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Oskarshamn site investigation

Data report from the laboratory investigations of the transport properties of the rock

Data delivery for data freeze Laxemar 2.2

Eva Gustavsson, Geosigma AB

August 2007

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Keywords: Transport properties, Porosity, Diffusivity, Batchsorption, AP PS 400-03-041, AP PS 400-03-093, AP PS 400-06-023.

This report concerns a study which was conducted for SKB. The conclusions and viewpoints presented in the report are those of the author and do not necessarily coincide with those of the client.

Data in SKB's database can be changed for different reasons. Minor changes in SKB's database will not necessarily result in a revised report. Data revisions may also be presented as supplements, available at www.skb.se.

A pdf version of this document can be downloaded from www.skb.se.

Abstract

This report presents data gained from laboratory investigations of diffusivity and sorption characteristics at the time for data freeze Laxemar 2.2. The cored boreholes concerned in the investigation are: KSH01A, KSH01B, KSH02, KSH03A, KLX02, KLX03, KLX04, KLX05, KLX06, KLX07A, KLX08, KLX10, KLX11A, KLX12A and KLX13A. The rock sample collection represents major as well as minor rock types, different fracture types and different kinds of structure elements found in deformation zones at the Oskarshamn site investigation area. The parameters that are determined for the rock materials are: matrix porosity, porosity distribution, matrix diffusivity, specific surface area (BET), cation exchange capacity (CEC) and sorption coefficients. Discussions and interpretations of the results are not included in the present report since some of the diffusion- and batch sorption experiments still are in progress. The laboratory investigations are part of the discipline-specific programme "Transport Properties of the Rock" within the SKB site investigations.

Sammanfattning

Föreliggande rapport redovisar resultat som erhållits från laboratoriemätningar av diffusions- och sorptionsegenskaper vid tidpunkten för datafrys Laxemar 2.2. Data från följande kärnbråhå presenteras i rapporten: KSH01A, KSH01B, KSH02, KSH03A, KLX02, KLX03, KLX04, KLX05, KLX06, KLX07A, KLX08, KLX10, KLX11A, KLX12A and KLX13A. Provrvalet representerar såväl huvudbergarter som underordnade bergarter, varierande spricktyper och olika strukturelement förekommande i deformationszoner inom Forsmarks platsundersökningsområde. De parametrar som bestämts är: matrisporositet, porositetsfördelning, matrisdiffusivitet, specifik ytarea (BET), katjonbyteskapacitet (CEC) och sorptionskoefficienter. Rapporten redovisar inga diskussioner eller tolkningar av resultat då ett antal mätningar av genomdiffusion samt batchsorption fortfarande pågår. Mätning av ovan nämnda egenskaper ingår i programmet för "Bergets transportegenskaper" inom SKB:s platsundersökningar.

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1 Introduction

This report contains data gained from the laboratory investigations of diffusivity and sorption characteristics within the discipline-specific programme “Transport Properties of the Rock”, which is one of the activities performed within the site investigation at Oskarshamn. The work was carried out during the period from February 2003 to September 2006, in accordance with activity plans AP PS 400-03-041, AP PS 400-03-093 and AP PS 400-06-023. In Table 1-1 controlling documents for performing this activity are listed. Both activity plans and method descriptions are SKB’s internal controlling documents.

The rock samples for the laboratory measurements were collected from the core drilled boreholes KSH01A, KSH01B, KSH02, KSH03A, KLX02, KLX03, KLX04, KLX05, KLX06, KLX07A, KLX08, KLX10, KLX11A, KLX12A and KLX13A by Eva Gustavsson, Johan Byegård and Henrik Widestrand, Geosigma AB.

This report includes all data earlier reported in SKB P-05-106, i.e. the data report produced for data freeze 2.1, and will consequently replace that report. Data presented have been delivered to SICADA according to AP PS 400-03-41, AP PS 400-03-093, AP PS 400-06-023 and are traceable by the activity plan number. The locations of the boreholes are presented in Figure 1-1 below.

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

Activity Plan	Number	Version
Provtagning och analyser av borrhärlor från KSH01 och KSH02 för bestämning av bergets transportegenskaper	AP PS 400-03-41	1.0
Provtagning och analyser av borrhärlor från KLX01, KLX02, KLX03, KLX04 för bestämning av bergets transportegenskaper	AP PS 400-03-093	1.0
Provtagning och analyser av borrhärlor under 2006 för bestämning av bergets transportegenskaper	AP PS 400-06-023	1.0
Method Descriptions	Number	Version
Metodbeskrivning för genomdiffusionsmätning	SKB MD 540.001	1.0
Metodbeskrivning för batchsorptionsmätning	SKB MD 540.002	3.0

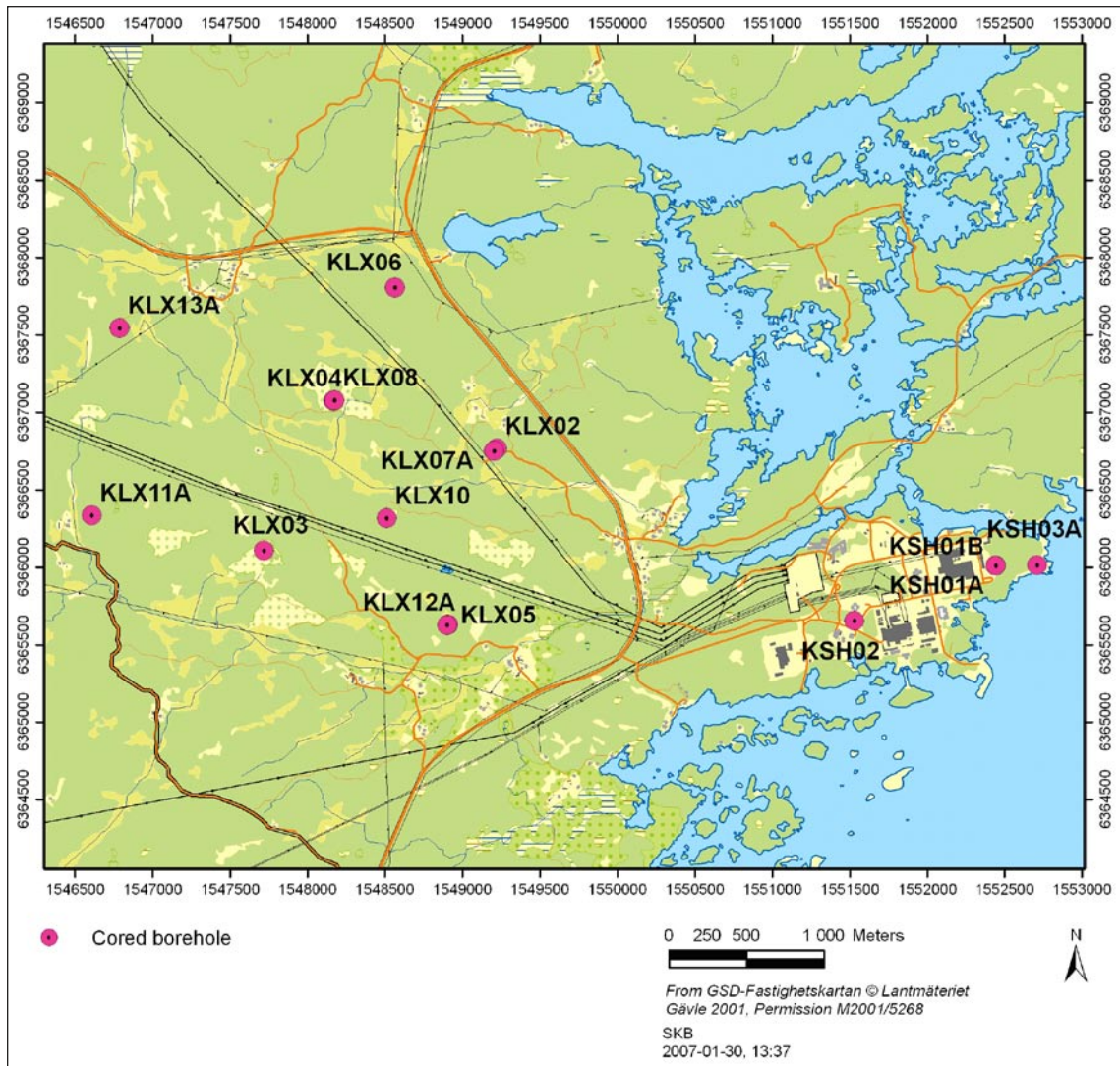


Figure 1-1. Oskarshamn site investigation area, with the cored boreholes KSH01A, KSH01B, KSH02, KSH03A, KLX02, KLX03, KLX04, KLX05, KLX06, KLX07A, KLX08, KLX10, KLX11A, KLX12A and KLX13A.

2 Objective and scope

Laboratory measurements on rock samples and drill cores provide direct information on the retardation properties of the rock matrix and the fracture materials. The laboratory work is performed according to /Byegård et al. 2003/ on rock samples from different parts of the candidate areas in Oskarshamn (Laxemar and Simpevarp subareas). Features as major and minor rock types, different fracture types and different kinds of structure elements which are building up deformation zones at the Laxemar and Simpevarp areas are represented in the total sample collection. The parameters that are determined for the different rock materials are:

- matrix porosity (defined as open porosity in SS-EN 1936),
- porosity distribution,
- matrix diffusivity (equivalent to effective diffusivity),
- BET, specific surface area,
- CEC, cation exchange capacity,
- sorption coefficients for a number of combinations of rock materials, radionuclides and groundwater compositions.

The report includes data from the cored boreholes KSH01A, KSH01B, KSH02, KSH03A, KLX02, KLX03, KLX04, KLX05, KLX06, KLX07A, KLX08, KLX10, KLX11A, KLX12A and KLX13A. Data tables are presented in Appendices 1, 2, 3, 4 and 5. Sorption and diffusivity experiments are very time-consuming and therefore, minor amounts of the laboratory works are still in progress. Data from these remaining measurements will be presented in data freeze 2.3 together with a final report including interpretations and discussions of the results from the laboratory investigations of the transport properties of the rock. This final report will also include a summary of the geological documentation which precedes the selection of the rock samples.

Supplementary porosity investigations using the ^{14}C -PMMA technique have been performed at the Laboratory of Radiochemistry, University of Helsinki (HYRL). The method is used to measure the two-dimensional distribution of porosity, matrix porosity and can also be used to evaluate porosity gradients in altered fracture materials or excavation disturbed materials. The results are documented in a separate report /Penttinen et al. 2006/. Electrical resistivity data, for calculating the formation factor and the effective diffusivity, are presented in three separate reports /Thunhed 2005abc, Löfgren and Neretnieks 2004/.

Brief descriptions of the laboratory methods, relevant for the data presentation in this document, are given in Chapter 3.

3 Laboratory measurements

3.1 General

Sample preparation, water porosity measurements and BET measurements were performed at the Swedish National Testing and Research Institute (SP). Through-diffusion experiments were carried out at the Chalmers University of Technology (CTH). The batch sorption experiments were made at the Royal Institute of Technology (KTH) and the Chalmers University of Technology (CTH). In addition to this CEC-measurements were performed at the Swedish Geotechnical Institute (SGI).

3.2 Matrix porosity

The selected drill core samples were sent to Swedish National Testing and Research Institute (SP) for matrix porosity measurements as supporting data for the diffusion experiments. The porosity of the rock matrix can be determined in several different ways by means of laboratory measurements on slices of drill cores. The most common method is the water saturation technique, in this investigation determined according to standard method SS-EN 1936. The diameter of the core samples is c. 5.0 centimetres and the sample thickness varies from 0.5 to 5 centimetres, although the majorities of the samples are 3 centimetres.

3.3 Through-diffusion

Matrix diffusivity measurements are carried out by measuring how quickly an added substance diffuses through a piece of a drill core, so-called through-diffusion measurements /Ohlsson and Neretnieks 1995, Byegård et al. 1998/. The measurement is normally performed on a 1–5 cm thick sawn-out slice of a drill core placed in a measurement cell (Figure 3-1). One side of the core piece is in contact with a synthetic groundwater and the other is in contact with a synthetic groundwater tagged with the radionuclide to be studied (in this case tritiated water, HTO). Samples are then taken on the un-tagged side, and the effective diffusion coefficient, D_e , for the rock matrix can be calculated based on the concentration increase on the un-tagged side.

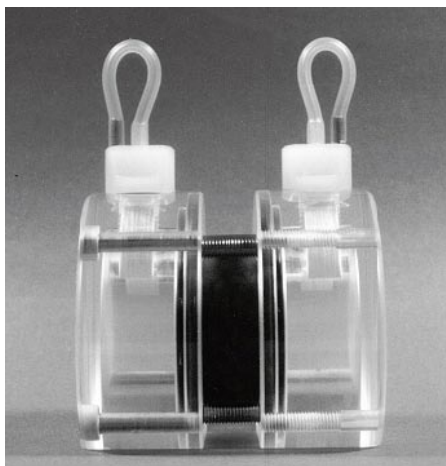


Figure 3-1. Photograph of a rock sample assembled in a diffusion cell.

The effective diffusivity is related to the water diffusivity, D_w , through the formation factor F as:

$$D_e = F \cdot D_w$$

The rock formation factor depends only on the properties of the rock and not on the tracer or solutes properties. The formation factor includes properties such as the tortuous winding of pores (tortuosity), variations in cross-sectional area of pores (constrictivity) and the porosity of the backbone of the pores that are utilised for transport by diffusion in a certain direction (transport porosity). These properties are poorly known and cannot easily be separated from each other in measurements.

A more detailed description of through-diffusion experiments can be found in SKB MD 540.001, SKB internal document.

3.4 BET

BET (Brunauer, Emmet, Teller, see /Brunauer et al. 1938/) is a method for measuring the specific surface area of a solid material by use of gas adsorption. BET measurements have been performed on site-specific materials from Oskarshamn according to the ISO 9277 standard method.

The determination of specific surface area does not produce sorption coefficients (K_d or K_a), i.e. parameters that are used in the safety assessment calculation to determine the retardation of radionuclides due to adsorption on to mineral surfaces. However, the BET surface areas, as well as the CEC, are good diagnostic parameters in order to give rough diagnoses of the sorption capacity of different geologic materials.

BET surface areas in this investigation are measured on the fractions 0.063–0.125 mm and 2–4 mm of crushed and sieved matrix rock samples together with scraped material from fracture fillings and altered bedrock, < 0.125 mm.

3.5 CEC

The determination of potential cation exchange capacity, CEC, as well as exchangeable cations, involve that the negatively charged sorption sites of a geological material are saturated with one particular cation in a high concentration solution; in this specific case barium chloride (BaCl). The amount of desorbed cations is then measured and defined as the CEC. A determination of sodium, potassium, calcium, magnesium, strontium and rubidium in the barium chloride extract of the rock material gives the sum of exchangeable cations.

The measurements of cation exchange capacity, CEC and exchangeable cations, are performed according to ISO 13536. The CEC is measured on crushed and sieved rock core samples and fracture filling material on the fractions 0.063–0.125 mm and 1–2 mm.

The CEC is closely related to BET, and as mentioned in 3.4, a diagnostic parameter for rough estimating of the sorption capacity of the rock material.

3.6 Batch sorption

In batch sorption measurements, crushed rock or mineral grains are contacted with groundwater and the distribution of a dissolved species between the aqueous and the solid phase is measured /cf. e.g. Byegård et al. 1998/. Thereby, the mass related sorption coefficient, K_d , can be calculated from the ratio of the concentration of the species in the solid and aqueous phase. By using several different size fractions, the sorption coefficient for internal rock surfaces (K_d) and outer surfaces (the surface related sorption coefficient, K_a) can be estimated. The batch sorption method is further described in SKB MD 540.002, SKB internal document.

4 Results

Original data from the reported activity are stored in the primary database Sicada. Data are traceable in Sicada by the Activity Plan number (AP PS 400-03-041, AP PS 400-03-093 and AP PS 400-06-023). Only data in databases are accepted for further interpretation and modeling. The data presented in this report are regarded as copies of the original data. Data in the databases may be revised, if needed. However, such revision of the database will not necessarily result in a revision of this report, although the normal procedure is that major data revisions entail a revision of P-reports. Minor data revisions are normally presented as supplements, available at www.skb.se.

4.1 General

The obtained results are stored in SICADA, according to AP PS 400-03-41, AP PS 400-03-093 and AP PS 400-06-023. Discussions of the results and evaluation of the methods (including estimation of uncertainties) will be presented in a final report, when the laboratory works are completed and evaluated.

4.2 Matrix porosity measurements

Data gained from the laboratory measurements are presented in Appendix 1. The uncertainty of a single reported porosity value is 0.09%, given with a coverage factor of 2.

4.3 Through-diffusion measurements

The obtained matrix diffusivities (or effective diffusivities), are presented in Appendix 2.

The data are presented as a scaled accumulated amount of tracer in the target cell C_r (mol/m³) as a function of time. The effective diffusivity D_e (m²/s), and the rock capacity factor α were fitted to the experimental data using Equation 1:

$$C_r = \frac{D_e t}{l^2} - \frac{\alpha}{6} - \frac{2\alpha}{\pi^2} \sum_{n=1}^{\infty} \frac{(-1)^n}{n^2} \exp\left\{-\frac{D_e n^2 \pi^2 t}{l^2 \alpha}\right\}, \quad (1)$$

where t is the experimental time after injection of tracer, l is the length of the rock sample and n is the summation factor.

The latter part of the experimental data is also fitted to a simplified linear form of Equation 1, *i.e.*

$$C_r = \frac{D_e t}{l^2} - \frac{\alpha}{6}. \quad (2)$$

In Figure 4-1 an example of experimental through-diffusion data is presented together with the result from successful model calculations using Equation 1.

The discussion of the results as well as an evaluation of the method and the diffusion model is left for the future when final results will be reported.

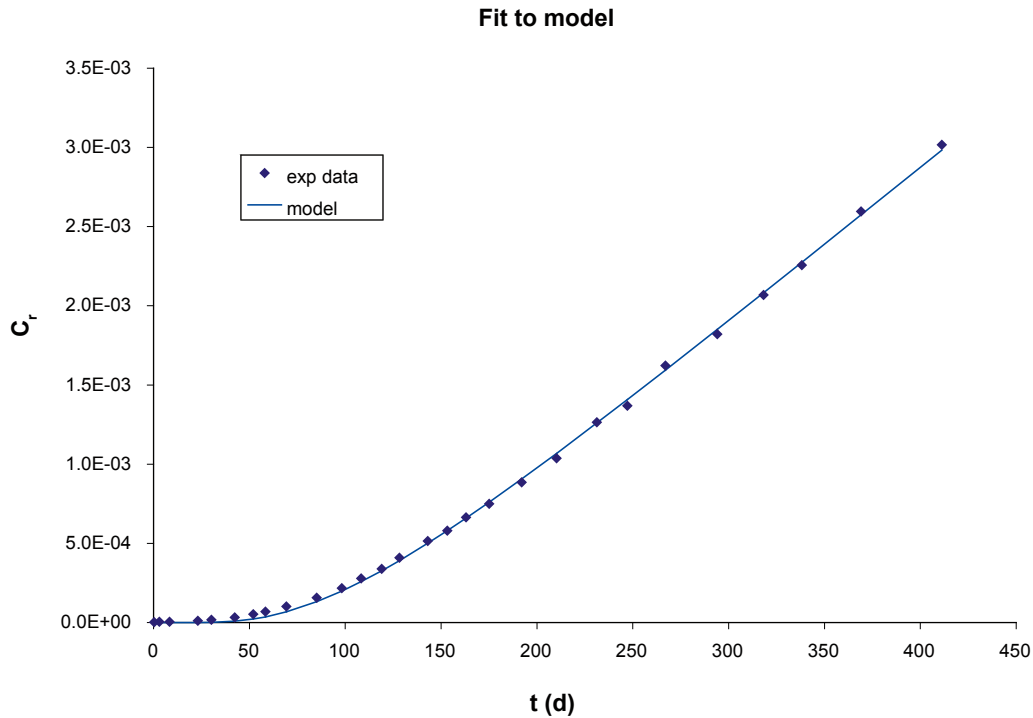


Figure 4-1. Data of measured C_r values (◆) as a function of time from a HTO through-diffusion experiment on a 3.0 cm thick sample from KLX02 936.50. The solid line represents calculated C_r values using Equation 1 with D_e and α optimized for a fit to the experimental data.

4.4 BET measurements

The results of the BET measurements are presented in Appendix 3.

4.5 CEC measurements

Data from the CEC measurements are to be found in Appendix 4.

4.6 Batch sorption measurements

The sorption data are summarized in Appendix 5.

The results from the measured distribution of tracer between the rock and water phase will be interpreted as:

- Adsorption of the tracers on the outer surfaces of the rock material, determined by the surface sorption parameter, K_a (m).
- Adsorption of the tracers on the inner surfaces of the rock material, determined by the volumetric sorption parameter, K_d (m^3/kg).

The evaluation of the batch sorption experimental results to sorption parameters is done according to:

$$R_d = K_d + \frac{6K_a}{d_p \rho} \quad (3)$$

where R_d (m^3/kg) is the measured tracer distribution between solid and liquid phases, d_p (m) is the average particle diameter, and ρ (kg/m^3) is the rock density. A graph of R_d versus $1/d_p$ gives an intercept corresponding to the K_d value, and a slope corresponding to $6K_a/\rho$, see Figure 4-2.

4.7 Nonconformities

No nonconformities with respect to the activity plan or the method description are reported.

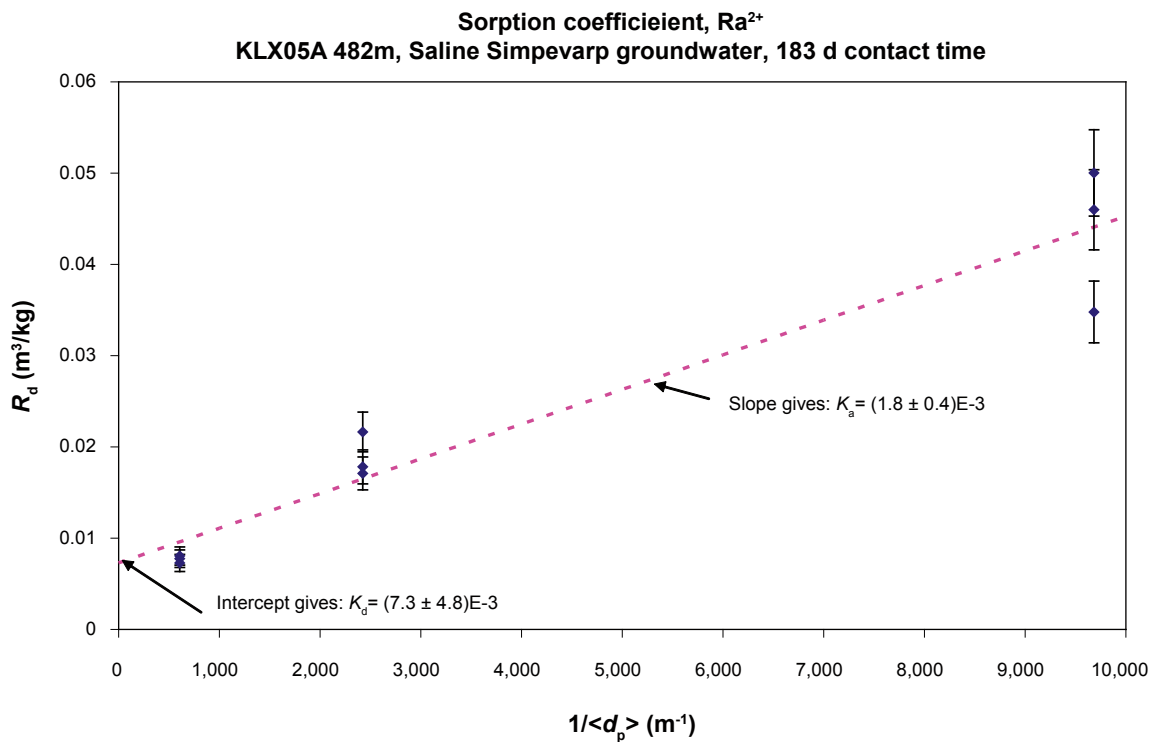


Figure 4-2. Experimental results and evaluation method from batch sorption experiments on rock sample from KLX05A 482 m.

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Matrix porosity

Appendix 1 contains matrix porosity data presented per drill-site. The uncertainty of a single reported porosity value is 0.09%, given with a coverage factor of 2.

Table A1-1.

Borehole	Secup	Seclow	Rock type	Rock code	Matrix porosity
KSH01A	19.96	19.99	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.47
KSH01A	39.59	39.62	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.10
KSH01A	59.12	59.15	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.08
KSH01A	76.65	76.68	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.12
KSH01A	99.71	99.74	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.08
KSH01A	121.41	121.44	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.08
KSH01A	140.68	140.71	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.34
KSH01A	160.72	160.75	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.10
KSH01A	181.47	181.50	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.13
KSH01A	200.11	200.14	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.08
KSH01A	219.36	219.39	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.08
KSH01A	222.72	222.73	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.15
KSH01A	222.73	222.76	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.08
KSH01A	239.96	239.99	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.19
KSH01A	261.08	261.11	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	1.59
KSH01A	280.23	280.26	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.45
KSH01A	295.41	295.44	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.13
KSH01A	317.78	317.81	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.08
KSH01A	340.88	340.91	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.08
KSH01A	362.55	362.58	Granite, fine- to medium-grained	511058	0.12
KSH01A	378.98	379.01	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.08
KSH01A	398.75	398.78	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.13
KSH01A	420.78	420.81	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.41
KSH01A	440.23	440.26	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.75
KSH01A	460.01	460.04	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.20
KSH01A	478.21	478.24	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.07
KSH01A	500.31	500.34	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.24
KSH01A	520.76	520.79	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.15
KSH01A	539.01	539.04	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.10
KSH01A	559.91	559.94	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.07
KSH01A	580.88	580.91	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.13
KSH01A	598.66	598.69	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.13
KSH01A	620.23	620.26	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.41
KSH01A	640.56	640.59	Granite to quartz monzodiorite, generally porphyritic	501044	0.17
KSH01A	661.07	661.10	Granite to quartz monzodiorite, generally porphyritic	501044	0.12
KSH01A	680.21	680.24	Granite, fine- to medium-grained	511058	0.05
KSH01A	699.01	699.04	Pegmatite	501061	0.02
KSH01A	720.25	720.28	Granite, fine- to medium-grained	511058	0.20

Borehole	Secup	Seclow	Rock type	Rock code	Matrix porosity
KSH01A	760.76	760.79	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.12
KSH01A	779.20	779.23	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.19
KSH01A	800.41	800.44	Granite to quartz monzodiorite, generally porphyritic	501044	0.58
KSH01A	820.09	820.12	Granite to quartz monzodiorite, generally porphyritic	501044	0.47
KSH01A	840.71	840.74	Granite to quartz monzodiorite, generally porphyritic	501044	0.35
KSH01A	859.16	859.19	Granite, fine- to medium-grained	511058	0.30
KSH01A	880.51	880.54	Granite to quartz monzodiorite, generally porphyritic	501044	0.39
KSH01A	891.66	891.67	Granite to quartz monzodiorite, generally porphyritic	501044	0.58
KSH01A	891.67	891.68	Granite to quartz monzodiorite, generally porphyritic	501044	0.54
KSH01A	891.69	891.72	Granite to quartz monzodiorite, generally porphyritic	501044	0.45
KSH01A	891.72	891.77	Granite to quartz monzodiorite, generally porphyritic	501044	0.43
KSH01A	891.77	891.78	Granite to quartz monzodiorite, generally porphyritic	501044	0.48
KSH01A	891.78	891.79	Granite to quartz monzodiorite, generally porphyritic	501044	0.60
KSH01A	891.80	891.83	Granite to quartz monzodiorite, generally porphyritic	501044	0.44
KSH01A	891.83	891.88	Granite to quartz monzodiorite, generally porphyritic	501044	0.42
KSH01A	891.88	891.89	Granite to quartz monzodiorite, generally porphyritic	501044	0.48
KSH01A	891.89	891.90	Granite to quartz monzodiorite, generally porphyritic	501044	0.44
KSH01A	891.91	891.94	Granite to quartz monzodiorite, generally porphyritic	501044	0.46
KSH01A	898.61	898.64	Granite to quartz monzodiorite, generally porphyritic	501044	0.35
KSH01A	919.66	919.69	Granite to quartz monzodiorite, generally porphyritic	501044	0.24
KSH01A	940.81	940.84	Granite to quartz monzodiorite, generally porphyritic	501044	0.32
KSH01A	960.78	960.81	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.35
KSH01A	980.41	980.44	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.25
KSH01A	981.43	981.46	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.29
KSH01A	981.46	981.49	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.29
KSH01A	981.50	981.53	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.27
KSH01A	999.46	999.49	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.22

Table A1-2.

Borehole	Secup	Seclow	Rock type	Rock code	Matrix porosity
KSH02	19.96	19.99	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.05
KSH02	39.96	39.99	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.07
KSH02	60.18	60.21	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.20
KSH02	80.01	80.04	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.12
KSH02	99.91	99.94	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.53
KSH02	119.96	119.99	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.10
KSH02	140.16	140.19	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.08
KSH02	148.09	148.10	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.38
KSH02	148.11	148.12	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.15
KSH02	148.12	148.15	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.07
KSH02	148.16	148.21	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.06
KSH02	148.21	148.22	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.00
KSH02	148.23	148.24	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.05
KSH02	148.24	148.27	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.08

Borehole	Secup	Seclow	Rock type	Rock code	Matrix porosity
KSH02	148.28	148.33	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.02
KSH02	148.34	148.35	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.05
KSH02	148.36	148.39	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.05
KSH02	148.39	148.44	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.03
KSH02	159.96	159.99	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.20
KSH02	179.96	179.99	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.10
KSH02	219.66	219.69	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.12
KSH02	239.96	239.99	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.07
KSH02	259.83	259.86	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.05
KSH02	280.01	280.04	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.07
KSH02	299.95	299.98	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.34
KSH02	339.94	339.97	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.10
KSH02	360.06	360.09	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.68
KSH02	397.42	397.45	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	1.32
KSH02	397.45	397.48	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	1.41
KSH02	397.58	397.61	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	3.35
KSH02	397.61	397.64	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	3.35
KSH02	419.96	419.99	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.84
KSH02	459.69	459.72	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.27
KSH02	474.46	474.47	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.61
KSH02	474.47	474.48	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.40
KSH02	474.56	474.59	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.42
KSH02	474.60	474.65	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.10
KSH02	474.65	474.66	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.30
KSH02	474.66	474.67	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.20
KSH02	474.68	474.71	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.20
KSH02	474.71	474.76	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.31
KSH02	474.77	474.78	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.59
KSH02	474.78	474.79	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.47
KSH02	474.80	474.83	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.18
KSH02	474.86	474.91	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.42
KSH02	480.01	480.04	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.19
KSH02	500.01	500.04	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	1.33
KSH02	539.86	539.89	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.20
KSH02	560.06	560.09	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.21
KSH02	580.11	580.14	Granite, fine- to medium-grained	511058	0.07
KSH02	599.35	599.36	Granite, fine- to medium-grained	511058	0.32
KSH02	599.36	599.37	Granite, fine- to medium-grained	511058	0.28
KSH02	599.37	599.40	Granite, fine- to medium-grained	511058	0.19
KSH02	599.41	599.46	Granite, fine- to medium-grained	511058	0.20
KSH02	599.46	599.47	Granite, fine- to medium-grained	511058	0.23
KSH02	599.47	599.48	Granite, fine- to medium-grained	511058	0.26
KSH02	599.48	599.51	Granite, fine- to medium-grained	511058	0.19
KSH02	599.52	599.57	Granite, fine- to medium-grained	511058	0.24
KSH02	599.57	599.58	Granite, fine- to medium-grained	511058	0.40
KSH02	599.58	599.59	Granite, fine- to medium-grained	511058	0.25
KSH02	599.59	599.62	Granite, fine- to medium-grained	511058	0.29

Borehole	Secup	Seclow	Rock type	Rock code	Matrix porosity
KSH02	599.62	599.67	Granite, fine- to medium-grained	511058	0.24
KSH02	600.01	600.04	Granite, fine- to medium-grained	511058	0.17
KSH02	639.89	639.92	Granite, fine- to medium-grained	511058	0.30
KSH02	660.09	660.12	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.09
KSH02	680.16	680.19	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.31
KSH02	685.98	685.99	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.38
KSH02	685.99	686.00	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.25
KSH02	686.00	686.03	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.10
KSH02	686.04	686.09	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.08
KSH02	686.09	686.10	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.19
KSH02	686.10	686.11	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.25
KSH02	686.11	686.14	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.12
KSH02	686.15	686.20	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.04
KSH02	686.20	686.21	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.10
KSH02	686.21	686.22	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.05
KSH02	686.22	686.25	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.05
KSH02	686.26	686.31	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.05
KSH02	700.01	700.04	Granite, fine- to medium-grained	511058	0.20
KSH02	720.01	720.04	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.10
KSH02	740.01	740.04	Granite, fine- to medium-grained	511058	1.15
KSH02	760.17	760.20	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.14
KSH02	779.82	779.85	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.25
KSH02	819.91	819.94	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.42
KSH02	840.01	840.04	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.02
KSH02	859.96	859.99	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.21
KSH02	880.01	880.04	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.15
KSH02	900.01	900.04	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.17
KSH02	920.01	920.04	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.13
KSH02	940.01	940.04	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.13
KSH02	959.96	959.99	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.12
KSH02	979.96	979.99	Mafic rock, fine-grained	505102	0.20

Table A1-3.

Borehole	Secup	Seclow	Rock type	Rock code	Matrix porosity
KSH03A	176.63	176.66	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.54
KSH03A	176.66	176.67	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.87
KSH03A	188.96	188.99	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	5.83

Table A1-4.

Borehole	Secup	Seclow	Rock type	Rock code	Matrix porosity
KLX02	201.89	201.92	Granite to quartz monzodiorite, generally porphyritic	501044	0.30
KLX02	216.69	216.70	Granite to quartz monzodiorite, generally porphyritic	501044	0.35
KLX02	216.70	216.71	Granite to quartz monzodiorite, generally porphyritic	501044	0.23
KLX02	216.71	216.74	Granite to quartz monzodiorite, generally porphyritic	501044	0.13
KLX02	216.74	216.79	Granite to quartz monzodiorite, generally porphyritic	501044	0.15
KLX02	216.79	216.80	Granite to quartz monzodiorite, generally porphyritic	501044	0.44
KLX02	216.80	216.81	Granite to quartz monzodiorite, generally porphyritic	501044	0.28
KLX02	216.81	216.84	Granite to quartz monzodiorite, generally porphyritic	501044	0.19
KLX02	216.84	216.89	Granite to quartz monzodiorite, generally porphyritic	501044	0.16
KLX02	216.89	216.90	Granite to quartz monzodiorite, generally porphyritic	501044	0.43
KLX02	216.91	216.92	Granite to quartz monzodiorite, generally porphyritic	501044	0.33
KLX02	216.92	216.95	Granite to quartz monzodiorite, generally porphyritic	501044	0.21
KLX02	216.95	217.00	Granite to quartz monzodiorite, generally porphyritic	501044	0.19
KLX02	220.11	220.14	Granite to quartz monzodiorite, generally porphyritic	501044	0.36
KLX02	235.02	235.05	Granite to quartz monzodiorite, generally porphyritic	501044	0.36
KLX02	235.05	235.08	Granite to quartz monzodiorite, generally porphyritic	501044	0.39
KLX02	235.08	235.11	Granite to quartz monzodiorite, generally porphyritic	501044	0.39
KLX02	239.88	239.91	Granite to quartz monzodiorite, generally porphyritic	501044	0.28
KLX02	258.96	258.99	Granite to quartz monzodiorite, generally porphyritic	501044	0.23
KLX02	280.01	280.04	Granite to quartz monzodiorite, generally porphyritic	501044	0.19
KLX02	299.79	299.82	Granite to quartz monzodiorite, generally porphyritic	501044	0.21
KLX02	320.04	320.07	Granite to quartz monzodiorite, generally porphyritic	501044	0.13
KLX02	339.95	339.98	Granite to quartz monzodiorite, generally porphyritic	501044	0.17
KLX02	387.78	387.81	Mafic rock, fine-grained	505102	0.21
KLX02	420.02	420.05	Granite to quartz monzodiorite, generally porphyritic	501044	0.25
KLX02	440.21	440.24	Granite to quartz monzodiorite, generally porphyritic	501044	0.15
KLX02	459.69	459.72	Granite to quartz monzodiorite, generally porphyritic	501044	0.38
KLX02	480.02	480.05	Granite to quartz monzodiorite, generally porphyritic	501044	0.40
KLX02	499.95	499.98	Granite to quartz monzodiorite, generally porphyritic	501044	0.25
KLX02	519.63	519.66	Granite to quartz monzodiorite, generally porphyritic	501044	0.21
KLX02	540.03	540.06	Granite to quartz monzodiorite, generally porphyritic	501044	0.29
KLX02	560.72	560.75	Granite to quartz monzodiorite, generally porphyritic	501044	0.43
KLX02	579.77	579.80	Granite to quartz monzodiorite, generally porphyritic	501044	0.30
KLX02	600.19	600.22	Granite to quartz monzodiorite, generally porphyritic	501044	0.27
KLX02	620.79	620.82	Granite to quartz monzodiorite, generally porphyritic	501044	0.34
KLX02	639.93	639.96	Granite to quartz monzodiorite, generally porphyritic	501044	0.42
KLX02	680.83	680.86	Granite to quartz monzodiorite, generally porphyritic	501044	0.27
KLX02	682.34	682.37	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.06
KLX02	682.37	682.40	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.06
KLX02	682.40	682.43	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.12
KLX02	700.15	700.18	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	1.49
KLX02	754.00	754.03	Granite to quartz monzodiorite, generally porphyritic	501044	0.24
KLX02	839.39	839.42	Fine-grained dioritoid (Metavolcanite, volcanite)	505102	0.15
KLX02	859.70	859.73	Granite to quartz monzodiorite, generally porphyritic	501044	0.42
KLX02	880.95	880.98	Granite to quartz monzodiorite, generally porphyritic	501044	1.12
KLX02	898.04	898.07	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.04

Borehole	Secup	Seclow	Rock type	Rock code	Matrix porosity
KLX02	921.15	921.18	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.07
KLX02	936.32	936.35	Granite to quartz monzodiorite, generally porphyritic	501044	0.52
KLX02	936.44	936.47	Granite to quartz monzodiorite, generally porphyritic	501044	0.19
KLX02	936.50	936.53	Granite to quartz monzodiorite, generally porphyritic	501044	0.17
KLX02	936.53	936.56	Granite to quartz monzodiorite, generally porphyritic	501044	0.15
KLX02	938.42	938.45	Granite to quartz monzodiorite, generally porphyritic	501044	0.39
KLX02	959.56	959.59	Granite to quartz monzodiorite, generally porphyritic	501044	0.32
KLX02	979.92	979.95	Granite to quartz monzodiorite, generally porphyritic	501044	0.41
KLX02	998.20	998.23	Granite to quartz monzodiorite, generally porphyritic	501044	0.25

Table A1-5.

Borehole	Secup	Seclow	Rock type	Rock code	Matrix porosity
KLX03	662.10	662.13	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.78
KLX03	662.13	662.16	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.76
KLX03	662.16	662.19	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	1.03

Table A1-6.

Borehole	Secup	Seclow	Rock type	Rock code	Matrix porosity
KLX04	110.40	110.43	Granite to quartz monzodiorite, generally porphyritic	501044	0.24
KLX04	130.55	130.58	Granite to quartz monzodiorite, generally porphyritic	501044	0.46
KLX04	149.56	149.59	Granite to quartz monzodiorite, generally porphyritic	501044	0.27
KLX04	169.66	169.69	Granite, medium- to coarse-grained	501058	0.38
KLX04	190.62	190.65	Granite to quartz monzodiorite, generally porphyritic	501044	0.39
KLX04	209.72	209.75	Granite to quartz monzodiorite, generally porphyritic	501044	0.36
KLX04	236.78	236.81	Granite to quartz monzodiorite, generally porphyritic	501044	0.99
KLX04	256.72	256.75	Granite to quartz monzodiorite, generally porphyritic	501044	0.43
KLX04	277.66	277.69	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.39
KLX04	297.06	297.09	Granite to quartz monzodiorite, generally porphyritic	501044	0.89
KLX04	317.19	317.22	Granite to quartz monzodiorite, generally porphyritic	501044	0.36
KLX04	337.55	337.58	Granite to quartz monzodiorite, generally porphyritic	501044	0.22
KLX04	357.06	357.09	Granite to quartz monzodiorite, generally porphyritic	501044	0.36
KLX04	380.78	380.81	Granite to quartz monzodiorite, generally porphyritic	501044	0.63
KLX04	400.72	400.75	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.19
KLX04	419.62	419.65	Granite, medium- to coarse-grained	501058	0.76
KLX04	419.95	419.98	Granite, medium- to coarse-grained	501058	0.84
KLX04	436.57	436.60	Granite to quartz monzodiorite, generally porphyritic	501044	0.21
KLX04	460.09	460.12	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.12
KLX04	479.82	479.85	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.21
KLX04	489.48	489.49	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.32
KLX04	489.49	489.50	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.21
KLX04	489.50	489.53	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.09
KLX04	489.53	489.58	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.19
KLX04	489.60	489.61	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.21

Borehole	Secup	Seclow	Rock type	Rock code	Matrix porosity
KLX04	489.61	489.62	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.16
KLX04	489.62	489.65	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.15
KLX04	489.65	489.70	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.05
KLX04	489.73	489.74	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.22
KLX04	489.74	489.75	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.31
KLX04	489.75	489.78	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.10
KLX04	489.78	489.83	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.10
KLX04	499.07	499.10	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.08
KLX04	499.70	499.73	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.10
KLX04	519.84	519.87	Granite, fine- to medium-grained	511058	0.28
KLX04	539.68	539.71	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.12
KLX04	559.69	559.72	Granite to quartz monzodiorite, generally porphyritic	501044	0.33
KLX04	579.73	579.76	Granite to quartz monzodiorite, generally porphyritic	501044	0.43
KLX04	600.37	600.40	Granite to quartz monzodiorite, generally porphyritic	501044	0.27
KLX04	620.02	620.05	Granite to quartz monzodiorite, generally porphyritic	501044	0.39
KLX04	640.02	640.05	Granite to quartz monzodiorite, generally porphyritic	501044	0.29
KLX04	659.81	659.84	Granite to quartz monzodiorite, generally porphyritic	501044	0.33
KLX04	680.77	680.80	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.09
KLX04	700.20	700.23	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.26
KLX04	718.21	718.24	Granite, fine- to medium-grained	511058	0.22
KLX04	718.24	718.27	Granite, fine- to medium-grained	511058	0.22
KLX04	718.27	718.30	Granite, fine- to medium-grained	511058	0.22
KLX04	719.37	719.40	Granite, fine- to medium-grained	511058	0.26
KLX04	726.07	726.10	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.08
KLX04	740.40	740.43	Granite to quartz monzodiorite, generally porphyritic	501044	0.25
KLX04	759.83	759.86	Granite to quartz monzodiorite, generally porphyritic	501044	0.22
KLX04	780.73	780.76	Granite to quartz monzodiorite, generally porphyritic	501044	0.20
KLX04	800.02	800.05	Granite to quartz monzodiorite, generally porphyritic	501044	0.15
KLX04	820.90	820.93	Granite to quartz monzodiorite, generally porphyritic	501044	0.23
KLX04	840.17	840.20	Granite to quartz monzodiorite, generally porphyritic	501044	0.22
KLX04	860.28	860.31	Fine-grained diorite-gabbro	505102	0.16
KLX04	880.25	880.28	Granite to quartz monzodiorite, generally porphyritic	501044	1.45
KLX04	899.89	899.92	Granite to quartz monzodiorite, generally porphyritic	501044	0.41
KLX04	920.40	920.43	Granite to quartz monzodiorite, generally porphyritic	501044	0.80
KLX04	939.77	939.80	Granite to quartz monzodiorite, generally porphyritic	501044	0.79
KLX04	978.72	978.75	Granite to quartz monzodiorite, generally porphyritic	501044	0.33

Table A1-7.

Borehole	Secup	Seclow	Rock type	Rock code	Matrix porosity
KLX05	364.02	364.05	Diorite to gabbro	501033	0.06
KLX05	552.68	552.71	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.18
KLX05	722.49	722.52	Granite, fine- to medium-grained	511058	0.15

Table A1-8.

Borehole	Secup	Seclow	Rock type	Rock code	Matrix porosity
KLX06	246.02	246.05	Granite to quartz monzodiorite, generally porphyritic	501044	0.32
KLX06	402.41	402.44	Granite, medium- to coarse-grained	501058	4.19

Table A1-9.

Borehole	Secup	Seclow	Rock type	Rock code	Matrix porosity
KLX07A	622.31	622.34	Granite to quartz monzodiorite, generally porphyritic	501044	0.63

Table A1-10.

Borehole	Secup	Seclow	Rock type	Rock code	Matrix porosity
KLX08	417.05	417.08	Granite to quartz monzodiorite, generally porphyritic	501044	0.45

Table A1-11.

Borehole	Secup	Seclow	Rock type	Rock code	Matrix porosity
KLX10	159.16	159.19	Granite to quartz monzodiorite, generally porphyritic	501044	8.28
KLX10	235.25	235.28	Granite, fine- to medium-grained	511058	0.16
KLX10	237.20	237.23	Granite, fine- to medium-grained	511058	0.13
KLX10	280.21	280.24	Granite, fine- to medium-grained	511058	0.25
KLX10	330.24	330.27	Mafic rock, fine-grained	505102	1.15
KLX10	331.47	331.50	Mafic rock, fine-grained	505102	0.51
KLX10	577.70	577.73	Granite to quartz monzodiorite, generally porphyritic	501044	0.32
KLX10	768.04	768.07	Mafic rock, fine-grained	505102	0.11
KLX10	790.41	790.44	Mafic rock, fine-grained	505102	0.21
KLX10	995.79	995.82	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.06

Table A1-12.

Borehole	Secup	Seclow	Rock type	Rock code	Matrix porosity
KLX11A	306.37	306.40	Granite, fine- to medium-grained	511058	0.73
KLX11A	326.15	326.18	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.16
KLX11A	346.45	346.48	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	3.74
KLX11A	366.35	366.38	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.16
KLX11A	386.69	386.72	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.09
KLX11A	406.18	406.21	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.09
KLX11A	426.63	426.66	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	1.32
KLX11A	446.92	446.95	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.09
KLX11A	466.28	466.31	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.52
KLX11A	486.49	486.52	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.17
KLX11A	506.39	506.42	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.91
KLX11A	526.92	526.95	Mafic rock, fine-grained	505102	0.05
KLX11A	540.89	540.92	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.03
KLX11A	565.14	565.17	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.03
KLX11A	586.36	586.39	Mafic rock, fine-grained	505102	0.03
KLX11A	607.35	607.38	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.00
KLX11A	627.46	627.49	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.07
KLX11A	646.63	646.66	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.12
KLX11A	666.98	667.01	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.14
KLX11A	686.13	686.16	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.20

Table A1-13.

Borehole	Secup	Seclow	Rock type	Rock code	Matrix porosity
KLX12A	240.24	240.26	Granite to quartz monzodiorite, generally porphyritic	501044	0.34
KLX12A	240.69	240.71	Granite to quartz monzodiorite, generally porphyritic	501044	0.35
KLX12A	430.50	430.53	Diorite to gabbro	501033	0.05

Table A1-14.

Borehole	Secup	Seclow	Rock type	Rock code	Matrix porosity
KLX13A	121.06	121.09	Granite to quartz monzodiorite, generally porphyritic	501044	0.15
KLX13A	122.10	122.13	Granite to quartz monzodiorite, generally porphyritic	501044	0.23
KLX13A	273.62	273.65	Granite to quartz monzodiorite, generally porphyritic	501044	0.20
KLX13A	373.36	373.69	Granite to quartz monzodiorite, generally porphyritic	501044	0.26

Matrix diffusivity and rock capacity factor.

Appendix 2 contains results from through-diffusion experiments. Matrix diffusivity, D_e , (also denoted effective diffusivity) and α , the rock capacity factor was obtained from least square fits of experimental data to Equation 1 and Equation 2 (the linear form).

Table A2-1.

Borehole	Secup	Seclow	Sample length (mm)	Rock type	Rock code	D_e from Equation 1 (m ² /s)	D_e from Equation 2 (m ² /s)	α from Equation 1	α from Equation 2
KSH01A	39.59	39.62	30	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	4.3E-15	4.5E-15	3.1E-04	3.6E-04
KSH01A	140.68	140.71	31	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	2.3E-14	2.2E-14	4.6E-03	3.8E-03
KSH01A	219.36	219.39	30	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	2.4E-15	2.5E-15	5.7E-05	5.9E-05
KSH01A	222.72	222.73	10	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	2.7E-15	2.9E-15	2.5E-03	3.0E-03
KSH01A	222.73	222.76	30	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	3.0E-15	3.5E-15	2.6E-04	2.0E-04
KSH01A	280.23	280.26	30	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	9.3E-14	9.3E-14	1.0E-02	1.0E-02
KSH01A	891.66	891.67	5	Granite to quartz monzodiorite, generally porphyritic	501044	1.3E-12	1.3E-12	1.3E-02	1.5E-02
KSH01A	891.67	891.68	10	Granite to quartz monzodiorite, generally porphyritic	501044	1.0E-12	1.0E-12	4.6E-03	4.9E-03
KSH01A	891.69	891.72	30	Granite to quartz monzodiorite, generally porphyritic	501044	9.2E-13	9.3E-13	1.3E-02	1.4E-02
KSH01A	891.72	891.77	50	Granite to quartz monzodiorite, generally porphyritic	501044	9.0E-13	9.2E-13	3.0E-03	4.1E-03
KSH01A	891.77	891.78	5	Granite to quartz monzodiorite, generally porphyritic	501044	1.0E-12	1.0E-12	1.5E-02	1.8E-02
KSH01A	891.78	891.77	10	Granite to quartz monzodiorite, generally porphyritic	501044	1.1E-12	1.2E-12	n.e. ¹⁾	n.e. ¹⁾
KSH01A	891.80	891.83	30	Granite to quartz monzodiorite, generally porphyritic	501044	9.8E-13	9.9E-13	1.3E-02	1.5E-02
KSH01A	891.83	891.88	30	Granite to quartz monzodiorite, generally porphyritic	501044	8.8E-13	8.6E-13	1.0E-02	9.8E-03
KSH01A	891.88	891.89	10	Granite to quartz monzodiorite, generally porphyritic	501044	1.1E-12	1.1E-12	1.0E-02	1.1E-02
KSH01A	891.91	891.94	30	Granite to quartz monzodiorite, generally porphyritic	501044	1.1E-12	1.1E-12	1.2E-02	1.2E-02
KSH01A	940.81	940.84	30	Granite to quartz monzodiorite, generally porphyritic	501044	4.4E-13	4.4E-13	9.5E-03	9.7E-03
KSH01A	981.43	981.46	30	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	4.8E-13	4.9E-13	8.8E-03	9.7E-03
KSH01A	981.46	981.49	30	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	4.2E-13	4.2E-13	1.1E-02	1.2E-02
KSH01A	981.50	981.53	30	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	3.7E-13	3.8E-13	7.4E-03	8.4E-03

1) Capacity factor not evaluated.

Table A2-2.

Borehole	Secup	Seclow	Sample length (mm)	Rock type	Rock code	D_e from Equation 1 (m^2/s)	D_e from Equation 2 (m^2/s)	α from Equation 1	α from Equation 2
KSH02	299.95	299.98	18	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	3.2E-14	3.1E-14	9.6E-03	8.6E-03
KSH02	339.94	339.97	30	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	3.8E-15	3.7E-15	2.7E-04	2.3E-04
KSH02	397.58	397.61	30	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	2.0E-12	2.0E-12	4.1E-02	3.7E-02
KSH02	397.61	397.64	30	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	1.6E-12	1.6E-12	4.5E-02	4.2E-02
KSH02	474.46	474.47	5	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	1.0E-13	1.0E-13	1.7E-02	1.8E-02
KSH02	474.47	474.48	10	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	5.1E-14	5.2E-14	6.6E-03	7.0E-03
KSH02	474.56	474.59	30	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	1.4E-13	1.4E-13	3.8E-03	4.2E-03
KSH02	474.6	474.65	50	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	1.4E-14	1.4E-14	5.8E-04	5.6E-04
KSH02	474.65	474.66	5	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	8.7E-14	8.8E-14	9.9E-03	1.3E-02
KSH02	474.66	474.67	10	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	9.5E-14	9.6E-14	1.2E-02	1.2E-02
KSH02	474.68	474.71	30	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	6.6E-14	6.6E-14	2.5E-03	2.6E-03
KSH02	474.71	474.76	50	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	5.1E-13	5.2E-13	3.7E-03	4.2E-03
KSH02	474.77	474.78	5	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	4.8E-13	4.8E-13	1.9E-02	2.0E-02
KSH02	474.78	474.79	10	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	8.5E-13	8.5E-13	1.7E-02	1.5E-02
KSH02	474.8	474.83	30	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	7.1E-14	7.2E-14	2.0E-03	2.1E-03
KSH02	474.86	474.91	43	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	1.2E-13	1.2E-13	4.5E-03	4.4E-03
KSH02	480.01	480.04	30	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	1.2E-14	1.2E-14	1.7E-03	1.5E-03
KSH02	600.01	600.04	30	Granite, fine- to medium-grained	511058	8.4E-14	8.5E-14	3.1E-03	3.2E-03
KSH02	660.09	660.12	30	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	3.1E-15	3.1E-15	1.6E-04	1.9E-04

Table A2-3.

Borehole	Secup	Seclow	Sample length (mm)	Rock type	Rock code	D_e from Equation 1 (m^2/s)	D_e from Equation 2 (m^2/s)	α from Equation 1	α from Equation 2
KSH03A	176.63	176.66	30	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	3.0E-13	2.9E-13	1.3E-02	1.0E-02
KSH03A	176.66	176.67	10	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	2.9E-13	2.7E-13	5.0E-02	3.3E-02
KSH03A	188.96	188.99	30	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	1.6E-11	1.6E-11	1.0E-01	9.8E-02

Table A2-4.

Borehole	Secup	Seclow	Sample length (mm)	Rock type	Rock code	D_e from Equation 1 (m^2/s)	D_e from Equation 2 (m^2/s)	α from Equation 1	α from Equation 2
KLX02	216.70	216.71	10	Granite to quartz monzodiorite, generally porphyritic	501044	1.1E-13	1.1E-13	n.e. ¹⁾	n.e. ¹⁾
KLX02	216.71	216.74	30	Granite to quartz monzodiorite, generally porphyritic	501044	4.9E-14	4.8E-14	1.6E-03	1.5E-03
KLX02	216.74	216.79	50	Granite to quartz monzodiorite, generally porphyritic	501044	2.7E-14	2.7E-14	4.3E-04	4.3E-04
KLX02	216.80	216.81	10	Granite to quartz monzodiorite, generally porphyritic	501044	1.1E-13	1.3E-13	n.e. ¹⁾	n.e. ¹⁾
KLX02	216.81	216.84	30	Granite to quartz monzodiorite, generally porphyritic	501044	5.6E-14	5.7E-14	2.0E-03	2.0E-03
KLX02	216.84	216.89	50	Granite to quartz monzodiorite, generally porphyritic	501044	3.2E-14	3.2E-14	6.1E-04	6.3E-04
KLX02	216.91	216.92	10	Granite to quartz monzodiorite, generally porphyritic	501044	1.6E-13	1.8E-13	2.2E-03	6.0E-03
KLX02	216.92	216.95	30	Granite to quartz monzodiorite, generally porphyritic	501044	8.3E-14	8.3E-14	3.5E-03	3.5E-03
KLX02	216.95	217.00	50	Granite to quartz monzodiorite, generally porphyritic	501044	3.4E-14	3.4E-14	6.8E-04	6.8E-04
KLX02	235.02	235.05	30	Granite to quartz monzodiorite, generally porphyritic	501044	6.5E-13	6.4E-13	1.0E-02	9.4E-03
KLX02	235.05	235.08	30	Granite to quartz monzodiorite, generally porphyritic	501044	6.1E-13	6.0E-13	1.0E-02	9.6E-03
KLX02	235.08	235.11	30	Granite to quartz monzodiorite, generally porphyritic	501044	6.8E-13	6.8E-13	1.4E-02	1.4E-02
KLX02	258.96	258.99	30	Granite to quartz monzodiorite, generally porphyritic	501044	1.0E-13	1.0E-13	3.3E-03	3.3E-03
KLX02	387.78	387.81	30	Mafic rock, fine-grained	505102	2.1E-13	2.1E-13	4.6E-03	4.8E-03
KLX02	600.19	600.22	30	Granite to quartz monzodiorite, generally porphyritic	501044	1.7E-13	1.7E-13	1.3E-02	1.3E-02
KLX02	682.34	682.37	30	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	1.7E-14	1.8E-14	1.0E-03	1.3E-03
KLX02	682.37	682.40	30	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	1.8E-14	1.9E-14	1.1E-03	1.3E-03
KLX02	682.40	682.43	30	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	2.1E-14	2.1E-14	1.5E-03	1.6E-03
KLX02	936.44	936.47	30	Granite to quartz monzodiorite, generally porphyritic	501044	1.3E-13	1.3E-13	1.2E-03	2.1E-03
KLX02	936.50	936.53	30	Granite to quartz monzodiorite, generally porphyritic	501044	9.8E-14	9.2E-14	6.2E-03	5.1E-03
KLX02	936.53	936.56	30	Granite to quartz monzodiorite, generally porphyritic	501044	8.1E-14	7.6E-14	n.e. ¹⁾	6.5E-04

1) Capacity factor not evaluated.

Table A2-5.

Borehole	Secup	Seclow	Sample length (mm)	Rock type	Rock code	D_e from Equation 1 (m^2/s)	D_e from Equation 2 (m^2/s)	α from Equation 1	α from Equation 2
KLX03	662.1	662.13	30	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	4.5E-13	4.8E-13	n.e. ¹⁾	n.e. ¹⁾
KLX03	662.13	662.16	30	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	7.5E-13	7.2E-13	1.5E-02	1.2E-02
KLX03	662.16	662.19	30	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	7.8E-13	7.5E-13	2.0E-02	1.7E-02
KLX03	725.5	725.54	40	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	4.5E-12	4.5E-12	4.5E-02	4.2E-02

Table A2-6.

Borehole	Secup	Seclow	Sample length (mm)	Rock type	Rock code	D _o from Equation 1 (m ² /s)	D _o from Equation 2 (m ² /s)	α from Equation 1	α from Equation 2
KLX04	277.66	277.69	30	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	4.8E-14	5.0E-14	2.9E-03	3.2E-03
KLX04	489.49	489.50	10	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	1.3E-13	1.3E-13	n.e. ¹⁾	n.e. ¹⁾
KLX04	489.50	489.53	30	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	1.1E-13	1.1E-13	n.e. ¹⁾	n.e. ¹⁾
KLX04	489.53	489.58	50	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	2.9E-13	3.2E-13	n.e. ¹⁾	n.e. ¹⁾
KLX04	489.61	489.62	10	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	5.6E-14	5.2E-14	n.e. ^c	n.e. ¹⁾
KLX04	489.65	489.70	50	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	> 1.8E-14	> 1.8E-14	n.e. ¹⁾	n.e. ¹⁾
KLX04	489.75	489.78	30	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	2.0E-14	8.0E-04	2.1E-14	8.5E-04
KLX04	718.21	718.24	30	Granite, fine- to medium-grained	511058	9.4E-14	9.7E-14	3.1E-03	3.3E-03
KLX04	718.24	718.27	30	Granite, fine- to medium-grained	511058	1.2E-13	1.2E-13	n.e. ¹⁾	n.e. ¹⁾
KLX04	718.27	718.30	30	Granite, fine- to medium-grained	511058	1.3E-13	1.4E-13	n.e. ¹⁾	n.e. ¹⁾
KLX04	719.37	719.40	30	Granite, fine- to medium-grained	511058	5.0E-14	5.2E-14	1.5E-03	1.9E-03
KLX04	920.40	920.43	30	Granite to quartz monzodiorite, generally porphyritic	501044	4.5E-13	4.5E-13	1.5E-02	1.5E-02

1) Capacity factor not evaluated.

Table A2-7.

Borehole	Secup	Seclow	Sample length (mm)	Rock type	Rock code	D _o from Equation 1 (m ² /s)	D _o from Equation 2 (m ² /s)	α from Equation 1	α from Equation 2
KLX06	402.41	402.44	30	Granite, medium- to coarse-grained	501058	2.4E-12	2.4E-12	2.2E-02	2.2E-02

Appendix 3

BET measurements

BET surface area are measured using double samples of the fractions 0.063–0.125 mm and 2–4 mm of crushed and sieved rock samples, or scraped fracture filling material, < 0.125 mm. Tables in Appendix 3 are presented per drill-site.

Table A3-1.

Borehole	Secup	Seclow	Rock type	Rock code	BET 2–4 mm (m ² /g)	BET 0.063–0.125 mm (m ² /g)	BET < 0.125 mm (m ² /g)	Comment
KSH01A	5.83	6.03	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.0142			
KSH01A	5.83	6.03	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.0520			
KSH01A	5.83	6.03	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036		0.2865		
KSH01A	5.83	6.03	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036		0.3215		
KSH01A	222.77	222.86	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.0346			
KSH01A	222.77	222.86	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.0385			
KSH01A	222.77	222.86	Fine-grained dioritoid (Metavolcanite, volcanite)	501030		0.5381		
KSH01A	222.77	222.86	Fine-grained dioritoid (Metavolcanite, volcanite)	501030		0.5411		
KSH01A	662.90	663.05	Granite to quartz monzodiorite, generally porphyritic	501044	0.0576			
KSH01A	662.90	663.05	Granite to quartz monzodiorite, generally porphyritic	501044	0.0662			
KSH01A	662.90	663.05	Granite to quartz monzodiorite, generally porphyritic	501044		1.1159		
KSH01A	662.90	663.05	Granite to quartz monzodiorite, generally porphyritic	501044		1.1208		
KSH01A	715.24	715.39	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.0699			
KSH01A	715.24	715.39	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.0580			
KSH01A	715.24	715.39	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036		1.0536		
KSH01A	715.24	715.39	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036		1.0808		
KSH01A	981.14	981.29	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.0447			
KSH01A	981.14	981.29	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.0570			
KSH01A	981.14	981.29	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036		0.3464		
KSH01A	981.14	981.29	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036		0.3558		

Table A3-2.

Borehole	Secup	Seclow	Rock type	Rock code	BET 2–4 mm (m ² /g)	BET 0.063–0.125 mm (m ² /g)	BET < 0.125 mm (m ² /g)	Comment
KSH02	148.77	148.96	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.0512			
KSH02	148.77	148.96	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.0490			
KSH02	148.77	148.96	Fine-grained dioritoid (Metavolcanite, volcanite)	501030		0.5177		
KSH02	148.77	148.96	Fine-grained dioritoid (Metavolcanite, volcanite)	501030		0.5088		
KSH02	288.86	289.85	Fine-grained dioritoid (Metavolcanite, volcanite)	501030			9.4792	Fracture filling
KSH02	288.86	289.85	Fine-grained dioritoid (Metavolcanite, volcanite)	501030			9.4674	Fracture filling
KSH02	397.40	397.58	Fine-grained dioritoid (Metavolcanite, volcanite)	501030			24.2604	Fracture filling
KSH02	473.80	474.00	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.0880			
KSH02	473.80	474.00	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.0796			
KSH02	473.80	474.00	Fine-grained dioritoid (Metavolcanite, volcanite)	501030		0.8549		
KSH02	473.80	474.00	Fine-grained dioritoid (Metavolcanite, volcanite)	501030		0.9049		
KSH02	578.23	578.73	Granite, fine- to medium-grained	511058			6.4066	Fracture filling
KSH02	578.23	578.73	Granite, fine- to medium-grained	511058			6.1294	Fracture filling
KSH02	599.83	600.00	Granite, fine- to medium-grained	511058	0.0740			
KSH02	599.83	600.00	Granite, fine- to medium-grained	511058	0.0753			
KSH02	599.83	600.00	Granite, fine- to medium-grained	511058		0.3170		
KSH02	599.83	600.00	Granite, fine- to medium-grained	511058		0.3551		
KSH02	686.50	686.70	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.0193			
KSH02	686.50	686.70	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.0330			
KSH02	686.50	686.70	Fine-grained dioritoid (Metavolcanite, volcanite)	501030		0.3641		
KSH02	686.50	686.70	Fine-grained dioritoid (Metavolcanite, volcanite)	501030		0.3472		
KSH02	742.55	743.30	Granite, fine- to medium-grained	511058	6.2570			
KSH02	742.55	743.30	Granite, fine- to medium-grained	511058	5.7301			
KSH02	742.55	743.30	Granite, fine- to medium-grained	511058		10.0417		
KSH02	742.55	743.30	Granite, fine- to medium-grained	511058		10.0619		

Table A3-3.

Borehole	Secup	Seclow	Rock type	Rock code	BET 2–4 mm (m ² /g)	BET 0.063–0.125 mm (m ² /g)	BET < 0.125 mm (m ² /g)	Comment
KSH03A	164.75	165.00	Granite to quartz monzodiorite, generally porphyritic	501044	2.2122			
KSH03A	164.75	165.00	Granite to quartz monzodiorite, generally porphyritic	501044	1.3588			
KSH03A	164.75	165.00	Granite to quartz monzodiorite, generally porphyritic	501044		13.4226		
KSH03A	164.75	165.00	Granite to quartz monzodiorite, generally porphyritic	501044		12.6572		

Table A3-4.

Borehole	Secup	Seclow	Rock type	Rock code	BET 2–4 mm (m ² /g)	BET 0.063–0.125 mm (m ² /g)	BET < 0.125 mm (m ² /g)	Comment
KLX02	217.00	217.20	Granite to quartz monzodiorite, generally porphyritic	501044	0.0569			
KLX02	217.00	217.20	Granite to quartz monzodiorite, generally porphyritic	501044	0.0655			
KLX02	217.00	217.20	Granite to quartz monzodiorite, generally porphyritic	501044		0.3985		
KLX02	217.00	217.20	Granite to quartz monzodiorite, generally porphyritic	501044		0.4016		
KLX02	235.11	235.31	Granite to quartz monzodiorite, generally porphyritic	501044	0.0437			
KLX02	235.11	235.31	Granite to quartz monzodiorite, generally porphyritic	501044	0.0451			
KLX02	235.11	235.31	Granite to quartz monzodiorite, generally porphyritic	501044		0.2687		
KLX02	235.11	235.31	Granite to quartz monzodiorite, generally porphyritic	501044		0.2919		
KLX02	359.83	360.03	Granite to quartz monzodiorite, generally porphyritic	501044	0.0504			
KLX02	359.83	360.03	Granite to quartz monzodiorite, generally porphyritic	501044	0.0452			
KLX02	359.83	360.03	Granite to quartz monzodiorite, generally porphyritic	501044		0.3407		
KLX02	359.83	360.03	Granite to quartz monzodiorite, generally porphyritic	501044		0.2938		
KLX02	385.50	385.60	Mafic rock, fine-grained	505102			2.5022	Fracture filling
KLX02	385.50	385.60	Mafic rock, fine-grained	505102			1.9591	Fracture filling
KLX02	387.53	387.73	Mafic rock, fine-grained	505102	0.0869			
KLX02	387.53	387.73	Mafic rock, fine-grained	505102	0.0720			
KLX02	387.53	387.73	Mafic rock, fine-grained	505102		0.7688		

Borehole	Secup	Seclow	Rock type	Rock code	BET 2–4 mm (m ² /g)	BET 0.063–0.125 mm (m ² /g)	BET < 0.125 mm (m ² /g)	Comment
KLX02	387.53	387.73	Mafic rock, fine-grained	505102		0.8004		
KLX02	509.50	509.70	Granite to quartz monzodiorite, generally porphyritic	501044	0.0252			
KLX02	509.50	509.70	Granite to quartz monzodiorite, generally porphyritic	501044	0.0333			
KLX02	509.50	509.70	Granite to quartz monzodiorite, generally porphyritic	501044			0.2641	
KLX02	509.50	509.70	Granite to quartz monzodiorite, generally porphyritic	501044			0.2441	
KLX02	540.42	540.62	Granite to quartz monzodiorite, generally porphyritic	501044	0.0439			
KLX02	540.42	540.62	Granite to quartz monzodiorite, generally porphyritic	501044	0.0457			
KLX02	540.42	540.62	Granite to quartz monzodiorite, generally porphyritic	501044			0.5406	
KLX02	540.42	540.62	Granite to quartz monzodiorite, generally porphyritic	501044			0.5771	
KLX02	682.70	682.90	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.0322			
KLX02	682.70	682.90	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.0425			
KLX02	682.70	682.90	Fine-grained dioritoid (Metavolcanite, volcanite)	501030			0.3501	
KLX02	682.70	682.90	Fine-grained dioritoid (Metavolcanite, volcanite)	501030			0.3660	
KLX02	753.80	754.00	Granite to quartz monzodiorite, generally porphyritic	501044	0.0489			
KLX02	753.80	754.00	Granite to quartz monzodiorite, generally porphyritic	501044	0.0352			
KLX02	753.80	754.00	Granite to quartz monzodiorite, generally porphyritic	501044			0.4322	
KLX02	753.80	754.00	Granite to quartz monzodiorite, generally porphyritic	501044			0.4402	
KLX02	805.05	805.23	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.1012			
KLX02	805.05	805.23	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.1016			
KLX02	805.05	805.23	Fine-grained dioritoid (Metavolcanite, volcanite)	501030			0.8058	
KLX02	805.05	805.23	Fine-grained dioritoid (Metavolcanite, volcanite)	501030			0.8450	
KLX02	936.11	936.37	Granite to quartz monzodiorite, generally porphyritic	501044	0.0984			
KLX02	936.11	936.37	Granite to quartz monzodiorite, generally porphyritic	501044	0.0927			
KLX02	936.11	936.37	Granite to quartz monzodiorite, generally porphyritic	501044			0.6153	
KLX02	936.11	936.37	Granite to quartz monzodiorite, generally porphyritic	501044			0.5803	

Table A3-5.

Borehole	Secup	Seclow	Rock type	Rock code	BET 2–4 mm (m ² /g)	BET 0.063–0.125 mm (m ² /g)	BET < 0.125 mm (m ² /g)	Comment
KLX03	278.27	278.39	Granite to quartz monzodiorite, generally porphyritic	501044		23.4761		
KLX03	278.27	278.39	Granite to quartz monzodiorite, generally porphyritic	501044		24.7734		
KLX03	457.42	457.51	Granite to quartz monzodiorite, generally porphyritic	501044			15.0154	single sample
KLX03	522.61	523.00	Granite to quartz monzodiorite, generally porphyritic	501044	0.0350			
KLX03	522.61	523.00	Granite to quartz monzodiorite, generally porphyritic	501044	0.0356			
KLX03	522.61	523.00	Granite to quartz monzodiorite, generally porphyritic	501044		0.2809		
KLX03	522.61	523.00	Granite to quartz monzodiorite, generally porphyritic	501044		0.2196		
KLX03	732.59	733.07	Mafic rock, fine-grained	505102			7.8928	Fracture filling
KLX03	732.59	733.07	Mafic rock, fine-grained	505102			7.8815	Fracture filling
KLX03	734.16	734.35	Granite, fine- to medium-grained	511058	0.1672			
KLX03	734.16	734.35	Granite, fine- to medium-grained	511058	0.2121			
KLX03	734.16	734.35	Granite, fine- to medium-grained	511058		1.7806		
KLX03	734.16	734.35	Granite, fine- to medium-grained	511058		1.8319		
KLX03	736.96	737.23	Mafic rock, fine-grained	505102			2.7392	Fracture filling
KLX03	736.96	737.23	Mafic rock, fine-grained	505102			2.6348	Fracture filling

Table A3-6.

Borehole	Secup	Seclow	Rock type	Rock code	BET 2–4 mm (m ² /g)	BET 0.063–0.125 mm (m ² /g)	BET < 0.125 mm (m ² /g)	Comment
KLX04	347.24	347.36	Granite to quartz monzodiorite, generally porphyritic	501044			23.4963	Fracture filling
KLX04	347.24	347.36	Granite to quartz monzodiorite, generally porphyritic	501044			23.9390	Fracture filling
KLX04	464.62	465.07	Granite to quartz monzodiorite, generally porphyritic	501044	0.0259			
KLX04	464.62	465.07	Granite to quartz monzodiorite, generally porphyritic	501044	0.0181			
KLX04	464.62	465.07	Granite to quartz monzodiorite, generally porphyritic	501044		0.3501		
KLX04	464.62	465.07	Granite to quartz monzodiorite, generally porphyritic	501044		0.2910		
KLX04	489.85	490.25	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.0404			
KLX04	489.85	490.25	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.0431			
KLX04	489.85	490.25	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036		0.4348		
KLX04	489.85	490.25	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036		0.3412		
KLX04	718.91	719.36	Granite, fine- to medium-grained	511058	0.0145			
KLX04	718.91	719.36	Granite, fine- to medium-grained	511058	0.0441			
KLX04	718.91	719.36	Granite, fine- to medium-grained	511058		0.2796		
KLX04	718.91	719.36	Granite, fine- to medium-grained	511058		0.2540		
KLX04	724.27	724.73	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.0162			
KLX04	724.27	724.73	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.0155			
KLX04	724.27	724.73	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036		0.6641		
KLX04	724.27	724.73	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036		0.6453		
KLX04	874.48	874.54	Granite to quartz monzodiorite, generally porphyritic	501044			25.2417	Fracture filling
KLX04	874.48	874.54	Granite to quartz monzodiorite, generally porphyritic	501044			24.4605	Fracture filling
KLX04	951.30	951.44	Granite to quartz monzodiorite, generally porphyritic	501044	3.6976			
KLX04	951.30	951.44	Granite to quartz monzodiorite, generally porphyritic	501044	3.0477			
KLX04	951.30	951.44	Granite to quartz monzodiorite, generally porphyritic	501044			7.2829	
KLX04	951.30	951.44	Granite to quartz monzodiorite, generally porphyritic	501044			7.2313	

Table A3-7.

Borehole	Secup	Seclow	Rock type	Rock code	BET 2–4 mm (m ² /g)	BET 0.063–0.125 mm (m ² /g)	BET < 0.125 mm (m ² /g)	Comment
KLX05	364.21	364.61	Diorite to gabbro	501033	0.0472			
KLX05	364.21	364.61	Diorite to gabbro	501033	0.0585			
KLX05	364.21	364.61	Diorite to gabbro	501033		0.4830		
KLX05	364.21	364.61	Diorite to gabbro	501033		0.4907		
KLX05	428.57	428.97	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.0759			
KLX05	428.57	428.97	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.0649			
KLX05	428.57	428.97	Fine-grained dioritoid (Metavolcanite, volcanite)	501030		0.9137		
KLX05	428.57	428.97	Fine-grained dioritoid (Metavolcanite, volcanite)	501030		0.9281		
KLX05	461.77	462.17	Granite to quartz monzodiorite, generally porphyritic	501044	0.0552			
KLX05	461.77	462.17	Granite to quartz monzodiorite, generally porphyritic	501044	0.0361			
KLX05	461.77	462.17	Granite to quartz monzodiorite, generally porphyritic	501044		0.2505		
KLX05	461.77	462.17	Granite to quartz monzodiorite, generally porphyritic	501044		0.3627		
KLX05	482.30	482.70	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.0982			
KLX05	482.30	482.70	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.0889			
KLX05	482.30	482.70	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036		0.8724		
KLX05	482.30	482.70	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036		0.9056		
KLX05	605.91	606.31	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.0124			
KLX05	605.91	606.31	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.0250			
KLX05	605.91	606.31	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036		0.4162		
KLX05	605.91	606.31	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036		0.5158		
KLX05	723.50	723.90	Granite, fine- to medium-grained	511058	0.0860			
KLX05	723.50	723.90	Granite, fine- to medium-grained	511058	0.0818			
KLX05	723.50	723.90	Granite, fine- to medium-grained	511058		0.3587		
KLX05	723.50	723.90	Granite, fine- to medium-grained	511058		0.3538		
KLX05	921.53	921.93	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.0328			
KLX05	921.53	921.93	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.0237			
KLX05	921.53	921.93	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036		0.3247		
KLX05	921.53	921.93	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036		0.3367		

Table A3-8.

Borehole	Secup	Seclow	Rock type	Rock code	BET 2–4 mm (m ² /g)	BET 0.063–0.125 mm (m ² /g)	BET < 0.125 mm (m ² /g)	Comment
KLX06	384.00	384.04	Mafic rock, fine-grained	505102	9.7944			Single sample
KLX06	384.00	384.04	Mafic rock, fine-grained	505102		24.1907		
KLX06	384.00	384.04	Mafic rock, fine-grained	505102		24.0593		

Table A3-9.

Borehole	Secup	Seclow	Rock type	Rock code	BET 2–4 mm (m ² /g)	BET 0.063–0.125 mm (m ² /g)	BET < 0.125 mm (m ² /g)	Comment
KLX07A	570.52	571.02	Granite to quartz monzodiorite, generally porphyritic	501044	0.0639			
KLX07A	570.52	571.02	Granite to quartz monzodiorite, generally porphyritic	501044	0.0712			
KLX07A	570.52	571.02	Granite to quartz monzodiorite, generally porphyritic	501044		0.5038		
KLX07A	570.52	571.02	Granite to quartz monzodiorite, generally porphyritic	501044		0.3730		
KLX07A	756.40	756.52	Granite to quartz monzodiorite, generally porphyritic	501044			8.0553	Single sample

Table A3-10.

Borehole	Secup	Seclow	Rock type	Rock code	BET 2–4 mm (m ² /g)	BET 0.063–0.125 mm (m ² /g)	BET < 0.125 mm (m ² /g)	Comment
KLX08	408.03	408.08	Granite to quartz monzodiorite, generally porphyritic	501044	16.3135			Single sample
KLX08	408.03	408.08	Granite to quartz monzodiorite, generally porphyritic	501044			10.5052	Single sample
KLX08	503.94	504.34	Granite to quartz monzodiorite, generally porphyritic	501044	0.0032			
KLX08	503.94	504.34	Granite to quartz monzodiorite, generally porphyritic	501044	0.0024			
KLX08	503.94	504.34	Granite to quartz monzodiorite, generally porphyritic	501044		0.0923		
KLX08	503.94	504.34	Granite to quartz monzodiorite, generally porphyritic	501044		0.0413		
KLX08	503.94	504.34	Granite to quartz monzodiorite, generally porphyritic	501044		0.0617		
KLX08	819.11	819.51	Granite to quartz monzodiorite, generally porphyritic	501044	0.0001			
KLX08	819.11	819.51	Granite to quartz monzodiorite, generally porphyritic	501044	0.0095			
KLX08	819.11	819.51	Granite to quartz monzodiorite, generally porphyritic	501044		0.0724		
KLX08	819.11	819.51	Granite to quartz monzodiorite, generally porphyritic	501044		0.1119		
KLX08	963.89	964.29	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.0024			
KLX08	963.89	964.29	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.005			
KLX08	963.89	964.29	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036		0.2219		
KLX08	963.89	964.29	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036		0.0876		

Table A3-11.

Borehole	Secup	Seclow	Rock type	Rock code	BET 2–4 mm (m ² /g)	BET 0.063–0.125 mm (m ² /g)	BET < 0.125 mm (m ² /g)	Comment
KLX10	106.38	106.48	Granite, fine- to medium-grained	511058	1.7656			
KLX10	106.38	106.48	Granite, fine- to medium-grained	511058	1.8892			
KLX10	106.38	106.48	Granite, fine- to medium-grained	511058			5.9776	Single sample
KLX10	404.82	405.05	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.0093			
KLX10	404.82	405.05	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.0007			
KLX10	404.82	405.05	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.0025			
KLX10	404.82	405.05	Fine-grained dioritoid (Metavolcanite, volcanite)	501030		0.1364		
KLX10	404.82	405.05	Fine-grained dioritoid (Metavolcanite, volcanite)	501030		0.1599		

Table A3-12.

Borehole	Secup	Seclow	Rock type	Rock code	BET 2–4 mm (m ² /g)	BET 0.063–0.125 mm (m ² /g)	BET < 0.125 mm (m ² /g)	Comment
KLX11A	509.30	509.40	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	1.1620			Fraction 5–2 mm
KLX11A	509.30	509.40	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036			3.4418	

Table A3-13.

Borehole	Secup	Seclow	Rock type	Rock code	BET 2–4 mm (m ² /g)	BET 0.063–0.125 mm (m ² /g)	BET < 0.125 mm (m ² /g)	Comment
KLX12A	430.58	430.78	Diorite to gabbro	501033	0.0088			
KLX12A	430.58	430.78	Diorite to gabbro	501033	0.0136			
KLX12A	430.58	430.78	Diorite to gabbro	501033		0.3886		
KLX12A	430.58	430.78	Diorite to gabbro	501033		0.4056		
KLX12A	569.86	570.26	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.0205			
KLX12A	569.86	570.26	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501037	0.0027			
KLX12A	569.86	570.26	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501038		0.1763		
KLX12A	569.86	570.26	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501039		0.1885		

Table A3-14.

Borehole	Secup	Seclow	Rock type	Rock code	BET 2–4 mm (m ² /g)	BET 0.063–0.125 mm (m ² /g)	BET < 0.125 mm (m ² /g)	Comment
KLX13A	373.35	373.36	Granite to quartz monzodiorite, generally porphyritic	501044			2.8076	Single sample
KLX13A	554.89	554.95	Granite to quartz monzodiorite, generally porphyritic	501044	18.9505			Single sample
KLX13A	554.89	554.95	Granite to quartz monzodiorite, generally porphyritic	501044			33.4684	Single sample

CEC measurements

Measured cation exchange capacity, CEC and sum of the exchangeable cations on the fractions 0.063–0.125 mm and 1–2 mm of crushed and sieved rock samples, or scraped fracture filling material, < 0.125 mm. Tables in Appendix 4 are presented per drill-site.

Table A4-1.

Borehole	Secup	Seclow	Rock type	Rock code	Fraction (mm)	CEC (cmol/kg)	Na (cmol/kg)	K (cmol/kg)	Mg (cmol/kg)	Ca (cmol/kg)	Cs (cmol/kg)	Rb (cmol/kg)	Sr (cmol/kg)
KLX02	217.00	217.20	Granite to quartz monzodiorite, generally porphyritic	501044	0.063–0.125	0.8	< 1.5	< 4.3	< 2.5	21.2	3.30E–05	2.02E–03	7.70E–03
KLX02	217.00	217.20	Granite to quartz monzodiorite, generally porphyritic	501044	1–2	0.4	0.14	< 1.3	< 0.7	8.3	3.40E–05	4.20E–07	
KLX02	682.70	682.90	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	0.063–0.125	2.3	< 0.9	0.64	< 1.5	13.2		2.64E–03	4.60E–03
KLX02	682.70	682.90	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	1–2	1	< 0.4	< 1.3	< 0.8	< 1	2.27E–05	8.80E–04	

Table A4-2.

Borehole	Secup	Seclow	Rock type	Rock code	Fraction (mm)	CEC (cmol/kg)	Na (cmol/kg)	K (cmol/kg)	Mg (cmol/kg)	Ca (cmol/kg)	Cs (cmol/kg)	Rb (cmol/kg)	Sr (cmol/kg)
KLX03	522.61	523.00	Granite to quartz monzodiorite, generally porphyritic	501044	0.063–0.125	2.1	< 0.4	< 1.3	< 0.8	< 1	1.00E–05	1.62E–03	3.60E–02
KLX03	522.61	523.00	Granite to quartz monzodiorite, generally porphyritic	501044	1–2	0.9	< 0.4	< 1.3	< 0.8	< 1	1.96E–05	7.50E–04	1.60E–02
KLX03	732.59	733.07	Mafic rock, fine-grained	505102	< 0.125	12.9	1.05		2.35	20.2	6.82E–05	1.59E–04	

Table A4-3.

Borehole	Secup	Seclow	Rock type	Rock code	Fraction (mm)	CEC (cmol/kg)	Na (cmol/kg)	K (cmol/kg)	Mg (cmol/kg)	Ca (cmol/kg)	Cs (cmol/kg)	Rb (cmol/kg)	Sr (cmol/kg)
KLX04	489.85	490.25	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.063–0.125	2.2	< 0.4	< 1.3	< 1	0.89	9.68E–07	1.74E–03	
KLX04	489.85	490.25	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	1–2	1	< 0.4	< 1.3	< 0.7	< 1	1.97E–05	1.13E–03	2.30E–03

Table A4-4.

Borehole	Secup	Seclow	Rock type	Rock code	Fraction (mm)	CEC (cmol/kg)	Na (cmol/kg)	K (cmol/kg)	Mg (cmol/kg)	Ca (cmol/kg)	Cs (cmol/kg)	Rb (cmol/kg)	Sr (cmol/kg)
KLX05	482.30	482.70	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	0.063–0.125	2.3	< 1.3	< 3.9	< 2.2	3.42	4.32E–05		

Table A4-5.

Borehole	Secup	Seclow	Rock type	Rock code	Fraction (mm)	CEC (cmol/kg)	Na (cmol/kg)	K (cmol/kg)	Mg (cmol/kg)	Ca (cmol/kg)	Cs (cmol/kg)	Rb (cmol/kg)	Sr (cmol/kg)
KLX10	106.38	106.48	Granite, fine- to medium-grained	511058	1–2	3.9	< 0.8	< 0.9	0.39	4.32	1.68E–04	1.24E–03	8.10E–03
KLX10	106.38	106.48	Granite, fine- to medium-grained	511058	< 0.125	12.2	< 3.3	< 3.9	0.78	22.6	7.42E–04	4.46E–03	

Table A4-6.

Borehole	Secup	Seclow	Rock type	Rock code	Fraction (mm)	CEC (cmol/kg)	Na (cmol/kg)	K (cmol/kg)	Mg (cmol/kg)	Ca (cmol/kg)	Cs (cmol/kg)	Rb (cmol/kg)	Sr (cmol/kg)
KLX13A	373.35	373.36	Granite to quartz monzodiorite, generally porphyritic	501044	< 0.125	40.4	4.81	< 9.9	0.45	63.7	3.06E–04	1.67E–03	1.30E–01
KLX13A	554.89	554.95	Granite to quartz monzodiorite, generally porphyritic	501044	1–2	15.2	3.15	< 1.1	1.98	14.5	1.00E–04	5.28E–04	0.1
KLX13A	554.89	554.95	Granite to quartz monzodiorite, generally porphyritic	501044	< 0.125	24.4	4.63		3.4	20.1	2.62E–04	9.52E–04	

Batch sorption measurements

Sorption coefficient, K_d , for a number of combinations of rock materials, radio nuclides and groundwater compositions. The different groundwater types used are: fresh water (F), marine water (M), saline water Simpevarp (SaS) and Brine water (B).

Table A5-1.

Borehole	Secup	Seclow	Rock type	Rock code	Tracer	Sorption coefficient K_d	Surface sorption Coefficient K_a	Water composition
KSH01A	981.14	981.29	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	Cs	1.6E-02	5.2E-03	B
KSH01A	981.14	981.29	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	Sr	< 1.3E-04	< 3.2E-05	B

Table A5-2.

Borehole	Secup	Seclow	Rock type	Rock code	Tracer	Sorption coefficient K_d	Surface sorption Coefficient K_a	Water composition
KSH02	397.40	397.58	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	Cs	7.6E-01		F
KSH02	397.40	397.58	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	Ra	1.9E+00		F
KSH02	397.40	397.58	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	Ni	1.2E+00		F
KSH02	397.40	397.58	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	Cs	8.5E-02		Sas
KSH02	397.40	397.58	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	Sr	1.0E-02		Sas
KSH02	397.40	397.58	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	Ra	1.9E-01		Sas
KSH02	397.40	397.58	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	Ni	5.2E-01		Sas
KSH02	578.23	578.73	Granite, fine- to medium-grained	511058	Cs	3.2E-01		F
KSH02	578.23	578.73	Granite, fine- to medium-grained	511058	Sr	4.8E-01		F
KSH02	578.23	578.73	Granite, fine- to medium-grained	511058	Cs	2.5E-02		SaS

Table A5-3.

Borehole	Secup	Seclow	Rock type	Rock code	Tracer	Sorption coefficient K_d	Surface sorption Coefficient K_a	Water composition
KSH03A	164.75	165.00	Granite to quartz monzodiorite, generally porphyritic	501044	Cs	< 2.0E-01	2.8E-01	F
KSH03A	164.75	165.00	Granite to quartz monzodiorite, generally porphyritic	501045	Sr	< 3.8E-02	8.5E-02	F
KSH03A	164.75	165.00	Granite to quartz monzodiorite, generally porphyritic	501046	Cs	< 9.9E-02	8.7E-02	SaS
KSH03A	164.75	165.00	Granite to quartz monzodiorite, generally porphyritic	501047	Sr	3.5E-03	9.6E-05	SaS

Table A5-4.

Borehole	Secup	Seclow	Rock type	Rock code	Tracer	Sorption coefficient K_d	Surface sorption Coefficient K_a	Water composition
KLX02	217.00	217.20	Granite to quartz monzodiorite, generally porphyritic	501044	Cs	< 1.3E-03	9.7E-04	SaS
KLX02	217.00	217.20	Granite to quartz monzodiorite, generally porphyritic	501044	Sr	< 1.1E-04	< 4.9E-06	SaS
KLX02	217.00	217.20	Granite to quartz monzodiorite, generally porphyritic	501044	Cs	2.6E-02	9.0E-03	F
KLX02	217.00	217.20	Granite to quartz monzodiorite, generally porphyritic	501044	Sr	7.7E-03	7.3E-04	F
KLX02	509.50	509.70	Granite to quartz monzodiorite, generally porphyritic	501044	Cs	< 4.8E-03	5.0E-03	B
KLX02	509.50	509.70	Granite to quartz monzodiorite, generally porphyritic	501044	Sr	3.4E-03	< 1.9E-04	B
KLX02	509.50	509.70	Granite to quartz monzodiorite, generally porphyritic	501044	Cs	< 3.7E-02	7.7E-02	F
KLX02	509.50	509.70	Granite to quartz monzodiorite, generally porphyritic	501044	Sr	1.9E-02	< 7.8E-03	F
KLX02	509.50	509.70	Granite to quartz monzodiorite, generally porphyritic	501044	Cs	5.5E-03	< 7.6E-03	M
KLX02	509.50	509.70	Granite to quartz monzodiorite, generally porphyritic	501044	Sr	< 3.0E-03	1.6E-04	M
KLX02	682.70	682.90	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	Cs	< 3.0E-01	9.9E-02	F
KLX02	682.70	682.90	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	Sr	2.0E-02	< 7.2E-03	F
KLX02	682.70	682.90	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	Cs	< 3.5E-03	4.2E-02	SaS
KLX02	682.70	682.90	Fine-grained dioritoid (Metavolcanite, volcanite)	501030	Sr	4.7E-03	< 5.7E-05	SaS
KLX02	753.80	754.00	Granite to quartz monzodiorite, generally porphyritic	501044	Cs	3.9E-03	4.0E-04	SaS
KLX02	753.80	754.00	Granite to quartz monzodiorite, generally porphyritic	501044	Sr	< 1.1E-03	< 3.8E-05	SaS
KLX02	753.80	754.00	Granite to quartz monzodiorite, generally porphyritic	501044	Cs	2.2E-02	4.3E-03	F
KLX02	753.80	754.00	Granite to quartz monzodiorite, generally porphyritic	501044	Sr	7.2E-03	8.2E-04	F
KLX02	936.11	936.37	Granite to quartz monzodiorite, generally porphyritic	501044	Cs	1.7E-03	7.8E-05	SaS
KLX02	936.11	936.37	Granite to quartz monzodiorite, generally porphyritic	501044	Sr	< 3.6E-05	< 2.2E-05	SaS

Table A5-5.

Borehole	Secup	Seclow	Rock type	Rock code	Tracer	Sorption coefficient K_d	Surface sorption Koefficient K_s	Water composition
KLX03	278.27	278.39	Granite to quartz monzodiorite, generally porphyritic	501044	Cs	1.2E+00		Sas
KLX03	278.27	278.39	Granite to quartz monzodiorite, generally porphyritic	501044	Sr	3.0E-03		Sas
KLX03	522.61	523.00	Granite to quartz monzodiorite, generally porphyritic	501044	Cs	< 6.0E-02	2.4E-02	SaS
KLX03	522.61	523.00	Granite to quartz monzodiorite, generally porphyritic	501044	Sr	2.5E-03	< 9.8E-05	SaS
KLX03	522.61	523.00	Granite to quartz monzodiorite, generally porphyritic	501044	Ra	8.8E-03	6.5E-04	SaS
KLX03	522.61	523.00	Granite to quartz monzodiorite, generally porphyritic	501044	Ni	< 3.2E-01	3.7E-02	SaS
KLX03	522.61	523.00	Granite to quartz monzodiorite, generally porphyritic	501044	Np	< 1.0E-02	< 9.3E-04	SaS
KLX03	522.61	523.00	Granite to quartz monzodiorite, generally porphyritic	501044	U	< 1.1E-02	1.1E-03	SaS
KLX03	522.61	523.00	Granite to quartz monzodiorite, generally porphyritic	501044	Cs	< 3.1E-01	1.1E-01	F
KLX03	522.61	523.00	Granite to quartz monzodiorite, generally porphyritic	501044	Sr	< 3.4E-02	< 3.1E-03	F
KLX03	522.61	523.00	Granite to quartz monzodiorite, generally porphyritic	501044	Ra	1.3E-01	2.2E-02	F
KLX03	522.61	523.00	Granite to quartz monzodiorite, generally porphyritic	501044	Ni	3.1E-01	3.4E-02	F
KLX03	522.61	523.00	Granite to quartz monzodiorite, generally porphyritic	501044	Np	< 2.1E-02	7.9E-03	F
KLX03	522.61	523.00	Granite to quartz monzodiorite, generally porphyritic	501044	U	< 6.3E-03	6.3E-04	F
KLX03	732.59	733.07	Mafic rock, fine-grained	505102	Cs	4.0E-01		F
KLX03	732.59	733.07	Mafic rock, fine-grained	505102	Ra	1.7E+00		F
KLX03	732.59	733.07	Mafic rock, fine-grained	505102	Ni	1.0E+00		F
KLX03	732.59	733.07	Mafic rock, fine-grained	505102	Cs	1.7E-02		SaS
KLX03	732.59	733.07	Mafic rock, fine-grained	505102	Sr	5.1E-03		SaS
KLX03	732.59	733.07	Mafic rock, fine-grained	505102	Ra	2.9E-02		SaS
KLX03	732.59	733.07	Mafic rock, fine-grained	505102	Ni	1.2E+00		SaS

Table A5-6.

Borehole	Secup	Seclow	Rock type	Rock code	Tracer	Sorption coefficient K_d	Surface sorption Coefficient K_a	Water composition
KLX04	489.85	490.25	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	Cs	< 2.4E-01	1.6E-01	F
KLX04	489.85	490.25	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	Sr	1.9E-02	2.4E-03	F
KLX04	489.85	490.25	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	Cs	< 1.4E-01	2.9E-02	SaS
KLX04	489.85	490.25	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	Sr	3.2E-03	< 3.3E-05	SaS
KLX04	718.91	719.36	Granite, fine- to medium-grained	511058	Cs	9.0E-02	1.2E-02	F
KLX04	718.91	719.36	Granite, fine- to medium-grained	511058	Sr	2.0E-02	1.6E-03	F
KLX04	718.91	719.36	Granite, fine- to medium-grained	511058	Cs	1.2E-02	2.3E-03	SaS
KLX04	718.91	719.36	Granite, fine- to medium-grained	511058	Sr	3.0E-03	< 4.8E-05	SaS
KLX04	951.30	951.44	Granite to quartz monzodiorite, generally porphyritic	501044	Cs	1.7E-02	1.5E-03	SaS
KLX04	951.30	951.44	Granite to quartz monzodiorite, generally porphyritic	501044	Sr	< 1.1E-04	1.2E-05	SaS

Table A5-7.

Borehole	Secup	Seclow	Rock type	Rock code	Tracer	Sorption coefficient K_d	Surface sorption Coefficient K_a	Water composition
KLX05	482.30	482.70	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	Cs	3.600E-02	5.900E-03	F
KLX05	482.30	482.70	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	Sr	< 2.600E-02	6.900E-03	F
KLX05	482.30	482.70	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	Ra	8.200E-01	< 1.500E-01	F
KLX05	482.30	482.70	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	Ni	< 5.600E-01	< 4.900E-02	F
KLX05	482.30	482.70	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	Cs	8.400E-03	1.000E-03	SaS
KLX05	482.30	482.70	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	Sr	4.600E-03	< 1.700E-04	SaS
KLX05	482.30	482.70	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	Ra	< 9.500E-03	1.800E-03	SaS
KLX05	482.30	482.70	Quartz monzonite to monzodiorite, equigranular to weakly porphyritic	501036	Ni	< 9.700E-02	2.700E-02	SaS