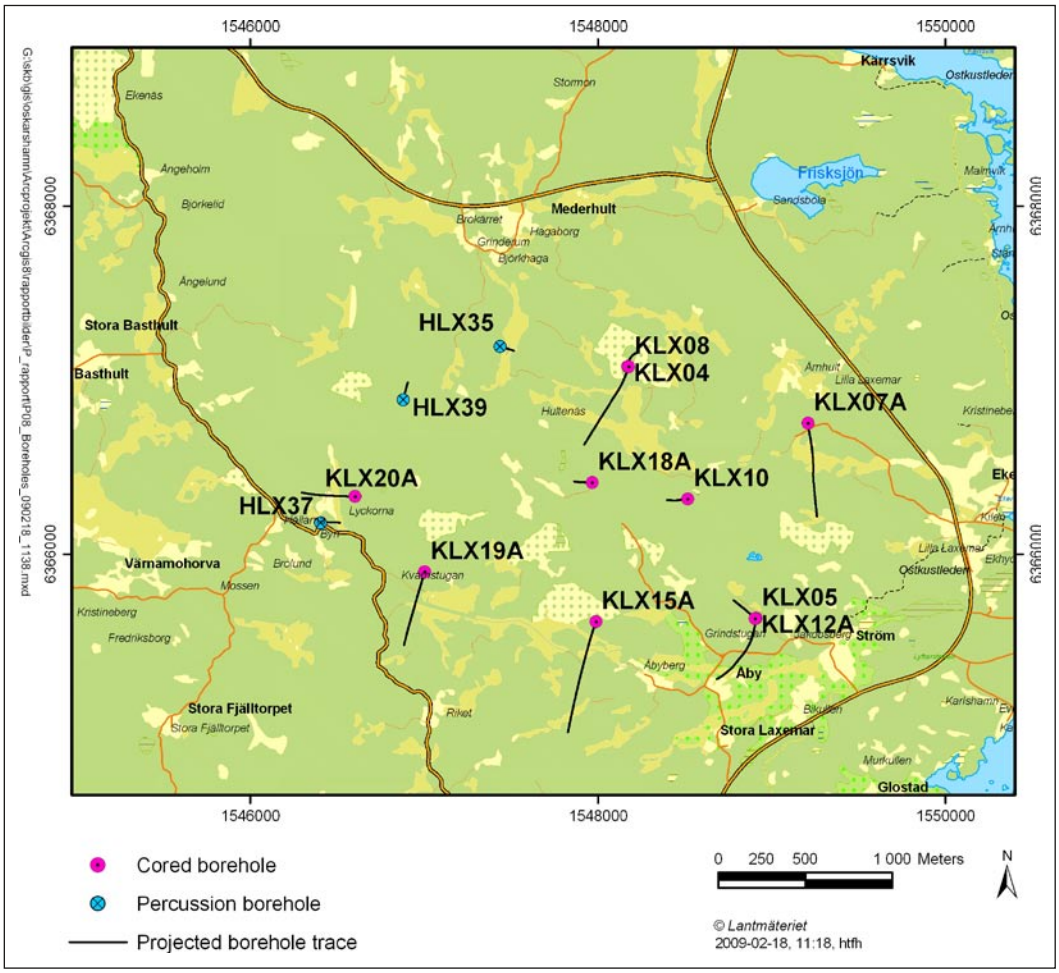

Figure 1-1. *Overview of the Oskarshamn site investigation area. The following borehole sections were sampled during the spring: KLX04:2, KLX04:5, KLX05:7, KLX07A:2, KLX08:3, KLX08:4, KLX10A:2, KLX10A:5, KLX12A:2, KLX15A:3, KLX15A:6, KLX18A:3, KLX19A:3 and KLX20A:2. The autumn field work included sampling of groundwater from KLX08:4, KLX10A:2, KLX10A:5, KLX12A:2, KLX15A:3, KLX15A:6, KLX18A:3, KLX19A:3, HLX35:2, HLX37:1 and HLX39:1.*

Table 1-1. Controlling documents for the performance of the activity.

Activity plan	Number	Version
Hydrogeokemisk monitering av kärnborrhål (våromgången) 2008.	AP PS 400-08-009	1.0
Hydrogeokemisk monitering av kärnborrhål (höstomgången) 2008.	AP PS 400-08-018	1.0
Method descriptions	**Number**	**Version**
Mätsystembeskrivning (MSB) – Handhavandedel, System för hydrologisk och meterologisk datainsamling. Vattenprovtagning och utspädningsmätning i observationshål.	SKB MD 368.010	2
Instruktion för rengöring av borrhålsutrustning och viss markbaserad utrustning.	SKB MD 600.004	1.0 (2002-02-07)

2 Objective and scope

According to the general programme for the Oskarshamn site investigation, core and percussion drilled boreholes are to be monitored twice every year. The water sampling is performed in circulation sections that are sealed off using permanently installed packers. The objective of the hydrogeochemical monitoring programme is to determine ground water composition over time in selected borehole sections chosen for this purpose. Previous water sampling within the programme has been made since 2005.

Ground water sampling within the monitoring programme of 2008 was carried out in spring during February–March and in autumn during October–November. Throughout the spring groundwater sampling was carried out in totally 14 sections, while the autumn field work included sampling of groundwater from 11 sections.

Apart from sending samples to laboratory for chemical analysis, field measurements of pH, temperature and electric conductivity were performed. Archive samples were stored in a freezer.

2.1 Spring sampling

The following sections were sampled during the spring sampling period:

- KLX04 section 2 and 5, 870 to 897 and 507 to 530 m
- KLX05 section 7, 241 to 255 m
- KLX07A section 2, 753 to 780 m
- KLX08 section 3 and 4, 626 to 683 and 594 to 625 m
- KLX10A section 2 and 5, 689 to 710 and 351 to 368 m
- KLX12A section 2, 535 to 545 m
- KLX15A section 3 and 6, 623 to 640 and 260 to 272 m
- KLX18A section 3, 472 to 489 m
- KLX19A section 3, 509 to 517 m
- KLX20 section 2, 260 to 296 m

During the spring sampling period, all sections were sampled in time series (Chapter 4.3).

2.2 Autumn sampling

The following sections were sampled during the autumn sampling period:

- KLX08 section 4, 594 to 625 m
- KLX10A section 2 and 5, 689 to 710 and 351 to 368 m
- KLX12A section 2, 535 to 545 m
- KLX15A section 3 and 6, 623 to 640 and 260 to 272 m
- KLX18A section 3, 472 to 489 m
- KLX19A section 3, 509 to 517 m
- HLX35 section 2, 120 to 130 m
- HLX37 section 1, 150 to 200 m
- HLX39 section 1, 187 to 199 m

Core drilled sections was sampled in time series, while the percussion drilled sections were sampled at one occasion, when electric conductivity was stable (Chapter 4.3).

3 Equipment

3.1 Description of equipment

Groundwater sampling is performed in boreholes with permanently installed packers. The pump equipment used for the groundwater sampling is schematically presented in Figure 3-1.

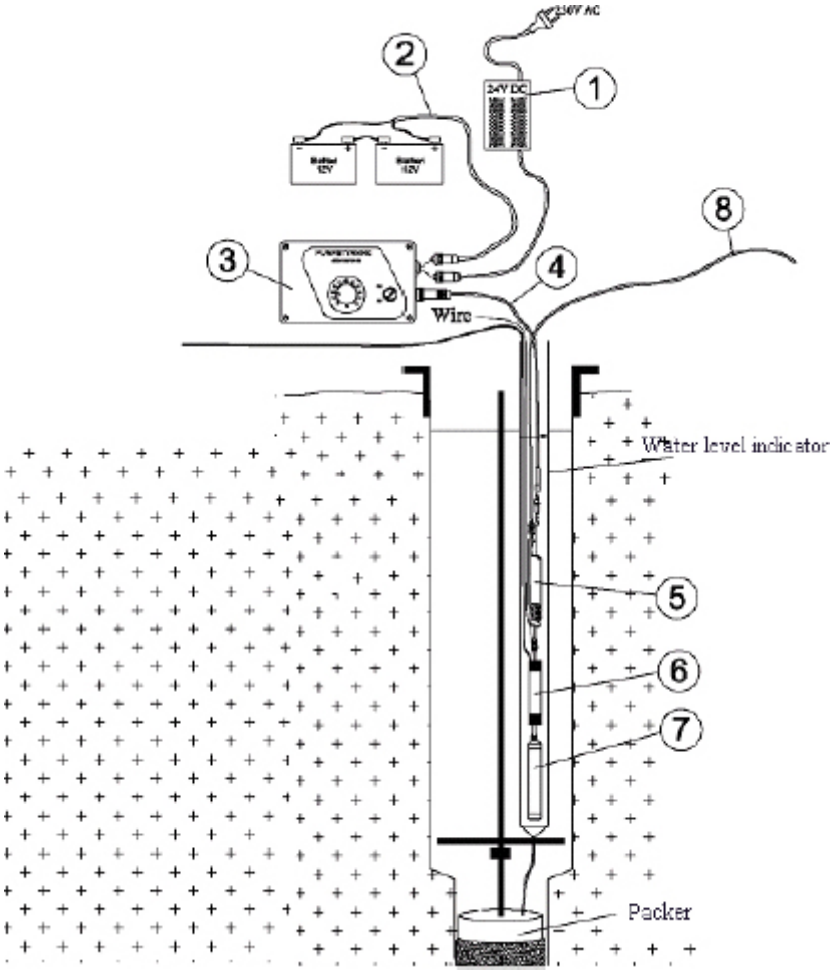

Figure 3-1. *Schematic drawing of the equipment used for groundwater sampling. 1. Battery eliminator 2. Battery cable 3. Pump control GEOPUMP UV 45 4. Pump cable 5. GEOPUMP UV 45 6. Mini packer 7. Filter holder with filter 8. Pump tube, polyamide 8/6 mm.*

4 Execution

4.1 General

The activity was performed in accordance with the activity plans AP PS 400-08-009 (spring sampling) and AP PS 400-08-018 (autumn sampling). Installation and handling of equipment was carried out in line with the method descriptions SKB MD 368.010 (Mätsystembeskrivning (MSB) – Handhavandedel, System för hydrologisk och meterologisk datainsamling. Vattenprovtagning och utspädningsmätning i observationshål. SKB internal document) and SKB MD 600.004 (Instruktion för rengöring av borrhåls-utrustning och viss markbaserad utrustning. SKB internal document).

4.2 Preparations

The portable pH- and electric conductivity-meters were calibrated at the Äspö Laboratory every second week.

Sampling bottles belonging to the same sample portion was labelled with the same SKB sampling number. Acid washed bottles for analysis of main components and archive samples was prepared with 1 ml HNO_3 suprapur. Acid washed bottles for analysis of Fe(II)/Fe(tot) was prepared with 5 ml HCl suprapur.

The first sample occasion in each time series was sampled after one conversion of the volume of water in the tube between the section and the pump. Since this volume was quite small the pump was not tested in fresh water before lowered into the borehole. The test in fresh water was eliminated in order to avoid that fresh water from the pump filter and the pump affected the water composition at the first sample occasion. Instead the pump was lowered approximately 10 m below the surface in the borehole and tested in the section. If the pump was not functional it was exchanged. To reduce the risk of particles entering the permanent installation in the boreholes, tubes and cables were placed on plastic sheaths. During the lowering of the pump into a borehole all visible particles on the tube and cable were wiped off. New tubes and pump filters were used in each borehole section.

4.3 Execution of field work

Water sampling in each borehole section was performed using identical pump equipment set-ups, as shown in Figure 3-1.

During 2005, 2006 and part of 2007 sampling was made after 3-5 conversions. This means that the water volume in the tube, plus the volume in the section should be converted preferably five times, but at least three times before sampling. In 2007 the sample method was changed from 3–5 conversions to time series sampling. This resulted in five sampling occasions instead of one for each borehole section.

During 2008 sampling of core drilled borehole sections has been made in time series. In comparison with 2007 an additional sampling occasion was added, that is in total each borehole section was sampled six times. The first sample (HS^-) was sampled after conversion of the water in the tube between the section and the pump. The next 3 sampling occasions consisted of a SKB reduced chemistry class 5 and was sampled after 1, 2 and 3 conversions of the section volume. After the third conversion field measurements of electric conductivity were performed until electric conductivity stabilised, then a fourth SKB reduced chemistry class 5 was sampled. During the time series sampling the activity leader was continuously updated on the electric conductivity values and took part in the decision of when the fourth SKB reduced chemistry class 5 should be sampled. After the fourth sampling of SKB reduced chemistry class 5 a SKB chemistry class 5 including options was sampled, in most cases after additionally one day. Field measurements of electric conductivity were performed until the last sample occasion.

Percussion drilled borehole sections was monitored by measuring electric conductivity after 1, 2 and 3 conversions of section volume and thereafter until electric conductivity stabilised. When electric conductivity was stable a SKB chemistry class 5 including options was sampled.

To control the volume of groundwater pumped to the surface the flow was measured. The excess water not used for sampling was released in close vicinity of the borehole container.

The water level in the borehole sections was logged in order to determine the maximal drawdown during the sampling. The drawdown was generally not allowed to exceed 10 m.

Field measurements of pH, temperature and electric conductivity were performed.

After completion of sampling in a borehole the pump was uninstalled. Borehole sections in which further measurements were to be made the pump were left in the section (during the spring sampling, equipment was left in two sections KLX15A:3 and KLX15A:6).

Archive samples were stored in a freezer.

4.3.1 Spring sampling

Groundwater sampling was performed in 14 sections. Sampled sections, volume in tube, volume in tube and section and the approximate total converted volume are listed in Table 4-1.

Approximate converted water volume, volume of water sample, drawdown, pump effect and flow rate for each borehole section are listed in Appendix 1 Table A1-1 – A1-3.

Events during field work, such as pump start, date and time of water sampling and field measurements of temperature, pH, electric conductivity and sample number are listed in Appendix 1 Table A1-4 – A1-17.

4.3.2 Autumn sampling

All core drilled borehole sections were sampled in time series while the percussion drilled sections were sampled at one occasion when electric conductivity was stable.

Groundwater sampling was performed in 11 sections. Sampled sections, volume in tube, volume in tube and section and the approximate converted volume are listed in Table 4-2.

The water level in the borehole sections was logged in order to determine the maximal drawdown during the sampling. The drawdown logging system was out of order during part of the sampling. Drawdown could not be logged in sections KLX10A:2, KLX10A:5, KLX12A:2 and KLX19A:3 due to this system failure.

Table 4-1. Sampled borehole sections during the spring sampling 2008. Volume in tube, volume in tube and borehole section and the approximate total converted volume.

Borehole section	Volume tube (L)	Volume tube+section (L)	Approximate total converted volume (L)
KLX04:2	23.5	37.9	370
KLX04:5	13.2	26.4	4,500
KLX05:7	5.7	16.2	3,600
KLX07A:2	20.1	34.9	8,000
KLX08:3	16.6	59.1	5,700
KLX08:4	15.7	48.8	5,700
KLX10A:2	18.3	31.1	1,400
KLX10A:5	8.8	20.2	4,000
KLX12A:2	14	23.2	1,300
KLX15A:3	16.5	58.0	5,600
KLX15A:6	6.2	29.6	5,700
KLX18A:3	12.2	37.3	730
KLX19A:3	13.3	36.5	6,500
KLX20A:2	6.2	59.9	5,000

Table 4-2. Sampled borehole sections during the autumn sampling 2008. Volume in tube, volume in tube and borehole section and the approximate total converted volume.

Borehole section	Volume tube (L)	Volume tube+section (L)	Approximate total converted volume (L)
KLX08:4	15.7	48.8	4,900
KLX10A:2	18.3	31.1	910
KLX10A:5	8.8	20.2	4,500
KLX12A:2	14	23.2	980
KLX15A:3	16.5	58.0	5,600
KLX15A:6	6.2	29.6	7,900
KLX18A:3	12.2	37.3	720
KLX19A:3	13.3	36.5	5,700
HLX35:2	2.5	230.8	5,000
HLX37:1	3.9	230.8	5,200
HLX39:1	4.4	184.6	4,100

Approximate converted water volume, volume of water sample, drawdown, pump effect and flow rate for each borehole section during the field work are listed in Appendix 1 Table A1-18 – A1-20.

Events during the field work, such as pump start, date of water sampling and field measurements of temperature, pH, electric conductivity and sample number are listed in Appendix 1 Table A1-21 – A1-31.

4.4 Data handling

All data related to events during field work such as installation of pumps, water sampling and field measurements were noted in protocols. Before the protocols were handed over to SKB they were quality reviewed and signed by the responsible field engineer.

Quality control of chemical analyse results were made by the responsible personnel before they were sent to SKB. A statistical evaluation showing results above and below the 90th and 10th percentile, as well as the 95th and 5th percentile, were conducted. In addition to the statistical evaluation calculation of charge balance errors (Equation 4-1) were made and reported.

$$\text{Relative error}\,(\%) = 100 \times \frac{\sum \text{cations(equivalents)} - \sum \text{anions(equivalents)}}{\sum \text{cations(equivalents)} + \sum \text{anions(equivalents)}} \qquad (4\text{-}1)$$

When the quality reviewed data are sent to SKB, routines for quality control and data management are applied.

Some of the constituents are determined by more than one method and/or laboratory. All analytical results are stored in the SICADA database. The applied hierarchy path “Hydrogeochemistry/ Hydrochemical investigation/Analyses/Water in the database” contains two types of tables, raw data tables and primary data tables (final data tables).

Data regarding basic water analyses are inserted into the raw data tables for further evaluation. The evaluation finally results in a reduced dataset for each sample. These data sets are compiled in a primary data table named “water composition”. The evaluation is based on:

- Comparison of the results from different laboratories and/or methods.
- Calculation of charge balance errors, (Equation 4-1). Relative errors within ± 5% are considered acceptable.
- General judgement of plausibility based on earlier results and experience.

All results from special analyses of trace metals and isotopes are inserted directly into primary data tables. In cases when the analyses are repeated or performed by more than one laboratory, a “best choice” notation will indicate those results which are considered most reliable.

An overview of the data management is given in Figure 4-1.

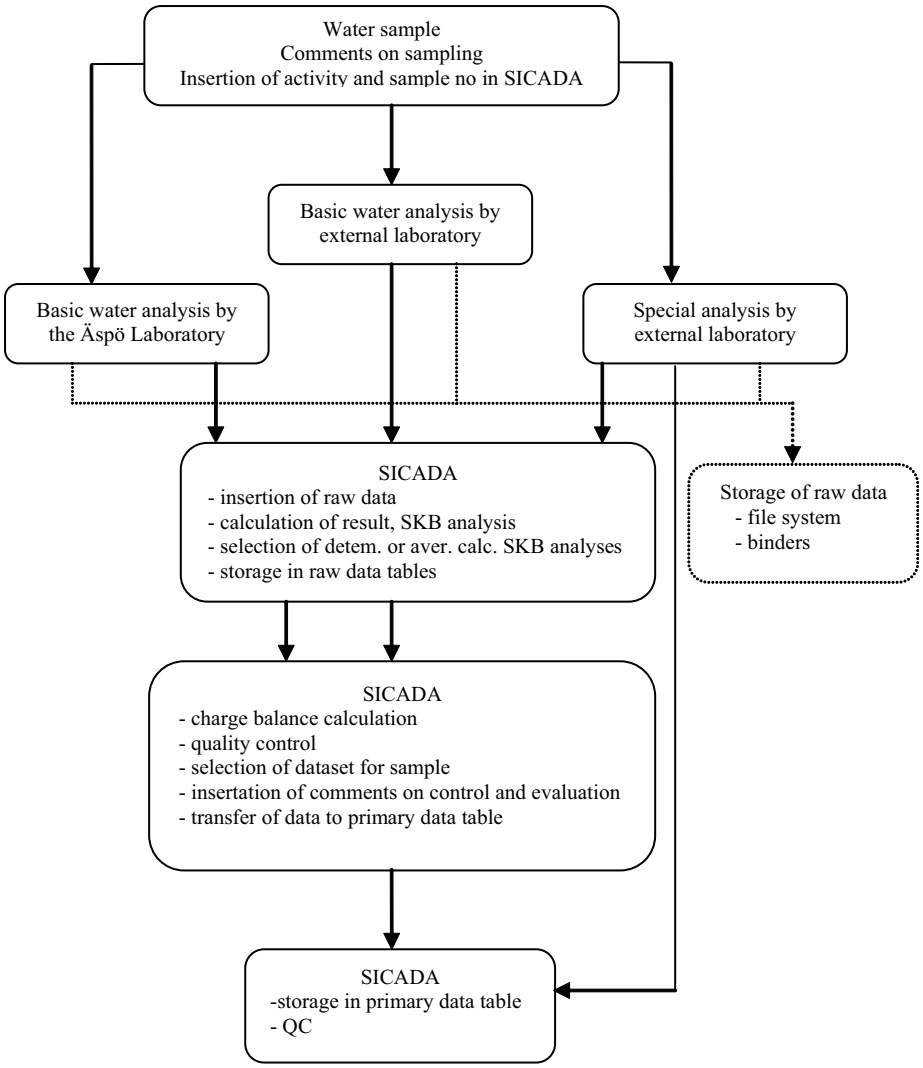

Figure 4-1. *Overview of data management for hydrogeochemical data.*

4.5 Analyses

Water pumped from the borehole was conveyed from the tube into the sample bottles. A water sample is defined as groundwater collected at one occasion and consists of several sample portions, labelled with the same SKB sample number.

The sampling bottles for each SKB chemistry class 5 including options consist of:

- eight 250 ml plastic bottles for pH, conductivity, anions, density, nutrient salts, TOC, DOC and archive samples,
- nine 100 ml plastic bottles; six for I^-, $\delta^2H/\delta^{18}O$, $^{87}Sr/^{86}Sr$, ^{13}C and drill water (brown) and three acid washed for main components and archive samples,
- three 500 ml plastic bottles; two for ^3H (dried) and ^{37}Cl and one acid washed for Fe(II)/Fe(tot),
- three 1,000 ml plastic bottles for ^{34}S, ^{226}Ra, ^{222}Rn, ^{238}U, ^{234}U and ^{230}Th,
- two 50 ml flasks for NH_4,
- two Winkler flasks for HS^-.

The sampling bottles for each SKB chemistry reduced class 5 consist of:

- seven 250 ml plastic bottles for pH, conductivity, anions, density, TOC, DOC and archive samples,
- three 100 ml plastic bottles; two for $\delta^2H/\delta^{18}O$ analyses and drill water analyses (brown) and one acid washed for main components,
- two 500 ml plastic bottles; one for ^3H (dried) and one acid washed for Fe(II)/Fe(tot),
- two Winkler flasks for HS^-.

Portioning into sample bottles, filtration and conservation of samples were performed in the field.

An overview of sample treatment and analyse methods is given in Appendix 2 Table A2-1. An overview of methods, reporting limits and uncertainties is given in Appendix 2 Table A2-2.

All analytical results are traceable by the activity plan numbers and the SKB sample numbers in the database SICADA.

4.6 Control analyses

Control analyses of main components, TOC, DOC and bromide has been made by sending samples for analysis to two different laboratories. The borehole sections selected for control analysis of main components, TOC and DOC were made together with the activity leader. A sample from the deepest section in each borehole has been sent for control analysis of bromide.

4.6.1 Spring sampling

During the spring sampling three SKB sample numbers (15355, 15362 and 15409) were sent for control analyses of main components. Control analysis of TOC and DOC was made for three SKB sample numbers (15397, 15409 and 15444). Nine samples (SKB sample numbers 15355, 15362, 15368, 15397, 15415, 15409, 15421, 15444 and 15477) were sent for control analysis of bromide.

4.6.2 Autumn sampling

During the autumn sampling three samples (SKB number 15699, 15705 and 15757) were sent for control analyses of main components, TOC and DOC. Nine samples (SKB numbers 15699, 15724, 15711, 15723, 15730, 15736, 15757, 15758 and 15759) were sent for control analysis of bromide.

4.7 Nonconformities

4.7.1 Spring sampling

Sampling in KLX20A:5 were excluded because of lack of time.

4.7.2 Autumn sampling

Drawdown in sections KLX10A:2, KLX10A:5, KLX12A:2 and KLX19A:3 could not be monitored during part of or the sampling period. The problems with the drawdown logging system were caused by lightning.

5 Results

Water chemistry data obtained within the hydrogeochemical monitoring programme during 2008 originate from groundwater samples from KLX04:2, KLX04:5, KLX05:7, KLX07A:2, KLX08:3, KLX08:4, KLX10A:2, KLX10A:5, KLX21A:2, KLX15A:3, KLX15A:6, KLX18A:3, KLX19A:3, KLX20A:2, HLX35:2, HLX37:1 and HLX39:1.

5.1 Chemical analyses

Results from the chemical analyses for both spring and autumn sampling periods are presented below and in Appendix 3. The results are stored in the SICADA database and are traceable by the activity plan numbers AP PS 400-08-009, AP PS 400-08-018 and the SKB sample numbers. It is only the data in the database that are accepted for further interpretation (modelling).

5.1.1 Spring sampling

Results from the spring sampling include water chemistry data for borehole sections KLX04:2, KLX04:5, KLX05:7, KLX07A:2, KLX08:3, KLX08:4, KLX10A:2, KLX10A:5, KLX12A:2, KLX15A:3, KLX15A:6, KLX18A:3, KLX19A:3 and KLX20A:2.

5.1.2 Autumn sampling

Results from the autumn sampling include water chemistry data for borehole sections KLX08:4, KLX10A:2, KLX10A:5, KLX12A:2, KLX15A:3, KLX15A:6, KLX18A:3, KLX19A:3, HLX35:2, HLX37:1 and HLX39:1.

5.2 Field measurements of electric conductivity

For each section field measurements of electric conductivity were made at least once a day (weekdays) and at every sample occasion.

5.2.1 Spring sampling

In Appendix 4 Figure A4-1 field measurement of electric conductivity is plotted versus date. Appendix 4 Figure A4-2 shows electric conductivity plotted versus time (minutes) after pump start. Appendix 4 Figure A4-3 shows electric conductivity plotted versus pumped volume (L).

5.2.2 Autumn sampling

In Appendix 4 Figure A4-4 field measurement of electric conductivity is plotted versus date. Appendix 4 Figure A4-5 shows electric conductivity plotted versus time (minutes) after pump start. Appendix 4 Figure A4-6 shows electric conductivity plotted versus pumped volume (L).

5.3 Sulphide analyses

Time series sampling, made in core drilled borehole sections, included analyses of sulphide in all sample occasions.

All samples intended for analysis of sulphide (Winkler flasks) were preserved with 0.5 ml zinc acetate and 0.5 ml sodium hydroxide.

5.3.1 Spring sampling

Appendix 5 Figure A5-1 shows HS^- concentration versus time (min) after pump start, spring sampling. Appendix 5 Figure A5-2 shows HS^- concentration plotted versus volume (L) after pump start, spring sampling.

5.3.2 Autumn sampling

Appendix 5 Figure A5-3 shows HS^- concentration versus time (min) after pump start, autumn sampling. Appendix 5 Figure A5-4 shows HS^- concentration plotted versus volume (L) after pump start, autumn sampling.

5.4 Basic water analyses

The basic water analyses include Na, K, Ca, Mg, Si, Li, S, Sr, SO_4^{2-}, Cl^-, HCO_3^-, Br^-, and F^-. Furthermore, measurements were made of pH, electric conductivity, drill water content and density. The basic water analysis data and relative charge balance errors are compiled in Appendix 3 Table A3-1.

Values of pH from laboratory and field measurements, are compared in Figure 5-1 (spring) and in Figure 5-2 (autumn). All values are from the last sample occasion in each borehole section.

The sulphur in sulphate has been analysed with two different methods, as sulphur in sulphate using spectrophotometer and as total sulphur using ICP-AES. In Figure 5-3 the sulphur in sulphate are compared to the total sulphur content for the spring sampling 2008. In Figure 5-4 the sulphur in sulphate are compared to the total sulphur content for the autumn sampling 2008.

The chloride concentration is plotted versus the corresponding value of electric conductivity for both the spring and the autumn sampling in Figure 5-5.

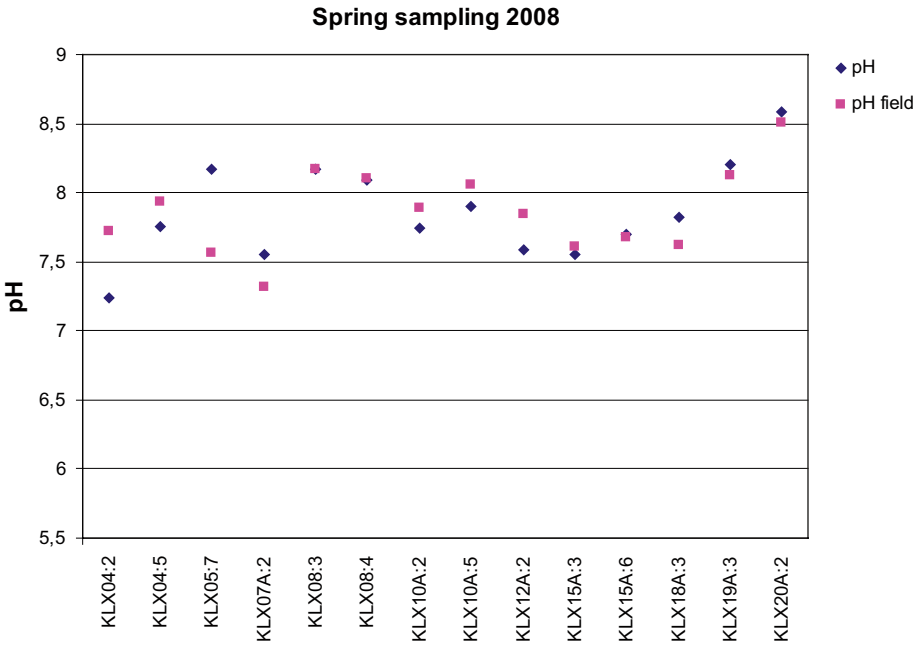

Figure 5-1. *pH analysed at the Äspö Laboratory compared to pH measured in field at the last sampling occasion in each borehole section during the spring sampling.*

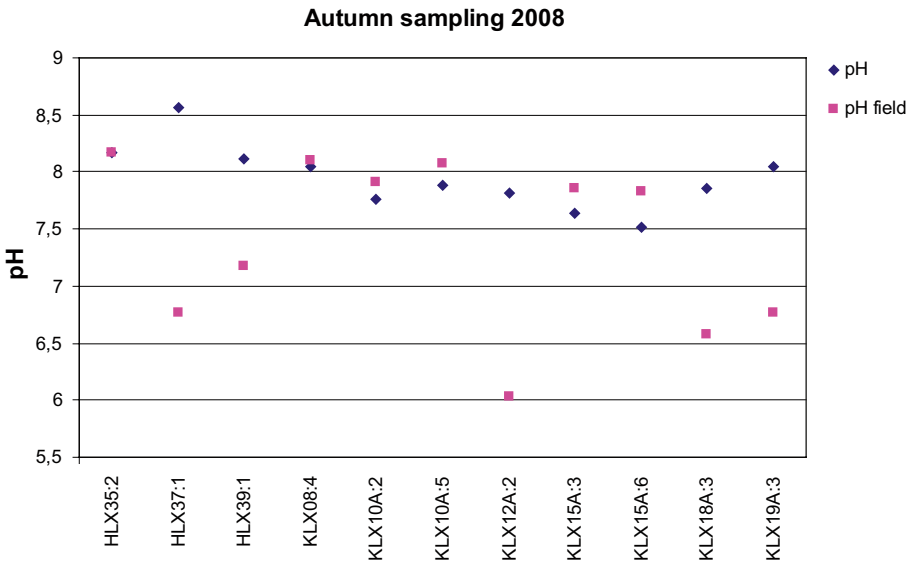

Figure 5-2. *pH analysed at the Äspö Laboratory compared to pH measured in field at the last sampling occasion in each borehole section during the autumn sampling.*

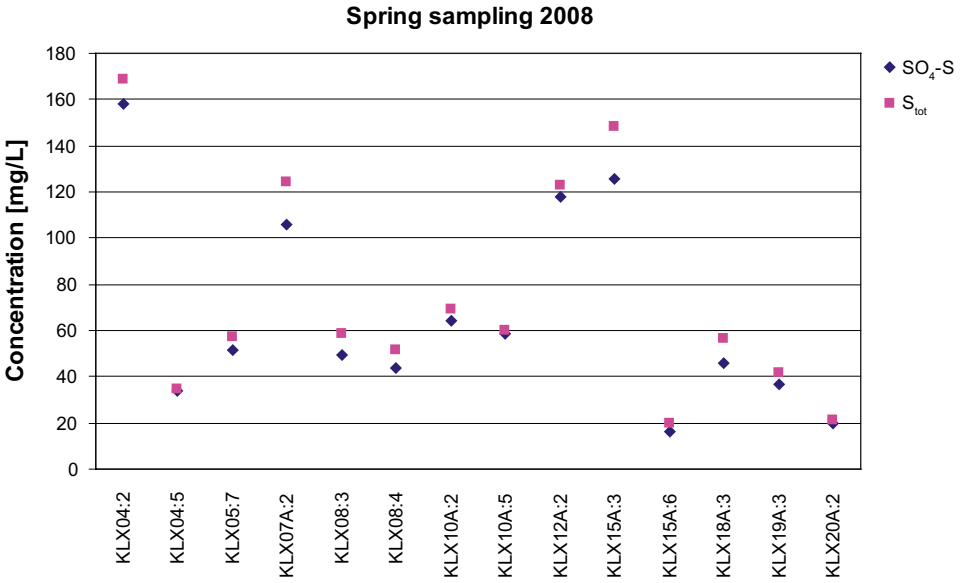

Figure 5-3. *Comparison of sulphur in sulphate (analysed using spectrophotometer) with total sulphur content (analysed using ICP-AES) for investigated sections during the spring sampling 2008.*

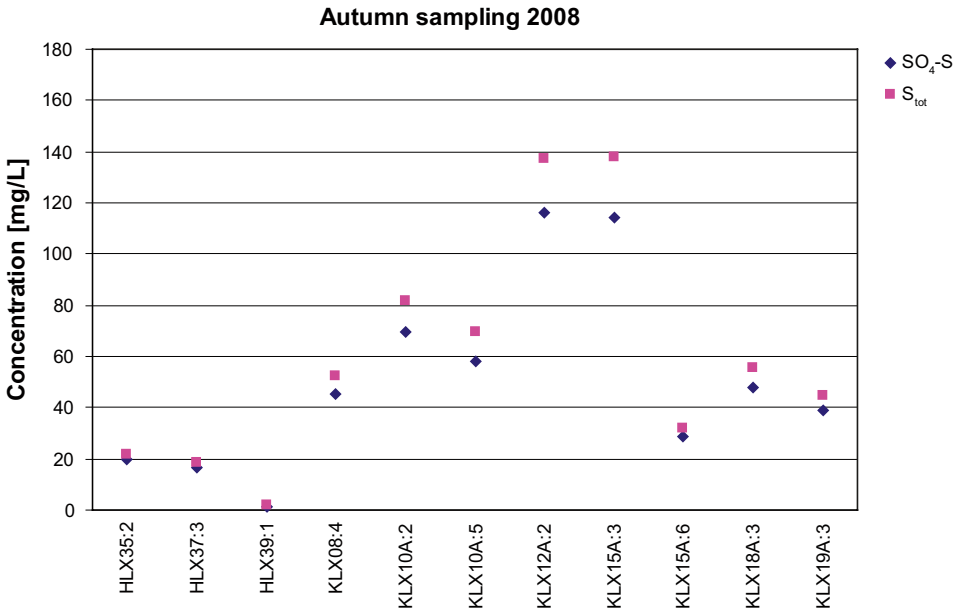

Figure 5-4. *Comparison of sulphur in sulphate (analysed using spectrophotometer) with total sulphur content (analysed using ICP-AES) for investigated sections during the autumn sampling 2008.*

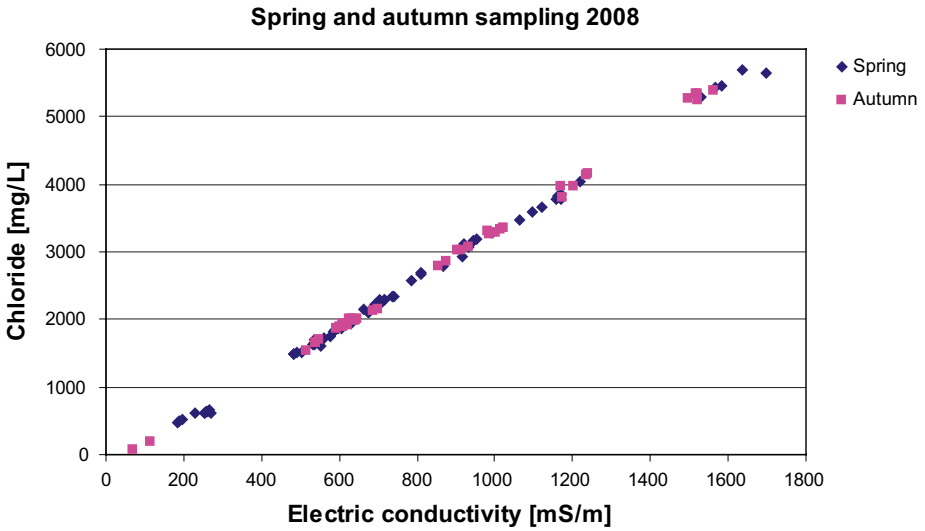

Figure 5-5. *Chloride concentration plotted versus electrical conductivity for sampling conducted during the spring and autumn sampling 2008.*

5.5 Trace elements (rare earth elements and other)

The analyses of trace and rare elements include As, Ba, Cd, Ce, Cs, Dy, Er, Eu, Gd, Hg, Hf, Ho, In, La, Lu, Nd, Pr, Rb, Sc, Sm, Th, Tb, Tl, Tm, U, V, Y, Yb and Zr. Commonly occurring metals, such as Cu, Zn, Pb and Mo are not included in the analysis programme due to contamination considerations. The trace element data are compiled in Appendix 3 Table A3-2.

5.6 Stable and radioactive isotopes

The isotope determinations include stable isotopes as well as radioactive isotopes. The isotope data are compiled in Appendix 3 Table A3-3.

The ^{3}H results from the monitored sections during the summer and autumn sampling are presented in Figures 5-6 and 5-7 respectively.

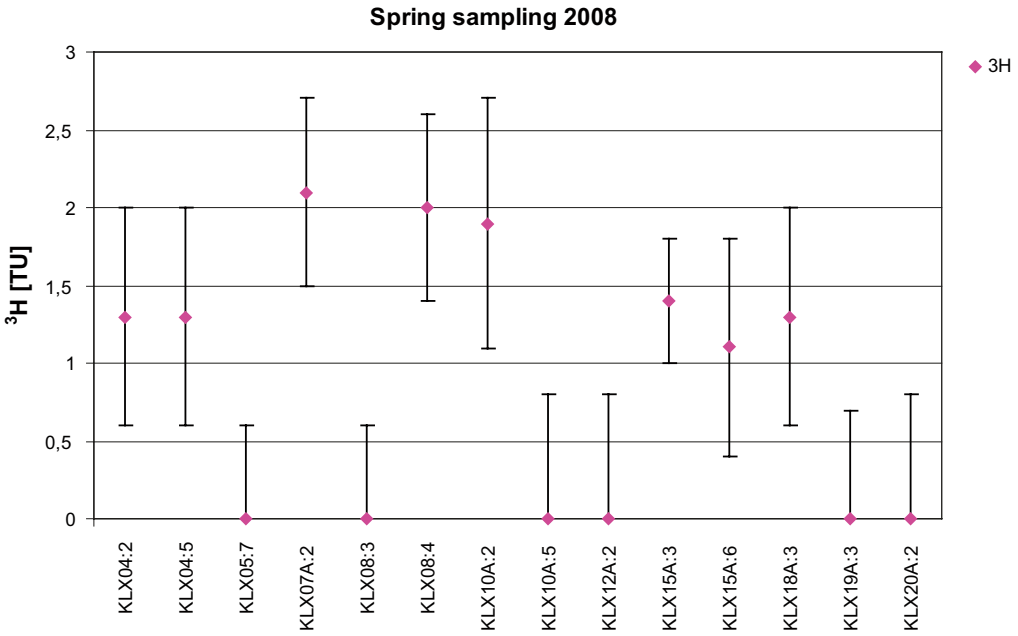

Figure 5-6. *^{3}H data from samples collected from the monitored sections during the spring sampling (error bars shows standard deviation).*

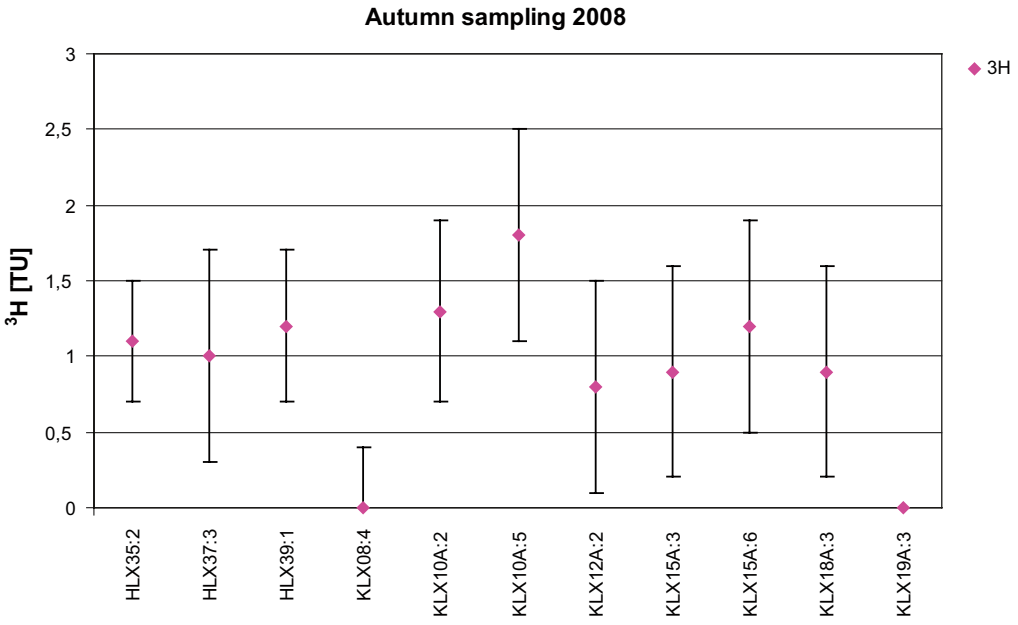

Figure 5-7. *^{3}H data from samples collected from the monitored sections during the autumn sampling (error bars shows standard deviation).*

The $\delta^{2}H$ and $\delta^{18}O$ results from the monitored sections during the summer and autumn sampling are presented in Figures 5-8 and 5-9 respectively. In the figures the $\delta^{2}H$ and $\delta^{18}O$ isotopes are plotted against each other.

The local specific plot of $\delta^{2}H$ and $\delta^{18}O$ isotopes against each other is compared to the Global Meteoric Water Line (GMWL, or sometimes GML) relationship. The GMWL describes the average relationship between hydrogen and oxygen isotope ratios in natural terrestrial waters, expressed as a worldwide average.

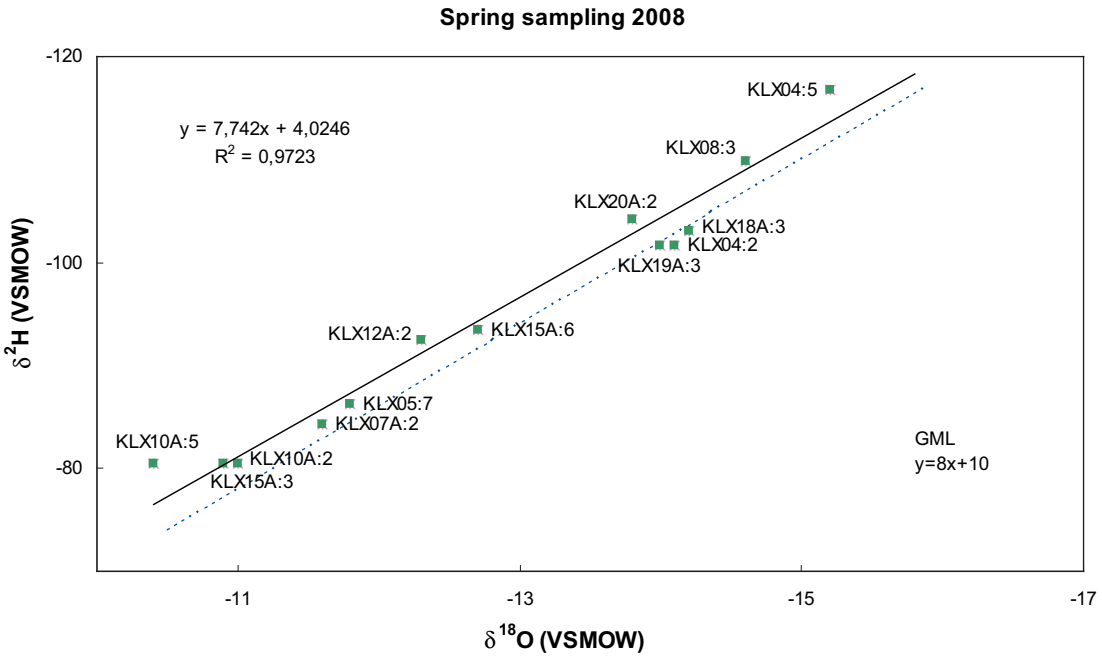

Figure 5-8. *δ^2H and $\delta^{18}O$ data from samples collected from the monitored sections during the spring sampling. The solid line represents the regression of δ^2H against $\delta^{18}O$ according to the equation in the left upper corner. The blue dotted line represents the Global Meteoric Water Line relationship between δ^2H and $\delta^{18}O$ according to the equation given by /Craig 1961/.*

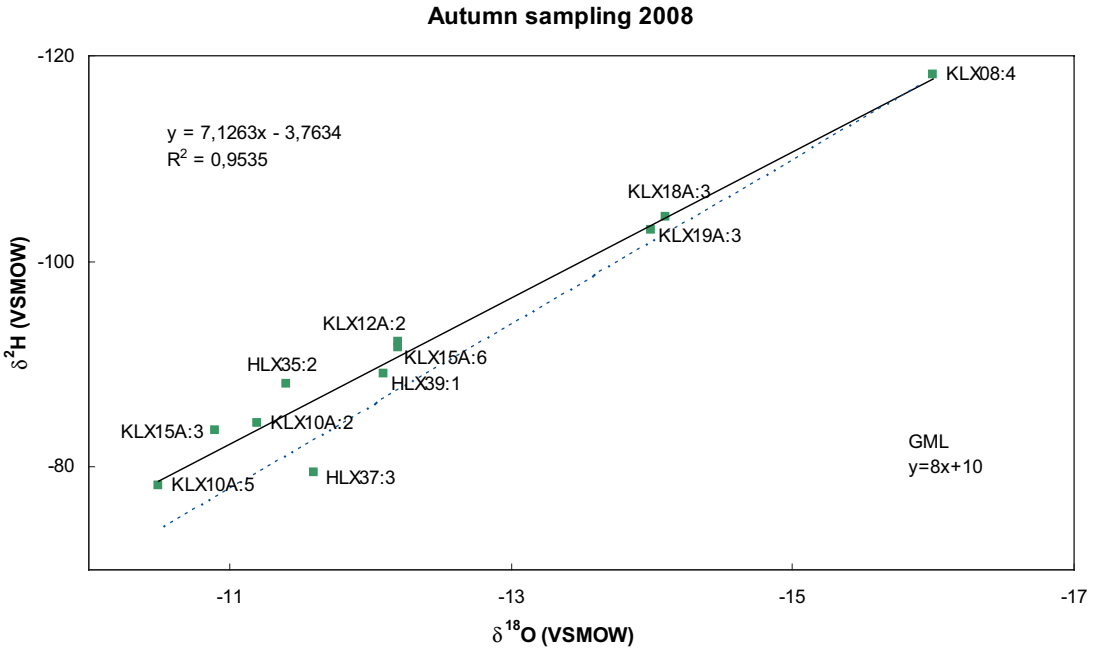

Figure 5-9. *δ^2H and $\delta^{18}O$ data from samples collected from the monitored sections during the autumn sampling. The solid line represents the regression of δ^2H against $\delta^{18}O$ according to the equation in the left upper corner. The blue dotted line represents the Global Meteoric Water Line relationship between δ^2H and $\delta^{18}O$ according to the equation given by /Craig 1961/.*

6 Summary and discussion

Two sampling periods were performed during 2008, the first in the spring and the second in the autumn. 14 borehole sections were sampled during the spring sampling period, and 11 borehole sections during the autumn sampling. Sampling was made in accordance with SKB chemistry class 5 and reduced class 5. Sampling was made in time series in all core drilled boreholes, each section was sampled six times in total. Electric conductivity has been an important parameter in the time series sampling and the last sample in each time series was sampled when electric conductivity was stable. The percussion drilled boreholes were sampled at one occasion when the electric conductivity was stable.

The nonconformities during the sampling periods were few and are considered to be insignificant with regard to the quality of the collected samples.

No nonconformities have been reported from the laboratories involved in the analyses of the samples.

Obtained results have been quality reviewed and comparison of the results from different laboratories and/or methods showed agreement in most cases. The charge balance error did not in any single case exceed the acceptable level of ± 5 %.

A statistical evaluation based on the complete data set of analytical results from the hydrogeochemical monitoring programmes of 2007 and 2008 were conducted. The obtained results are generally within the 10th and the 90th percentile. In some cases however, the obtained results show a distinct deviation. For the percussion drilled boreholes the results generally lies below the 5th percentile. The consistent deviations for the percussion drilled boreholes clearly indicate a systematic measure/sampling related phenomenon as apposed to an analytical error, which would occur as randomly distributed deviations. The systematic deviations for the percussion drilled boreholes could be related to the shallow depth of the sections. Neither of these sections is placed below 200 meters, unlike sections in core drilled boreholes which all are placed deeper. The generally lower conductivity and lower density of the groundwater from these shallow sections suggests a different composition than groundwater from deeper sections and perhaps another origin.

In KLX15A:6 the content of uranine exceeds 95th percentile. Uranine is not a naturally occurring element in groundwater, but an additive to the mud during drilling. Measured levels were well above 100% of the original content in the mud which clearly show that uranine have been used as a tracer at test(s) after the completion of the borehole.

In KLX15A:6 a number of analysed elements also show results above the 95th percentile, witch could indicate a different chemical composition in this section compared to other sections in core drilled boreholes. It can however not be ruled out that the deviation in this section has a connection to the above mentioned test(s).

The local specific plot of $\delta^{2}H$ and $\delta^{18}O$ isotopes against each other, see Figures 5-8 and 5-9, deviates between spring and autumn as well as deviating from the Global Meteoric Water Line (GMWL) relationship between $\delta^{2}H$ and $\delta^{18}O$.

The GMWL describes the average relationship between hydrogen and oxygen isotope ratios in natural terrestrial waters, expressed as a worldwide average. The original assertion of the GMWL is that the isotopic enrichments, relative to ocean water, is linear for all waters which have not undergone excessive evaporation /Craig 1961/.

Any deviations from the GMWL as well as temporal variations in the relationship between $\delta^{2}H$ and $\delta^{18}O$ may depend on isotopic fractionation. One well known example of kinetic fractionation is the evaporation of seawater during which isotopically heavier water molecules (i.e. those with ^{18}O) will be retained compared to the evaporate which will be slightly lighter (i.e. containing more ^{16}O).

The end result of this process is that the clouds become enriched with ^{16}O, while the seawater becomes enriched in ^{18}O. Thus, rainwater is observed to be isotopically lighter than seawater.

The lighter water vapor in the atmosphere is driven polewards /Allam and Tuck 2006, Peixoto et al. 1976/ which causes higher latitude water to become isotopically light (i.e. depleted in ^{18}O). This probably explains the depletion of ^{18}O compared to the GMWL observed in Figures 5-8 and 5-9.

If the temporal variability between spring and autumn in the ratio of $\delta^{2}H$ to $\delta^{18}O$ is statistically significant this would indicate a fluctuating source/recharge of the groundwater. Such a conclusion needs more data evaluation and possibly more measurements to be substantiated however.

Given the outcome of the execution of the samplings and the consistently high quality of the analyses, the obtained data can be recommended for further evaluation of the hydrogeochemical conditions in the investigation area.

7 References

Allam R J, Tuck A F, 2006. Transport of water vapour in a stratosphere-troposphere general circulation model. 1: Fluxes. The Quarterly Journal of the Royal Meteorological Society, 110 (464). 321–356.

Craig H, 1961. Isotopic variations in meteoric waters. Science 133 (3465). 1702–1703.

Peixoto J P, Rosen R D, Wu M, 1976. Seasonal variability in the pole-to-pole water vapor balance during the IGY. Nordic Hydrology, 7. 95–114.

Appendix 1

Sampling conditions and events during field work

Spring sampling

Table A1-1. Sampling conditions in borehole sections sampled during the spring sampling.

	KLX04:2	KLX04:5	KLX05:7	KLX07A:2	KLX08:3
Pumped, converted water volume (L)	370	4,890	3,500	8,000	5,700
Water sample, volume (L)	24	24	24	24	24
Maximal drawdown (m)	5	3	2.5	0.5	5
Maximum pump effect (%)	60	55	64	85	53
Maximum flow rate (L/min)	0.025	0.5	0.3	0.5	0.5

Table A1-2. Sampling conditions in borehole sections sampled during the spring sampling.

	KLX08:4	KLX10A:2	KLX10A:5	KLX12A:2	KLX15A:3
Pumped, converted water volume (L)	5,700	1,400	4,000	1,300	5,600
Water sample, volume (L)	24	24	24	24	24
Maximal drawdown (m)	5.5	8	1	16	3
Maximum pump effect (%)	48	38	38	48	60
Maximum flow rate (L/min)	0.5	0.07	0.4	0.085	0.3

Table A1-3. Sampling conditions in borehole sections sampled during the spring sampling.

	KLX15A:6	KLX18A:3	KLX19A:3	KLX20A:2
Pumped, converted water volume (L)	5,700	730	6,500	5,000
Water sample, volume (L)	24	24	24	24
Maximal drawdown (m)	1.5	16	3	5
Maximum pump effect (%)	44	27	45	48
Maximum flow rate (L/min)	0.5	0.07	0.5	0.5

Table A1-4. Events in KLX04, 870 to 897 m, section 2.

Date	Event	SKB sample no.
2008-03-10	Deflation of packer	
2008-03-11	Installation of pump	
2008-03-17	Start of pump*	
2008-03-17	Water sampling: SKB reduced chemistry class 5 (HS^-) T_{field}: 13.7°C, pH_{field}: 6.83, EC_{field}: 1,131 mS/m Conversed volume: 22.5 L	15416
2008-03-18	Water sampling: SKB reduced chemistry class 5 T_{field}: 5.1°C, pH_{field}: 7.54, EC_{field}: 1,102 mS/m	15417
2008-03-19	Water sampling: SKB reduced chemistry class 5 T_{field}: 9.4°C**, pH_{field}: 7.44, EC_{field}: 1,074 mS/m	15418
2008-03-20	Water sampling: SKB reduced chemistry class 5 T_{field}: 8.9°C**, pH_{field}: 7.74, EC_{field}: 1,140 mS/m	15419
2008-03-25	Water sampling: SKB reduced chemistry class 5 T_{field}: 10.4°C**, pH_{field}: 7.54, EC_{field}: 1,163 mS/m	15420
2008-03-27	Water sampling: SKB chemistry class 5 T_{field}: 8.1°C, pH_{field}: 7.72, EC_{field}: 1,173 mS/m	15421
2008-03-27	Stop of pump	

* Field measurement of temperature, pH and EC has been made in between water sampling, these values can be found in SICADA.
** The tube is heated due to low temperatures and flow rate and thereby risk of freezing.

Table A1-5. Events in KLX04, 507 to 530 m, section 5.

Date	Event	SKB sample no.
2008-03-03	Deflation of packer	
2008-03-03	Installation of pump	
2008-03-05	Start of pump	
2008-03-05	Installation of new pump	
2008-03-06	Start of pump*	
2008-03-06	Water sampling: SKB reduced chemistry class 5 (HS^-) T_{field}: 9.0°C, pH_{field}: 7.57, EC_{field}: 490 mS/m Conversed volume: 13,7 L	15375
2008-03-06	Water sampling: SKB reduced chemistry class 5 T_{field}: 8.5°C, pH_{field}: 7.81, EC_{field}: 495 mS/m	15376
2008-03-06	Water sampling: SKB reduced chemistry class 5 T_{field}: 8.1°C, pH_{field}: 7.85, EC_{field}: 491 mS/m	15377
2008-03-06	Water sampling: SKB reduced chemistry class 5 T_{field}: 7.9°C, pH_{field}: 7.83, EC_{field}: 489 mS/m	15378
2008-03-11	Water sampling: SKB reduced chemistry class 5 T_{field}: 7.2°C, pH_{field}: 7.77, EC_{field}: 542 mS/m	15379
2008-03-13	Water sampling: SKB chemistry class 5 T_{field}: 7.7°C, pH_{field}: 7.93, EC_{field}: 545 mS/m	15380
2008-03-13	Stop of pump	

* Field measurement of temperature, pH and EC has been made in between water sampling, these values can be found in SICADA.

Table A1-6. Events in KLX05, 241 to 255 m, section 7.

Date	Event	SKB sample no.
2008-03-12	Deflation of packer	
2008-03-12	Installation of pump	
2008-03-17	Installation of new pump	
2008-03-17	Start of pump*	
2008-03-17	Water sampling: SKB reduced chemistry class 5 (HS^-) T_{field}: 7.7°C, pH_{field}: 8.07, EC_{field}: 268 mS/m Conversed volume: 6.2 L	15445
2008-03-17	Water sampling: SKB reduced chemistry class 5 T_{field}: 6.8°C, pH_{field}: 7.67, EC_{field}: 275 mS/m	15446
2008-03-17	Water sampling: SKB reduced chemistry class 5 T_{field}: 6.5°C, pH_{field}: 7.03, EC_{field}: 273 mS/m	15447
2008-03-17	Water sampling: SKB reduced chemistry class 5 T_{field}: 5.1°C, pH_{field}: 7.65, EC_{field}: 277 mS/m	15448
2008-03-20	Water sampling: SKB reduced chemistry class 5 T_{field}: 6.6°C, pH_{field}: 7.09, EC_{field}: 273 mS/m	15449
2008-03-25	Water sampling: SKB chemistry class 5 T_{field}: 5.9°C, pH_{field}: 7.56 , EC_{field}: 283 mS/m	15450
2008-03-25	Stop of pump	

* Field measurement of temperature, pH and EC has been made in between water sampling, these values can be found in SICADA.

Table A1-7. Events in KLX07A, 753 to 780 m, section 2.

Date	Event	SKB sample no.
2008-03-12	Deflation of packer	
2008-03-12	Installation of pump	
2008-03-13	Start of pump*	
2008-03-13	Water sampling: SKB reduced chemistry class 5 (HS^-) T_{field}: 7.4°C, pH_{field}: 7.34, EC_{field}: no value mS/m Conversed volume: 20.6 L	15410
2008-03-13	Water sampling: SKB reduced chemistry class 5 T_{field}: 7.1°C, pH_{field}: 7.33, EC_{field}: no value mS/m	15411
2008-03-13	Water sampling: SKB reduced chemistry class 5 T_{field}: 7.5°C, pH_{field}: 7.87, EC_{field}: 759 mS/m	15412
2008-03-13	Water sampling: SKB reduced chemistry class 5 T_{field}: 7.3°C, pH_{field}: 7.79, EC_{field}: 762 mS/m	15413
2008-03-19	Water sampling: SKB reduced chemistry class 5 T_{field}: 7.9°C, pH_{field}: 7.85, EC_{field}: 879 mS/m	15414
2008-03-25	Water sampling: SKB chemistry class 5 T_{field}: 7.2°C, pH_{field}: 7.32, EC_{field}: 929 mS/m	15415
2008-03-25	Stop of pump	

* Field measurement of temperature, pH and EC has been made in between water sampling, these values can be found in SICADA.

Table A1-8. Events in KLX08, 626 to 683 m, section 3.

Date	Event	SKB sample no.
2008-03-10	Deflation of packer	
2008-03-10	Installation of pump	
2008-03-11	Start of pump*	
2008-03-11	Water sampling: SKB reduced chemistry class 5 (HS^-) T_{field}: 7.7°C, pH_{field}: 7.89, EC_{field}: 696 mS/m Conversed volume: 17.1 L	15392
2008-03-11	Water sampling: SKB reduced chemistry class 5 T_{field}: 7.3°C, pH_{field}: 8.01, EC_{field}: 715 mS/m	15393
2008-03-11	Water sampling: SKB reduced chemistry class 5 T_{field}: 6.8°C, pH_{field}: 8.04, EC_{field}: 730 mS/m	15394
2008-03-11	Water sampling: SKB reduced chemistry class 5 T_{field}: 7.4°C, pH_{field}: 8.27, EC_{field}: 729 mS/m	15395
2008-03-14	Water sampling: SKB reduced chemistry class 5 T_{field}: 7.3°C, pH_{field}: 8.46, EC_{field}: 719 mS/m	15396
2008-03-19	Water sampling: SKB chemistry class 5 T_{field}: 7.2°C, pH_{field}: 8.17, EC_{field}: 712 mS/m	15397
2008-03-19	Stop of pump	

* Field measurement of temperature, pH and EC has been made in between water sampling, these values can be found in SICADA.

Table A1-9. Events in KLX08, 594 to 625 m, section 4.

Date	Event	SKB sample no.
2008-03-11	Deflation of packer	
2008-03-11	Installation of pump	
2008-03-11	Start of pump*	
2008-03-11	Water sampling: SKB reduced chemistry class 5 (HS^-) T_{field}: 7.7°C, pH_{field}: 7.69, EC_{field}: 623 mS/m Conversed volume: 16.2 L	15398
2008-03-11	Water sampling: SKB reduced chemistry class 5 T_{field}: 7.4°C, pH_{field}: 8.04, EC_{field}: 619 mS/m	15399
2008-03-11	Water sampling: SKB reduced chemistry class 5 T_{field}: 7.4°C, pH_{field}: 8.23, EC_{field}: 626 mS/m	15400
2008-03-11	Water sampling: SKB reduced chemistry class 5 T_{field}: 7.6°C, pH_{field}: 8.20, EC_{field}: 634 mS/m	15401
2008-03-13	Water sampling: SKB reduced chemistry class 5 T_{field}: 7.6°C, pH_{field}: 8.10, EC_{field}: 636 mS/m	15402
2008-03-18	Water sampling: SKB chemistry class 5 T_{field}: 7.5°C, pH_{field}: 8.10, EC_{field}: 627 mS/m	15403
2008-03-18	Stop of pump	

* Field measurement of temperature, pH and EC has been made in between water sampling, these values can be found in SICADA.

Table A1-10. Events in KLX10A, 689 to 710 m, section 2.

Date	Event	SKB sample no.
2008-03-11	Deflation of packer	
2008-03-11	Installation of pump	
2008-03-12	Start of pump*	
2008-03-12	Water sampling: SKB reduced chemistry class 5 (HS^-) T_{field}: 5.9°C, pH_{field}: 7.56, EC_{field}: 1,014 mS/m Conversed volume: 18.8 L	15404
2008-03-12	Water sampling: SKB reduced chemistry class 5 T_{field}: 7.1°C, pH_{field}: 7.31, EC_{field}: 1,008 mS/m	15405
2008-03-13	Water sampling: SKB reduced chemistry class 5 T_{field}: 6.3°C, pH_{field}: 6.87, EC_{field}: 1,019 mS/m	15406
2008-03-13	Water sampling: SKB reduced chemistry class 5 T_{field}: 7.3°C, pH_{field}: 6.68, EC_{field}: 1,004 mS/m	15407
2008-03-25	Water sampling: SKB reduced chemistry class 5 T_{field}: 15.2**°C, pH_{field}: 7.76, EC_{field}: 982 mS/m	15408
2008-03-26	Water sampling: SKB chemistry class 5 T_{field}: 4.4°C, pH_{field}: 7.89, EC_{field}: 1,018 mS/m	
2008-03-26	Stop of pump	

* Field measurement of temperature, pH and EC has been made in between water sampling, these values can be found in SICADA.

** The tube is heated due to low temperatures and flow rate and thereby risk of freezing.

Table A1-11. Events in KLX10A, 351 to 368 m, section 5.

Date	Event	SKB sample no.
2008-03-17	Deflation of packer	
2008-03-17	Installation of pump	
2008-03-19	Start of pump*	
2008-03-19	Water sampling: SKB reduced chemistry class 5 (HS^-) T_{field}: 6.5°C, pH_{field}: 7.61, EC_{field}: 435 mS/m Conversed volume: 9.3 L	15451
2008-03-19	Water sampling: SKB reduced chemistry class 5 T_{field}: 5.9°C, pH_{field}: 7.79, EC_{field}: 559 mS/m	15452
2008-03-19	Water sampling: SKB reduced chemistry class 5 T_{field}: 6.4°C, pH_{field}: 7.94, EC_{field}: 573 mS/m	15453
2008-03-19	Water sampling: SKB reduced chemistry class 5 T_{field}: 6.7°C, pH_{field}: 7.93, EC_{field}: 578 mS/m	15454
2008-03-25	Water sampling: SKB reduced chemistry class 5 T_{field}: 7.4°C, pH_{field}: 7.87, EC_{field}: 685 mS/m	15455
2008-03-26	Water sampling: SKB chemistry class 5 T_{field}: 4.8°C, pH_{field}: 8.06, EC_{field}: 688 mS/m	15456
2008-03-26	Stop of pump	

* Field measurement of temperature, pH and EC has been made in between water sampling, these values can be found in SICADA.

Table A1-12. Events in KLX12A, 535 to 545 m, section 2.

Date	Event	SKB sample no.
2008-03-12	Deflation of packer	
2008-03-12	Installation of pump	
2008-03-17	Start of pump*	
2008-03-17	Water sampling: SKB reduced chemistry class 5 (HS^-) T_{field}: 5.9°C, pH_{field}: 6.19, EC_{field}: 1,230 mS/m Conversed volume: 14.5 L	15439
2008-03-17	Water sampling: SKB reduced chemistry class 5 T_{field}: 5.9°C, pH_{field}: 7.64, EC_{field}: 1,250 mS/m	15440
2008-03-17	Water sampling: SKB reduced chemistry class 5 T_{field}: 5.0°C, pH_{field}: 7.25, EC_{field}: 1,223 mS/m	15441
2008-03-18	Water sampling: SKB reduced chemistry class 5 T_{field}: 4.4°C, pH_{field}: 7.02, EC_{field}: 1,239 mS/m	15442
	Water sampling: SKB reduced chemistry class 5 T_{field}: –°C, pH_{field}: –, EC_{field}: – mS/m	Excluded due to lack of time
2008-03-25	Installation of new pump	
2008-03-24	Installation of new pump	
2008-03-27	Water sampling: SKB chemistry class 5 T_{field}: 5.3°C, pH_{field}: 7.85, EC_{field}: 1,314 mS/m	15444
2008-03-27	Stop of pump	

* Field measurement of temperature, pH and EC has been made in between water sampling, these values can be found in SICADA.

Table A1-13. Events in KLX15A, 623 to 640 m, section 3.

Date	Event	SKB sample no.
2008-02-25	Deflation of packer	
2008-02-25	Installation of pump	
2008-02-26	Start of pump*	
2008-02-26	Water sampling: SKB reduced chemistry class 5 (HS^-) T_{field}: 6.9°C, pH_{field}: no value, EC_{field}: 884 mS/m Conversed volume: 17 L	15356
2008-02-26	Water sampling: SKB reduced chemistry class 5 T_{field}: 6.8°C, pH_{field}: 7.19, EC_{field}: 1,577 mS/m	15351
2008-02-26	Water sampling: SKB reduced chemistry class 5 T_{field}: 6.6°C, pH_{field}: 6.83, EC_{field}: 1,633 mS/m	15352
2008-03-26	Water sampling: SKB reduced chemistry class 5 T_{field}: 7.2°C, pH_{field}: 6.66, EC_{field}: 1,637 mS/m	15353
2008-03-06	Water sampling: SKB reduced chemistry class 5 T_{field}: 7.2°C, pH_{field}: 7.78, EC_{field}: 1,672 mS/m	15354
2008-03-10	Water sampling: SKB chemistry class 5 T_{field}: 7.3°C, pH_{field}: 7.61, EC_{field}: 1,680 mS/m	15355
2008-03-10	Stop of pump	

* Field measurement of temperature, pH and EC has been made in between water sampling, these values can be found in SICADA.

Table A1-14. Events in KLX15A, 260 to 272 m, section 6.

Date	Event	SKB sample no.
2008-02-27	Deflation of packer	
2008-02-27	Installation of pump	
2008-02-27	Start of pump*	
2008-02-27	Water sampling: SKB reduced chemistry class 5 (HS^-) T_{field}: 9.1°C, pH_{field}: 7.60, EC_{field}: 842 mS/m Conversed volume: 6.7 L	15369
2008-02-27	Water sampling: SKB reduced chemistry class 5 T_{field}: 8.4°C, pH_{field}: 7.99, EC_{field}: 816 mS/m	15370
2008-02-27	Water sampling: SKB reduced chemistry class 5 T_{field}: 7.7°C, pH_{field}: 7.95, EC_{field}: 811 mS/m	15371
2008-02-27	Water sampling: SKB reduced chemistry class 5 T_{field}: 7.2°C, pH_{field}: 7.96, EC_{field}: 832 mS/m	15372
2008-03-05	Water sampling: SKB reduced chemistry class 5 T_{field}: 7.7°C, pH_{field}: 7.76, EC_{field}: 935 mS/m	15373
2008-03-06	Water sampling: SKB chemistry class 5 T_{field}: 8.3°C, pH_{field}: 7.68, EC_{field}: 934 mS/m	15374
2008-03-06	Stop of pump	

* Field measurement of temperature, pH and EC has been made in between water sampling, these values can be found in SICADA.

Table A1-15. Events in KLX18A, 472 to 489 m, section 3.

Date	Event	SKB sample no.
2008-02-26	Deflation of packer	
2008-02-26	Installation of pump	
2008-02-27	Start of pump	
2008-02-27	Water sampling: SKB reduced chemistry class 5 (HS^-) T_{field}: 9.2°C, pH_{field}: 7.73, EC_{field}: 533 mS/m Conversed volume: 12 L	15363
2008-02-27	Water sampling: SKB reduced chemistry class 5 T_{field}: 7.6°C, pH_{field}: 7.94, EC_{field}: 520 mS/m	15364
2008-02-28	Water sampling: SKB reduced chemistry class 5 T_{field}: 3.5°C, pH_{field}: 7.89, EC_{field}: 562 mS/m	15365
2008-02-28	Water sampling: SKB reduced chemistry class 5 T_{field}: 9.4°C, pH_{field}: 8.03, EC_{field}: 542 mS/m	15366
2008-03-04	Water sampling: SKB reduced chemistry class 5 T_{field}: 10.3°C, pH_{field}: 8.00, EC_{field}: 533 mS/m	15367
2008-03-05	Water sampling: SKB chemistry class 5 T_{field}: 11.7°C, pH_{field}: 7.62, EC_{field}: 529 mS/m	15368
2008-03-05	Stop of pump	

* Field measurement of temperature, pH and EC has been made in between water sampling, these values can be found in SICADA.

Table A1-16. Events in KLX19A, 509 to 517 m, section 3.

Date	Event	SKB sample no.
2008-02-25	Deflation of packer	
2008-02-25	Installation of pump	
2008-02-26	Start of pump*	
2008-02-26	Water sampling: SKB reduced chemistry class 5 (HS^-) T_{field}: 6.5°C, pH_{field}: 7.25, EC_{field}: 610 mS/m Conversed volume: 13.8 L	15357
2008-02-26	Water sampling: SKB reduced chemistry class 5 T_{field}: 6.9°C, pH_{field}: 7.77, EC_{field}: 611 mS/m	15358
2008-02-26	Water sampling: SKB reduced chemistry class 5 T_{field}: 6.8°C, pH_{field}: 7.83, EC_{field}: no value mS/m	15359
2008-02-26	Water sampling: SKB reduced chemistry class 5 T_{field}: 7.2°C, pH_{field}: 8.14, EC_{field}: 607 mS/m	15360
2008-02-28	Water sampling: SKB reduced chemistry class 5 T_{field}: 7.9°C, pH_{field}: 8.28, EC_{field}: 613 mS/m	15361
2008-03-04	Water sampling: SKB chemistry class 5 T_{field}: 6.9°C, pH_{field}: 8.13, EC_{field}: 619 mS/m	15362
2008-03-06	Stop of pump	

* Field measurement of temperature, pH and EC has been made in between water sampling, these values can be found in SICADA.

Table A1-17. Events in KLX20A, 260 to 296 m, section 2.

Date	Event	SKB sample no.
2008-03-18	Deflation of packer	
2008-03-18	Installation of pump	
2008-03-19	Start of pump*	
2008-03-19	Water sampling: SKB reduced chemistry class 5 (HS^-) T_{field}: 5.5°C, pH_{field}: 7.53, EC_{field}: 198 mS/m Conversed volume: 6.7 L	15472
2008-03-19	Water sampling: SKB reduced chemistry class 5 T_{field}: 5.6°C, pH_{field}: 7.47, EC_{field}: 200 mS/m	15473
2008-03-19	Water sampling: SKB reduced chemistry class 5 T_{field}: 7.8°C, pH_{field}: 7.70, EC_{field}: 207 mS/m	15474
2008-03-19	Water sampling: SKB reduced chemistry class 5 T_{field}: 5.3°C, pH_{field}: 8.43, EC_{field}: 206 mS/m	15475
2008-03-25	Water sampling: SKB reduced chemistry class 5 T_{field}: 8.4°C, pH_{field}: 7.62, EC_{field}: 238 mS/m	15476
2008-03-26	Water sampling: SKB chemistry class 5 T_{field}: 6.3°C, pH_{field}: 8.51, EC_{field}: 241 mS/m	15477
2008-03-26	Stop of pump	

* Field measurement of temperature, pH and EC has been made in between water sampling, these values can be found in SICADA.

Autumn sampling

Table A1-18. Sampling conditions in borehole sections sampled during the autumn sampling.

	KLX08:4	KLX10A:2	KLX10A:5	KLX12A:2
Pumped, converted water volume (L)	4,900	910	4,500	980
Water sample, volume (L)	24	24	24	24
Maximal drawdown (m)	5	8*	2*	11*
Maximum pump effect (%)	63	33	42	61
Maximum flow rate (L/min)	0.5	0.07	0.4	0.085

* The system that is logging drawdown was out of order during part of or the entire pump period.

Table A1-19. Sampling conditions in borehole sections sampled during the spring sampling.

	KLX15A:3	KLX15A:6	KLX18A:3	KLX19A:3
Pumped, converted water volume (L)	5,600	7,900	720	5,700
Water sample. volume (L)	24	24	24	24
Maximal drawdown (m)	2.5	1.5	16	*
Maximum pump effect (%)	57	42	25	52
Maximum flow rate (L/min)	0.3	0.5	0.07	0.5

* The system that is logging drawdown was out of order during part of or the entire pump period.

Table A1-20. Sampling conditions in borehole sections sampled during the spring sampling.

	HLX35:2	HLX37:1	HLX39:1
Pumped, converted water volume (L)	5,000	5,200	4,100
Water sample. volume (L)	8	8	8
Maximal drawdown (m)	0.5	0.5	0.5
Maximum pump effect (%)	33	34	41
Maximum flow rate (L/min)	0.5	0.5	0.5

Table A1-21. Events in KLX08, 594 to 625 m, section 4.

Date	Event	SKB sample no.
2008-10-23	Deflation of packer	
2008-10-23	Installation of pump	
2008-10-27	Start of pump*	
2008-10-27	Water sampling: SKB reduced chemistry class 5 (HS^-) T_{field}: 9.1°C, pH_{field}: 7.63, EC_{field}: 648 mS/m Conversed volume: 16.2 L	15752
2008-10-27	Water sampling: SKB reduced chemistry class 5 T_{field}: 8.8°C, pH_{field}: 8.30, EC_{field}: 634 mS/m	15753
2008-10-27	Water sampling: SKB reduced chemistry class 5 T_{field}: 8.8°C, pH_{field}: 8.11, EC_{field}: 634 mS/m	15754
2008-10-27	Water sampling: SKB reduced chemistry class 5 T_{field}: 8.4°C, pH_{field}: 7.69, EC_{field}: 650 mS/m	15755
2008-10-30	Water sampling: SKB reduced chemistry class 5 T_{field}: 7.0°C, pH_{field}: 7.91, EC_{field}: 645 mS/m	15756
2008-11-03	Water sampling: SKB chemistry class 5 T_{field}: 6.7°C, pH_{field}: 8.10, EC_{field}: 642 mS/m	15757
2008-11-03	Stop of pump	

* Field measurement of temperature, pH and EC has been made in between water sampling, these values can be found in SICADA.

Table A1-22. Events in KLX10A, 689 to 710 m, section 2.

Date	Event	SKB sample no.
2008-10-20	Deflation of packer	
2008-10-20	Installation of pump	
2008-10-21	Start of pump*	
2008-10-21	Water sampling: SKB reduced chemistry class 5 (HS^-) T_{field}: 12.2°C, pH_{field}: 8.10, EC_{field}: 1,018 mS/m Conversed volume: 19 L	15731
2008-10-21	Water sampling: SKB reduced chemistry class 5 T_{field}: 9.4°C, pH_{field}: 7.86, EC_{field}: 1,027 mS/m	15732
2008-10-22	Water sampling: SKB reduced chemistry class 5 T_{field}: 5.5°C, pH_{field}: 7.81, EC_{field}: 1,046 mS/m	15733
2008-10-22	Water sampling: SKB reduced chemistry class 5 T_{field}: 8.9°C, pH_{field}: 7.76, EC_{field}: 1,029 mS/m	15734
2008-10-28	Water sampling: SKB reduced chemistry class 5 T_{field}: 10.7°C, pH_{field}: 8.26, EC_{field}: 1,055 mS/m	15735
2008-10-30	Water sampling: SKB chemistry class 5 T_{field}: 5.5°C, pH_{field}: 7.91, EC_{field}: 1,044 mS/m	15736
2008-10-30	Stop of pump	

* Field measurement of temperature, pH and EC has been made in between water sampling, these values can be found in SICADA.

Table A1-23. Events in KLX10A, 351 to 368 m, section 5.

Date	Event	SKB sample no.
2008-10-20	Deflation of packer	
2008-10-20	Installation of pump	
2008-10-20	Start of pump*	
2008-10-20	Water sampling: SKB reduced chemistry class 5 (HS^-) T_{field}: 10.0°C, pH_{field}: 7.94, EC_{field}: 622 mS/m Conversed volume: 9.3 L	15712
2008-10-20	Water sampling: SKB reduced chemistry class 5 T_{field}: 9.3°C, pH_{field}: 7.95, EC_{field}: 664 mS/m	15713
2008-10-20	Water sampling: SKB reduced chemistry class 5 T_{field}: 9.6°C, pH_{field}: 8.03, EC_{field}: 660 mS/m	15714
2008-10-20	Water sampling: SKB reduced chemistry class 5 T_{field}: 9.1°C, pH_{field}: 7.97, EC_{field}: 667 mS/m	15715
2008-10-23	Water sampling: SKB reduced chemistry class 5 T_{field}: 8.2°C, pH_{field}: 8.28, EC_{field}: 711 mS/m	15716
2008-10-28	Water sampling: SKB chemistry class 5 T_{field}: 7.6°C, pH_{field}: 8.07, EC_{field}: 715 mS/m	15717
2008-10-28	Stop of pump	

* Field measurement of temperature, pH and EC has been made in between water sampling, these values can be found in SICADA.

Table A1-24. Events in KLX12A, 535 to 545 m, section 2.

Date	Event	SKB sample no.
2008-10-20	Deflation of packer	
2008-10-20	Installation of pump	
2008-10-21	Start of pump*	
2008-10-21	Water sampling: SKB reduced chemistry class 5 (HS^-) T_{field}: 11.4°C, pH_{field}: 7.05, EC_{field}: 1,224 mS/m Conversed volume: 14.5 L	15725
2008-10-21	Water sampling: SKB reduced chemistry class 5 T_{field}: 12.6°C, pH_{field}: 7.22, EC_{field}: 1,229 mS/m	15726
2008-10-21	Water sampling: SKB reduced chemistry class 5 T_{field}: 10.0°C, pH_{field}: 6.95, EC_{field}: 1,261 mS/m	15727
2008-10-22	Water sampling: SKB reduced chemistry class 5 T_{field}: 6.4°C, pH_{field}: 5.64, EC_{field}: 1,264 mS/m	15728
2008-10-27	Water sampling: SKB reduced chemistry class 5 T_{field}: 9.4°C, pH_{field}: 6.77, EC_{field}: 1,298 mS/m	15729
2008-10-29	Water sampling: SKB chemistry class 5 T_{field}: 4.6°C, pH_{field}: 6.03, EC_{field}: 1,330 mS/m	15730
2008-10-29	Stop of pump	

* Field measurement of temperature, pH and EC has been made in between water sampling, these values can be found in SICADA.

Table A1-25. Events in KLX15A, 623 to 640 m, section 3.

Date	Event	SKB sample no.
2008-10-15	Deflation of packer	
2008-10-15	Installation of pump	
2008-10-15	Start of pump*	
2008-10-15	Water sampling: SKB reduced chemistry class 5 (HS^-) T_{field}: 8.4°C, pH_{field}: 7.97, EC_{field}: 949 mS/m Conversed volume: 17 L	15706
2008-10-15	Water sampling: SKB reduced chemistry class 5 T_{field}: 9.8°C, pH_{field}: 7.73, EC_{field}: 1,565 mS/m	15707
2008-10-15	Water sampling: SKB reduced chemistry class 5 T_{field}: 9.7°C, pH_{field}: 7.70, EC_{field}: 1,582 mS/m	15708
2008-10-15	Water sampling: SKB reduced chemistry class 5 T_{field}: 8.8°C, pH_{field}: 7.68, EC_{field}: 1,589 mS/m	15709
2008-10-23	Water sampling: SKB reduced chemistry class 5 T_{field}: 6.4°C, pH_{field}: 7.51, EC_{field}: 1,648 mS/m	15710
2008-10-28	Water sampling: SKB chemistry class 5 T_{field}: 8.1°C, pH_{field}: 7.85, EC_{field}: 1,650 mS/m	15711
2008-10-28	Stop of pump	

* Field measurement of temperature, pH and EC has been made in between water sampling, these values can be found in SICADA.

Table A1-26. Events inKLX15A, 260 to 272 m, section 6.

Date	Event	SKB sample no.
2008-10-15	Deflation of packer	
2008-10-15	Installation of pump	
2008-10-15	Start of pump*	
2008-10-15	Water sampling: SKB reduced chemistry class 5 (HS^-) T_{field}: 8.3°C, pH_{field}: 7.66, EC_{field}: 1,305 mS/m Conversed volume: 6.7 L	15700
2008-10-15	Water sampling: SKB reduced chemistry class 5 T_{field}: 8.4°C, pH_{field}: 7.86, EC_{field}: 960 mS/m	15701
2008-10-15	Water sampling: SKB reduced chemistry class 5 T_{field}: 9.0°C, pH_{field}: 7.86, EC_{field}: 899 mS/m	15702
2008-10-15	Water sampling: SKB reduced chemistry class 5 T_{field}: 9.2°C, pH_{field}: 7.88, EC_{field}: 822 mS/m	15703
2008-10-21	Water sampling: SKB reduced chemistry class 5 T_{field}: 9.4°C, pH_{field}: 7.75, EC_{field}: 933 mS/m	15704
2008-10-27	Water sampling: SKB chemistry class 5 T_{field}: 8.7°C, pH_{field}: 7.83, EC_{field}: 965 mS/m	15705
2008-10-27	Stop of pump	

* Field measurement of temperature, pH and EC has been made in between water sampling, these values can be found in SICADA.

Table A1-27. Events in KLX18A, 472 to 489 m, section 3.

Date	Event	SKB sample no.
2008-10-20	Deflation of packer	
2008-10-20	Installation of pump	
2008-10-21	Start of pump	
2008-10-21	Installation of new pump	
2008-10-22	Start of pump*	
2008-10-22	Water sampling: SKB reduced chemistry class 5 (HS^-) T_{field}: 5.3°C, pH_{field}: 6.85, EC_{field}: 563 mS/m Conversed volume: 12.7 L	15718
2008-10-22	Water sampling: SKB reduced chemistry class 5 T_{field}: 8.9°C, pH_{field}: 6.88, EC_{field}: 534 mS/m	15719
2008-10-23	Water sampling: SKB reduced chemistry class 5 T_{field}: 4.9°C, pH_{field}: 6.56, EC_{field}: 571 mS/m	15720
2008-10-23	Water sampling: SKB reduced chemistry class 5 T_{field}: 10.9°C, pH_{field}: 6.52, EC_{field}: 571 mS/m	15721
2008-10-28	Water sampling: SKB reduced chemistry class 5 T_{field}: 5.5°C, pH_{field}: 7.15, EC_{field}: 572 mS/m	15722
2008-10-29	Water sampling: SKB chemistry class 5 T_{field}: 5.5°C, pH_{field}: 6.58, EC_{field}: 577 mS/m	15723
2008-10-29	Stop of pump	

* Field measurement of temperature, pH and EC has been made in between water sampling, these values can be found in SICADA.

Table A1-28. Events in KLX19A, 509 to 517 m, section 3.

Date	Event	SKB sample no.
2008-10-14	Deflation of packer	
2008-10-14	Installation of pump	
2008-10-14	Start of pump*	
2008-10-14	Water sampling: SKB reduced chemistry class 5 (HS^-) T_{field}: 10.4°C, pH_{field}: 6.95, EC_{field}: 607 mS/m Conversed volume: 16 L	15694
2008-10-14	Water sampling: SKB reduced chemistry class 5 T_{field}: 9.9°C, pH_{field}: 6.43, EC_{field}: 623 mS/m	15695
2008-10-14	Water sampling: SKB reduced chemistry class 5 T_{field}: 10.9°C, pH_{field}: 6.32, EC_{field}: 621 mS/m	15696
2008-10-14	Water sampling: SKB reduced chemistry class 5 T_{field}: 9.4°C, pH_{field}: 6.48, EC_{field}: 622 mS/m	15697
2008-10-21	Water sampling: SKB reduced chemistry class 5 T_{field}: 10.0°C, pH_{field}: 7.06, EC_{field}: 638 mS/m	15698
2008-10-22	Water sampling: SKB chemistry class 5 T_{field}: 8.1°C, pH_{field}: 6.77, EC_{field}: 639 mS/m	15699
2008-10-22	Stop of pump	

* Field measurement of temperature, pH and EC has been made in between water sampling, these values can be found in SICADA.

Table A1-29. Events in HLX35, 120 to 130 m, section 2.

Date	Event	SKB sample no.
2008-10-27	Deflation of packer	
2008-10-27	Installation of pump	
2008-10-28	Start of pump*	
2008-11-04	Water sampling: SKB chemistry class 5 T_{field}: 7.4°C, pH_{field}: 8.17, EC_{field}: 115.7 mS/m	15759
2008-11-04	Stop of pump	

* Field measurement of temperature, pH and EC has been made in between water sampling, these values can be found in SICADA.

Table A1-30. Events in HLX37, 150 to 120 m, section 1.

Date	Event	SKB sample no.
2008-10-14	Deflation of packer	
2008-10-14	Installation of pump	
2008-10-14	Installation of new pump	
2008-10-15	Start of pump*	
2008-10-22	Water sampling: SKB chemistry class 5 T_{field}: 8.4°C, pH_{field}: 6.77, EC_{field}: 736 mS/m	15724
2008-10-22	Stop of pump	

* Field measurement of temperature, pH and EC has been made in between water sampling, these values can be found in SICADA.

Table A1-31. Events in HLX39, 187 to 199 m, section 1.

Date	Event	SKB sample no.
2008-10-29	Deflation of packer	
2008-10-29	Installation of pump	
2008-10-29	Start of pump*	
2008-11-04	Water sampling: SKB chemistry class 5 T_{field}: 7.2°C, pH_{field}: 7.17, EC_{field}: 71.2 mS/m	15758
2008-11-04	Stop of pump	

* Field measurement of temperature, pH and EC has been made in between water sampling, these values can be found in SICADA.

Appendix 2

Sampling and analyse methods

Table A2-1 (page 1 of 2). Sample handling routines and analyse methods.

Component group	Component/element	Sample container (material)	Volume (ml)	Filtering	Preparation/ Conservation	Analyse methods	Analysis within – or delivery time to lab	Included in SKB class
Drill water	Uranine	Plastic (brown)	100	No	No	Spectroflurometry	–	2,3,5
Anions	HCO_3	Plastic	250	No	No	Titration	The same day – maximum 24 h	2,3,5
	pH (lab)					Pot.meas.		2,3,5
	cond (lab)					Cond. meas.		2,3,5
	SO_4^{2-}, Br^-, F^-	Plastic	250	No	No	IC	Not critical (month)	3,5
	Cl^-					Titration	Not critical (month)	2,3,5
	Br^-, I^-	Plastic	100	No	No	ICP-SFMS	Not critical (month)	5
Cations	Na, K, Ca, Mg, S(tot), Si (tot), Li, Sr, Fe, Mn	Plastic (acid washed)	100	Yes (0.47 µm)	Yes (1 mL HNO_3, suprapur)	ICP-AES/ICP-SFMS	Not critical (month)	3 (except Fe, Mn),5
Environmental metals	Al, As, Ba, Cd, Co, Cr, Cu, Hg, In, Mo, Ni, P, Pb, V, Zn					ICP-SFMS	Not critical (month)	5
Boron isotopes	$^{10}B/^{11}B$*					ICP-SFMS	No limit	5
Lanthanoids	Sc, Rb, Y, Zr, Sb, Cs, La, Hf, Tl, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, U, Th					ICP-SFMS	Not critical (month)	5
Fe(II), Fe (tot)	Fe(II), Fe(tot)	Plastic (PEH, acid washed)	500	Yes (0.47 µm)	Yes (5 mL HCl, suprapur)	Spectrophotometry	As soon as possible the same day	5
Hydrogen sulphide	HS^-	Glass (Winkler)	About 120×2	Yes (0.45 µm)	Yes (0.5 mL 1M ZnAc, 0.5 mL 1M NaOH)	Spectrophotometry	Immeddiately or if conserved, a few days	5
Nutrient salts	NO_2, NO_3+NO_2, PO_4	Plastic	250	Yes (0.45 µm) Frozen, transported in isolated bag	No	Spectrophotometry	Short transportation time	5
	NH_4	Glass (flask)	2×25	No	No	Spectrophotometry	Maximum 24 h	5

Table A2-1 (page 2 of 2). Sample handling routines and analyse methods.

Component group	Component/element	Samplecontainer (material)	Volume (ml)	Filtering	Preparation/ Conservation	Analysis method	Analysis within – or delivery time to lab	Included in SKB class
Dissolved organic carbon	DOC	Plastic	250	Yes	No	UV oxidation, IR. Carbon analysator	Short transportation time	5
Total organic carbon	TOC	Plastic	250	No	No	UV oxidation, IR. Carbon analysator	Short transportation time	5
Environmental isotopes	$\delta^{2}H$, $\delta^{18}O$	Plastic	100	No	No	MS	Not critical (month)	2,3,5
Tritium	^{3}H (enhanced)	Plastic (dry bottle)	500	No	No	LSC	Not critical (month)	2,3,5
Chlorine-37	$\delta^{37}Cl$	Plastic	500	No	No	A (MS)	Not critical (month)	5
Carbon isotopes	$\delta^{13}C$, pmC (^{14}C)	Plastic (fluorescence)	2×100	No	No	A (MS)	A few days	5
Sulphur isotopes	$\delta^{34}S$	Plastic	1,000	No	No	MS	No limit	5
Strontium isotopes	$^{87}Sr/^{86}Sr$	Plastic	100	No	No	TIMS	Days or weeks	5
Uranium and Thorium isotopes	^{234}U, ^{235}U, ^{238}U, ^{230}Th, ^{232}Th	Plastic (HPDE)	1,000	No	No	Alfa spectr.	No limit	5
Radon and Radium isotopes	^{222}Ra, ^{226}Rn	Plastic (HPDE)	1,000	No	No	LSS	Immediate transport	5
Density	Density	Plastic	250	No	No	Pycnometer	–	2,3,5
Archive samples with acid	–	Plastic (acid washed)	2×100	Yes	Yes (1 mL HNO_3, suprapur)	–	Storage in freeze container	5
Archive samples without acid	–	Plastic	2×250	Yes	No	–	Storage in freeze container	2,3,5

* The B-isotope ratio is given as $^{10}B/^{11}B$ (the result reported from the consulting laboratory). If the notation according to internatiol stanard for environmental isotopes, $^{11}B/^{10}B$, it is necessary to invert the $^{10}B/^{11}B$ value ($1/^{10}B/^{11}B$).

Abbrevations and definitions:

IC	Ion chromatograph
ICP AES	Inductively Coupled Plasma Atomic Emission Spectrometry
ICP SFMS	Inductively Coupled Plasma Sector Field Mass Spectrometry
MS	Mass Spectrometry
LSC	Liquid Scintillation Counting
A (MS)	Accelerator (Mass Spectrometry)
TIMS	Thermal Ionization Mass Spectrometry
LSS	Liquid Scintillation Spectroscopy

Table A2-2 (page 1 of 2). Methods, reporting limits and measurement uncertainties (updated 2008).

Component	Method[1]	Reporting limits (RL), detection limits (DL) or range[2]	Unit	Measurement uncertainty[3]
pH	Potentiometric	3–10	pH unit	±0.1
EC	Electrical Conductivity meas.	1–150	mS/m	5%
		150–10,000		3%
HCO_3	Alkalinity titration	1	mg/L	4%
Cl^-	Mohr-titration	≥ 70	mg/L	5%
Cl^-	IC	0.5 – 70		8%
SO_4	IC	0.5	mg/L	12%
Br^-	IC	DL 0.2, RL 0.5	mg/L	15%
Br	ICP SFMS	0.001, 0.004, 0.010[4]	mg/L	25%[5]
F^-	IC	DL 0.2, RL 0.5	mg/L	13%
F^-	Potentiometric	DL 0.1, RL 0.2		12%
I^-	ICP SFMS	0.001, 0.004, 0.010[4]	mg/L	25%[5]
Na	ICP AES	0.1	mg/L	13%
K	ICP AES	0.4	mg/L	12%
Ca	ICP AES	0.1	mg/L	12%
Mg	ICP AES	0.09	mg/L	12%
S(tot)	ICP AES	0.16	mg/L	12%
Si(tot)	ICP AES	0.03	mg/L	14%
Sr	ICP AES	0.002	mg/L	12%
Li	ICP AES	0.004	mg/L	12.2%
Fe	ICP AES	0.02	mg/L	13.3%[6]
Fe	ICP SFMS	0.0004, 0.002, 0.004[4]	mg/L	20%[6]
Mn	ICP AES	0.003	mg/L	12.1%[5]
Mn	ICP SFMS	0.00003, 0.00004, 0.0001[4]	mg/L	53%[6]
Fe(II), Fe(tot)	Spectrophotometry	DL 0.006, RL 0.02	mg/L	0.005 (0.02–0.05 mg/L)
				9% (0.05–1 mg/L)
				7% (1–3 mg/L)
HS^-	Spectrophotometry, SKB	SKB DL 0.006, RL 0.02	mg/L	25%
HS^-	Spectrophotometry, external laboratory	0.01	mg/L	0.02 (0.01–0.2 mg/L)
				12% (>0.2 mg/L)
NO_2 as N	Spectrophotometry	0.1	mg/L	2%
NO_3 as N	Spectrophotometry	0.2	mg/L	5%
NO_2+NO_3 as N	Spectrophotometry	0.2	mg/L	0.2 (0.2–20 mg/L)
				2% (> 20 mg/L)
NH_4 as N	Spectrophotometry, SKB	11	mg/L	30% (11–20 mg/L)
				25% (20–50 mg/L)
				12% (50–1,200 mg/L)
NH_4 as N	Spectrophotometry	0.8	mg/L	0.8 (0.8–20 mg/L)
	external laboratory			5% (> 20 mg/L)
PO_4 as P	Spectrophotometry	0.7	mg/L	0.7 (0.7–20 mg/L)
				3% (> 20 mg/L)
Al,	ICP SFMS	0.2, 0.3, 0.7[4]	mg/L	17.6%[6]
Zn	ICP SFMS	0.2, 0.8, 2[4]	mg/L	15.5, 17.7, 25.5%[6]

Table A2-2 (page 2 of 2). Methods, reporting limits and measurement uncertainties (updated 2008).

Component	Method[1]	Reporting limits (RL), detection limits (DL) or range[2]	Unit	Measurement uncertainty[3]
Ba, Cr, Mo,	ICP SFMS	0.01, 0.04, 0.1[4]	mg/L	Ba 15%[4], Cr 22%[5] Mo 39%[6]
Pb	ICP SFMS	0.01, 0.1, 0.3[4]	mg/L	15%[6]
Cd	ICP SFMS	0.002, 0.02, 0.5[4]	mg/L	15.5%[6]
Hg	ICP AFS	0.002	mg/L	10.7%[6]
Co	ICP SFMS	0.005, 0.02, 0.05[4]	mg/L	25.9%[6]
V	ICP SFMS	0.005, 0.03, 0.05[4]	mg/L	18.1%[6]
Cu	ICP SFMS	0.1, 0.2, 0.5[4]	mg/L	14.4%[6]
Ni	ICP SFMS	0.05, 0.2, 0.5[4]	mg/L	15.8%[6]
P	ICP SFMS	1, 5, 40[4]	mg/L	16.3%[6]
As	ICP SFMS	0.01 (520 mS/m)	mg/L	59.2%[6]
La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu	ICP SFMS	0.005, 0.02, 0.05[4]	mg/L	20%, 20%, 25%[6]
Sc, In, Th	ICP SFMS	0.05, 0.2, 0.5[4]	mg/L	25%[6]
Rb, Zr, Sb, Cs	ICP SFMS	0.025, 0.1, 0.25[4]	mg/L	15%, 20%, 20%[5], 25%[6]
Tl	ICP SFMS	0.025, 0.1, 0.25[4]	mg/L	14.3%[5 and 6]
Y, Hf	ICP SFMS	0.005, 0.02, 0.05[4]	mg/L	15%, 20%, 20%[5], 25%[6]
U	ICP SFMS	0.001, 0.005, 0.01[4]	mg/L	13.5%, 14.3%, 15.9%[5] 19.1%, 17.9%, 20.9%[6]
DOC	UV oxidation, IR Carbon analysator	0.5	mg/L	8%
TOC	UV oxidation, IR Carbon analysator	0.5	mg/L	10%
$\delta^{2}H$	MS	2	‰ SMOW[7]	0.9 (one standard deviation)
$\delta^{18}O$	MS	0.1	‰ SMOW[7]	0.1 (one standard dev.)
^{3}H	LSC	0.8	TU[8]	0.8
$\delta^{37}Cl$	A (MS)	0.2	‰ SMOC[9]	0.2[15]
$\delta^{13}C$	A (MS)	–	‰ PDB[10]	0.3[15]
^{14}C pmc	A (MS)	–	PMC[11]	0.4[15]
δ^{34} S	MS	0.2	‰ CDT[12]	0.4 (one standard dev.)
$^{87}Sr/^{86}Sr$	TIMS	–	No unit (ratio)[13]	0.00002
$^{10}B/^{11}B$	ICP SFMS	–	No unit (ratio)[13]	–
^{234}U, ^{235}U, ^{238}U, ^{232}Th, ^{30}Th	Alfa spectr.	0.0001	Bq/L[14]	≤5% (Counting statistics uncertainty)
^{222}Rn, ^{226}Ra	LSS	0.015	Bq/L[14]	≤5% (Counting statistics uncertainty)

1. Many elements may be determined by more than one ICP technique depending on concentration range. The most relevant technique and measurement uncertainty for the concentrations normally encountered in groundwater are presented. In cases where two techniques were frequently used, both are displayed.
2. Reporting limits (RL), generally 10×standard deviation, if nothing else is stated. Measured values below RL or DL are stored as negative values in SICADA (i.e. –RL value and –DL value).
3. Measurement uncertainty reported by the laboratory, generally as ± percent of measured value in question at 95% confidence interval.
4. Reporting limits at electrical cond. 520 mS/m, 1,440 mS/m and 3,810 mS/m respectively.
5. Measurement uncertainty at concentrations 100×RL
6. Measurement uncertainty at concentrations 10×RL
7. Per mille deviation from SMOW (Standard Mean Oceanic Water).
8. TU=Tritium Units, where one TU corresponds to a tritium/hydrogen ratio of 10–18 (1 Bq/L Tritium = 8.45 TU).
9. Per mille deviation from SMOC (Standard Mean Oceanic Chloride).
10. Per mille deviation from PDB (the standard PeeDee Belemnite).
11. The following relation is valid between pmC (percent modern carbon) and Carbon-14 age: pmC = 100´ e((1950-y-1.03t)/8274) where y = the year of the C-14 measurement and t = C-14 age.
12. Per mille deviation from CDT (the standard Canyon Diablo Troilite).
13. Isotope ratio without unit.
14. The following expressions are applicable to convert activity to concentration, for uranium-238 and thorium-232: 1 ppm U = 12.4 Bq/kg238U, 1 ppm Th = 3.93 Bq/kg232Th.
15. Isotopes are often reported as per mill deviation from a standard. The deviation is calculated as: $\delta yI = 1{,}000\times(K_{sample}-K_{standard})/K_{standard}$, where K= the isotope ratio and yI = $\delta^{2}H$, $\delta^{18}O$, 37Cl, 13C or 34S etc.

Appendix 3

Groundwater chemistry data

Table A3-1 (page 1 of 15). Compilation of results from basic water analyses.

Idcode	Secup m	Seclow m	Date and time of sampling	SKB sample no.	Na mg/l	K mg/l	Ca mg/l	Mg mg/l	Si mg/l	Li mg/l	SO_4^2 mg/l	SO_4S mg/l	Sr mg/l	Cl mg/l	Br mg/l	F mg/l	Mn mg/l	I mg/l	HCO_3 mg/l
KLX15A	623.00	640.00	2008/02/26 08:29:00	15351	1,860.0	17.60	1,330.0	57.60	6.45	0.2790	277.00	120.00	25.400	5,280.0	24.400	1.51	0.62700	–	72.80
KLX15A	623.00	640.00	2008/02/26 08:29:00	15352	2,020.0	16.70	1,450.0	57.90	6.26	0.2930	327.00	136.00	26.600	5,430.0	26.500	1.59	0.63700	–	46.10
KLX15A	623.00	640.00	2008/02/26 08:29:00	15353	1,940.0	16.20	1,410.0	57.30	6.22	0.2970	339.00	139.00	26.600	5,470.0	26.000	1.60	0.62700	–	36.40
KLX15A	623.00	640.00	2008/02/26 08:29:00	15354	1,990.0	14.20	1,460.0	57.20	5.68	0.3070	380.00	152.00	27.300	5,650.0	27.900	1.80	0.53700	–	18.30
KLX15A	623.00	640.00	2008/02/26 08:29:00	15355	1,990.0	13.30	1,470.0	54.70	5.50	0.2700	377.00	148.00	26.100	5,690.0	28.100	1.64	0.52200	0.2350	17.80
KLX15A	623.00	640.00	2008/02/26 08:29:00	15356	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
KLX19A	509.00	517.00	2008/02/26 11:58:00	15357	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
KLX19A	509.00	517.00	2008/02/26 11:58:00	15358	1,050.0	8.90	161.0	11.10	6.53	0.0947	106.00	41.40	2.910	1,840.0	9.200	2.25	0.08040	–	34.30
KLX19A	509.00	517.00	2008/02/26 11:58:00	15359	1,030.0	8.58	156.0	10.60	6.43	0.0959	106.00	41.20	2.800	1,830.0	8.900	2.45	0.07650	–	33.60
KLX19A	509.00	517.00	2008/02/26 11:58:00	15360	1,030.0	8.60	158.0	10.60	6.51	0.0947	105.00	41.30	2.800	1,830.0	8.950	2.25	0.07420	–	33.50
KLX19A	509.00	517.00	2008/02/26 11:58:00	15361	1,050.0	6.96	158.0	10.70	6.45	0.0942	108.00	42.60	2.900	1,860.0	9.600	2.50	0.06520	–	29.80
KLX19A	509.00	517.00	2008/02/26 11:58:00	15362	988.0	6.02	160.0	10.10	6.06	0.0869	110.00	41.40	2.740	1,860.0	9.250	2.65	0.06450	0.0782	28.00
KLX18A	472.00	489.00	2008/02/27 10:00:00	15363	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
KLX18A	472.00	489.00	2008/02/27 10:00:00	15364	795.0	3.87	214.0	13.70	7.10	0.1190	128.00	49.80	4.150	1,510.0	8.300	2.08	0.08780	–	72.90
KLX18A	472.00	489.00	2008/02/27 10:00:00	15365	855.0	3.97	232.0	14.60	6.69	0.1280	139.00	55.10	4.540	1,620.0	7.950	1.84	0.08700	–	50.80
KLX18A	472.00	489.00	2008/02/27 10:00:00	15366	871.0	4.04	236.0	14.90	6.64	0.1260	143.00	55.30	4.660	1,620.0	8.150	2.00	0.08650	–	50.20
KLX18A	472.00	489.00	2008/02/27 10:00:00	15367	867.0	3.75	238.0	14.80	6.34	0.1290	136.00	54.00	4.710	1,620.0	8.600	2.25	0.08300	–	49.80
KLX18A	472.00	489.00	2008/02/27 10:00:00	15368	813.0	3.62	230.0	13.70	6.05	0.1140	139.00	56.80	4.350	1,610.0	8.400	2.00	0.07740	0.0993	50.20
KLX15A	260.00	272.00	2008/02/27 14:27:00	15369	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
KLX15A	260.00	272.00	2008/02/27 14:27:00	15370	984.0	23.80	488.0	68.00	4.90	0.1300	51.50	20.50	9.990	2,690.0	10.700	1.35	0.38700	–	62.20
KLX15A	260.00	272.00	2008/02/27 14:27:00	15371	969.0	24.80	495.0	69.70	5.02	0.1250	51.00	20.40	10.000	2,580.0	10.400	1.45	0.38100	–	63.90
KLX15A	260.00	272.00	2008/02/27 14:27:00	15372	987.0	24.70	507.0	69.90	5.06	0.1350	52.20	20.60	10.400	2,660.0	10.400	1.38	0.39800	–	63.20
KLX15A	260.00	272.00	2008/02/27 14:27:00	15373	1,090.0	19.60	612.0	78.40	5.32	0.1550	49.30	20.40	12.500	3,110.0	12.000	1.27	0.54900	–	49.80
KLX15A	260.00	272.00	2008/02/27 14:27:00	15374	1,070.0	19.00	606.0	75.80	5.25	0.1330	49.00	19.70	12.100	3,080.0	12.300	1.30	0.53700	0.3580	50.00
KLX04	507.00	530.00	2008/03/06 14:48:00	15375	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
KLX04	507.00	530.00	2008/03/06 14:48:00	15376	697.0	5.62	266.0	15.40	8.26	0.1620	85.30	33.10	5.180	1,510.0	7.330	2.08	0.29400	–	51.10
KLX04	507.00	530.00	2008/03/06 14:48:00	15377	709.0	5.69	265.0	15.70	8.48	0.1660	87.30	34.40	5.310	1,500.0	7.430	1.93	0.30400	–	48.30

– = not analysed.

Table A3-1 (page 2 of 15). Compilation of results from basic water analyses.

Idcode	Secup m	Seclow m	Date and time of sampling	SKB sample no.	Na mg/l	K mg/l	Ca mg/l	Mg mg/l	Si mg/l	Li mg/l	SO_4^2 mg/l	SO_4S mg/l	Sr mg/l	Cl mg/l	Br mg/l	F mg/l	Mn mg/l	I mg/l	HCO_3 mg/l
KLX04	507.00	530.00	2008/03/06 14:48:00	15378	702.0	5.47	266.0	15.40	8.41	0.1660	88.90	34.30	5.200	1,480.0	8.080	1.93	0.29800	–	46.90
KLX04	507.00	530.00	2008/03/06 14:48:00	15379	801.0	4.32	284.0	11.00	7.66	0.1870	99.10	38.20	5.870	1,650.0	8.350	2.05	0.20100	–	34.50
KLX04	507.00	530.00	2008/03/06 14:48:00	15380	780.0	4.04	283.0	10.40	6.86	0.1760	102.00	34.50	5.750	1,690.0	8.730	2.18	0.19600	0.0928	33.10
KLX08	626.00	683.00	2008/03/11 10:00:00	15392	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
KLX08	626.00	683.00	2008/03/11 10:00:00	15393	981.0	6.73	408.0	9.27	7.44	0.2120	118.00	45.60	7.890	2,210.0	10.600	2.30	0.08690	–	54.20
KLX08	626.00	683.00	2008/03/11 10:00:00	15394	981.0	8.25	431.0	10.80	7.47	0.2150	127.00	49.80	8.330	2,280.0	10.700	2.24	0.08850	–	21.60
KLX08	626.00	683.00	2008/03/11 10:00:00	15395	999.0	8.51	431.0	10.70	7.60	0.2110	128.00	50.60	8.530	2,290.0	10.900	2.00	0.08770	–	20.60
KLX08	626.00	683.00	2008/03/11 10:00:00	15396	1,020.0	6.95	415.0	9.05	7.71	0.2110	138.00	53.40	8.100	2,290.0	10.700	2.14	0.08060	–	17.60
KLX08	626.00	683.00	2008/03/11 10:00:00	15397	934.0	6.04	416.0	7.89	7.70	0.1890	149.00	58.30	7.750	2,250.0	10.400	2.25	0.07960	0.0767	16.60
KLX08	594.00	625.00	2008/03/11 09:53:00	15398	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
KLX08	594.00	625.00	2008/03/11 09:53:00	15399	913.0	4.06	330.0	7.89	7.68	0.1860	105.00	43.80	6.490	1,910.0	9.950	2.79	0.07880	–	45.90
KLX08	594.00	625.00	2008/03/11 09:53:00	15400	947.0	3.91	343.0	8.20	7.58	0.1930	125.00	49.50	6.790	1,930.0	9.800	2.48	0.08580	–	24.60
KLX08	594.00	625.00	2008/03/11 09:53:00	15401	939.0	3.75	343.0	8.13	7.38	0.1960	129.00	48.90	6.770	1,940.0	10.100	2.42	0.08620	–	23.10
KLX08	594.00	625.00	2008/03/11 09:53:00	15402	943.0	3.45	348.0	8.11	7.03	0.1910	134.00	50.40	6.780	1,950.0	10.400	2.30	0.08830	–	20.20
KLX08	594.00	625.00	2008/03/11 09:53:00	15403	919.0	3.29	341.0	7.61	6.98	0.1680	131.00	51.70	6.500	1,940.0	9.880	2.35	0.08440	0.0743	20.60
KLX10	689.00	710.00	2008/03/12 11:33:00	15404	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
KLX10	689.00	710.00	2008/03/12 11:33:00	15405	1,280.0	12.50	627.0	39.70	8.45	0.2250	137.00	55.60	11.900	3,160.0	12.900	1.66	0.23000	–	46.40
KLX10	689.00	710.00	2008/03/12 11:33:00	15406	1,240.0	12.10	618.0	38.10	8.77	0.2310	161.00	61.70	11.900	3,170.0	13.000	1.69	0.24200	–	31.40
KLX10	689.00	710.00	2008/03/12 11:33:00	15407	1,260.0	12.10	621.0	37.50	8.61	0.2300	162.00	61.60	11.800	3,180.0	12.800	1.74	0.24100	–	30.80
KLX10	689.00	710.00	2008/03/12 11:33:00	15408	1,260.0	11.00	689.0	32.60	8.79	0.2600	193.00	74.00	13.300	3,290.0	14.500	1.61	0.23600	–	26.40
KLX10	689.00	710.00	2008/03/12 11:33:00	15409	1,320.0	11.10	697.0	33.60	8.32	0.2350	193.00	69.20	12.600	3,280.0	13.000	1.62	0.23400	0.1510	26.60
KLX07A	753.00	780.00	2008/03/13 07:34:00	15410	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
KLX07A	753.00	780.00	2008/03/13 07:34:00	15411	1,050.0	7.21	491.0	21.50	7.36	0.2040	238.00	102.00	9.020	2,160.0	12.700	1.45	0.32400	–	58.60
KLX07A	753.00	780.00	2008/03/13 07:34:00	15412	989.0	7.40	482.0	22.50	7.37	0.2000	273.00	101.00	8.720	2,340.0	12.700	1.71	0.33600	–	30.50
KLX07A	753.00	780.00	2008/03/13 07:34:00	15413	975.0	7.43	480.0	22.70	7.41	0.2000	270.00	100.00	8.560	2,340.0	13.300	1.60	0.33800	–	29.80
KLX07A	753.00	780.00	2008/03/13 07:34:00	15414	1,090.0	8.13	626.0	26.50	7.46	0.2360	309.00	114.00	11.400	2,780.0	16.200	1.63	0.40600	–	25.00
KLX07A	753.00	780.00	2008/03/13 07:34:00	15415	1,100.0	8.10	682.0	27.10	7.56	0.2320	317.00	124.00	11.300	2,930.0	17.500	1.66	0.41100	0.1300	24.20

– = not analysed.

Table A3-1 (page 3 of 15). Compilation of results from basic water analyses.

Idcode	Secup m	Seclow m	Date and time of sampling	SKB sample no.	Na mg/l	K mg/l	Ca mg/l	Mg mg/l	Si mg/l	Li mg/l	SO_4^2 mg/l	SO_4S mg/l	Sr mg/l	Cl mg/l	Br mg/l	F mg/l	Mn mg/l	I mg/l	HCO_3 mg/l
KLX04	870.00	897.00	2008/03/17 19:13:00	15416	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
KLX04	870.00	897.00	2008/03/17 19:13:00	15417	1,290.0	5.92	926.0	9.80	8.23	0.3310	420.00	157.00	18.300	3,470.0	24.400	2.00	0.14600	–	38.10
KLX04	870.00	897.00	2008/03/17 19:13:00	15418	1,360.0	5.62	989.0	7.98	7.96	0.3410	451.00	168.00	18.700	3,600.0	25.700	2.10	0.12900	–	20.20
KLX04	870.00	897.00	2008/03/17 19:13:00	15419	1,350.0	5.62	998.0	7.02	7.98	0.3420	461.00	177.00	19.600	3,670.0	25.000	2.05	0.11500	–	15.40
KLX04	870.00	897.00	2008/03/17 19:13:00	15420	1,410.0	5.52	1050.0	5.90	7.61	0.3520	473.00	183.00	20.000	3,790.0	26.100	2.05	0.09940	–	10.80
KLX04	870.00	897.00	2008/03/17 19:13:00	15421	1,430.0	5.48	1020.0	5.00	7.13	0.3240	475.00	169.00	18.800	3,790.0	26.300	2.10	0.08990	0.1610	10.10
KLX12A	535.00	545.00	2008/03/17 10:00:00	15439	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
KLX12A	535.00	545.00	2008/03/17 10:00:00	15440	1,770.0	10.00	667.0	18.40	6.94	0.2040	318.00	119.00	13.000	3,860.0	19.900	2.02	0.19200	–	61.50
KLX12A	535.00	545.00	2008/03/17 10:00:00	15441	1,810.0	8.87	648.0	18.10	6.94	0.2010	325.00	122.00	12.800	3,850.0	20.000	1.98	0.19600	–	24.00
KLX12A	535.00	545.00	2008/03/17 10:00:00	15442	1,810.0	8.86	655.0	18.20	7.14	0.2040	322.00	125.00	13.000	3,840.0	19.100	1.95	0.19600	–	23.00
KLX12A	535.00	545.00	2008/03/17 10:00:00	15444	1,940.0	9.00	705.0	18.30	5.84	0.1940	354.00	123.00	13.000	4,040.0	20.400	1.77	0.18300	0.1780	15.30
KLX05	241.00	255.00	2008/03/17 10:20:00	15445	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
KLX05	241.00	255.00	2008/03/17 10:20:00	15446	463.0	4.18	55.3	7.37	4.75	0.0571	125.00	48.60	1.090	634.0	2.450	3.24	0.07030	–	195.00
KLX05	241.00	255.00	2008/03/17 10:20:00	15447	463.0	4.13	55.0	7.57	5.10	0.0531	141.00	51.70	1.120	617.0	2.440	3.23	0.07720	–	192.00
KLX05	241.00	255.00	2008/03/17 10:20:00	15448	466.0	4.03	57.0	7.79	5.40	0.0546	145.00	53.40	1.110	616.0	2.470	3.20	0.08340	–	193.00
KLX05	241.00	255.00	2008/03/17 10:20:00	15449	469.0	3.72	60.4	8.10	5.83	0.0550	154.00	56.40	1.110	630.0	2.300	3.08	0.06790	–	187.00
KLX05	241.00	255.00	2008/03/17 10:20:00	15450	477.0	3.71	64.3	8.01	5.63	0.0506	155.00	57.30	1.160	657.0	2.450	3.15	0.06290	0.0281	185.00
KLX10	351.00	368.00	2008/03/19 11:56:00	15451	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
KLX10	351.00	368.00	2008/03/19 11:56:00	15452	883.0	8.09	229.0	36.20	6.91	0.1000	120.00	43.40	3.980	1,690.0	5.350	1.88	0.23200	–	128.00
KLX10	351.00	368.00	2008/03/19 11:56:00	15453	887.0	7.86	230.0	36.00	6.76	0.0998	130.00	48.30	4.000	1,720.0	5.450	1.90	0.22700	–	115.00
KLX10	351.00	368.00	2008/03/19 11:56:00	15454	918.0	7.81	236.0	37.00	6.68	0.1020	134.00	51.00	4.160	1,750.0	5.400	1.93	0.22700	–	107.00
KLX10	351.00	368.00	2008/03/19 11:56:00	15455	1,040.0	7.07	289.0	43.70	5.90	0.1230	176.00	67.60	4.860	2,100.0	6.800	2.10	0.26000	–	72.20
KLX10	351.00	368.00	2008/03/19 11:56:00	15456	1,020.0	7.30	281.0	44.40	5.51	0.1100	176.00	60.30	4.590	2,110.0	6.830	2.03	0.25900	0.1070	71.10
KLX20A	260.00	293.00	2008/03/19 07:15:00	15472	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
KLX20A	260.00	293.00	2008/03/19 07:15:00	15473	346.0	2.60	24.4	2.86	6.05	0.0383	34.30	13.00	0.412	484.0	2.210	4.34	0.04530	–	134.00
KLX20A	260.00	293.00	2008/03/19 07:15:00	15474	360.0	2.52	24.9	2.85	6.01	0.0394	36.80	14.10	0.429	497.0	2.160	4.42	0.03860	–	130.00
KLX20A	260.00	293.00	2008/03/19 07:15:00	15475	369.0	2.47	25.0	2.81	5.90	0.0388	38.50	14.30	0.433	510.0	2.350	4.44	0.03480	–	127.00

– = not analysed.

Table A3-1 (page 4 of 15). Compilation of results from basic water analyses.

Idcode	Secup m	Seclow m	Date and time of sampling	SKB sample no.	Na mg/l	K mg/l	Ca mg/l	Mg mg/l	Si mg/l	Li mg/l	SO_4^2 mg/l	SO_4S mg/l	Sr mg/l	Cl mg/l	Br mg/l	F mg/l	Mn mg/l	I mg/l	HCO_3 mg/l
KLX20A	260.00	293.00	2008/03/19 07:15:00	15476	428.0	2.11	30.7	2.84	5.68	0.0457	58.40	21.40	0.547	616.0	2.780	5.08	0.02160	–	107.00
KLX20A	260.00	293.00	2008/03/19 07:15:00	15477	454.0	2.18	29.4	2.65	5.64	0.0437	59.10	21.30	0.545	614.0	2.800	5.18	0.01930	0.0219	107.00
KLX19A	509.00	517.00	2008/10/14 13:28:00	15694	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
KLX19A	509.00	517.00	2008/10/14 13:28:00	15695	1,010.0	9.04	167.0	11.70	7.26	0.0898	99.80	36.70	2.940	1880.0	9.500	2.71	0.08890	–	56.10
KLX19A	509.00	517.00	2008/10/14 13:28:00	15696	1,010.0	8.96	163.0	11.10	6.96	0.0884	99.40	40.00	2.840	1870.0	9.550	2.72	0.08210	–	39.70
KLX19A	509.00	517.00	2008/10/14 13:28:00	15697	1,000.0	8.72	160.0	10.90	6.95	0.0882	112.00	40.90	2.810	1870.0	9.840	2.72	0.07950	–	37.30
KLX19A	509.00	517.00	2008/10/14 13:28:00	15698	1,080.0	5.90	171.0	10.20	6.35	0.0857	112.00	44.10	2.900	1920.0	9.790	2.67	0.06550	–	26.00
KLX19A	509.00	517.00	2008/10/14 13:28:00	15699	1,050.0	5.99	167.0	10.20	6.41	0.0870	116.00	44.60	2.910	1930.0	10.500	2.91	0.06580	0.0906	25.90
KLX15A	260.00	272.00	2008/10/15 09:34:00	15700	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
KLX15A	260.00	272.00	2008/10/15 09:34:00	15701	1,110.0	28.70	592.0	74.20	6.18	1.7500	98.70	38.50	12.400	3020.0	14.000	1.95	0.53200	–	112.00
KLX15A	260.00	272.00	2008/10/15 09:34:00	15702	1,060.0	27.10	564.0	70.90	6.08	1.9000	104.00	40.10	11.500	2860.0	12.000	2.16	0.48400	–	113.00
KLX15A	260.00	272.00	2008/10/15 09:34:00	15703	1,000.0	25.80	558.0	70.10	6.18	1.7300	99.60	41.50	11.300	2800.0	12.300	2.11	0.47400	–	117.00
KLX15A	260.00	272.00	2008/10/15 09:34:00	15704	1,080.0	20.40	608.0	74.10	5.90	1.7500	90.40	34.60	12.200	3020.0	12.200	1.63	0.56200	–	84.50
KLX15A	260.00	272.00	2008/10/15 09:34:00	15705	1,120.0	20.80	611.0	73.40	5.88	1.6300	86.60	32.10	12.300	3070.0	12.400	1.49	0.56600	0.3180	70.40
KLX15A	623.00	640.00	2008/10/15 10:06:00	15706	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
KLX15A	623.00	640.00	2008/10/15 10:06:00	15707	2,000.0	17.50	1310.0	61.40	6.64	0.5450	329.00	129.00	24.400	5260.0	25.500	1.88	0.54900	–	42.70
KLX15A	623.00	640.00	2008/10/15 10:06:00	15708	2,020.0	16.60	1320.0	60.40	6.56	0.5280	340.00	134.00	24.600	5250.0	25.700	1.92	0.54700	–	36.70
KLX15A	623.00	640.00	2008/10/15 10:06:00	15709	1,840.0	16.70	1310.0	61.00	6.57	0.5290	343.00	134.00	25.100	5340.0	25.800	1.88	0.55100	–	36.10
KLX15A	623.00	640.00	2008/10/15 10:06:00	15710	2,010.0	14.00	1390.0	60.70	5.75	0.5540	351.00	138.00	25.100	5350.0	25.500	1.83	0.54100	–	26.00
KLX15A	623.00	640.00	2008/10/15 10:06:00	15711	1,930.0	16.40	1370.0	61.30	5.87	0.5680	342.00	138.00	26.100	5400.0	26.800	1.60	0.53300	0.2660	25.00
KLX10	351.00	368.00	2008/10/20 14:05:00	15712	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
KLX10	351.00	368.00	2008/10/20 14:05:00	15713	993.0	8.90	268.0	41.20	6.96	0.1060	101.00	42.20	4.470	1990.0	6.270	1.82	0.20600	–	157.00
KLX10	351.00	368.00	2008/10/20 14:05:00	15714	972.0	7.86	270.0	41.90	6.73	0.1050	132.00	50.90	4.600	1990.0	6.740	1.73	0.22300	–	107.00
KLX10	351.00	368.00	2008/10/20 14:05:00	15715	939.0	7.63	269.0	41.50	6.63	0.1020	146.00	57.50	4.600	2010.0	6.640	2.06	0.22900	–	96.90
KLX10	351.00	368.00	2008/10/20 14:05:00	15716	980.0	7.21	291.0	45.30	5.94	0.1080	172.00	66.20	4.950	2130.0	7.240	2.25	0.25700	–	70.70
KLX10	351.00	368.00	2008/10/20 14:05:00	15717	1,030.0	7.53	293.0	44.20	6.06	0.1170	175.00	69.70	4.930	2140.0	7.210	2.24	0.25800	0.1020	69.00
KLX18A	472.00	489.00	2008/10/22 09:00:00	15718	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

– = not analysed.

Table A3-1 (page 5 of 15). Compilation of results from basic water analyses.

Idcode	Secup m	Seclow m	Date and time of sampling	SKB sample no.	Na mg/l	K mg/l	Ca mg/l	Mg mg/l	Si mg/l	Li mg/l	SO_4^2 mg/l	SO_4S mg/l	Sr mg/l	Cl mg/l	Br mg/l	F mg/l	Mn mg/l	I mg/l	HCO_3 mg/l
KLX18A	472.00	489.00	2008/10/22 09:00:00	15719	822.0	3.94	219.0	14.20	7.19	0.1100	118.00	45.10	4.210	1,540.0	8.300	2.11	0.08420	–	75.50
KLX18A	472.00	489.00	2008/10/22 09:00:00	15720	864.0	3.91	238.0	15.10	6.71	0.1170	145.00	56.40	4.620	1,650.0	8.400	2.15	0.08890	–	41.30
KLX18A	472.00	489.00	2008/10/22 09:00:00	15721	869.0	3.77	244.0	15.30	6.56	0.1190	152.00	57.30	4.590	1,690.0	8.680	2.30	0.08910	–	39.40
KLX18A	472.00	489.00	2008/10/22 09:00:00	15722	855.0	3.55	244.0	15.00	6.38	0.1240	147.00	56.10	4.610	1,640.0	8.410	2.34	0.08410	–	42.70
KLX18A	472.00	489.00	2008/10/22 09:00:00	15723	843.0	3.66	239.0	14.70	6.28	0.1270	144.00	55.30	4.590	1,640.0	9.320	2.27	0.08380	0.1020	41.20
HLX37	150.00	199.80	2008/10/15 07:55:00	15724	131.0	2.58	10.1	2.39	6.23	0.0117	50.40	18.20	0.149	70.1	0.298	7.33	0.03820	0.0060	207.00
KLX12A	535.00	545.00	2008/10/21 09:52:00	15725	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
KLX12A	535.00	545.00	2008/10/21 09:52:00	15726	1,770.0	9.60	656.0	16.90	6.76	0.1760	295.00	152.00	13.000	3,800.0	19.200	2.09	0.15100	–	73.30
KLX12A	535.00	545.00	2008/10/21 09:52:00	15727	1,800.0	8.96	697.0	18.30	6.81	0.1840	323.00	130.00	13.200	3,970.0	18.900	2.02	0.18600	–	23.50
KLX12A	535.00	545.00	2008/10/21 09:52:00	15728	1,780.0	8.45	681.0	18.10	6.76	0.1870	323.00	127.00	13.000	3,970.0	18.900	1.96	0.19200	–	17.50
KLX12A	535.00	545.00	2008/10/21 09:52:00	15729	1,890.0	9.64	729.0	17.90	6.36	0.2100	344.00	139.00	13.900	4,130.0	19.800	2.07	0.18700	–	14.20
KLX12A	535.00	545.00	2008/10/21 09:52:00	15730	1,920.0	9.54	724.0	17.40	6.03	0.2080	348.00	137.00	13.800	4,150.0	21.500	2.12	0.18100	0.1900	13.90
KLX10	689.00	710.00	2008/10/21 12:27:00	15731	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
KLX10	689.00	710.00	2008/10/21 12:27:00	15732	1,270.0	12.30	689.0	39.00	8.88	0.2150	165.00	65.00	13.100	3,280.0	13.200	1.96	0.21600	–	42.60
KLX10	689.00	710.00	2008/10/21 12:27:00	15733	1,270.0	11.40	679.0	36.20	9.10	0.2210	177.00	72.50	13.000	3,300.0	13.200	1.60	0.22600	–	28.50
KLX10	689.00	710.00	2008/10/21 12:27:00	15734	1,270.0	11.40	689.0	35.50	8.93	0.2240	185.00	71.90	13.000	3,250.0	13.900	1.70	0.22900	–	27.80
KLX10	689.00	710.00	2008/10/21 12:27:00	15735	1,340.0	11.30	724.0	31.50	8.92	0.2480	202.00	83.10	13.900	3,330.0	14.200	1.77	0.22500	–	24.40
KLX10	689.00	710.00	2008/10/21 12:27:00	15736	1,360.0	11.50	737.0	30.80	9.00	0.2520	208.00	81.60	13.800	3,340.0	15.500	1.80	0.22300	0.1560	25.40
KLX08	594.00	625.00	2008/10/27 13:34:00	15752	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
KLX08	594.00	625.00	2008/10/27 13:34:00	15753	919.0	4.19	327.0	7.71	8.32	0.1820	97.90	40.60	6.380	1,900.0	9.500	2.00	0.09710	–	55.40
KLX08	594.00	625.00	2008/10/27 13:34:00	15754	913.0	3.90	341.0	7.76	7.82	0.1860	121.00	48.80	6.410	1,900.0	9.450	2.30	0.09480	–	25.50
KLX08	594.00	625.00	2008/10/27 13:34:00	15755	923.0	3.87	343.0	7.76	7.66	0.1840	129.00	49.90	6.500	1,940.0	10.700	2.61	0.09260	–	22.60
KLX08	594.00	625.00	2008/10/27 13:34:00	15756	970.0	3.86	359.0	8.16	7.46	0.1890	135.00	52.50	7.030	2,010.0	11.000	2.54	0.08930	–	19.70
KLX08	594.00	625.00	2008/10/27 13:34:00	15757	946.0	3.95	360.0	8.02	7.25	0.1930	135.00	52.20	6.810	2,000.0	10.800	2.50	0.08610	0.0789	20.00
HLX39	187.00	199.30	2008/10/29 15:08:00	15758	125.0	2.03	23.5	3.57	7.79	0.0143	4.66	1.92	0.236	74.3	0.280	4.95	0.06510	0.0065	275.00
HLX35	120.00	135.00	2008/10/28 08:35:00	15759	212.0	4.13	18.3	5.90	6.49	0.0176	59.70	21.50	0.284	197.0	0.718	4.08	0.07950	0.0094	252.00

– = not analysed.

Table A3-1 (page 6 of 15). Compilation of results from basic water analyses.

Idcode	Secup m	Seclow m	Date and time of sampling	SKB sample no.	Fe mg/l	Fe(tot) mg/l	Fe(II) mg/l	HS mg/l	TOC mg/l	DOC mg/l	NO_2<N mg/l	NO_3<N mg/l	NO_2<+NO_3<N mg/l	NH_4<N mg/l	PO_4<P mg/l	PO_4<P hlysis mg/l	P mg/l
KLX15A	623.00	640.00	2008/02/26 08:29:00	15351	0.3730	0.406	0.398	5.590	7.5	8.1	–	–	–	–	–	–	–
KLX15A	623.00	640.00	2008/02/26 08:29:00	15352	0.4560	0.472	0.471	4.180	6.1	6.5	–	–	–	–	–	–	–
KLX15A	623.00	640.00	2008/02/26 08:29:00	15353	0.4870	0.517	0.508	0.931	4.9	5.1	–	–	–	–	–	–	–
KLX15A	623.00	640.00	2008/02/26 08:29:00	15354	0.2700	0.289	0.288	0.140	1.4	1.6	–	–	–	–	–	–	–
KLX15A	623.00	640.00	2008/02/26 08:29:00	15355	0.2860	0.316	0.312	0.133	1.5	1.6	<0.0002	0.0007	0.0008	0.0953	0.0005	0.0006	<0.04
KLX15A	623.00	640.00	2008/02/26 08:29:00	15356	–	–	–	22.300	–	–	–	–	–	–	–	–	–
KLX19A	509.00	517.00	2008/02/26 11:58:00	15357	–	–	–	1.070	–	–	–	–	–	–	–	–	–
KLX19A	509.00	517.00	2008/02/26 11:58:00	15358	0.0811	0.084	0.080	0.207	2.0	1.6	–	–	–	–	–	–	–
KLX19A	509.00	517.00	2008/02/26 11:58:00	15359	0.0797	0.082	0.078	0.209	1.8	1.6	–	–	–	–	–	–	–
KLX19A	509.00	517.00	2008/02/26 11:58:00	15360	0.0756	0.083	0.075	0.170	1.8	1.6	–	–	–	–	–	–	–
KLX19A	509.00	517.00	2008/02/26 11:58:00	15361	0.0588	0.065	0.059	0.034	1.3	1.5	–	–	–	–	–	–	–
KLX19A	509.00	517.00	2008/02/26 11:58:00	15362	0.0508	0.051	0.044	0.018	1.4	1.4	<0.0002	<0.0003	<0.0003	0.0288	0.0016	0.0015	0.00533
KLX18A	472.00	489.00	2008/02/27 10:00:00	15363	–	–	–	4.690	–	–	–	–	–	–	–	–	–
KLX18A	472.00	489.00	2008/02/27 10:00:00	15364	0.0260	0.029	0.025	8.850	4.4	4.2	–	–	–	–	–	–	–
KLX18A	472.00	489.00	2008/02/27 10:00:00	15365	0.0308	0.039	0.028	1.450	3.3	3.3	–	–	–	–	–	–	–
KLX18A	472.00	489.00	2008/02/27 10:00:00	15366	0.0315	0.040	0.036	1.290	3.4	3.3	–	–	–	–	–	–	–
KLX18A	472.00	489.00	2008/02/27 10:00:00	15367	0.0309	0.041	0.029	1.230	3.2	3.2	–	–	–	–	–	–	–
KLX18A	472.00	489.00	2008/02/27 10:00:00	15368	0.0315	–	–	1.160	3.3	3.1	<0.0002	0.0011	0.0011	0.0433	0.0009	–	<0.005
KLX15A	260.00	272.00	2008/02/27 14:27:00	15369	–	–	–	1.320	–	–	–	–	–	–	–	–	–
KLX15A	260.00	272.00	2008/02/27 14:27:00	15370	0.6570	0.683	0.685	0.055	2.7	2.1	–	–	–	–	–	–	–
KLX15A	260.00	272.00	2008/02/27 14:27:00	15371	0.5900	0.616	0.602	0.051	2.8	2.6	–	–	–	–	–	–	–
KLX15A	260.00	272.00	2008/02/27 14:27:00	15372	0.5730	0.588	0.577	0.047	2.6	2.6	–	–	–	–	–	–	–
KLX15A	260.00	272.00	2008/02/27 14:27:00	15373	0.3560	0.377	0.347	0.016	1.8	1.7	–	–	–	–	–	–	–
KLX15A	260.00	272.00	2008/02/27 14:27:00	15374	0.3510	0.361	0.370	0.012	1.8	1.7	<0.0002	<0.0003	<0.0003	0.2410	0.0005	0.0012	<0.005
KLX04	507.00	530.00	2008/03/06 14:48:00	15375	–	–	–	5.430	–	–	–	–	–	–	–	–	–
KLX04	507.00	530.00	2008/03/06 14:48:00	15376	0.1310	0.141	0.136	2.260	2.9	2.8	–	–	–	–	–	–	–
KLX04	507.00	530.00	2008/03/06 14:48:00	15377	0.1680	0.182	0.180	1.180	2.9	2.3	–	–	–	–	–	–	–

– = not analysed.

Table A3-1 (page 7 of 15). Compilation of results from basic water analyses.

Idcode	Secup m	Seclow m	Date and time of sampling	SKB sample no.	Fe mg/l	Fe(tot) mg/l	Fe(II) mg/l	HS mg/l	TOC mg/l	DOC mg/l	NO_2<N mg/l	NO_3<N mg/l	NO_2<+NO_3<N mg/l	NH_4<N mg/l	PO_4<P mg/l	PO_4<P hlysis mg/l	P mg/l
KLX04	507.00	530.00	2008/03/06 14:48:00	15378	0.1800	0.188	0.181	0.731	2.7	2.6	–	–	–	–	–	–	–
KLX04	507.00	530.00	2008/03/06 14:48:00	15379	0.1290	0.131	0.104	0.045	2.1	2.2	–	–	–	–	–	–	–
KLX04	507.00	530.00	2008/03/06 14:48:00	15380	0.1140	0.118	0.110	0.038	2.1	2.1	<0.0002	0.0023	0.0024	0.0550	0.0016	0.0027	0.00156
KLX08	626.00	683.00	2008/03/11 10:00:00	15392	–	–	–	22.600	–	–	–	–	–	–	–	–	–
KLX08	626.00	683.00	2008/03/11 10:00:00	15393	0.0248	0.037	0.033	12.300	3.1	2.8	–	–	–	–	–	–	–
KLX08	626.00	683.00	2008/03/11 10:00:00	15394	0.0562	0.065	0.068	1.320	1.8	1.6	–	–	–	–	–	–	–
KLX08	626.00	683.00	2008/03/11 10:00:00	15395	0.0620	0.075	0.072	0.924	1.8	1.7	–	–	–	–	–	–	–
KLX08	626.00	683.00	2008/03/11 10:00:00	15396	0.0727	0.074	0.075	0.159	1.6	1.7	–	–	–	–	–	–	–
KLX08	626.00	683.00	2008/03/11 10:00:00	15397	0.0754	0.095	0.087	0.074	1.7	1.6	0.0002	0.0014	0.0015	0.0256	0.0017	0.0049	0.00773
KLX08	594.00	625.00	2008/03/11 09:53:00	15398	–	–	–	7.870	–	–	–	–	–	–	–	–	–
KLX08	594.00	625.00	2008/03/11 09:53:00	15399	0.0408	0.044	0.037	2.860	3.9	3.7	–	–	–	–	–	–	–
KLX08	594.00	625.00	2008/03/11 09:53:00	15400	0.0539	0.059	0.047	0.922	2.5	2.4	–	–	–	–	–	–	–
KLX08	594.00	625.00	2008/03/11 09:53:00	15401	0.0543	0.060	0.050	0.702	2.2	2.1	–	–	–	–	–	–	–
KLX08	594.00	625.00	2008/03/11 09:53:00	15402	0.0730	0.077	0.074	0.070	1.9	2.4	–	–	–	–	–	–	–
KLX08	594.00	625.00	2008/03/11 09:53:00	15403	0.0789	0.085	0.081	0.043	1.9	2.0	<0.0002	<0,0003	0.0003	0.0179	0.0011	0.0026	<0.005
KLX10	689.00	710.00	2008/03/12 11:33:00	15404	–	–	–	14.900	–	–	–	–	–	–	–	–	–
KLX10	689.00	710.00	2008/03/12 11:33:00	15405	0.0203	0.048	0.033	7.780	3.1	3.2	–	–	–	–	–	–	–
KLX10	689.00	710.00	2008/03/12 11:33:00	15406	0.0391	0.051	0.041	1.600	2.6	2.4	–	–	–	–	–	–	–
KLX10	689.00	710.00	2008/03/12 11:33:00	15407	0.0385	0.042	0.036	1.530	2.5	2.2	–	–	–	–	–	–	–
KLX10	689.00	710.00	2008/03/12 11:33:00	15408	0.0567	0.067	0.060	0.898	2.0	2.1	–	–	–	–	–	–	–
KLX10	689.00	710.00	2008/03/12 11:33:00	15409	0.0622	0.062	0.051	1.220	2.0	2.1	<0.0002	0.0007	0.0007	0.0602	0.0022	0.0038	0.01140
KLX07A	753.00	780.00	2008/03/13 07:34:00	15410	–	–	–	2.020	–	–	–	–	–	–	–	–	–
KLX07A	753.00	780.00	2008/03/13 07:34:00	15411	0.2680	0.284	0.278	0.786	3.4	3.0	–	–	–	–	–	–	–
KLX07A	753.00	780.00	2008/03/13 07:34:00	15412	0.3110	0.313	0.323	0.236	2.4	2.5	–	–	–	–	–	–	–
KLX07A	753.00	780.00	2008/03/13 07:34:00	15413	0.3270	0.339	0.342	0.134	2.3	2.2	–	–	–	–	–	–	–
KLX07A	753.00	780.00	2008/03/13 07:34:00	15414	0.3750	0.392	0.395	0.040	2.0	1.6	–	–	–	–	–	–	–
KLX07A	753.00	780.00	2008/03/13 07:34:00	15415	0.3590	0.387	0.390	0.032	2.0	2.0	0.0002	0.0009	0.0010	0.0951	<0.0005	0.0027	<0.005

– = not analysed.

Table A3-1 (page 8 of 15). Compilation of results from basic water analyses.

Idcode	Secup m	Seclow m	Date and time of sampling	SKB sample no.	Fe mg/l	Fe(tot) mg/l	Fe(II) mg/l	HS mg/l	TOC mg/l	DOC mg/l	NO_2<N mg/l	NO_3<N mg/l	NO_2<+NO_3<N mg/l	NH_4<N mg/l	PO_4<P mg/l	PO_4<P hlysis mg/l	P mg/l
KLX04	870.00	897.00	2008/03/17 19:13:00	15416	–	–	–	3.460	–	–	–	–	–	–	–	–	–
KLX04	870.00	897.00	2008/03/17 19:13:00	15417	0.0371	0.039	0.034	4.840	3.3	3.8	–	–	–	–	–	–	–
KLX04	870.00	897.00	2008/03/17 19:13:00	15418	0.0300	0.039	0.034	1.910	2.1	2.1	–	–	–	–	–	–	–
KLX04	870.00	897.00	2008/03/17 19:13:00	15419	0.0314	0.041	0.040	1.470	2.1	2.2	–	–	–	–	–	–	–
KLX04	870.00	897.00	2008/03/17 19:13:00	15420	0.0363	0.040	0.035	0.660	2.2	1.7	–	–	–	–	–	–	–
KLX04	870.00	897.00	2008/03/17 19:13:00	15421	0.0430	0.043	0.037	0.742	1.8	2.2	<0.0002	0.0022	0.0023	0.0258	0.0008	0.0015	<0.005
KLX12A	535.00	545.00	2008/03/17 10:00:00	15439	–	–	–	19.900	–	–	–	–	–	–	–	–	–
KLX12A	535.00	545.00	2008/03/17 10:00:00	15440	<0.02	0.015	0.009	11.700	3.0	3.5	–	–	–	–	–	–	–
KLX12A	535.00	545.00	2008/03/17 10:00:00	15441	<0.02	0.023	0.012	2.510	2.8	2.8	–	–	–	–	–	–	–
KLX12A	535.00	545.00	2008/03/17 10:00:00	15442	<0.02	0.017	0.018	2.270	3.5	3.2	–	–	–	–	–	–	–
KLX12A	535.00	545.00	2008/03/17 10:00:00	15444	0.0249	0.036	0.026	1.620	2.3	2.0	<0.0002	0.0004	0.0005	0.0146	0.0005	0.0010	<0.005
KLX05	241.00	255.00	2008/03/17 10:20:00	15445	–	–	–	18.900	–	–	–	–	–	–	–	–	–
KLX05	241.00	255.00	2008/03/17 10:20:00	15446	0.1860	0.189	0.185	1.800	8.3	7.6	–	–	–	–	–	–	–
KLX05	241.00	255.00	2008/03/17 10:20:00	15447	0.2870	0.286	0.275	0.627	7.1	7.0	–	–	–	–	–	–	–
KLX05	241.00	255.00	2008/03/17 10:20:00	15448	0.3500	0.346	0.336	0.264	7.3	7.0	–	–	–	–	–	–	–
KLX05	241.00	255.00	2008/03/17 10:20:00	15449	0.4130	0.411	0.414	0.038	6.8	6.5	–	–	–	–	–	–	–
KLX05	241.00	255.00	2008/03/17 10:20:00	15450	0.3680	0.389	0.392	0.018	6.4	6.0	0.0004	<0.0003	0.0004	0.0353	0.0026	0.0035	0.00491
KLX10	351.00	368.00	2008/03/19 11:56:00	15451	–	–	–	12.200	–	–	–	–	–	–	–	–	–
KLX10	351.00	368.00	2008/03/19 11:56:00	15452	0.0374	0.048	0.043	7.310	4.9	4.5	–	–	–	–	–	–	–
KLX10	351.00	368.00	2008/03/19 11:56:00	15453	0.0644	0.076	0.071	4.630	4.1	4.0	–	–	–	–	–	–	–
KLX10	351.00	368.00	2008/03/19 11:56:00	15454	0.0820	0.098	0.096	2.420	3.6	3.5	–	–	–	–	–	–	–
KLX10	351.00	368.00	2008/03/19 11:56:00	15455	0.2000	0.201	0.194	0.545	2.8	2.7	–	–	–	–	–	–	–
KLX10	351.00	368.00	2008/03/19 11:56:00	15456	0.1930	0.199	0.200	0.399	2.8	2.5	<0.0002	0.0003	0.0004	0.0697	0.0039	0.0063	0.00517
KLX20A	260.00	293.00	2008/03/19 07:15:00	15472	–	–	–	2.400	–	–	–	–	–	–	–	–	–
KLX20A	260.00	293.00	2008/03/19 07:15:00	15473	0.1240	0.128	0.126	0.527	4.5	4.6	–	–	–	–	–	–	–
KLX20A	260.00	293.00	2008/03/19 07:15:00	15474	0.0970	0.109	0.095	0.452	3.9	4.0	–	–	–	–	–	–	–
KLX20A	260.00	293.00	2008/03/19 07:15:00	15475	0.0873	0.100	0.100	0.413	3.8	3.7	–	–	–	–	–	–	–

– = not analysed.

Table A3-1 (page 9 of 15). Compilation of results from basic water analyses.

Idcode	Secup m	Seclow m	Date and time of sampling	SKB sample no.	Fe mg/l	Fe(tot) mg/l	Fe(II) mg/l	HS mg/l	TOC mg/l	DOC mg/l	NO_2<N mg/l	NO_3<N mg/l	NO_2<+NO_3<N mg/l	NH_4<N mg/l	PO_4<P mg/l	PO_4<P hlysis mg/l	P mg/l
KLX20A	260.00	293.00	2008/03/19 07:15:00	15476	0.0391	0.035	0.030	0.039	3.6	3.5	–	–	–	–	–	–	–
KLX20A	260.00	293.00	2008/03/19 07:15:00	15477	0.0403	0.036	0.032	0.030	3.6	3.5	0.0002	<0.0003	0.0003	0.0086	0.0018	0.0021	0.00238
KLX19A	509.00	517.00	2008/10/14 13:28:00	15694	–	–	–	19.000	–	–	–	–	–	–	–	–	–
KLX19A	509.00	517.00	2008/10/14 13:28:00	15695	0.0706	0.043	0.070	1.090	3.0	2.5	–	–	–	–	–	–	–
KLX19A	509.00	517.00	2008/10/14 13:28:00	15696	0.0744	0.089	0.078	0.634	2.6	2.0	–	–	–	–	–	–	–
KLX19A	509.00	517.00	2008/10/14 13:28:00	15697	0.0755	0.090	0.085	0.505	1.9	1.8	–	–	–	–	–	–	–
KLX19A	509.00	517.00	2008/10/14 13:28:00	15698	0.0546	0.055	0.045	0.024	1.4	1.5	–	–	–	–	–	–	–
KLX19A	509.00	517.00	2008/10/14 13:28:00	15699	0.0487	0.112	0.112	0.025	1.2	1.4	<0.0002	<0.0003	<0.0003	0.0171	0.0021	0.0042	<0.005
KLX15A	260.00	272.00	2008/10/15 09:34:00	15700	–	–	–	3.990	–	–	–	–	–	–	–	–	–
KLX15A	260.00	272.00	2008/10/15 09:34:00	15701	1.0500	1.080	0.532	0.111	3.8	3.1	–	–	–	–	–	–	–
KLX15A	260.00	272.00	2008/10/15 09:34:00	15702	0.8390	0.831	0.448	0.056	3.6	3.2	–	–	–	–	–	–	–
KLX15A	260.00	272.00	2008/10/15 09:34:00	15703	0.6800	0.682	0.544	0.039	3.2	3.4	–	–	–	–	–	–	–
KLX15A	260.00	272.00	2008/10/15 09:34:00	15704	0.2450	0.274	0.246	0.054	2.2	2.5	–	–	–	–	–	–	–
KLX15A	260.00	272.00	2008/10/15 09:34:00	15705	0.2170	0.261	0.170	–0.006	1.9	2.0	<0.0002	<0.0003	<0.0003	0.2450	0.0007	0.0017	<0.005
KLX15A	623.00	640.00	2008/10/15 10:06:00	15706	–	–	–	27.100	–	–	–	–	–	–	–	–	–
KLX15A	623.00	640.00	2008/10/15 10:06:00	15707	0.3830	0.379	0.377	1.060	2.0	1.9	–	–	–	–	–	–	–
KLX15A	623.00	640.00	2008/10/15 10:06:00	15708	0.3410	0.346	0.338	0.331	1.6	1.4	–	–	–	–	–	–	–
KLX15A	623.00	640.00	2008/10/15 10:06:00	15709	0.3300	0.319	0.349	0.207	1.5	1.6	–	–	–	–	–	–	–
KLX15A	623.00	640.00	2008/10/15 10:06:00	15710	0.2050	0.218	0.216	0.152	1.0	1.1	–	–	–	–	–	–	–
KLX15A	623.00	640.00	2008/10/15 10:06:00	15711	0.2420	0.262	0.258	0.093	1.2	1.0	0.0003	<0.0003	0.0003	0.1240	0.0011	0.0024	<0.04
KLX10	351.00	368.00	2008/10/20 14:05:00	15712	–	–	–	32.200	–	–	–	–	–	–	–	–	–
KLX10	351.00	368.00	2008/10/20 14:05:00	15713	0.0525	0.073	0.062	12.500	6.7	6.4	–	–	–	–	–	–	–
KLX10	351.00	368.00	2008/10/20 14:05:00	15714	0.0690	0.095	0.086	7.770	4.3	4.1	–	–	–	–	–	–	–
KLX10	351.00	368.00	2008/10/20 14:05:00	15715	0.0970	0.118	0.107	5.220	3.5	3.7	–	–	–	–	–	–	–
KLX10	351.00	368.00	2008/10/20 14:05:00	15716	0.2020	0.213	0.213	0.351	2.5	2.6	–	–	–	–	–	–	–
KLX10	351.00	368.00	2008/10/20 14:05:00	15717	0.1990	0.205	0.204	0.188	3.1	2.6	<0.0002	<0.0003	<0.0003	0.0804	0.0027	0.0052	<0.005
KLX18A	472.00	489.00	2008/10/22 09:00:00	15718	–	–	–	10.300	–	–	–	–	–	–	–	–	–

– = not analysed.

Table A3-1 (page 10 of 15). Compilation of results from basic water analyses.

Idcode	Secup m	Seclow m	Date and time of sampling	SKB sample no.	Fe mg/l	Fe(tot) mg/l	Fe(II) mg/l	HS mg/l	TOC mg/l	DOC mg/l	NO_2<N mg/l	NO_3<N mg/l	NO_2<+NO_3<N mg/l	NH_4<N mg/l	PO_4<P mg/l	PO_4<P hlysis mg/l	P mg/l
KLX18A	472.00	489.00	2008/10/22 09:00:00	15719	0.0294	0.040	0.051	6.780	8.3	8.0	–	–	–	–	–	–	–
KLX18A	472.00	489.00	2008/10/22 09:00:00	15720	0.0432	0.045	0.060	1.640	3.9	4.0	–	–	–	–	–	–	–
KLX18A	472.00	489.00	2008/10/22 09:00:00	15721	0.0468	0.051	0.048	1.190	3.7	3.9	–	–	–	–	–	–	–
KLX18A	472.00	489.00	2008/10/22 09:00:00	15722	0.0402	0.049	0.049	1.420	3.3	2.9	–	–	–	–	–	–	–
KLX18A	472.00	489.00	2008/10/22 09:00:00	15723	0.0428	0.043	0.055	0.167	3.4	3.1	0.0002	<0.0003	0.0004	0.0458	0.0023	0.0033	<0.005
HLX37	150.00	199.80	2008/10/15 07:55:00	15724	0.0205	0.021	0.011	0.056	2.1	2.3	0.0002	<0.0003	<0.0003	0.0566	0.0111	0.0109	0.00832
KLX12A	535.00	545.00	2008/10/21 09:52:00	15725	–	–	–	21.100	–	–	–	–	–	–	–	–	–
KLX12A	535.00	545.00	2008/10/21 09:52:00	15726	–0.0200	0.017	0.007	11.200	4.5	3.6	–	–	–	–	–	–	–
KLX12A	535.00	545.00	2008/10/21 09:52:00	15727	–0.0200	0.017	0.009	0.403	2.6	2.4	–	–	–	–	–	–	–
KLX12A	535.00	545.00	2008/10/21 09:52:00	15728	–0.0200	0.023	0.016	1.610	2.4	2.6	–	–	–	–	–	–	–
KLX12A	535.00	545.00	2008/10/21 09:52:00	15729	0.0206	0.035	0.022	1.240	2.3	2.3	–	–	–	–	–	–	–
KLX12A	535.00	545.00	2008/10/21 09:52:00	15730	0.0233	0.040	0.078	1.150	2.2	2.1	<0.0002	<0.0003	<0.0003	0.0175	0.0014	0.0017	<0.005
KLX10	689.00	710.00	2008/10/21 12:27:00	15731	–	–	–	23.400	–	–	–	–	–	–	–	–	–
KLX10	689.00	710.00	2008/10/21 12:27:00	15732	0.0246	0.028	0.027	0.369	2.9	2.7	–	–	–	–	–	–	–
KLX10	689.00	710.00	2008/10/21 12:27:00	15733	0.0349	0.044	0.065	0.982	2.2	2.0	–	–	–	–	–	–	–
KLX10	689.00	710.00	2008/10/21 12:27:00	15734	0.0352	0.087	0.050	0.948	2.5	2.2	–	–	–	–	–	–	–
KLX10	689.00	710.00	2008/10/21 12:27:00	15735	0.0508	0.109	0.102	0.789	2.1	2.1	–	–	–	–	–	–	–
KLX10	689.00	710.00	2008/10/21 12:27:00	15736	0.0510	0.058	0.040	1.030	2.0	1.8	<0.0002	<0.0003	<0.0003	0.0657	0.0042	0.0074	0.01100
KLX08	594.00	625.00	2008/10/27 13:34:00	15752	–	–	–	25.500	–	–	–	–	–	–	–	–	–
KLX08	594.00	625.00	2008/10/27 13:34:00	15753	0.0602	0.079	0.070	2.630	9.2	8.1	–	–	–	–	–	–	–
KLX08	594.00	625.00	2008/10/27 13:34:00	15754	0.0732	0.085	0.081	0.709	3.3	3.3	–	–	–	–	–	–	–
KLX08	594.00	625.00	2008/10/27 13:34:00	15755	0.0755	0.085	0.081	0.413	2.7	2.7	–	–	–	–	–	–	–
KLX08	594.00	625.00	2008/10/27 13:34:00	15756	0.0719	0.060	0.056	0.129	2.1	2.2	–	–	–	–	–	–	–
KLX08	594.00	625.00	2008/10/27 13:34:00	15757	0.0741	0.085	0.079	0.049	2.3	2.1	<0.0002	<0.0003	<0.0003	0.0236	0.0010	–	<0.005
HLX39	187.00	199.30	2008/10/29 15:08:00	15758	0.0417	0.048	0.040	0.012	7.6	7.6	<0.0002	<0.0003	<0.0003	0.0727	0.0140	–	0.01820
HLX35	120.00	135.00	2008/10/28 08:35:00	15759	0.0609	0.052	0.053	0.021	5.9	5.9	<0.0002	<0.0003	<0.0003	0.1950	0.0167	–	0.01990

– = not analysed.

Table A3-1 (page 11 of 15). Compilation of results from basic water analyses.

Idcode	Secup m	Seclow m	Date and time of sampling	SKB sample no.	Ph	El. cond mS/m	Drill water %	Charge balance %	Density g/ml
KLX15A	623.00	640.00	2008/02/26 08:29:00	15351	7.79	1530.0	7.12	–1.57	1.0038
KLX15A	623.00	640.00	2008/02/26 08:29:00	15352	7.78	1570.0	6.47	0.99	1.0040
KLX15A	623.00	640.00	2008/02/26 08:29:00	15353	7.63	1580.0	6.39	–1.06	1.0040
KLX15A	623.00	640.00	2008/02/26 08:29:00	15354	7.57	1700.0	4.29	–1.33	1.0043
KLX15A	623.00	640.00	2008/02/26 08:29:00	15355	7.55	1640.0	4.14	–1.51	1.0044
KLX15A	623.00	640.00	2008/02/26 08:29:00	15356	–	–	–	–	–
KLX19A	509.00	517.00	2008/02/26 11:58:00	15357	–	–	–	–	–
KLX19A	509.00	517.00	2008/02/26 11:58:00	15358	8.20	591.0	7.82	–0.32	0.9994
KLX19A	509.00	517.00	2008/02/26 11:58:00	15359	8.23	589.0	8.12	–1.13	0.9994
KLX19A	509.00	517.00	2008/02/26 11:58:00	15360	8.24	586.0	8.34	–1.03	0.9993
KLX19A	509.00	517.00	2008/02/26 11:58:00	15361	8.21	599.0	7.83	–1.06	0.9994
KLX19A	509.00	517.00	2008/02/26 11:58:00	15362	8.20	604.0	7.10	–3.47	0.9992
KLX18A	472.00	489.00	2008/02/27 10:00:00	15363	–	–	–	–	–
KLX18A	472.00	489.00	2008/02/27 10:00:00	15364	7.93	505.0	12.90	–0.55	0.9991
KLX18A	472.00	489.00	2008/02/27 10:00:00	15365	7.75	534.0	13.60	0.03	0.9992
KLX18A	472.00	489.00	2008/02/27 10:00:00	15366	7.81	535.0	12.70	0.93	0.9992
KLX18A	472.00	489.00	2008/02/27 10:00:00	15367	7.88	532.0	6.58	0.91	0.9991
KLX18A	472.00	489.00	2008/02/27 10:00:00	15368	7.82	553.0	6.04	–1.85	0.9991
KLX15A	260.00	272.00	2008/02/27 14:27:00	15369	–	–	–	–	–
KLX15A	260.00	272.00	2008/02/27 14:27:00	15370	7.81	810.0	24.50	–3.12	1.0003
KLX15A	260.00	272.00	2008/02/27 14:27:00	15371	7.84	786.0	26.00	–1.21	1.0003
KLX15A	260.00	272.00	2008/02/27 14:27:00	15372	7.84	811.0	24.70	–1.74	1.0003
KLX15A	260.00	272.00	2008/02/27 14:27:00	15373	7.69	920.0	15.00	–2.74	1.0009
KLX15A	260.00	272.00	2008/02/27 14:27:00	15374	7.70	932.0	14.80	–3.08	1.0009
KLX04	507.00	530.00	2008/03/06 14:48:00	15375	–	–	–	–	–
KLX04	507.00	530.00	2008/03/06 14:48:00	15376	7.59	492.0	1.94	–0.60	0.9989
KLX04	507.00	530.00	2008/03/06 14:48:00	15377	7.69	484.0	1.69	0.24	0.9989

– = not analysed.

Table A3-1 (page 12 of 15). Compilation of results from basic water analyses.

Idcode	Secup m	Seclow m	Date and time of sampling	SKB sample no.	Ph	El. cond mS/m	Drill water %	Charge balance %	Density g/ml
KLX04	507.00	530.00	2008/03/06 14:48:00	15378	7.71	481.0	1.59	0.57	0.9989
KLX04	507.00	530.00	2008/03/06 14:48:00	15379	7.71	534.0	1.01	0.49	0.9991
KLX04	507.00	530.00	2008/03/06 14:48:00	15380	7.75	537.0	0.93	–1.42	0.9991
KLX08	626.00	683.00	2008/03/11 10:00:00	15392	–	–	–	–	–
KLX08	626.00	683.00	2008/03/11 10:00:00	15393	7.41	692.0	12.90	–1.65	0.9998
KLX08	626.00	683.00	2008/03/11 10:00:00	15394	7.89	714.0	11.00	–1.89	0.9999
KLX08	626.00	683.00	2008/03/11 10:00:00	15395	8.05	715.0	11.20	–1.52	0.9999
KLX08	626.00	683.00	2008/03/11 10:00:00	15396	8.14	704.0	13.70	–1.67	0.9998
KLX08	626.00	683.00	2008/03/11 10:00:00	15397	8.17	708.0	14.20	–4.02	0.9998
KLX08	594.00	625.00	2008/03/11 09:53:00	15398	–	–	–	–	–
KLX08	594.00	625.00	2008/03/11 09:53:00	15399	7.54	607.0	4.05	–0.46	0.9994
KLX08	594.00	625.00	2008/03/11 09:53:00	15400	7.94	614.0	4.32	0.92	0.9994
KLX08	594.00	625.00	2008/03/11 09:53:00	15401	8.02	619.0	4.29	0.43	0.9995
KLX08	594.00	625.00	2008/03/11 09:53:00	15402	8.05	622.0	3.75	0.50	0.9995
KLX08	594.00	625.00	2008/03/11 09:53:00	15403	8.09	630.0	2.82	–0.57	0.9994
KLX10	689.00	710.00	2008/03/12 11:33:00	15404	–	–	–	–	–
KLX10	689.00	710.00	2008/03/12 11:33:00	15405	7.48	944.0	19.40	–1.50	1.0009
KLX10	689.00	710.00	2008/03/12 11:33:00	15406	7.70	946.0	19.60	–3.02	1.0010
KLX10	689.00	710.00	2008/03/12 11:33:00	15407	7.72	952.0	19.30	–2.61	1.0009
KLX10	689.00	710.00	2008/03/12 11:33:00	15408	7.69	995.0	18.80	–2.95	1.0011
KLX10	689.00	710.00	2008/03/12 11:33:00	15409	7.74	989.0	19.50	–1.01	1.0012
KLX07A	753.00	780.00	2008/03/13 07:34:00	15410	–	–	–	–	–
KLX07A	753.00	780.00	2008/03/13 07:34:00	15411	7.49	664.0	5.69	2.76	1.0001
KLX07A	753.00	780.00	2008/03/13 07:34:00	15412	7.58	736.0	6.25	–2.60	1.0001
KLX07A	753.00	780.00	2008/03/13 07:34:00	15413	7.57	742.0	6.27	–3.05	1.0002
KLX07A	753.00	780.00	2008/03/13 07:34:00	15414	7.54	866.0	6.47	–2.91	1.0008
KLX07A	753.00	780.00	2008/03/13 07:34:00	15415	7.55	917.0	6.42	–3.68	1.0010

– = not analysed.

Table A3-1 (page 13 of 15). Compilation of results from basic water analyses.

Idcode	Secup m	Seclow m	Date and time of sampling	SKB sample no.	Ph	El. cond mS/m	Drill water %	Charge balance %	Density g/ml
KLX04	870.00	897.00	2008/03/17 19:13:00	15416	–	–	–	–	–
KLX04	870.00	897.00	2008/03/17 19:13:00	15417	7.36	1060.0	5.15	–2.34	1.0018
KLX04	870.00	897.00	2008/03/17 19:13:00	15418	7.32	1100.0	3.66	–1.36	1.0019
KLX04	870.00	897.00	2008/03/17 19:13:00	15419	7.19	1120.0	3.49	–2.45	1.0021
KLX04	870.00	897.00	2008/03/17 19:13:00	15420	7.33	1160.0	2.74	–1.75	1.0022
KLX04	870.00	897.00	2008/03/17 19:13:00	15421	7.24	1170.0	2.67	–1.70	1.0022
KLX12A	535.00	545.00	2008/03/17 10:00:00	15439	–	–	–	–	–
KLX12A	535.00	545.00	2008/03/17 10:00:00	15440	7.48	1170.0	4.01	–2.31	1.0021
KLX12A	535.00	545.00	2008/03/17 10:00:00	15441	7.44	1170.0	3.70	–1.68	1.0021
KLX12A	535.00	545.00	2008/03/17 10:00:00	15442	7.65	1160.0	3.81	–1.47	1.0020
KLX12A	535.00	545.00	2008/03/17 10:00:00	15444	7.60	1220.0	2.74	–0.25	1.0023
KLX05	241.00	255.00	2008/03/17 10:20:00	15445	–	–	–	–	–
KLX05	241.00	255.00	2008/03/17 10:20:00	15446	8.30	256.0	1.42	–1.38	0.9981
KLX05	241.00	255.00	2008/03/17 10:20:00	15447	8.40	253.0	1.14	–0.68	0.9980
KLX05	241.00	255.00	2008/03/17 10:20:00	15448	8.37	254.0	0.96	–0.35	0.9981
KLX05	241.00	255.00	2008/03/17 10:20:00	15449	8.19	260.0	0.32	–0.67	0.9981
KLX05	241.00	255.00	2008/03/17 10:20:00	15450	8.17	266.0	0.24	–1.16	0.9981
KLX10	351.00	368.00	2008/03/19 11:56:00	15451	–	–	–	–	–
KLX10	351.00	368.00	2008/03/19 11:56:00	15452	7.85	556.0	20.30	0.46	0.9993
KLX10	351.00	368.00	2008/03/19 11:56:00	15453	7.88	560.0	20.90	–0.23	0.9992
KLX10	351.00	368.00	2008/03/19 11:56:00	15454	7.88	576.0	21.70	0.55	0.9993
KLX10	351.00	368.00	2008/03/19 11:56:00	15455	7.89	674.0	20.90	–0.98	0.9998
KLX10	351.00	368.00	2008/03/19 11:56:00	15456	7.90	675.0	20.70	–1.79	0.9998
KLX20A	260.00	293.00	2008/03/19 07:15:00	15472	–	–	–	–	–
KLX20A	260.00	293.00	2008/03/19 07:15:00	15473	8.39	185.0	1.08	–0.98	0.9977
KLX20A	260.00	293.00	2008/03/19 07:15:00	15474	8.43	190.0	1.05	–0.20	0.9978
KLX20A	260.00	293.00	2008/03/19 07:15:00	15475	8.44	194.0	1.03	–0.03	0.9980

– = not analysed.

Table A3-1 (page 14 of 15). Compilation of results from basic water analyses.

Idcode	Secup m	Seclow m	Date and time of sampling	SKB sample no.	Ph	El. cond mS/m	Drill water %	Charge balance %	Density g/ml
KLX20A	260.00	293.00	2008/03/19 07:15:00	15476	8.59	229.0	0.71	–0.76	0.9979
KLX20A	260.00	293.00	2008/03/19 07:15:00	15477	8.58	270.0	0.69	1.89	0.9979
KLX19A	509.00	517.00	2008/10/14 13:28:00	15694	–	–	–	–	–
KLX19A	509.00	517.00	2008/10/14 13:28:00	15695	8.11	601.0	5.84	–2.69	0.9995
KLX19A	509.00	517.00	2008/10/14 13:28:00	15696	8.21	593.0	6.75	–2.62	0.9994
KLX19A	509.00	517.00	2008/10/14 13:28:00	15697	8.21	593.0	6.94	–3.21	0.9994
KLX19A	509.00	517.00	2008/10/14 13:28:00	15698	8.26	620.0	5.98	–0.90	0.9993
KLX19A	509.00	517.00	2008/10/14 13:28:00	15699	8.05	611.0	5.85	–2.53	0.9993
KLX15A	260.00	272.00	2008/10/15 09:34:00	15700	–	–	–	–	–
KLX15A	260.00	272.00	2008/10/15 09:34:00	15701	7.47	912.0	125.00	–2.56	1.0010
KLX15A	260.00	272.00	2008/10/15 09:34:00	15702	7.78	877.0	153.00	–2.37	1.0009
KLX15A	260.00	272.00	2008/10/15 09:34:00	15703	7.53	855.0	136.00	–3.36	1.0007
KLX15A	260.00	272.00	2008/10/15 09:34:00	15704	7.58	904.0	116.00	–2.58	1.0008
KLX15A	260.00	272.00	2008/10/15 09:34:00	15705	7.51	931.0	79.80	–2.08	1.0009
KLX15A	623.00	640.00	2008/10/15 10:06:00	15706	–	–	–	–	–
KLX15A	623.00	640.00	2008/10/15 10:06:00	15707	7.65	1,500.0	26.00	0.31	1.0039
KLX15A	623.00	640.00	2008/10/15 10:06:00	15708	7.54	1,520.0	22.60	0.73	1.0039
KLX15A	623.00	640.00	2008/10/15 10:06:00	15709	7.51	1,520.0	21.80	–2.72	1.0040
KLX15A	623.00	640.00	2008/10/15 10:06:00	15710	7.52	1,520.0	21.60	0.76	1.0041
KLX15A	623.00	640.00	2008/10/15 10:06:00	15711	7.64	1,560.0	19.50	–1.03	1.0045
KLX10	351.00	368.00	2008/10/20 14:05:00	15712	–	–	–	–	–
KLX10	351.00	368.00	2008/10/20 14:05:00	15713	8.14	642.0	19.70	–0.99	0.9997
KLX10	351.00	368.00	2008/10/20 14:05:00	15714	8.12	639.0	21.20	–1.42	1.0000
KLX10	351.00	368.00	2008/10/20 14:05:00	15715	8.11	648.0	20.40	–3.38	0.9997
KLX10	351.00	368.00	2008/10/20 14:05:00	15716	7.88	686.0	19.10	–3.46	1.0001
KLX10	351.00	368.00	2008/10/20 14:05:00	15717	7.89	698.0	17.90	–2.06	0.9998
KLX18A	472.00	489.00	2008/10/22 09:00:00	15718	–	–	–	–	–

– = not analysed.

Table A3-1 (page 15 of 15). Compilation of results from basic water analyses.

Idcode	Secup m	Seclow m	Date and time of sampling	SKB sample no.	Ph	El. cond mS/m	Drill water %	Charge balance %	Density g/ml
KLX18A	472.00	489.00	2008/10/22 09:00:00	15719	8.14	516.0	7.63	0.37	0.9990
KLX18A	472.00	489.00	2008/10/22 09:00:00	15720	7.75	540.0	9.00	–0.03	0.9992
KLX18A	472.00	489.00	2008/10/22 09:00:00	15721	7.76	547.0	8.95	–0.65	0.9991
KLX18A	472.00	489.00	2008/10/22 09:00:00	15722	7.91	541.0	4.66	0.12	0.9992
KLX18A	472.00	489.00	2008/10/22 09:00:00	15723	7.85	539.0	4.35	–0.60	0.9993
HLX37	150.00	199.80	2008/10/15 07:55:00	15724	8.57	68.6	0.04	–3.18	0.9977
KLX12A	535.00	545.00	2008/10/21 09:52:00	15725	–	–	–	–	–
KLX12A	535.00	545.00	2008/10/21 09:52:00	15726	7.18	1,180.0	2.80	–2.85	1.0022
KLX12A	535.00	545.00	2008/10/21 09:52:00	15727	7.32	1,200.0	2.55	–2.41	1.0021
KLX12A	535.00	545.00	2008/10/21 09:52:00	15728	7.75	1,170.0	2.67	–3.04	1.0028
KLX12A	535.00	545.00	2008/10/21 09:52:00	15729	7.85	1,230.0	2.11	–2.07	1.0024
KLX12A	535.00	545.00	2008/10/21 09:52:00	15730	7.82	1,240.0	1.98	–1.84	1.0024
KLX10	689.00	710.00	2008/10/21 12:27:00	15731	–	–	–	–	–
KLX10	689.00	710.00	2008/10/21 12:27:00	15732	7.41	1,000.0	16.90	–2.13	1.0012
KLX10	689.00	710.00	2008/10/21 12:27:00	15733	7.75	982.0	17.20	–2.93	1.0014
KLX10	689.00	710.00	2008/10/21 12:27:00	15734	7.82	984.0	17.20	–1.95	1.0012
KLX10	689.00	710.00	2008/10/21 12:27:00	15735	7.63	1,020.0	17.30	–1.08	1.0014
KLX10	689.00	710.00	2008/10/21 12:27:00	15736	7.76	1,020.0	16.90	–0.45	1.0014
KLX08	594.00	625.00	2008/10/27 13:34:00	15752	–	–	–	–	–
KLX08	594.00	625.00	2008/10/27 13:34:00	15753	7.68	611.0	2.98	–0.05	0.9995
KLX08	594.00	625.00	2008/10/27 13:34:00	15754	7.90	610.0	3.31	0.30	0.9995
KLX08	594.00	625.00	2008/10/27 13:34:00	15755	8.04	619.0	3.35	–0.26	0.9995
KLX08	594.00	625.00	2008/10/27 13:34:00	15756	8.10	634.0	2.74	0.41	0.9998
KLX08	594.00	625.00	2008/10/27 13:34:00	15757	8.04	625.0	2.33	–0.17	0.9995
HLX39	187.00	199.30	2008/10/29 15:08:00	15758	8.11	71.7	0.10	–0.15	0.9975
HLX35	120.00	135.00	2008/10/28 08:35:00	15759	8.17	116.0	0.07	–2.34	0.9975

– = not analysed.

Table A3-2 (page 1 of 2). Compilation of results from analyses of trace elements and rare earth elements.

Idcode	Secup m	Seclow m	Date and time of sampling	SKB sample no.	As ug/l	Ba ug/l	Cd ug/l	Hg ug/l	Se ug/l	V ug/l	Zr ug/l	U ug/l	Th ug/l	Sc ug/l	Rb ug/l	Y ug/l	Indium ug/l	Cs ug/l	La ug/l
KLX15A	623.00	640.00	2008/02/26 08:29:00	15355	<1	163.0000	<0.05	<0.002	–	0.1270	<0.3	0.1640	<0.2	<0.5	29.70	0.1240	<0.5	1.7400	0.1260
KLX19A	509.00	517.00	2008/02/26 11:58:00	15362	<0.5	103.0000	<0.02	<0.002	–	0.0598	<0.1	0.0613	<0.2	<0.4	16.50	0.0186	<0.2	0.5120	<0.02
KLX18A	472.00	489.00	2008/02/27 10:00:00	15368	<0.5	65.2000	<0.02	<0.002	–	0.1220	<0.1	0.1020	<0.2	<0.4	79.00	0.0277	<0.2	28.0000	0.0548
KLX15A	260.00	272.00	2008/02/27 14:27:00	15374	<0.5	937.0000	<0.02	<0.002	–	0.1120	<0.1	1.7400	<0.2	<0.4	35.50	0.0665	<0.2	0.7300	<0.02
KLX04	507.00	530.00	2008/03/06 14:48:00	15380	0.2400	203.0000	0.0064	<0.002	–	0.0737	0.0798	0.1490	<0.02	0.0747	10.80	0.0478	<0.05	0.7970	0.0296
KLX08	626.00	683.00	2008/03/11 10:00:00	15397	<0.5	98.5000	<0.02	<0.002	–	0.0636	<0.1	0.0151	<0.2	<0.4	13.70	0.0298	<0.2	0.3970	<0.02
KLX08	594.00	625.00	2008/03/11 09:53:00	15403	<0.5	57.0000	<0.02	<0.002	–	0.0462	<0.1	0.0056	<0.2	<0.4	8.53	0.0281	<0.2	0.7540	<0.02
KLX10	689.00	710.00	2008/03/12 11:33:00	15409	<0.5	126.0000	<0.02	<0.002	–	0.1430	<0.1	0.0114	<0.2	<0.4	26.20	0.0560	<0.2	1.0800	0.0381
KLX07A	753.00	780.00	2008/03/13 07:34:00	15415	<0.5	171.0000	<0.02	<0.002	–	0.1290	<0.1	0.1440	<0.2	<0.4	21.30	0.0723	<0.2	1.1700	0.0635
KLX04	870.00	897.00	2008/03/17 19:13:00	15421	<0.5	118.0000	<0.02	<0.002	–	0.0887	<0.1	0.0093	<0.2	<0.4	21.80	0.0642	<0.2	2.1400	0.0890
KLX12A	535.00	545.00	2008/03/17 10:00:00	15444	<0.5	58.5000	<0.02	<0.002	–	0.0881	<0.1	0.0083	<0.2	<0.4	24.40	0.0489	<0.2	1.0200	0.0651
KLX05	241.00	255.00	2008/03/17 10:20:00	15450	0.3600	20.8000	0.0037	<0.002	–	0.2040	0.4050	1.2200	<0.02	<0.05	7.80	0.0234	<0.05	0.1860	0.0120
KLX10	351.00	368.00	2008/03/19 11:56:00	15456	<0.5	109.0000	<0.02	<0.002	–	0.2130	0.1760	0.0961	<0.2	<0.4	14.50	0.0646	<0.2	0.8310	0.0320
KLX20A	260.00	293.00	2008/03/19 07:15:00	15477	0.1800	55.7000	<0.002	<0.002	–	0.1660	0.1020	0.3490	<0.02	<0.05	5.04	0.0664	<0.05	0.2980	0.0416
KLX19A	509.00	517.00	2008/10/14 13:28:00	15699	<0.5	103.0000	<0.02	<0.002	0.0328	0.3260	<0.1	0.0778	<0.2	<0.4	17.10	0.0315	<0.2	0.4420	<0.2
KLX15A	260.00	272.00	2008/10/15 09:34:00	15705	<0.5	880.0000	<0.02	<0.002	0.0293	0.4050	<0.1	2.1100	<0.2	<0.4	3500.00	0.9860	<0.2	1460.0	0.0728
KLX15A	623.00	640.00	2008/10/15 10:06:00	15711	<1	243.0000	<0.05	<0.002	0.0627	0.0885	<0.3	0.4040	<0.2	<0.5	719.00	0.3270	<0.5	310.0	0.1360
KLX10	351.00	368.00	2008/10/20 14:05:00	15717	<0.5	92.3000	<0.02	<0.002	0.0210	0.2350	<0.1	0.0196	<0.2	<0.4	11.80	0.0677	<0.2	0.8500	<0.02
KLX18A	472.00	489.00	2008/10/22 09:00:00	15723	<0.5	67.4000	<0.02	<0.002	0.0635	0.1010	<0.1	0.1580	<0.2	<0.4	70.90	0.0370	<0.2	23.6000	0.0581
HLX37	150.00	199.80	2008/10/15 07:55:00	15724	<0.05	20.5000	<0.002	<0.002	0.0373	0.2790	0.0712	0.1400	<0.02	<0.05	4.70	0.1640	<0.05	0.2120	0.0374
KLX12A	535.00	545.00	2008/10/21 09:52:00	15730	<0.5	54.5000	<0.02	<0.002	<0.03	0.1320	<0.1	0.0084	<0.2	<0.4	25.30	0.0915	<0.2	1.3600	0.0802
KLX10	689.00	710.00	2008/10/21 12:27:00	15736	1.2600	134.0000	<0.02	<0.002	0.0332	0.1020	<0.1	0.0157	<0.2	<0.4	26.30	0.1030	<0.2	1.1100	0.0407
KLX08	594.00	625.00	2008/10/27 13:34:00	15757	<0.5	60.9000	<0.02	<0.002	0.0306	0.2590	<0.1	0.0062	<0.2	<0.4	9.68	0.0497	<0.2	0.8760	<0.02
HLX39	187.00	199.30	2008/10/29 15:08:00	15758	0.1240	40.8000	<0.002	<0.002	0.0522	1.7600	0.5680	3.9100	<0.02	<0.05	3.84	0.2030	<0.05	0.2690	0.1790
HLX35	120.00	135.00	2008/10/28 08:35:00	15759	0.0974	63.6000	<0.002	<0.002	0.0207	0.8850	0.4230	0.5890	<0.02	<0.05	7.30	0.1110	<0.05	0.7360	0.0724

- = not analysed.

Table A3-2 (page 2 of 2). Compilation of results from analyses of trace elements and rare earth elements.

Idcode	Secup m	Seclow m	Date and time of sampling	SKB sample no.	Hf ug/l	Tl ug/l	Ce ug/l	Pr ug/l	Nd ug/l	Sm ug/l	Eu ug/l	Gd ug/l	Tb ug/l	Dy ug/l	Ho ug/l	Er ug/l	Tm ug/l	Yb ug/l	Lu ug/l
KLX15A	623.00	640.00	2008/02/26 08:29:00	15355	<0.05	<0.1	0.0846	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
KLX19A	509.00	517.00	2008/02/26 11:58:00	15362	<0.02	<0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
KLX18A	472.00	489.00	2008/02/27 10:00:00	15368	<0.02	<0.05	0.0465	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
KLX15A	260.00	272.00	2008/02/27 14:27:00	15374	<0.02	<0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
KLX04	507.00	530.00	2008/03/06 14:48:00	15380	0.0156	<0.01	0.0363	<0.005	0.0171	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.004	<0.005	<0.005
KLX08	626.00	683.00	2008/03/11 10:00:00	15397	<0.02	<0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
KLX08	594.00	625.00	2008/03/11 09:53:00	15403	<0.02	<0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
KLX10	689.00	710.00	2008/03/12 11:33:00	15409	<0.02	<0.05	0.0307	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
KLX07A	753.00	780.00	2008/03/13 07:34:00	15415	<0.02	<0.05	0.0504	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
KLX04	870.00	897.00	2008/03/17 19:13:00	15421	<0.02	<0.05	0.0358	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
KLX12A	535.00	545.00	2008/03/17 10:00:00	15444	<0.02	<0.05	0.0419	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
KLX05	241.00	255.00	2008/03/17 10:20:00	15450	0.0666	<0.01	0.0172	<0.005	0.0132	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.004	<0.005	<0.005
KLX10	351.00	368.00	2008/03/19 11:56:00	15456	<0.02	<0.05	0.0472	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
KLX20A	260.00	293.00	2008/03/19 07:15:00	15477	0.0142	<0.01	0.0629	0.0070	0.0320	<0.005	<0.005	0.0063	<0.005	<0.005	<0.005	<0.005	<0.004	<0.005	<0.005
KLX19A	509.00	517.00	2008/10/14 13:28:00	15699	<0.02	<0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
KLX15A	260.00	272.00	2008/10/15 09:34:00	15705	<0.02	<0.05	0.4440	0.1440	1.0700	0.3070	<0.03	0.3720	18.40	0.1850	0.0321	0.0883	<0.02	0.0341	<0.02
KLX15A	623.00	640.00	2008/10/15 10:06:00	15711	<0.05	<0.1	0.1510	<0.05	0.2030	<0.05	<0.05	0.0595	3.3500	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
KLX10	351.00	368.00	2008/10/20 14:05:00	15717	<0.02	<0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
KLX18A	472.00	489.00	2008/10/22 09:00:00	15723	<0.02	<0.05	0.0445	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
HLX37	150.00	199.80	2008/10/15 07:55:00	15724	<0.005	<0.01	0.0575	0.0075	0.0375	0.0090	<0.005	0.0115	<0.005	0.0141	<0.005	0.0117	<0.004	0.0107	<0.005
KLX12A	535.00	545.00	2008/10/21 09:52:00	15730	<0.02	<0.05	0.0513	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
KLX10	689.00	710.00	2008/10/21 12:27:00	15736	<0.02	<0.05	0.0337	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
KLX08	594.00	625.00	2008/10/27 13:34:00	15757	<0.02	<0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
HLX39	187.00	199.30	2008/10/29 15:08:00	15758	<0.005	<0.01	0.2680	0.0326	0.1630	0.0265	<0.005	0.0289	<0.005	0.0232	0.0056	0.0178	<0.004	0.0168	<0.005
HLX35	120.00	135.00	2008/10/28 08:35:00	15759	<0.005	<0.01	0.1150	0.0152	0.0739	0.0134	<0.005	0.0166	<0.005	0.0135	<0.005	0.0090	<0.004	0.0084	<0.005

- = not analysed.

Table A3-3 (page 1 of 7). Compilation of results from isotope analyses.

Idcode	Secup m	Seclow m	Date and time of sampling	SKB sample no.	$\delta^{2}H$ dev SMOW	^{3}H TU	$\delta^{18}O$ dev SMOW	PMC pmc	$\delta^{13}C$ dev PDB	$\delta^{34}S$ dev CDT	$^{10}B/^{11}B$ ratio	$\delta^{37}Cl$ dev SMOC	$^{87}Sr/^{86}Sr$ ratio
KLX15A	623.00	640.00	2008/02/26 08:29:00	15351	–90.2	<0.8	–11.20	–	–	–	–	–	–
KLX15A	623.00	640.00	2008/02/26 08:29:00	15352	–89.6	1.10	–11.10	–	–	–	–	–	–
KLX15A	623.00	640.00	2008/02/26 08:29:00	15353	–74.7	1.20	–11.10	–	–	–	–	–	–
KLX15A	623.00	640.00	2008/02/26 08:29:00	15354	–89.5	<0.8	–11.00	–	–	–	–	–	–
KLX15A	623.00	640.00	2008/02/26 08:29:00	15355	–80.5	1.40	–10.90	39.70	–18.10	19.0	0.2330	0.23	0.715584
KLX19A	509.00	517.00	2008/02/26 11:58:00	15358	–112.9	<0.8	–14.30	–	–	–	–	–	–
KLX19A	509.00	517.00	2008/02/26 11:58:00	15359	–112.3	<0.8	–14.20	–	–	–	–	–	–
KLX19A	509.00	517.00	2008/02/26 11:58:00	15360	–112.2	1.00	–14.30	–	–	–	–	–	–
KLX19A	509.00	517.00	2008/02/26 11:58:00	15361	–109.6	1.00	–14.30	–	–	–	–	–	–
KLX19A	509.00	517.00	2008/02/26 11:58:00	15362	–101.7	<0.8	–14.00	–	–	22.7	0.2320	0.79	0.715486
KLX18A	472.00	489.00	2008/02/27 10:00:00	15364	–113.3	1.10	–14.40	–	–	–	–	–	–
KLX18A	472.00	489.00	2008/02/27 10:00:00	15365	–115.7	<0.8	–14.70	–	–	–	–	–	–
KLX18A	472.00	489.00	2008/02/27 10:00:00	15366	–115.7	<0.8	–14.60	–	–	–	–	–	–
KLX18A	472.00	489.00	2008/02/27 10:00:00	15367	–114.8	<0.8	–14.60	–	–	–	–	–	–
KLX18A	472.00	489.00	2008/02/27 10:00:00	15368	–103.1	1.30	–14.20	34.70	–19.20	17.4	0.2330	0.16	0.715331
KLX15A	260.00	272.00	2008/02/27 14:27:00	15370	–103.3	<0.8	–12.80	–	–	–	–	–	–
KLX15A	260.00	272.00	2008/02/27 14:27:00	15371	–100.6	0.90	–12.80	–	–	–	–	–	–
KLX15A	260.00	272.00	2008/02/27 14:27:00	15372	–101.8	<0.8	–12.80	–	–	–	–	–	–
KLX15A	260.00	272.00	2008/02/27 14:27:00	15373	–104.5	<0.8	–13.00	–	–	–	–	–	–
KLX15A	260.00	272.00	2008/02/27 14:27:00	15374	–93.5	1.10	–12.70	32.70	–18.30	28.0	0.2335	–0.01	0.715460
KLX04	507.00	530.00	2008/03/06 14:48:00	15376	–123.3	2.50	–15.60	–	–	–	–	–	–
KLX04	507.00	530.00	2008/03/06 14:48:00	15377	–122.3	1.60	–15.50	–	–	–	–	–	–
KLX04	507.00	530.00	2008/03/06 14:48:00	15378	–123.5	1.20	–15.50	–	–	–	–	–	–
KLX04	507.00	530.00	2008/03/06 14:48:00	15379	–127.2	1.00	–15.80	–	–	–	–	–	–
KLX04	507.00	530.00	2008/03/06 14:48:00	15380	–116.7	1.30	–15.20	33.20	–20.20	16.9	0.2326	0.20	0.715860
KLX08	626.00	683.00	2008/03/11 10:00:00	15393	–118.7	2.20	–15.50	–	–	–	–	–	–
KLX08	626.00	683.00	2008/03/11 10:00:00	15394	–119.5	2.00	–15.00	–	–	–	–	–	–

– = not analysed.

Table A3-3 (page 2 of 7). Compilation of results from isotope analyses.

Idcode	Secup m	Seclow m	Date and time of sampling	SKB sample no.	$\delta^{2}H$ dev SMOW	^{3}H TU	$\delta^{18}O$ dev SMOW	PMC pmc	$\delta^{13}C$ dev PDB	$\delta^{34}S$ dev CDT	$^{10}B/^{11}B$ ratio	$\delta^{37}Cl$ dev SMOC	$^{87}Sr/^{86}Sr$ ratio
KLX08	626.00	683.00	2008/03/11 10:00:00	15395	–119.7	2.10	–15.30	–	–	–	–	–	–
KLX08	626.00	683.00	2008/03/11 10:00:00	15396	–121.2	1.40	–15.20	–	–	–	–	–	–
KLX08	626.00	683.00	2008/03/11 10:00:00	15397	–109.8	<0.8	–14.60	–	–	14.0	0.2330	–0.25	0.715373
KLX08	594.00	625.00	2008/03/11 09:53:00	15399	–129.8	1.00	–16.40	–	–	–	–	–	–
KLX08	594.00	625.00	2008/03/11 09:53:00	15400	–118.3	1.60	–16.40	–	–	–	–	–	–
KLX08	594.00	625.00	2008/03/11 09:53:00	15401	–130.1	0.90	–16.40	–	–	–	–	–	–
KLX08	594.00	625.00	2008/03/11 09:53:00	15402	–130.1	0.90	–16.50	–	–	–	–	–	–
KLX08	594.00	625.00	2008/03/11 09:53:00	15403	–120.8	2.00	–15.80	–	–	15.3	0.2332	0.17	0.715513
KLX10	689.00	710.00	2008/03/12 11:33:00	15405	–88.4	2.50	–11.00	–	–	–	–	–	–
KLX10	689.00	710.00	2008/03/12 11:33:00	15406	–89.5	3.00	–11.10	–	–	–	–	–	–
KLX10	689.00	710.00	2008/03/12 11:33:00	15407	–88.3	2.00	–11.00	–	–	–	–	–	–
KLX10	689.00	710.00	2008/03/12 11:33:00	15408	–87.2	1.80	–10.80	–	–	–	–	–	–
KLX10	689.00	710.00	2008/03/12 11:33:00	15409	–80.4	1.90	–11.00	–	–	23.3	0.2426	0.17	0.715696
KLX07A	753.00	780.00	2008/03/13 07:34:00	15411	–102.5	4.80	–11.80	–	–	–	–	–	–
KLX07A	753.00	780.00	2008/03/13 07:34:00	15412	–99.3	4.50	–11.80	–	–	–	–	–	–
KLX07A	753.00	780.00	2008/03/13 07:34:00	15413	–97.3	4.30	–11.80	–	–	–	–	–	–
KLX07A	753.00	780.00	2008/03/13 07:34:00	15414	–96.3	3.40	–12.00	–	–	–	–	–	–
KLX07A	753.00	780.00	2008/03/13 07:34:00	15415	–84.3	2.10	–11.60	–	–	14.7	0.2335	0.21	0.715508
KLX04	870.00	897.00	2008/03/17 19:13:00	15417	–109.8	1.50	–14.30	–	–	–	–	–	–
KLX04	870.00	897.00	2008/03/17 19:13:00	15418	–112.4	1.90	–14.40	–	–	–	–	–	–
KLX04	870.00	897.00	2008/03/17 19:13:00	15419	–111.4	1.60	–14.40	–	–	–	–	–	–
KLX04	870.00	897.00	2008/03/17 19:13:00	15420	–112.9	2.10	–14.60	–	–	–	–	–	–
KLX04	870.00	897.00	2008/03/17 19:13:00	15421	–101.7	1.30	–14.10	–	–	10.2	0.2426	0.32	0.715551
KLX12A	535.00	545.00	2008/03/17 10:00:00	15440	–99.0	<0.8	–12.60	–	–	–	–	–	–
KLX12A	535.00	545.00	2008/03/17 10:00:00	15441	–99.9	1.50	–12.60	–	–	–	–	–	–
KLX12A	535.00	545.00	2008/03/17 10:00:00	15442	–98.6	0.90	–12.70	–	–	–	–	–	–
KLX12A	535.00	545.00	2008/03/17 10:00:00	15444	–92.4	<0.8	–12.30	–	–	15.9	0.2418	0.14	0.714844

– = not analysed.

Table A3-3 (page 3 of 7). Compilation of results from isotope analyses.

Idcode	Secup m	Seclow m	Date and time of sampling	SKB sample no.	$\delta^{2}H$ dev SMOW	^{3}H TU	$\delta^{18}O$ dev SMOW	PMC pmc	$\delta^{13}C$ dev PDB	$\delta^{34}S$ dev CDT	$^{10}B/^{11}B$ ratio	$\delta^{37}Cl$ dev SMOC	$^{87}Sr/^{86}Sr$ ratio
KLX05	241.00	255.00	2008/03/17 10:20:00	15446	–99.9	<0.8	–12.30	–	–	–	–	–	–
KLX05	241.00	255.00	2008/03/17 10:20:00	15447	–101.0	<0.8	–12.30	–	–	–	–	–	–
KLX05	241.00	255.00	2008/03/17 10:20:00	15448	–96.2	1.00	–12.30	–	–	–	–	–	–
KLX05	241.00	255.00	2008/03/17 10:20:00	15449	–93.9	1.00	–12.20	–	–	–	–	–	–
KLX05	241.00	255.00	2008/03/17 10:20:00	15450	–86.3	<0.8	–11.80	28.10	–15.00	24.9	0.2334	–0.03	0.715177
KLX10	351.00	368.00	2008/03/19 11:56:00	15452	–84.7	2.10	–10.70	–	–	–	–	–	–
KLX10	351.00	368.00	2008/03/19 11:56:00	15453	–81.9	2.90	–10.40	–	–	–	–	–	–
KLX10	351.00	368.00	2008/03/19 11:56:00	15454	–84.4	3.90	–10.40	–	–	–	–	–	–
KLX10	351.00	368.00	2008/03/19 11:56:00	15455	–85.9	2.40	–10.50	–	–	–	–	–	–
KLX10	351.00	368.00	2008/03/19 11:56:00	15456	–80.4	<0.8	–10.40	38.10	–15.00	23.8	0.2395	–0.18	0.715419
KLX20A	260.00	293.00	2008/03/19 07:15:00	15473	–98.8	1.40	–13.00	–	–	–	–	–	–
KLX20A	260.00	293.00	2008/03/19 07:15:00	15474	–100.9	2.50	–13.30	–	–	–	–	–	–
KLX20A	260.00	293.00	2008/03/19 07:15:00	15475	–102.8	0.90	–13.30	–	–	–	–	–	–
KLX20A	260.00	293.00	2008/03/19 07:15:00	15476	–110.9	<0.8	–14.30	–	–	–	–	–	–
KLX20A	260.00	293.00	2008/03/19 07:15:00	15477	–104.2	<0.8	–13.80	19.20	–16.90	36.1	0.2345	0.34	0.715508
KLX19A	509.00	517.00	2008/10/14 13:28:00	15695	–107.1	<0.8	–14.00	–	–	–	–	–	–
KLX19A	509.00	517.00	2008/10/14 13:28:00	15696	–105.9	0.90	–14.00	–	–	–	–	–	–
KLX19A	509.00	517.00	2008/10/14 13:28:00	15697	–105.2	<0.8	–14.00	–	–	–	–	–	–
KLX19A	509.00	517.00	2008/10/14 13:28:00	15698	–103.4	1.70	–14.30	–	–	–	–	–	–
KLX19A	509.00	517.00	2008/10/14 13:28:00	15699	–103.1	<0.8	–14.00	–	–	21.9	0.2317	0.47	0.715452
KLX15A	260.00	272.00	2008/10/15 09:34:00	15701	–87.2	1.40	–11.80	–	–	–	–	–	–
KLX15A	260.00	272.00	2008/10/15 09:34:00	15702	–88.0	2.30	–11.80	–	–	–	–	–	–
KLX15A	260.00	272.00	2008/10/15 09:34:00	15703	–87.8	1.90	–11.80	–	–	–	–	–	–
KLX15A	260.00	272.00	2008/10/15 09:34:00	15704	–88.3	1.80	–11.90	–	–	–	–	–	–
KLX15A	260.00	272.00	2008/10/15 09:34:00	15705	–91.6	1.20	–12.20	32.00	–17.50	22.7	0.2372	–0.26	0.714125
KLX15A	623.00	640.00	2008/10/15 10:06:00	15707	–83.3	1.00	–11.10	–	–	–	–	–	–
KLX15A	623.00	640.00	2008/10/15 10:06:00	15708	–82.9	1.20	–11.00	–	–	–	–	–	–

– = not analysed.

Table A3-3 (page 4 of 7). Compilation of results from isotope analyses.

Idcode	Secup m	Seclow m	Date and time of sampling	SKB sample no.	$\delta^{2}H$ dev SMOW	^{3}H TU	$\delta^{18}O$ dev SMOW	PMC pmc	$\delta^{13}C$ dev PDB	$\delta^{34}S$ dev CDT	$^{10}B/^{11}B$ ratio	$\delta^{37}Cl$ dev SMOC	$^{87}Sr/^{86}Sr$ ratio
KLX15A	623.00	640.00	2008/10/15 10:06:00	15709	–81.1	1.20	–11.00	–	–	–	–	–	–
KLX15A	623.00	640.00	2008/10/15 10:06:00	15710	–78.2	1.20	–11.60	–	–	–	–	–	–
KLX15A	623.00	640.00	2008/10/15 10:06:00	15711	–83.5	0.90	–10.90	29.00	–18.60	17.2	0.2370	–0.07	0.715437
KLX10	351.00	368.00	2008/10/20 14:05:00	15713	–79.0	2.20	–10.40	–	–	–	–	–	–
KLX10	351.00	368.00	2008/10/20 14:05:00	15714	–77.7	2.80	–10.30	–	–	–	–	–	–
KLX10	351.00	368.00	2008/10/20 14:05:00	15715	–76.1	1.90	–11.60	–	–	–	–	–	–
KLX10	351.00	368.00	2008/10/20 14:05:00	15716	–77.7	2.00	–10.50	–	–	–	–	–	–
KLX10	351.00	368.00	2008/10/20 14:05:00	15717	–78.2	1.80	–10.50	30.40	–15.90	20.7	0.2375	–0.20	0.715410
KLX18A	472.00	489.00	2008/10/22 09:00:00	15719	–98.1	<0.8	–14.10	–	–	–	–	–	–
KLX18A	472.00	489.00	2008/10/22 09:00:00	15720	–100.2	1.20	–14.10	–	–	–	–	–	–
KLX18A	472.00	489.00	2008/10/22 09:00:00	15721	–102.5	<0.8	–14.10	–	–	–	–	–	–
KLX18A	472.00	489.00	2008/10/22 09:00:00	15722	–105.4	<0.8	–14.20	–	–	–	–	–	–
KLX18A	472.00	489.00	2008/10/22 09:00:00	15723	–104.3	0.90	–14.10	29.10	–20.40	15.6	0.2369	–0.05	0.715326
HLX37	150.00	199.80	2008/10/15 07:55:00	15724	–79.4	1.00	–11.60	28.20	–16.00	28.4	0.2377	–0.11	0.715880
KLX12A	535.00	545.00	2008/10/21 09:52:00	15726	–86.5	1.70	–12.10	–	–	–	–	–	–
KLX12A	535.00	545.00	2008/10/21 09:52:00	15727	–86.5	1.50	–12.00	–	–	–	–	–	–
KLX12A	535.00	545.00	2008/10/21 09:52:00	15728	–87.0	1.30	–12.20	–	–	–	–	–	–
KLX12A	535.00	545.00	2008/10/21 09:52:00	15729	–90.7	1.60	–12.30	–	–	–	–	–	–
KLX12A	535.00	545.00	2008/10/21 09:52:00	15730	–92.2	0.80	–12.20	–	–	13.8	0.2366	0.18	0.714848
KLX10	689.00	710.00	2008/10/21 12:27:00	15732	–79.2	1.90	–11.00	–	–	–	–	–	–
KLX10	689.00	710.00	2008/10/21 12:27:00	15733	–79.4	2.60	–10.80	–	–	–	–	–	–
KLX10	689.00	710.00	2008/10/21 12:27:00	15734	–78.5	1.70	–10.80	–	–	–	–	–	–
KLX10	689.00	710.00	2008/10/21 12:27:00	15735	–84.3	2.50	–11.20	–	–	–	–	–	–
KLX10	689.00	710.00	2008/10/21 12:27:00	15736	–84.3	1.30	–11.20	54.80	–22.70	19.9	0.2374	–0.12	0.715650
KLX08	594.00	625.00	2008/10/27 13:34:00	15753	–116.5	0.80	–16.00	–	–	–	–	–	–
KLX08	594.00	625.00	2008/10/27 13:34:00	15754	–118.6	0.90	–15.90	–	–	–	–	–	–
KLX08	594.00	625.00	2008/10/27 13:34:00	15755	–116.3	0.90	–15.80	–	–	–	–	–	–

– = not analysed.

Table A3-3 (page 5 of 7). Compilation of results from isotope analyses.

Idcode	Secup m	Seclow m	Date and time of sampling	SKB sample no.	$\delta^{2}H$ dev SMOW	^{3}H TU	$\delta^{18}O$ dev SMOW	PMC pmc	$\delta^{13}C$ dev PDB	$\delta^{34}S$ dev CDT	$^{10}B/^{11}B$ ratio	$\delta^{37}Cl$ dev SMOC	$^{87}Sr/^{86}Sr$ ratio
KLX08	594.00	625.00	2008/10/27 13:34:00	15756	–116.1	<0.8	–15.90	–	–	–	–	–	–
KLX08	594.00	625.00	2008/10/27 13:34:00	15757	–118.2	<0.8	–16.00	–	–	13.3	0.2375	0.07	0.715488
HLX39	187.00	199.30	2008/10/29 15:08:00	15758	–89.1	1.20	–12.10	38.60	–15.90	39.8	0.2367	0.36	0.716361
HLX35	120.00	135.00	2008/10/28 08:35:00	15759	–88.1	1.10	–11.40	39.60	–17.50	26.9	0.2377	0.34	0.715480

– = not analysed.

Table A3-3 (page 6 of 7). Compilation of results from isotope analyses.

Idcode	Secup m	Seclow m	Date and time of sampling	SKB sample no.	^{238}U mBq/kg	^{235}U mBq/kg	^{234}U mBq/kg	^{232}Th mBq/kg	^{230}TH mBq/kg	^{226}Ra Bq/l	^{222}Rn Bq/l	^{222}Rn corr* Bq/l
KLX15A	623.00	640.00	2008/02/26 08:29:00	15355	2.30	-0.02	5.00	0.21	0.32	2.03E-001	5.10E+001	1.21E+002
KLX15A	623.00	640.00	2008/02/26 08:29:00	15355	2.30	-0.02	5.00	0.21	0.32	2.03E-001	5.10E+001	1.21E+002
KLX19A	509.00	517.00	2008/02/26 11:58:00	15362	0.70	0.05	3.50	0.33	0.13	<0.015	3.40E+001	1.36E+002
KLX19A	509.00	517.00	2008/02/26 11:58:00	15362	0.70	0.05	3.50	0.33	0.13	<0.015	3.40E+001	1.36E+002
KLX18A	472.00	489.00	2008/02/27 10:00:00	15368	1.60	–0.02	4.30	0.19	0.19	2.10E-002	3.90E+001	1.40E+002
KLX18A	472.00	489.00	2008/02/27 10:00:00	15368	1.60	–0.02	4.30	0.19	0.19	2.10E-002	3.90E+001	1.40E+002
KLX04	507.00	530.00	2008/03/06 14:48:00	15380	1.90	0.15	12.90	0.10	0.24	6.48E-001	4.77E+002	1.12E+003
KLX04	507.00	530.00	2008/03/06 14:48:00	15380	1.90	0.15	12.90	0.10	0.24	6.48E-001	4.77E+002	1.12E+003
KLX08	594.00	625.00	2008/03/11 09:53:00	15403	–0.01	0.02	0.20	0.42	–0.30	4.20E-002	4.60E+001	7.80E+001
KLX08	594.00	625.00	2008/03/11 09:53:00	15403	–0.01	0.02	0.20	0.42	–0.30	4.20E-002	4.60E+001	7.80E+001
KLX07A	753.00	780.00	2008/03/13 07:34:00	15415	2.00	0.21	5.70	0.28	0.28	1.81E-001	6.10E+001	1.00E+002
KLX07A	753.00	780.00	2008/03/13 07:34:00	15415	2.00	0.21	5.70	0.28	0.28	1.81E-001	6.10E+001	1.00E+002
KLX04	870.00	897.00	2008/03/17 19:13:00	15421	0.20	0.02	0.50	0.21	–0.20	1.78E-001	9.80E+000	2.29E+001
KLX04	870.00	897.00	2008/03/17 19:13:00	15421	0.20	0.02	0.50	0.21	–0.20	1.78E-001	9.80E+000	2.29E+001
KLX12A	535.00	545.00	2008/03/17 10:00:00	15444	0.10	0.04	0.30	0.19	–0.06	8.40E-002	4.09E+001	9.88E+001
KLX12A	535.00	545.00	2008/03/17 10:00:00	15444	0.10	0.04	0.30	0.19	–0.06	8.40E-002	4.09E+001	9.88E+001
KLX05	241.00	255.00	2008/03/17 10:20:00	15450	17.20	0.70	74.90	0.20	0.41	<0.015	4.38E+002	7.42E+002
KLX05	241.00	255.00	2008/03/17 10:20:00	15450	17.20	0.70	74.90	0.20	0.41	<0.015	4.38E+002	7.42E+002
KLX20A	260.00	293.00	2008/03/19 07:15:00	15477	5.00	0.22	21.00	0.02	0.23	1.29E-001	1.47E+002	2.40E+002
KLX20A	260.00	293.00	2008/03/19 07:15:00	15477	5.00	0.22	21.00	0.02	0.23	1.29E-001	1.47E+002	2.40E+002
KLX19A	509.00	517.00	2008/10/14 13:28:00	15699	1.10	0.04	3.50	0.32	0.86	<0.015	6.66E+001	1.93E+002
KLX19A	509.00	517.00	2008/10/14 13:28:00	15699	1.10	0.04	3.50	0.32	0.86	<0.015	6.66E+001	1.93E+002
KLX18A	472.00	489.00	2008/10/22 09:00:00	15723	1.90	0.02	4.30	0.14	0.70	1.60E-002	1.21E+002	2.34E+002
KLX18A	472.00	489.00	2008/10/22 09:00:00	15723	1.90	0.02	4.30	0.14	0.70	1.60E-002	1.21E+002	2.34E+002
HLX37	150.00	199.80	2008/10/15 07:55:00	15724	2.50	0.08	7.90	0.41	0.47	<0.015	5.65E+001	1.68E+002
HLX37	150.00	199.80	2008/10/15 07:55:00	15724	2.50	0.08	7.90	0.41	0.47	<0.015	5.65E+001	1.68E+002
KLX12A	535.00	545.00	2008/10/21 09:52:00	15730	0.20	0.01	0.30	–	–	8.20E-002	5.83E+001	1.16E+002

- = not analysed.
* = value at time of collection (calculated).

Table A3-3 (page 7 of 7). Compilation of results from isotope analyses.

Idcode	Secup m	Seclow m	Date and time of sampling	SKB sample no.	^{238}U mBq/kg	^{235}U mBq/kg	^{234}U mBq/kg	^{232}Th mBq/kg	^{230}TH mBq/kg	^{226}Ra Bq/l	^{222}Rn Bq/l	^{222}Rn corr* Bq/l
KLX12A	535.00	545.00	2008/10/21 09:52:00	15730	0.20	0.01	0.30	–	–	8.20E-002	5.83E+001	1.16E+002
KLX08	594.00	625.00	2008/10/27 13:34:00	15757	0.10	0.04	0.20	–	–	3.30E-002	5.06E+001	9.94E+001
KLX08	594.00	625.00	2008/10/27 13:34:00	15757	0.10	0.04	0.20	–	–	3.30E-002	5.06E+001	9.94E+001
HLX39	187.00	199.30	2008/10/29 15:08:00	15758	40.90	1.80	53.80	0.21	0.35	<0.015	5.24E+001	8.98E+001
HLX39	187.00	199.30	2008/10/29 15:08:00	15758	40.90	1.80	53.80	0.21	0.35	<0.015	5.24E+001	8.98E+001
HLX35	120.00	135.00	2008/10/28 08:35:00	15759	824.00	24.46	2664.80	0.13	0.17	<0.015	3.31E+001	5.87E+001
HLX35	120.00	135.00	2008/10/28 08:35:00	15759	824.00	24.46	2664.80	0.13	0.17	<0.015	3.31E+001	5.87E+001

- = not analysed.
* = value at time of collection (calculated).

Appendix 4

Electric conductivity during time series sampling

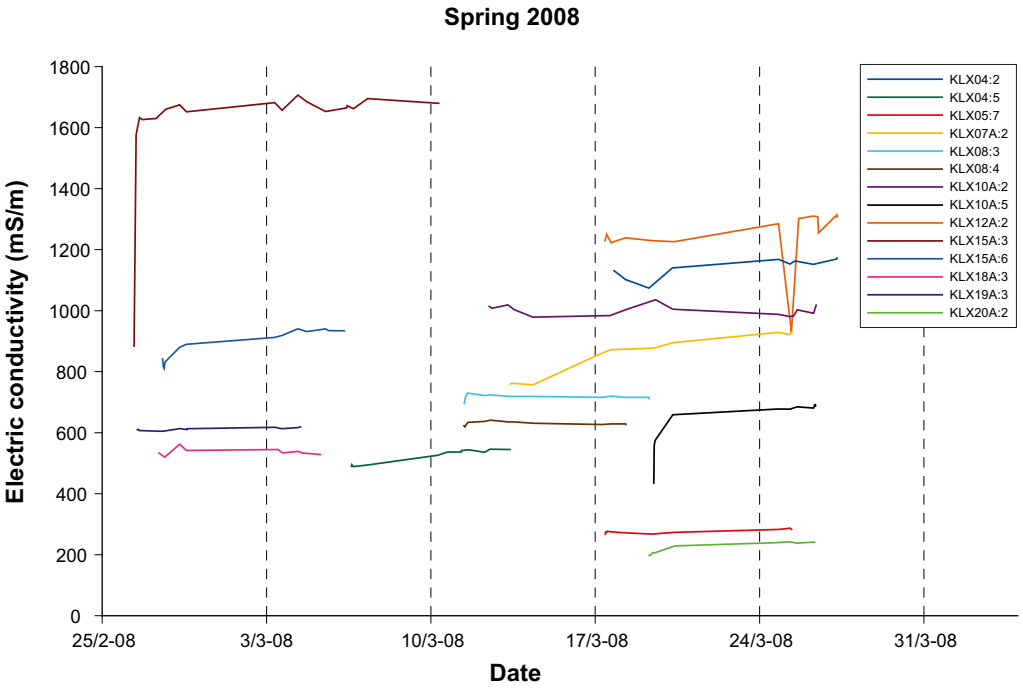

Figure A4-1. *Field measurements of electric conductivity plotted versus date for borehole sections sampled during the spring sampling.*

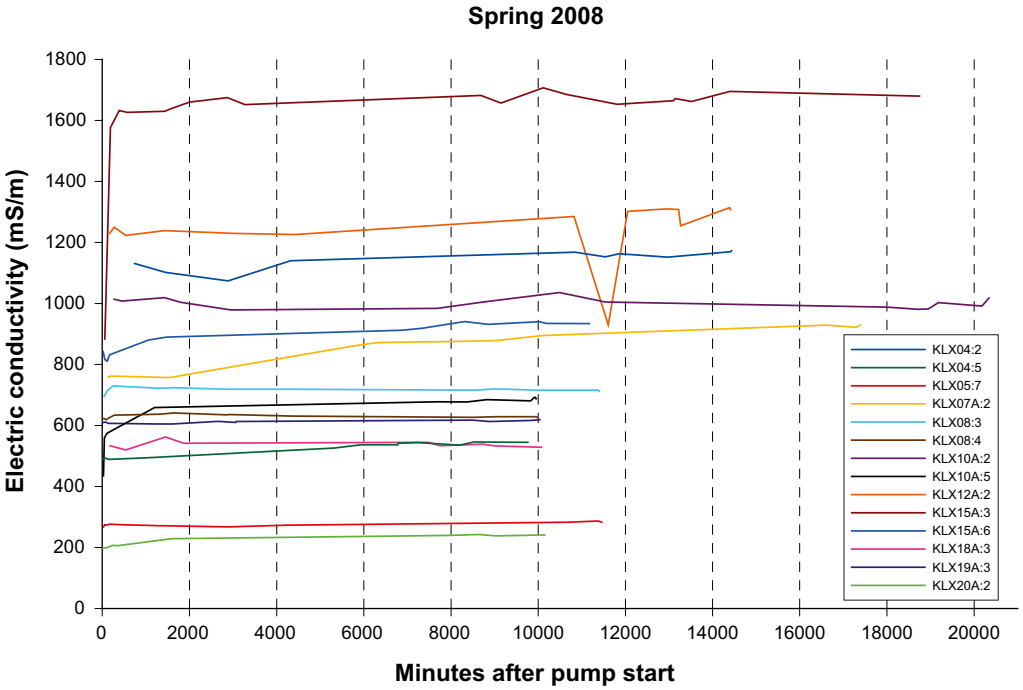

Figure A4-2. *Field measurements of electric conductivity plotted versus minutes after pump start for borehole sections sampled during the spring sampling .*

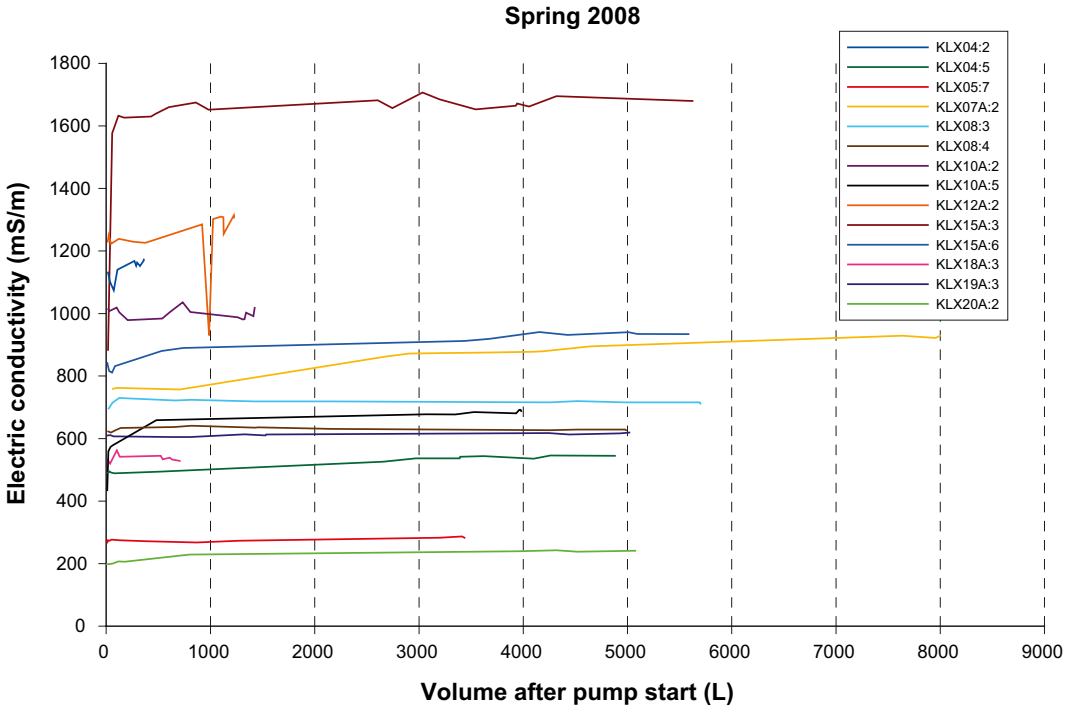

Figure A4-3. *Field measurements of electric conductivity plotted versus volume (L) after pump start for borehole sections sampled during the spring sampling.*

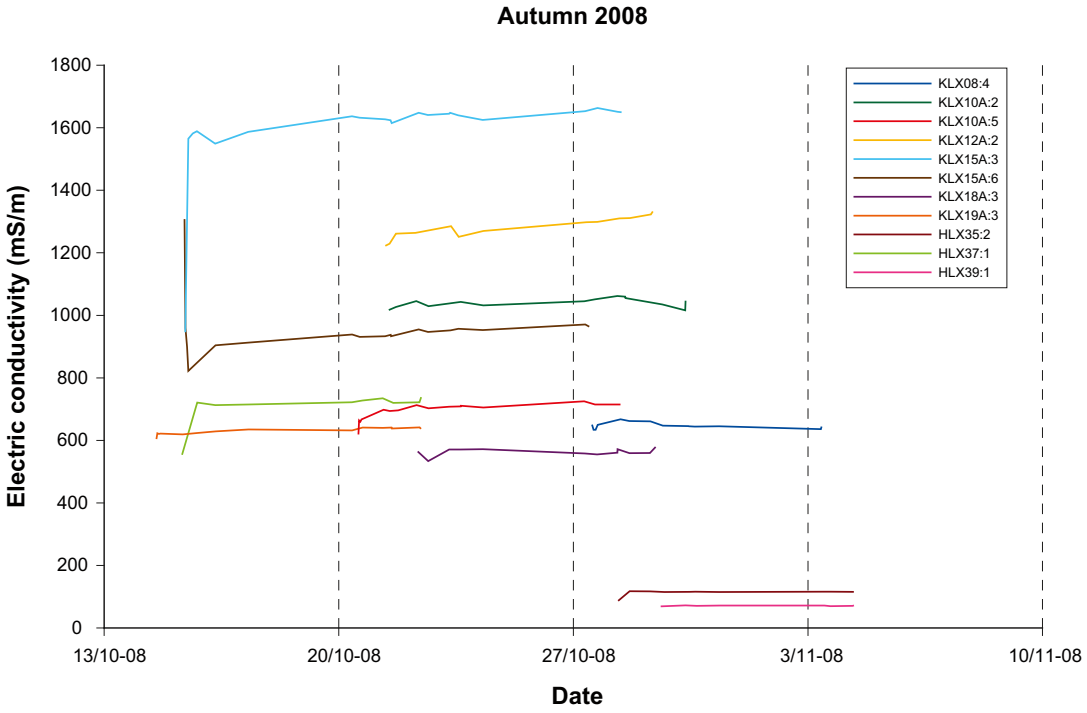

Figure A4-4. *Field measurements of electric conductivity plotted versus date for borehole sections sampled during the autumn sampling.*

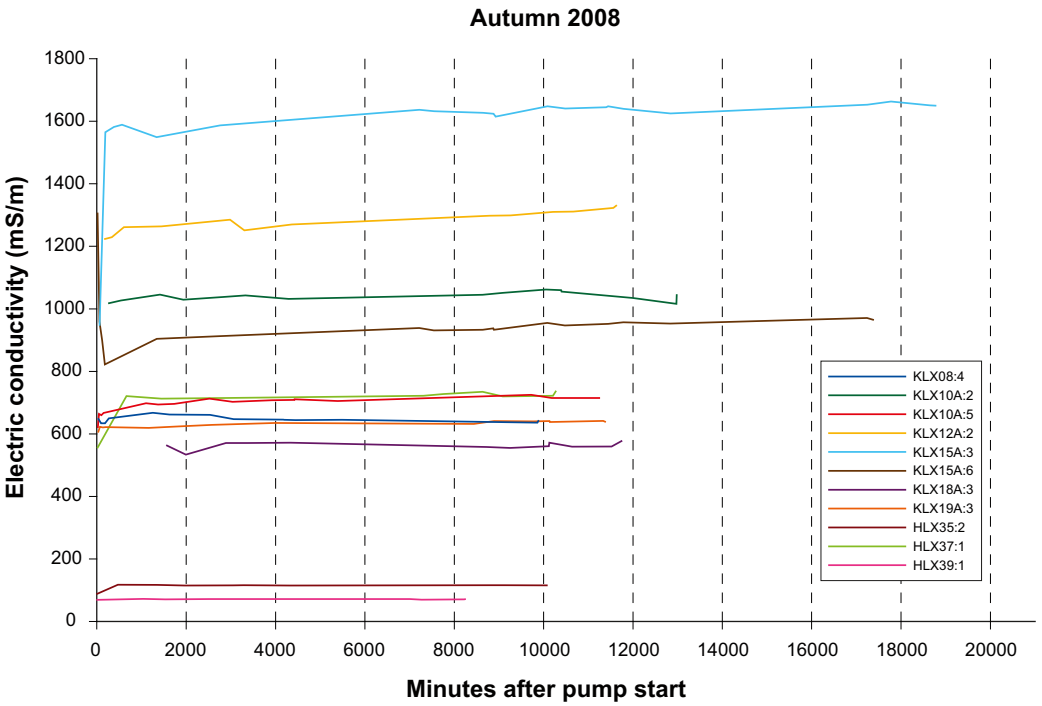

Figure A4-5. *Field measurements of electric conductivity plotted versus minutes after pump start for borehole sections sampled during the autumn sampling.*

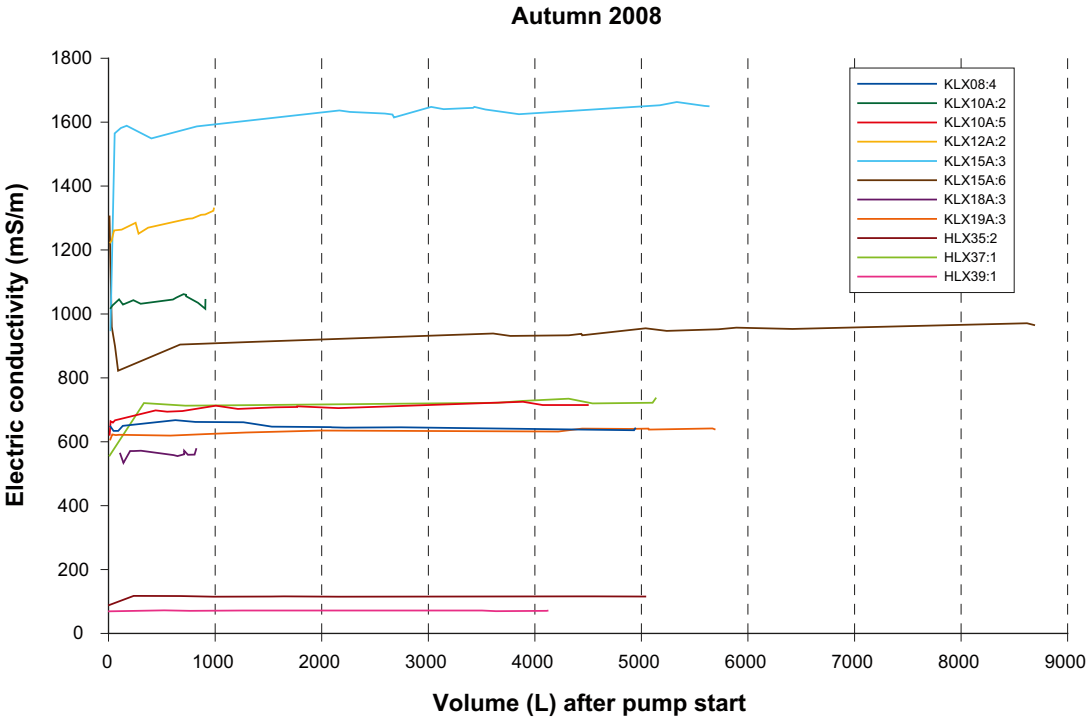

Figure A4-6. *Field measurements of electric conductivity plotted versus volume (L) after pump start for borehole sections sampled during the autumn sampling.*

Appendix 5

Sulphide during time series sampling

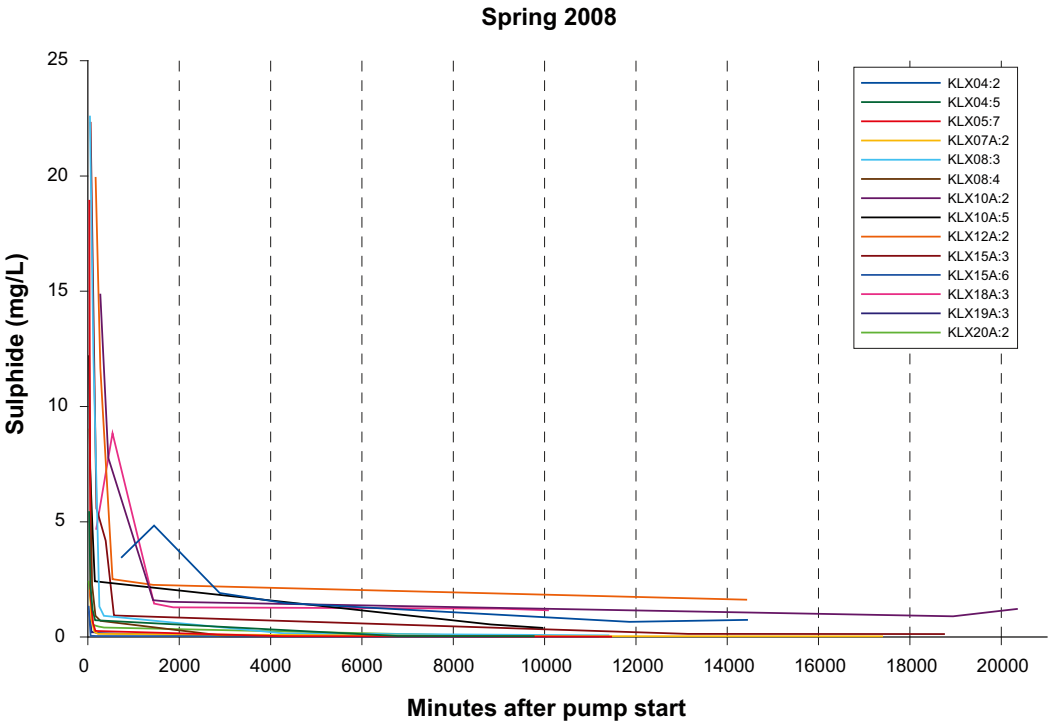

Figure A5-1. *HS^- concentration (mg/L) plotted versus minutes after pump start, spring sampling.*

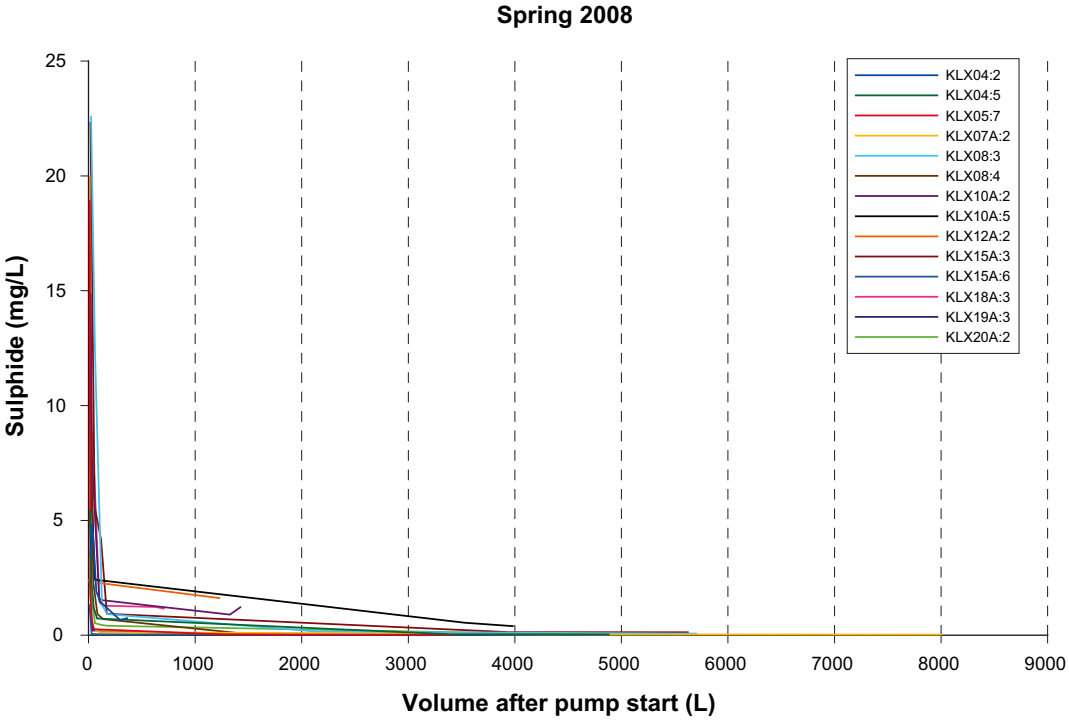

Figure A5-2. *HS^- concentration (mg/L) plotted versus volume (L) after pump start, spring sampling.*

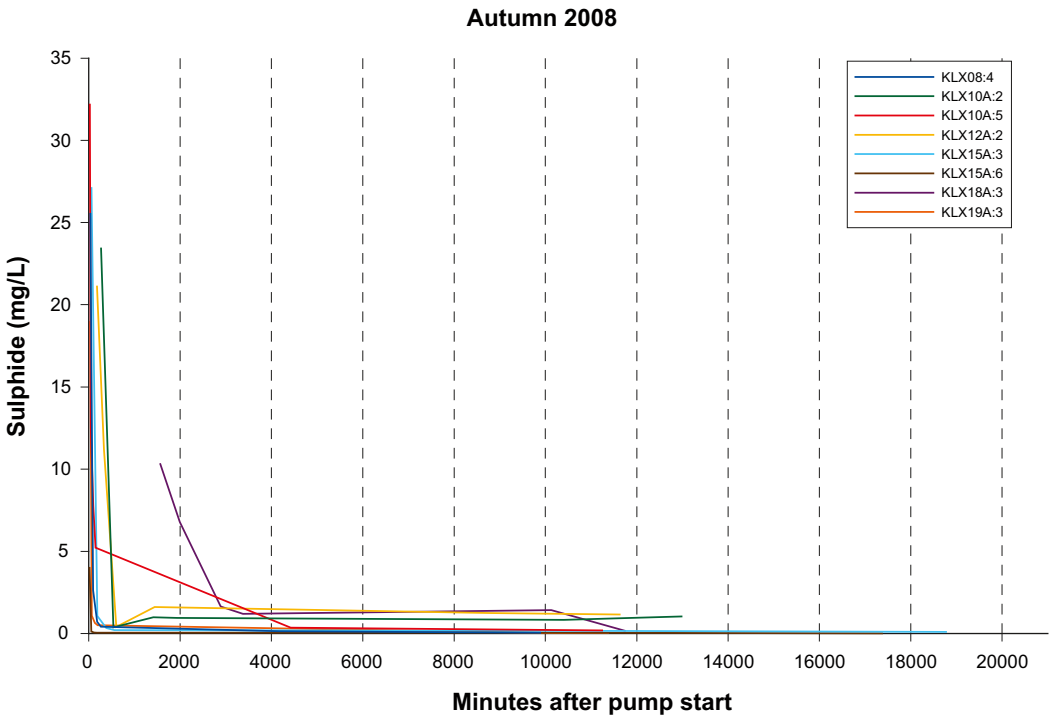

Figure A5-3. *HS^- concentration (mg/L) plotted versus minutes after pump start, autumn sampling.*

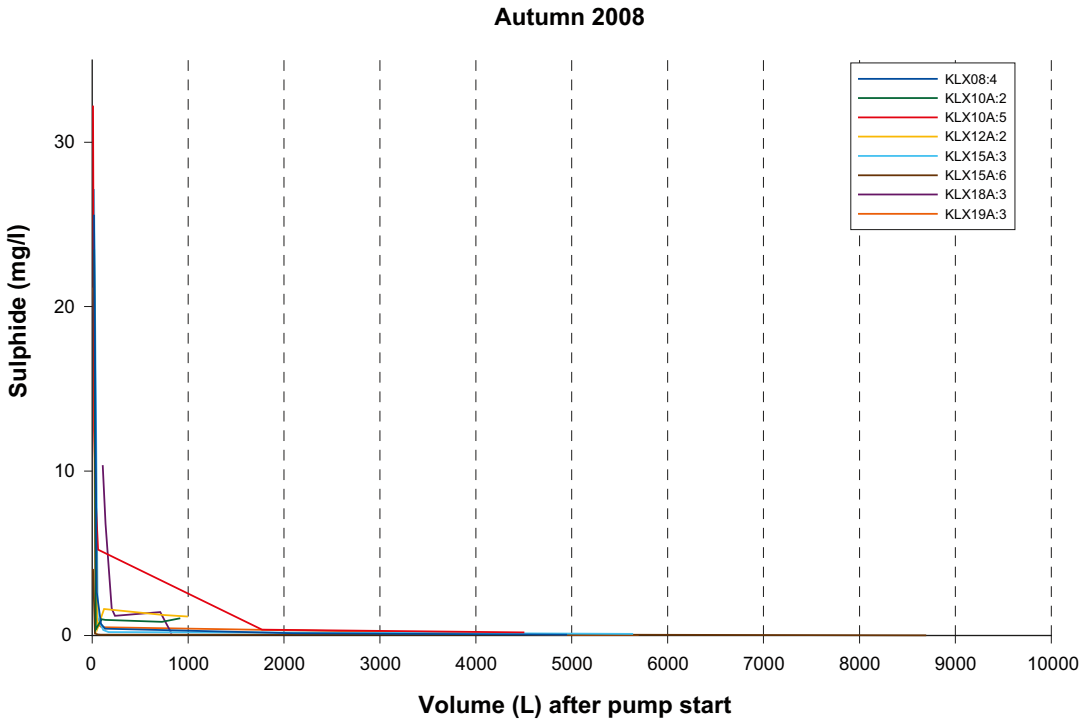

Figure A5-4. *HS^- concentration (mg/L) plotted versus volume (L) after pump start, autumn sampling.*