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Heavy metals in the bottom sediments of the Western Norwegian fjords

MSc thesis

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Contents

1. Introduction

1.1 Subject

The fjords are huge sediment traps, which are feed by sediments from the erosion of surrounding uplifted areas. The recent (Holocene) sedimentation in the fjords is characterized by deposition of fine grain-size muds, which accumulate at a high rate. Due to a limited mixing of bottom waters, the environment in fjords tends to be anoxic giving possibilities for organic material preservation. These muddy and organic-rich sediments are prone to heavy metal accumulation.

Heavy metals can be carried as particulate matter or as adsorbed onto mineral surfaces such as clays, Fe oxides and hydroxides, Mn oxides; or organic matter. The heavy metals are capable to enters the food chain and they tend to bioaccumulate (Förstner, 1979; Dai and Martin, 1995). Bioaccumulation means an increase in the concentration of a chemical in a biological organism over time, compared to the chemical's concentration in the environment. Compounds accumulate in living things any time they are taken up and stored faster than they are broken down (metabolised) or excreted.

The geochemical mapping of marine and overbank sediments, undertaken by Norwegian Geological Survey (Norges Geologiske Undersøkelse – NGU) over the last decade (Longva and Thorsnes, 1997; Ottesen et al., 2000) has indicated variable loads of environmentally significant heavy metals into marine areas from both natural and anthropogenic pollution sources. High natural loads of heavy metals in certain areas can be attributed to high heavy metal availability and supply from the local bedrock, whereas the pollution loads reflect discharges from industries.

Figure 1.1 – Location of studied fjords and samples

The consequences of those different loadings are equally important, determining healthiness, habitability and environmental state of the seabed and the marine basin in general (Lepland & Bøe, 2002).

A sampling cruise with NGU's research vessel "Seisma" to selected fjords in Møre and Romsdal and Sogn and Fjordane, western Norway (fig. 1.1) was undertaken by Lepland and Bøe in June-July, 2002. The objective of this study was to study the carrier phases and distribution mechanisms of metal contaminants, their mineralogic and sedimentologic controls as well as natural backgrounds. Fjords occurring both in areas with relatively high and low natural heavy-metal background were sampled. Sample material from fjords with significant industrial activities was also obtained (Lepland & Bøe, 2002).

The current study reports the results of the bottom sediment geochemical composition and clay mineralogy of bottom sediments in two fjords – Nordfjord and Sunndalsfjord. My aim is to study the general trends and the factors controlling mineral composition of clays in the bottom sediments in western Norwegian fjords and their relation to heavy metal distribution and possible contamination.

1.2 Source rock composition

The main sediment supply into the fjord originates from particulate surface runoff. The rocks exposed in drainage area significantly determine the composition of recent fjord sediments. The estimated proportion of different bedrock types found in the drainage areas around the studied fjords is shown in figure 1.2.

In the northern part of the area investigated the gneisses of diverse origin are prevailing in the drainage area of the fjords. Gneisses are mostly of Precambrian age and are caledonized. The most widespread rock type is the migmatitic gneiss of granitic and granodioritic composition. Zones of banded gneiss, mica-, hornblende- and augen gneisses frequently cut these rocks.

To the southeast the gneisses are replaced with other metamorphic rocks of the Precambrian age constituting the Caledonian nappes. In the eastern and southeastern part of the Sognefjord drainage area the different rocks of charnocitic to anortositic composition, gabbro, norite, hyperstendiorite, anortosite, anortosite-gabbro and less tonalite and tonalitic gneiss are exposed. Subparallel to them metamorphosed sedimentary rocks of the Cambrian to Ordovician age are exposed.

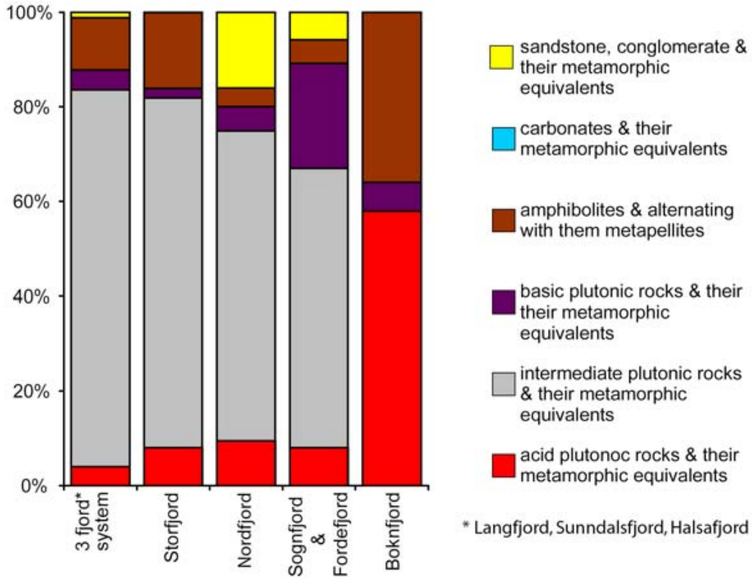

Figure 1.2. The approximate proportions of the bedrock types found around the fjords studied (according to 1:1milj. Bedrock map of Norway).

To the south from the Boknafjord the basement rocks of Precambrian age are exposed. Proterozoic plutonic rocks are the most abundant in this area. There are also different kinds of granites, granodiorites and gneisses found (Bedrock map of Norway 1:1 000 000. Sigmond et al., 1984)

Bedrock is covered with Quaternary deposits represented mainly by thin and incoherent till cover. In some regions moraine cover is more thick and continuous (for example in the area from Sognfjord to Romsdal). However, in most places the bare bedrock is outcropping.

1.3 The stratigraphy and development of the fjord bottom sediments

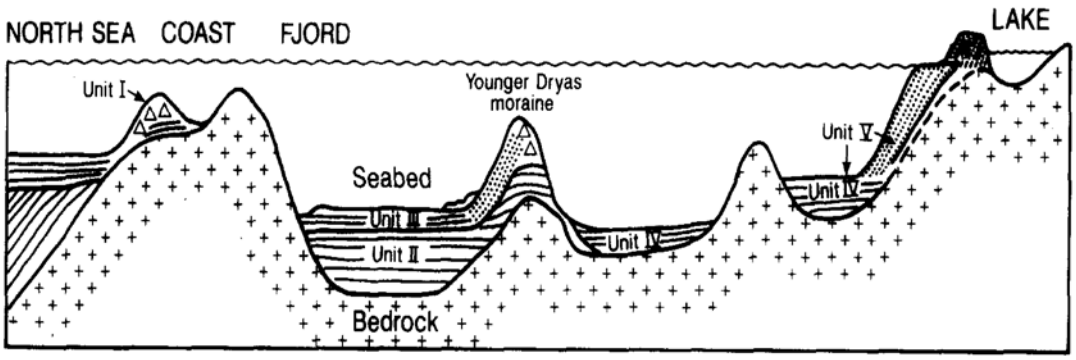

Figure 1.3. Longitudinal profile of the sediment distribution in a typical western Norwegian fjord. The sediments are subdivided into five chronostratigraphical units described in the text. This is based on terrestrial Quaternary stratigraphy as well as interpretation of the seismostratigraphical data. The sill area just inside the North Sea can be a complex of bedrock, till and sub-till sediments. The depression at sill area is caused by current erosion from episodic deep-water renewals. The fjord basins may have rock thresholds as well as terminal moraine thresholds (mainly deposited during the Younger Dryas chronozone). Sediment thicknesses are in the order of 200-400 m outside and 50-200 m inside these moraines. At the head of the fjords the recent deltas are supplied with material from river erosion of the terraces deposited as ice marginal deltas during the Preboreal chronozone (Aarseth, 1997).

Fjord basins comprise effective sediment traps that were active during deglaciation as well as during interglacial and interstadial phases (Syvitski et al., 1987; Syvitski and Shaw, 1995). Nearly 90% of the sediments in the western Norwegian fjords are considered being deposited during deglaciation of the last (Weichselian) ice sheet. Less than 10% of the fjord sediment in this area is older than the last glacial (Weichselian) maximum (Syvitski and Shaw, 1995).

Fjord sediments are correlated to the well-established terrestrial Quaternary stratigraphy and altogether five chronostratigraphic units (I–V) are proposed for the fjord sediments. A general scheme of the distribution of the five suggested chronostratigraphic units in a typical western Norwegian fjord is given in figure 1.3.

The western Norwegian fjord basins contain sediments deposited mainly during the deglaciation in the late Weichselian and early Holocene. Older sediments are found in some of the fjords northeast of Stadfjord and south of the Hardangerfjord. The older sediments are almost without any exception found near the coast and mainly in fjords and sounds normal to the directions of the observed glacial movements. This is in areas of reduced glacial erosion due to glacial difluence. Chronostratigraphic Unit I is defined to represent Quaternary sediments older than Weichselian maximum (18 ka) (Aarseth, 1997).

Deglaciation of the Norwegian Channel took place around 15 ka (Sejrup et al., 1994, 1995a), whereas the outermost coast of western Norway became ice-free during the interval 14.0-12.6 ka (Mangerud, 1977; Andersen, 1979; Anundsen, 1985; Andersen et al., 1987; Paus, 1990). The sediments from this period are attributed to the chronostratigraphic Unit II. Thick sequences of glaciomarine sediments were deposited in the fjord basins during the deglaciation in the late Weichselian (Unit II and III). Unit III is associated with the glacial advance in the Younger Dryas and comprises coarse ice-front deposits as well as distal glaciomarine sediments. Unit IV is defined as glaciomarine sediments deposited during the final deglaciation after the Younger Dryas glacial advance (11-10 ka). Unit V that comprises only the upper 3-6 m of the sediments was deposited in a period after 9 ka. Very little of fine-grained sediments were deposited in the fjords after 9 ka as lakes at many of the fjord heads have acted as sedimentary traps (Aarseth, 1997). Our samples originate from the latest phases of this period.

After deglaciation, gravity-induced processes have taken place both in subaerial and submarine areas of the fjords. The submarine topography in western Norway comprises steep fjord sides and slopes connecting tributary fjords to the much deeper trunk fjords (hanging valleys) (Holtedahl, 1965, 1975). In many fjords gravitational mass movements are among the most pronounced sedimentary processes (Bøe et al., 2004).

1.3.1 Lithology of the Late Glacial and Holocene fjord sediments

Most of the fjord sediments are fine-grained glaciomarine clays and were deposited during the last deglaciation. Samples from slide scars about 100 m below the seabed usually show lamination with 20-40% quartz and feldspar in the typically 1-2 mm thick fine-sand laminae. Gravel-sized, angular clasts occur frequently in the glaciomarine sediments and the clay content varies from 25-55% (note – the clay fraction is defined here as the <4 µm grain-size fraction) (Aarseth, 1997).

The Holocene sediments are typically bioturbated and are distinguished by lower density, higher water content, and a relatively warm foraminiferal fauna presence (Aarseth et al., 1975, 1989). They are typically somewhat coarser comparing to Late Glacial sediments and contain frequent turbidite structures from submarine mass movements (Aarseth, 1997).

The sedimentation of the glacial material in the fjords occurs even today, but it is limited to few fjords fed by glacial melt-water rivers without large lakes in the drainage areas. The present sedimentation rates in fjords are measured for Fjærlandsfjord and Gaupnefjord in the Sognefjord (fig. 1.1). In Gaupnefjord, sediment traps reveal a sedimentation rate of 10-20 cm/yr near the entering delta at the fjord head, the rate drops to ~10% of this value 1.5 km further down the sloping delta front (Relling and Nordseth, 1979). In Fjærlandsfjord, Pb^{210} measurements gave rates of 4 mm/yr at a distance of 2.2 km from the delta front and 1.2 mm/yr at 6.6 km from the delta area. In the Sognefjord proper, a sedimentation rate of 0.3 mm/yr is measured at 1000 m water depth (Aarseth et al., 1989). Similar sedimentation rates are recently found in other fjord basins in western Norway (Aarseth, 1997).

However, according to Paetzel and Schrader (1992) sedimentation rates in fjords with well ventilated and thus dissolved oxygen-rich bottom waters are smaller and usually do not exceed <0.1 to 0.2 cm/year.

In some smaller fjords with very shallow thresholds, sediments rich in organic matter are deposited due to the lack of oxygen, which is caused by the limited circulation (Strøm, 1936; Taylor and Price, 1983; Paetzel and Schrader, 1992). This is due to shallow sills, which effectively limit circulation and exchange of the water masses in deep fjords. High primary production coupled with high organic matter flux from the photic zone causes high consumption of oxygen by organic matter degradation in the deeper waters and at the sediment-water interface. Therefore, anoxic conditions may prevail in the bottom sediment and waters there. These fjords are characterized also by higher sedimentation rate of >0.5 cm/year. This is due to both high organic production/preservation as well as the high supply of terrigenous clayey matter (Paetzel and Schrader, 1992).

1.4 Mineral composition of bottom sediments

Bottom sediment mineral composition of the west Norwegian fjords (Halsafjord, Sunndalsfjord, Langfjord, Storfjord, Nordfjord, Sognefjord and Boknafjord) is directly controlled by the bedrock and sediments composition exposed in the drainage area of the fjords.

The bottom sediment of the fjords is composed of terrigenous and authigenic mineral phases. Main terrigenous mineral phases found in all bottom sediment samples are quartz, feldspars and clay minerals, and amphibole, which is identified in most cases as an actinolite type mineral. The share of clay minerals (illite/mica, chlorite, illite-smectite and vermiculite/smectite) varies 5-50%, quartz and feldspars constitute 4.7-

38.0% and 15.8-57.5%, respectively. The amphibole compromises 0.5-22.9% of the sediment.

The authigenic portion of the minerals is composed of calcite and in lesser amount aragonite, which were determined in most cases from littoral samples. The content of calcite/aragonite increases towards the fjords mouth with the increasing water salinity up to 35‰ at normal marine conditions. The calcite and aragonite are of biogenic origin and are composed of pelagic organisms like ostracods and foraminifers.

Despite to considerable occasional variations in the content of main sediment forming minerals the average composition of the sediments is still rather stable throughout all the fjords investigated in western Norway. Most significant variations in mineral composition of fjord bottom sediments are controlled by variations in surrounding rock composition. The most significant trends along the main fjord axes are explainable by appearance of considerable amount of biogenic carbonates toward the outer part of the fjord (Karimov, 2004).

2. Material and Methods

2.1 Sampling

The material for mineralogical analyses was sampled and chosen by Dr. Aivo Lepland (Geological Survey of Norway, Marine Geology Department).

A sampling cruise to selected fjords in western Norway was undertaken in June-July, 2002 on the NGU research vessel “SEISMA”. A modified Niemistö (Niemistö, 1974) corer was used as the sampling device. Corer loadings were kept unchanged throughout the cruise. Typical penetration depths range between 0.4 and 0.6 m, but in areas with fluffy unconsolidated sediments penetration depths up to 1.1 m were reached (Lepland & Bøe, 2002).

For current study samples from the depth intervals 0–1, 9–11, 11–13 and the last two centimetres of the core (usually > 20 cm down the sediment profile) were used. In the Nordfjord three cores from locations 059, 066 and 076 (26, 45 and 36 cm deep accordingly) were analyzed to get data on vertical clay mineral and heavy metal distribution pattern in recent bottom sediments. Altogether 376 samples were analyzed with XRF method. Five core samples were taken from Langfjord, 13 core samples from Sunndalsfjord, 12 samples form Halsafjord, 12 samples from Storfjord, 57 samples from Nordfjord, 8 samples from Fordefjord, 40 samples from Sognefjord tributary valleys and 5 core samples from outermost part of the Boknafjord. (fig. 1.1) Among them 50 samples from Sunndalsfjord and Nordfjord (including three vertical profiles from location 059, 066 and 076) were analysed on the clay mineralogical composition with XRD method.

The exact position of the sampling stations were chosen using seismic data and the areas in the basin(s) with the highest interpreted sediment accumulation rates were most preferred localities (Lepland & Bøe, 2002).

2.2 Analytical methods

2.2.1 Clay mineralogy - XRD

Clay fraction from 50 samples was separated by a dispersive method using tetra-sodium pyrophosphate ($Na_4P_2O_7$) and ultrasound dispergator. About 10 cm of clay suspension from the glass were decanted after 8 h of settling and centrifuged. The settling time for the clay size fraction was calculated for a particle density of 2.6 g cm^{-3} using Stokes' Law. Afterwards clay fraction was Mg^{2+}-saturated with magnesium chloride ($MgCl_2$*$6H_2O$).

For X-ray diffraction analyses, oriented mounts were prepared by smearing a portion of the clay size fraction on a petrographic slide so that the (001) axis of the clay minerals were subparallel to the slide surface (Moore & Reynolds, 1997).

Samples were scanned from 2 to 30°2θ on a Dron-3M X-ray diffractometer (XRD). Samples were scanned at a step size of 0.3° with a counting time of 3 s at each step. Each prepared slide was subsequently placed in a chamber with ethylene glycol, heated at 60°C for 24 h, and scanned on the XRD a second time to identify expandable minerals. For the same purpose some of them were additionally saturated with glycerol for vermiculite and mixed-layer illite-vermiculite identification.

The measured XRD profiles were fitted prior clay mineral identification into elementary bands using AXES code (Mändar et al., 1996). In addition the experimental curves were compared to theoretical clay mineral models obtained by using MLMC2 and MLMC3 codes (Plancon and Drits, 2000).

Clay mineral identification was based on criteria given by Moore and Reynolds (1997) from scans taken from air-dry, ethylene and glycerol solvated preparations.

2.2.2 XRF, ICP-AES and TOC

The distribution of trace and major elements of studied samples was determined by geochemical analyses with X-ray fluoresence spectrometry, Inductively Coupled Plasma - Atomic Emission Spectrometry (ICP AES) and Atomic Adsorption (AA) analyse methods in Norwegian Geological Survey laboratory according to standard techniques.

The total organic carbon (TOC) was measured in the same using Leco Total Organic Carbon Analyzer.

2.2.3 Grain size

Grain size distribution in the fjord sediments was determined in NGU laboratory with COULTER COUNTER particle size analyzer from the samples where the organic material was oxidized by using H_2O_2 prior analyses.

Additionally grain size analysis for selected samples (010, 012, 013, 018, 019, 021, 024, 026, 059, 061, 064, 070, 073, 076, 077, 078) was done with pipette method. The results show about two times higher values for clay fraction (<2 µm) (table 3.1; fig. 3.1.2). This is probably due to under-estimation of clay content by Laser-diffraction method or owning to insufficient dispersion in the same analysis. Moreover, the total clay mineral content in bulk mineralogy is the same or even greater than the <2 µm fraction measured by pipette analysis.

The comparative study by Buurman, et al. (2001) also shows that the laser-diffraction shows only 42% of "pipette clay" in marine samples, and 62% in fluvial and loess samples. The fact that both in marine and in loess samples, laser fractions <50 µm are under-estimated compare to these in sieve/pipette analysis, is mainly due to non-sphericity of grains. At the same time, in marine samples, all laser fractions between 2 and 50 µm are systematically higher than the pipette fractions (Buurman, et al., 2001).

2.3 PCA and maps

Correlation matrixes and the Principal Component Analysis (PCA) were performed using Statistica 6.1. All illustrative maps were made by *Mapinfo Professional 6.5.* Initial files for bedrock map data were obtained from digital maps at NGU website - www.ngu.no.

2.3.1 PCA

The relationships between heavy metals, clay minerals and general mineral composition in studied sediments were analyzed by means of statistical analysis of the *principal components (PCA)*. The statistical PCA analysis was done using Statistica 6.1 software. Only terrigenous minerals were used for PCA procedure and the calcite, aragonite as well as seawater salts were excluded.

Principal Component analysis (PCA) reduces multidimensional data to a two-dimensional plot displaying the major directions of variation within the data set, and to facilitate correlation of the results of different methods. The analysis was performed on a correlation matrix (centered by variables) using un-transformed data. Scaling in correlation biplots was focused on inter-sample distances. PCA is used to reduce the overall dimensionality in the data, to identify a small set of factors that define the interrelationship among a group of variables, and to define subgroups of variables that are highly correlated (Birks and Gordon, 1985). The resulting dimension reduction permits graphical representation of the data so that significant relationships among observations or samples can be identified. The first principal component (PCA axis 1) is the combination of variables that explains the greatest amount of variation. The second principal component (PCA axis 2) defines the next largest amount of variation and is independent to the first principal component.

2.4 Background levels

There are no common European sediment quality guidelines. The background levels used to measure the state of pollution are therefore based on an average of the values in surface sediments in unpolluted Norwegian fjords and coastal waters (Table 2.1; the first column). The sediment quality guidelines from the Norwegian Pollution Control Authority (SFT), the Swedish EPA and the USGS are relatively similar (Table. 2.1).

Table 2.1 Background levels of environmental toxins in different unpolluted fjord surface sediments; pre-industrial sediments from Puddefjorden-Solheimsviken and Vågen, and values from natural soils, the earth material most closely resembling uncontaminated estuarine sediments (from United States Geological Survey, USGS) (Sivertsen, 2000).

Element[1)]	**Pre-industrial sediments from Norwegian fjords and coastal waters[2)]**	Pre-industrial sediments from Puddefjorden-Solheimsviken	Pre-industrial sediments from Vågen[3)]	Pre-industrial sediments from Swedish pelagic areas[4)]	Uncontaminated natural soils from the US[5)]
As	<20	5	0.8	10	6
Cd	<0.25	1.5	<1	0.2	0.1
Cr	<70	28	32	40	70
Cu	<35	5	9	15	30
Hg	<0.15	0.01	0.05	0.04	0.06
Ni	<30	9	17	30	50
Pb	**<30**	**15**	**12**	**25**	**14**
Zn	<150	34	33	85	90
V	<150*	57	82	-	90
Fe	<4*	2	3	-	4

1) Concentration units for all elements are in ppm, except Fe, which is in %.

2) Knutzen et al. (1997)

3) Mathisen and Prestmo (1999)

4) Sedin (2000)

5) Manheim and Hayes (2000)

* Rygg and Thélin (1993)

However, regionally geological conditions (e.g. the geology of the bedrock in the area of precipitation) affect the content of metals in fjord sediments and will affect the background levels. The regionally geological differences are the main reason for the difference between the guidelines (Sivertsen, 2000).

Because the *background levels* are based on an average of the values in upper sediments in Norwegian fjords, thus including an average of different sediment deposition environments, all sediment types in the Sunndalsfjord and Nordfjord area can be compared to the background levels. These guidelines are still the most used in Norwegian anoxic polluted fjords, to classify their state of pollution (Sivertsen, 2000).

Sedimentological investigations regarding the content of environmental toxins were done in Vågen in 1999 (Leifsen and Nes, 1999; Mathisen and Prestmo, 1999). The environmental toxin concentrations in the bottom 10 cm of the sediments interpreted to be of pre-industrial (non-polluted) age were used as background levels (Table 2.1).

Apart from (regional) background levels mentioned above, in current research there used values of elements from the deepest layer (preferably over ≥ 30 cm) reached with sampling corer. They were taken as a *local background*, assuming that the average accumulation rate was 1.5 mm year^{-1} (Aarseth, 1997) and the thickness of ≥ 30 cm sediment was accumulated during 150 years, so that the deeper layers should be deposited before the so-called industrial time.

3. Results and discussion

The analytical results - clay fraction content and mineralogy, oxide and elemental composition, TOC, L.O.I., and carbon-C of the bottom sediments studied and correlation matrixes are shown in appendix (Appendix: tables 1 – 9).

Figures 3.1 – 3.2 show position of the sampling places involved in creating illustrative trends along the fjord axes. Both *y*-axes on the graphs with depth profiles on (fig. 3.1.3 – 3.3.23) are given in reverse order to show if the current trend repeats bottom relief and to what extent. The *x*-axis runs from the inner (right) to the outer (left) part of the fjord, that relatively corresponds to the geographical stretch of the fjords from east to west. The legend for the graphs is regularly placed by Nordfjord graph, when there are more than two graphs on a figure.

Bathymetry shown on the graphics is mostly based on the sampling location depth data. Resulting curve corresponds to general relief.

Only exception is Sunndalsfjord. It has a secondary deeper sill (at ~200 m) in the inner basin area between the upper part and the outer shallower sill (at ~100 m) on the 60th km from the upper part (e.g. fig. 3.1.3). It is not reflected by sampling depths, so for Sunndalsfjord graphs more detailed relief profile was used. This deeper sill divides the inner basin of Sunndalsfjord into two sub-basins, which have some differences in sedimentation conditions. Those differences are also confirmed by the three outermost samples situated between two sills in Sunndalsfjord (fig. 3.1.4, 3.1.5).

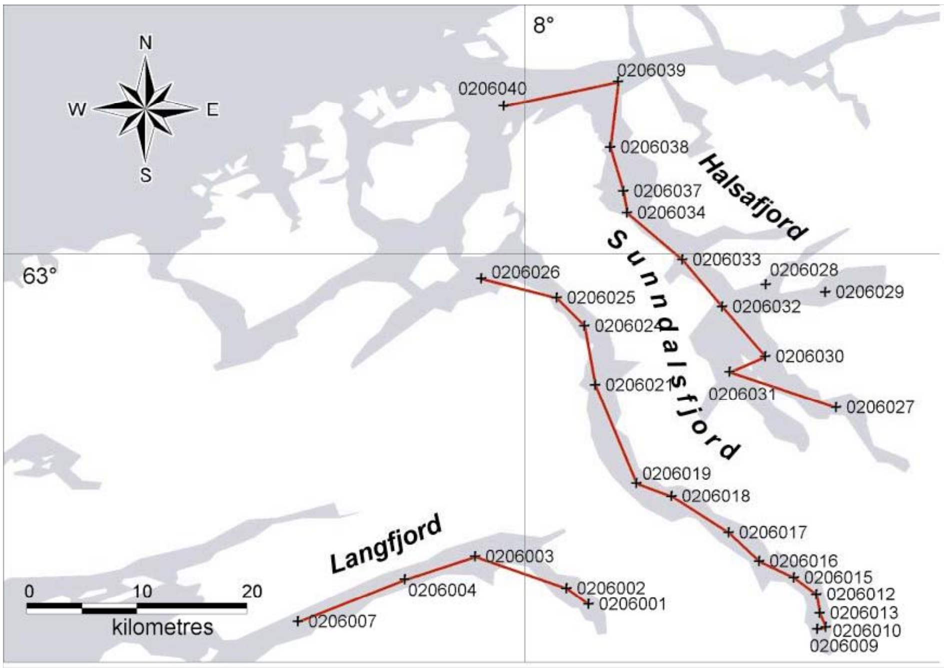

Figure 3.1. The profile lines through the points involved in along-fjord distribution charts.

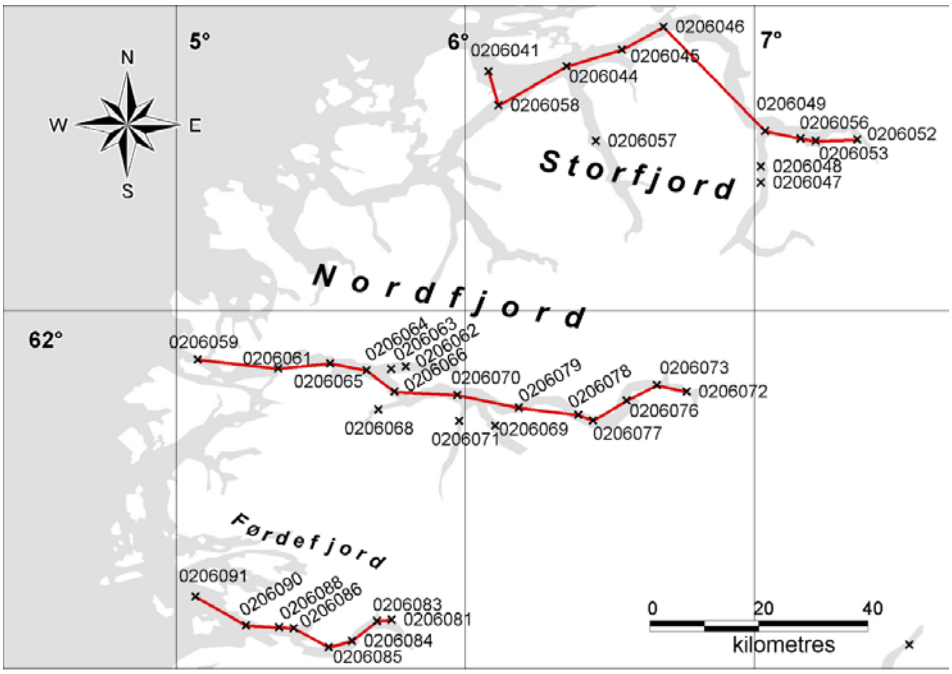

Figure 3.2. The profile lines through the points involved in along-fjord distribution charts.

3.1 General parameters

3.1.1 Clay content and salinity

<u>*Stratification and salinity*</u>

For the current study the halite (NaCl) content in the samples was identified as the near-bottom water salinity (referred as *relative salinity*), since the salt content in the sample comes from the sample pore-water, which is related to its content in marine water.

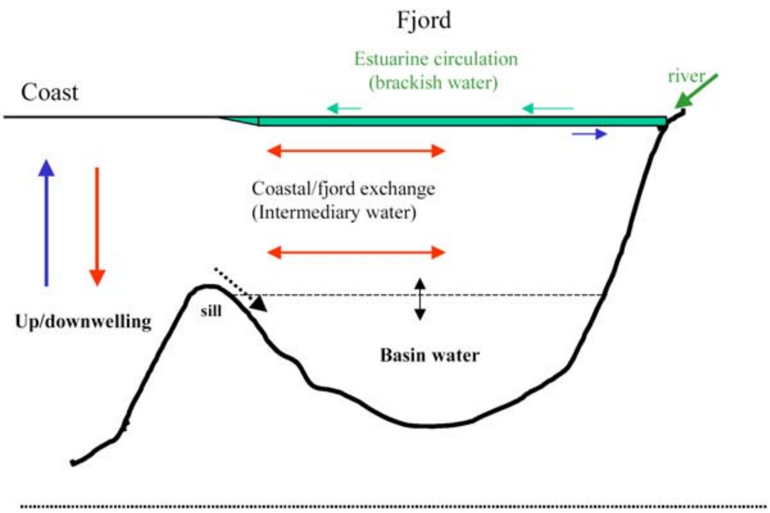

Figure 3.1.1. Schematic transect trough a fjord showing the surface brackish water layer, the intermediate water layer above sill depth, and the basin water layer below sill depth (after Aure J., and Skjoldal R. H., 1997).

Due to the sills the water exchange between the deeper (inner) fjord and the Norwegian Sea is limited. The upper water layers are affected by the input of freshwater from the terrestrial surroundings, whereas the lower water layers are build up mostly from seawater. So, there is a density gradient between a diluted surface salinity and deeper heavier layers with a higher salinity. There exists a chemocline between these two layers (http://web.mac.com/stoeck_lab).

The water mass structure in fjords can be separated into three main layers: a surface layer, an intermediate layer down to the sill depth, and a basin layer below sill depth (fig. 3.1.1) (Aure J., and Skjoldal R. H., 1997).

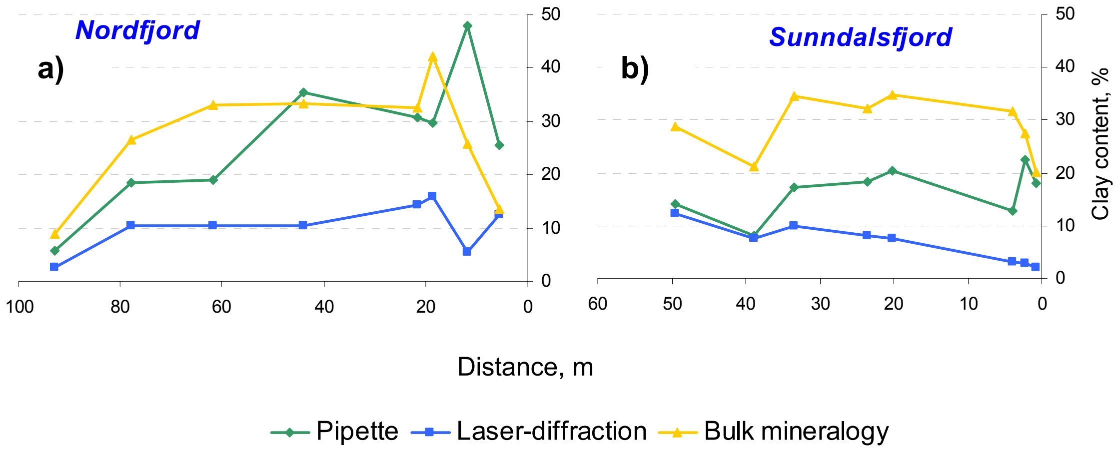

Figure 3.1.2. Comparison of three approaches for clay content estimating: pipette, laser-diffractometry grain size analyses and total clay mineral content in the bulk mineralogy. The data is arranged along the Nordfjord (a) and Sunndalsfjord (b) axes.

Stratification is caused by temperature and salinity differences as well. Salinity *(relative according to NaCl content in the samples)* trends in the fjords follow the depth profile, as it can be seen at the graphs (fig. 3.1.3) on which the salinity trend (in relative units, increasing downwards) is a light gray line. The mean content of the halite content in samples (for 11-13 cm interval) is 4.1% with its median 3.6% (in weight %).

<u>Clay content</u>

The results of grain size analyses are shown in table 3.1 and figures 3.1.2, 3.1.3 and 3.1.4. Clay fraction content behaves similarly with both trends: salt content *(relative salinity)* and water depth. This means that the physical precipitation of clay particle or floccules is favoured by both of parameters (fig. 3.1.3). Salinity favours flocculation of clay particles, which in one's turn prefer deeper and still standing water to settle down.

Table 3.1. Pipette analysis

		SILT	CLAY
	>63mkm	63-2mkm	<2mkm
0206010	18.3	63.5	18.1
0206012	1.7	85.3	13.0
0206013	10.4	67.2	22.4
0206018	4.8	74.8	20.4
0206019	23.1	58.5	18.4
0206021	18.7	64.0	17.4
0206024	46.9	45.0	8.1
0206026	3.3	82.4	14.2
0206059	75.5	18.7	5.8
0206061	21.9	59.6	18.5
0206064	23.4	57.5	19.1
0206068	6.5	81.8	11.7
0206070	11.2	53.3	35.5
0206071	12.5	74.0	13.5
0206073	1.7	72.6	25.6
0206076	23.2	28.8	48.0
0206077	9.7	60.5	29.8
0206078	6.9	62.3	30.8
average	17.8	61.7	20.6
mediane	11.9	62.9	18.5
min	1.7	18.7	5.8
max	75.5	85.3	48.0

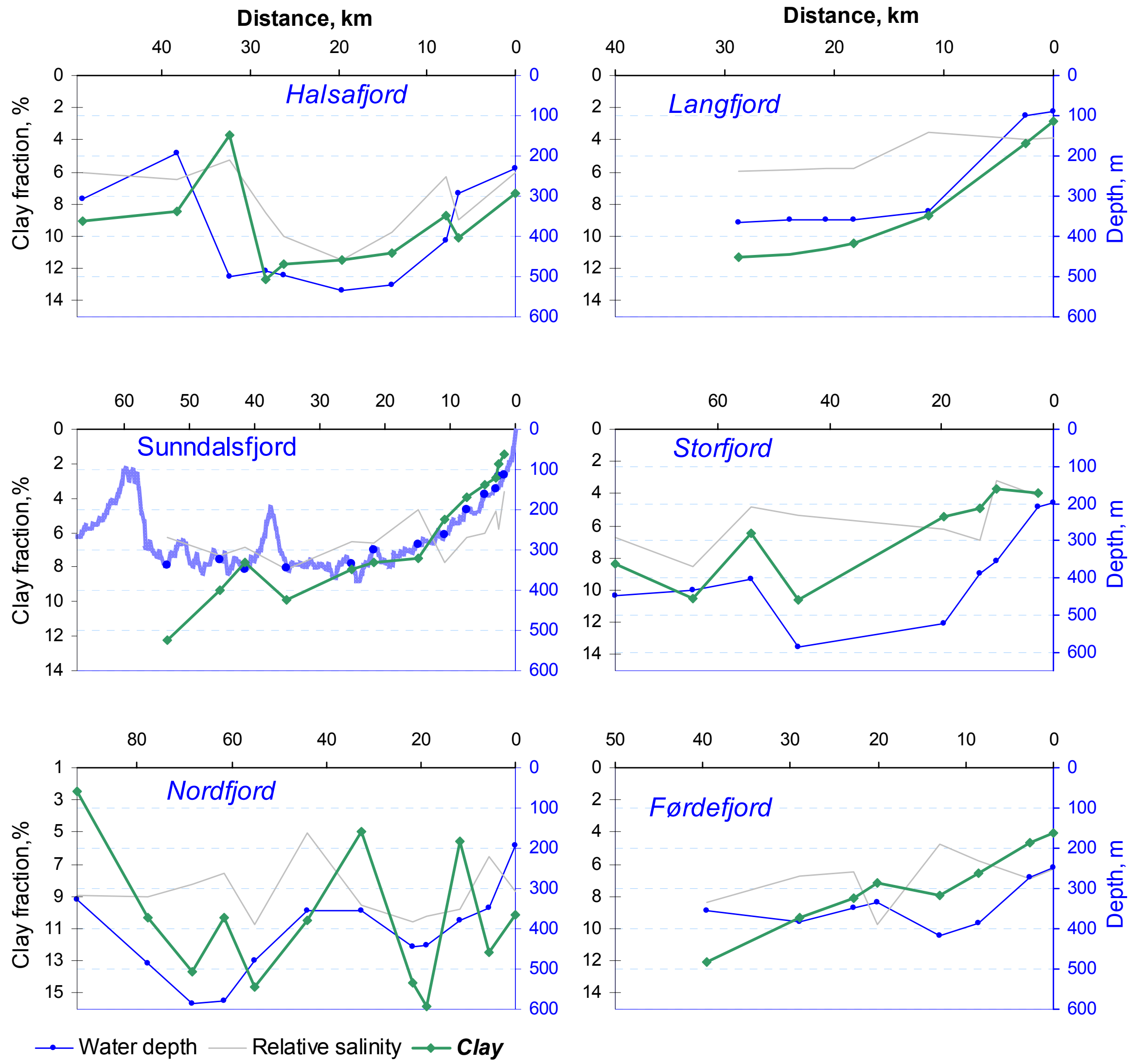

Figure 3.1.3. Clay fraction content trends along fjord axes on the background of bottom relief of the fjords and relative salinity trend. Salt content is in the relative units. (NB! *y*-axes are in the reverse order)

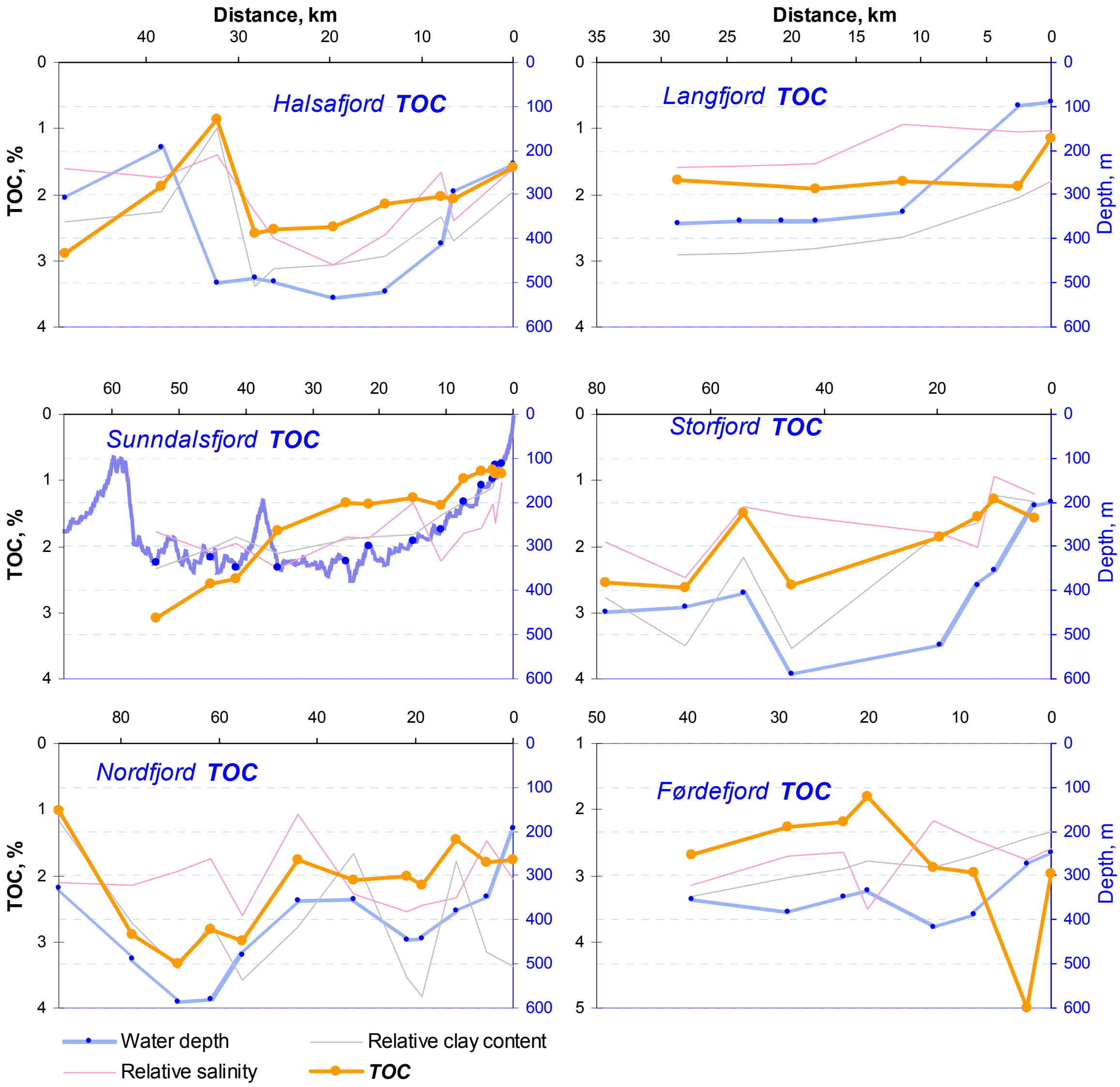

Figure 3.1.4. TOC (%) distribution along the fjords on the background of clay fraction and (relative) salinity trends, which are in relative units here. (NB! (1) *y*-axes are in the reverse order; (2) for numerical values of clay fraction see 3.1.3 and tab. 2 in appendix)

As it was mentioned above (chapter 2.2.3) there is a reason to suspect an under-estimation of clay content by Laser-diffraction granulometry (fig. 3.1.2). Nevertheless, for current research we used granulometrical data based from laser-diffractometry to show general variations in clay fraction content, just by reason of higher number of measurements. However, for average estimating of clay fraction content we are inclined to agree rather with pipette analysis results, because of too low values got with laser counting. According to the pipette analysis there is around 20% (mean 20.6, median 18.5 %) of clay particles (<2 μm) in fjord bottom sediments judging from Nordfjord and Sunndalsfjord samples (fig. 3.1.2).

3.1.2 TOC and sulphur

An evident correlation with TOC have four heavy metals: Cd, Pb, Hg and As was found. The density stratification of the fjord inhibits mixing and the decomposition of organic matter falling into the stratified water column quickly consumes available oxygen.

TOC content trends behave similar to almost all general clay trends along the fjord and are also following the fjord bathymetry. It is quite evident that in deeper waters the probability of anoxic conditions in sediments is much higher, as shown from the organic matter preservation (fig 3.1.4). Extremely high accumulation rates of marine organic carbon between 5.4 and 17.2 g m^{-2} yr^{-1} are found in Storfjord area, and probably in high-latitude fjord environments in general, which can be considered as a important sink for carbon dioxide (Winkelmann & Knies, 2005).

There is a little higher TOC content in the second part of Sunndalsfjord basin between two sills (fig. 3.1.4). This indicates differences in sedimentation/environmental conditions. It is confirmed also by sulphur higher contents (>0.3%) in three last samples from the outermost part of the fjord, whereas the rest of samples show values between 0.15 and 0.08 % (fig. 3.1.5, a).

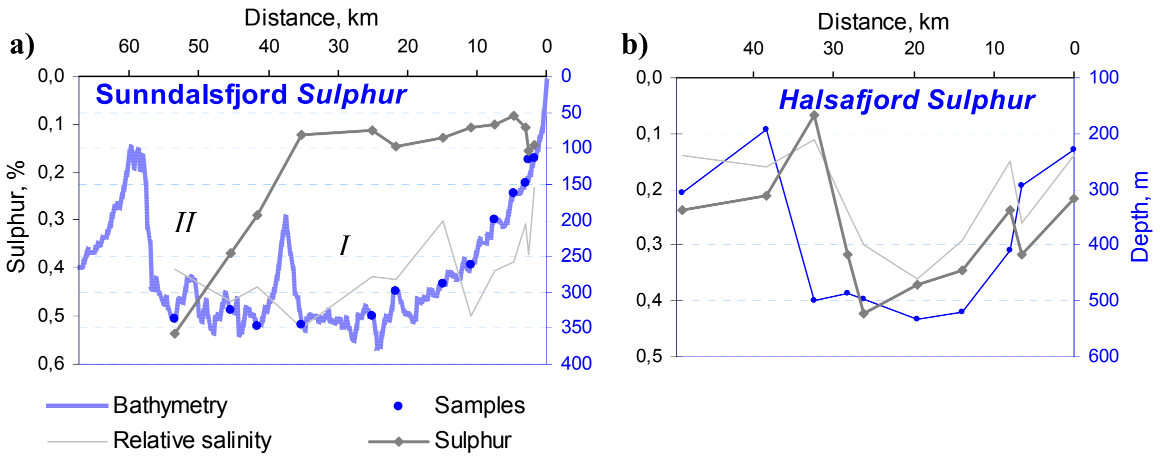

Figure 3.1.5. Sulphur content variations in Sunndalsfjord (a) and Halsafjord (b). (NB! *y*-axes are in the reverse order)

Sulphur is a likely a marker of anoxic conditions in the deeper parts of the fjords, also as a hydrogen sulphide (H_2S) component (fig. 3.1.5, b). Sulphur has good positive correlations (significant at $p < 0.0500$) with L.O.I. ($r = 0.50$), TOC ($r = 0.71$) and Cl content ($r = 0.89$) (see appendix, tab.9). There is evident increase of S content with depth in Halsafjord, what can be taken as a sign of anoxic environment in the deeper part.

Also, the Nordfjord shows quite depleted oxygen conditions, and from the beginning of the 20th century it was at least periodically anoxic (Husum, K. and Alve, E., 2006).

3.1.3 Adsorption

There are four major parameters that may significantly affect the heavy metal content in the fjord bottom sediments: (1) TOC, (2) bathymetry and hydrodynamics, (3) clay content and its mineralogical composition, (4) presence of Fe and Mn oxides/oxihydrites. All these (1, 3 & 4) to a greater or lesser extent may act as heavy metal adsorbents.

3.2 Clay mineral distribution in fjord bottom sediments

3.2.1 Clay mineral composition

The results of clay mineral analysis of bottom sediments and representative XRD patterns are shown in tables 1 and 2 in appendix and on the figures 3.2.2, 3.2.3.

Clay minerals compose about 30% (average 27.8%, median 28.3%) of the sample according to the bulk mineral composition of studied sediments. The pipette granulometrical analysis estimates clay fraction content to be about 20%. Main minerals in the clay fraction (<2 μm) are chlorite, illitic minerals (illite and illitic illite-smectite (I/S_1), R1 ordered, with illite layers content 60-80%), mixed layer illite-smectite and illite-vermiculite, less common kaolinite. In more than half of the Nordfjord samples also vermiculite was determined (table 1 in appendix), whereas the mixed layers (ML) were determined of two types: illite/vermiculite (I/V) and smectitic illite-smectite (I/S_2) (R0 ordered, with illite layers content <50%).

3.2.2 Clay mineral distribution in Sunndalsfjord and Nordfjord

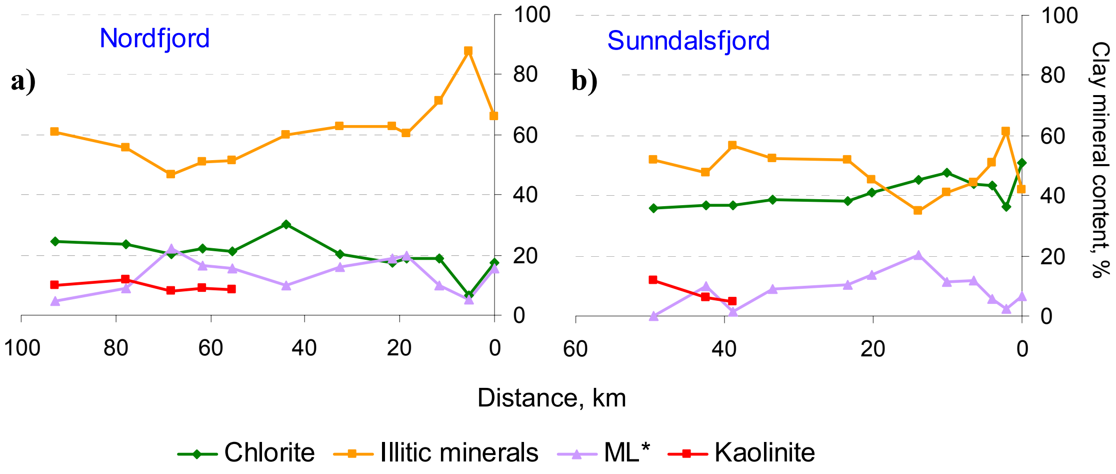

Figure 3.2.1. Distribution of clay minerals along the fjord axes from the inner (right) to the outer (left) area of Sunndalsfjord (b) and Nordfjord (a).

* ML – mixed layers illite-vermiculite and illite-smectite.

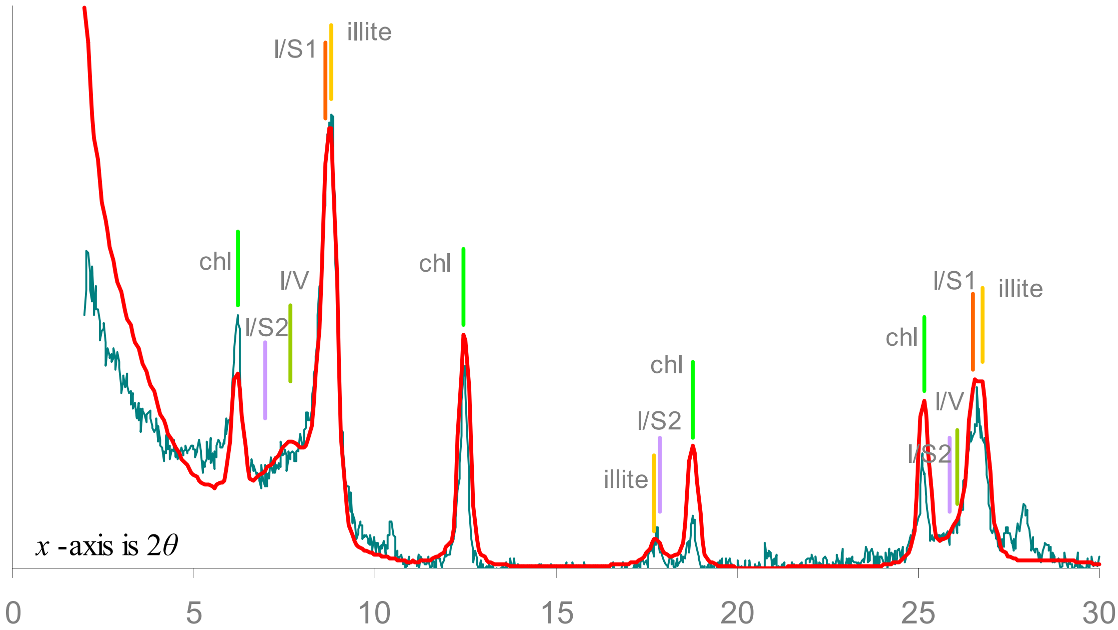

Figure 3.2.2 X-ray oriented mount diffraction pattern for clay sample 0206025.
I/S1 - illitic illite-smectite, R1 ordered, illite layers 60-80%; **chl** – chlorite;
I/V - illite/vermiculite; **I/S2** - smectitic illite-smectite, R0, illite layers <50%.

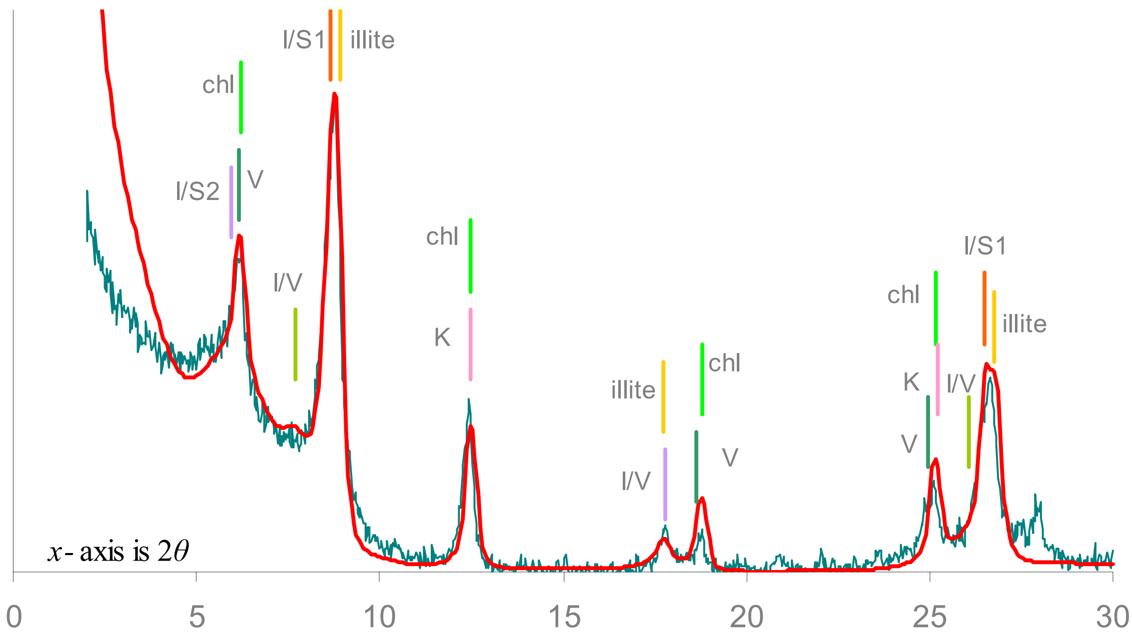

Figure 3.2.3 X-ray oriented mount diffraction pattern for clay sample 0206063.
V – vermiculite; **K** –kaolinite.

Chlorite content distinctly grows towards the Norwegian Sea in Nordfjord (fig. 3.2.1, a; 3.2.4, a), however in Sunndalsfjord it shows an opposite trend (fig. 3.2.1, b). There is somewhat higher chlorite content in Sunndalsfjord with mean of 41.2 % (median 39.9), whereas in Nordfjord it makes up only 21.8 % in average (median 20.7).

Content of illitic minerals is higher in Nordfjord averaging 60 % (median 60.5), whereas in Sunndalsfjord average value was 48.4% (median 49.3). The illitic minerals are taken as the sum of (1) illite and (2) illitic illite-smectite, R1 ordered, with illite layers content 60-80%, according to their belonging to one phase (crystallographic and genetic similarity). Only evident trend for illitic minerals is the increase of content towards the outer part of Nordfjord (fig. 3.2.1, a; 3.2.4, b), illitic mineral content in Sunndalsfjord bottom sediments has more even distribution mostly remaining between 40 and 60 %.

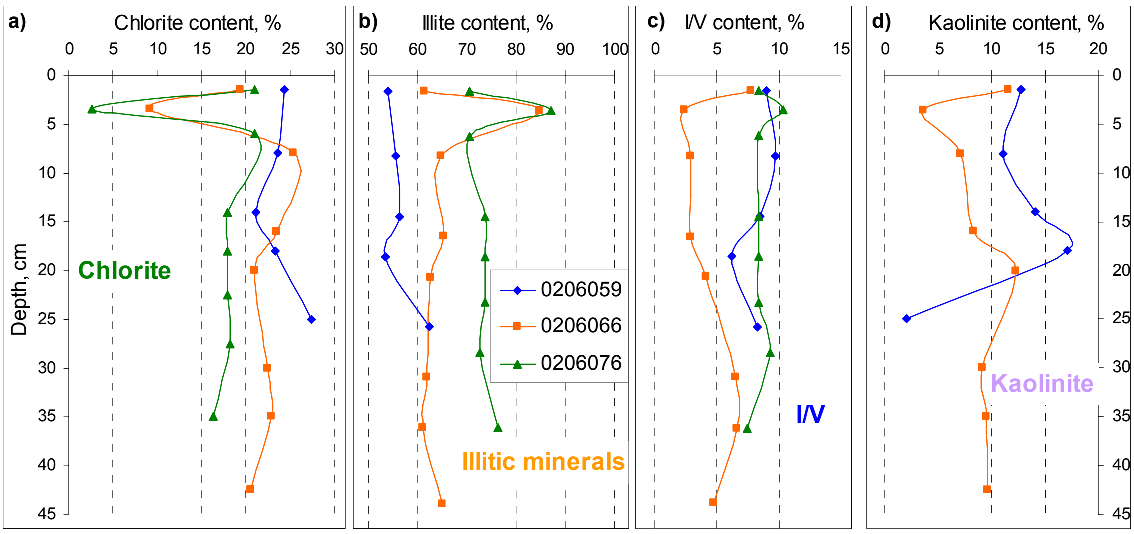

Figure 3.2.4. Vertical distribution of clay minerals in three sampling places of *Nordfjord* (076, 066 and 059, from the inner to the outer part of the fjord accordingly); a) chlorite; b) illitic minerals; c) mixed layer (ML) illite/vermiculite (I/V); d) kaolinite.

Mixed-layer minerals have a little bit higher content in Nordfjord sediments, where were determined both types of ML (I/V and I/S_2), whereas in Sunndalsfjord only the

I/V type was found. An average content of these minerals in Nordfjord bottom sediments is 13.1 % (median 15.5) and in Sunndalsfjord they make up 8.5 % (median 9.3).

Kaolinite appears mostly closer to the outer area of the fjord (fig. 3.2.1) and it lacks in upper (landward) parts of both fjords. Kaolinite shows growing trend towards the sea in Sunndalsfjord and Nordfjord, reaching maximum 12 % in Sunndalsfjord.

Some small amount of vermiculite is present in the Nordfjord bottom sediment samples, with an average of 0.9 % (mean of values that are >0 is 1.5%).

Vertical distribution of clay minerals in three different locations in Nordfjord: upper, middle and outer part of the fjord (076, 066 and 059 accordingly) is shown on the figure 3.2.4. Except for some rapid and drastic changes, as it is in the 3-4 cm interval, vertical distribution of clay minerals tends to be homogenous, taking in account semi-quantitative character of measurements.

3.3 Distribution of heavy metals in fjord bottom sediments

Marked correlations (see table 9 in appendix) used in this and following chapters are significant at $p < 0.050$.

3.3.1. Relationships to the mineralogical composition

A difference in the concentration of metals in the bottom sediments can be caused by both peculiarities of the mineralogical/chemical composition, and the type of sediments, as well as by an external input (pollution) from other sources.

Nevertheless, prevailing amount of heavy metals in fjords bottom sediments is still derived form the surrounding source rocks and their concentration variations are to the great extent determined by changes in geology of particular region.

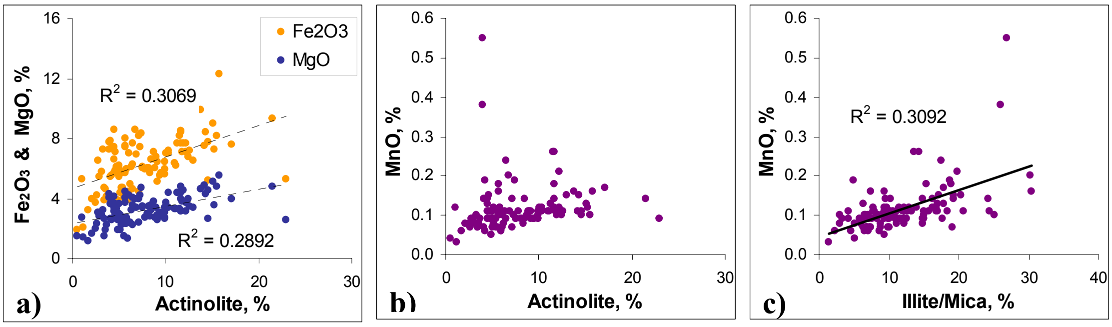

Figure 3.3.1. Fe_2O_3 and MnO versus actinolite and illite/mica scatter plots.

<u>Actinolite</u>

Fe_2O_3, (correlation coefficient *r* = 0.55), MgO, (r = 0.54) belong to the actinolite's composition (fig. 3.3.1, a). TiO_2, (r = 0.50) and Al_2O_3 (r = 0.49) are very likely admixtures in actinolite-type amphiboles.

Actinolite's correlation with Cu (r = 0.52) and iron-group elements (V, Ni, Co, with r = 0.42, 0.58, 0.47 accordingly) can be is explained on the basis of amphibolite facies basic rock origin of major part of the bottom sediments (Karimov, 2004).

<u>Labradorite</u> associates with actinolite (r = 0.52), what to some extent is confirmed by its secondary correlations with TiO_2, (r = 0.38) and Cu, Ni, Co (r = 0.40, 0.33, 0.31).

<u>K-feldspar</u> shows appreciable correlations with Na_2O and K_2O (r = 0.42 for both) as constituting elements. Rb (r = 0.38) is a typical isomorphic admixture for K-minerals as well as Ba (r = 0.43), Th (r = 0.40) and *rare earths* (Ce, La, Nd with r = 0.46, 0.45, 0.43).

<u>Illite/Mica</u> has clearest correlation with Th (r = 0.62) and *rare earths* (Ce, La, Nd with r = 0.69, 0.64, 0.64) than K-feldspar that may be explained by the dominating position of this mineral over K-feldspar in the felsic rocks of granodioritic composition. Various gneisses with granodioritic composition, which are of widespread occurrence

throughout the studied area, contain abundant biotite mica. Quite high contents of Ba in fjord bottom sediments (~800 ppm in average) also suppose rather felsic composition of source rocks that is substantiated by marked correlation of illite/mica with Ba (r = 0.52). High Th values (averaging 18 ppm) also indicate the presence of felsic rocks, especially intrusives (De Vos & Tarvainen, 2006) and their equivalents.

Na_2O (r = 0.48) and specially K_2O (r = 0.64) are also components of illite/mica. Rb (r = 0.68) along with Ba may substitute K from its lattice, since their atomic radiuses are compatible. There are also marked correlations of illite/mica with MnO (r = 0.55) (fig. 3.3.1, c) and Zn (r = 0.62). That is probably because Mn in the sediments is mainly controlled by the distribution of fine-grained particles (Daessle, et al, 2002), whereas Zinc is widely dispersed as a trace element in mica (De Vos & Tarvainen, 2006). However Zn association with Mn in the secondary environment may be attributed to co-precipitation (De Vos & Tarvainen, 2006).
Vanadium V is also present as a trace element in mica (r = 0.45) and amphibole (r = 0.42).

Chlorite
Fe_2O_3, (r = 0.36), MgO, (r = 0.43) belong clearly to the chlorite's composition. Chlorite correlates also with other iron-group elements as Cr (r = 0.53), V (r = 0.51) and Ni, Co (r = 0.51, 0.41).

Quartz
SiO_2 (r= 0.50). Good correlation with Zr (r= 0.68) indicates that Zr has probably acid rock origin.

Calcite and aragonite
Correlation with CaO and carbonate-C ($r_{calcite}$= 0.93 and 0.96, $r_{aragonite}$=0.84 and 0.84 accordingly) states the fact that the CaO is of biogenic origin, since calcite content increases with appearing carboniferous fauna in outer parts of the fjords (Karimov, 2004). Furthermore they have strong negative correlations with Al_2O_3, SiO_2, Fe_2O_3,

TiO_2, Na_2O and K_2O that testify the influence of biogenic calcite on the fjord bottom sediment composition.

Sr ($r_{calcite}$= 0.58, $r_{aragonite}$= 0.64) seems to be associated with biogenic carbonates; its content also increases towards the fjord mouths. Sc has marked correlation with carbonatic phase ($r_{calcite}$= 0.65, $r_{aragonite}$= 0.48), since probably correction with respect to Ca was not done sufficiently.

Manganese and iron oxides/hydroxides

Since manganese and oxides/hydroxides precipitate mostly in amorphous form, they cannot be discovered by XRD analyze technique. Distribution of manganese and iron enrichment zones may be assessed via the XRF data. The Mn content of sedimentary rocks is controlled by the geochemistry of the source rock and the redox conditions of the depositional environment (Wedepohl, 1978).

Manganese (MnO[*]) in analyzed fjord bottom sediment samples correlates with Fe_2O_3 (r = 0.54). In association with iron, Mn may denote the effects of co-precipitation in fjord bottom sediments and allow the screening of false anomalies of other elements (De Vos & Tarvainen, 2006). Among all investigated heavy metals the strongest affinity with Mn is revealed by V (r = 0.57) and Zn (r = 0.55). Moreover marked correlations with Mn have REE (r = 0.51, 0.44, 0.45, for Ce, La, Nd, accordingly) and Rb, Th (r = 0.40; 0.42). This indicates the influence of sorption by Fe-Mn oxides/hydroxides on the content of these heavy metals in fjord bottom sediments.

[*] Measurements were performed using XRF analyse.

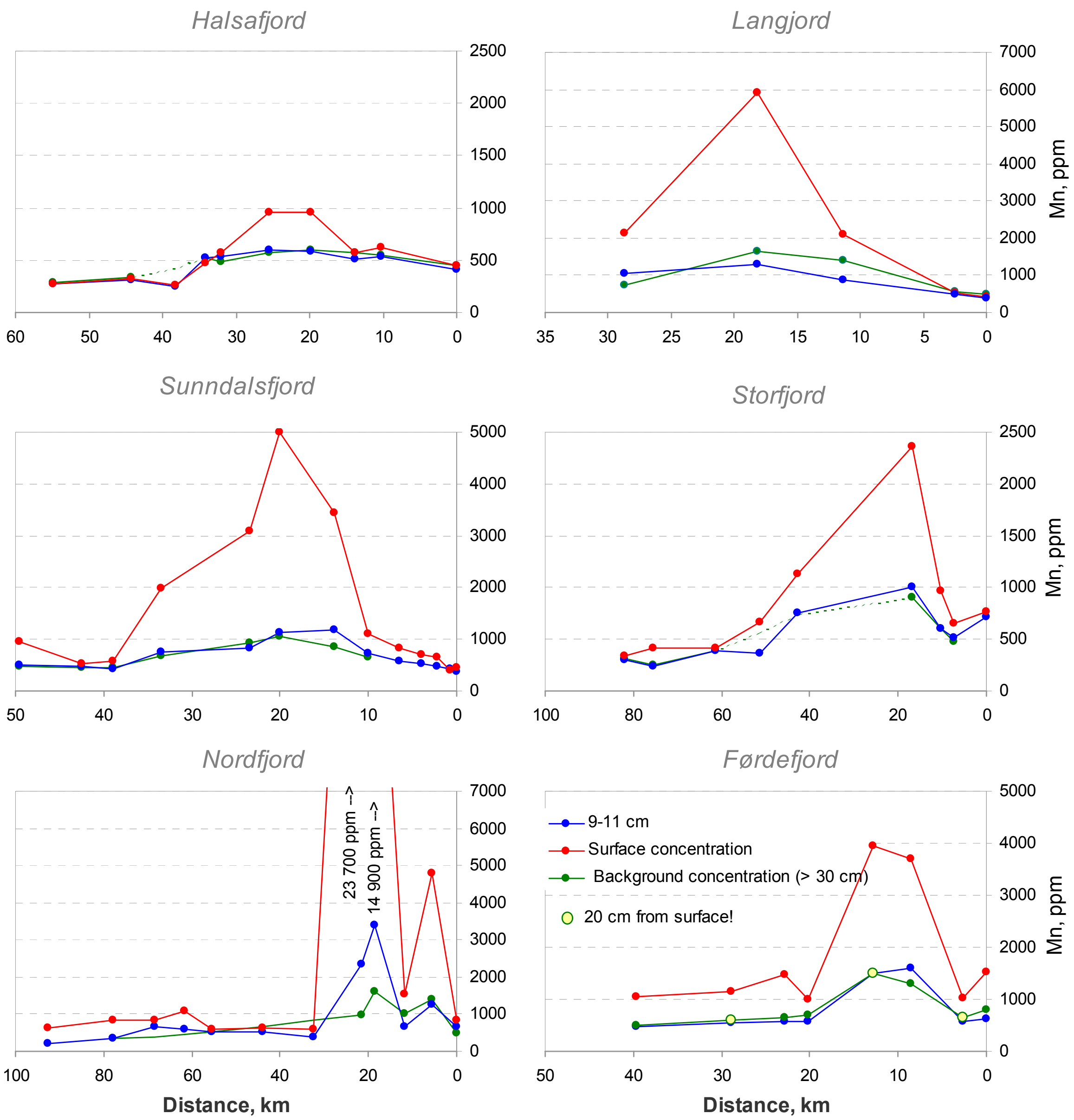

Figure 3.3.2. Manganese distribution along the fjord axes for surface (0-1 cm), intermediate (9-11 cm) and the deepest (>30 cm) level, which can be considered as a relative background for current cases.

Manganese (Mn**) and iron (Fe**) distribution along the fjord axes for three different levels (surface – 0-1 cm; intermediate 9-11 cm and considered as a background >30 cm level) can be seen at the plots shown in figures 3.3.2 and 3.3.3. There are some very high concentrations of Mn almost in every fjord, which can be attributed to zones of Fe-Mn concretions and/or oxides-hydroxides appearance. Enormously high values appear in Nordfjord from sampling locations 077 and 078 (23700 and 14900 ppm, respectively; for surface samples at 0-1 cm). As a rule, the deeper levels of sediments at locations with higher surface values, though in lower degree, also have evident enrichment signs.

An increase in content of many of heavy metals (e.g. As, V, Cu, Ni, see fig. 3.3.4, 3.3.10, 3.3.12, 3.3.18) coincides (and are explainable) with the higher content peaks of Mn, however they do not necessarily have any satisfactory correlation with Mn (as it is with As or Cu).

3.3.2 Heavy metal distribution along the fjords

Concentration and distribution pattern for 10 chemical elements are presented in this chapter, which are: vanadium (V), chromium (Cr), nickel (Ni), copper (Cu), zinc (Zn), arsenic (As***), cobalt (Co), cadmium (Cd***), lead (Pb) and mercury (Hg***).

There is a general tendency for most heavy metals to concentrate in deeper (and consequently quieter) parts of the fjords. It seems that heavy metals, being scavenged in the fjord basin water beforehand by particulate material and/or in process of modifying floccules from ion complexes, are settling down in deeper parts of the fjords with lower turbulence and higher content of such adsorbents as clay minerals, organic matter, Fe-Mn enrichment and additional favouring factors such as higher salinity and (sub-)anoxic conditions.

** Measurements were performed using ICP AES analyse.
*** Measurements were performed using Atomic Adsorption (AA) analyse.

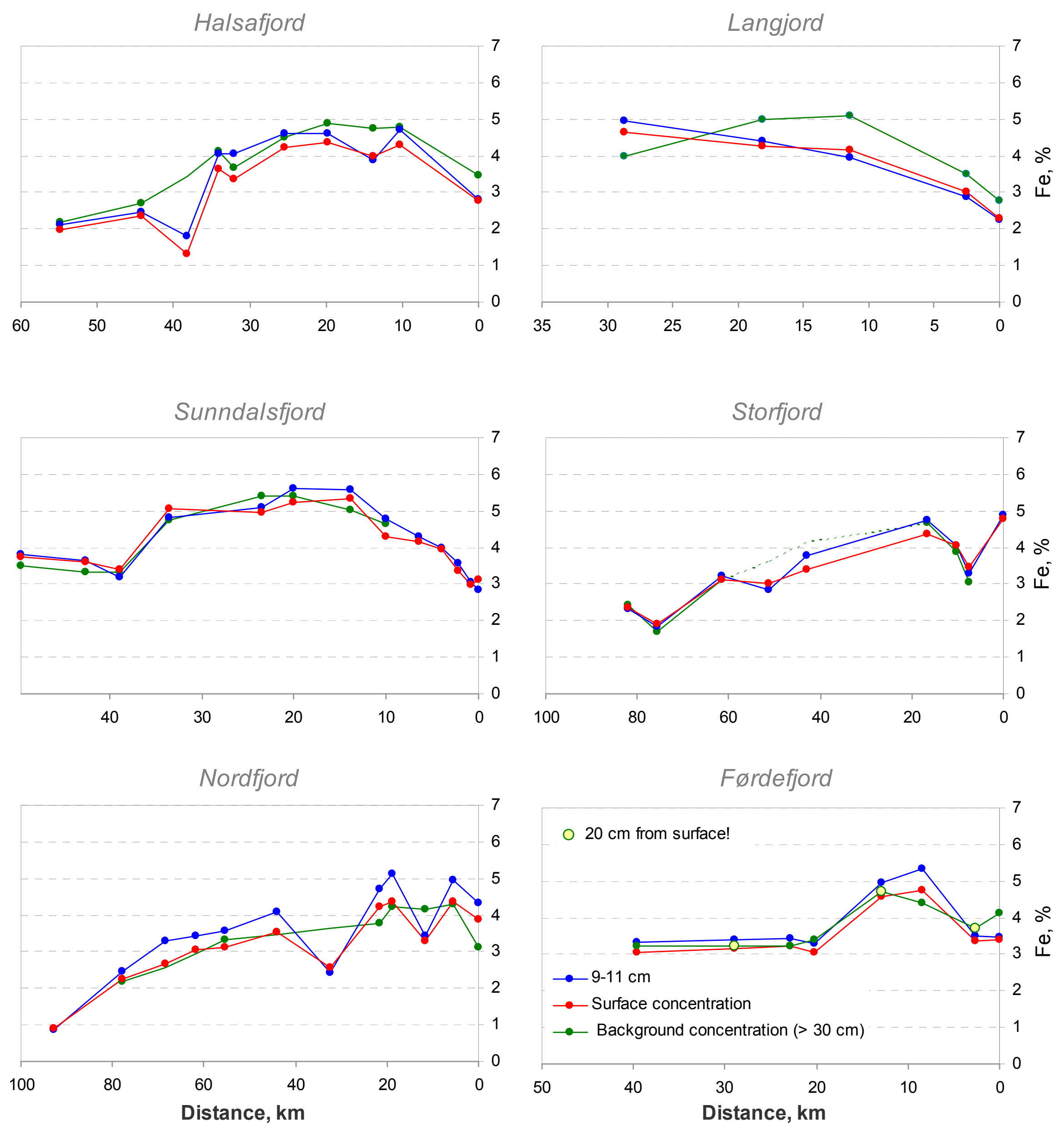

Figure 3.3.3. Iron distribution along the fjord axes for surface (0-1 cm), intermediate (9-11 cm) and background (>30 cm) level.

Arsenic (As)

The relatively small amount of As released into stream water during weathering in the most cases is rapidly oxidized to relatively insoluble As^{5+} and, as arsenate ($AsO_4{}^{3-}$), becomes sorbed to hydrous oxides of Fe and Mn, clays and organic matter. Arsenic is strongly chalcophile, and is partitioned into a variety of sulphide and sulpharsenide minerals (De Vos & Tarvainen, 2006). This is confirmed by well established correlations (*significant at* $p < 0.050$) with sulphur (r = 0.53) and TOC (r = 0.60). Moreover, statistical (PCA) analyse (see fig. 3.4.2) reveals its affinity to clay fraction.

Since the Fe-Mn enrichments carry a local character, their relationship with As can be detected only on the base of comparison of the graphs showing Fe, Mn and As content distribution along the fjord axes (fig. 3.3.2 - 3.3.5), e.g. As anomalies in Nordfjord, Sunndalsfjord, Halsafjord and Storfjord.

Relative to the regional background <20 ppm (Knutzen et al, 1997; see chapter 2.4; tab. 2.2) arsenic generally remains below this value. Compared to the intermediate (9-11 cm) and the deepest (>30 cm) level, which can be considered as a relative background for current cases, surface content of As show higher values just in places with Fe/Mn enrichment, remaining within the same scale for the rest cases (fig. 3.3.4, 3.3.5). Arsenic content between the fjords is rather similar.

Cadmium (Cd)

Cadmium tends to be highly mobile in the surface environments, since it is most mobile under oxidising conditions at pH levels below 8 (De Vos & Tarvainen, 2006). Probably for that reason its distributions in bottom sediments is quite even (fig. 3.3.6, 3.3.7).

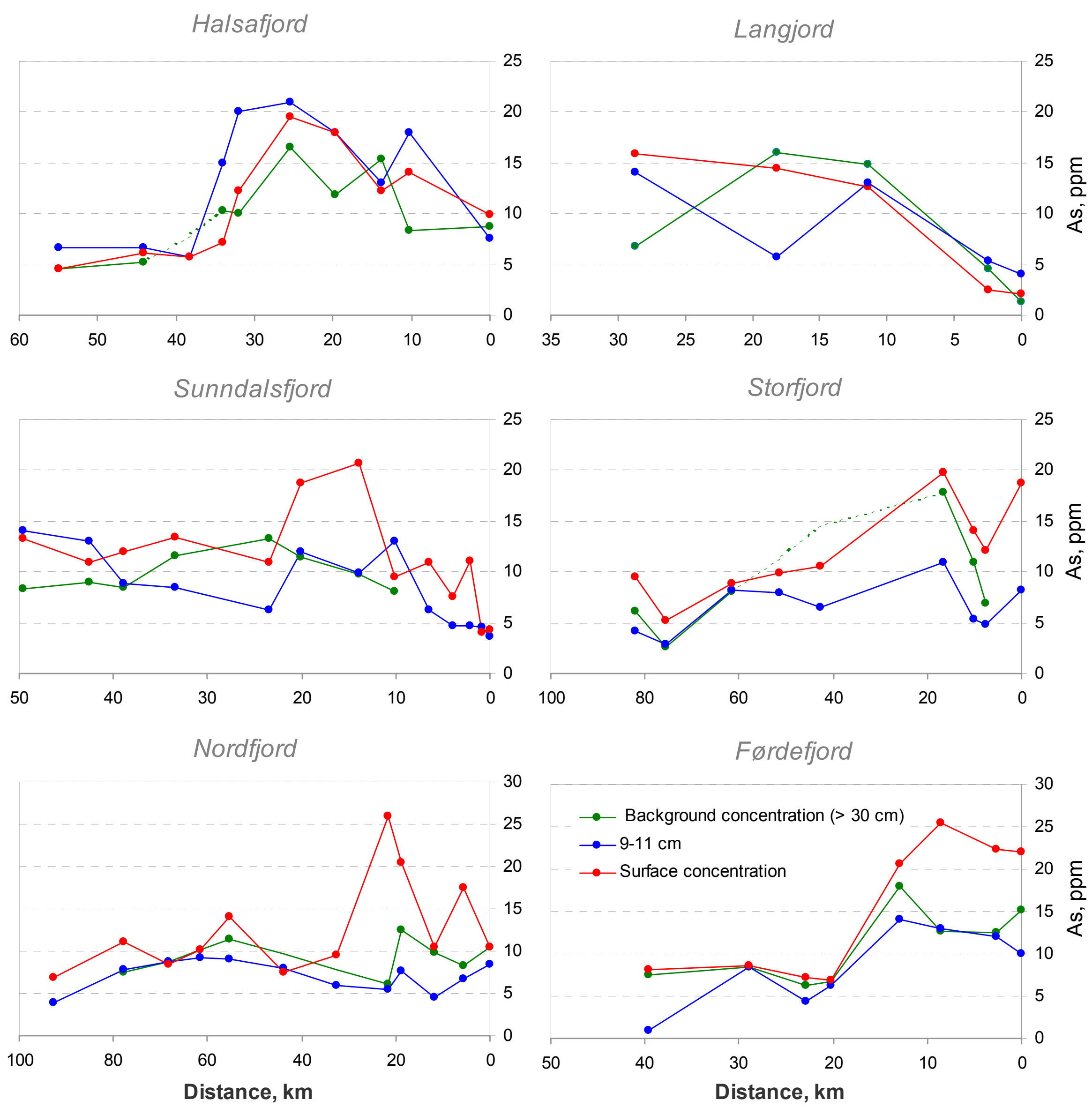

Figure 3.3.4. Arsenic distribution along the fjord axes for surface (0-1 cm), intermediate (9-11 cm) and background (>30 cm) level.

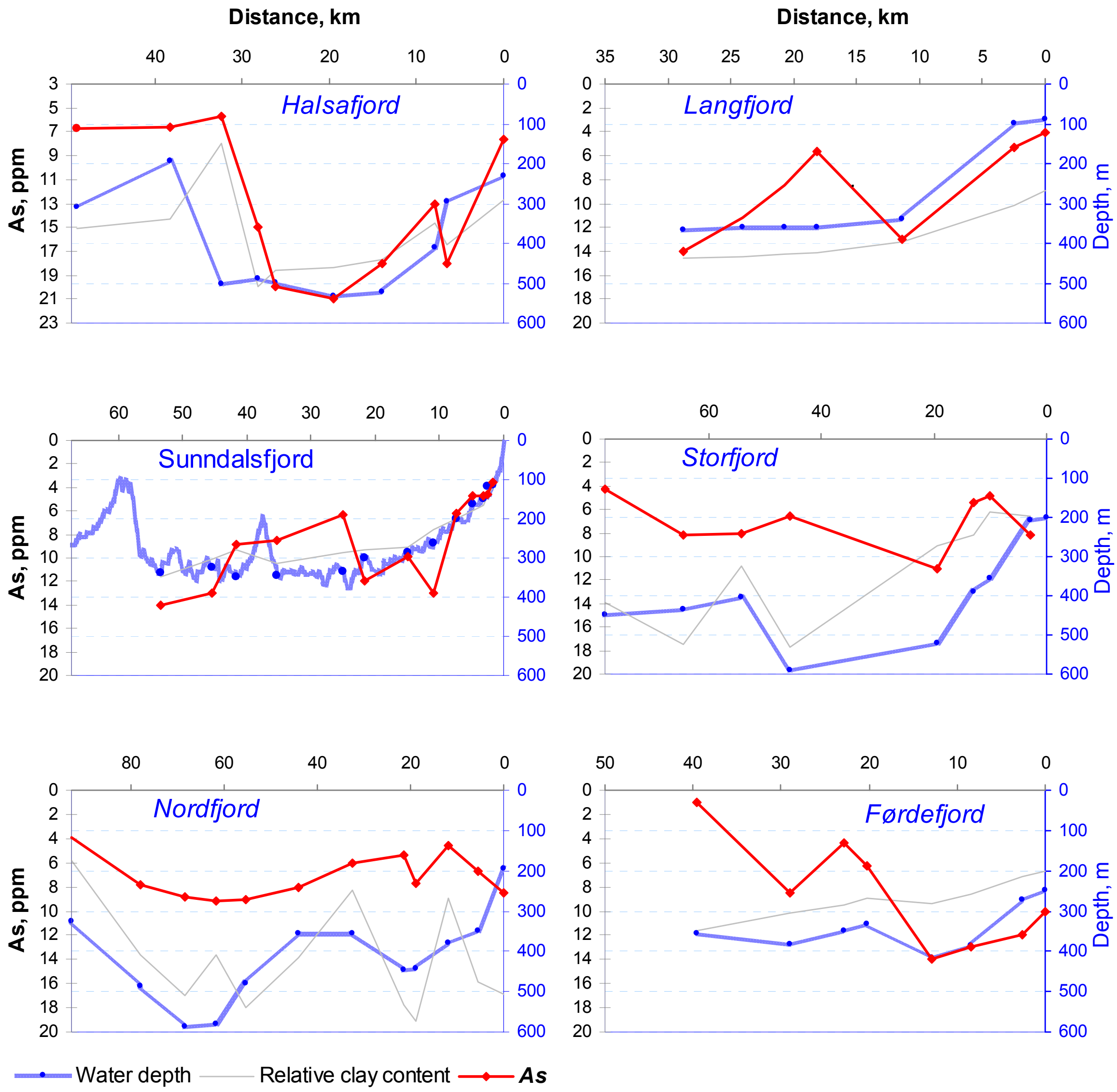

Figure 3.1.5. Arsenic distribution along the fjords on the background of depth profile and clay fraction trend, which is in relative units here. (NB! (1) *y*-axes are in the reverse order; (2) for numerical values of clay fraction see 3.1.3 and tab. 2 in appendix.)

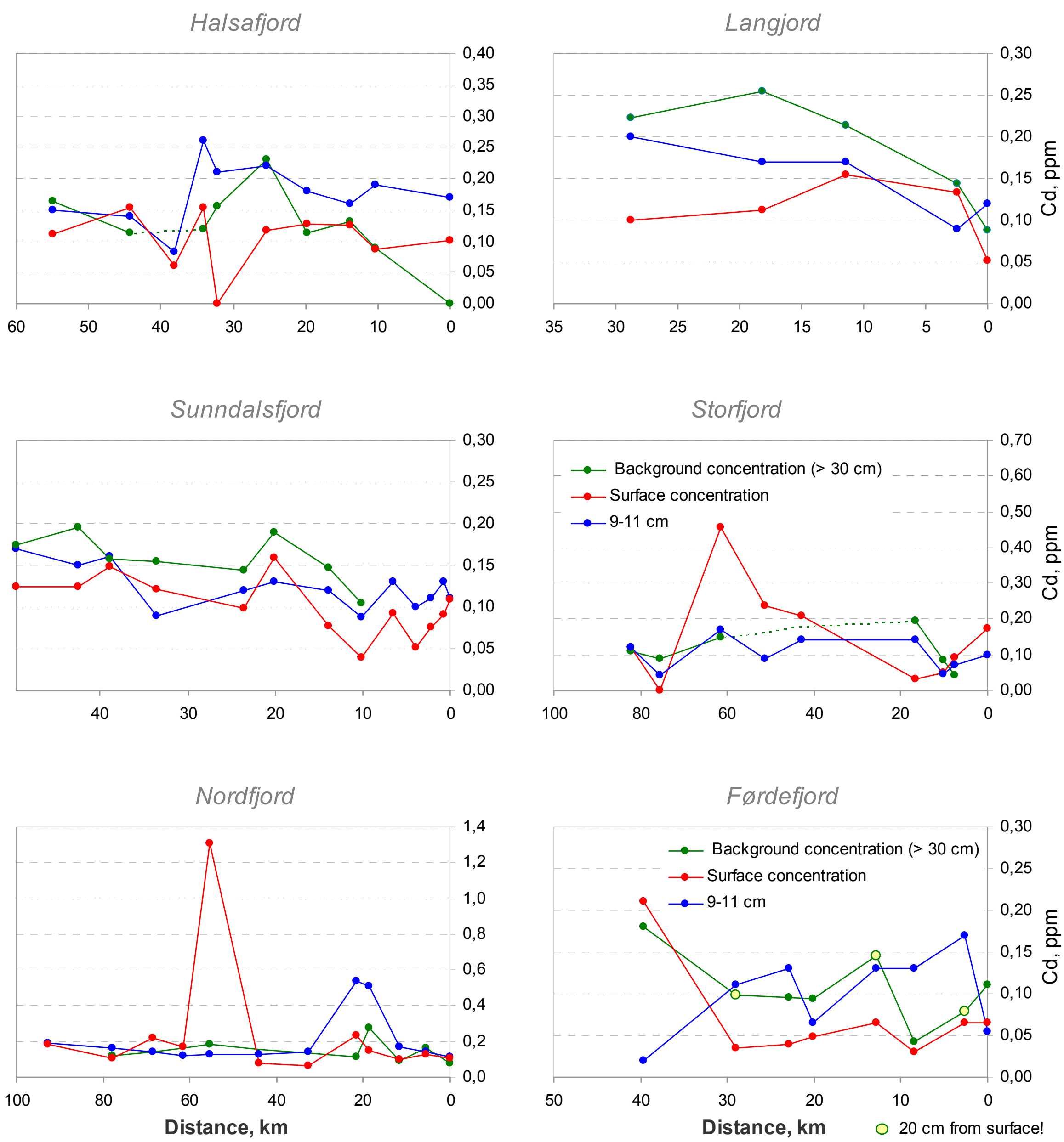

Figure 3.3.6. Cadmium distribution along the fjord axes for surface (0-1 cm), intermediate (9-11 cm) and background (>30 cm) level.

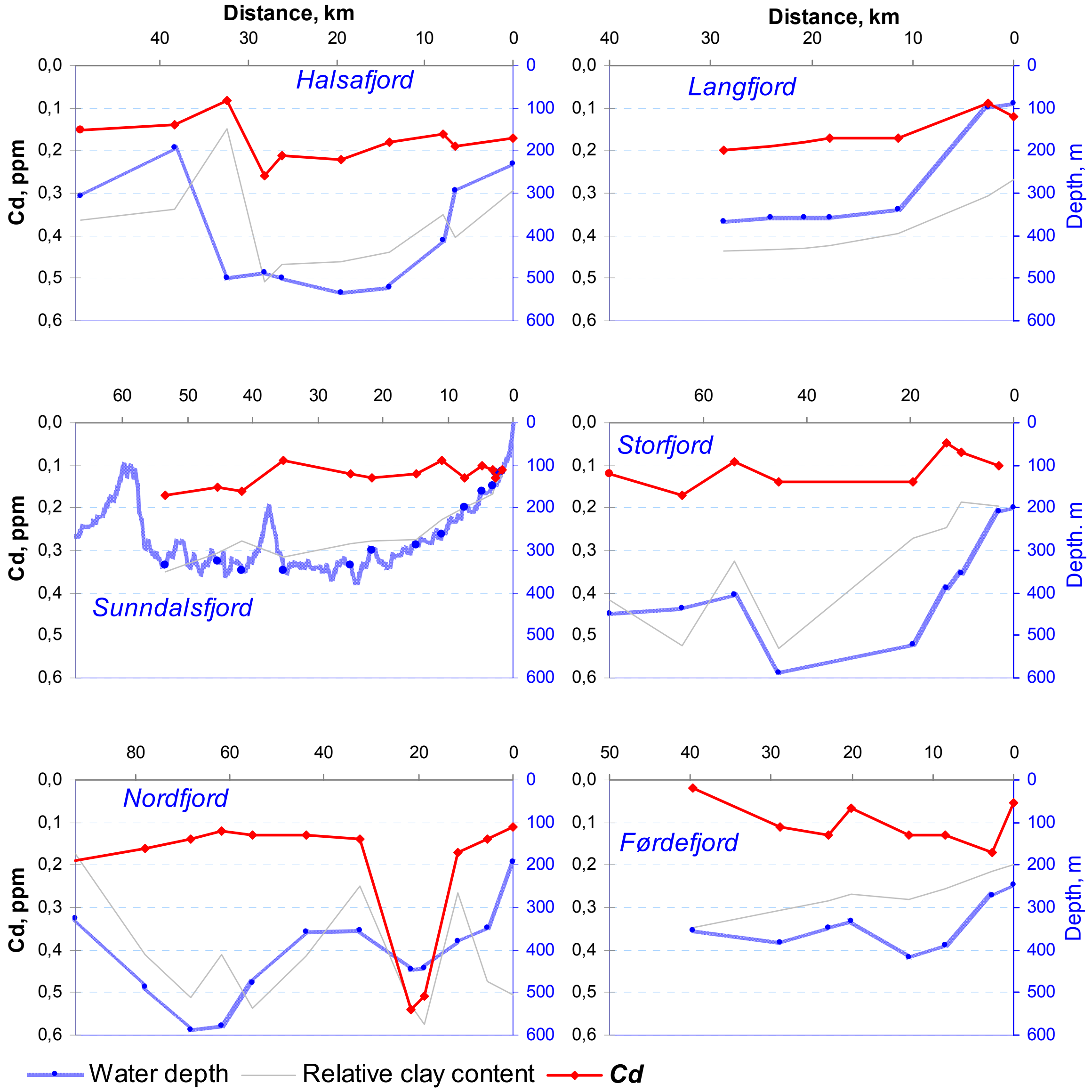

Figure 3.1.7. Cadmium distribution along the fjords on the background of depth profile and clay fraction trend, which is in relative units here. (NB! (1) *y*-axes are in the reverse order; (2) for numerical values of clay fraction see 3.1.3 and tab. 2 in appendix.)

Regional background value for cadmium content in fjord bottom sediments is <0.25 ppm (Knutzen et al, 1997). Compared to the deeper levels it shows even rather lower contents, except a few excess values. Cadmium relationship with manganese or iron phase is quite speculative. However there are some places of marked Cd enrichment that can be attributed to Fe-Mn enrichment zones (as it is for Sunndalsfjord and Nordfjord).

Cd has the strong affinity with S and Cl (r = 0.86 and 0.77); moreover it has good correlation with pyrite and monosulphide appearings. In comparison to other heavy metals investigated in the current work cadmium (Cd) has quite good correlation with organic matter content (r_{TOC} = 0.48). Apart from Cd, Pb, Hg and As the rest heavy metals considered below doesn't show any significant correlation with TOC.

Cobalt (Co) & vanadium (V)

Cobalt distribution along the fjord axes is very similar to vanadium (figures 3.3.8 – 3.3.11). The main explanation for high Co values in fjord sediment seems to be co-precipitation and adsorption on/with Fe and Mn oxides. Vanadium occurs with the siderophile element iron in the secondary environment, adsorbed or in co-precipitation with Fe-oxides/hydroxides. The distribution of V on the fjord sediment profiles is practically identical with that of Fe. The correlation coefficient Fe-V is very strong (r = 0.85).

The value of >14.0 ppm is considered as high for natural Co content in stream sediments of Norway (De Vos & Tarvainen, 2006). Compared to this value fjord bottom sediments as a whole contain a bit higher amount of Co content making up to 22.7 ppm in average (median 22.0).

Background level for vanadium content in fjord sediments is >150 ppm (Knutzen et al, 1997). Bottom sediments in investigated fjords show generally lower values in comparison with the background levels.

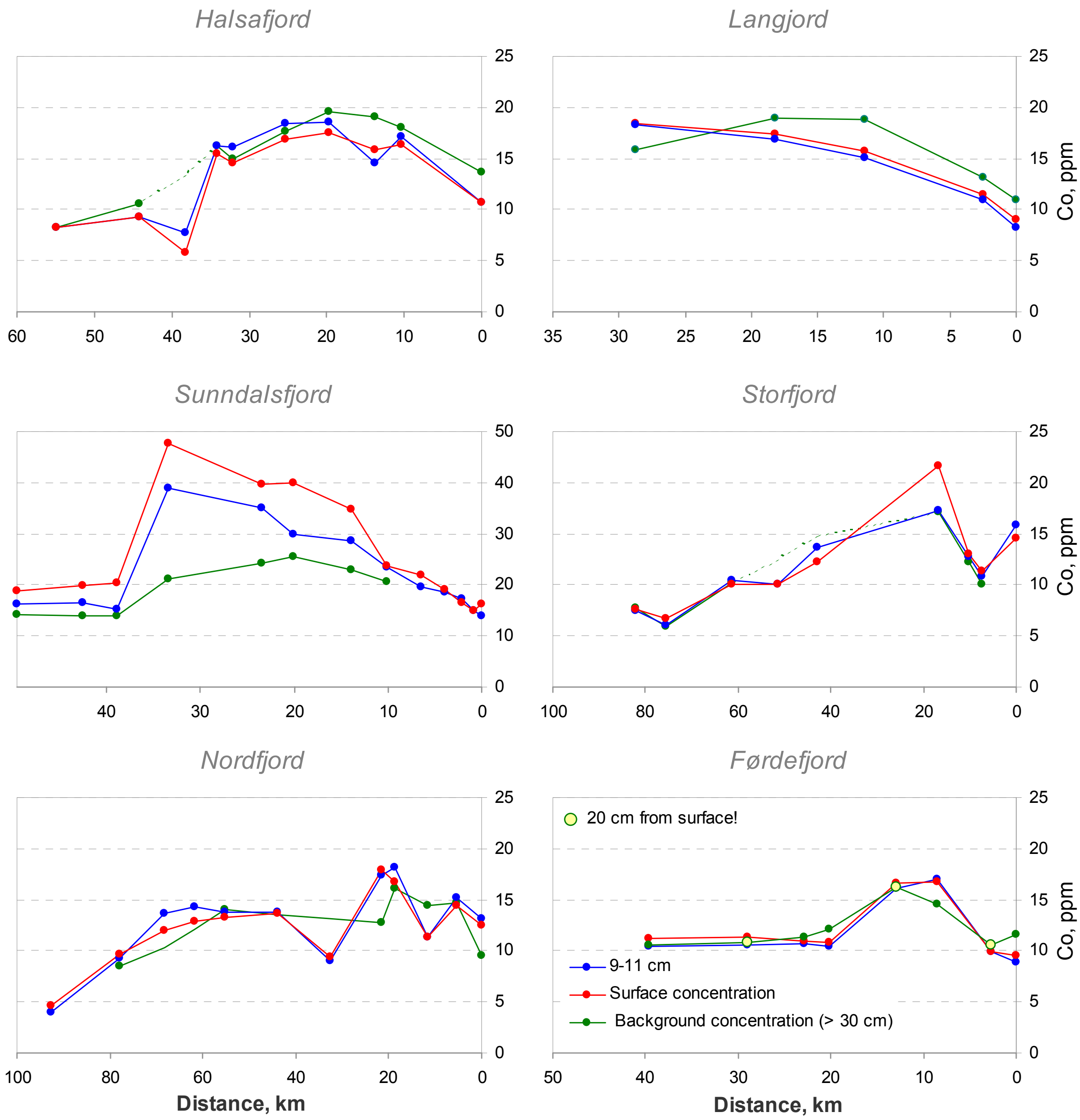

Figure 3.3.8. Cobalt distribution along the fjord axes for surface (0-1 cm), intermediate (9-11 cm) and background (>30 cm) level.

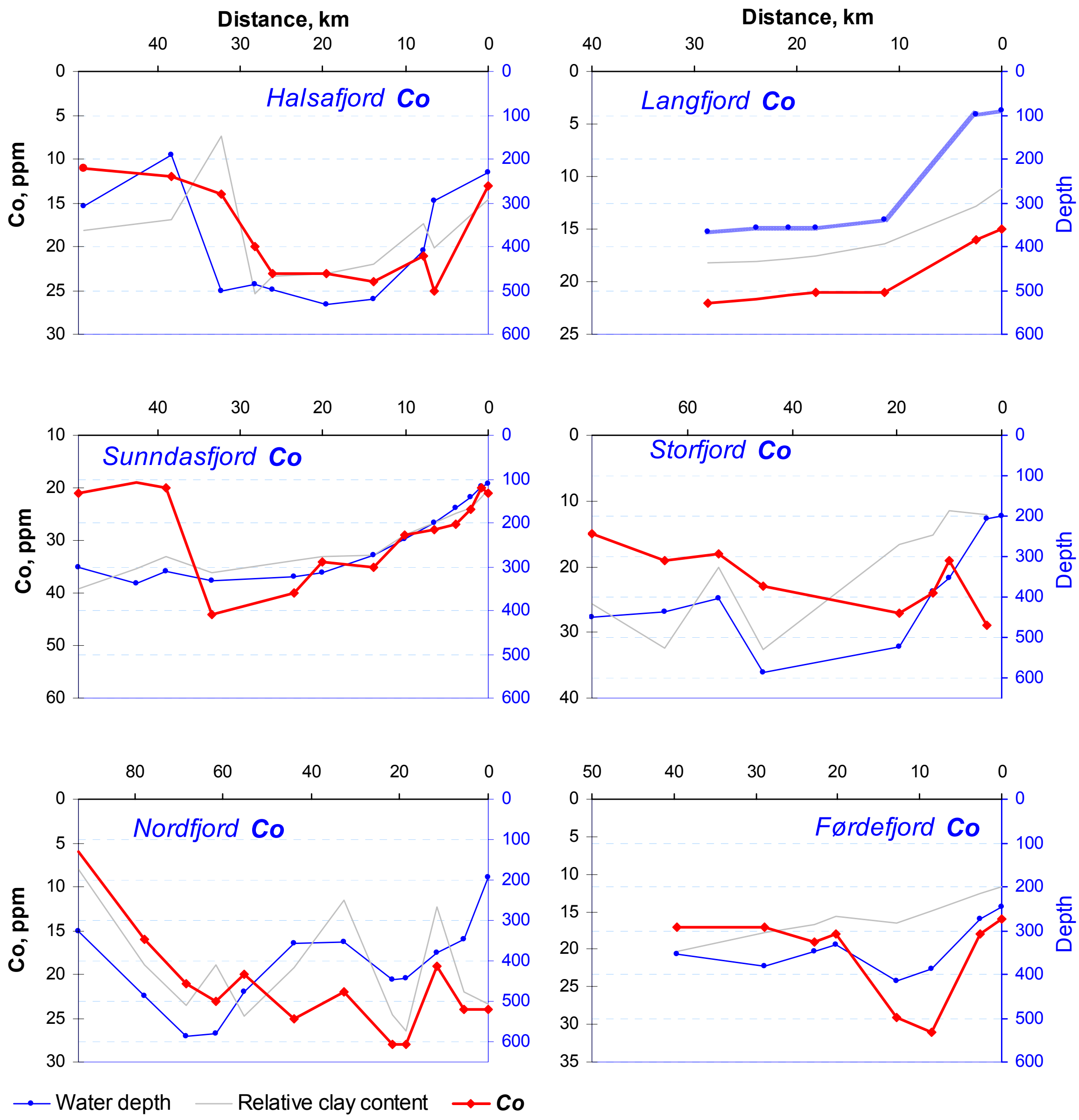

Figure 3.1.9. Cobalt distribution along the fjords on the background of depth profile and clay fraction trend, which is in relative units here. (NB! (1) *y*-axes are in the reverse order; (2) for numerical values of clay fraction see 3.1.3 and tab. 2 in appendix.)

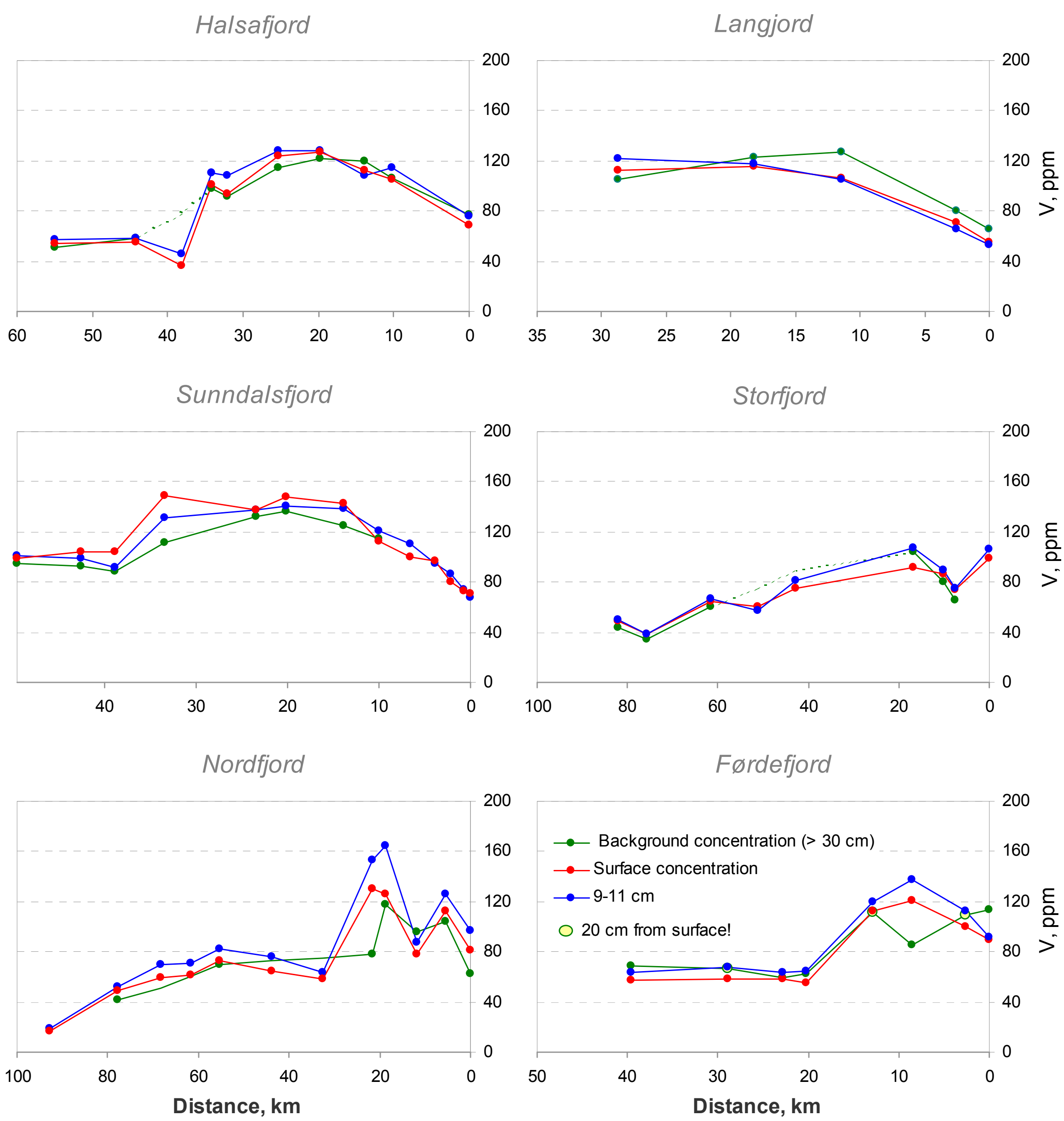

Figure 3.3.10. Vanadium distribution along the fjord axes for surface (0-1 cm), intermediate (9-11 cm) and background (>30 cm) level.

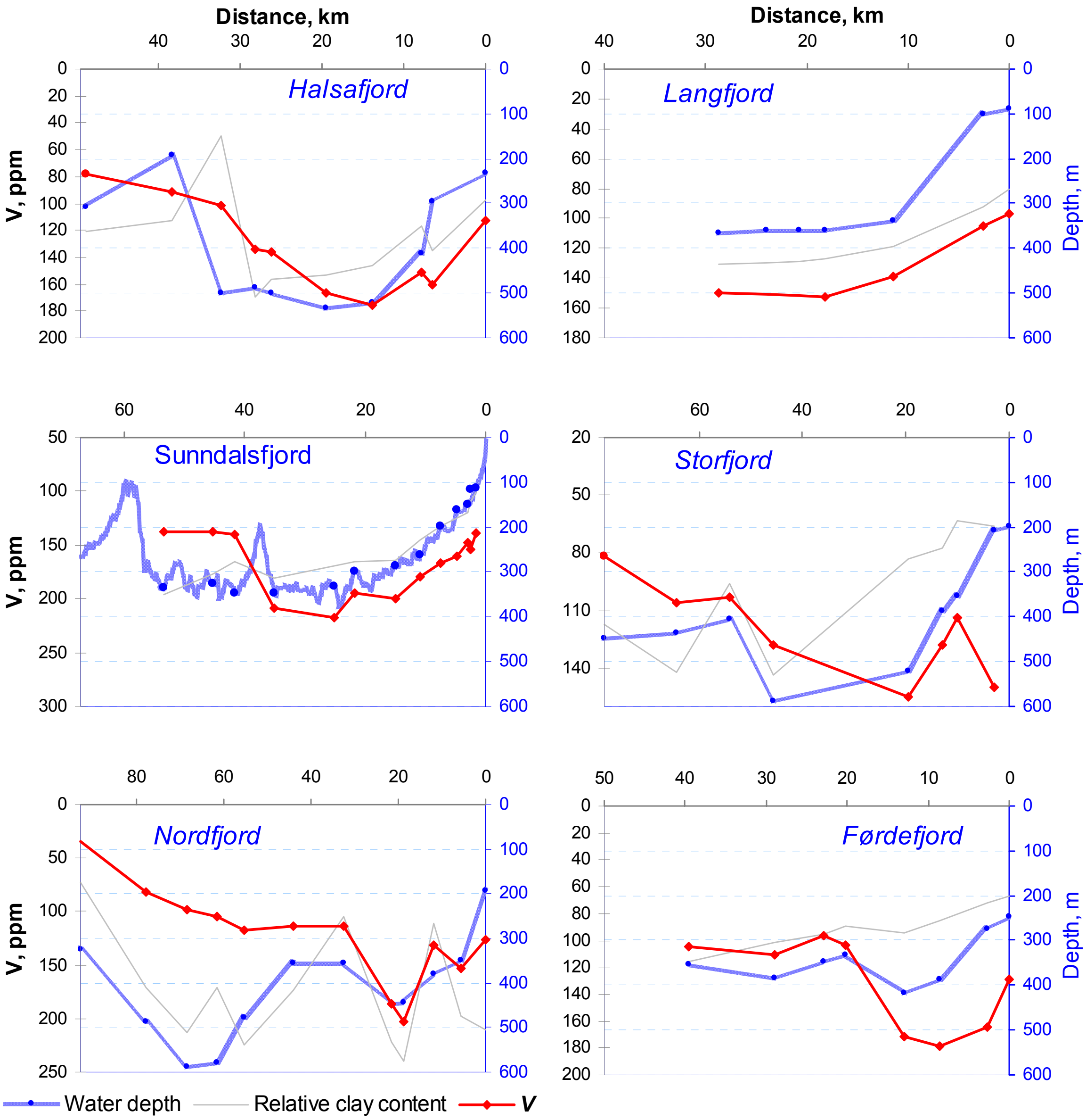

Figure 3.1.11. Vanadium distribution along the fjords on the background of depth profile and clay fraction trend, which is in relative units here. (NB! (1) *y*-axes are in the reverse order; (2) for numerical values of clay fraction see 3.1.3 and tab. 2 in appendix.)

Compared to the deeper levels that can be considered as a local background the concentration of V and Co in surface layer does not significantly differ form the deeper layers. Only exception is evident contamination of anthropogenic origin in Sunndalsfjord (it refers more to Co, than to V).

Copper (Cu) & zinc (Zn)

In sediments, Cu concentrations are principally determined by mafic detritus, secondary Fe and Mn oxides (Forbes et al., 1976), clay minerals (Heydemann, 1959) and organic matter (Stevenson and Ardakani, 1972). Co-precipitation of Cu and Zn occurs in the presence of Fe hydrous oxides (Lottermoser et al., 1999). The distribution of Zn in sedimentary rocks is primarily controlled by the abundance of ferromagnesian silicates, detrital oxides, e.g., magnetite, and clay minerals (Wedepohl, 1978). Cu and Zn correlations with iron oxide are $r_{(Fe2O3\text{-}Cu)} = 0.79$ and $r_{(Fe2O3\text{-}Zn)} = 0.68$; zinc has greater affinity for manganese ($r_{(MnO\text{-}Zn)} = 0.55$) than copper ($r_{(MnO\text{-}Cu)} = 0.39$).

High total Cu values in floodplain sediment (>28 ppm) are found over the amphibolite facies rocks of central and northern Norway, but also attributed to mineralization and its exploitation through mining (e.g., Killingdal Cu-Zn-pyrite, Tverrfjellet Cu-Zn-pyrite, Løggen Cu-Zn-pyrite) (De Vos & Tarvainen, 2006).

Their general means over the investigated fjord bottom sediments ($\overline{X}_{Cu}$ = 40.4 ppm, MED_{Cu} = 36.0 ppm; $\overline{X}_{Zn}$ = 111.4 ppm, MED_{Zn} = 110.0 ppm) are close to the background level of < 35 ppm for Cu and of <150 ppm for Zn (Knutzen et al., 1997).

Zn has very good correlations with REE (r = 0.80), Rb, Th and Ba (r ≈ 0.65); Cu, however, does not have the same correlations. Based on the comparative analysis of Cu and Zn distribution I found that their behaviour resembles the distribution of clay fraction content and also follows very well the water depth profiles (figures 3.3.12 – 3.3.15).

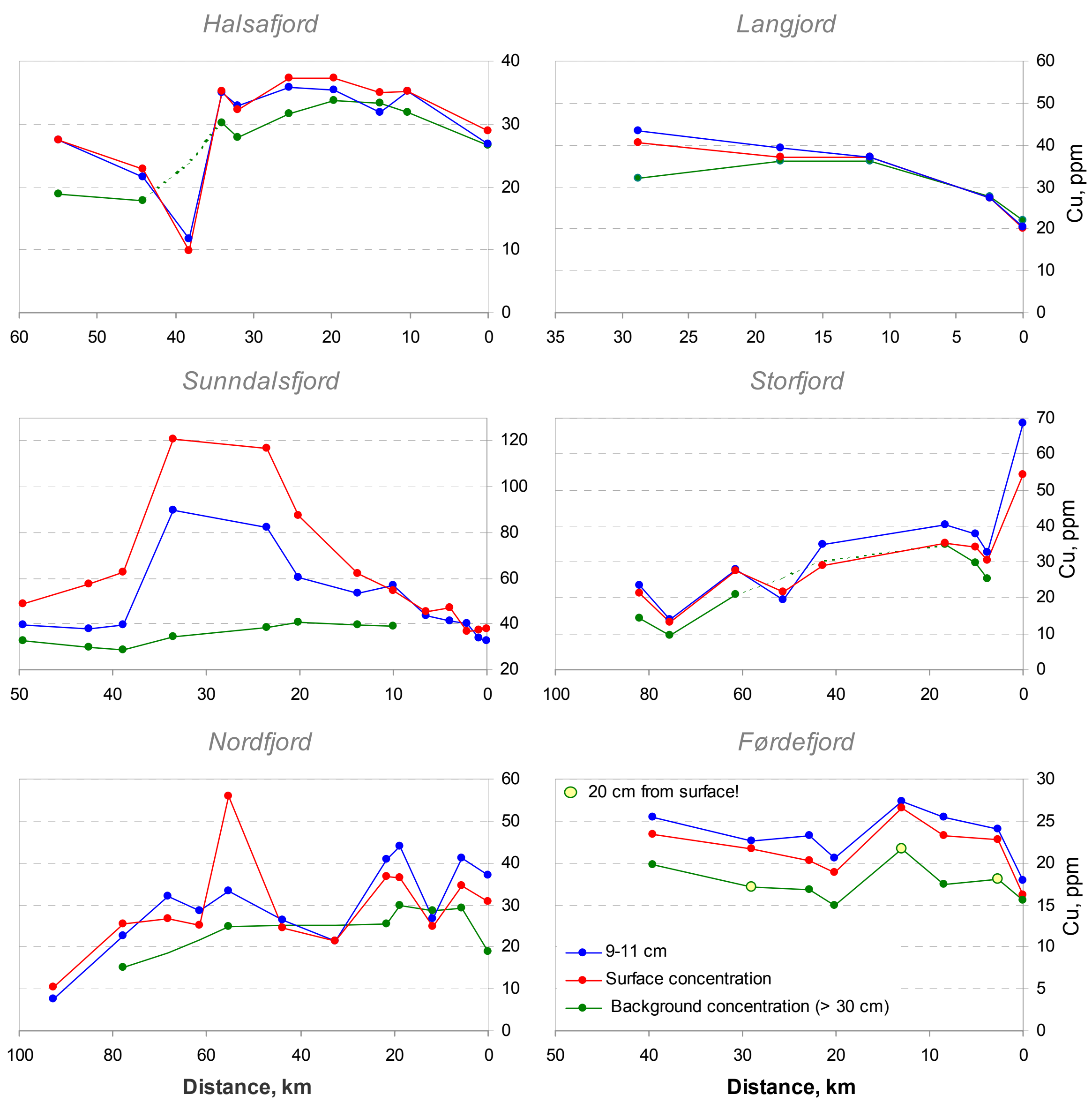

Figure 3.3.12. Copper distribution along the fjord axes for surface (0-1 cm), intermediate (9-11 cm) and background (>30 cm) level.

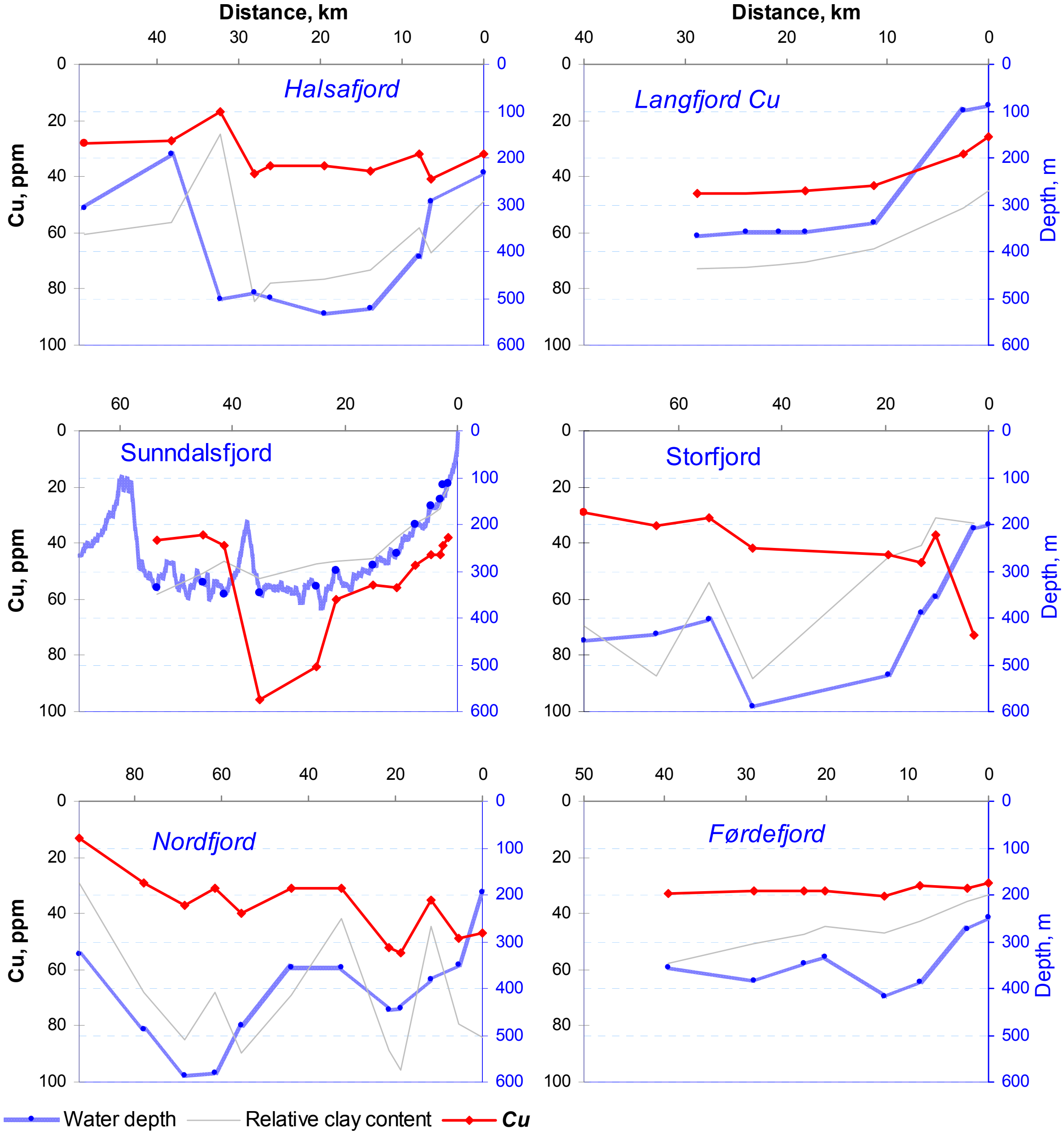

Figure 3.1.13. Copper distribution along the fjords on the background of depth profile and clay fraction trend, which is in relative units here. (NB! (1) *y*-axes are in the reverse order; (2) for numerical values of clay fraction see 3.1.3 and tab. 2 in appendix.)

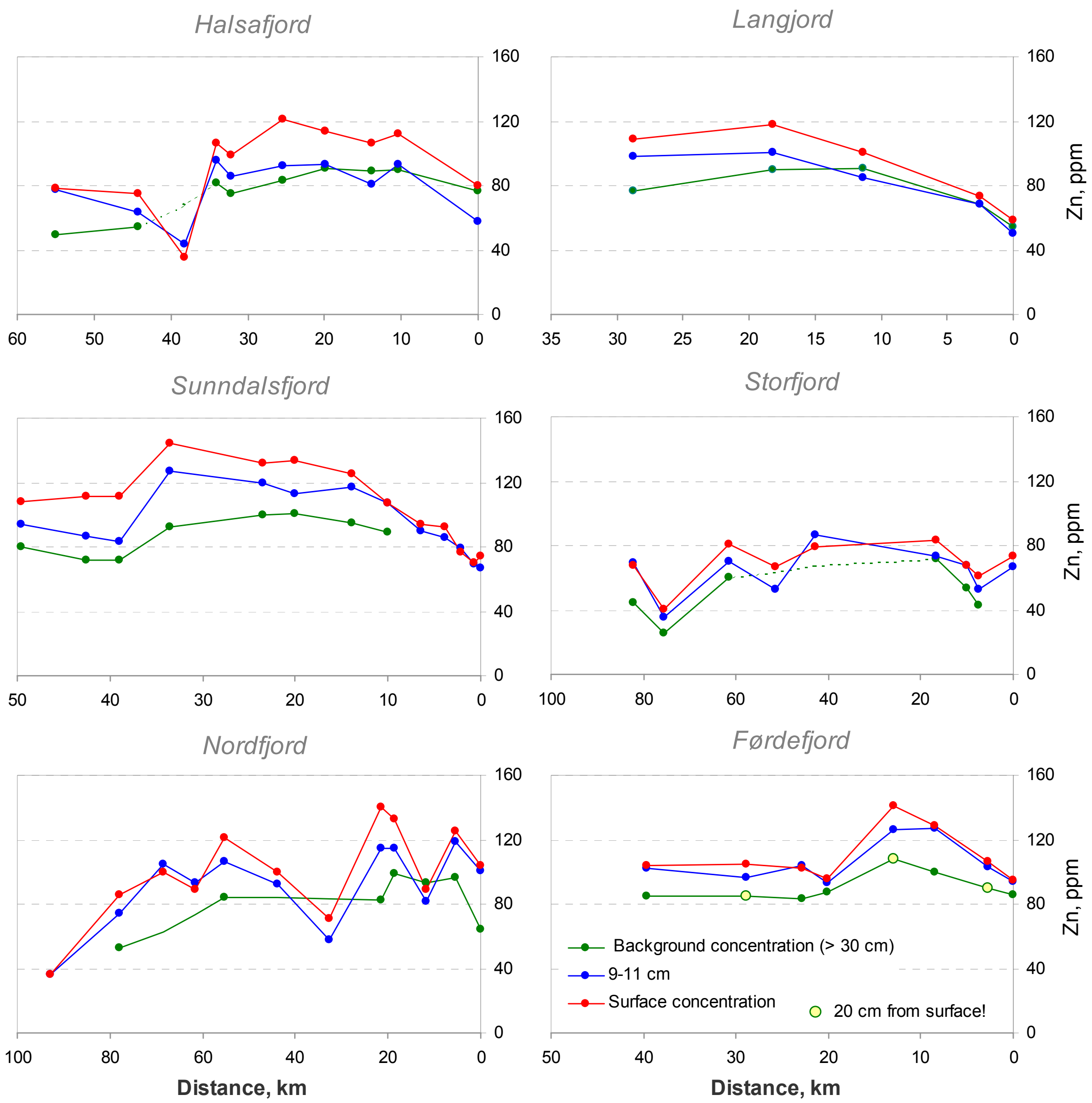

Figure 3.3.14. Zinc distribution along the fjord axes for surface (0-1 cm), intermediate (9-11 cm) and background (>30 cm) level.

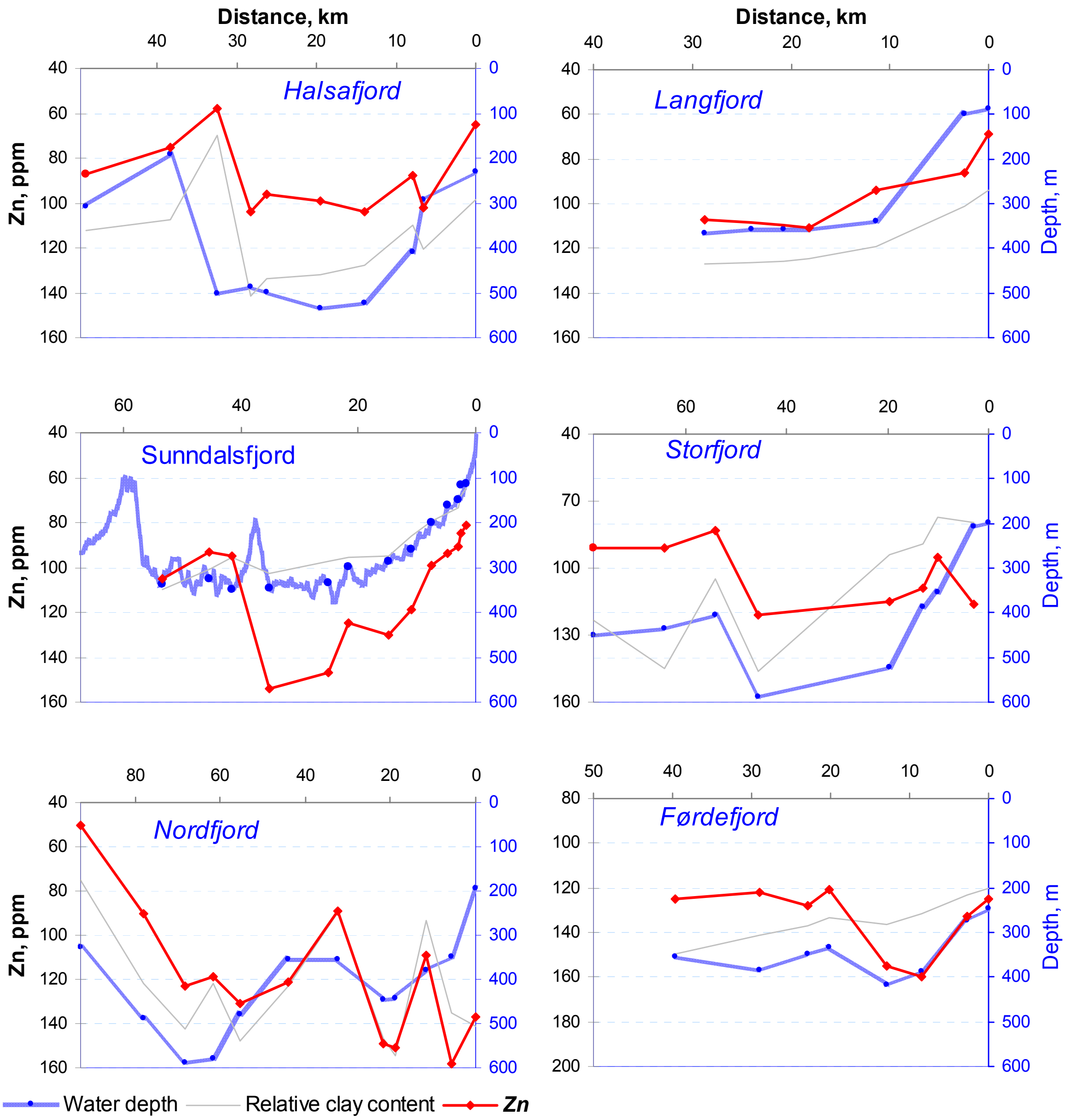

Figure 3.1.15. Zinc distribution along the fjords on the background of depth profile and clay fraction trend, which is in relative units here. (NB! (1) *y*-axes are in the reverse order; (2) for numerical values of clay fraction see 3.1.3 and tab. 2 in appendix.)

Chromium (Cr) & nickel (Ni)

In general, the next two heavy metals: chromium (Cr) and nickel (Ni) are similar to other heavy metals. In comparison to natural background (according to Knutzen et al, 1997: <30 ppm for Ni and <70 for Cr), their content in bottom sediments is distinctly higher only in two fjords: in Sunndalsfjord Ni and Cr and Ni in Halsafjord (figures 3.3.16 - 3.3.19), for other fjords Cu and Ni contents remain at the level close to natural.

A large proportion of the Ni in stream sediment is held in detrital silicate and oxide minerals that are resistant to weathering. Its mobility is generally restricted by its tendency to be sorbed by clay minerals (Short, 1961) or hydrous oxides of Fe and Mn (Ure and Berrow, 1982).

During weathering, the behaviour of Cr^{3+} resembles that of Fe^{3+} and Al^{3+}, leading to widespread accumulation with secondary oxides and clays (De Vos & Tarvainen, 2006). However, for sampling material considered in current work this statement is true only for nickel (Ni) whereas the chromium correlations are more modest. With Al_2O_3, Fe_2O_3, MgO and MnO nickel (Ni) has next correlation coefficients (***r***): 0.53, 0.74, 0.90 and 0.34 respectively (significant at $p < 0.05$); chromium (Cr) in turn shows respective ***r*** values only 0.33, 0.41, 0.59, 0.06 (no correlation with MnO at all). The relationship between Ni and Fe_2O_3 and MgO points out the maffic minerals as the natural source of Ni.

Comparison of Cr and Ni along-axis distribution with clay fraction, both metals seem to be affected to the lesser or greater extent by distribution of the last.

Lead (Pb) and mercury (Hg)

It is quite obvious that the strongest factors controlling lead (Pb) and mercury (Hg) contents are organic matter (TOC) and clay fraction in fjord sediments. This statement is confirmed by PCA statistical analyse and comparison of given heavy metals and TOC and clay fraction distribution curves (figures 3.3.20 – 3.3.23).

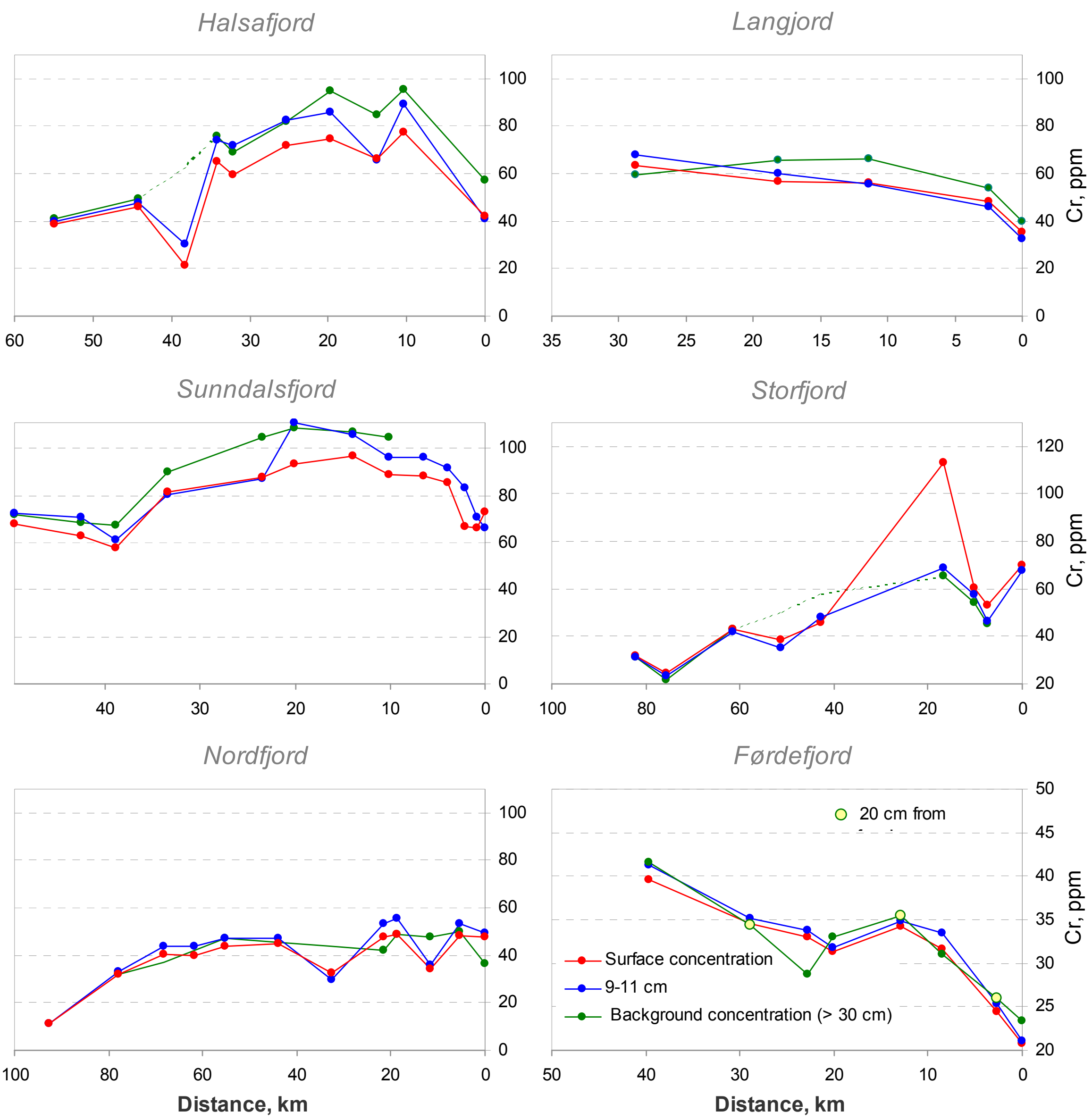

Figure 3.3.16. Chromium distribution along the fjord axes for surface (0-1 cm), intermediate (9-11 cm) and background (>30 cm) level.

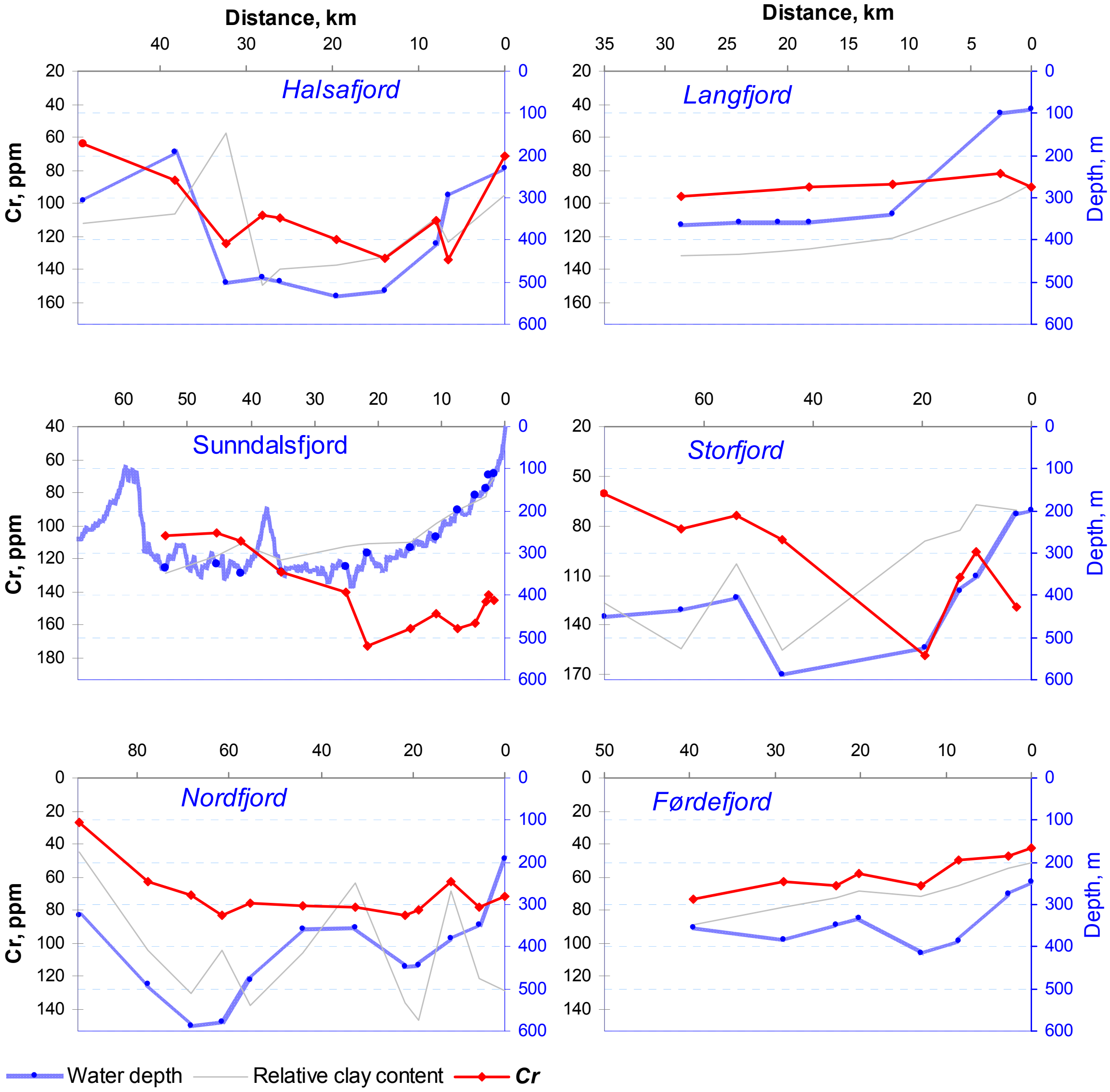

Figure 3.1.17. Chromium distribution along the fjords on the background of depth profile and clay fraction trend, which is in relative units here. (NB! (1) *y*-axes are in the reverse order; (2) for numerical values of clay fraction see 3.1.3 and tab. 2 in appendix.)

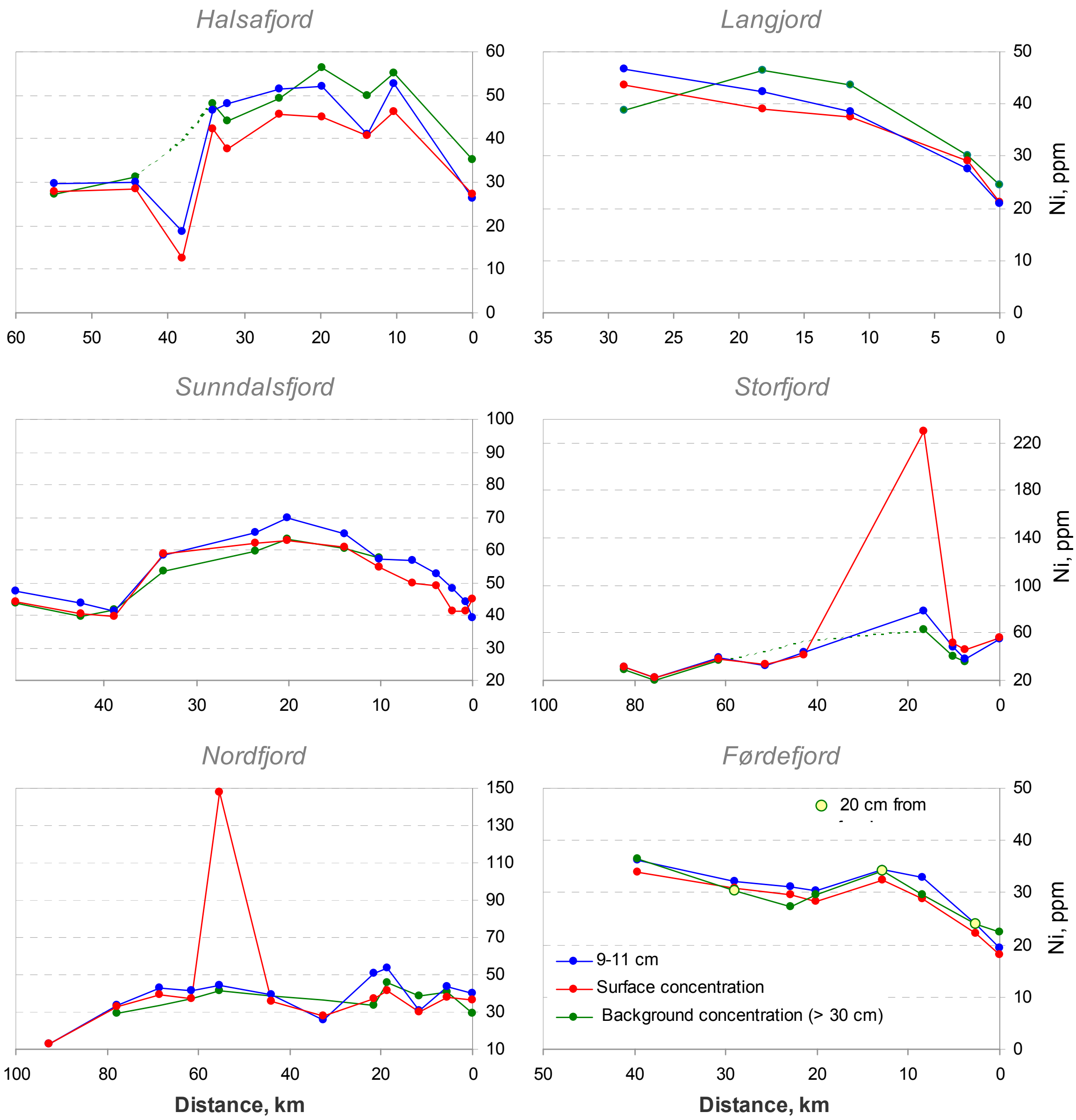

Figure 3.3.18. Nickel distribution along the fjord axes for surface (0-1 cm), intermediate (9-11 cm) and background (>30 cm) level.

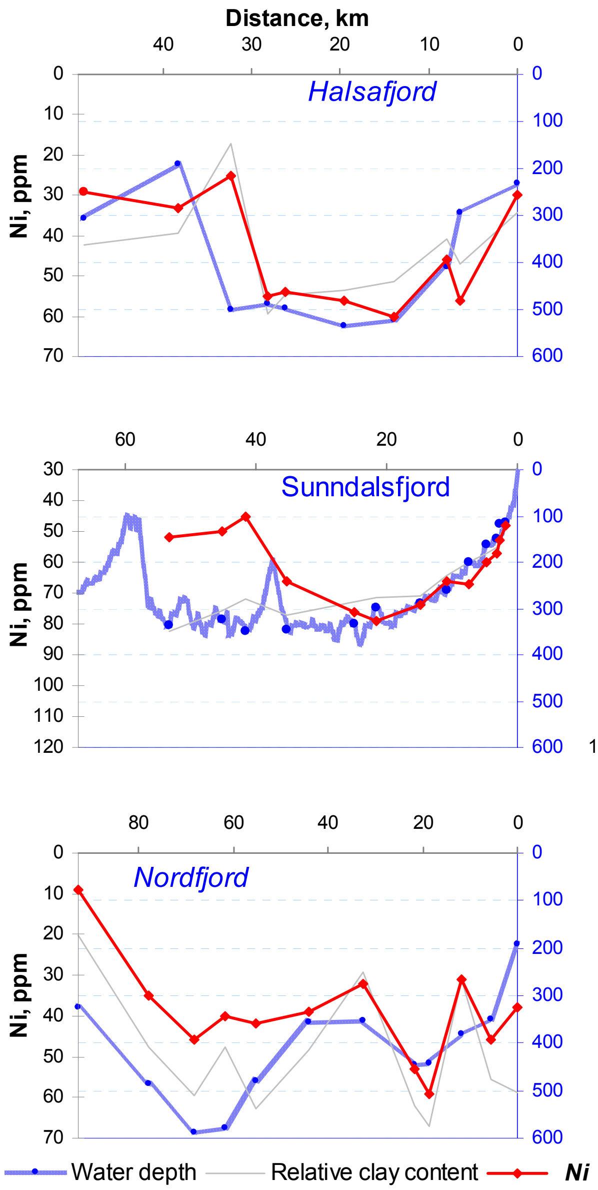

Figure 3.1.19. Nickel distribution along the fjords on the background of depth profile and clay fraction trend, which is in relative units here. (NB! (1) *y*-axes are in the reverse order; (2) for numerical values of clay fraction see 3.1.3 and tab. 2 in appendix.)

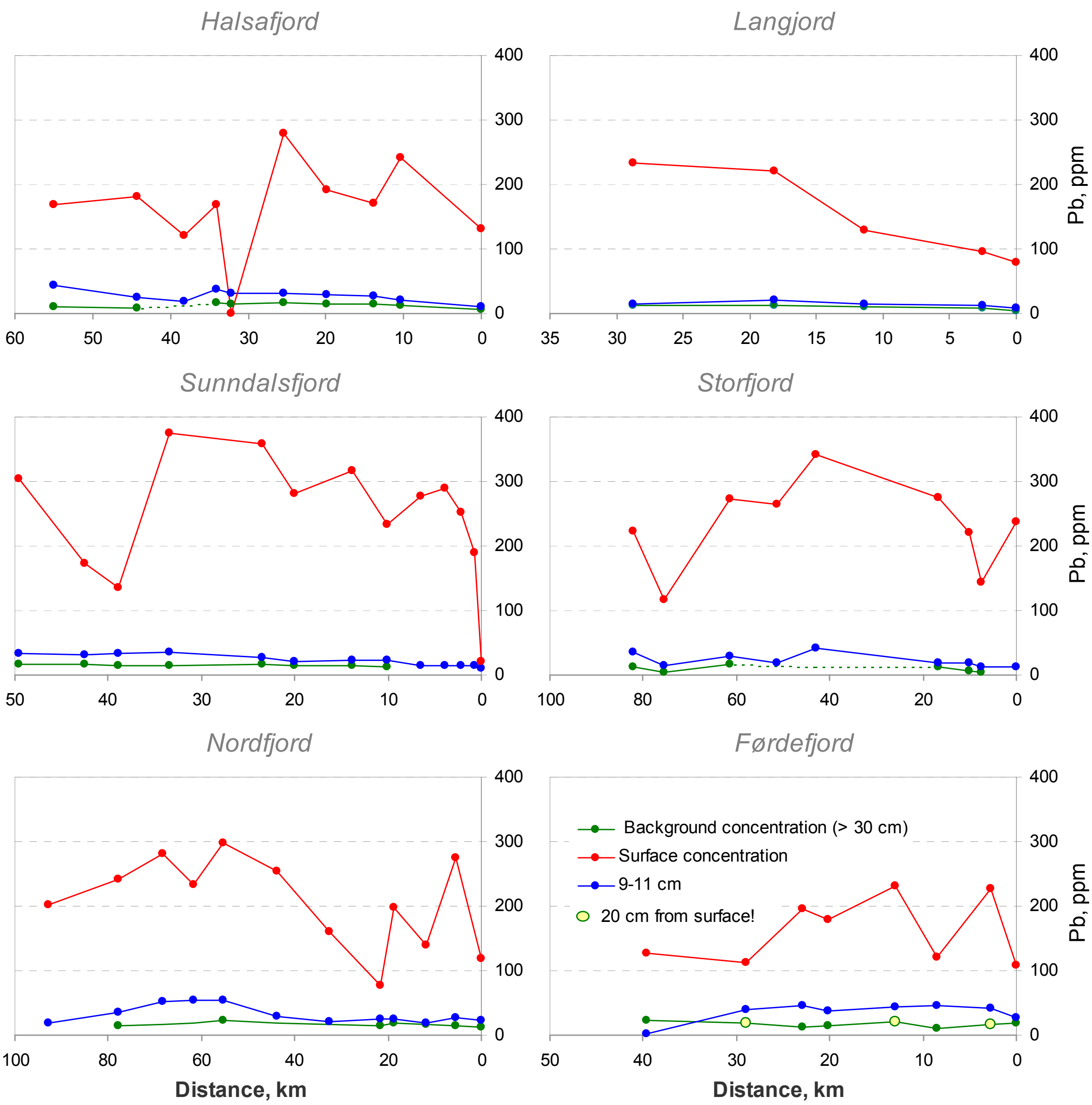

Figure 3.3.20. Lead distribution along the fjord axes for surface (0-1 cm), intermediate (9-11 cm) and background (>30 cm) level.

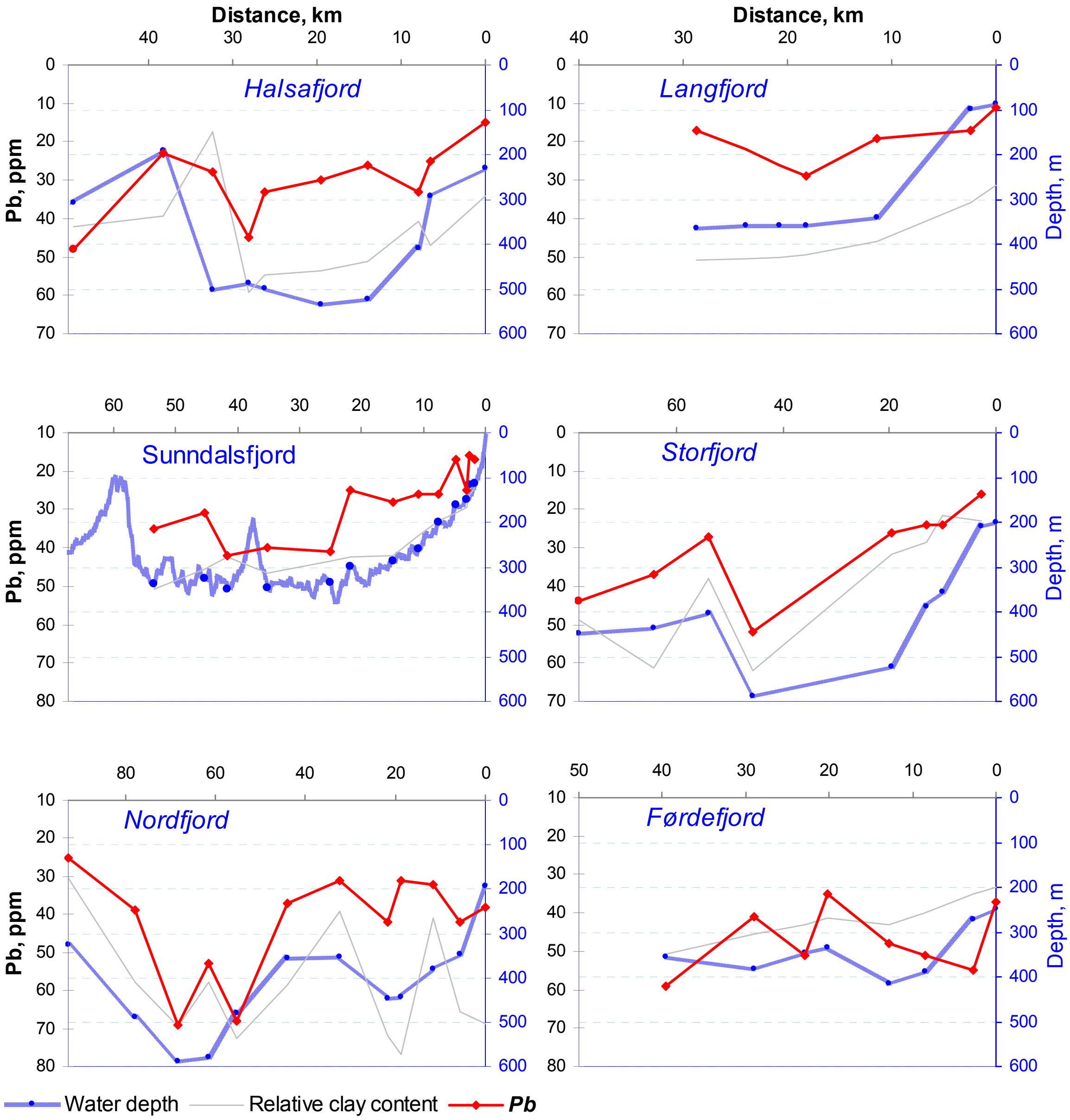

Figure 3.1.21. Lead distribution along the fjords on the background of depth profile and clay fraction trend, which is in relative units here. (NB! (1) *y*-axes are in the reverse order; (2) for numerical values of clay fraction see 3.1.3 and tab. 2 in appendix.)

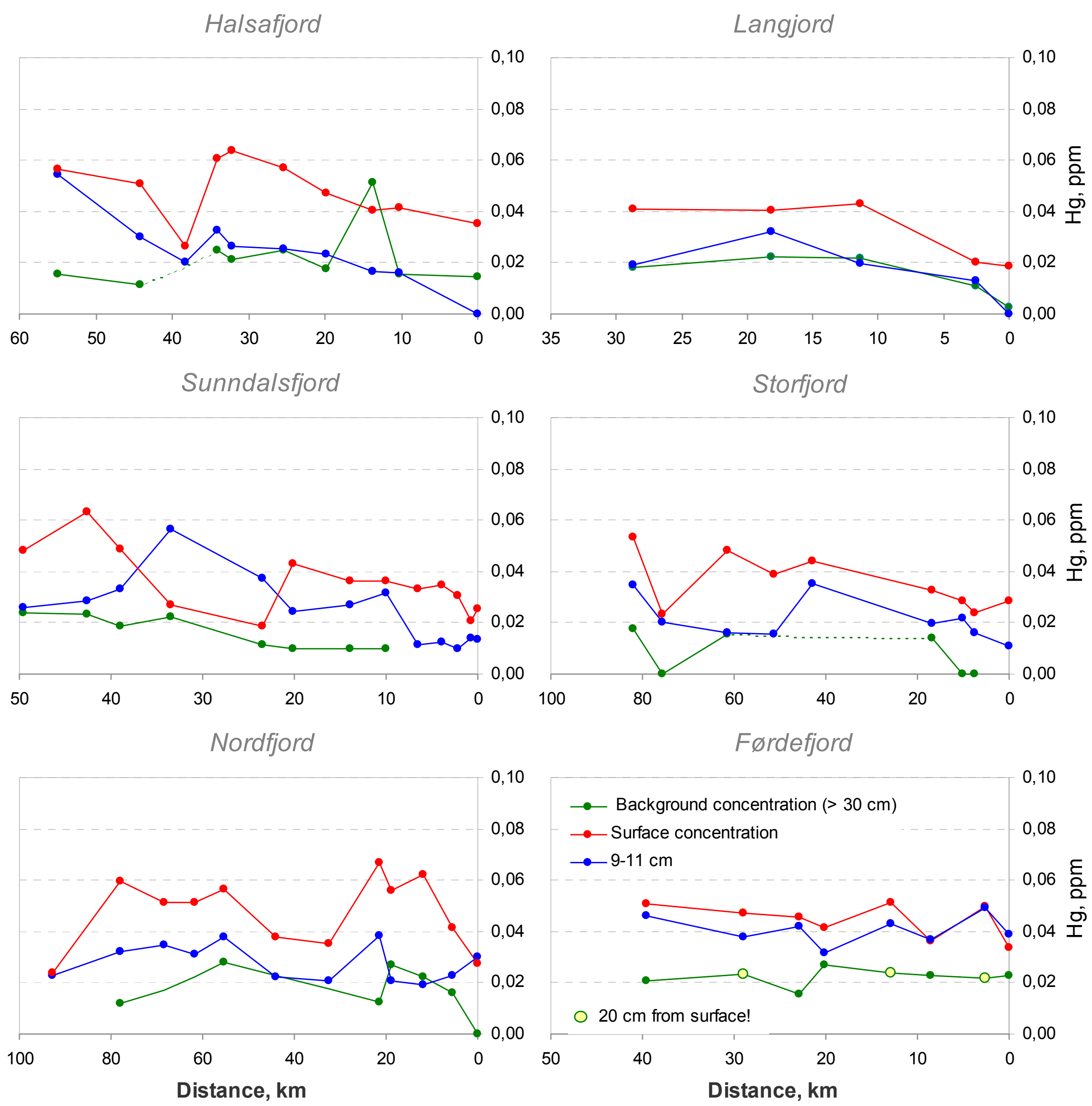

Figure 3.3.22. Mercury distribution along the fjord axes for surface (0-1 cm), intermediate (9-11 cm) and background (>30 cm) level.

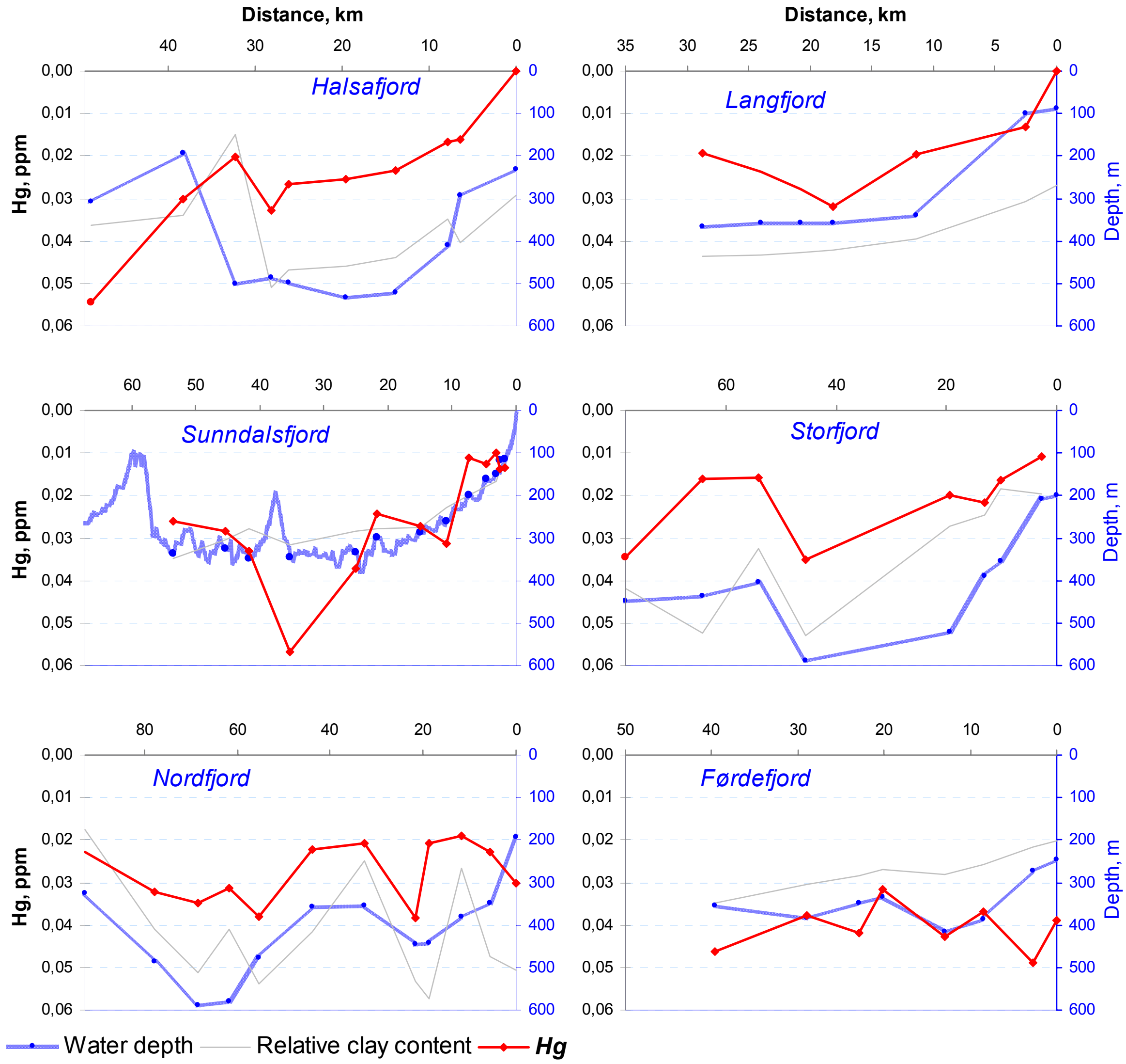

Figure 3.1.23. Mercury distribution along the fjords on the background of depth profile and clay fraction trend, which is in relative units here. (NB! (1) *y*-axes are in the reverse order; (2) for numerical values of clay fraction see 3.1.3 and tab. 2 in appendix.)

There is an increased content of lead (Pb) in surface layer of fjord bottom sediments of all investigated fjords without single exception, which many times exceeds values of natural background for this element. This is probably related to pollution.

Background levels for Pb and Hg are <30 and <0.15 accordingly (Knutzen et al, 1997). Mercury (Hg) does not have higher values compared to natural concentrations. However Hg, along with Pb, shows increasing content towards the surface, although its increase is not comparable with Pb. Any significant correlation with manganese or iron oxides for these heavy metals was not observed.

3.3.3 Vertical distribution of heavy metals.

Iron (Fe) content in most fjords remains at the natural background level, except for Sunndalsfjord, which is polluted due to vicinity to industrial areas. Vertical distribution of Fe is similar for all three horizons considered here, remaining the same for given cross section (fig. 3.3.3).

Manganese (Mn) in turn tends to accumulate in specific locations with favourable redox conditions, showing much greater concentrations in such places in sediment surface layer (fig. 3.3.2).

The concentrations of the cadmium (Cd), vanadium (V), arsenic (As), chromium (Cr) and nickel (Ni) remain the same or in some places even decreases towards the surface in a vertical cross-section of bottom sediments in all fjords investigated (figures 3.3.4, 3.3.6, 3.3.10, 3.3.16, 3.3.18). Still, for these heavy metals there are some variations along the fjord axes, which were discussed above. These metals are mostly related to variation of such parameters as clay content, TOC, Fe-Mn oxide-hydroxide abundance and fjord depth. Some localities with a increase of arsenic concentrations are most likely related to its adsorption on manganese oxide-hydroxides.

In general terms, the vertical distribution of copper (Cu), cobalt (Co) and zinc (Zn) show slight increase or remains at the same content as in deeper layers of bottom sediments. However, there is an evident increase of Cu, Co and Zn content in Sunndalsfjord, reaching significant contamination level (fig. 3.3.8, 3.3.12, 3.3.14).

Investigations of the environmental status of the Sunndalsfjord area near Rausand were carried out by NIVA (Norwegian Institute for Water Research) in year 2003. The aim of the investigation was to describe the environmental status in the fjord area near Rausand, and to define the possible area of influence caused by discharges from Aluscan AS (Rygg et al., 2003).

After the discharges from Rausand mines ceased in 1983, the concentrations of metals in the surface sediments (0-2 cm) have already changed. The changes are caused by sedimentation of natural particles, but also by new pollution discharges to the fjord area. Typical components in the earlier discharges from the mines, such as iron and vanadium, now occur in lower concentrations, whereas discharges from the new industry have caused an increase in the concentrations of aluminium, copper, zinc and chrome. The pollution is strongest in the vicinity to Aluscan, but even in the deep basin of the fjord, the concentrations of zinc and especially copper have increased (Rygg et al., 2003).

Sampling locations for current project are situated at five to six kilometres' distance from Aluscan AS and for that reason contamination rate reflected by graphs is not so striking. However there are evidently higher copper, cobalt and zinc contents especially in the first (upper, *I*) part of Sunndalsfjord, in comparison to its second part, separated by a high, ~150 m, sill (see bathymetry profile on fig. 3.1.5, a). Furthermore, there is also much higher content of Fe and Mn in this (first) part of the fjord.
For some reason this part of the fjord has more favourable conditions for heavy metal precipitation, although the organic matter and clay accumulation occurs preferably in the second part of Sunndalsfjord, behind the sill (figures 3.1.3 and 3.1.4).

Copper and cobalt have markedly increased values only in Sunndalsfjord, as soon as zinc shows some higher content in surface horizon of other fjords too. Most likely higher levels of TOC (fig. 3.1.4) can explain this increase. Good example for that is Halsafjord (fig. 3.3.8 and 3.3.12). There is some higher zinc surface content in Langfjord and Nordfjord as well.

Lead (Pb)

Lead shows the most significant contamination in all fjords investigated. According to SFT environmental condition classification (Knutzen et al., 1997) there is a marked contamination level of lead in the uppermost fjord sediment layer in all fjord without an exception (fig. 3.3.20). Vertical distribution of lead shows exponential growth of its content towards the surface. Three means of lead content in Sunndalsfjord arranged in descending order of bedding depth appear as follows: 15 ppm, 22 ppm and 278 ppm.

Some higher values of lead were measured already in an intermediate 9-11 cm layer. For this layer lead content exceeds its natural background concentration only in Nordfjord. It is obviously related with increase of organic matter (TOC) content there and probably clay (figures 3.1.3 and 3.1.4).

Mercury (Hg)

There is no increased content of mercury (Hg), which would indicate contamination, nevertheless upper layers (10 and 0.5 cm) show twice as high Hg concentration compared to the deepest samples (≥ 30 cm), which were taken as a background (fig. 3.3.22).

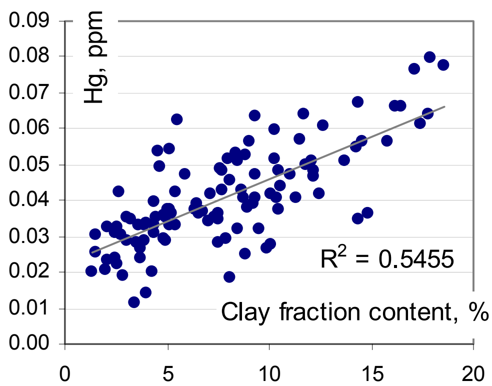

Figure 3.3.24. Hg in upper layer versus clay content.

The major factors controlling mercury (Hg) content are TOC and clay content in sediments.

If to look at Hg and TOC curves, Hg almost repeats TOC curve's shape in all horizons (≥ 30, 9-11 and ≤ 2 cm). It has good correlation with clay fraction content ($r = 0.74$, $p < 0.05$), a good example to that is a scatter plot showing relationship of clay content versus mercury content in upper (≤ 2cm) layer on figure 3.3.24.

3.4 Statistical analysis

3.4.1 The relations between clay mineralogical composition and heavy metals

3.4.1.1 Correlations

Correlation table of clay minerals and heavy metals is shown in appendix (table 8). Marked correlations are significant at $p < 0.0500$.

Kaolinite

The clay mineral phase determined as kaolinite has negative correlation with most heavy metals, especially with La, Nd, Ce, Ba ($r \approx 0.35$), Rb and the most clear negative correlation can be observed with Zr ($r = 0.43$). Furthermore it appears with K_2O ($r = - 0.74$) and SiO_2 ($r = - 0.69$).

Only significant positive correlation is with Sc ($r = 0.69$). Among oxides CaO ($r = 0.64$) and also L.O.I. ($r = 0.78$) display positive correlation with kaolinite. The last two are probably related to both kaolinite, CaO and L.O.I. increase towards outer part of the fjords (Karimov, 2004).

Chlorite

Chlorite has weak positive correlation with MgO ($r = 0.43$), Zr ($r = 0.56$) and quite strong correlation with Cr ($r = 0.82$) and Ni ($r = 0.56$).

There is slight negative correlation between chlorite and L.O.I. Chlorite has negative correlation with Sr ($r = - 0.57$), Pb ($r = - 0.51$), Ba ($r = - 0.55$), Ce ($r = - 0.55$), La (r = -

0.57), Nd (r = - 0.45), Pr (r = - 0.71). All of these elements a more abundant in felsic rocks whereas the chlorite was probably derived from maffic sources.

Illitic minerals

Illitic minerals show negative correlation with Cr (r = - 0.58), but there is no significant correlation with Pb. Also, Ni gives slightly negative correlation (r = - 0.48).

Illitic minerals show positive correlation with Ba (r = 0.58). Ce, La and Nd all as one give positive correlation (r ≈ 0.6). Some kind of positive correlation gives also Sr (r = 0.45)

Mixed layer clay minerals (ML)

Illite-vermiculite I/V shows weak positive trend with Rb (r = 0.51), Th (r = 0.51), Zn (r = 0.51) and Ce (r = 0.53),. There is, whereas low, but marked positive correlation between MgO, Fe_2O_3 and I/V, which probably one more time confirms presence of this phase (FeO and MgO make up 13 and 14.4 % accordingly in composition of vermiculite). MnO also gives satisfactory correlation with I/V (r = 0.53)

Illite-smectite I/S (that is smectitic illite-smectite, R0 ordered; illite-type layer content <50%) has positive correlation with L.O.I. (r = 0.41), Sc (r = 0.44), W (r = 0.51) and TOC (r = 0.53). Strong positive correlation appears with Pb (r = 0.79).

3.4.1.2 Heavy metal and clay mineralogy PCA

The results of PCA show that about 60% of the system variation, which comprises clay mineralogical composition and major heavy metals, can be described already by the two first factors, and about 75% of the system variation - by three factors (fig. 3.4.1). PCA analyses are performed for data range derived from the sediment column interval 9-13 cm.

It seems that the greater influence from the clay minerals exert mixed layers with illite-smectitic composition in any proportions that have at least modest ability for expanding. By this means the most definite and evident tendency for ML with illite-smectitic composition is to control to the some extent the content of lead (Pb) and may be REEs and Rb, Th. However the last assumtion is fairly speculative, since the illitic minerals itself can be the source of these trace elements.

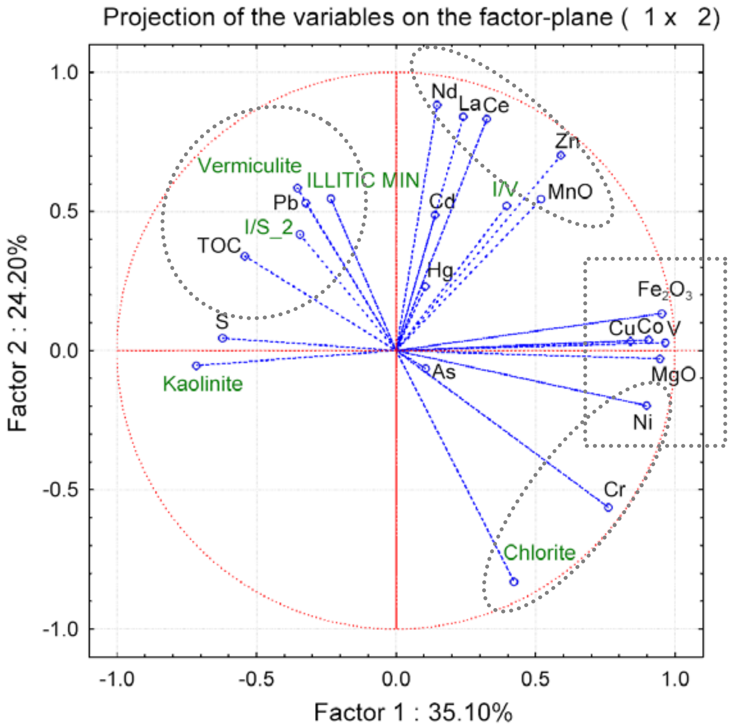

Figure 3.4.1. Factor-plane diagram showing relations of heavy metals and clay minerals from fjord bottom sediments. Factors 1 & 2 together describe this system to the 46.52% extent, it is enough to select clear groups. *I_S_2* corresponds to smectitic illite-smectite, R0 ordered, illite layers content <50%; *I/V* to illite-vermiculite; *ILLITIC MINERALS* is the sum of minerals with content of illitic layers > 60%.

Chlorite behaviour on the factor-plane refers to its relationship with chromium (Cr) and probably nickel (Ni). Zinc-manganese association have a propensity for illite-vermiculitic (I/V) phase of clay minerals.

Arsenic and mercury are best described by the third factor, expressing their affinity to the clay fraction content in total.

3.4.2 Heavy metal and general mineralogy PCA

PCA performed on XRF data (plus Hg, As and Cd from Atomic Adsorption analyses) shows the system variance is to be described up to 41% by the two first factors and up to 56% by three factors (figures 3.4.2 and 3.4.3).

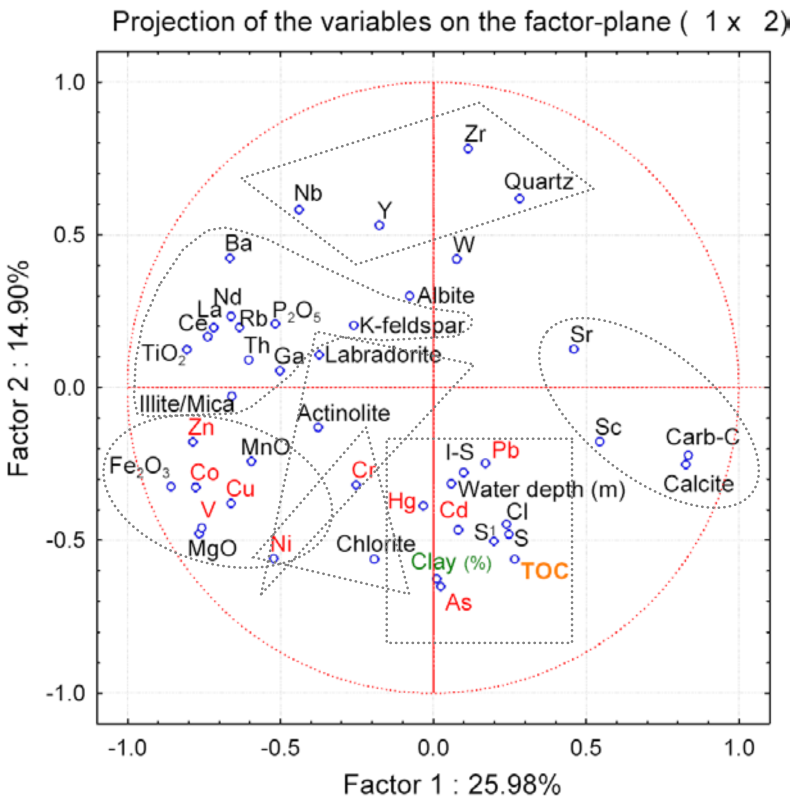

Figure 3.4.2. Factor-plane diagram showing relations of heavy metals and total mineralogy of fjord bottom sediments. Factors 1 & 2 together describe this system to the 40.88% extent; it is enough to select clear groups. *I-S* corresponds to illite-smectite.

The second and the third factors have similar extent of description ability. If to compare two factor planes displaying 1. and 2. factors and 1. and 3., then it is evident that the last factor correlation (1. vs. 3.) better describes current system, grouping specific naturally related variables more clearly.

Based on the associations outlined on two factor-plane diagrams five major groups/associations can be defined.

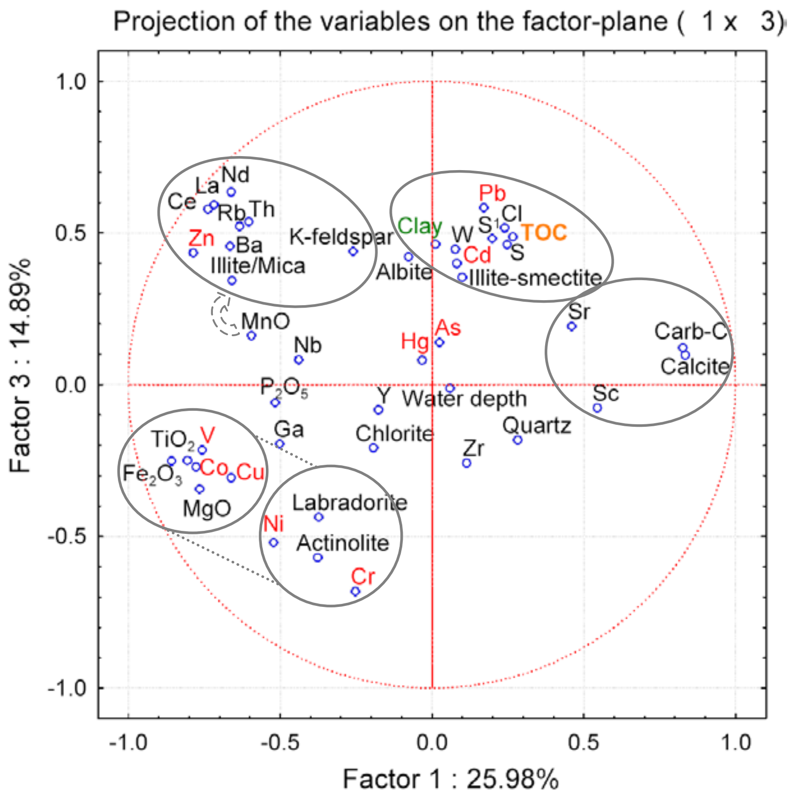

Figure 3.4.3. Factor-plane diagram showing relations of heavy metals and total mineralogy of fjord bottom sediments. Factors 1 & 3 together describe this system to the 40.87% extent. *I-S* corresponds to illite-smectite.

The first group is the biogenic carbonate and its inherent elements: Sr, Ca, carbonate-C and calcite. This group can be identified as an association described best by the factor I.

The second group includes K-bearing minerals and their associated elements: REE and Th, Rb, Ba, Zn, illite/mica and K-feldspar. This association is best described by the negative loading of factor I.

The third group is a group of mafic elements: Fe_2O_3, MgO, Co, Cu, V, Ni, Cr and TiO_2 and includes also minerals actinolite and labradorite. This group in can be divided into two groups: (1) best described by the factor III: labradorite actinolite and Ni, Cr and (2) best described by factor I: Fe_2O_3, MgO, Co, Cu, V, and TiO_2.

Fourth group is an association of elements taking part in adsorption by organic matter (TOC) and clay (total clay content and ML illite-smectite): Hg, As, Pb. Moreover, this group includes sulphides inherent to anoxic conditions: Cd, S.

Fifth group that belongs to the factor II is an association of Zr, including quartz, Y and Nb.

4. Summary and Conclusion

Concentration and distribution patterns of vanadium (V), chromium (Cr), nickel (Ni), copper (Cu), zinc (Zn), arsenic (As), cobalt (Co), cadmium (Cd), lead (Pb) and mercury (Hg) in bottom sediments of Norwegian fjords was studied.

Results of this study show that prevailing mass of heavy metals is derived form the surrounding source rocks in drainage area. Mineralogical-chemical composition and the type of sediments principally control the distribution of heavy metals. However, in some cases increased concentrations were found which are probably due to the pollution.

Weathering and erosion of amphibolite facies basic rocks supplies the largest part of the material into the fjord bottom sediments. These weathered materials yield relatively high content of Cu and iron group heavy metals (V, Ni, Co). At the same, the Zn and V are dispersed as trace elements in mica minerals that are widespread in felsic rocks.

However, the relationship between clay mineral composition of bottom sediments and their heavy metal content is not well defined. Only mixed layer minerals with illite-smectite composition probably control the content of Pb to the some extent. Nevertheless, illitic minerals itself can be the source of these trace elements. Zinc-manganese heavy metal association can be related to illite-vermiculitic (I/V) type clay minerals, which reflect increased weathering. Arsenic and mercury display their affinity to the clay fraction content in total. Sorption by Fe-Mn oxides/hydroxides has significant contribution in the content of heavy metals in fjord bottom sediments, especially on the concentration of As, V, Cu and Ni.

Distribution of heavy metals in fjord bottom sediments suggests a general tendency for most heavy metals to concentrate in deeper (and consequently hydrodynamically calm) parts of the fjords. It seems that heavy metals, being scavenged in the fjord basin water beforehand by particulate material and/or in process of modifying floccules from ion complexes, are settling down in deeper parts of the fjords with lower turbulence and higher content of such adsorbents as clay minerals, organic matter, Fe-Mn enrichment and additional favouring factors such as higher salinity and (sub-)anoxic conditions.

The concentrations of Cd, V, As, Cr and Ni are about the same scale in a vertical distribution pattern. The vertical distribution of Cu, Co and Zn show slight increase or remains at the same rate as in deeper layers of bottom sediments. There is an evident increase of Cu, Co and Zn concentration in Sunndalsfjord that can be considered already as a significant contamination. Zinc shows some higher content also in surface layers of other fjords (Halsafjord, Langfjord and Nordfjord), which can be explained by higher levels of TOC in these locations.

Lead concentrations are problematic in all fjords investigated. According to SFT environmental condition classification (Knutzen et al., 1997) there is a contamination level of lead in the uppermost fjord sediment layer in all fjords without an exception, exceeding the natural background concentrations up to 10 times and more.

However, for the deeper layers (9-11cm) lead content exceeds its natural background concentration only in Nordfjord. It is obviously related with increase of organic matter (TOC) and the higher clay fraction content. No contamination values exceeding background levels (Knutzen et al, 1997) of mercury (Hg) were found during current study, nevertheless upper layers (10 and 0.5 cm) show twice as high Hg concentration compared to the deepest samples (≥ 30 cm). The major factors controlling mercury (Hg) content are TOC and clay content in sediments.

In conclusion this suggests that there are four major parameters that may significantly affect on the heavy metal content in the fjord bottom sediments: (1) TOC, (2) bathymetry and hydrodynamics, (3) clay content and its mineralogical composition, (4) presence of Fe and Mn oxides/oxyhydrates.

Acknowledgements

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Raskmetallid Lääne Norra fjordide põhjasetetes

Kokkuvõte

Käesolevas töös uuriti raskmetallide levikut Lääne Norra fjordide (Halsafjord, Sunndalsfjord, Langfjord, Storfjord, Nordfjord, Sognefjord ja Boknafjord) põhjasetetes. Põhitähelepanu oli suunatud kümnele enamohtlikele raskmetallile: vanaadium (V), kroom (Cr), nikkel (Ni), vask (Cu), tsink (Zn), arseen (As), koobalt (Co), kaadmium (Cd), plii (Pb) ja elavhõbe (Hg). Uurimuse põhiülesandeks oli selgitada nende elementide levikut kontrollivad tegurid.

Uuringu tulemused näitavad, et valdav osa raskmetallidest on loodusliku päritoluga ning peegeldavad fjordide valgalas paljanduvate aluspõhjakivimite koostist. Raskmetallide levik on enamasti kontrollitud mineraloogilise/keemilise setete koostise ja tüübiga. Siiski võib mõnedel juhtudel pidada raskmetallide kõrgema sisalduse põhjuseks ka inimtegevust (reostust).

Peamiseks põhjasetete settematerjali allikaks on fjordide piirkonnas avanevad amfiboolse faatsiese aluselised kivimid. Nende kivimite murenemisel ja erosioonil moodustunud setted on suhteliselt kõrge vase ning raua grupi raskmetallide (V, Ni, Co) sisaldusega. Samas Zn ja V, mis on samuti tüüpiliselt kõrgema sisaldusega on hajutatud jälgelementidena peamiselt vilkudes, mis on laialt levinud granitoidsetes kivimites.

Seos setetes tüüpiliselt heade raskmetallide sorbentide savimineraalide ja raskmetallide sisalduse vahel ei ole hästi väljendunud. See kinnitab eeltoodud järeldust, et raskmetallid fjordide põhjasetetes on valdavalt aluspõhjalist päritolu ning esinevad settes kas iseseisvate mineraalidena või jälgelementidena teistes

mineraalides. Vaid suhteliselt hea seos segakihiliste iliit-smektiitse koostisega mineraalide ja Pb sisalduse vahel viitab, et osa pliist võib pärineda veest ning on adsorbeeritud savimineraalidega. Samas võivad aga illitsed mineraalid ise olla nende jälgelementide allikaks. Positiivne on savimineraalidel seos ka arseen ja elavhõbeda sisaldusega. Võrreldes savimineraalidega on olulisem seos raskmetallide kõrgendatud sisaldusetel Fe-Mn oksiid/hüdroksiidide sorptsiooniga, eriti As, V, Cu ja Ni puhul.

Raskmetallide levik fjordide põhjasetetes näitab üldist tendentsi enamikul raskmetallidel kontsentreeruda sügavamates (ja seega rahulikuma hüdrodünaamikaga) fjordide osades, mida iseloomustab ka kõrgem potentsiaalsete adsorbentide savimineraalide, orgaaniline aines, Fe-Mn oksühüdraadid sisaldus ning selliseid settimist soodustavad faktorid nagu kõrgem soolsus ja (sub-)anaeroobne keskkond.

Sunndalsfjordis on täheldatud märgatavalt kõrgemaid Cu, Co, ja Zn sisaldusi, mida võib juba käsitleda olulise reostusena. Kõikides fjordides on problemaatiliselt kõrge plii sisaldus. Vastavalt Norra reostuse järelvalve inspektsiooni (SFT) klassifikatsioonile Pb sisaldus on reostuse tasemel kõikide fjordide põhjasetete ülemises kihis, ületades loodusliku fooni rohkem kui 10 korda.

Elavhõbeda sisaldused ei ületa loodusliku fooni, kuid setete ülemistes kihtides (sügavustel 10 ja 0,5 cm setete pealispinnast), võrreldes alumise loodusliku taustana võetava tasemega (≥ 30 cm), näitavad kaks korda kõrgemaid sisaldusi.

Kokkuvõtteks võib välja tuua neli põhilist tegurit, mis võivad oluliselt mõjutada raskmetallide sisaldust fjordide põhjasetetes, need on: (1) TOC, (2) batümeetria ja hüdrodünaamika, (3) savide sisaldus ning selle mineraloogiline koostis, (4) Fe and Mn oksiidide/oksühüdraatide olemasolu.

Appendix

Table 1. Clay mineral composition in Nordfjord and Sunndalsfjord (in semi-quantitative %; sampling interval 11-13 cm).

	Sample nr.	Chlorite	Vermiculite	Illite	I/V	I/S_1	Kaolinite	I/S_2
Sunndalsfjord	S009	51.0	0.0	42.2	6.8	0.0	0.0	0.0
	S012	43.2	0.0	51.1	5.8	0.0	0.0	0.0
	S013	36.3	0.0	55.9	2.2	5.6	0.0	0.0
	S015	43.8	0.0	44.5	11.7	0.0	0.0	0.0
	S016	47.6	0.0	39.7	11.1	1.6	0.0	0.0
	S017	45.2	0.0	32.7	20.1	2.0	0.0	0.0
	S018	40.9	0.0	43.6	13.6	1.9	0.0	0.0
	S019	38.2	0.0	49.6	10.2	2.0	0.0	0.0
	S021	38.8	0.0	51.1	8.9	1.2	0.0	0.0
	S024	37.0	0.0	54.3	1.6	2.4	4.7	0.0
	S025	36.7	0.0	42.1	9.7	5.3	6.2	0.0
	S026	36.1	0.0	48.1	0.0	3.8	12.0	0.0
	S059	24.4	0.0	46.8	4.9	14.1	9.8	0.0
Nordfjord	S061	23.7	0.0	45.0	8.9	10.7	11.8	0.0
	S062	20.7	1.7	33.1	8.3	22.3	9.9	4.1
	S063	21.6	1.4	28.8	11.5	20.9	8.6	7.2
	S064	22.4	1.5	29.9	11.9	20.9	9.0	4.5
	S065	20.3	2.7	27.0	10.8	19.6	8.1	11.5
	S066	21.4	2.9	28.6	11.4	22.9	8.6	4.3
	S068	40.3	0.0	53.8	3.4	2.5	0.0	0.0
	S069	18.3	1.8	29.4	12.8	32.1	2.8	2.8
	S070	30.2	0.0	50.3	10.1	9.4	0.0	0.0
	S071	27.4	0.0	29.3	9.1	31.4	2.7	0.0
	S072	17.3	1.2	27.6	15.5	38.3	0.0	0.0
	S073	6.7	0.4	74.9	5.2	12.7	0.0	0.0
	S076	18.9	0.0	66.7	9.8	4.5	0.0	0.0
	S077	18.9	0.8	30.3	17.7	30.3	0.0	2.1
	S078	17.5	0.7	28.0	17.5	34.8	0.0	1.5
	S079	20.2	1.1	26.9	14.6	35.7	0.0	1.5

Table 2. Clay mineral composition in vertical profiles for sample locations 0206059, 0206066, 0206076 (in semi-quantitative %)

Sample nr.	Depth	Chlorite	Illite	I/V	I/S_1	Kaolinite
S590102	1.5	24.4	38.5	9.0	15.4	12.8
S590709	8.0	23.6	36.1	9.7	19.6	11.1
S591315	14.0	21.2	36.7	8.5	19.5	14.1
S591719	18.0	23.3	35.7	6.2	17.8	17.1
S592426	25.0	27.4	45.7	8.2	16.6	2.0
S660102	1.5	19.4	47.1	7.7	14.2	11.6
S660304	3.5	9.2	20.8	2.4	64.0	3.6
S660709	8.0	25.4	48.8	2.8	15.9	7.1
S661517	16.0	23.5	48.7	2.9	16.5	8.4
S661921	20.0	21.0	46.9	4.1	15.6	12.3
S662931	30.0	22.5	47.3	6.6	14.6	9.1
S663436	35.0	22.8	48.1	6.7	12.9	9.5
S664145	42.5	20.5	50.7	4.8	14.4	9.6
S760102	1.5	21.0	67.1	8.4	3.5	0.0
S760304	3.5	2.6	82.8	10.3	4.3	0.0
S760507	6.0	21.0	67.1	8.4	3.5	0.0
S761315	14.0	17.9	69.0	8.3	4.8	0.0
S761719	18.0	17.9	69.0	8.3	4.8	0.0
S762124	22.5	17.9	69.0	8.3	4.8	0.0
S762629	27.5	18.1	67.4	9.3	5.2	0.0
S763436	35.0	16.4	71.0	7.4	5.2	0.0

continues on the next page

Table 3. Grain size, TOC, carbonate C of the fjord bottom sediments at 11-13 cm interval and water depth in sampling place

STATION	Median	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	TOC [%]	Carb-C [%]	Water depth in sampling place (m)
0206001	33.12	2.86	76.14	20.3	0.7	1.15	0.20	88
0206002	20.8	4.25	89.55	6.2	0	1.87	0.23	99
0206003	14.08	8.7	83	8.3	0	1.80	0.36	339
0206004	10.33	10.4	89.3	0.3	0	1.91	0.42	358
0206007	9.307	11.3	87	1.7	0	1.79	0.43	365
0206009	33.81	1.48	75.82	22.7	0	0.89	0.31	112
0206010	26.67	2.01	79.49	18.5	0	0.91	0.02	116
0206012	16.75	3.22	93.58	3.2	0	0.86	0.08	165
0206013	19.86	2.78	89.12	8.1	0	0.84	0.06	140
0206015	14.67	3.94	87.06	9	0	0.97	0.14	199
0206016	12.54	5.22	92.08	2.7	0	1.39	0.13	238
0206017	9.18	7.5	90.9	1.6	0	1.26	0.14	275
0206018	10.64	7.71	87.69	4.6	0	1.35	0.25	314
0206019	11.86	8.14	72.86	19	0	1.34	0.14	324
0206021	9.857	9.91	79.99	9.5	0.6	1.76	0.51	333
0206024	19.86	7.72	61.58	30.7	0	2.48	0.63	311
0206025	13.83	9.3	74.5	16.2	0	2.57	0.94	337
0206026	8.429	12.2	83.5	4.3	0	3.09	1.45	302
0206027	16.79	7.32	83.58	9.1	0	1.60	0.15	230
0206028	10.98	7.48	88.12	4.4	0	1.67	0.43	257
0206029	13.38	4.37	94.03	1.6	0	1.65	0.11	110
0206030	11.5	8.73	81.27	10	0	2.03	0.61	410
0206031	8.881	10.1	88.6	1.3	0	2.07	0.53	294
0206032	7.702	11	87.9	1.1	0	2.15	1.00	521
0206033	7.824	11.5	85.7	2.8	0	2.48	1.36	533
0206034	8.633	11.7	80.8	7.5	0	2.52	1.93	498
0206037	7.468	12.7	84.4	2.9	0	2.58	1.98	487
0206038	207.7	3.71	24.29	65.8	6.2	0.87	1.39	500
0206039	20.86	8.47	77.13	14.4	0	1.87	2.37	192
0206040	19.36	9.05	78.05	12.9	0	2.88	3.43	307
0206041	24.64	8.35	71.25	20.4	0	2.55	2.59	449
0206044	12.75	10.5	87.9	1.6	0	2.61	1.77	435
0206045	27.09	6.5	77.7	15.8	0	1.49	1.00	404
0206046	12	10.6	81.5	7.9	0	2.58	1.13	588
0206047	58.09	2.59	50.01	47.4	0	1.43	0.03	314
0206048	37.75	2.43	63.17	34.4	0	1.68	0.09	346
0206049	21.5	5.42	80.68	13.9	0	1.85	0.28	522
0206052	19.59	3.94	89.36	6.7	0	1.57	0.10	208
0206053	24.67	3.7	80.8	15.5	0	1.28	0.03	354
0206056	18.9	4.92	86.18	8.9	0	1.55	0.06	388
0206057	29.12	5.15	70.15	24.7	0	2.43	0.89	435
0206058	65.59	2.06	45.94	52	0	1.02	0.86	298
0206059	214.6	2.48	16.82	80.7	0	1.01	6.66	326
0206061	20.83	10.3	66.3	23.4	0	2.89	3.10	487
0206062	14.66	9.38	81.62	9	0	2.60	0.41	366
0206063	10.35	12.2	81.9	5.9	0	3.14	1.18	509
0206064	16.26	10.3	69.1	20.6	0	2.81	1.46	579
0206065	9.308	13.7	80	6.3	0	3.32	2.44	587
0206066	7.921	14.6	79.5	5.9	0	2.99	1.75	478
0206068	14.94	8.95	87.35	3.7	0	3.81	0.83	92
0206069	14.21	7.54	86.66	5.8	0	2.07	0.10	249
0206070	11.78	10.5	79.7	9.8	0	1.75	0.43	356
0206071	29.84	5.16	69.44	25.4	0	2.49	0.42	190
0206072	11.69	10.1	83.7	6.2	0	1.76	0.15	193
0206073	8.277	12.5	86.2	1.3	0	1.81	0.20	348
0206076	40.34	5.56	55.24	39.2	0	1.45	0.09	380
0206077	6.909	15.8	81.4	2.8	0	2.14	0.34	443
0206078	7.558	14.4	85.5	0.1	0	2.01	0.31	446

						TOC	Carb-C	Water depth in sampling place (m)
STATION	Median	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	[%]	[%]	
0206079	57.79	4.99	47.01	48	0	2.07	0.10	354
0206081	19.49	4.02	85.48	10.5	0	3.06	0.25	247
0206083	17.63	4.64	85.26	10.1	0	5.09	0.29	273
0206084	12.53	6.58	90.92	2.5	0	3.04	0.20	387
0206085	11.62	7.96	88.64	3.4	0	2.97	0.73	416
0206086	16.71	7.19	77.81	15	0	1.89	0.97	333
0206088	14.3	8.11	84.09	7.8	0	2.27	0.89	347
0206090	12.67	9.32	87.48	3.2	0	2.35	1.20	383
0206091	8.382	12.1	87	0.9	0	2.78	1.83	354
0206092	9.772	11.8	85.6	2.6	0	1.86	1.50	387
0206093	4.994	17.8	81.1	1.1	0	2.48	2.26	398
0206094	76.21	4.61	39.29	56.1	0	2.29	6.78	157
0206096	78.12	5.44	37.46	57.1	0	0.84	1.51	487
0206099	74.71	4.48	39.02	56.5	0	0.71	1.55	294
0206100	93.45	3.07	29.03	67.9	0	0.56	2.52	293
0206101	49.94	5.89	52.21	41.9	0	1.01	3.19	387
0206102	17.53	9.27	77.03	13.7	0	1.62	4.54	278
0206103	6.253	17.1	80.3	2.6	0	5.69	3.23	215
0206104	22.25	8.85	73.55	17.6	0	4.33	2.64	193
0206107	31.14	6.42	66.98	26.6	0	5.98	0.62	123
0206108	76.75	1.37	38.13	60.5	0	0.46	0.14	147
0206110	47.84	2.12	61.18	36.7	0	1.64	0.29	265
0206112	41.6	2.56	68.24	29.2	0	1.09	0.00	264
0206115	37.24	1.5	73.3	25.2	0	1.45	0.21	192
0206116	31.48	3.44	74.46	22.1	0	2.19	0.51	15
0206117	25.33	4.81	76.79	18.4	0	0.97	0.09	302
0206118	34.38	3.57	64.13	32.3	0	0.92	0.04	214
0206119	25.1	4.88	72.92	22.2	0	0.95	0.06	245
0206120	12.27	7.04	85.06	7.9	0	1.11	0.10	213
0206121	21.72	3	80.1	16.9	0	1.03	0.05	119
0206123	24.77	7.61	76.69	15.7	0	2.78	0.23	134
0206124	12.34	14.3	79.9	5.8	0	2.68	0.02	264
0206125	9.438	17.4	79.1	3.5	0	3.05	0.14	67
0206126	18.07	6.42	78.98	14.6	0	1.22	0.10	432
0206127	12.75	8.83	79.17	12	0	0.60	0.11	504
0206128	23.31	4.42	79.08	16.5	0	1.79	0.09	290
0206129	15.93	5.1	87.1	7.8	0	2.49	0.11	66
0206130	23.72	3.64	78.76	17.6	0	1.56	0.14	416
0206131	34.95	3.05	68.05	28.9	0	1.27	0.10	440
0206132	22.69	2.65	87.15	10.2	0	1.77	0.06	57
0206133	5.801	14.9	84.5	0.6	0	0.89	0.14	632
0206134	10.42	7.9	85.7	6.4	0	0.41	0.05	374
0206135	21.85	3.96	80.94	15.1	0	0.38	0.04	376
0206136	20.18	3.4	84.6	12	0	0.33	0.05	273
0206139	8.197	9.53	89.07	1.4	0	0.72	0.07	347
0206140	14.88	4.39	88.21	7.4	0	0.92	0.06	133
0206141	29.38	5.06	70.04	24.9	0	1.34	0.13	162
0206142	23.82	6.76	72.04	21.2	0	1.17	0.05	293
0206143	18.79	8.52	74.58	16.9	0	1.43	0.05	346
0206145	5.228	16.5	76.8	6.7	0	1.93	1.55	308
0206150	5.329	16.2	78.4	5.4	0	1.88	1.46	294
0206152	7.009	14.4	71.9	13.7	0	0.81	1.38	251
0206156	4.34	18.6	79.7	1.7	0	2.30	1.40	502
0206158	4.564	17.9	77.5	4.6	0	2.27	1.41	523

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Table 4. Major and trace element composition of the fjord bottom sediments
for interval 11-13cm. XRF data.

	SiO2	Al2O3	Fe2O3	TiO2	MgO	CaO	Na2O	K2O	MnO	P2O5	L.O.I.	SUM	Mo	Nb	Zr
STATION	%												mg/kg		
0206001	59.57	14.79	5.17	0.68	2.60	4.62	3.92	2.55	0.10	0.27	5.66	99.93	<5	13	221
0206002	55.03	14.70	5.62	0.71	3.09	4.53	4.06	2.60	0.10	0.26	9.16	99.87	<5	13	166
0206003	52.62	14.39	6.51	0.72	3.39	4.53	3.82	2.98	0.15	0.25	9.46	98.81	<5	13	146
0206004	49.98	14.16	7.10	0.73	3.74	4.64	4.13	2.86	0.21	0.25	11.87	99.67	<5	11	118
0206007	50.08	14.75	7.56	0.77	3.94	4.63	3.77	3.20	0.17	0.23	10.55	99.63	<5	12	96
0206009	59.08	14.57	5.98	0.80	3.44	3.98	3.52	2.78	0.09	0.22	5.58	100.03	<5	15	209
0206010	58.99	14.84	6.22	0.82	3.59	3.39	3.55	2.91	0.09	0.23	5.17	99.81	<5	15	213
0206012	56.06	15.43	7.01	0.82	4.17	3.13	3.50	3.29	0.10	0.23	5.64	99.39	<5	14	198
0206013	57.35	15.39	6.76	0.82	3.95	3.31	3.52	3.18	0.10	0.22	5.51	100.13	<5	15	200
0206015	54.44	15.59	7.20	0.81	4.35	3.16	3.65	3.33	0.11	0.21	6.90	99.74	<5	13	191
0206016	51.72	15.28	7.69	0.83	4.37	3.09	3.86	3.19	0.13	0.24	9.38	99.78	<5	12	166
0206017	51.43	15.45	8.34	0.84	4.66	3.05	3.47	3.61	0.19	0.21	8.49	99.74	<5	13	158
0206018	50.26	15.42	8.53	0.85	4.79	3.32	3.49	3.58	0.18	0.21	9.29	99.92	<5	12	154
0206019	50.57	14.81	8.45	1.08	4.25	3.66	3.77	3.06	0.15	0.19	9.76	99.75	<5	12	136
0206021	49.22	14.36	8.17	1.06	4.00	4.64	3.54	2.84	0.14	0.22	11.52	99.71	<5	12	155
0206024	51.47	13.16	5.56	0.64	3.09	5.10	3.88	2.62	0.09	0.20	13.58	99.39	<5	11	153
0206025	47.76	12.83	6.02	0.65	3.43	6.26	3.73	2.46	0.09	0.22	15.46	98.90	<5	11	144
0206026	44.66	12.46	6.10	0.66	3.42	7.70	3.28	2.49	0.09	0.22	17.71	98.79	<5	12	123
0206027	59.23	13.63	5.12	0.67	2.56	3.35	3.74	3.23	0.09	0.20	7.54	99.36	<5	13	211
0206028	51.11	14.32	7.63	0.85	4.55	4.35	3.67	2.60	0.10	0.20	10.20	99.58	<5	12	147
0206029	52.01	14.44	8.13	0.92	4.82	3.95	3.50	2.29	0.10	0.20	8.14	98.51	<5	11	165
0206030	51.50	13.41	6.45	0.69	3.36	4.81	4.12	2.71	0.09	0.20	12.11	99.46	<5	11	152
0206031	48.62	14.14	7.41	0.77	4.18	4.72	3.59	2.83	0.10	0.20	12.59	99.16	<5	11	132
0206032	45.10	13.32	7.42	0.72	4.06	6.51	3.51	2.36	0.11	0.20	15.81	99.12	<5	10	118
0206033	43.72	12.81	7.12	0.69	3.82	8.01	3.16	2.18	0.10	0.21	16.87	98.71	<5	11	116
0206034	41.44	12.02	6.57	0.64	3.55	9.91	2.97	1.96	0.09	0.21	19.40	98.77	<5	10	114
0206037	40.94	11.97	6.23	0.65	3.56	10.01	3.27	1.76	0.09	0.20	20.48	99.16	<5	9	103
0206038	47.85	10.18	4.33	0.52	1.90	9.99	3.04	1.56	0.08	0.15	10.57	90.18	<5	9	160
0206039	44.57	10.92	4.70	0.58	2.64	12.65	2.79	1.36	0.07	0.20	18.57	99.04	<5	10	162
0206040	36.04	9.34	4.00	0.48	2.48	16.41	2.56	0.88	0.06	0.21	26.43	98.91	<5	10	114
0206041	40.75	10.69	4.48	0.57	2.42	14.03	2.42	1.01	0.07	0.24	21.92	98.59	<5	10	155
0206044	43.62	12.20	5.73	0.68	2.80	10.33	2.55	1.71	0.08	0.23	18.57	98.50	<5	10	131
0206045	51.74	13.03	5.93	0.74	2.72	7.94	2.87	2.03	0.09	0.28	11.51	98.88	<5	11	252
0206046	46.54	13.20	6.61	0.73	3.19	7.68	2.74	2.24	0.14	0.25	15.83	99.16	<5	11	128
0206047	55.78	14.36	6.34	0.85	3.32	4.38	3.56	2.66	0.11	0.27	7.19	98.83	<5	11	186
0206048	52.66	14.51	7.64	0.94	3.95	4.19	3.42	2.93	0.12	0.32	8.07	98.75	<5	12	174
0206049	49.68	14.10	7.96	0.87	4.49	4.45	3.39	2.96	0.18	0.28	10.56	98.93	<5	11	134
0206052	50.46	14.80	8.46	1.01	4.40	4.33	3.52	3.17	0.14	0.31	8.25	98.87	<5	13	116
0206053	56.37	14.76	6.19	0.86	3.27	4.15	3.73	2.80	0.11	0.31	6.48	99.04	<5	12	205
0206056	52.69	14.69	7.02	0.87	3.74	4.02	3.92	2.88	0.12	0.32	8.95	99.21	<5	13	157
0206057	46.87	13.05	6.76	0.82	3.38	7.19	3.10	1.92	0.11	0.26	15.45	98.89	<5	13	166
0206058	55.52	13.39	5.25	0.74	2.52	8.03	2.95	1.78	0.09	0.25	8.75	99.27	<5	12	264
0206059	24.46	5.20	1.87	0.26	1.49	31.85	1.14	0.48	0.04	0.13	30.73	97.66	<5	6	92
0206061	37.16	9.94	4.24	0.51	2.31	15.94	2.35	0.99	0.07	0.19	24.28	97.98	<5	10	120
0206062	51.12	13.78	5.77	0.71	2.88	4.49	3.88	2.68	0.08	0.25	13.42	99.05	<5	11	152
0206063	46.02	12.92	6.04	0.67	2.95	6.73	2.97	2.49	0.11	0.24	17.49	98.64	<5	11	118
0206064	47.67	12.98	5.83	0.69	2.92	8.85	2.96	2.26	0.11	0.23	17.27	101.76	<5	12	134
0206065	39.30	11.13	5.26	0.57	2.74	11.74	2.40	1.53	0.12	0.21	23.46	98.47	<5	10	104
0206066	41.51	12.13	5.70	0.63	3.10	8.36	3.26	2.01	0.09	0.22	21.04	98.06	<5	11	96
0206068	50.45	11.06	4.73	0.67	2.66	5.34	3.58	2.08	0.07	0.22	17.70	98.56	<5	11	211
0206069	54.03	14.16	6.00	0.82	2.98	2.71	4.00	3.73	0.09	0.31	10.03	98.84	<5	13	178
0206070	53.38	14.29	6.48	0.74	3.05	3.68	3.44	3.59	0.09	0.24	10.28	99.27	<5	13	136
0206071	52.33	13.45	6.07	0.73	3.29	4.24	3.46	2.85	0.09	0.21	12.44	99.16	<5	12	162
0206072	52.64	14.49	6.62	0.83	3.60	2.76	4.00	3.94	0.11	0.26	9.34	98.58	<5	12	117
0206073	49.38	14.39	7.38	0.81	4.00	2.73	4.18	3.92	0.19	0.26	11.18	98.44	<5	12	95
0206076	57.92	14.52	5.46	0.80	2.65	2.78	3.77	4.07	0.11	0.31	7.00	99.38	<5	13	222
0206077	46.53	14.04	7.79	0.78	4.31	2.91	4.18	3.72	0.55	0.24	14.00	99.04	<5	11	75
0206078	47.58	13.86	7.26	0.75	4.06	3.12	4.32	3.36	0.38	0.22	13.93	98.84	<5	11	93

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	Y	Sr	Rb	U	Th	Pb	Cr	V	As	Sc	Hf	S	Cl	F	Ba
STATION	mg/kg											%			mg/kg
0206001	30	473	75	<10	16	11	90	97	<5	15	<10	0.18	1.34	<0.1	745
0206002	28	445	83	<10	10	17	82	105	6	12	<10	0.22	1.83	<0.1	779
0206003	26	426	100	<10	15	19	88	139	11	10	<10	0.25	1.54	0.1	783
0206004	24	403	108	<10	15	29	90	153	<5	10	<10	0.22	2.21	<0.1	773
0206007	23	399	119	<10	14	17	96	150	13	15	<10	0.33	1.54	0.13	794
0206009	26	303	100	<10	16	17	145	139	<5	15	<10	0.20	1.29	<0.1	660
0206010	28	298	105	<10	18	16	142	154	5	13	<10	0.18	1.10	<0.1	683
0206012	27	281	122	<10	16	17	159	161	<5	14	<10	<0.1	0.89	0.14	723
0206013	25	288	117	<10	18	25	146	148	<5	14	<10	0.12	0.94	0.11	703
0206015	24	310	133	<10	22	26	162	167	<5	12	<10	0.12	1.24	0.13	728
0206016	24	285	130	<10	22	26	153	180	15	16	<10	0.15	1.71	0.1	723
0206017	23	273	143	<10	20	28	162	200	7	16	<10	0.17	1.14	0.14	747
0206018	25	273	147	<10	26	25	173	195	8	18	<10	0.19	1.21	0.15	740
0206019	20	309	120	<10	19	41	140	218	<5	15	<10	0.19	1.78	0.12	718
0206021	23	328	115	<10	20	40	128	208	9	14	10	0.18	1.68	<0.1	717
0206024	23	371	99	<10	16	42	109	140	<5	13	<10	0.45	2.49	<0.1	743
0206025	24	378	101	<10	18	31	104	137	14	15	<10	0.49	2.53	<0.1	707
0206026	24	392	104	<10	18	35	106	138	12	18	<10	0.58	1.91	<0.1	692
0206027	27	321	98	<10	17	15	71	113	8	13	<10	0.23	1.22	<0.1	768
0206028	25	257	92	<10	16	29	167	172	6	18	<10	0.26	1.47	<0.1	552
0206029	27	220	75	<10	14	16	206	228	13	20	<10	0.18	1.14	0.11	453
0206030	25	321	98	<10	16	33	110	151	10	12	<10	0.31	1.74	<0.1	694
0206031	25	303	109	<10	17	25	134	160	14	11	<10	0.39	1.66	<0.1	662
0206032	24	332	100	<10	19	26	133	176	19	16	<10	0.43	1.86	<0.1	610
0206033	25	377	96	<10	16	30	122	167	19	17	<10	0.43	1.81	<0.1	590
0206034	24	440	89	<10	16	33	109	136	16	18	<10	0.50	2.11	<0.1	576
0206037	23	436	95	<10	14	45	107	134	9	15	<10	0.40	2.17	<0.1	588
0206038	19	514	55	<10	9	28	124	102	5	15	<10	0.20	1.59	<0.1	543
0206039	25	532	71	<10	13	23	86	91	8	18	<10	0.28	1.90	<0.1	558
0206040	20	721	66	<10	11	48	64	78	<5	21	<10	0.33	2.87	<0.1	543
0206041	24	668	73	<10	10	44	61	82	<5	30	12	0.30	2.62	0.11	610
0206044	26	483	94	<10	15	37	82	106	13	22	<10	0.40	1.95	<0.1	655
0206045	30	443	81	<10	12	27	74	103	10	28	14	0.26	1.44	<0.1	667
0206046	28	418	99	<10	16	52	88	128	6	22	<10	0.29	1.65	<0.1	713
0206047	25	530	90	<10	13	18	107	126	<5	21	<10	0.29	2.17	<0.1	867
0206048	27	476	116	<10	19	24	111	136	7	27	12	0.25	2.22	<0.1	894
0206049	29	407	116	<10	20	26	158	155	13	29	<10	0.31	1.75	0.22	800
0206052	31	351	118	<10	20	16	129	150	8	24	<10	0.32	1.81	0.44	780
0206053	29	482	101	<10	14	24	96	114	5	17	<10	0.17	1.69	0.17	927
0206056	27	454	106	<10	16	24	111	128	9	18	17	0.21	2.14	0.22	918
0206057	31	377	97	<10	14	43	86	124	9	23	<10	0.36	2.59	<0.1	655
0206058	31	453	65	<10	8	24	91	91	<5	27	11	0.19	1.88	<0.1	673
0206059	15	1268	27	<10	5	25	27	34	<5	38	13	0.35	2.43	<0.1	298
0206061	22	683	82	<10	15	39	63	82	10	31	11	0.50	2.07	<0.1	579
0206062	25	451	109	<10	19	40	76	103	9	18	<10	0.36	2.24	<0.1	941
0206063	24	454	116	<10	21	69	80	116	8	25	<10	0.27	1.65	<0.1	861
0206064	26	510	112	<10	23	53	83	104	12	21	<10	0.36	1.78	0.1	867
0206065	23	545	103	<10	22	69	71	98	<5	29	<10	0.40	2.01	0.2	682
0206066	20	463	122	<10	22	68	76	117	9	26	<10	0.49	2.97	0.12	820
0206068	27	402	97	<10	20	35	87	87	9	16	24	0.58	3.22	<0.1	799
0206069	28	501	142	<10	24	36	67	103	8	16	14	0.21	1.95	0.24	1189
0206070	27	447	142	<10	23	37	77	114	10	21	<10	0.28	1.27	0.11	1025
0206071	24	393	118	<10	18	24	99	116	18	16	<10	0.56	2.30	<0.1	849
0206072	21	591	171	<10	28	38	72	126	8	16	<10	0.25	1.76	0.38	1204
0206073	20	555	176	<10	31	42	78	153	<5	14	<10	0.22	2.23	0.35	1165
0206076	22	722	141	<10	22	32	63	131	<5	13	14	0.11	1.50	<0.1	1463
0206077	20	464	177	<10	29	31	80	203	9	15	<10	0.33	2.95	0.41	1053
0206078	23	457	160	<10	27	42	83	186	<5	17	11	0.31	2.86	0.29	1027

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	Sb	Sn	Ga	Zn	Cu	Ni	Yb	Co	Ce	La	Nd	W	Cs	Ta	Pr
STATION	mg/kg														
0206001	<10	<10	19	69	26	30	<15	15	96	51	35	<10	<10	<10	<10
0206002	<10	<10	19	86	32	37	<15	16	102	54	38	<10	<10	<10	<10
0206003	<10	<10	13	94	43	43	<15	21	109	50	41	<10	<10	<10	16
0206004	<10	<10	15	111	45	46	<15	21	112	45	44	<10	<10	<10	12
0206007	<10	<10	10	107	46	50	<15	22	107	53	38	<10	<10	<10	12
0206009	<10	<10	16	81	38	48	<15	21	90	42	28	<10	<10	<10	<10
0206010	<10	<10	15	85	41	53	<15	20	91	41	30	<10	<10	<10	<10
0206012	<10	<10	20	94	44	60	<15	27	104	48	36	<10	<10	<10	<10
0206013	<10	<10	12	91	44	57	<15	24	93	42	34	<10	<10	<10	<10
0206015	<10	<10	20	99	48	67	<15	28	100	55	35	<10	<10	<10	11
0206016	<10	<10	19	119	56	66	<15	29	114	59	37	<10	<10	<10	12
0206017	<10	<10	20	130	55	74	<15	35	138	58	44	<10	<10	<10	11
0206018	<10	<10	19	125	60	79	<15	34	121	51	47	<10	<10	<10	11
0206019	<10	<10	15	147	84	76	<15	40	108	50	39	<10	<10	<10	12
0206021	<10	<10	14	154	96	66	<15	44	101	53	39	<10	<10	<10	11
0206024	<10	<10	12	95	41	45	<15	20	94	46	29	<10	<10	<10	12
0206025	<10	<10	15	93	37	50	<15	19	91	41	34	<10	<10	<10	10
0206026	<10	<10	14	105	39	52	<15	21	84	48	34	<10	<10	<10	10
0206027	<10	<10	14	65	32	30	<15	13	91	38	27	<10	<10	<10	10
0206028	<10	<10	13	103	37	69	<15	25	96	43	31	<10	<10	<10	<10
0206029	<10	<10	15	102	41	73	<15	25	86	34	25	<10	<10	<10	<10
0206030	<10	<10	10	88	32	46	<15	21	90	45	29	<10	<10	<10	<10
0206031	<10	<10	11	102	41	56	<15	25	105	55	36	10	<10	<10	13
0206032	<10	<10	15	104	38	60	<15	24	97	53	29	<10	<10	<10	<10
0206033	<10	<10	19	99	36	56	<15	23	90	39	35	<10	<10	<10	16
0206034	<10	<10	11	96	36	54	<15	23	108	43	33	<10	<10	<10	11
0206037	<10	<10	12	104	39	55	<15	20	88	43	34	<10	<10	<10	<10
0206038	<10	<10	<10	58	17	25	<15	14	65	36	22	<10	<10	<10	<10
0206039	<10	<10	11	75	27	33	<15	12	63	36	24	<10	<10	<10	13
0206040	<10	<10	11	87	28	29	<15	11	69	36	23	<10	<10	<10	11
0206041	<10	<10	15	91	29	31	<15	15	68	32	35	17	<10	<10	<10
0206044	<10	<10	10	91	34	42	<15	19	77	31	43	12	10	<10	16
0206045	<10	<10	<10	83	31	36	<15	18	75	40	36	16	<10	<10	<10
0206046	<10	<10	<10	121	42	44	<15	23	101	57	38	27	11	<10	12
0206047	<10	<10	17	84	36	44	<15	24	112	50	50	15	13	<10	12
0206048	<10	<10	12	117	45	54	<15	25	148	70	55	19	<10	<10	15
0206049	<10	<10	<10	115	44	89	<15	27	149	64	60	13	<10	<10	22
0206052	<10	<10	11	116	73	63	<15	29	137	61	51	13	<10	<10	13
0206053	<10	<10	15	95	37	39	<15	19	130	53	54	15	<10	<10	18
0206056	<10	<10	13	109	47	51	<15	24	141	68	60	15	<10	<10	13
0206057	<10	<10	13	109	43	47	<15	21	93	49	49	15	<10	<10	10
0206058	<10	<10	13	70	24	26	<15	17	52	25	28	21	<10	<10	10
0206059	<10	<10	<10	50	13	9	<15	6	32	13	22	16	13	<10	<10
0206061	<10	<10	<10	90	29	35	<15	16	71	42	31	17	<10	<10	12
0206062	<10	<10	11	108	34	35	<15	21	127	71	49	22	<10	<10	14
0206063	<10	<10	<10	128	41	44	<15	23	140	68	52	16	11	<10	17
0206064	<10	<10	10	119	31	40	<15	23	106	58	51	23	<10	<10	11
0206065	<10	<10	<10	123	37	46	<15	21	91	44	40	22	10	<10	14
0206066	<10	<10	10	131	40	42	<15	20	126	57	49	19	10	<10	16
0206068	<10	<10	<10	90	30	33	<15	15	104	62	49	16	<10	<10	10
0206069	<10	<10	12	127	32	36	<15	19	193	100	78	21	<10	<10	23
0206070	<10	<10	10	121	31	39	<15	25	167	74	66	24	<10	<10	17
0206071	<10	<10	<10	104	33	49	<15	21	129	62	54	18	<10	<10	19
0206072	<10	<10	13	137	47	38	<15	24	221	99	71	12	11	<10	21
0206073	<10	<10	10	158	49	46	<15	24	210	100	78	15	<10	<10	30
0206076	<10	<10	16	109	35	31	<15	19	192	84	75	19	<10	<10	25
0206077	<10	<10	14	151	54	59	<15	28	208	87	75	<10	14	<10	28
0206078	<10	<10	13	149	52	53	<15	28	198	99	72	10	<10	<10	25

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	SiO2	Al2O3	Fe2O3	TiO2	MgO	CaO	Na2O	K2O	MnO	P2O5	L.O.I.	SUM	Mo	Nb	Zr
STATION	%												mg/kg		
0206079	56.82	14.56	4.98	0.66	2.43	4.60	3.88	2.54	0.08	0.20	8.85	99.59	<5	9	177
0206081	53.12	13.42	5.93	0.83	2.28	2.99	4.43	3.23	0.12	0.31	11.89	98.54	<5	15	205
0206083	48.27	12.82	5.79	0.80	2.56	2.91	4.43	2.91	0.11	0.28	17.84	98.71	<5	11	156
0206084	48.52	13.32	8.45	0.83	3.15	3.13	3.99	3.51	0.26	0.31	13.43	98.89	<5	12	124
0206085	46.29	12.83	8.17	0.79	3.26	4.46	3.87	2.99	0.26	0.29	15.49	98.70	<5	11	117
0206086	50.14	13.27	5.96	0.77	2.67	6.45	3.46	2.82	0.11	0.27	12.96	98.89	<5	13	194
0206088	49.24	13.23	5.99	0.76	2.70	6.22	3.56	2.83	0.11	0.26	13.86	98.76	<5	12	155
0206090	47.47	12.97	5.91	0.72	2.73	7.40	3.37	2.54	0.11	0.26	15.66	99.12	<5	12	146
0206091	41.92	12.39	5.65	0.64	2.81	9.50	2.82	2.03	0.09	0.23	20.77	98.85	<5	10	114
0206092	45.38	13.38	5.67	0.68	2.70	8.44	2.93	2.25	0.09	0.22	17.57	99.31	<5	11	135
0206093	39.38	12.37	5.41	0.59	2.77	10.94	2.53	1.79	0.09	0.20	23.21	99.28	<5	11	105
0206094	20.51	5.03	2.07	0.29	1.39	32.36	0.89	0.37	0.03	0.15	34.94	98.01	<5	<5	88
0206096	56.40	11.43	3.84	0.61	1.49	9.47	2.56	1.81	0.07	0.17	11.14	98.99	<5	11	292
0206099	56.37	11.43	4.05	0.69	1.48	9.82	2.69	1.80	0.07	0.21	10.62	99.22	<5	11	289
0206100	52.44	9.72	3.85	0.55	1.30	13.46	2.28	1.58	0.06	0.19	13.86	99.30	<5	11	280
0206101	44.68	9.91	3.97	0.55	1.64	15.84	2.21	1.21	0.08	0.18	18.65	98.92	<5	9	212
0206102	33.64	8.89	3.75	0.47	1.98	21.42	1.67	0.82	0.08	0.17	25.71	98.61	<5	9	112
0206103	29.22	8.73	4.15	0.43	2.25	14.68	2.82	0.82	0.09	0.26	33.53	96.97	10	8	82
0206104	36.82	9.89	3.84	0.58	1.93	13.60	2.89	1.12	0.05	0.28	27.63	98.63	<5	10	157
0206107	40.47	9.31	4.48	0.50	2.38	3.86	5.17	2.40	0.07	0.19	28.05	96.88	34	9	102
0206108	68.24	12.71	3.18	0.64	1.12	3.31	3.31	3.09	0.06	0.23	3.22	99.11	<5	14	390
0206110	59.42	13.22	4.63	0.81	1.86	3.49	3.58	3.03	0.08	0.26	7.97	98.35	<5	14	311
0206112	56.42	14.06	5.65	1.11	2.35	4.42	3.83	3.08	0.10	0.36	7.11	98.49	<5	17	333
0206115	51.98	17.79	7.26	0.96	3.22	2.31	3.09	4.20	0.10	0.23	8.02	99.16	<5	17	235
0206116	50.66	13.98	6.41	1.06	2.88	5.63	3.70	3.02	0.11	0.34	10.58	98.39	6	15	237
0206117	53.94	15.51	7.41	0.97	3.37	2.68	3.86	4.44	0.13	0.31	6.21	98.84	5	15	173
0206118	57.74	15.19	5.97	0.87	2.72	2.76	4.21	3.86	0.12	0.31	5.32	99.06	<5	13	204
0206119	53.08	15.38	7.87	1.05	3.62	2.61	3.85	4.53	0.14	0.34	6.19	98.68	<5	15	176
0206120	50.59	15.17	8.55	1.12	4.09	2.54	3.98	4.52	0.14	0.40	7.65	98.74	<5	14	146
0206121	54.38	15.08	7.03	1.11	3.37	3.07	4.13	4.03	0.12	0.49	5.78	98.60	<5	13	217
0206123	48.36	14.15	6.89	0.92	3.40	3.98	4.07	3.26	0.11	0.30	13.41	98.86	<5	13	153
0206124	46.22	14.22	8.59	0.90	4.00	2.27	4.31	4.06	0.20	0.27	13.58	98.60	<5	13	102
0206125	43.87	12.65	7.48	0.79	3.73	2.19	5.46	3.73	0.16	0.24	16.76	97.05	34	10	104
0206126	48.62	17.74	7.78	0.80	4.51	5.61	3.72	2.46	0.11	0.26	7.45	99.06	<5	8	91
0206127	43.90	17.48	12.28	1.25	5.49	7.92	2.91	1.16	0.16	0.42	6.42	99.37	<5	9	172
0206128	47.39	15.82	9.02	1.12	5.11	6.06	3.78	1.88	0.13	0.41	8.32	99.06	<5	7	109
0206129	46.13	17.19	7.53	0.83	4.85	6.27	4.04	1.60	0.11	0.27	10.64	99.46	<5	7	85
0206130	47.95	15.19	9.92	1.31	4.64	5.55	3.53	2.39	0.16	0.63	7.49	98.77	<5	9	137
0206131	48.37	15.72	9.31	1.23	4.76	5.80	3.76	2.20	0.14	0.52	6.87	98.67	<5	11	184
0206132	53.74	13.98	7.71	1.10	3.13	4.11	3.96	2.75	0.12	0.46	7.72	98.77	<5	10	258
0206133	51.63	16.11	7.68	0.81	4.01	2.80	3.81	4.59	0.24	0.26	7.16	99.11	<5	11	74
0206134	58.09	15.53	5.78	0.72	2.92	2.32	3.77	4.79	0.12	0.28	4.57	98.87	<5	15	144
0206135	62.24	14.81	4.72	0.69	2.20	2.68	3.62	4.46	0.09	0.30	3.32	99.13	<5	16	233
0206136	61.70	14.66	4.59	0.67	2.24	2.70	3.69	4.43	0.09	0.29	3.03	98.11	<5	14	224
0206139	49.67	15.32	7.07	0.75	3.62	2.10	3.68	4.37	0.15	0.23	11.71	98.67	<5	13	98
0206140	45.15	14.20	6.14	0.68	3.18	2.01	3.10	3.73	0.11	0.19	20.71	99.19	<5	15	131
0206141	52.42	15.86	7.28	0.86	3.57	5.36	3.98	2.64	0.12	0.31	6.40	98.80	<5	9	123
0206142	53.79	15.29	7.15	0.85	3.45	3.97	4.13	3.29	0.11	0.31	6.69	99.03	<5	10	105
0206143	51.53	16.03	7.08	0.79	3.82	4.17	4.07	3.25	0.11	0.29	7.88	99.01	<5	9	84
0206145	44.59	13.16	5.52	0.64	2.52	7.16	2.13	2.60	0.06	0.16	20.40	98.93	<5	12	140
0206150	46.85	13.33	5.83	0.67	2.57	7.18	2.45	2.35	0.07	0.19	18.31	99.79			
0206152	51.80	13.45	5.47	0.67	2.62	7.08	2.29	3.06	0.07	0.14	12.77	99.45	<5	14	175
0206156	44.36	14.07	5.94	0.65	2.73	6.75	2.54	2.51	0.07	0.17	19.43	99.22			
0206158	43.70	13.90	5.91	0.65	2.74	6.89	2.63	2.41	0.06	0.18	20.08	99.14			

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	Y	Sr	Rb	U	Th	Pb	Cr	V	As	Sc	Hf	S	Cl	F	Ba
STATION	mg/kg											%			mg/kg
0206079	25	519	92	<10	19	31	78	113	<5	17	12	0.32	2.30	<0.1	861
0206081	37	384	104	<10	14	37	42	129	12	15	14	0.24	2.58	0.14	1126
0206083	34	351	99	<10	14	55	47	164	13	21	<10	0.54	3.54	0.14	1033
0206084	36	355	116	<10	21	51	50	179	16	19	<10	0.22	2.08	0.17	1041
0206085	33	375	110	<10	18	48	65	172	14	22	<10	0.35	2.36	0.18	959
0206086	34	403	114	<10	19	35	58	104	8	21	<10	0.23	1.89	<0.1	930
0206088	32	390	116	<10	19	51	65	96	<5	20	<10	0.23	1.67	<0.1	959
0206090	32	413	113	<10	18	41	63	111	9	20	<10	0.30	1.75	<0.1	900
0206091	26	419	113	<10	17	59	73	105	<5	26	<10	0.33	2.16	<0.1	762
0206092	29	435	106	<10	14	52	68	105	<5	25	<10	0.24	2.08	<0.1	726
0206093	23	437	111	<10	15	53	77	107	6	27	<10	0.31	2.50	<0.1	582
0206094	18	1210	32	<10	5	26	32	40	6	36	<10	0.54	2.98	<0.1	310
0206096	29	494	65	<10	9	21	50	69	<5	26	11	0.18	1.15	<0.1	656
0206099	28	504	61	<10	13	22	85	73	7	25	<10	0.15	1.35	<0.1	690
0206100	25	549	58	<10	11	25	55	50	7	26	<10	0.11	1.22	<0.1	548
0206101	25	608	66	<10	10	32	55	70	<5	29	10	0.15	1.51	<0.1	515
0206102	21	811	72	<10	12	41	51	70	<5	34	<10	0.21	1.16	<0.1	410
0206103	23	582	73	<10	11	61	57	88	22	28	<10	1.24	4.74	<0.1	589
0206104	28	564	69	<10	13	68	50	72	8	27	<10	0.62	4.40	<0.1	762
0206107	21	299	75	<10	13	35	41	138	19	17	<10	3.00	9.51	<0.1	621
0206108	37	319	89	<10	12	25	85	60	<5	19	<10	0.15	1.54	<0.1	841
0206110	34	355	114	<10	17	43	57	82	<5	15	<10	0.16	2.11	<0.1	992
0206112	43	488	110	<10	16	28	57	94	<5	22	14	0.12	1.81	<0.1	1029
0206115	36	266	179	<10	19	35	117	166	6	22	<10	0.20	1.75	<0.1	854
0206116	37	567	105	<10	18	28	51	115	10	15	<10	0.65	1.79	<0.1	1046
0206117	30	431	176	<10	26	32	52	122	11	14	<10	0.18	1.17	<0.1	1178
0206118	31	454	151	<10	25	32	43	108	<5	14	<10	0.11	1.34	<0.1	1176
0206119	29	428	193	<10	24	36	53	129	6	11	<10	0.12	1.34	<0.1	1230
0206120	27	513	193	<10	29	48	45	144	<5	15	<10	0.14	1.79	0.17	1411
0206121	30	649	152	<10	23	35	42	130	<5	17	<10	0.12	1.52	<0.1	1337
0206123	28	489	144	<10	25	43	59	140	8	15	<10	0.37	2.96	<0.1	1112
0206124	24	467	195	<10	32	49	51	210	9	13	<10	0.40	2.63	<0.1	1209
0206125	18	463	195	<10	34	27	42	135	14	15	<10	1.57	4.58	<0.1	1121
0206126	22	516	87	<10	18	13	69	132	11	17	<10	0.25	1.62	<0.1	819
0206127	31	405	24	<10	5	11	84	197	7	37	<10	0.12	1.14	<0.1	358
0206128	25	513	44	<10	5	28	124	161	5	24	<10	0.24	2.24	<0.1	972
0206129	20	547	38	<10	10	21	78	121	7	16	<10	0.39	2.54	<0.1	761
0206130	29	457	66	<10	10	28	100	180	6	25	<10	0.26	1.82	<0.1	1062
0206131	30	525	61	<10	11	17	98	173	9	25	<10	0.35	1.95	<0.1	990
0206132	40	568	84	<10	11	28	65	142	9	19	15	0.32	1.96	<0.1	1111
0206133	19	503	218	<10	45	29	54	134	<5	20	10	0.13	1.48	<0.1	1168
0206134	25	576	216	<10	37	31	46	98	<5	11	<10	<0.1	1.05	<0.1	1250
0206135	25	615	181	<10	28	32	45	84	<5	16	10	<0.1	1.00	<0.1	1210
0206136	25	622	177	<10	26	29	53	80	<5	10	<10	<0.1	0.94	<0.1	1210
0206139	23	437	235	<10	38	30	61	141	8	19	<10	0.12	1.44	0.1	1116
0206140	29	328	206	<10	29	32	71	147	5	11	<10	0.14	1.24	<0.1	943
0206141	28	632	66	<10	9	23	71	138	5	17	<10	0.15	1.73	<0.1	1102
0206142	24	578	101	<10	18	29	60	141	<5	16	<10	0.16	1.73	<0.1	1206
0206143	21	557	119	<10	19	26	68	131	6	20	<10	0.18	1.72	<0.1	1087
0206145	25	255	123	<10	16	63	93	141	10	25	<10	0.25	2.08	<0.1	453
0206150															
0206152	26	251	134	<10	19	22	81	116	12	25	<10	0.43	0.87	<0.1	474
0206156															
0206158															

	Sb	Sn	Ga	Zn	Cu	Ni	Yb	Co	Ce	La	Nd	W	Cs	Ta	Pr
STATION	mg/kg														
0206079	<10	<10	11	89	31	32	<15	22	128	68	49	21	<10	<10	12
0206081	<10	<10	15	125	29	19	<15	16	151	74	60	22	<10	<10	19
0206083	<10	<10	<10	133	31	22	<15	18	133	76	63	26	<10	<10	21
0206084	<10	<10	11	160	30	34	<15	31	177	79	65	17	<10	<10	18
0206085	<10	<10	<10	155	34	35	<15	29	182	74	71	24	<10	<10	19
0206086	<10	<10	13	121	32	31	<15	18	127	63	58	24	<10	<10	15
0206088	<10	<10	<10	128	32	27	<15	19	110	51	52	20	12	<10	12
0206090	<10	<10	10	122	32	27	<15	17	124	62	50	21	<10	<10	11
0206091	<10	<10	12	125	33	36	<15	17	91	42	42	16	10	<10	15
0206092	<10	<10	13	111	29	38	<15	20	72	39	32	24	<10	<10	13
0206093	<10	<10	<10	113	31	35	<15	21	64	30	35	20	<10	<10	<10
0206094	<10	<10	<10	50	18	13	<15	5	54	20	25	18	<10	<10	<10
0206096	<10	<10	<10	51	18	19	<15	13	57	27	29	23	<10	<10	12
0206099	<10	<10	<10	51	19	17	<15	14	62	32	33	24	<10	<10	<10
0206100	<10	<10	<10	46	16	12	<15	14	41	16	25	24	<10	<10	<10
0206101	<10	<10	<10	56	18	19	<15	12	47	27	24	18	<10	<10	<10
0206102	<10	<10	<10	77	17	22	<15	13	57	27	27	16	<10	<10	<10
0206103	<10	<10	<10	96	31	32	<15	15	65	43	37	20	10	<10	11
0206104	<10	<10	10	104	26	26	<15	12	98	45	41	21	<10	<10	16
0206107	<10	<10	<10	79	33	17	<15	10	86	47	44	17	<10	<10	11
0206108	<10	<10	<10	49	18	8	<15	14	64	40	34	27	<10	<10	13
0206110	<10	<10	12	103	26	20	<15	17	136	66	59	30	10	<10	13
0206112	<10	<10	10	103	25	21	<15	19	141	62	63	22	<10	<10	19
0206115	<10	<10	20	124	30	39	<15	22	130	55	54	21	10	<10	18
0206116	<10	<10	11	115	33	25	<15	23	151	84	60	25	<10	<10	15
0206117	<10	<10	<10	147	33	32	<15	29	218	99	91	19	<10	<10	24
0206118	<10	<10	14	128	34	24	<15	23	177	86	61	31	<10	<10	14
0206119	<10	<10	16	170	37	34	<15	24	209	112	85	20	16	<10	35
0206120	<10	<10	21	191	39	37	<15	31	248	128	91	13	15	<10	23
0206121	<10	<10	18	145	33	30	<15	24	198	98	80	21	<10	<10	22
0206123	<10	<10	17	182	49	36	<15	25	203	109	75	27	<10	<10	19
0206124	<10	<10	17	194	52	37	<15	31	271	135	93	21	15	<10	25
0206125	<10	<10	15	169	45	32	<15	30	280	121	93	23	<10	<10	25
0206126	<10	<10	11	114	55	71	<15	34	116	55	46	19	<10	<10	12
0206127	<10	<10	15	131	114	72	<15	60	73	35	35	15	<10	10	<10
0206128	<10	<10	11	121	82	86	<15	36	79	46	34	17	<10	<10	<10
0206129	<10	<10	11	110	65	91	<15	34	69	32	30	19	<10	<10	<10
0206130	<10	<10	12	141	75	68	<15	42	96	49	40	22	<10	<10	14
0206131	<10	<10	14	116	69	69	<15	40	106	59	50	19	10	<10	<10
0206132	<10	<10	<10	147	55	30	<15	23	134	65	56	23	<10	<10	16
0206133	<10	<10	15	160	56	41	<15	30	245	104	79	25	10	<10	26
0206134	<10	<10	12	130	41	28	<15	22	202	94	71	17	<10	<10	16
0206135	<10	<10	13	102	33	25	<15	17	152	81	56	24	11	<10	11
0206136	<10	<10	<10	93	34	25	<15	16	133	65	53	22	<10	<10	15
0206139	<10	<10	13	162	54	37	<15	27	255	115	88	17	11	<10	18
0206140	<10	<10	19	150	53	35	<15	27	185	98	76	20	11	<10	14
0206141	<10	<10	12	120	87	37	<15	28	113	58	49	22	<10	<10	15
0206142	<10	<10	17	126	75	34	<15	27	157	81	65	23	15	<10	21
0206143	<10	<10	12	132	62	44	<15	30	167	83	70	21	<10	<10	21
0206145	<10	<10	14	118	28	37	<15	21	78	34	40	28	12	<10	12
0206150															
0206152	<10	<10	11	92	25	31	<15	21	82	45	38	25	<10	<10	<10
0206156															
0206158															

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Table 5. Elementary composition and TOC of the samples
from the interval 0-1 cm

		Al	Fe	Ti	Mg	Ca	Na	K	Mn	P	Cu	Zn	Ni	Co	V
	STATION	[%]	[%]	[%]	[%]	[%]	[%]	[%]	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
		ICP-AES													
Langfjord	0206001	1.52	2.30	0.21	1.08	1.00	1.41	0.68	424	1150	20.2	58.3	21.1	9.0	55.7
	0206002	2.14	3.00	0.25	1.39	1.15	1.84	0.86	521	1100	27.3	73.0	29.1	11.5	70.4
	0206003	2.87	4.16	0.26	1.76	1.56	2.72	1.13	2090	1110	37.0	101.0	37.5	15.7	106.0
	0206004	2.78	4.25	0.25	1.86	1.83	3.05	1.20	5900	1110	37.1	118.0	39.1	17.4	116.0
	0206007	3.20	4.66	0.27	2.01	1.83	3.10	1.35	2140	1030	40.4	109.0	43.7	18.4	112.0
Sunndalsfjord	0206009	2.58	3.13	0.19	1.56	0.67	1.17	0.71	460	1030	38.0	73.9	44.8	16.2	71.1
	0206010	2.54	2.99	0.19	1.47	0.65	1.27	0.72	391	961	37.0	70.3	41.2	14.9	72.6
	0206012	3.18	3.95	0.24	1.90	0.85	1.76	0.93	693	1060	47.2	92.6	49.0	19.1	96.4
	0206013	2.66	3.35	0.20	1.53	0.72	1.41	0.76	645	1210	36.7	76.6	41.1	16.6	80.2
	0206015	3.18	4.15	0.23	1.92	0.74	1.79	1.00	836	891	45.3	94.1	49.9	21.8	99.9
	0206016	2.92	4.29	0.25	2.10	0.92	2.10	1.10	1100	869	54.3	107.0	54.5	23.8	113.0
	0206017	3.42	5.34	0.25	2.26	1.02	1.96	1.23	3440	990	62.0	125.0	60.8	34.7	143.0
	0206018	3.52	5.22	0.24	2.28	1.26	2.56	1.21	4990	883	87.3	134.0	63.0	39.9	148.0
	0206019	3.56	4.97	0.23	2.16	1.30	2.59	1.15	3090	788	117.0	132.0	62.1	39.7	138.0
	0206021	3.64	5.05	0.23	2.05	1.98	2.36	1.08	1990	974	121.0	144.0	58.7	47.6	149.0
	0206024	2.59	3.38	0.18	1.51	2.26	2.46	0.82	574	918	62.6	111.0	39.7	20.4	104.0
	0206025	2.75	3.59	0.19	1.66	2.93	2.88	0.90	532	968	57.5	111.0	40.3	19.9	104.0
	0206026	2.92	3.74	0.19	1.76	3.52	3.36	1.01	952	937	48.7	108.0	44.2	18.8	99.2
	0206027	2.16	2.78	0.19	1.23	0.97	1.93	0.68	446	915	28.9	80.3	27.3	10.7	68.9
Halsafjord	0206028	2.84	4.41	0.27	2.12	1.60	2.10	0.87	709	877	33.6	99.9	53.7	18.3	104.0
	0206029	2.70	4.81	0.26	2.00	1.05	1.64	0.59	699	1120	34.8	88.5	55.4	18.8	125.0
	0206030	2.67	3.99	0.21	1.73	2.26	2.34	0.94	576	863	34.9	106.0	40.6	15.8	112.0
	0206031	2.94	4.29	0.23	1.93	1.99	2.64	0.99	616	922	35.1	112.0	46.2	16.4	105.0
	0206032	2.83	4.35	0.20	1.84	3.42	2.58	0.92	952	925	37.3	114.0	44.9	17.5	127.0
	0206033	2.74	4.24	0.19	1.82	3.38	2.84	0.94	962	960	37.3	121.0	45.5	16.9	124.0
	0206034	2.50	3.36	0.16	1.55	3.59	2.44	0.85	578	812	32.2	98.8	37.7	14.5	94.2
	0206037	2.87	3.64	0.18	1.68	6.41	2.45	0.94	469	772	35.1	106.0	42.2	15.5	101.0
	0206038	0.94	1.33	0.06	0.53	3.27	0.83	0.30	264	714	9.9	35.2	12.6	5.8	36.9
	0206039	2.11	2.37	0.13	1.15	8.02	1.98	0.66	322	862	22.9	74.8	28.5	9.3	55.7
	0206040	1.95	1.99	0.11	1.20	11.40	2.76	0.66	276	767	27.4	78.2	27.9	8.2	53.9
Storfjord	0206041	1.80	2.37	0.13	1.24	8.84	2.44	0.91	344	979	21.4	67.9	30.7	7.6	48.6
	0206044	2.43	3.13	0.18	1.51	6.08	2.67	1.22	410	961	27.4	81.1	38.4	10.1	64.1
	0206045	2.09	3.02	0.19	1.36	4.17	2.07	1.03	669	1110	21.7	67.1	33.2	10.1	60.7
	0206046	2.46	3.40	0.21	1.62	4.02	2.53	1.29	1130	961	29.1	79.5	41.1	12.2	74.8
	0206047	2.72	4.28	0.36	2.22	1.10	1.95	1.74	784	1320	33.8	73.7	61.2	13.7	83.1
	0206048	2.20	3.34	0.30	2.10	1.06	1.73	1.24	498	1150	27.2	62.0	80.5	12.5	72.0
	0206049	2.60	4.35	0.29	3.96	1.38	2.22	1.49	2360	1110	35.3	83.3	230.0	21.6	91.2
	0206052	2.99	4.79	0.41	2.31	1.24	2.06	1.86	762	1430	54.3	73.4	55.9	14.5	99.2
	0206053	2.31	3.47	0.31	1.76	1.04	1.74	1.29	654	1330	30.5	60.7	45.7	11.3	74.0
	0206056	2.70	4.06	0.35	2.03	1.13	2.05	1.53	968	1220	34.2	67.8	51.4	13.0	86.0
	0206057	2.43	3.35	0.24	1.58	3.64	2.21	1.22	672	1050	32.0	72.0	39.5	11.3	72.9
	0206058	1.32	1.92	0.16	0.91	3.53	1.09	0.62	419	1040	13.1	40.4	21.9	6.7	38.9
Nordfjord	0206059	0.64	0.89	0.04	0.81	21.30	1.40	0.35	616	565	10.4	36.2	13.2	4.7	16.5
	0206061	1.88	2.25	0.11	1.31	9.89	2.96	0.99	847	814	25.5	85.4	33.1	9.7	48.9
	0206062	2.41	3.21	0.22	1.56	1.97	2.42	1.29	780	1030	23.9	85.0	34.1	11.3	64.7
	0206063	2.67	3.39	0.21	1.65	3.92	2.38	1.45	580	876	27.2	101.0	38.1	13.7	67.2
	0206064	2.42	3.04	0.18	1.51	4.98	2.41	1.28	1070	829	25.0	89.3	36.9	12.9	61.8
	0206065	2.36	2.68	0.14	1.48	7.20	2.83	1.26	836	777	26.7	99.4	39.6	12.0	59.1
	0206066	2.63	3.12	0.18	1.72	4.82	3.48	1.51	591	852	55.8	121.0	148.0	13.3	73.2
	0206068	2.04	2.48	0.23	1.61	2.70	3.46	1.01	404	918	23.6	80.2	34.2	7.7	47.5
	0206069	2.50	3.51	0.28	1.72	0.82	2.22	1.58	773	1300	22.1	102.0	33.4	11.3	65.5
	0206070	2.80	3.55	0.24	1.75	1.71	2.17	1.62	633	947	24.5	100.0	35.5	13.7	65.0
	0206071	2.51	3.14	0.23	1.87	1.50	2.82	1.37	730	961	30.1	95.2	41.5	11.7	67.8
	0206072	3.01	3.89	0.35	2.04	0.79	2.12	2.06	833	1110	30.9	104.0	36.1	12.5	81.0
	0206073	3.13	4.36	0.34	2.23	0.88	2.92	2.15	4790	1090	34.7	125.0	37.8	14.4	113.0
	0206076	2.39	3.30	0.29	1.60	0.82	1.65	1.56	1540	1330	24.9	89.2	30.1	11.4	78.4
	0206077	3.19	4.38	0.31	2.34	1.00	3.49	2.13	14900	1020	36.5	133.0	41.4	16.7	126.0
	0206078	3.07	4.24	0.29	2.24	1.09	3.39	2.03	23700	1060	36.7	140.0	37.1	17.9	130.0
	0206079	2.04	2.55	0.20	1.27	1.11	1.61	1.12	595	868	21.3	70.8	27.9	9.4	58.8
Førdefjord	0206081	1.68	3.38	0.26	1.27	0.95	1.97	1.01	1520	1420	16.2	95.0	18.2	9.5	89.8
	0206083	1.83	3.37	0.26	1.39	1.05	2.38	1.07	1030	1370	22.8	106.0	22.1	9.9	99.8
	0206084	2.30	4.75	0.28	1.72	1.27	2.27	1.38	3690	1330	23.2	129.0	28.8	16.7	121.0
	0206085	2.38	4.58	0.28	1.76	2.14	2.45	1.44	3960	1250	26.6	141.0	32.5	16.6	112.0
	0206086	2.15	3.04	0.21	1.40	3.44	2.02	1.22	989	1050	18.8	95.7	28.4	10.8	55.4
	0206088	2.30	3.21	0.22	1.49	3.32	2.36	1.33	1480	1060	20.3	102.0	29.5	10.9	58.0
	0206090	2.36	3.14	0.20	1.48	4.34	2.37	1.32	1160	1100	21.6	105.0	30.9	11.3	58.3

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		Mo	Cr	Ba	Sr	Zr	Ag	B	Be	Li	Sc	Ce	La
	STATION	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
		ICP-AES											
Langfjord	0206001	<1	35.3	98	50.9	5.4	<1	15.3	4.0	21.3	6.3	74.5	32.6
	0206002	<1	48.2	120	63.2	6.9	<1	21.4	5.2	27.9	8.0	87.5	37.0
	0206003	<1	56.2	162	96.9	8.3	<1	41.4	6.8	35.6	8.6	95.6	39.1
	0206004	2.05	56.9	178	124	8.2	<1	60.9	7.2	35.9	8.7	95.8	38.6
	0206007	1.45	63.3	182	110	9.3	<1	52.9	7.9	38.4	9.5	99.1	40.9
Sunndalsfjord	0206009	<1	72.9	95.6	55.6	12.6	<1	14.3	5.7	28.5	5.8	62.7	26.0
	0206010	<1	66.5	96.4	54.4	12.4	<1	19.5	5.6	28.6	5.7	59.9	25.3
	0206012	<1	85.6	122	69.7	15.8	<1	19.0	7.0	35.3	7.4	73.5	29.7
	0206013	<1	66.7	102	60.2	11.6	<1	<5	6.0	29.6	5.9	62.4	25.5
	0206015	<1	88.1	131	62	16.4	<1	10.0	7.1	37.1	7.4	74.5	30.0
	0206016	<1	88.7	146	71.1	16.2	<1	27.3	7.9	40.8	8.1	83.3	31.6
	0206017	2.57	96.6	169	82.4	18.4	<1	41.0	9.4	42.3	8.9	88.3	33.0
	0206018	2.70	93.4	177	101	17.6	<1	40.8	9.3	41.1	8.8	86.8	31.8
	0206019	1.82	87.7	168	89.7	16.7	<1	43.5	8.8	42.0	8.7	80.7	31.0
	0206021	<1	81.6	172	112	14.8	<1	45.7	8.9	37.6	9.5	82.2	30.6
	0206024	<1	57.5	118	115	9.8	<1	46.0	6.2	29.2	7.1	74.7	27.3
	0206025	<1	62.6	125	142	10.4	<1	47.5	6.4	32.6	7.6	82.2	29.8
	0206026	<1	67.8	126	170	11.4	<1	62.4	6.6	33.2	8.2	90.3	32.5
	0206027	<1	41.9	83.6	59.3	6.9	<1	31.3	4.9	29.6	5.6	69.9	28.8
Halsafjord	0206028	1.28	97.8	102	89	14.2	<1	41.0	7.9	39.5	8.4	71.5	26.6
	0206029	1.12	102	69.9	68.7	13.5	<1	27.2	8.3	34.6	7.3	52.0	18.4
	0206030	<1	66.4	115	121	10.7	<1	49.8	7.6	36.8	7.2	80.9	28.8
	0206031	<1	77.4	117	107	11.7	<1	56.1	8.0	38.8	7.8	80.9	28.7
	0206032	1.14	74.5	119	173	11.7	<1	58.3	8.1	36.5	7.5	80.0	26.7
	0206033	<1	71.6	118	186	11.3	<1	64.5	7.7	36.3	7.5	80.3	27.7
	0206034	<1	59.7	103	231	10.3	<1	56.5	6.5	30.9	6.9	78.9	26.5
	0206037	<1	65.1	109	223	11.9	<1	58.9	7.0	34.4	7.6	84.9	28.2
	0206038	<1	21.2	39.1	142	3.9	<1	20.0	2.7	10.0	2.7	50.2	15.5
	0206039	<1	46	68.6	262	8.2	<1	51.7	4.9	23.0	6.0	84.3	26.0
	0206040	<1	38.6	81.4	456	7.1	<1	63.0	4.2	22.2	5.5	85.2	23.7
Storfjord	0206041	<1	31.9	117	452	5.2	<10	64.8	0.2	26.1	5.3	54.0	25.7
	0206044	<1	43.2	152	274	6.7	<10	72.7	0.3	36.3	7.1	69.0	31.3
	0206045	<1	38.7	132	176	5.8	<10	57.8	<0.2	30.4	6.6	70.0	31.8
	0206046	<1	45.6	166	187	6.4	<10	65.0	<0.2	38.1	7.4	77.0	34.5
	0206047	<1	67.9	257	86.3	3.8	<10	41.9	<0.2	46.5	8.4	110.0	48.3
	0206048	<1	73.8	186	71.6	3.2	<10	36.2	<0.2	46.2	6.9	85.0	35.9
	0206049	1.20	113	205	95.6	4.1	<10	45.7	<0.2	43.0	8.1	96.0	41.3
	0206052	<1	70.2	249	79.3	3.3	<10	36.7	<0.2	46.0	10.8	113.0	49.3
	0206053	<1	53.1	186	67.8	3.3	<10	31.0	<0.2	37.2	8.0	102.0	45.1
	0206056	<1	60.3	216	75.8	3.8	<10	34.5	<0.2	43.8	8.9	109.0	47.2
	0206057	<1	43.4	171	178	5.2	<10	55.2	<0.2	46.3	7.5	73.0	32.4
	0206058	<1	24.5	90.1	153	3.3	<10	29.5	<0.2	26.5	4.7	45.0	22.3
Nordfjord	0206059	<1	11.4	45.6	1200	1.8	<10	39.5	<0.2	11.1	1.7	36.0	18.3
	0206061	<1	32.2	126	502	4.6	<10	71.6	0.4	30.7	4.3	61.0	28.7
	0206062	<1	42.1	186	123	5.7	<10	60.3	<0.2	37.2	5.8	99.0	42.9
	0206063	<1	45.2	191	202	7.1	<10	72.3	0.3	42.7	6.0	100.0	43.5
	0206064	<1	40.1	172	249	6.4	<10	69.5	0.3	41.3	5.4	84.0	37.8
	0206065	<1	40.3	152	371	6.3	<10	78.5	0.4	39.4	5.2	75.0	34.3
	0206066	<1	43.6	206	260	6.4	<10	79.6	0.3	44.4	5.6	98.0	42.8
	0206068	<1	46.6	109	170	5.9	<10	66.5	<0.2	33.1	4.8	92.0	39.2
	0206069	<1	39.6	233	95.1	5.8	<10	47.8	<0.2	42.4	5.3	146.0	63.6
	0206070	<1	45.1	227	115	7.1	<10	61.8	<0.2	45.4	6.0	127.0	55.5
	0206071	<1	52.4	192	116	4.5	<10	54.6	<0.2	56.3	4.6	101.0	42.6
	0206072	<1	47.6	283	106	5.1	<10	37.6	<0.2	53.7	6.0	176.0	77.8
	0206073	2.30	48.2	302	127	5.2	<10	60.7	<0.2	56.6	6.3	166.0	74.4
	0206076	<1	34.4	232	103	5.0	<10	36.2	<0.2	43.2	4.8	151.0	67.4
	0206077	5.60	48.6	316	152	5.3	<10	61.9	<0.2	60.4	6.1	154.0	68.2
	0206078	10.50	47.5	342	178	4.8	<10	62.6	<0.2	57.7	5.8	141.0	62.9
	0206079	<1	32.8	183	96.3	3.9	<10	40.7	<0.2	32.9	4.1	94.0	42.2
Førdefjord	0206081	<1	20.7	176	96.7	4.2	<10	40.4	<0.2	37.7	4.9	104.0	48.9
	0206083	<1	24.4	176	109	4.2	<10	62.4	<0.2	44.3	4.8	102.0	47.5
	0206084	<1	31.6	226	117	5.5	<10	61.1	<0.2	49.3	5.9	119.0	55.0
	0206085	<1	34.3	231	157	5.6	<10	68.7	<0.2	48.4	6.0	119.0	54.7
	0206086	<1	31.3	197	182	5.7	<10	51.0	<0.2	31.4	5.3	83.0	39.6
	0206088	<1	33	213	182	5.8	<10	55.0	<0.2	33.4	5.6	86.0	40.2
	0206090	<1	34.5	208	227	6.5	<10	65.3	0.2	32.9	5.7	83.0	39.5

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		Y	Hg	As	Cd	Pb	Se	Sulphur	Karbon	TOC	C-carb
	STATION	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	[%]	[%]	[%]	[%]
		ICP-AES	AA					Leco			
Langfjord	0206001	13.8	0.019	2.05	0.05	80	< 1	0.161	1.544	1.4	0.1
	0206002	15.8	0.020	2.49	0.13	95.2	< 1	0.159	2.271	2.0	0.2
	0206003	16.4	0.043	12.6	0.16	130	< 1	0.181	2.721	2.2	0.5
	0206004	16.1	0.041	14.5	0.11	221	4.09	0.152	2.799	2.2	0.6
	0206007	16.6	0.041	15.9	0.10	234	4.35	0.162	2.622	2.1	0.5
Sunndalsfjord	0206009	11.8	0.025	4.31	0.11	20.1	< 1	0.053	1.642	1.4	0.2
	0206010	11.6	0.021	4.08	0.09	189	< 1	0.115	1.505	1.7	-0.2
	0206012	14.0	0.035	7.53	0.05	289	< 1	0.090	1.581	1.3	0.3
	0206013	11.9	0.031	11.1	0.08	252	2.42	0.055	1.257	1.1	0.1
	0206015	13.3	0.033	11	0.09	278	2.26	0.077	1.336	1.2	0.2
	0206016	14.1	0.036	9.45	0.04	233	2.43	0.132	1.583	1.4	0.2
	0206017	15.2	0.036	20.7	0.08	317	4	0.124	1.723	1.5	0.3
	0206018	14.6	0.043	18.7	0.16	282	3.49	0.151	1.938	1.6	0.4
	0206019	13.9	0.018	10.9	0.10	358	2.84	0.155	1.800	1.4	0.4
	0206021	15.1	0.027	13.4	0.12	374	3.92	0.149	2.486	2.0	0.5
	0206024	13.2	0.049	12	0.15	135	4.86	0.159	3.023	2.4	0.6
	0206025	14.1	0.063	10.9	0.12	172	4.61	0.212	3.539	2.6	0.9
	0206026	15.6	0.048	13.3	0.12	304	4.31	0.274	4.336	3.1	1.3
	0206027	13.3	0.035	9.91	0.10	131	3.45	0.139	2.522	2.3	0.2
Halsafjord	0206028	15.2	0.035	10.8	< 0.02	219	2.5	0.157	2.230	1.9	0.3
	0206029	13.2	0.031	22.1	< 0.02	117	3.01	0.115	2.097	1.9	0.2
	0206030	15.3	0.041	12.3	0.13	171	4.8	0.189	3.144	2.4	0.7
	0206031	15.0	0.042	14.1	0.09	242	3.27	0.209	3.019	2.4	0.6
	0206032	15.5	0.047	18	0.13	192	4.74	0.270	3.794	2.7	1.1
	0206033	15.7	0.057	19.5	0.12	279	5.92	0.269	4.011	2.8	1.3
	0206034	14.4	0.064	12.2	< 0.02	< 0.4	3.01	0.244	4.327	2.6	1.7
	0206037	15.7	0.061	7.18	0.15	169	4.55	0.269	4.431	2.6	1.8
	0206038	7.4	0.027	5.67	0.06	120	1.62	0.091	1.786	0.7	1.1
	0206039	13.5	0.051	6.12	0.15	181	2.24	0.201	4.447	2.0	2.4
	0206040	13.1	0.056	4.52	0.11	168	3.51	0.302	6.334	3.0	3.4
Storfjord	0206041	12.1	0.053	9.52	0.12	223	5.71	0.271	4.944	2.5	2.4
	0206044	14.3	0.048	8.88	0.46	273	5.22	0.251	4.197	2.6	1.6
	0206045	14.4	0.039	9.91	0.24	265	5.01	0.178	2.908	1.9	1.0
	0206046	14.2	0.044	10.5	0.21	341	5.27	0.249	3.367	2.4	1.0
	0206047	13.2	0.022	11.4	0.04	189	2.11	0.154	1.898	1.8	0.1
	0206048	11.1	0.031	9.63	0.07	210	2.26	0.160	1.842	1.7	0.1
	0206049	13.6	0.033	19.8	0.03	274	3.09	0.180	1.947	1.7	0.2
	0206052	17.3	0.029	18.7	0.18	237	2.3	0.206	1.898	1.8	0.1
	0206053	14.3	0.024	12.1	0.09	143	1.86	0.147	1.566	1.5	0.1
	0206056	14.8	0.029	14.1	0.05	221	1.96	0.162	1.677	1.6	0.1
	0206057	14.4	0.033	11.7	0.08	253	2.91	0.223	3.178	2.3	0.9
	0206058	10.7	0.023	5.25	< 0.02	116	1.13	0.084	2.014	1.2	0.9
Nordfjord	0206059	7.6	0.024	6.81	0.18	202	1.68	0.142	7.797	1.1	6.7
	0206061	11.0	0.060	11.1	0.11	241	3.59	0.229	5.888	3.1	2.8
	0206062	13.2	0.041	15.3	0.06	193	2.77	0.214	3.185	2.9	0.3
	0206063	13.8	0.047	12.4	0.09	360	2.51	0.251	4.008	3.1	1.0
	0206064	12.6	0.051	10.1	0.17	233	2.73	0.239	4.050	2.7	1.3
	0206065	12.3	0.051	8.48	0.22	281	3.78	0.308	5.372	3.2	2.2
	0206066	13.1	0.057	14.1	1.31	298	4.01	0.361	4.578	3.2	1.4
	0206068	12.5	0.038	10.1	0.04	148	3.56	0.388	4.796	4.1	0.7
	0206069	14.9	0.028	11.7	0.04	227	4.41	0.207	2.305	2.2	0.1
	0206070	14.1	0.038	7.47	0.08	254	3.16	0.220	2.346	2.0	0.3
	0206071	11.7	0.037	12.3	0.12	196	4.56	0.270	3.448	3.1	0.4
	0206072	13.1	0.028	10.5	0.11	118	2.78	0.199	1.999	1.8	0.2
	0206073	13.0	0.042	17.5	0.13	276	5.18	0.278	2.122	1.9	0.2
	0206076	12.1	0.062	10.5	0.10	139	3.44	0.156	1.738	1.6	0.1
	0206077	13.2	0.056	20.4	0.15	197	4.6	0.330	2.517	2.2	0.3
	0206078	12.9	0.067	25.9	0.24	76.2	4.84	0.313	2.793	2.4	0.4
	0206079	10.2	0.035	9.58	0.06	160	3.68	0.151	2.235	2.0	0.2
Førdefjord	0206081	16.8	0.034	22.1	0.07	108	2.49	0.185	3.372	3.2	0.2
	0206083	16.0	0.050	22.4	0.07	227	3.9	0.257	5.402	5.0	0.4
	0206084	18.3	0.036	25.4	0.03	120	3.24	0.228	3.473	3.2	0.3
	0206085	18.3	0.051	20.7	0.07	232	1.33	0.190	3.977	3.4	0.5
	0206086	15.2	0.042	6.87	0.05	180	1.37	0.199	2.989	2.1	0.9
	0206088	15.6	0.046	7.18	0.04	195	2.75	0.226	3.077	2.2	0.9
	0206090	15.7	0.047	8.65	0.03	112	4.31	0.205	3.665	2.5	1.2

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		Al	Fe	Ti	Mg	Ca	Na	K	Mn	P	Cu	Zn	Ni	Co	V
	STATION	[%]	[%]	[%]	[%]	[%]	[%]	[%]	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
		ICP-AES													
	0206091	2.53	3.04	0.15	1.56	5.90	3.08	1.33	1040	927	23.4	104.0	34.0	11.2	57.2
Sognefjord	0206092	2.52	2.83	0.13	1.39	5.22	2.83	1.14	765	856	19.9	90.2	32.4	11.2	51.2
	0206093	2.70	2.82	0.09	1.53	6.76	3.83	1.25	2610	803	22.6	101.0	34.8	12.1	58.0
	0206094	1.26	1.14	0.05	1.02	16.90	3.40	0.66	184	894	27.6	86.9	24.2	4.2	38.2
	0206096	1.36	1.77	0.08	0.76	6.41	1.57	0.55	458	771	10.0	48.5	15.1	6.5	32.4
	0206099	1.17	1.59	0.09	0.57	5.85	1.06	0.46	275	862	6.8	34.8	11.1	5.6	27.4
	0206100	1.08	1.91	0.07	0.64	9.32	1.15	0.53	411	740	6.3	37.0	11.0	6.4	26.3
	0206101	1.56	2.12	0.07	0.90	9.99	1.84	0.69	1020	744	11.3	57.0	18.2	8.3	38.4
	0206102	1.76	2.11	0.06	1.17	14.60	2.28	0.77	624	643	14.1	67.3	23.1	8.3	39.8
	0206103	1.65	2.09	0.07	1.45	8.76	5.84	1.01	1500	1250	30.0	108.0	29.8	7.2	62.0
	0206104	1.58	2.05	0.11	1.11	8.69	3.38	0.82	264	1030	22.7	81.9	24.0	5.3	45.1
	0206107	0.87	2.39	0.09	1.97	2.91	11.90	1.11	322	770	26.8	131.0	15.7	5.9	88.8
	0206108	0.97	1.50	0.16	0.62	0.97	0.81	0.51	286	911	7.5	39.0	8.1	4.4	25.9
	0206110	1.74	2.65	0.25	1.12	1.56	1.52	0.96	486	1060	15.1	76.4	17.1	7.7	46.5
	0206112	2.19	1.99	0.98	1.31	17.60	2.35	0.61	460	741	2.9	<2	18.2	<1	103.0
	0206115	2.59	4.10	0.19	1.72	0.94	1.41	0.98	510	924	20.3	101.0	35.9	12.3	51.9
	0206116	2.37	3.24	0.35	1.86	0.96	1.61	1.36	635	1400	20.3	123.0	24.6	10.0	64.6
	0206117	2.99	4.42	0.38	2.05	0.95	1.96	2.01	948	1250	23.1	115.0	29.0	13.2	78.8
	0206118	2.47	3.70	0.35	1.71	0.89	1.57	1.63	690	1210	19.7	97.4	23.0	10.9	68.6
	0206119	3.13	4.85	0.42	2.25	0.95	2.24	2.28	936	1350	22.4	125.0	28.4	14.3	87.3
	0206120	3.37	5.55	0.48	2.49	0.98	2.17	2.53	931	1600	23.5	136.0	32.8	15.2	105.0
	0206121	2.57	4.43	0.44	2.02	1.04	1.63	1.97	668	2010	18.3	104.0	27.3	12.2	94.0
	0206123	2.71	3.58	0.30	1.78	2.25	2.73	1.55	638	1170	29.3	117.0	30.9	11.2	81.6
	0206124	3.20	5.17	0.35	2.34	1.26	3.94	2.22	3990	1350	34.0	166.0	33.5	17.7	150.0
	0206125	1.84	3.09	0.23	2.27	1.08	9.26	1.78	487	907	23.5	135.0	21.5	12.1	72.3
	0206126	3.76	3.69	0.22	1.87	1.76	2.00	0.98	720	1120	43.7	77.5	53.6	16.2	71.7
	0206127	7.49	2.37	0.13	1.36	4.25	1.72	0.33	1140	634	31.3	38.7	45.8	13.1	40.5
	0206128	2.78	3.74	0.24	1.80	1.57	2.24	0.85	512	1710	59.3	68.7	61.3	17.2	89.5
	0206129	3.65	3.21	0.22	2.04	1.82	2.42	0.72	342	991	50.4	69.4	72.3	16.1	63.6
	0206130	2.63	4.26	0.27	1.70	1.16	1.53	1.04	1320	1680	39.8	90.2	37.8	15.7	73.6
	0206131	3.19	4.27	0.30	1.93	1.70	1.71	1.03	697	2070	56.8	76.4	52.0	18.0	90.8
	0206132	2.21	3.76	0.28	1.65	1.48	2.25	1.06	420	2220	36.2	111.0	26.5	11.2	78.9
	0206133	3.57	4.69	0.35	2.30	0.97	2.29	2.19	2380	1030	44.0	131.0	39.2	15.6	104.0
	0206134	2.74	4.05	0.33	1.95	0.78	1.90	1.96	1630	1150	29.8	108.0	29.8	11.8	81.3
	0206135	2.02	3.00	0.29	1.48	0.67	1.25	1.45	1130	1120	23.5	80.8	22.9	9.0	60.9
	0206136	1.87	2.80	0.28	1.42	0.69	1.12	1.35	514	1170	19.9	70.3	22.7	7.9	57.2
	0206139	3.00	4.35	0.32	2.18	0.76	2.35	2.05	3220	1070	37.0	126.0	31.1	15.1	91.6
	0206140	2.99	4.29	0.30	2.15	0.74	1.98	1.84	747	1010	39.7	120.0	32.2	13.4	78.9
	0206141	2.43	3.21	0.25	1.42	1.39	1.53	0.85	472	1380	78.2	79.7	41.6	12.0	83.2
	0206142	2.43	3.70	0.28	1.64	1.14	1.84	1.12	626	1410	56.8	85.5	29.0	12.1	78.3
	0206143	2.59	3.79	0.30	1.70	1.23	1.64	1.06	599	1350	70.1	79.4	32.4	13.2	84.4
Boknafjord	0206145	2.98	3.41	0.05	1.47	4.96	2.39	1.13	575	656	17.8	103.0	33.2	12.1	77.4
	0206150	2.79	3.31	0.04	1.46	4.64	2.72	1.12	1140	731	18.0	100.0	30.7	12.5	77.1
	0206152	1.51	1.95	0.06	0.82	6.54	1.06	0.58	611	590	8.8	49.3	18.7	6.9	39.1
	0206156	3.13	3.72	0.05	1.56	4.76	2.87	1.24	1140	802	20.6	114.0	35.6	13.5	88.0
	0206158	3.01	3.52	0.05	1.54	4.76	2.97	1.20	1810	760	20.3	115.0	33.4	13.9	85.9

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		Mo	Cr	Ba	Sr	Zr	Ag	B	Be	Li	Sc	Ce	La
	STATION	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
		ICP-AES											
	0206091	<1	39.6	181	291	7.9	<10	76.4	0.5	36.8	5.9	73.0	34.3
Sognefjord	0206092	<1	34.4	147	260	8.3	<10	70.3	0.5	35.5	5.6	69.0	32.1
	0206093	<1	38.9	139	349	8.2	<10	87.4	0.8	41.2	5.9	54.0	25.4
	0206094	<1	22.1	84	1000	2.8	<10	79.2	0.3	18.7	3.0	39.0	20.7
	0206096	<1	20.8	72.4	265	5.6	<10	46.5	0.3	18.6	3.4	43.0	19.7
	0206099	<1	17.2	52.7	229	5.2	<10	38.1	<0.2	14.0	2.9	44.0	19.7
	0206100	<1	17.9	50.7	362	6.0	<10	53.2	0.3	14.4	2.9	38.0	17.4
	0206101	<1	24.2	81.4	425	6.1	<10	57.8	0.4	23.7	3.8	44.0	20.2
	0206102	<1	27.8	69.7	726	6.0	<10	67.2	0.5	29.2	4.2	45.0	20.8
	0206103	1.40	30.9	114	448	3.7	<10	101.0	0.5	27.1	4.1	51.0	24.9
	0206104	<1	29	85.6	378	4.8	<10	78.5	0.3	25.4	4.2	71.0	32.7
	0206107	51.60	15.1	101	226	2.1	<10	99.0	<0.2	16.7	2.2	55.0	26.5
	0206108	<1	12.1	62.2	46.8	3.8	<10	19.6	<0.2	20.1	3.5	75.0	32.0
	0206110	<1	23.1	154	94.8	5.0	<10	30.5	<0.2	41.7	5.1	106.0	45.3
	0206112	<1	102	108	253	256.0	<10	80.1	0.3	41.2	33.4	169.0	66.6
	0206115	<1	38	105	67.7	19.1	<10	25.9	<0.2	66.0	4.5	98.0	43.2
	0206116	<1	30.8	196	95.4	5.1	<10	30.5	<0.2	58.6	5.5	130.0	64.6
	0206117	<1	31.1	332	102	7.9	<10	36.6	<0.2	55.1	6.5	158.0	74.4
	0206118	<1	25	288	94.7	6.6	<10	28.9	<0.2	52.5	5.9	139.0	64.7
	0206119	<1	31.1	383	106	7.1	<10	36.3	<0.2	56.7	6.5	164.0	77.3
	0206120	<1	31.2	531	117	6.8	<10	35.1	<0.2	58.6	6.9	183.0	88.1
	0206121	<1	25.9	443	113	5.7	<10	20.5	<0.2	43.7	6.0	164.0	78.8
	0206123	<1	28.5	248	167	4.9	<10	44.5	<0.2	55.5	4.8	129.0	61.6
	0206124	<1	32.7	333	166	5.9	<10	57.9	<0.2	66.7	5.7	176.0	85.1
	0206125	57.80	18.1	207	155	3.8	<10	69.3	<0.2	38.2	3.3	124.0	58.9
	0206126	<1	31.5	220	163	5.6	<10	36.3	<0.2	43.6	5.2	73.0	35.0
	0206127	<1	23.3	84.9	277	2.6	<10	25.2	<0.2	18.4	3.4	22.0	11.2
	0206128	<1	44.9	276	127	2.9	<10	45.8	<0.2	38.5	5.6	48.0	24.9
	0206129	<1	35.2	173	168	2.2	<10	45.8	<0.2	41.0	4.6	37.0	20.3
	0206130	<1	33.6	232	111	15.2	<10	31.5	<0.2	48.5	5.4	95.0	47.3
	0206131	<1	42.6	363	124	5.1	<10	34.7	<0.2	43.0	6.8	65.0	32.2
	0206132	<1	24.5	262	148	6.4	<10	42.4	<0.2	38.3	4.6	88.0	46.8
	0206133	1.50	37.6	327	129	8.1	<10	38.6	<0.2	61.8	6.6	191.0	87.3
	0206134	<1	33.9	257	108	7.4	<10	28.0	<0.2	49.6	5.8	182.0	83.0
	0206135	<1	28	183	82.7	7.1	<10	15.6	<0.2	37.0	4.9	153.0	70.0
	0206136	<1	29.6	168	84.9	6.6	<10	16.5	<0.2	31.9	4.7	138.0	64.0
	0206139	2.30	36.3	259	109	9.1	<10	36.5	<0.2	59.7	5.9	188.0	87.0
	0206140	<1	38.7	213	86.9	10.5	<10	30.1	<0.2	70.4	5.8	162.0	77.8
	0206141	<1	30.9	203	105	4.4	<10	30.5	0.3	39.2	5.4	75.0	35.8
	0206142	<1	31.1	219	106	4.9	<10	32.8	<0.2	42.0	5.9	99.0	47.8
	0206143	<1	33.6	211	110	5.3	<10	34.3	<0.2	44.3	6.2	97.0	46.2
Boknafjord	0206145	<1	44.1	110	195	13.3	<10	85.0	1.1	49.5	6.4	52.0	24.6
	0206150	<1	42.5	107	185	12.6	<10	81.2	1.0	46.0	6.2	51.0	23.9
	0206152	<1	23	71.1	237	10.2	<10	48.3	0.4	23.5	3.6	46.0	21.7
	0206156	<1	45.4	146	203	13.4	<10	89.2	1.1	52.3	6.6	55.0	25.9
	0206158	<1	43.8	155	209	12.1	<10	89.7	1.1	51.0	6.3	52.0	25.0

		Y	Hg	As	Cd	Pb	Se	Sulphur	Karbon	TOC	C-carb
	STATION	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	[%]	[%]	[%]	[%]
		ICP-AES	AA					Leco			
	0206091	14.7	0.051	8.18	0.21	128	3.92	0.292	4.487	2.8	1.7
Sognefjord	0206092	13.4	0.050	7.09	0.05	116	3.62	0.268	3.497	2.0	1.5
	0206093	12.7	0.064	8.33	0.09	179	4.75	0.356	4.779	2.7	2.1
	0206094	10.1	0.054	5.2	0.34	178	5.2	0.381	9.612	4.1	5.6
	0206096	10.9	0.043	2.74	0.08	197	< 1	0.133	2.853	1.1	1.7
	0206099	11.0	0.035	2.58	0.14	79.3	2.43	0.072	2.360	0.7	1.6
	0206100	10.1	0.035	4.02	0.11	71.3	< 1	0.082	3.474	0.7	2.7
	0206101	11.2	0.047	4.12	0.14	199	< 1	0.149	4.237	1.2	3.0
	0206102	11.4	0.039	4.57	0.21	269	1.31	0.192	6.103	1.6	4.5
	0206103	12.1	0.076	12.8	0.79	161	5.57	0.638	8.703	5.7	3.0
	0206104	13.8	0.053	6.82	0.29	195	3.67	0.410	7.002	4.3	2.7
	0206107	8.8	0.114	16.4	2.61	122	9.8	2.334	6.579	5.6	0.9
	0206108	15.9	0.020	1.81	0.10	101	< 1	0.060	0.864	0.7	0.2
	0206110	16.6	0.033	5.34	0.04	121	2.72	0.145	2.219	1.8	0.4
	0206112	42.7	0.033	8.7	0.06	119	1.46	0.209	6.258	1.0	5.2
	0206115	15.3	0.031	5.47	0.05	215	< 1	0.127	1.696	1.5	0.2
	0206116	17.3	0.113	5.88	0.05	47.1	< 1	0.205	2.242	2.1	0.1
	0206117	17.5	0.030	6.17	0.10	168	1.11	0.157	1.169	1.0	0.1
	0206118	17.6	0.028	5.03	0.24	76.2	1.97	0.115	1.117	1.0	0.1
	0206119	17.0	0.036	7.32	0.09	165	2.05	0.163	1.224	1.1	0.1
	0206120	16.6	0.034	13.3	0.09	80	1.27	0.170	1.355	1.2	0.1
	0206121	16.5	0.029	8.23	0.04	100	< 1	0.116	1.181	1.0	0.1
	0206123	12.8	0.049	9.85	0.22	53.2	4.71	0.264	3.252	2.7	0.6
	0206124	14.9	0.055	21.9	0.16	69.7	5.09	0.341	3.030	2.7	0.3
	0206125	9.7	0.061	9.16	0.64	30.4	6.35	1.477	3.560	3.1	0.5
	0206126	10.8	0.038	10.6	0.05	75.6	5.43	0.141	1.402	1.2	0.2
	0206127	5.5	0.025	7.15	< 0.02	88.1	4.09	0.073	0.645	0.5	0.1
	0206128	10.6	0.040	15	< 0.02	66.9	2.16	0.201	2.213	2.0	0.3
	0206129	9.2	0.054	6.01	< 0.02	73.5	2.7	0.193	2.557	2.3	0.3
	0206130	14.9	0.033	11.6	< 0.02	76.6	3.25	0.105	1.353	1.2	0.1
	0206131	12.7	0.185	12.1	< 0.02	128	2.65	0.088	1.518	1.3	0.2
	0206132	16.2	0.043	7.27	0.10	196	3.4	0.152	2.719	2.4	0.3
	0206133	14.8	0.036	10.3	0.18	80.5	1.51	0.099	1.087	0.9	0.2
	0206134	15.2	0.029	11.2	< 0.02	19.5	1.81	0.085	0.703	0.6	0.1
	0206135	15.6	0.014	4.77	0.16	28.8	1.61	0.054	0.403	0.4	0.0
	0206136	15.5	0.011	4.81	< 0.02	72.1	< 1	0.057	0.445	0.4	0.1
	0206139	15.8	0.032	15.9	0.07	29.4	1.51	0.102	1.077	0.9	0.2
	0206140	17.4	0.033	11.8	0.03	45.2	3.07	0.098	1.054	1.0	0.1
	0206141	14.0	0.037	8.17	0.32	61.1	3.58	0.078	2.790	2.6	0.2
	0206142	13.6	0.037	11.3	0.07	99.8	3.41	0.093	1.361	1.2	0.1
	0206143	14.0	0.032	9.94	0.08	39.6	4.16	0.134	1.862	1.7	0.2
Boknafjord	0206145	12.6	0.066	10.8	0.12	65.4	3.45	0.148	3.678	2.0	1.7
	0206150	12.4	0.066	15.1	0.13	65.3	3.03	0.200	3.464	1.9	1.6
	0206152	11.7	0.035	7.65	0.05	19.1	2.95	0.109	2.985	0.9	2.1
	0206156	13.1	0.078	17.8	0.05	61.9	4.66	0.230	3.682	2.1	1.6
	0206158	12.7	0.080	15.5	0.12	62.8	3.21	0.270	3.778	2.2	1.5

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Table 6. Elementary composition and TOC of the samples from the interval 9-11 cm

	STATION	Al	Fe	Ti	Mg	Ca	Na	K	Mn	P	Cu	Zn	Ni	Co	V
		[%]	[%]	[%]	[%]	[%]	[%]	[%]	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
		ICP-AES													
Langfjord	0206001	1.55	2.24	0.20	1.00	0.88	0.81	0.66	397	1110	20.4	50.4	20.9	8.2	52.8
	0206002	2.01	2.86	0.24	1.32	1.09	1.32	0.84	481	1030	27.3	68.8	27.6	11.0	65.9
	0206003	2.67	3.95	0.27	1.67	1.55	1.42	1.11	858	979	37.0	84.7	38.4	15.1	105.0
	0206004	2.92	4.40	0.28	1.87	1.74	1.98	1.24	1290	927	39.2	101.0	42.3	16.9	118.0
	0206007	3.36	4.96	0.31	2.05	1.87	1.59	1.41	1060	869	43.3	98.4	46.8	18.3	122.0
Sunndalsfjord	0206009	2.23	2.84	0.21	1.48	1.03	0.78	0.69	388	907	32.7	66.5	39.3	13.9	67.3
	0206010	2.40	3.04	0.21	1.55	0.72	0.72	0.74	415	930	34.1	69.2	44.0	15.0	73.5
	0206012	3.12	3.97	0.27	2.00	0.83	0.85	0.98	529	910	41.5	85.9	52.5	18.5	95.0
	0206013	2.86	3.58	0.25	1.82	0.80	0.79	0.91	486	906	40.4	78.9	48.3	17.3	86.7
	0206015	3.35	4.31	0.28	2.11	0.88	1.11	1.11	582	819	43.4	89.5	56.9	19.7	110.0
	0206016	3.59	4.78	0.27	2.18	0.97	1.53	1.16	718	956	56.6	107.0	57.0	23.5	121.0
	0206017	3.93	5.59	0.28	2.38	1.08	1.20	1.36	1170	782	53.2	117.0	65.1	28.6	139.0
	0206018	4.10	5.63	0.29	2.46	1.29	1.33	1.41	1120	783	60.2	113.0	69.7	29.9	141.0
	0206019	3.71	5.10	0.24	2.15	1.35	1.66	1.21	827	696	82.1	120.0	65.4	35.0	137.0
	0206021	3.61	4.81	0.23	1.98	2.04	1.60	1.12	759	847	89.9	127.0	58.2	38.8	131.0
	0206024	2.72	3.19	0.19	1.52	2.35	1.82	0.91	437	750	39.3	83.4	41.1	15.3	91.5
	0206025	3.09	3.63	0.21	1.72	2.80	2.11	1.04	478	837	37.9	86.5	43.7	16.4	99.0
	0206026	3.25	3.82	0.20	1.72	3.46	1.74	1.09	512	805	39.3	94.0	47.3	16.2	101.0
	0206027	2.42	2.81	0.21	1.22	0.96	1.12	0.74	416	824	26.8	58.1	26.3	10.7	75.9
Halsafjord	0206028	3.70	4.62	0.29	2.13	1.62	1.51	0.90	518	756	33.3	92.3	57.1	18.1	110.0
	0206029	3.28	4.50	0.29	2.01	0.94	1.04	0.59	457	768	36.1	83.1	58.7	17.9	125.0
	0206030	3.08	3.88	0.23	1.64	2.11	1.59	0.91	506	762	31.8	80.9	41.1	14.5	108.0
	0206031	3.78	4.73	0.27	2.06	2.11	1.71	1.10	533	761	35.2	92.8	52.6	17.2	115.0
	0206032	3.57	4.61	0.24	1.97	2.87	1.80	1.01	581	739	35.4	92.9	52.1	18.5	128.0
	0206033	3.58	4.60	0.23	1.92	4.03	1.88	1.02	593	780	35.8	92.6	51.3	18.4	128.0
	0206034	3.28	4.06	0.20	1.73	4.35	1.99	0.96	529	761	32.9	85.6	48.1	16.1	108.0
	0206037	3.39	4.06	0.20	1.78	4.37	2.15	1.01	523	790	34.9	95.3	46.6	16.3	110.0
	0206038	1.39	1.80	0.09	0.70	4.26	0.80	0.44	251	541	11.7	43.5	18.6	7.8	46.3
	0206039	2.33	2.45	0.14	1.16	4.55	1.58	0.68	313	815	21.5	63.7	30.1	9.3	58.0
	0206040	2.15	2.13	0.12	1.18	4.80	2.17	0.67	279	827	27.4	77.6	29.6	8.3	57.0
Storfjord	0206041	1.79	2.31	0.13	1.22	9.40	2.00	0.88	305	913	23.6	68.9	31.1	7.5	50.4
	0206044	2.34	3.23	0.18	1.45	6.74	1.77	1.13	394	901	28.0	69.8	39.2	10.5	66.6
	0206045	1.88	2.84	0.19	1.20	4.25	1.26	0.92	367	1130	19.6	52.8	32.2	10.1	57.2
	0206046	2.63	3.77	0.23	1.65	4.51	1.65	1.30	749	956	34.8	86.8	43.6	13.7	81.6
	0206047	1.99	3.01	0.29	1.50	0.99	1.19	1.08	415	1090	25.9	45.8	36.2	10.1	68.3
	0206048	2.63	4.13	0.37	1.96	1.09	1.40	1.61	556	1300	36.2	69.6	45.4	13.2	85.8
	0206049	3.04	4.76	0.36	2.39	1.74	1.66	1.63	1000	1060	40.3	73.3	78.8	17.3	107.0
	0206052	3.17	4.89	0.46	2.35	1.26	1.52	1.95	716	1240	68.5	66.7	55.2	15.9	106.0
	0206053	2.27	3.29	0.32	1.61	0.94	1.26	1.24	511	1270	32.8	53.1	38.0	10.8	74.5
	0206056	2.68	4.05	0.35	1.99	1.11	1.76	1.50	608	1190	37.8	67.8	48.6	12.8	89.4
	0206057	2.45	3.42	0.25	1.62	3.81	2.03	1.20	442	989	35.2	75.1	42.7	11.6	77.3
	0206058	1.27	1.85	0.16	0.87	3.61	0.90	0.60	241	1030	14.1	35.6	22.2	6.1	38.8
Nordfjord	0206059	0.66	0.88	0.04	0.84	22.40	1.24	0.36	196	536	7.5	36.6	12.8	4.0	18.7
	0206061	1.97	2.45	0.12	1.26	11.10	1.83	0.99	362	706	22.7	74.6	33.6	9.3	52.4
	0206062	2.53	3.33	0.24	1.58	2.05	2.08	1.33	414	936	25.7	81.5	36.4	11.4	69.1
	0206063	2.90	3.79	0.23	1.69	4.22	1.78	1.47	671	922	32.8	105.0	43.2	14.3	80.1
	0206064	2.66	3.44	0.20	1.56	5.52	1.73	1.36	588	851	28.7	93.3	41.6	14.3	71.1
	0206065	2.64	3.29	0.17	1.57	8.14	2.01	1.32	679	774	31.9	105.0	42.9	13.7	69.3
	0206066	2.93	3.58	0.22	1.79	5.51	2.81	1.59	537	791	33.3	106.0	44.6	13.8	82.2
	0206068	2.18	2.84	0.27	1.59	3.15	2.39	1.01	366	850	23.9	63.0	36.5	7.8	55.9
	0206069	2.63	3.76	0.33	1.80	0.92	1.81	1.66	492	1210	24.7	96.0	36.8	11.0	73.2
	0206070	2.99	4.09	0.28	1.80	1.81	1.47	1.72	528	933	26.3	92.0	39.3	13.8	76.2
	0206071	2.59	3.46	0.27	1.78	1.82	1.74	1.33	424	774	28.1	75.9	44.3	11.7	72.5
	0206072	3.22	4.34	0.40	2.20	0.96	1.76	2.18	676	1010	37.1	101.0	39.9	13.1	97.2
	0206073	3.46	4.96	0.41	2.46	1.08	2.31	2.38	1250	985	41.0	119.0	43.4	15.2	126.0
	0206076	2.40	3.44	0.31	1.63	0.84	1.21	1.59	681	1220	26.7	81.6	31.0	11.4	87.5
	0206077	3.64	5.14	0.39	2.65	1.40	2.74	2.43	3400	846	43.9	115.0	53.7	18.2	165.0
	0206078	3.42	4.73	0.35	2.47	1.41	2.86	2.23	2340	824	40.9	115.0	50.7	17.4	153.0
	0206079	1.86	2.43	0.21	1.24	1.13	1.37	1.06	382	723	21.4	57.6	25.7	9.0	63.3
Førdefjord	0206081	1.69	3.45	0.28	1.29	0.99	1.71	1.02	631	1260	17.9	94.0	19.5	8.9	91.4
	0206083	1.95	3.50	0.30	1.51	1.12	2.39	1.13	574	1090	24.0	103.0	24.0	9.9	113.0
	0206084	2.49	5.34	0.33	1.87	1.35	2.07	1.53	1610	1220	25.4	127.0	32.8	17.0	137.0
	0206085	2.47	4.97	0.31	1.85	2.27	2.23	1.51	1510	1070	27.3	126.0	34.5	16.1	120.0
	0206086	2.20	3.30	0.24	1.42	3.66	1.62	1.31	566	1020	20.5	93.3	30.3	10.5	64.8
	0206088	2.31	3.42	0.24	1.49	3.65	1.71	1.35	575	1010	23.2	104.0	31.0	10.7	64.0
	0206090	2.35	3.39	0.22	1.48	4.63	1.88	1.36	551	990	22.6	96.5	32.1	10.6	67.9

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	STATION	Mo	Cr	Ba	Sr	Zr	Ag	B	Be	Li	Sc	Ce	La
		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
		ICP-AES											
Langfjord	0206001	<1	32.8	100	44	4.8	<1	19.1	5.2	22.4	6.0	66.3	30.0
	0206002	<1	45.9	119	58.5	6.2	<1	34.0	6.6	28.4	7.6	82.9	34.4
	0206003	<1	55.5	160	85.3	8.3	<1	41.7	8.9	36.6	8.9	93.9	38.1
	0206004	<1	60	173	96.6	9.3	<1	50.8	9.8	40.8	9.5	97.4	38.5
	0206007	<1	68.1	202	101	10.7	<1	48.2	10.7	43.1	10.7	101.0	40.5
Sunndalsfjord	0206009	<1	66	96.7	64.6	13.4	<1	16.1	6.7	29.2	5.9	60.4	23.3
	0206010	<1	70.7	109	55.4	14.6	<1	15.3	7.1	30.5	6.3	62.9	25.4
	0206012	<1	92	136	63.1	19.3	<1	17.0	9.0	38.7	8.1	75.7	29.8
	0206013	<1	83	129	62.2	17.7	<1	16.8	8.3	35.8	7.4	74.3	28.8
	0206015	<1	96.5	151	65.4	19.8	<1	22.6	9.8	43.1	8.5	80.2	31.1
	0206016	<1	96.3	159	72.8	18.6	<1	39.4	10.5	46.0	9.0	87.5	33.0
	0206017	<1	106	175	73.9	21.9	<1	36.8	12.1	49.6	9.8	94.6	35.3
	0206018	<1	111	183	82.3	22.9	<1	38.7	12.2	52.5	10.1	102.0	37.9
	0206019	<1	87	169	81.7	17.7	<1	40.2	11.2	43.4	9.4	83.1	31.2
	0206021	<1	80.6	160	106	16.0	<1	46.5	10.6	40.0	9.3	86.3	31.8
	0206024	1.13	61.4	113	117	11.8	<1	51.2	7.5	33.2	7.2	78.0	29.4
	0206025	1.03	70.7	124	152	12.9	<1	58.3	8.4	38.4	8.2	88.6	32.1
	0206026	1.25	72.7	125	189	13.7	<1	68.2	8.8	38.4	8.7	94.4	33.3
	0206027	1.23	41.1	88.2	57	8.3	<1	30.1	6.5	29.1	6.4	72.8	29.9
Halsafjord	0206028	<1	104	98.7	81.3	15.6	<1	44.3	10.1	44.2	9.1	74.1	26.5
	0206029	<1	106	70.4	55.3	14.8	<1	30.5	9.6	39.4	7.9	52.1	20.2
	0206030	<1	65.5	107	110	11.4	<1	50.1	8.7	38.8	7.6	75.8	28.9
	0206031	<1	89.1	117	106	15.1	<1	54.6	10.4	46.2	9.2	85.9	31.2
	0206032	1.40	86.1	113	158	14.6	<1	58.1	10.1	43.2	8.6	81.7	28.3
	0206033	1.37	82.6	115	211	14.6	<1	65.8	10.1	43.4	8.8	85.9	29.2
	0206034	<1	72.1	106	266	13.2	<1	67.1	9.0	39.1	8.2	84.2	28.5
	0206037	<1	73.9	111	267	13.2	<1	71.0	9.1	40.0	8.4	88.9	29.6
	0206038	<1	30.3	44.7	292	5.7	<1	34.0	4.3	14.7	3.6	58.6	18.8
	0206039	<1	47.7	65.7	296	8.8	<1	53.8	5.8	25.9	6.4	85.9	27.4
	0206040	<1	40.1	82.9	498	7.6	<1	68.0	5.2	23.6	5.9	85.2	24.5
Storfjord	0206041	<1	31.3	117	501	5.6	<1	67.2	0.2	27.5	5.2	55.0	26.5
	0206044	<1	41.8	151	311	7.4	<1	76.7	<0.2	38.6	6.8	71.0	32.8
	0206045	<1	35.4	119	174	6.3	<1	54.1	<0.2	29.8	6.1	69.0	32.6
	0206046	<1	48.2	185	211	7.6	<1	75.4	<0.2	43.2	7.8	83.0	38.2
	0206047	<1	46.4	178	65.9	2.8	<1	35.7	<0.2	45.4	5.8	76.0	32.9
	0206048	<1	57.1	261	80.2	3.7	<1	39.2	<0.2	48.4	8.0	106.0	47.9
	0206049	<1	69.1	241	104	5.5	<1	54.0	<0.2	56.6	9.0	112.0	49.5
	0206052	<1	67.9	278	75	3.4	<1	37.5	<0.2	49.3	11.0	122.0	54.4
	0206053	<1	46.5	191	58.7	3.1	<1	29.4	<0.2	38.7	7.5	101.0	46.4
	0206056	<1	57.4	223	73.5	3.8	<1	38.2	<0.2	48.0	8.7	113.0	50.0
	0206057	<1	45.1	178	187	5.8	<1	60.4	<0.2	50.4	7.4	78.0	35.4
	0206058	<1	23.3	88.1	158	3.3	<1	30.8	<0.2	27.8	4.4	43.0	22.3
Nordfjord	0206059	<1	11.2	42.4	1240	2.3	<1	42.2	<0.2	11.8	1.7	38.0	18.4
	0206061	<1	33.2	125	567	6.3	<1	72.1	0.3	35.0	4.5	67.0	31.1
	0206062	<1	43.8	198	124	6.7	<1	66.1	<0.2	41.5	6.1	106.0	46.5
	0206063	<1	47.9	209	220	8.4	<1	82.8	<0.2	47.5	6.6	107.0	47.5
	0206064	<1	43.7	185	277	8.3	<1	80.4	0.2	47.3	6.0	94.0	42.8
	0206065	<1	43.7	168	408	8.2	<1	92.6	0.4	46.3	6.0	86.0	39.0
	0206066	<1	47.3	222	283	8.1	<1	85.1	0.2	51.6	6.4	106.0	47.4
	0206068	1.40	49	116	178	7.6	<1	71.0	<0.2	37.4	5.3	102.0	43.5
	0206069	<1	41.7	243	95.1	6.7	<1	51.5	<0.2	47.9	5.8	153.0	67.6
	0206070	<1	46.9	243	117	8.5	<1	65.8	<0.2	51.4	6.6	136.0	59.9
	0206071	<1	53.4	197	120	5.5	<1	56.6	<0.2	62.2	4.8	102.0	43.7
	0206072	<1	49.6	304	110	5.4	<1	40.9	<0.2	61.6	6.4	181.0	80.3
	0206073	<1	53.2	321	119	6.0	<1	50.7	<0.2	69.2	7.1	183.0	82.5
	0206076	<1	35.7	232	90.8	5.0	<1	39.6	<0.2	48.0	4.9	146.0	66.8
	0206077	<1	55.7	317	134	6.8	<1	61.9	<0.2	72.7	7.2	175.0	78.6
	0206078	<1	53.5	295	131	6.5	<1	62.9	<0.2	71.9	6.8	162.0	72.8
	0206079	<1	29.9	171	89.3	3.8	<1	39.3	<0.2	33.4	3.7	90.0	41.7
Førdefjord	0206081	<1	21	180	86.1	4.5	<1	47.7	<0.2	42.7	4.9	107.0	50.6
	0206083	<1	25.4	187	100	5.0	<1	73.2	<0.2	51.2	5.2	108.0	50.8
	0206084	<1	33.5	240	108	6.7	<1	73.1	<0.2	58.8	6.6	129.0	61.2
	0206085	<1	34.9	239	145	6.6	<1	70.5	<0.2	54.4	6.4	122.0	57.9
	0206086	<1	31.8	203	187	6.5	<1	55.5	<0.2	35.5	5.6	88.0	42.1
	0206088	<1	33.8	207	183	6.8	<1	59.4	<0.2	36.9	5.9	88.0	42.0
	0206090	<1	35.1	204	225	7.4	<1	63.9	<0.2	36.5	5.9	86.0	41.2

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	STATION	Y	Hg	As	Cd	Pb	Se	Sulphur	tot Karbon	TOC	C-carb
		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	[%]	[%]	[%]	[%]
		ICP-AES			AA				Leco		
Langfjord	0206001	12.8	< 0.01	4.1	0.12	8.6	1.6	0.161	1.350	1.2	0.2
	0206002	14.6	0.013	5.3	0.09	12	< 1	0.188	2.101	1.9	0.2
	0206003	16.5	0.020	13	0.17	15	< 1	0.226	2.158	1.8	0.4
	0206004	17.0	0.032	5.7	0.17	21	< 1	0.159	2.326	1.9	0.4
	0206007	17.6	0.019	14	0.20	15	< 1	0.288	2.215	1.8	0.4
Sunndalsfjord	0206009	11.8	0.014	3.6	0.11	10	< 1	0.144	1.203	0.9	0.3
	0206010	12.7	0.014	4.6	0.13	14	< 1	0.156	0.885	0.9	0.0
	0206012	15.0	0.013	4.7	0.10	15	< 1	0.082	0.941	0.9	0.1
	0206013	14.2	< 0.01	4.7	0.11	14	< 1	0.105	0.899	0.8	0.1
	0206015	14.9	0.011	6.2	0.13	15	< 1	0.100	1.111	1.0	0.1
	0206016	15.7	0.031	13	0.09	23	< 1	0.106	1.516	1.4	0.1
	0206017	16.9	0.027	9.9	0.12	22	< 1	0.127	1.404	1.3	0.1
	0206018	17.7	0.024	12	0.13	21	1.4	0.148	1.596	1.4	0.2
	0206019	15.3	0.037	6.3	0.12	27	< 1	0.112	1.475	1.3	0.1
	0206021	15.6	0.057	8.5	0.09	35	< 1	0.123	2.264	1.8	0.5
	0206024	14.3	0.033	8.9	0.16	34	< 1	0.291	3.110	2.5	0.6
	0206025	16.0	0.028	13	0.15	31	< 1	0.370	3.507	2.6	0.9
	0206026	17.1	0.026	14	0.17	34	< 1	0.537	4.534	3.1	1.4
	0206027	15.1	< 0.01	7.6	0.17	11	2.9	0.216	1.744	1.6	0.1
Halsafjord	0206028	16.2	0.023	9.5	0.11	26	2.2	0.195	2.099	1.7	0.4
	0206029	14.4	0.025	10	0.12	18	1.6	0.115	1.762	1.7	0.1
	0206030	16.0	0.017	13	0.16	27	2.2	0.237	2.647	2.0	0.6
	0206031	17.0	0.016	18	0.19	21	2.3	0.317	2.600	2.1	0.5
	0206032	17.0	0.023	18	0.18	29	2.5	0.346	3.149	2.1	1.0
	0206033	17.9	0.026	21	0.22	32	2.3	0.370	3.836	2.5	1.4
	0206034	16.9	0.027	20	0.21	31	2.4	0.424	4.451	2.5	1.9
	0206037	17.5	0.033	15	0.26	38	2.3	0.317	4.565	2.6	2.0
	0206038	8.8	0.020	5.7	0.08	19	1.6	0.067	2.264	0.9	1.4
	0206039	14.5	0.030	6.6	0.14	26	1.8	0.211	4.241	1.9	2.4
	0206040	13.9	0.055	6.7	0.15	43	2.5	0.237	6.313	2.9	3.4
Storfjord	0206041	12.1	0.035	4.2	0.12	36	2	0.205	5.134	2.5	2.6
	0206044	14.4	0.016	8.2	0.17	29	3.4	0.300	4.385	2.6	1.8
	0206045	13.7	0.016	8	0.09	18	1.8	0.186	2.491	1.5	1.0
	0206046	15.1	0.035	6.5	0.14	42	1.4	0.182	3.705	2.6	1.1
	0206047	9.2	0.010	6.1	0.07	11	1.2	0.132	1.461	1.4	0.0
	0206048	12.0	0.016	6.5	0.05	16	2.1	0.116	1.770	1.7	0.1
	0206049	15.4	0.020	11	0.14	18	1.4	0.202	2.126	1.8	0.3
	0206052	18.4	0.011	8.2	0.10	12	2	0.197	1.664	1.6	0.1
	0206053	13.2	0.016	4.8	0.07	13	< 1	0.097	1.310	1.3	0.0
	0206056	14.3	0.022	5.4	0.05	18	1.9	0.120	1.610	1.6	0.1
	0206057	14.1	0.036	6.2	0.06	32	2.4	0.174	3.315	2.4	0.9
	0206058	9.9	0.020	2.9	0.04	15	< 1	0.067	1.879	1.0	0.9
Nordfjord	0206059	7.8	0.023	3.9	0.19	18	< 1	0.194	7.675	1.0	6.7
	0206061	11.6	0.032	7.8	0.16	36	3	0.374	5.994	2.9	3.1
	0206062	13.8	0.027	7.4	0.12	32	1.9	0.262	3.006	2.6	0.4
	0206063	15.1	0.037	8.9	0.07	55	2.9	0.170	4.319	3.1	1.2
	0206064	14.0	0.031	9.2	0.12	55	3.1	0.256	4.267	2.8	1.5
	0206065	14.0	0.035	8.8	0.14	53	3.2	0.269	5.765	3.3	2.4
	0206066	14.5	0.038	9.1	0.13	54	2.9	0.360	4.743	3.0	1.8
	0206068	13.9	0.018	6.7	0.14	23	3.7	0.396	4.641	3.8	0.8
	0206069	16.2	< 0.01	6.1	0.11	25	3.5	0.150	2.164	2.1	0.1
	0206070	15.3	0.022	8	0.13	29	2.5	0.213	2.180	1.8	0.4
	0206071	11.9	0.016	13	0.14	20	1.8	0.387	2.914	2.5	0.4
	0206072	13.3	0.030	8.5	0.11	23	1.6	0.251	1.913	1.8	0.2
	0206073	14.2	0.023	6.7	0.14	27	2.4	0.181	2.001	1.8	0.2
	0206076	11.7	0.019	4.6	0.17	18	1.2	0.108	1.542	1.5	0.1
	0206077	14.5	0.021	7.7	0.51	26	3.3	0.239	2.487	2.1	0.3
	0206078	14.6	0.038	5.4	0.54	25	3.3	0.210	2.314	2.0	0.3
	0206079	9.4	0.021	6	0.14	20	2.7	0.161	2.173	2.1	0.1
Førdefjord	0206081	16.7	0.039	10	0.06	27	3	0.133	3.309	3.1	0.3
	0206083	17.1	0.049	12	0.17	42	4.4	0.275	5.385	5.1	0.3
	0206084	20.2	0.037	13	0.13	46	2.9	0.143	3.240	3.0	0.2
	0206085	19.2	0.043	14	0.13	43	3.6	0.218	3.702	3.0	0.7
	0206086	16.1	0.032	6.3	0.07	37	2.1	0.131	2.863	1.9	1.0
	0206088	16.4	0.042	4.4	0.13	45	1.7	0.116	3.169	2.3	0.9
	0206090	16.4	0.038	8.5	0.11	40	3.5	0.149	3.548	2.3	1.2

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	STATION	Al	Fe	Ti	Mg	Ca	Na	K	Mn	P	Cu	Zn	Ni	Co	V
		[%]	[%]	[%]	[%]	[%]	[%]	[%]	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
		ICP-AES													
	0206091	2.62	3.34	0.17	1.56	6.47	2.35	1.38	482	858	25.4	102.0	36.3	10.4	63.8
Sognefjord	0206092	2.66	3.23	0.15	1.43	5.53	2.34	1.26	449	840	21.3	90.4	35.0	11.3	56.4
	0206093	2.80	3.26	0.10	1.54	7.67	2.69	1.30	498	722	23.8	102.0	38.9	11.5	59.1
	0206094	0.83	0.98	0.05	0.76	22.40	1.80	0.40	110	522	11.4	39.9	16.7	3.2	25.5
	0206096	1.27	1.59	0.08	0.62	5.66	0.90	0.52	202	730	7.8	34.5	15.4	5.7	29.8
	0206099	1.23	1.61	0.09	0.58	5.73	0.89	0.52	203	807	7.2	33.2	15.1	5.6	28.5
	0206100	0.99	1.69	0.07	0.55	8.74	0.82	0.53	219	742	5.2	31.6	13.1	5.6	24.2
	0206101	1.46	1.96	0.07	0.80	10.90	1.28	0.68	368	689	9.3	47.5	20.5	7.2	34.2
	0206102	1.77	2.07	0.06	1.08	15.30	1.32	0.80	433	610	14.3	67.3	26.0	8.1	40.0
	0206103	2.09	2.56	0.09	1.28	10.30	3.81	1.07	541	950	27.2	85.8	37.2	8.1	67.2
	0206104	1.66	2.03	0.12	1.05	9.06	3.04	0.86	223	1050	25.1	88.3	26.4	5.4	47.6
	0206107	1.66	2.81	0.20	1.43	2.05	5.57	1.09	419	725	21.8	63.3	22.3	7.0	107.0
	0206108	0.84	1.24	0.15	0.50	0.97	0.57	0.44	197	848	4.6	27.9	8.8	3.5	23.4
	0206110	1.68	2.44	0.24	1.02	1.49	1.15	0.93	349	1010	15.2	73.4	18.4	6.6	43.9
	0206112	1.97	2.93	0.34	1.28	1.79	1.17	1.15	432	1470	12.6	67.5	20.7	7.2	54.5
	0206115	2.63	4.10	0.20	1.69	1.00	1.22	0.99	433	916	22.2	98.8	38.4	11.9	53.6
	0206116	2.36	3.45	0.35	1.58	1.99	1.28	1.18	471	1310	20.4	74.3	25.6	8.5	65.6
	0206117	3.09	4.43	0.41	1.96	0.90	1.26	2.11	737	1230	25.3	109.0	31.8	12.8	83.3
	0206118	2.38	3.43	0.35	1.60	0.81	1.08	1.60	605	1160	20.8	89.4	23.9	10.0	65.6
	0206119	3.29	4.79	0.46	2.17	0.90	1.31	2.40	777	1300	25.3	122.0	34.4	13.6	90.8
	0206120	3.51	5.39	0.53	2.51	0.97	1.74	2.72	806	1510	27.8	138.0	36.7	15.5	111.0
	0206121	2.67	4.20	0.45	1.97	0.99	1.23	1.98	650	1960	24.4	108.0	30.0	12.1	94.8
	0206123	3.17	4.07	0.37	1.94	1.77	2.40	1.90	565	1140	36.7	141.0	37.4	12.6	96.2
	0206124	3.90	5.62	0.44	2.47	0.97	2.77	2.64	1220	1010	38.9	150.0	41.2	18.9	164.0
	0206125	3.47	5.06	0.41	2.41	1.00	4.37	2.69	1000	898	32.8	133.0	35.8	17.4	117.0
	0206126	4.07	3.78	0.27	1.88	1.77	1.70	1.27	456	966	43.1	72.8	58.3	16.7	75.0
	0206127	5.55	6.09	0.42	2.63	3.04	1.36	0.47	632	1520	106.0	75.2	62.8	27.9	112.0
	0206128	3.04	3.55	0.27	1.79	1.55	1.68	0.91	363	1580	67.3	66.7	68.1	17.3	85.0
	0206129	3.95	3.42	0.26	2.00	1.83	2.14	0.81	353	992	53.6	67.6	75.5	16.4	66.9
	0206130	2.99	3.70	0.30	1.71	1.58	1.44	1.05	424	1970	56.9	61.5	53.4	17.2	84.9
	0206131	2.88	4.20	0.30	1.73	1.65	1.42	1.10	548	2490	62.4	80.1	52.3	19.7	97.3
	0206132	2.27	3.69	0.31	1.50	1.28	1.42	1.07	430	1880	40.8	104.0	28.9	12.2	78.9
	0206133	2.76	3.69	0.36	1.77	0.77	1.27	2.06	725	1060	29.9	98.5	27.1	10.9	75.5
	0206134	3.77	4.82	0.39	2.27	1.04	1.73	2.50	1450	944	44.9	122.0	42.6	16.6	109.0
	0206135	1.92	2.74	0.29	1.28	0.71	0.84	1.41	508	1200	21.6	70.2	21.1	8.3	56.2
	0206136	1.86	2.63	0.30	1.26	0.69	0.78	1.38	475	1130	20.6	64.7	21.6	7.7	54.2
	0206139	3.51	4.75	0.39	2.25	0.84	1.73	2.48	961	938	42.1	126.0	35.0	15.8	104.0
	0206140	3.17	4.21	0.33	2.07	0.69	1.33	1.96	666	847	42.9	110.0	32.9	14.0	81.0
	0206141	2.41	2.92	0.26	1.33	1.34	1.37	0.91	361	1270	72.8	70.0	30.9	11.2	67.7
	0206142	2.54	3.38	0.29	1.54	1.07	1.55	1.27	464	1200	58.0	82.8	30.3	12.3	79.0
	0206143	3.15	3.62	0.30	1.75	1.18	1.78	1.50	494	1060	51.8	86.1	36.5	13.5	81.6
Boknafjord	0206145	3.12	3.41	0.05	1.40	5.10	2.21	1.34	333	593	18.4	105.0	35.8	12.1	80.2
	0206150	2.97	3.43	0.05	1.39	5.02	2.43	1.30	380	675	18.2	103.0	35.6	11.4	78.7
	0206152	2.75	3.10	0.09	1.39	4.78	1.41	1.22	372	511	16.3	75.7	31.8	10.6	61.1
	0206156	3.29	3.57	0.05	1.48	4.84	2.66	1.44	399	609	22.5	127.0	39.7	13.4	92.4
	0206158	3.18	3.54	0.05	1.48	4.83	2.80	1.43	372	617	22.6	124.0	38.0	12.6	91.4

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	STATION	Mo	Cr	Ba	Sr	Zr	Ag	B	Be	Li	Sc	Ce	La
		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
		ICP-AES											
	0206091	<1	41.3	177	298	9.3	<1	80.7	0.4	41.3	6.2	75.0	36.3
Sognefjord	0206092	<1	36.8	140	256	10.0	<1	73.6	0.4	42.1	6.1	75.0	35.1
	0206093	<1	41.5	116	360	10.8	<1	90.2	0.8	47.9	6.4	60.0	28.7
	0206094	<1	14.4	32.9	1220	3.0	<1	54.5	<0.2	14.0	2.2	36.0	18.7
	0206096	<1	18.4	50	240	6.3	<1	42.5	0.2	17.9	3.1	42.0	19.2
	0206099	<1	16.4	51.8	229	6.0	<1	39.7	<0.2	15.8	2.9	44.0	20.5
	0206100	<1	15	44.4	347	6.1	<1	50.0	0.2	13.6	2.6	36.0	17.4
	0206101	<1	21.4	56.7	471	7.1	<1	56.7	0.4	23.0	3.6	44.0	20.7
	0206102	<1	26.5	60	780	7.6	<1	66.1	0.5	31.3	4.2	46.0	21.7
	0206103	4.10	35.7	114	519	7.2	<1	114.0	0.5	34.8	5.0	61.0	29.9
	0206104	<1	28.7	93.5	404	5.3	<1	89.4	0.2	28.2	4.2	72.0	33.6
	0206107	24.10	25.3	147	153	4.4	<1	87.0	<0.2	35.3	4.3	81.0	38.5
	0206108	<1	9.5	55.5	46.6	4.4	<1	14.6	<0.2	19.9	2.9	67.0	29.7
	0206110	<1	20.7	154	89.7	5.1	<1	32.5	<0.2	42.5	4.7	97.0	42.0
	0206112	<1	25.4	206	82.9	21.7	<1	38.2	<0.2	50.7	6.7	106.0	48.1
	0206115	<1	36.6	105	70.8	21.4	<1	29.4	<0.2	71.5	4.5	100.0	45.4
	0206116	3.20	26.3	240	147	4.8	<1	34.6	<0.2	67.3	4.6	104.0	52.5
	0206117	<1	29.9	347	97	8.6	<1	34.0	<0.2	61.2	6.4	158.0	76.0
	0206118	<1	22.9	288	84.3	6.8	<1	26.0	<0.2	56.2	5.5	129.0	61.9
	0206119	<1	31.1	410	101	8.1	<1	33.2	<0.2	63.2	6.6	164.0	79.9
	0206120	<1	32	585	113	7.9	<1	33.2	<0.2	65.4	7.2	187.0	92.3
	0206121	<1	25.4	463	108	6.4	<1	23.1	<0.2	53.1	6.1	153.0	75.4
	0206123	<1	32	312	151	6.4	<1	52.3	<0.2	71.1	5.5	151.0	73.9
	0206124	<1	34.7	417	145	8.1	<1	58.7	<0.2	83.8	6.7	204.0	99.9
	0206125	24.40	28.2	409	153	7.1	<1	52.2	<0.2	68.7	6.2	221.0	103.0
	0206126	<1	33.5	264	157	7.0	<1	38.2	<0.2	60.0	5.4	85.0	40.0
	0206127	<1	51.8	91.4	193	6.7	<1	23.9	<0.2	33.6	11.5	36.0	18.1
	0206128	<1	46.3	295	117	3.1	<1	37.8	<0.2	46.8	5.8	49.0	24.3
	0206129	<1	37.7	194	172	2.5	<1	48.6	<0.2	51.3	5.1	41.0	21.3
	0206130	<1	39.7	376	111	4.6	<1	37.8	<0.2	52.7	5.9	58.0	28.1
	0206131	<1	39.2	391	105	6.6	<1	30.6	<0.2	47.4	6.4	65.0	31.6
	0206132	<1	25.3	257	133	7.6	<1	33.1	<0.2	44.2	5.1	88.0	45.4
	0206133	<1	32.3	253	101	8.1	<1	17.1	<0.2	55.0	5.9	183.0	82.8
	0206134	<1	36.2	346	128	9.1	<1	36.2	<0.2	76.6	7.0	206.0	92.7
	0206135	<1	25.2	176	81	7.1	<1	15.0	<0.2	39.0	4.6	143.0	66.0
	0206136	<1	26.6	165	81.3	7.1	<1	11.1	<0.2	37.1	4.6	136.0	62.5
	0206139	<1	38.2	289	107	11.2	<1	29.4	<0.2	82.4	6.7	209.0	95.0
	0206140	<1	40.2	214	78	12.6	<1	24.0	<0.2	87.8	5.9	163.0	75.5
	0206141	<1	28.8	202	110	3.9	<1	30.7	<0.2	49.1	5.1	74.0	35.0
	0206142	<1	30.6	239	102	5.5	<1	32.7	<0.2	50.2	6.0	103.0	48.7
	0206143	<1	32.8	254	120	6.2	<1	37.2	<0.2	60.8	6.0	126.0	57.9
Boknafjord	0206145	<1	44.9	89.1	196	14.4	<1	84.6	1.2	59.0	6.7	54.0	24.8
	0206150	<1	43.1	109	194	13.7	<1	83.1	1.1	56.4	6.4	53.0	24.3
	0206152	<1	36.6	84.8	161	20.9	<1	60.1	0.8	50.2	6.4	64.0	30.0
	0206156	<1	47	123	197	14.7	<1	91.0	1.2	62.9	6.9	57.0	26.0
	0206158	<1	46.5	184	201	14.4	<1	91.1	1.2	62.6	6.9	56.0	25.7

	STATION	Y	Hg	As	Cd	Pb	Se	Sulphur	tot Karbon	TOC	C-carb
		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	[%]	[%]	[%]	[%]
		ICP-AES			AA				Leco		
	0206091	15.6	0.046	< 1	< 0.02	1.9	< 1	0.220	4.610	2.8	1.8
Sognefjord	0206092	14.5	0.052	5	0.08	53	2.1	0.151	3.357	1.9	1.5
	0206093	14.3	0.052	5.9	0.07	51	2.5	0.206	4.743	2.5	2.3
	0206094	9.1	0.028	8.9	0.27	29	3.7	0.325	9.067	2.3	6.8
	0206096	10.7	< 0.01	4.4	0.06	14	1.2	0.109	2.349	0.8	1.5
	0206099	10.7	< 0.01	3.9	0.05	15	1.5	0.081	2.259	0.7	1.6
	0206100	9.8	< 0.01	4.2	0.10	23	< 1	0.048	3.081	0.6	2.5
	0206101	11.0	< 0.01	3.9	0.11	23	1.6	0.087	4.192	1.0	3.2
	0206102	11.9	< 0.01	5.1	0.12	44	1.8	0.129	6.159	1.6	4.5
	0206103	14.5	< 0.01	19	0.26	58	7.4	0.819	8.918	5.7	3.2
	0206104	14.1	< 0.01	8.9	0.10	56	4.9	0.345	6.973	4.3	2.6
	0206107	12.8	< 0.01	20	1.60	30	5.4	1.712	6.600	6.0	0.6
	0206108	14.7	< 0.01	2.5	0.02	9.7	< 1	0.066	0.600	0.5	0.1
	0206110	15.3	0.014	3.3	0.04	27	2.1	0.092	1.929	1.6	0.3
	0206112	18.5	0.019	< 1	< 0.02	0.51	< 1	< 0.01	< 0.07	1.1	0.0
	0206115	15.9	0.021	5.4	0.03	28	1.2	0.096	1.661	1.5	0.2
	0206116	14.2	0.026	8.6	0.11	18	1.9	0.519	2.701	2.2	0.5
	0206117	17.8	0.015	6.9	0.08	24	< 1	0.130	1.058	1.0	0.1
	0206118	16.9	0.014	3.5	0.08	23	1.4	0.069	0.959	0.9	0.0
	0206119	17.4	0.019	3.8	< 0.02	25	< 1	0.074	1.016	1.0	0.1
	0206120	17.3	< 0.01	5.5	0.04	28	< 1	0.096	1.210	1.1	0.1
	0206121	16.1	0.026	5.1	0.05	22	1.5	0.091	1.082	1.0	0.1
	0206123	14.0	0.001	7.8	0.12	31	2.7	0.228	3.009	2.8	0.2
	0206124	15.7	0.029	12	0.24	33	2.7	0.283	2.706	2.7	0.0
	0206125	13.1	0.022	9.9	0.72	22	2.7	1.413	3.194	3.0	0.1
	0206126	11.7	0.017	7.4	0.24	20	1.7	0.133	1.318	1.2	0.1
	0206127	14.5	0.017	3.4	0.15	31	1.9	0.064	0.712	0.6	0.1
	0206128	11.0	0.035	4.7	0.02	20	2.3	0.109	1.876	1.8	0.1
	0206129	9.8	0.057	6.8	0.05	16	2	0.213	2.603	2.5	0.1
	0206130	11.6	0.022	8.3	0.18	14	2.4	0.184	1.699	1.6	0.1
	0206131	13.6	0.044	7.2	0.13	22	1.4	0.104	1.370	1.3	0.1
	0206132	17.1	0.046	5.8	0.15	22	1.2	0.238	1.830	1.8	0.1
	0206133	15.8	0.021	3.3	0.09	17	< 1	0.091	1.029	0.9	0.1
	0206134	15.1	0.024	4.8	0.16	24	2.5	0.059	0.461	0.4	0.0
	0206135	15.5	0.012	1.5	0.09	12	< 1	0.049	0.421	0.4	0.0
	0206136	15.8	0.010	1.2	0.06	11	< 1	0.043	0.383	0.3	0.1
	0206139	16.9	0.023	5	0.11	21	< 1	0.076	0.797	0.7	0.1
	0206140	17.6	0.022	5.5	0.10	20	< 1	0.072	0.983	0.9	0.1
	0206141	12.7	0.031	4.2	0.06	12	< 1	0.062	1.469	1.3	0.1
	0206142	13.2	0.031	4.1	0.07	18	1.1	0.084	1.215	1.2	0.0
	0206143	13.1	0.030	5	0.03	20	1.7	0.088	1.475	1.4	0.0
Boknafjord	0206145	12.9	0.056	7.1	0.09	52	2.1	0.159	3.483	1.9	1.6
	0206150	12.7	0.062	11	0.14	62	2.2	0.123	3.334	1.9	1.5
	0206152	14.8	0.020	7	0.14	16	1.3	0.315	2.188	0.8	1.4
	0206156	13.6	0.084	7.5	0.13	66	1.9	0.147	3.696	2.3	1.4
	0206158	13.4	0.065	8	0.08	70	2.9	0.173	3.678	2.3	1.4

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Table 7. Elementary composition and TOC of the samples from the lower end of the core

	STATION	interval/ depth, cm	Al [%]	Fe [%]	Ti [%]	Mg [%]	Ca [%]	Na [%]	K [%]	Mn mg/kg	P mg/kg	Cu mg/kg	Zn mg/kg	Ni mg/kg	Co mg/kg	V mg/kg
			ICP-AES													
Langfjord	0206001	35	1.90	2.76	0.24	1.18	0.97	0.81	0.80	495	1060	22.0	54.2	24.4	10.9	65.2
	0206002	50	2.51	3.49	0.28	1.46	1.22	1.17	0.95	567	1030	27.5	68.7	30.1	13.2	79.8
	0206003	40	3.14	5.08	0.29	1.93	1.48	1.57	1.34	1390	904	36.2	90.6	43.5	18.8	127.0
	0206004	50	3.21	5.00	0.27	1.93	1.63	1.68	1.34	1660	860	36.1	89.5	46.4	19.0	123.0
	0206007	40	2.90	3.97	0.23	1.60	1.91	1.37	1.14	743	881	31.9	76.9	38.9	15.8	105.0
Sunndalsfjord	0206009	14	2.19	2.80	0.19	1.36	0.55	0.59	0.71	384	907	30.0	59.0	35.3	14.9	61.7
	0206010	20	2.17	2.74	0.19	1.33	0.58	0.59	0.71	378	935	28.4	54.1	35.0	14.3	60.8
	0206012	18	3.11	3.87	0.25	1.89	0.76	0.84	0.98	519	868	38.2	74.6	50.0	19.2	90.5
	0206013	27	2.75	3.38	0.23	1.59	0.70	0.68	0.86	472	932	35.3	65.5	41.7	16.7	75.7
	0206015	20	3.39	4.81	0.29	2.47	0.76	0.89	1.39	663	760	59.7	90.3	70.8	24.6	115.0
	0206016	50	3.36	4.63	0.27	2.21	1.02	1.11	1.26	657	751	38.9	88.8	57.4	20.6	115.0
	0206017	25	3.65	5.46	0.28	2.34	1.10	1.13	1.40	929	744	40.1	97.2	60.7	24.7	130.0
	0206018	30	3.70	5.42	0.26	2.33	1.48	1.26	1.42	1050	745	40.5	101.0	63.3	25.5	136.0
	0206019	37	3.79	5.41	0.27	2.28	1.71	1.37	1.42	941	715	38.3	99.4	59.7	24.2	132.0
	0206021	40	3.50	4.76	0.25	2.00	2.13	1.38	1.27	679	760	34.3	92.1	53.4	21.2	111.0
	0206024	50	2.66	3.32	0.19	1.51	2.84	1.57	0.95	450	763	28.8	71.5	41.7	13.8	88.4
	0206025	40	2.68	3.32	0.19	1.49	3.19	1.46	0.94	455	806	30.0	72.0	39.5	13.8	92.9
	0206026	30	2.87	3.49	0.19	1.59	3.70	1.67	1.01	467	803	32.7	80.3	43.7	14.3	94.4
	0206027	40	2.64	3.45	0.22	1.45	0.96	1.05	0.86	450	789	26.7	76.5	35.1	13.7	77.1
Halsafjord	0206028	30	3.07	4.53	0.27	2.08	1.36	0.88	0.88	513	670	28.4	79.3	57.7	18.5	97.4
	0206029	40	2.92	4.77	0.29	2.06	0.95	0.88	0.61	491	728	31.7	72.0	61.3	19.4	120.0
	0206030	40	3.17	4.76	0.24	1.98	2.66	1.45	1.09	578	694	33.2	89.3	50.0	19.1	120.0
	0206031	35	3.39	4.77	0.26	2.07	2.07	1.19	1.09	544	714	31.9	89.9	55.1	18.1	106.0
	0206032	35	3.30	4.89	0.24	2.12	3.31	1.40	1.08	597	680	33.7	90.4	56.3	19.6	122.0
	0206033	30	3.15	4.51	0.21	1.86	3.46	1.44	1.00	571	693	31.6	83.5	49.4	17.7	115.0
	0206034	40	2.82	3.66	0.18	1.58	6.84	1.38	0.90	487	677	27.8	75.3	44.0	14.9	91.4
	0206037	40	3.18	4.13	0.19	1.75	6.91	1.61	1.00	525	713	30.1	81.3	48.2	16.2	98.0
	0206038	14	1.32	1.85	0.08	0.69	3.56	0.64	0.43	246	531	10.0	35.2	16.7	8.4	45.2
	0206039	40	2.29	2.71	0.15	1.15	7.72	0.93	0.70	330	757	17.8	54.5	31.1	10.6	58.1
	0206040	50	1.98	2.18	0.12	1.06	11.60	1.33	0.62	288	744	18.8	49.3	27.2	8.2	51.2
Storfjord	0206041	48	1.81	2.43	0.14	1.11	9.56	1.23	0.87	319	904	14.4	44.5	28.8	7.7	43.7
	0206044	29	2.37	3.11	0.18	1.36	6.54	1.41	1.15	385	901	21.0	59.8	36.4	10.2	60.6
	0206045	23	2.80	3.87	0.29	1.71	3.28	0.96	1.55	615	905	23.6	62.6	39.8	14.5	78.2
	0206046	20	2.73	3.75	0.22	1.59	4.52	1.43	1.34	558	930	28.1	67.8	42.7	13.3	82.1
	0206047	30	2.35	3.76	0.33	1.68	0.99	0.91	1.54	535	1120	26.7	56.7	38.2	12.4	73.2
	0206048	30	2.17	3.33	0.29	1.64	1.02	1.06	1.29	473	1160	24.8	48.5	41.6	11.3	66.4
	0206049	25	3.05	4.68	0.34	2.13	1.79	1.33	1.71	910	1020	34.9	71.7	62.1	17.2	104.0
	0206052	27	2.86	4.40	0.41	2.12	1.50	1.26	1.77	700	1270	56.6	57.8	52.9	14.8	92.2
	0206053	50	2.09	3.05	0.30	1.48	1.04	1.07	1.13	481	1310	25.2	42.9	35.2	10.1	65.6
	0206056	30	2.58	3.89	0.34	1.76	1.17	1.12	1.42	599	1150	29.7	53.6	40.3	12.3	79.8
	0206057	30	2.65	3.50	0.23	1.56	4.45	1.39	1.26	440	863	29.0	62.0	42.8	11.3	75.3
	0206058	30	1.15	1.71	0.16	0.78	3.00	0.59	0.55	247	952	9.4	25.6	19.9	5.9	33.9
Nordfjord	0206059	20	0.79	0.97	0.05	0.84	20.40	1.09	0.42	205	491	6.7	27.1	15.3	4.2	17.9
	0206061	30	1.80	2.17	0.11	1.09	11.40	1.25	0.91	336	724	15.2	52.4	29.2	8.5	42.0
	0206062	48	2.33	3.13	0.23	1.36	2.00	0.97	1.20	419	880	15.8	56.7	32.2	12.6	56.4
	0206063	18	2.74	3.50	0.22	1.62	4.09	1.56	1.48	506	819	26.4	85.4	40.0	13.5	71.7
	0206064	20	2.66	3.27	0.18	1.51	5.40	1.51	1.38	525	783	23.9	78.5	38.8	14.2	67.6
	0206065	29	2.55	3.02	0.14	1.43	7.65	1.64	1.30	396	703	23.3	75.2	40.1	12.6	62.4
	0206066	40	2.83	3.32	0.18	1.61	5.13	1.70	1.50	520	773	24.9	84.4	41.4	14.0	70.0
	0206068	58	1.62	2.11	0.23	1.15	2.42	1.57	0.72	296	894	16.3	45.7	29.9	6.1	40.8
	0206069	30	2.28	3.29	0.28	1.46	0.88	1.13	1.43	453	1250	16.1	76.1	30.2	10.1	59.3
	0206070	27	2.47	3.32	0.23	1.44	1.39	1.07	1.42	441	963	17.2	74.6	32.1	13.0	56.8
	0206071	40	2.60	3.32	0.24	1.69	1.59	1.33	1.34	433	819	24.2	72.7	41.4	12.2	61.5
	0206072	60	2.25	3.13	0.31	1.46	0.80	0.98	1.46	490	1170	18.9	64.5	29.0	9.6	62.9
	0206073	48	3.11	4.31	0.36	2.10	0.99	1.43	2.11	1400	940	29.1	96.7	41.0	14.7	104.0
	0206076	30	3.09	4.17	0.35	1.99	0.90	1.22	2.02	1010	1020	28.5	93.2	38.4	14.4	95.5
	0206077	40	3.13	4.22	0.33	2.08	1.15	1.77	2.10	1610	937	29.8	98.7	45.5	16.1	118.0
	0206078	70	2.81	3.78	0.36	1.87	1.00	1.48	1.97	995	1090	25.3	82.8	33.5	12.7	78.1
	0206079	20	1.59	1.87	0.17	0.93	0.93	0.86	0.81	324	760	15.1	41.3	21.9	7.6	44.9
Førdefjord	0206081	30	2.05	4.12	0.32	1.42	0.94	1.26	1.24	791	1200	15.6	85.7	22.5	11.6	114.0
	0206083	20	2.09	3.72	0.31	1.44	0.84	1.41	1.20	651	1060	18.1	90.2	24.1	10.6	109.0
	0206084	40	2.43	4.39	0.32	1.66	1.04	1.28	1.56	1310	1090	17.5	100.0	29.7	14.6	84.9
	0206085	20	2.57	4.71	0.31	1.76	1.93	1.51	1.57	1490	1120	21.7	108.0	34.3	16.3	111.0
	0206086	27	2.44	3.40	0.24	1.46	3.15	1.25	1.45	698	970	15.0	87.2	29.5	12.1	62.3
	0206088	28	2.25	3.23	0.26	1.39	2.79	0.99	1.37	644	1080	16.8	83.7	27.4	11.4	59.4
	0206090	20	2.38	3.22	0.22	1.41	4.02	1.48	1.36	589	992	17.1	85.2	30.4	10.8	66.3

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	STATION	interval/ depth, cm	Mo	Cr	Ba	Sr	Zr	Ag	B	Be	Li	Sc	Ce	La
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
			ICP-AES											
Langfjord	0206001	35	<1	39.8	123	46.3	6.3	<1	<5	4.7	22.4	7.2	74.5	33.3
	0206002	50	<1	53.8	139	61.4	8.0	<1	19.7	5.8	30.6	8.7	93.4	39.6
	0206003	40	<1	66.5	198	81.3	10.5	<1	50.1	8.3	41.0	9.9	104.0	43.0
	0206004	50	1.45	65.8	192	89.1	10.3	<1	56.9	8.4	42.0	9.5	99.7	40.9
	0206007	40	<1	59.4	166	93.1	9.2	<1	44.1	6.8	34.5	8.4	92.6	38.5
Sunndalsfjord	0206009	14	1.67	61.2	98.4	41.6	12.0	<1	11.3	5.2	28.2	5.2	55.5	23.7
	0206010	20	<1	62.5	97.2	42.1	12.6	<1	<5	5.0	27.5	5.3	54.9	23.5
	0206012	18	<1	93	132	57.5	18.6	<1	<5	6.9	35.8	7.5	75.0	30.9
	0206013	27	1.74	72.7	117	54	14.5	<1	<5	6.0	32.4	6.3	67.6	28.3
	0206015	20	<1	126	192	58.9	26.2	<1	17.1	8.8	42.6	9.3	99.5	38.2
	0206016	50	<1	105	163	66.2	20.7	<1	29.3	8.3	44.5	8.9	90.5	34.9
	0206017	25	<1	111	177	70.7	23.7	<1	31.8	9.5	45.8	9.5	95.3	37.1
	0206018	30	<1	109	177	81.8	22.5	<1	40.3	9.6	46.6	9.7	98.6	37.2
	0206019	37	<1	105	173	90.6	22.2	<1	44.2	9.5	45.8	10.2	101.0	38.1
	0206021	40	<1	89.9	154	101	19.6	<1	46.5	8.4	42.0	9.8	103.0	39.5
	0206024	50	1.40	67.3	114	127	13.1	<1	46.7	6.0	32.3	7.6	85.6	32.1
	0206025	40	1.36	68.5	116	138	12.8	<1	44.5	5.9	32.9	7.6	87.4	31.6
	0206026	30	2.96	71.9	116	182	12.8	<1	57.4	6.2	34.7	8.2	95.6	34.5
	0206027	40	<1	57.4	99.5	53.1	10.6	<1	34.0	5.9	35.4	6.7	79.3	32.2
Halsafjord	0206028	30	<1	104	96.5	67	17.1	<1	34.5	8.1	39.5	8.4	67.8	25.4
	0206029	40	<1	112	70.7	53.9	16.3	<1	21.9	8.4	36.2	7.6	54.1	19.1
	0206030	40	<1	84.5	121	125	15.0	<1	52.0	8.7	42.7	8.4	88.2	30.6
	0206031	35	1.34	95.2	118	98.8	16.8	<1	47.8	8.7	43.3	8.9	85.7	31.3
	0206032	35	<1	95	121	161	16.9	<1	51.7	8.7	44.1	8.8	86.5	29.6
	0206033	30	<1	82.2	108	192	14.9	<1	58.7	8.1	39.6	8.3	86.9	28.5
	0206034	40	<1	69	97.2	237	12.6	<1	54.1	7.0	35.6	7.4	85.6	27.3
	0206037	40	1.21	75.9	107	250	14.2	<1	59.9	7.9	37.9	8.2	89.6	28.8
	0206038	14	<1	31.2	41.1	209	6.1	<1	26.1	3.8	14.2	3.7	61.1	17.7
	0206039	40	<1	49.6	68.1	264	11.4	<1	39.6	5.4	25.2	6.5	92.9	29.4
	0206040	50	2.68	40.8	61	484	8.8	<1	50.2	4.5	22.0	5.7	90.7	25.6
Storfjord	0206041	48	<1	31.5	95.6	454	6.3	<10	57.5	0.2	25.9	5.4	58.0	27.1
	0206044	29	<1	42.9	133	279	7.7	<10	68.4	0.3	36.3	7.0	70.0	31.7
	0206045	23	<1	49.1	184	135	11.2	<10	41.4	<0.2	36.8	9.3	86.0	40.3
	0206046	20	<1	48.8	175	200	7.9	<10	67.4	<0.2	41.4	8.0	82.0	36.8
	0206047	30	<1	54.3	239	62.7	3.7	<10	30.1	<0.2	38.5	7.6	95.0	43.2
	0206048	30	<1	55	204	62.2	3.7	<10	33.5	<0.2	36.2	6.8	86.0	38.6
	0206049	25	<1	65.4	230	97.9	6.2	<10	50.7	<0.2	50.9	9.6	116.0	50.0
	0206052	27	<1	60.4	248	78.8	3.3	<10	29.5	<0.2	40.3	10.5	108.0	47.5
	0206053	50	<1	45.4	172	60.5	3.5	<10	29.0	<0.2	39.4	7.2	102.0	46.3
	0206056	30	<1	54.2	208	67.2	4.3	<10	34.8	<0.2	42.8	8.7	112.0	48.7
	0206057	30	<1	48.6	167	203	7.0	<10	63.2	<0.2	47.2	7.7	78.0	33.9
	0206058	30	<1	21.7	80.8	125	3.3	<10	21.4	<0.2	24.3	4.2	42.0	21.8
Nordfjord	0206059	20	<1	13.4	42.9	1120	2.8	<10	39.3	<0.2	13.5	2.0	40.0	19.9
	0206061	30	<1	32.1	109	557	6.1	<10	57.6	0.3	28.6	4.3	64.0	30.1
	0206062	48	<1	38	179	107	7.1	<10	39.5	<0.2	33.0	5.9	98.0	43.8
	0206063	18	<1	46.7	200	207	8.0	<10	72.7	0.2	43.9	6.2	104.0	45.5
	0206064	20	<1	44.7	174	271	8.3	<10	72.4	0.3	43.8	6.0	94.0	42.0
	0206065	29	1.00	43.6	151	383	8.2	<10	74.0	0.4	42.5	5.7	81.0	36.9
	0206066	40	<1	47	218	258	8.6	<10	73.8	0.4	46.5	6.3	103.0	44.8
	0206068	58	1.70	43	96	138	7.4	<10	55.1	<0.2	25.1	4.8	90.0	38.2
	0206069	30	<1	37.4	229	82.7	6.4	<10	42.1	<0.2	38.0	5.3	142.0	62.4
	0206070	27	<1	40.3	210	93.1	7.7	<10	52.9	<0.2	39.6	5.7	123.0	53.4
	0206071	40	1.40	55.6	213	105	6.4	<10	51.6	<0.2	54.5	5.1	113.0	47.3
	0206072	60	<1	36.6	228	87.9	5.6	<10	34.7	<0.2	40.3	5.1	161.0	71.0
	0206073	48	<1	49.9	318	105	6.5	<10	54.0	<0.2	56.8	6.8	181.0	80.4
	0206076	30	<1	47.7	290	102	6.6	<10	47.8	<0.2	58.6	6.4	179.0	78.2
	0206077	40	<1	49.1	325	113	7.1	<10	56.8	<0.2	54.4	6.8	171.0	76.3
	0206078	70	<1	42.1	288	105	6.4	<10	42.9	<0.2	43.2	6.4	172.0	78.3
	0206079	20	<1	25.5	142	73.7	3.3	<10	25.6	<0.2	24.8	3.3	76.0	34.6
Førdefjord	0206081	30	<1	23.4	229	82.2	5.2	<10	47.2	<0.2	43.3	6.0	120.0	56.1
	0206083	20	<1	26	215	81.6	5.4	<10	58.1	<0.2	46.9	5.7	115.0	53.4
	0206084	40	<1	31	257	86.7	6.6	<10	44.2	<0.2	45.4	6.4	130.0	59.9
	0206085	20	<1	35.4	255	129	6.9	<10	63.0	<0.2	49.3	6.6	129.0	59.2
	0206086	27	<1	33	205	158	7.1	<10	49.1	<0.2	34.8	6.0	93.0	42.3
	0206088	28	<1	28.7	227	149	6.2	<10	41.1	<0.2	31.3	5.6	89.0	42.0
	0206090	20	<1	34.4	212	201	7.3	<10	58.0	<0.2	33.0	5.9	87.0	41.0

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	STATION	interval/	Y	Hg	As	Cd	Pb	Se	Sulphur	tot Karbon	TOC	C-carb
		depth, cm	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	[%]	[%]	[%]	[%]
			ICP-AES			AA				Leco		
Langfjord	0206001	22	14.6	0.003	1.34	0.09	4	< 1	0.226	0.949	0.9	0.1
	0206002	27.5	16.7	0.011	4.51	0.14	7.86	< 1	0.412	1.859	1.7	0.2
	0206003	36.2	17.7	0.022	14.8	0.21	11	3.28	0.580	3.009	2.3	0.7
	0206004	36.1	17.1	0.022	16	0.25	11.8	4.17	0.367	2.539	2.1	0.4
	0206007	31.9	15.9	0.018	6.81	0.22	13.2	< 1	0.297	2.675	2.2	0.5
Sunndalsfjord	0206009	30	10.7	0.004	1.94	0.10	8.98	< 1	0.246	0.740	0.7	0.1
	0206010	28.4	10.6	0.005	1.74	0.09	7.47	< 1	0.203	0.683	0.6	0.1
	0206012	38.2	13.9	0.011	4.6	0.15	10.7	1.32	0.119	0.840	0.7	0.1
	0206013	35.3	12.7	0.008	5.58	0.07	9.09	1.61	0.200	0.937	0.8	0.1
	0206015	59.7	15.5	0.012	6.67	0.12	13.5	2.23	0.128	0.927	0.8	0.2
	0206016	38.9	15.6	< 0.01	8.09	0.11	13.4	2.56	0.331	1.479	1.3	0.2
	0206017	40.1	16.5	0.017	13.2	0.10	13.5	3.6	0.215	1.480	1.2	0.3
	0206018	40.5	16.7	0.010	11.5	0.19	15.4	2.88	0.181	1.837	1.5	0.4
	0206019	38.3	17.5	0.011	13.3	0.14	17	2.92	0.265	2.079	1.6	0.5
	0206021	34.3	17.9	0.022	11.6	0.15	14.9	3.01	0.277	2.162	1.6	0.6
	0206024	28.8	14.9	0.019	8.47	0.16	14	4.21	0.461	3.064	2.2	0.9
	0206025	30	14.7	0.023	9	0.20	16	4.23	0.442	3.397	2.4	1.0
	0206026	32.7	16.2	0.024	8.29	0.17	17.6	4.14	0.428	4.489	3.0	1.5
	0206027	26.7	14.4	0.015	8.74	< 0.02	6.75	2.9	0.331	1.898	1.7	0.2
Halsafjord	0206028	28.4	14.6	0.013	9.37	0.05	9.74	4.26	0.216	1.495	1.3	0.2
	0206029	31.7	13.7	0.010	11.6	0.12	7.28	2.34	0.227	1.290	1.1	0.2
	0206030	33.2	16.6	0.051	15.3	0.13	13.6	3.11	0.390	2.944	2.2	0.7
	0206031	31.9	16.1	0.015	8.28	0.09	13.1	2.54	0.290	2.437	1.8	0.6
	0206032	33.7	16.5	0.018	11.9	0.11	15.2	2.8	0.347	3.081	2.0	1.1
	0206033	31.6	16.3	0.025	16.5	0.23	17.2	3.62	0.479	3.728	2.3	1.4
	0206034	27.8	15.1	0.021	10	0.16	13.7	2.23	0.429	4.107	2.2	1.9
	0206037	30.1	16.5	0.025	10.3	0.12	15.7	3.4	0.425	4.274	2.4	1.9
	0206038	9.96	8.3	0.014	8.66	0.09	7.19	1.06	0.135	2.500	0.8	1.7
	0206039	17.8	14.3	0.011	5.25	0.11	8.4	1.5	0.286	3.550	1.2	2.4
	0206040	18.8	13.7	0.016	4.52	0.16	10.1	3.16	0.359	5.902	2.2	3.7
Storfjord	0206041	14.4	12.9	0.174	6.08	0.11	12.4	4.36	0.381	4.172	1.6	2.6
	0206044	21	14.5	0.016	8.1	0.15	17.5	4.31	0.348	3.856	2.1	1.7
	0206045	23.6	15.9	< 0.01	9.23	0.16	8.57	2.43	0.237	1.424	0.7	0.7
	0206046	28.1	15.3	0.018	13	0.22	22.1	2.86	0.327	3.324	2.2	1.1
	0206047	26.7	11.7	< 0.01	10.9	0.08	6.35	1.35	0.232	1.328	1.3	0.0
	0206048	24.8	11.3	< 0.01	6.9	0.07	6.1	1.55	0.184	1.202	1.1	0.1
	0206049	34.9	16.3	0.014	17.9	0.20	11.5	2.12	0.280	1.849	1.6	0.3
	0206052	56.6	17.9	< 0.01	7.57	0.11	8.31	1.18	0.262	1.567	1.4	0.2
	0206053	25.2	14.3	< 0.01	6.88	0.04	5.16	1.35	0.249	1.447	1.4	0.1
	0206056	29.7	15.5	< 0.01	11	0.08	5.83	2.54	0.222	1.428	1.3	0.1
	0206057	29	15.0	0.019	9.5	0.18	17.5	2.68	0.455	3.595	2.5	1.1
	0206058	9.4	10.0	< 0.01	2.61	0.09	4.02	< 1	0.122	1.283	0.6	0.7
Nordfjord	0206059	6.7	7.9	< 0.01	5.12	0.30	9.9	1.77	0.221	7.328	1.0	6.3
	0206061	15.2	11.5	0.012	7.45	0.12	15	2.72	0.337	5.126	1.9	3.2
	0206062	15.8	13.9	0.013	9.94	0.18	10.4	1.12	0.297	1.346	1.0	0.4
	0206063	26.4	14.3	0.030	12.8	0.21	38.9	3.25	0.336	3.957	2.9	1.0
	0206064	23.9	13.9	0.028	14	0.20	27.6	2.92	0.365	4.120	2.6	1.5
	0206065	23.3	13.5	0.022	12.5	0.37	25.4	5.88	0.397	4.826	2.7	2.1
	0206066	24.9	14.4	0.028	11.4	0.18	22.1	3.95	0.397	3.896	2.4	1.5
	0206068	16.3	14.2	0.014	5.72	0.12	18.3	4.75	0.434	3.304	2.8	0.5
	0206069	16.1	16.3	0.021	9.15	0.11	14.6	2.7	0.249	1.483	1.4	0.0
	0206070	17.2	14.5	0.023	8.23	0.08	17.8	2.05	0.265	1.626	1.3	0.3
	0206071	24.2	13.7	0.018	9.06	0.22	15.8	3.43	0.465	2.603	2.2	0.4
	0206072	18.9	15.0	< 0.01	10.5	0.08	12	2.57	0.262	1.488	1.4	0.1
	0206073	29.1	15.6	0.016	8.27	0.16	15.3	3.17	0.287	1.771	1.6	0.2
	0206076	28.5	14.9	0.022	9.8	0.09	16.3	3.15	0.216	1.633	1.5	0.1
	0206077	29.8	16.0	0.027	12.5	0.27	18.5	3.94	0.283	1.741	1.5	0.2
	0206078	25.3	15.9	0.013	6.08	0.11	13.8	2.79	0.279	1.204	1.1	0.1
	0206079	15.1	9.1	0.013	4.75	0.14	11.1	2.3	0.131	1.173	1.0	0.2
Førdefjord	0206081	15.6	19.0	0.023	15.2	0.11	17.8	1.49	0.246	2.739	2.7	0.1
	0206083	18.1	17.9	0.022	12.5	0.08	16.4	2.72	0.389	4.128	3.9	0.3
	0206084	17.5	19.2	0.023	12.7	0.04	11.4	1.74	0.281	1.652	1.5	0.2
	0206085	21.7	19.4	0.024	17.9	0.15	20.3	2.3	0.256	3.074	2.7	0.4
	0206086	15	15.9	0.027	6.68	0.09	15	1.69	0.222	2.156	1.4	0.8
	0206088	16.8	16.2	0.015	6.31	0.10	12.6	1.32	0.173	1.754	1.1	0.7
	0206090	17.1	16.2	0.023	8.37	0.10	17.9	3.41	0.279	3.024	2.0	1.1

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	STATION	interval/ depth, cm	Al [%]	Fe [%]	Ti [%]	Mg [%]	Ca [%]	Na [%]	K [%]	Mn mg/kg	P mg/kg	Cu mg/kg	Zn mg/kg	Ni mg/kg	Co mg/kg	V mg/kg
			ICP-AES													
	0206091	30	2.69	3.21	0.166	1.45	5.94	1.5	1.36	490	859	19.8	85.2	36.4	10.6	68.4
Sognefjord	0206092	40	2.67	3.05	0.16	1.29	5.15	1.20	1.16	536	858	14.7	67.4	32.1	12.1	54.0
	0206093	20	2.84	2.94	0.09	1.39	7.56	1.90	1.24	488	714	21.4	87.0	38.1	10.9	56.1
	0206094	50	0.99	0.98	0.07	0.79	20.20	1.17	0.41	137	520	9.1	26.5	16.8	3.2	22.3
	0206096	20	1.25	1.80	0.09	0.62	6.41	0.71	0.51	238	733	6.3	29.1	13.7	6.1	30.3
	0206099	40	1.97	2.51	0.16	0.98	4.57	0.75	0.81	364	892	12.7	45.3	21.8	9.4	46.0
	0206100	30	1.01	1.53	0.08	0.64	11.00	0.80	0.47	273	704	5.0	25.2	11.2	4.8	23.5
	0206101	20	1.57	2.14	0.09	0.86	9.49	0.85	0.68	435	742	8.6	40.7	19.2	9.0	38.2
	0206102	10	1.77	2.07	0.06	1.08	15.30	1.32	0.80	433	610	14.3	67.3	26.0	8.1	40.0
	0206103	47	2.03	2.62	0.09	1.22	10.10	2.79	1.02	407	919	23.2	71.7	34.7	8.1	66.7
	0206104	40	1.76	2.45	0.14	1.03	8.04	1.93	0.87	243	998	18.8	56.1	27.3	5.7	49.5
	0206107	50	1.81	3.29	0.19	1.36	2.05	4.32	1.07	401	798	26.8	68.2	25.3	7.6	124.0
	0206108	20	0.84	1.30	0.16	0.50	1.00	0.47	0.41	212	902	3.4	25.9	7.2	3.7	22.7
	0206110	30	1.45	2.33	0.21	0.90	1.00	0.70	0.77	345	1010	8.5	51.0	14.9	6.7	38.7
	0206112	38	1.82	3.07	0.27	1.21	0.83	0.66	1.05	450	1620	9.3	66.1	20.7	9.1	50.9
	0206115	30	2.58	4.33	0.18	1.62	1.01	0.76	0.98	566	864	24.3	89.0	38.0	13.5	54.2
	0206116	25	2.26	3.36	0.32	1.48	1.10	1.04	1.08	474	1360	16.5	66.3	23.7	9.1	67.4
	0206117	30	3.07	4.62	0.39	2.02	0.94	1.08	2.06	721	1220	21.7	111.0	30.4	13.2	80.1
	0206118	40	2.21	3.27	0.32	1.54	0.70	1.00	1.42	548	1020	14.1	78.5	22.0	10.4	59.1
	0206119	37	3.38	5.16	0.45	2.32	0.91	1.60	2.41	737	1240	21.6	122.0	32.2	15.0	90.2
	0206120	50	3.22	5.19	0.48	2.43	0.89	1.25	2.50	874	1430	25.1	128.0	34.0	14.0	99.7
	0206121	40	2.06	3.49	0.37	1.56	0.96	0.69	1.43	541	2010	13.6	68.5	22.5	10.8	74.0
	0206123	50	2.45	3.33	0.30	1.51	1.84	1.41	1.32	484	1280	23.6	79.6	29.0	10.8	72.5
	0206124	50	3.58	5.52	0.38	2.33	1.28	2.18	2.32	1340	1040	32.7	129.0	37.2	20.3	146.0
	0206125	70	2.86	4.51	0.33	2.10	0.99	3.71	2.12	871	941	28.7	121.0	35.9	15.9	117.0
	0206126	50	3.65	3.61	0.23	1.77	1.56	1.15	1.07	465	983	35.0	68.5	53.0	15.7	65.9
	0206127	25	5.68	3.12	0.18	1.72	2.97	1.57	0.74	402	914	38.8	56.9	57.9	15.7	61.2
	0206128	50	2.88	3.57	0.24	1.85	1.45	1.25	0.76	339	1620	71.2	49.1	83.5	19.0	82.0
	0206129	48	3.44	3.67	0.26	1.92	1.69	1.41	0.76	382	1130	53.6	53.8	65.8	16.3	74.4
	0206130	50	2.98	4.23	0.27	1.72	1.63	1.22	1.00	523	2430	55.6	65.5	48.2	19.5	92.0
	0206131	42	2.97	3.83	0.29	1.81	1.60	1.28	1.03	448	1900	55.5	58.3	52.4	16.6	86.5
	0206132	23	2.29	4.06	0.30	1.52	1.11	1.10	1.00	448	1590	41.9	87.6	28.7	12.8	81.9
	0206133	46	3.52	4.81	0.37	2.30	0.99	1.78	2.24	1240	922	40.0	114.0	40.2	16.4	109.0
	0206134	80	2.43	3.56	0.34	1.66	0.71	0.90	1.73	622	1080	25.5	84.8	24.9	10.0	74.4
	0206135	10	1.92	2.74	0.29	1.28	0.71	0.84	1.41	508	1200	21.6	70.2	21.1	8.3	56.2
	0206136	20	1.85	2.76	0.28	1.29	0.70	0.61	1.28	488	1140	19.5	68.0	21.6	7.6	55.6
	0206139	80	2.75	4.13	0.33	1.81	0.85	1.03	1.64	754	927	33.4	97.8	29.9	13.5	87.7
	0206140	50	2.84	4.22	0.29	1.88	0.71	1.24	1.42	583	919	37.8	107.0	33.8	14.4	78.7
	0206141	50	2.01	3.24	0.25	1.35	1.10	0.94	0.84	385	1400	55.6	54.1	26.6	11.2	69.8
	0206142	40	2.62	3.81	0.30	1.69	1.17	1.37	1.23	494	1150	53.0	76.1	31.8	12.8	84.1
	0206143	50	3.17	4.08	0.31	1.86	1.17	1.40	1.46	531	1040	45.0	85.4	35.7	13.4	85.6
Boknafjord	0206145	50	2.92	3.30	0.05	1.40	5.11	1.61	1.15	312	535	13.4	75.7	32.5	10.4	76.1
	0206150	50	2.64	3.06	0.05	1.29	5.04	1.52	1.05	314	532	12.0	69.9	31.8	10.0	68.1
	0206152	50	3.05	3.49	0.11	1.62	3.34	1.22	1.21	416	524	19.2	84.0	33.0	11.2	66.5
	0206156	50	3.15	3.46	0.05	1.46	4.96	1.78	1.25	331	547	16.1	84.1	36.9	11.2	87.5
	0206158	50	3.25	3.58	0.05	1.52	4.93	1.82	1.27	329	562	16.4	87.0	35.7	11.4	91.2

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	STATION	interval/	Mo	Cr	Ba	Sr	Zr	Ag	B	Be	Li	Sc	Ce	La
		depth, cm	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
			ICP-AES											
	0206091	30	<1	41.6	184	282	10.0	<10	75.3	0.5	39.1	6.3	77.0	36.6
Sognefjord	0206092	40	<1	34.2	138	246	10.4	<10	58.9	0.4	35.8	5.9	74.0	34.4
	0206093	20	<1	41.9	118	372	10.8	<10	88.5	0.8	43.5	6.2	58.0	27.6
	0206094	50	3.50	15.5	34.2	1240	5.1	<10	42.8	<0.2	13.9	2.6	40.0	21.8
	0206096	20	<1	18.8	50.6	254	6.8	<10	37.3	0.2	16.4	3.2	45.0	20.1
	0206099	40	<1	25.1	104	215	11.6	<10	31.5	<0.2	25.3	4.8	64.0	30.1
	0206100	30	<1	14.8	42.2	464	6.2	<10	38.2	<0.2	14.8	2.8	42.0	18.9
	0206101	20	<1	23	64.4	409	8.6	<10	43.4	0.3	23.2	4.0	51.0	23.2
	0206102	10	<1	26.5	60	780	7.6	<1	66.1	0.5	31.3	4.2	46.0	21.7
	0206103	47	7.40	38	130	482	7.2	<10	87.0	0.5	32.2	5.1	65.0	31.3
	0206104	40	5.10	32.4	118	361	6.6	<10	72.3	0.2	27.3	4.7	82.0	37.2
	0206107	50	32.20	35	209	148	5.8	<10	94.6	<0.2	30.6	4.9	106.0	48.0
	0206108	20	<1	10.6	54.4	47.1	4.6	<10	27.6	<0.2	16.9	3.1	68.0	28.7
	0206110	30	<1	20.4	117	61.2	5.6	<10	25.9	<0.2	35.2	4.5	91.0	38.4
	0206112	38	<1	22.6	205	62.6	6.1	<10	25.1	<0.2	40.1	4.9	104.0	45.2
	0206115	30	<1	36.2	106	65.4	26.3	<10	18.2	<0.2	53.0	4.4	94.0	43.8
	0206116	25	3.60	29.9	209	102	5.8	<10	31.4	<0.2	49.8	4.9	108.0	52.8
	0206117	30	<1	33.1	334	96.7	8.7	<10	35.0	<0.2	54.5	6.4	167.0	79.7
	0206118	40	<1	26.5	244	80.3	6.6	<10	30.0	<0.2	45.5	5.0	130.0	59.6
	0206119	37	<1	36.8	435	106	9.0	<10	46.2	<0.2	59.0	7.2	201.0	93.0
	0206120	50	<1	30.7	456	104	7.5	<10	27.5	<0.2	52.3	6.5	183.0	92.1
	0206121	40	<1	22.6	359	89	4.6	<10	19.8	<0.2	40.2	4.8	116.0	56.0
	0206123	50	<1	28.5	222	138	5.8	<10	38.7	<0.2	49.3	4.6	137.0	64.5
	0206124	50	<1	38.4	363	147	7.8	<10	64.1	<0.2	73.0	6.4	221.0	105.0
	0206125	70	44.10	29.4	357	143	7.0	<10	59.7	<0.2	50.7	5.3	224.0	104.0
	0206126	50	<1	33.8	244	141	7.1	<10	34.2	<0.2	48.2	5.1	78.0	36.8
	0206127	25	<1	33.1	188	207	4.8	<10	32.7	<0.2	35.9	4.1	50.0	24.9
	0206128	50	<1	52	287	103	2.9	<10	37.7	<0.2	41.3	5.5	43.0	21.6
	0206129	48	<1	45.2	202	138	2.9	<10	49.4	<0.2	42.7	5.7	46.0	24.3
	0206130	50	<1	37	351	106	7.8	<10	32.6	<0.2	42.0	5.9	66.0	32.3
	0206131	42	<1	41.4	391	109	5.1	<10	33.3	<0.2	41.2	6.2	62.0	30.7
	0206132	23	<1	25.2	226	119	8.1	<10	30.6	<0.2	41.7	4.9	88.0	45.7
	0206133	46	<1	35.7	325	119	9.1	<10	43.2	<0.2	65.6	6.8	201.0	90.6
	0206134	80	<1	26.6	225	83.4	8.3	<10	18.0	<0.2	45.6	5.5	190.0	86.5
	0206135	10	<1	25.2	176	81	7.1	<1	15.0	<0.2	39.0	4.6	143.0	66.0
	0206136	20	<1	27.1	169	80	6.7	<10	10.9	<0.2	32.0	4.6	139.0	65.0
	0206139	80	<1	31.8	223	92.3	10.3	<10	28.8	<0.2	58.0	5.4	170.0	78.0
	0206140	50	1.50	39.5	178	78.6	15.9	<10	40.9	<0.2	67.6	5.5	169.0	78.9
	0206141	50	<1	33.3	205	83.4	4.4	<10	25.9	<0.2	37.4	5.3	76.0	35.7
	0206142	40	<1	34.3	245	105	6.3	<10	33.0	<0.2	44.2	6.4	111.0	51.5
	0206143	50	<1	36.4	270	113	7.2	<10	39.5	<0.2	54.0	6.5	133.0	60.9
Boknafjord	0206145	50	<1	44.2	69.4	189	14.4	<10	81.2	1.1	48.8	6.5	53.0	24.8
	0206150	50	<1	40.8	63.7	180	13.6	<10	76.5	1.0	44.1	6.0	52.0	24.1
	0206152	50	<1	40.9	88.2	94.5	23.3	<10	57.4	0.9	48.9	7.2	69.0	33.3
	0206156	50	<1	46.9	81.6	193	15.1	<10	89.2	1.2	54.0	6.9	55.0	26.0
	0206158	50	<1	48.6	84.3	193	15.1	<10	95.4	1.2	55.4	7.0	58.0	27.0

	STATION	interval/	Y	Hg	As	Cd	Pb	Se	Sulphur	tot Karbon	TOC	C-carb
		depth, cm	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	[%]	[%]	[%]	[%]
			ICP-AES			AA				Leco		
	0206091	30	15.5	0.021	7.57	0.18	22	3.15	0.298	4.344	2.6	1.8
Sognefjord	0206092	40	14.3	0.024	6.63	0.08	14.6	1.58	0.187	2.721	1.3	1.4
	0206093	20	13.8	0.028	4.32	0.21	41.7	3.95	0.244	4.857	2.5	2.4
	0206094	50	11.0	0.014	2.89	0.39	10.3	1.02	0.213	7.235	1.1	6.1
	0206096	20	11.5	0.011	3.4	0.18	13	1.17	0.138	2.423	0.6	1.8
	0206099	40	14.3	< 0.01	4.97	0.16	13	< 1	0.153	1.752	0.5	1.2
	0206100	30	10.7	< 0.01	1.83	0.15	12.1	< 1	0.178	3.778	0.5	3.3
	0206101	20	12.2	0.015	8.5	0.20	15.7	< 1	0.142	3.574	0.8	2.8
	0206102	10	11.9	< 0.01	5.1	0.12	44	1.8	0.129	6.159	1.6	4.5
	0206103	47	15.0	0.037	12	0.71	25.6	5.75	0.772	8.259	5.0	3.3
	0206104	40	15.4	0.023	7.85	0.35	16.2	2.38	0.512	5.922	3.5	2.5
	0206107	50	16.3	0.041	22.8	4.41	15.1	8.18	2.001	8.449	7.4	1.1
	0206108	20	16.3	< 0.01	2.36	0.08	8.97	3.3	0.072	0.642	0.5	0.2
	0206110	30	16.0	0.013	4.46	0.08	10.7	< 1	0.159	1.205	1.0	0.2
	0206112	38	16.8	0.011	6.78	0.08	11	< 1	0.138	1.026	1.0	0.1
	0206115	30	16.0	0.010	6.07	0.12	16.4	< 1	0.208	1.004	0.8	0.2
	0206116	25	15.6	0.012	6.95	0.31	13.2	< 1	0.467	2.220	2.1	0.1
	0206117	30	17.4	0.017	5.89	0.11	18	2.14	0.138	1.007	0.9	0.1
	0206118	40	15.5	< 0.01	5.89	0.07	14	< 1	0.146	1.027	0.9	0.1
	0206119	37	18.1	0.023	7.13	0.05	19	1.89	0.217	1.220	1.1	0.1
	0206120	50	18.2	0.018	5.45	0.03	16.1	< 1	0.127	0.699	0.6	0.1
	0206121	40	13.8	0.017	5.61	0.09	14	< 1	0.149	0.880	0.8	0.1
	0206123	50	14.2	0.023	8.46	0.30	14.9	3.64	0.319	2.471	2.1	0.4
	0206124	50	17.3	0.023	14.2	0.21	24	4.37	0.413	3.007	2.7	0.3
	0206125	70	14.8	0.029	10.7	1.23	20.5	5.97	1.603	4.052	3.6	0.5
	0206126	50	11.7	0.023	7	0.02	13.9	3.19	0.124	0.897	0.8	0.1
	0206127	25	8.7	0.034	7	< 0.02	17	4.22	0.125	1.241	1.1	0.2
	0206128	50	9.9	0.025	6.97	0.02	9.52	4.27	0.231	1.460	1.3	0.1
	0206129	48	10.9	0.022	8.17	0.12	9.42	3.66	0.433	2.071	1.9	0.2
	0206130	50	13.5	0.015	8.29	0.02	13.9	< 1	0.212	1.182	1.1	0.1
	0206131	42	12.1	0.017	6.63	0.13	12.8	3.13	0.241	1.399	1.2	0.2
	0206132	23	16.6	0.036	6.33	0.07	21.6	2.28	0.249	1.554	1.4	0.2
	0206133	46	15.5	0.022	9.52	0.14	19.6	1.09	0.170	0.907	0.7	0.2
	0206134	80	16.5	< 0.01	4.34	0.09	10.5	< 1	0.071	0.437	0.4	0.0
	0206135	10	15.5	0.012	1.5	0.09	12	< 1	0.049	0.421	0.4	0.0
	0206136	20	15.7	0.013	3.34	< 0.02	13.4	< 1	0.043	0.343	0.3	0.0
	0206139	80	15.4	0.011	7.62	0.09	13.8	1.75	0.094	0.766	0.7	0.1
	0206140	50	17.1	0.021	10	0.08	16.4	2.36	0.177	1.774	1.6	0.2
	0206141	50	13.0	0.016	7.18	0.11	5.03	3.74	0.160	0.935	0.8	0.1
	0206142	40	14.8	0.019	9.38	0.05	9.37	3.11	0.171	1.006	0.9	0.1
	0206143	50	15.0	0.026	8.34	0.18	12.9	1.79	0.172	1.001	0.9	0.1
Boknafjord	0206145	50	13.0	0.028	8.27	0.12	23.1	3.49	0.258	3.130	1.4	1.7
	0206150	50	12.8	0.022	9.83	0.11	22.4	2.61	0.213	2.931	1.3	1.7
	0206152	50	16.7	0.022	6.92	0.18	14	1.6	0.409	1.722	0.7	1.1
	0206156	50	13.6	0.025	7.78	0.18	29	2.49	0.270	3.429	1.8	1.7
	0206158	50	14.0	0.032	8.17	0.16	31.3	3.49	0.312	3.382	1.7	1.6

Table 8. Correlation matrix of clay mineralogy vs elemental composition (XRF) of fjord bottom sediments. **I/S1** - illitic illite-smectite, R1 ordered, illite layers 60-80%; **I/V** - illite/vermiculite; **I/S2** - smectitic illite-smectite, R0, illite layers <50%. Marked correlations are significant at $p < 0.0500$

	Chlorite	Vermiculite	Illite	I/V	I/S_1	Kaolinite	I/S_2
SiO2	0.30	-0.22	0.15	0.08	-0.13	-0.69	-0.30
Al2O3	0.27	-0.13	0.05	0.31	-0.12	-0.67	-0.21
Fe2O3	0.31	-0.18	0.04	**0.39**	-0.20	-0.59	-0.18
TiO2	0.30	-0.21	0.16	0.24	-0.22	-0.68	-0.27
MgO	**0.43**	-0.29	0.07	0.31	-0.29	-0.59	-0.29
CaO	-0.17	0.06	-0.03	-0.25	0.02	0.64	0.15
Na2O	0.00	-0.07	0.05	0.25	0.12	-0.63	-0.27
K2O	0.02	-0.17	0.16	**0.35**	0.02	-0.74	-0.31
MnO	-0.21	0.02	-0.18	**0.53**	0.28	-0.34	0.04
P2O5	-0.32	0.25	0.07	0.18	0.20	-0.27	0.10
Nb	**0.42**	-0.23	0.24	-0.05	-0.35	-0.50	-0.25
Zr	**0.56**	-0.39	0.31	-0.25	-0.45	-0.43	-0.35
Y	0.34	-0.01	-0.10	-0.06	-0.12	-0.20	0.04
Sr	-0.57	0.15	0.04	-0.07	0.32	0.42	0.10
Rb	-0.23	0.09	-0.02	**0.51**	0.23	-0.57	-0.06
Th	-0.38	**0.30**	-0.11	**0.51**	0.35	-0.42	0.16
Pb	-0.51	**0.75**	-0.31	0.12	0.33	**0.49**	**0.79**
Cr	**0.82**	-0.46	0.15	0.01	-0.62	-0.48	-0.35
V	**0.39**	-0.32	0.11	**0.34**	-0.29	-0.60	-0.29
Sc	-0.32	**0.35**	-0.27	-0.03	0.21	**0.69**	**0.44**
S	-0.20	0.19	-0.23	-0.27	0.25	**0.62**	0.17
Cl	-0.44	0.31	-0.22	0.01	**0.46**	0.28	0.16
F	-0.53	0.25	-0.15	0.43	**0.52**	-0.31	0.08
Ba	-0.55	0.24	0.04	**0.34**	**0.42**	-0.36	0.04
Zn	-0.32	0.29	-0.12	0.51	0.26	-0.30	0.20
Cu	0.31	-0.20	0.13	0.23	-0.28	-0.47	-0.18
Ni	**0.56**	-0.29	0.03	0.26	-0.42	-0.45	-0.18
Co	**0.35**	-0.18	0.01	**0.39**	-0.24	-0.53	-0.14
Ce	-0.55	0.24	-0.10	**0.53**	**0.53**	-0.46	0.01
La	-0.57	0.28	-0.13	**0.46**	**0.57**	-0.39	0.05
Nd	-0.67	0.31	-0.09	**0.47**	**0.59**	-0.34	0.10
W	-0.58	**0.57**	-0.24	0.06	**0.46**	**0.37**	0.51
Hg*	-0.1	0.2	-0.2	0.2	0.0	0.3	0.3
As*	0.2	0.0	-0.2	0.1	0.0	0.3	0.0
Cd*	-0.3	0.0	-0.2	0.3	**0.4**	-0.1	0.0
Pb*	-0.4	**0.7**	-0.3	0.1	0.2	0.7	0.7
Se*	-0.6	**0.6**	-0.4	0.3	**0.6**	0.2	**0.5**
S	-0.18	0.14	-0.16	-0.31	0.19	**0.62**	0.10
TOC	-0.37	0.48	-0.30	-0.11	0.32	**0.59**	**0.53**
L.O.I	-0.36	**0.33**	-0.20	-0.16	0.20	0.78	0.41
Carb-C	-0.19	0.10	-0.05	-0.25	0.04	**0.67**	0.20

* Measurements were performed using Atomic Adsorption (AA) analyse.

Table 9. Correlation of XRD data

Variable	Correlations (*r*) Marked correlations are significant at p < .05000 N=109 (Casewise deletion of missing data)													
	SiO2	Al2O3	Fe2O3	TiO2	MgO	CaO	Na2O	K2O	MnO	P2O5	L.O.I.	Nb	Zr	Y
SiO2	1.00	*0.67*	*0.20*	*0.45*	0.10	*-0.77*	*0.52*	*0.65*	0.06	*0.25*	*-0.90*	*0.67*	*0.64*	*0.44*
Al2O3	*0.67*	1.00	*0.75*	*0.76*	*0.69*	*-0.83*	*0.61*	*0.68*	*0.34*	*0.46*	*-0.83*	*0.47*	0.08	*0.27*
Fe2O3	*0.20*	*0.75*	1.00	*0.82*	*0.91*	*-0.59*	*0.51*	*0.42*	*0.54*	*0.53*	*-0.49*	0.13	*-0.26*	0.14
TiO2	*0.45*	*0.76*	*0.82*	1.00	*0.66*	*-0.63*	*0.52*	*0.49*	*0.33*	*0.77*	*-0.68*	*0.36*	0.18	*0.46*
MgO	0.10	*0.69*	*0.91*	*0.66*	1.00	*-0.49*	*0.45*	*0.32*	*0.48*	*0.35*	*-0.39*	0.01	*-0.41*	-0.13
CaO	*-0.77*	*-0.83*	*-0.59*	*-0.63*	*-0.49*	1.00	*-0.83*	*-0.81*	*-0.37*	*-0.34*	*0.74*	*-0.62*	-0.19	*-0.33*
Na2O	*0.52*	*0.61*	*0.51*	*0.52*	*0.45*	*-0.83*	1.00	*0.67*	*0.42*	*0.39*	*-0.54*	*0.32*	-0.02	0.17
K2O	*0.65*	*0.68*	*0.42*	*0.49*	*0.32*	*-0.81*	*0.67*	1.00	*0.40*	*0.27*	*-0.66*	*0.70*	0.10	*0.19*
MnO	0.06	*0.34*	*0.54*	*0.33*	*0.48*	*-0.37*	*0.42*	*0.40*	1.00	*0.21*	*-0.20*	0.06	*-0.32*	-0.04
P2O5	*0.25*	*0.46*	*0.53*	*0.77*	*0.35*	*-0.34*	*0.39*	*0.27*	*0.21*	1.00	*-0.44*	0.12	0.15	*0.46*
L.O.I	*-0.90*	*-0.83*	*-0.49*	*-0.68*	*-0.39*	*0.74*	*-0.54*	*-0.66*	*-0.20*	*-0.44*	1.00	*-0.55*	*-0.47*	*-0.36*
Nb	*0.67*	*0.47*	0.13	*0.36*	0.01	*-0.62*	*0.32*	*0.70*	0.06	0.12	*-0.55*	1.00	*0.50*	*0.51*
Zr	*0.64*	0.08	*-0.26*	0.18	*-0.41*	-0.19	-0.02	0.10	*-0.32*	0.15	*-0.47*	*0.50*	1.00	*0.64*
Y	*0.44*	*0.27*	0.14	*0.46*	-0.13	*-0.33*	0.17	*0.19*	-0.04	*0.46*	*-0.36*	*0.51*	*0.64*	1.00
Sr	*-0.48*	*-0.52*	*-0.47*	*-0.36*	*-0.41*	*0.71*	*-0.43*	*-0.36*	-0.18	0.05	*0.38*	*-0.47*	-0.16	*-0.32*
Rb	*0.32*	*0.44*	*0.27*	*0.24*	*0.22*	*-0.58*	*0.43*	*0.87*	*0.40*	0.05	*-0.31*	*0.61*	-0.12	-0.03
Th	*0.27*	*0.39*	*0.26*	0.17	*0.24*	*-0.53*	*0.44*	*0.78*	*0.42*	0.01	*-0.26*	*0.46*	*-0.21*	-0.15
Pb	*-0.43*	*-0.34*	*-0.19*	*-0.25*	*-0.27*	0.17	-0.16	-0.12	0.00	-0.10	*0.56*	-0.09	*-0.30*	-0.04
Cr	*0.21*	*0.33*	*0.41*	*0.24*	*0.59*	*-0.26*	0.05	0.00	0.06	-0.17	*-0.29*	0.10	-0.00	-0.09
V	0.14	*0.60*	*0.85*	*0.61*	*0.84*	*-0.57*	*0.51*	*0.40*	*0.57*	*0.22*	*-0.34*	0.14	*-0.31*	-0.00
As_AA *	*-0.37*	*-0.19*	0.16	-0.15	*0.23*	0.01	0.13	-0.13	0.07	-0.19	*0.39*	*-0.24*	*-0.43*	-0.18
Hg_AA*	*-0.33*	-0.02	0.16	0.04	0.14	0.09	-0.04	-0.17	0.12	0.03	*0.27*	*-0.25*	*-0.37*	-0.03
Cd_AA*	*-0.28*	*-0.26*	-0.05	*-0.22*	0.02	0.01	*0.29*	-0.04	*0.21*	-0.16	*0.34*	*-0.26*	*-0.31*	*-0.30*
Sc	*-0.58*	*-0.51*	*-0.24*	*-0.25*	*-0.28*	*0.71*	*-0.72*	*-0.66*	*-0.21*	-0.03	*0.51*	*-0.49*	-0.07	-0.02
S	*-0.40*	*-0.38*	-0.16	*-0.27*	-0.11	0.11	*0.20*	*-0.21*	-0.08	-0.14	*0.50*	*-0.30*	*-0.28*	*-0.21*
Cl	*-0.46*	*-0.41*	-0.19	*-0.26*	-0.14	0.14	*0.22*	*-0.25*	0.02	-0.06	*0.56*	*-0.37*	*-0.31*	-0.18
Ba	*0.49*	*0.52*	*0.31*	*0.51*	0.15	*-0.64*	*0.67*	*0.78*	*0.35*	*0.59*	*-0.52*	*0.43*	0.08	*0.26*
Ga	*0.25*	*0.46*	*0.38*	*0.34*	*0.42*	*-0.38*	*0.29*	*0.41*	0.18	0.12	*-0.35*	*0.37*	0.04	0.00
Zn	0.02	*0.50*	*0.68*	*0.58*	*0.54*	*-0.51*	*0.52*	*0.60*	*0.55*	*0.44*	-0.18	*0.23*	*-0.39*	0.08
Cu	0.07	*0.60*	*0.79*	*0.64*	*0.78*	*-0.37*	*0.37*	*0.21*	*0.39*	*0.43*	*-0.35*	-0.11	*-0.33*	-0.10

* Measurements were performed using Atomic Adsorption (AA) analyse

Correlations (r)
Marked correlations are significant at $p < .05000$
N=109 (Casewise deletion of missing data)

Variable	Sr	Rb	Th	Pb	Cr	V	As_AA	Hg_AA	Cd_AA	Sc	S	Cl	Ba	Ga
SiO2	*-0.48*	*0.32*	*0.27*	*-0.43*	*0.21*	0.14	*-0.37*	*-0.33*	*-0.28*	*-0.58*	*-0.40*	*-0.46*	*0.49*	*0.25*
Al2O3	*-0.52*	*0.44*	*0.39*	*-0.34*	*0.33*	*0.60*	*-0.19*	-0.02	*-0.26*	*-0.51*	*-0.38*	*-0.41*	*0.52*	*0.46*
Fe2O3	*-0.47*	*0.27*	*0.26*	*-0.19*	*0.41*	*0.85*	0.16	0.16	-0.05	*-0.24*	-0.16	-0.19	*0.31*	*0.38*
TiO2	*-0.36*	*0.24*	0.17	*-0.25*	*0.24*	*0.61*	-0.15	0.04	*-0.22*	*-0.25*	*-0.27*	*-0.26*	*0.51*	*0.34*
MgO	*-0.41*	*0.22*	*0.24*	*-0.27*	*0.59*	*0.84*	*0.23*	0.14	0.02	*-0.28*	-0.11	-0.14	0.15	*0.42*
CaO	*0.71*	*-0.58*	*-0.53*	0.17	*-0.26*	*-0.57*	0.01	0.09	0.01	*0.71*	0.11	0.14	*-0.64*	*-0.38*
Na2O	*-0.43*	*0.43*	*0.44*	-0.16	0.05	*0.51*	0.13	-0.04	*0.29*	*-0.72*	*0.20*	*0.22*	*0.67*	*0.29*
K2O	*-0.36*	*0.87*	*0.78*	-0.12	0.00	*0.40*	-0.13	-0.17	-0.04	*-0.66*	*-0.21*	*-0.25*	*0.78*	*0.41*
MnO	-0.18	*0.40*	*0.42*	0.00	0.06	*0.57*	0.07	0.12	*0.21*	*-0.21*	-0.08	0.02	*0.35*	0.18
P2O5	0.05	0.05	0.01	-0.10	-0.17	*0.22*	-0.19	0.03	-0.16	-0.03	-0.14	-0.06	*0.59*	0.12
L.O.I	*0.38*	*-0.31*	*-0.26*	*0.56*	*-0.29*	*-0.34*	*0.39*	*0.27*	*0.34*	*0.51*	*0.50*	*0.56*	*-0.52*	*-0.35*
Nb	*-0.47*	*0.61*	*0.46*	-0.09	0.10	0.14	*-0.24*	*-0.25*	*-0.26*	*-0.49*	*-0.30*	*-0.37*	*0.43*	*0.37*
Zr	-0.16	-0.12	*-0.21*	*-0.30*	-0.00	*-0.31*	*-0.43*	*-0.37*	*-0.31*	-0.07	*-0.28*	*-0.31*	0.08	0.04
Y	*-0.32*	-0.03	-0.15	-0.04	-0.09	-0.00	-0.18	-0.03	*-0.30*	-0.02	*-0.21*	-0.18	*0.26*	0.00
Sr	1.00	*-0.25*	-0.19	0.05	*-0.57*	*-0.58*	*-0.25*	-0.00	-0.03	*0.44*	-0.02	0.09	0.01	*-0.28*
Rb	*-0.25*	1.00	*0.93*	0.16	-0.11	*0.28*	-0.09	-0.09	0.01	*-0.49*	-0.13	-0.15	*0.66*	*0.34*
Th	-0.19	*0.93*	1.00	0.16	-0.11	*0.26*	-0.03	-0.09	0.06	*-0.45*	-0.07	-0.11	*0.62*	*0.26*
Pb	0.05	0.16	0.16	1.00	*-0.33*	-0.12	0.14	*0.45*	0.01	*0.21*	0.16	*0.33*	0.08	*-0.25*
Cr	*-0.57*	-0.11	-0.11	*-0.33*	1.00	*0.58*	*0.23*	-0.03	-0.13	*-0.20*	-0.19	*-0.29*	*-0.36*	*0.33*
V	*-0.58*	*0.28*	*0.26*	-0.12	*0.58*	1.00	*0.35*	*0.21*	0.14	*-0.37*	-0.03	-0.05	0.15	*0.47*
As_AA	*-0.25*	-0.09	-0.03	0.14	*0.23*	*0.35*	1.00	0.08	*0.43*	-0.12	*0.53*	*0.41*	*-0.24*	-0.05
Hg_AA	-0.00	-0.09	-0.09	*0.45*	-0.03	*0.21*	0.08	1.00	-0.08	0.13	-0.03	0.10	-0.04	-0.13
Cd_AA	-0.03	0.01	0.06	0.01	-0.13	0.14	*0.43*	-0.08	1.00	-0.08	*0.86*	*0.77*	-0.09	-0.09
Sc	*0.44*	*-0.49*	*-0.45*	*0.21*	*-0.20*	*-0.37*	-0.12	0.13	-0.08	1.00	0.06	0.10	*-0.48*	*-0.38*
S	-0.02	-0.13	-0.07	0.16	-0.19	-0.03	*0.53*	-0.03	*0.86*	0.06	1.00	*0.89*	-0.16	*-0.21*
Cl	0.09	-0.15	-0.11	*0.33*	*-0.29*	-0.05	*0.41*	0.10	*0.77*	0.10	*0.89*	1.00	-0.07	*-0.20*
Ba	0.01	*0.66*	*0.62*	0.08	*-0.36*	0.15	*-0.24*	-0.04	-0.09	*-0.48*	-0.16	-0.07	1.00	0.18
Ga	*-0.28*	*0.34*	*0.26*	*-0.25*	*0.33*	*0.47*	-0.05	-0.13	-0.09	*-0.38*	*-0.21*	*-0.20*	0.18	1.00
Zn	*-0.21*	*0.67*	*0.65*	*0.35*	-0.12	*0.58*	0.06	*0.30*	0.00	*-0.27*	-0.05	0.04	*0.65*	*0.28*
Cu	*-0.21*	0.09	0.13	*-0.20*	*0.31*	*0.67*	0.00	*0.22*	0.00	-0.14	-0.10	-0.08	*0.20*	*0.27*

Correlations (r)
Marked correlations are significant at $p < .05000$
N=109 (Casewise deletion of missing data)

Variable	Zn	Cu	Ni	Co	Ce	La	Nd	W	Sulphur	TOC	Carb-C	Clay (%)
SiO2	0.02	0.07	0.02	0.15	*0.27*	*0.28*	*0.24*	0.09	*-0.39*	*-0.54*	*-0.79*	*-0.48*
Al2O3	*0.50*	*0.60*	*0.53*	*0.70*	*0.46*	*0.45*	*0.40*	-0.03	*-0.36*	*-0.43*	*-0.88*	-0.18
Fe2O3	*0.68*	*0.79*	*0.74*	*0.91*	*0.42*	*0.39*	*0.36*	*-0.21*	-0.12	-0.15	*-0.65*	0.06
TiO2	*0.58*	*0.64*	*0.47*	*0.76*	*0.42*	*0.43*	*0.42*	0.05	*-0.27*	*-0.30*	*-0.71*	*-0.29*
MgO	*0.54*	*0.78*	*0.90*	*0.83*	*0.31*	*0.27*	*0.20*	*-0.43*	-0.06	-0.12	*-0.54*	0.10
CaO	*-0.51*	*-0.37*	*-0.31*	*-0.47*	*-0.59*	*-0.59*	*-0.53*	-0.01	0.08	0.17	*0.98*	0.10
Na2O	*0.52*	*0.37*	*0.21*	*0.37*	*0.63*	*0.64*	*0.56*	-0.04	*0.22*	0.09	*-0.82*	-0.07
K2O	*0.60*	*0.21*	0.06	*0.33*	*0.81*	*0.79*	*0.75*	0.11	-0.16	*-0.35*	*-0.75*	-0.08
MnO	*0.55*	*0.39*	*0.34*	*0.47*	*0.51*	*0.44*	*0.45*	-0.16	-0.05	-0.02	*-0.35*	*0.28*
P2O5	*0.44*	*0.43*	0.15	*0.47*	*0.34*	*0.38*	*0.41*	*0.26*	-0.17	-0.12	*-0.44*	*-0.31*
L.O.I	-0.18	*-0.35*	*-0.26*	*-0.44*	*-0.34*	*-0.33*	*-0.28*	-0.00	*0.49*	*0.68*	*0.82*	*0.50*
Nb	*0.23*	-0.11	-0.12	0.03	*0.40*	*0.41*	*0.39*	0.08	*-0.27*	*-0.36*	*-0.55*	*-0.27*
Zr	*-0.39*	*-0.33*	*-0.37*	*-0.25*	-0.18	-0.15	-0.11	*0.28*	*-0.31*	*-0.42*	*-0.22*	*-0.63*
Y	0.08	-0.10	*-0.21*	0.02	0.05	0.09	0.17	*0.38*	*-0.26*	-0.09	*-0.36*	*-0.46*
Sr	*-0.21*	*-0.21*	*-0.41*	*-0.35*	-0.07	-0.07	-0.01	0.18	-0.03	-0.02	*0.65*	-0.07
Rb	*0.67*	0.09	-0.01	*0.21*	*0.84*	*0.81*	*0.77*	0.11	-0.05	*-0.20*	*-0.47*	*0.24*
Th	*0.65*	0.13	0.04	*0.24*	*0.83*	*0.80*	*0.74*	0.09	0.01	-0.13	*-0.42*	*0.32*
Pb	*0.35*	*-0.20*	*-0.23*	-0.16	0.10	0.14	0.18	*0.29*	0.14	*0.59*	*0.29*	*0.52*
Cr	-0.12	*0.31*	*0.75*	*0.34*	*-0.26*	*-0.30*	*-0.39*	*-0.61*	-0.15	*-0.19*	*-0.29*	-0.12
V	*0.58*	*0.67*	*0.73*	*0.76*	*0.33*	*0.30*	*0.22*	*-0.38*	-0.00	-0.00	*-0.57*	0.13
As_AA	0.06	0.00	*0.27*	0.05	-0.04	-0.05	-0.11	*-0.32*	*0.57*	*0.60*	0.08	*0.38*
Hg_AA	*0.30*	*0.22*	0.17	*0.19*	-0.07	-0.07	-0.04	0.06	-0.04	*0.29*	0.11	*0.34*
Cd_AA	0.00	0.00	-0.05	-0.08	0.07	0.06	0.05	-0.12	*0.83*	*0.48*	0.06	*0.26*
Sc	*-0.27*	-0.14	-0.14	-0.13	*-0.45*	*-0.47*	*-0.33*	*0.26*	-0.01	0.13	*0.66*	0.09
S	-0.05	-0.10	-0.13	*-0.19*	-0.05	-0.03	-0.02	0.02	*0.96*	*0.71*	0.16	*0.27*
Cl	0.04	-0.08	-0.17	*-0.22*	0.00	0.03	0.06	0.08	*0.81*	*0.79*	0.19	*0.25*
Ba	*0.65*	*0.20*	-0.12	*0.25*	*0.83*	*0.85*	*0.86*	*0.36*	-0.14	-0.13	*-0.62*	-0.11
Ga	*0.28*	*0.27*	*0.29*	*0.33*	*0.28*	*0.27*	*0.19*	*-0.28*	-0.16	*-0.29*	*-0.37*	-0.15
Zn	1.00	*0.51*	*0.27*	*0.62*	*0.80*	*0.80*	*0.78*	0.17	-0.01	0.10	*-0.47*	*0.32*
Cu	*0.51*	1.00	*0.68*	*0.86*	*0.23*	*0.22*	0.18	-0.19	-0.10	-0.14	*-0.46*	0.06

Variable	Water depth (m)	Quartz	K-feldspar (Microcline, minor Orthoclase)	Labradorite	Albite	Actinolite	Chlorite
	Correlations (r) Marked correlations are significant at p < .05000 N=109 (Casewise deletion of missing data)						
SiO2	*-0.22*	*0.50*	*0.23*	*0.39*	0.18	*0.24*	*-0.20*
Al2O3	-0.08	-0.09	0.16	*0.46*	0.06	*0.49*	0.13
Fe2O3	0.10	*-0.46*	0.03	*0.35*	-0.08	*0.55*	*0.36*
TiO2	-0.14	*-0.22*	0.08	*0.38*	0.14	*0.50*	0.07
MgO	0.05	*-0.47*	-0.04	*0.39*	*-0.22*	*0.54*	*0.43*
CaO	0.16	-0.10	*-0.32*	*-0.33*	*-0.22*	*-0.29*	-0.08
Na2O	*-0.27*	-0.10	*0.42*	*0.38*	*0.27*	*0.31*	-0.10
K2O	-0.17	0.10	*0.42*	0.18	*0.26*	0.01	-0.06
MnO	*0.23*	*-0.31*	0.18	0.18	-0.04	0.13	0.08
P2O5	-0.08	*-0.26*	0.11	*0.40*	0.11	*0.43*	*-0.23*
L.O.I	0.16	*-0.27*	-0.18	*-0.53*	-0.07	*-0.43*	0.13
Nb	*-0.25*	*0.42*	*0.20*	-0.04	*0.31*	-0.08	-0.05
Zr	*-0.30*	*0.68*	0.01	0.04	*0.24*	-0.01	*-0.34*
Y	*-0.21*	*0.23*	0.07	0.01	*0.36*	0.18	*-0.21*
Sr	0.05	-0.12	-0.05	-0.02	-0.11	*-0.24*	*-0.42*
Rb	-0.02	-0.01	*0.38*	-0.06	0.18	*-0.26*	0.07
Th	0.06	-0.10	*0.40*	-0.01	0.13	*-0.26*	0.13
Pb	*0.30*	*-0.24*	0.04	*-0.48*	*0.20*	*-0.42*	*0.20*
Cr	-0.01	0.09	*-0.29*	*0.19*	*-0.33*	*0.35*	*0.53*
V	0.04	*-0.33*	0.01	0.18	-0.04	*0.42*	*0.51*
As_AA	0.14	*-0.25*	-0.03	-0.18	-0.04	0.02	*0.33*
Hg_AA	*0.22*	*-0.41*	0.01	-0.16	0.06	0.09	*0.23*
Cd_AA	-0.07	-0.17	0.08	-0.07	0.03	-0.11	-0.04
Sc	*0.31*	-0.17	*-0.36*	*-0.27*	-0.16	-0.12	-0.03
S	-0.17	-0.18	0.03	*-0.20*	0.11	-0.13	-0.06
Cl	-0.14	*-0.23*	0.05	-0.15	0.12	-0.15	-0.14
Ba	-0.12	-0.07	*0.43*	*0.26*	*0.33*	0.02	*-0.31*
Ga	*-0.25*	-0.02	-0.03	*0.21*	-0.05	*0.20*	0.19
Zn	0.05	*-0.50*	*0.28*	0.01	*0.21*	0.07	*0.22*
Cu	0.04	*-0.47*	-0.05	*0.40*	-0.19	*0.52*	*0.35*

Variable	Correlations (r) Marked correlations are significant at p < .05000 N=109 (Casewise deletion of missing data) Vermiculite/Smectite(high charge)	Illite-smectite	Illite/Mica	Kaolinite	Pyrite	Calcite	Aragonite
SiO2	0.07	*-0.26*	*0.20*	-0.08	-0.03	*-0.78*	*-0.67*
Al2O3	*0.22*	-0.12	*0.43*	0.02	*-0.21*	*-0.86*	*-0.74*
Fe2O3	*0.29*	-0.03	*0.43*	0.04	*-0.22*	*-0.63*	*-0.53*
TiO2	*0.41*	-0.13	*0.34*	-0.07	-0.16	*-0.71*	*-0.59*
MgO	*0.25*	-0.06	*0.37*	0.08	*-0.22*	*-0.53*	*-0.39*
CaO	-0.16	0.05	*-0.51*	0.05	-0.03	*0.93*	*0.84*
Na2O	*0.26*	*-0.20*	*0.48*	-0.17	0.09	*-0.81*	*-0.66*
K2O	-0.03	-0.08	*0.64*	-0.04	-0.08	*-0.75*	*-0.62*
MnO	0.02	-0.01	*0.55*	-0.10	-0.12	*-0.37*	*-0.30*
P2O5	*0.47*	-0.14	0.13	*-0.26*	-0.10	*-0.44*	*-0.36*
L.O.I	-0.18	*0.35*	*-0.27*	0.07	*0.19*	*0.84*	*0.63*
Nb	-0.17	0.05	*0.34*	0.05	-0.03	*-0.53*	*-0.48*
Zr	0.03	*-0.25*	-0.17	0.01	0.09	*-0.24*	*-0.20*
Y	*0.27*	-0.01	-0.03	0.01	-0.01	*-0.34*	*-0.38*
Sr	0.02	-0.17	*-0.23*	*-0.22*	-0.11	*0.58*	*0.64*
Rb	*-0.21*	0.13	*0.68*	0.01	-0.06	*-0.44*	*-0.41*
Th	*-0.19*	0.11	*0.62*	-0.05	-0.01	*-0.39*	*-0.37*
Pb	-0.15	*0.47*	0.01	-0.07	*0.27*	*0.38*	0.09
Cr	-0.01	-0.07	0.03	*0.29*	-0.14	*-0.27*	-0.16
V	0.14	-0.06	*0.45*	0.14	-0.15	*-0.56*	*-0.43*
As_AA	0.05	0.16	0.02	*0.28*	0.12	0.10	0.09
Hg_AA	0.15	*0.24*	-0.05	-0.02	-0.07	0.15	0.03
Cd_AA	0.04	0.05	0.15	-0.01	*0.44*	0.03	0.05
Sc	0.06	*0.22*	*-0.38*	0.01	0.02	*0.65*	*0.48*
S	0.13	*0.21*	-0.01	-0.01	*0.48*	0.16	0.10
Cl	0.17	0.15	0.01	-0.11	*0.48*	*0.20*	0.12
Ba	*0.21*	-0.10	*0.52*	*-0.28*	-0.03	*-0.60*	*-0.53*
Ga	-0.11	*-0.19*	*0.38*	0.15	*-0.19*	*-0.41*	*-0.22*
Zn	0.15	0.15	*0.62*	-0.13	-0.08	*-0.42*	*-0.43*
Cu	*0.27*	*-0.20*	*0.31*	-0.12	-0.12	*-0.46*	*-0.35*

Variable	Correlations (r) Marked correlations are significant at $p < .05000$ N=109 (Casewise deletion of missing data) Apatite	Garnet	Troilite	Dolomite	Epidote	Diopside
SiO2	-0.08	0.01	-0.15	-0.03	0.03	0.04
Al2O3	-0.09	-0.11	*-0.20*	-0.02	*0.22*	0.02
Fe2O3	-0.10	-0.10	-0.12	0.03	*0.31*	-0.00
TiO2	-0.11	-0.05	-0.16	0.03	*0.29*	-0.01
MgO	-0.09	-0.06	-0.09	0.02	*0.22*	-0.04
CaO	0.08	-0.02	-0.03	0.02	-0.02	-0.07
Na2O	-0.05	0.02	*0.20*	-0.05	-0.08	0.04
K2O	-0.11	-0.06	-0.06	-0.08	-0.06	0.08
MnO	-0.09	-0.07	-0.08	-0.01	0.02	-0.04
P2O5	-0.06	-0.05	-0.10	0.00	*0.31*	-0.01
L.O.I	0.11	0.07	*0.25*	0.04	-0.18	-0.00
Nb	-0.07	-0.03	-0.12	0.06	-0.10	0.06
Zr	-0.05	0.08	-0.13	0.01	0.02	-0.04
Y	-0.08	0.01	-0.15	0.09	0.05	0.08
Sr	0.08	-0.04	-0.09	-0.05	-0.02	-0.04
Rb	-0.05	-0.03	-0.07	-0.03	-0.15	0.05
Th	-0.01	0.03	-0.04	-0.05	-0.17	0.04
Pb	0.06	0.01	0.12	0.07	*-0.19*	0.09
Cr	-0.06	0.00	-0.12	0.00	-0.00	-0.06
V	-0.12	-0.10	0.01	-0.01	0.13	-0.00
As_AA	-0.00	-0.02	*0.27*	-0.03	-0.17	0.04
Hg_AA	0.05	-0.05	-0.06	0.09	-0.07	0.06
Cd_AA	-0.00	-0.00	*0.74*	-0.05	-0.04	-0.01
Sc	0.10	-0.05	0.01	0.06	*0.24*	0.04
S	0.04	0.08	*0.74*	0.01	-0.07	0.01
Cl	0.02	0.12	*0.69*	0.06	-0.14	-0.00
Ba	-0.03	-0.01	-0.08	-0.07	-0.07	0.09
Ga	-0.10	-0.09	-0.12	0.00	-0.01	-0.12
Zn	-0.05	-0.07	-0.06	-0.01	0.04	0.05
Cu	-0.07	-0.06	-0.04	0.01	*0.41*	-0.07

Correlations (r)
Marked correlations are significant at $p < .05000$
N=109 (Casewise deletion of missing data)

Variable	SiO_2	Al_2O_3	Fe_2O_3	TiO_2	MgO	CaO	Na_2O	K_2O	MnO	P_2O_5	L.O.I.	Nb	Zr	Y
Ni	0.02	*0.53*	*0.74*	*0.47*	*0.90*	*-0.31*	*0.21*	0.06	*0.34*	0.15	*-0.26*	-0.12	*-0.37*	*-0.21*
Co	0.15	*0.70*	*0.91*	*0.76*	*0.83*	*-0.47*	*0.37*	*0.33*	*0.47*	*0.47*	*-0.44*	0.03	*-0.25*	0.02
Ce	*0.27*	*0.46*	*0.42*	*0.42*	*0.31*	*-0.59*	*0.63*	*0.81*	*0.51*	*0.34*	*-0.34*	*0.40*	-0.18	0.05
La	*0.28*	*0.45*	*0.39*	*0.43*	*0.27*	*-0.59*	*0.64*	*0.79*	*0.44*	*0.38*	*-0.33*	*0.41*	-0.15	0.09
Nd	*0.24*	*0.40*	*0.36*	*0.42*	*0.20*	*-0.53*	*0.56*	*0.75*	*0.45*	*0.41*	*-0.28*	*0.39*	-0.11	0.17
W	0.09	-0.03	*-0.21*	0.05	*-0.43*	-0.01	-0.04	0.11	-0.16	*0.26*	-0.00	0.08	*0.28*	*0.38*
Sulphur	*-0.39*	*-0.36*	-0.12	*-0.27*	-0.06	0.08	*0.22*	-0.16	-0.05	-0.17	*0.49*	*-0.27*	*-0.31*	*-0.26*
TOC	*-0.54*	*-0.43*	-0.15	*-0.30*	-0.12	0.17	0.09	*-0.35*	-0.02	-0.12	*0.68*	*-0.36*	*-0.42*	-0.09
Carb-C	*-0.79*	*-0.88*	*-0.65*	*-0.71*	*-0.54*	*0.98*	*-0.82*	*-0.75*	*-0.35*	*-0.44*	*0.82*	*-0.55*	*-0.22*	*-0.36*
Clay (%)	*-0.48*	-0.18	0.06	*-0.29*	0.10	0.10	-0.07	-0.08	*0.28*	*-0.31*	*0.50*	*-0.27*	*-0.63*	*-0.46*
Water depth (m)	*-0.22*	-0.08	0.10	-0.14	0.05	0.16	*-0.27*	-0.17	*0.23*	-0.08	0.16	*-0.25*	*-0.30*	*-0.21*
Quartz	*0.50*	-0.09	*-0.46*	*-0.22*	*-0.47*	-0.10	-0.10	0.10	*-0.31*	*-0.26*	*-0.27*	*0.42*	*0.68*	*0.23*
K-feldspar (Microcline, minor Orthoclase)	*0.23*	0.16	0.03	0.08	-0.04	*-0.32*	*0.42*	*0.42*	0.18	0.11	-0.18	*0.20*	0.01	0.07
Labradorite	*0.39*	*0.46*	*0.35*	*0.38*	*0.39*	*-0.33*	*0.38*	0.18	0.18	*0.40*	*-0.53*	-0.04	0.04	0.01
Albite	0.18	0.06	-0.08	0.14	*-0.22*	*-0.22*	*0.27*	*0.26*	-0.04	0.11	-0.07	*0.31*	*0.24*	*0.36*
Actinolite	*0.24*	*0.49*	*0.55*	*0.50*	*0.54*	*-0.29*	*0.31*	0.01	0.13	*0.43*	*-0.43*	-0.08	-0.01	0.18
Chlorite	*-0.20*	0.13	*0.36*	0.07	*0.43*	-0.08	-0.10	-0.06	0.08	*-0.23*	0.13	-0.05	*-0.34*	*-0.21*
Vermiculite/Smectite(high charge)	0.07	*0.22*	*0.29*	*0.41*	*0.25*	-0.16	*0.26*	-0.03	0.02	*0.47*	-0.18	-0.17	0.03	*0.27*
Illite-smectite	*-0.26*	-0.12	-0.03	-0.13	-0.06	0.05	*-0.20*	-0.08	-0.01	-0.14	*0.35*	0.05	*-0.25*	-0.01
Illite/Mica	*0.20*	*0.43*	*0.43*	*0.34*	*0.37*	*-0.51*	*0.48*	*0.64*	*0.55*	0.13	*-0.27*	*0.34*	-0.17	-0.03
Kaolinite	-0.08	0.02	0.04	-0.07	0.08	0.05	-0.17	-0.04	-0.10	*-0.26*	0.07	0.05	0.01	0.01
Pyrite	-0.03	*-0.21*	*-0.22*	-0.16	*-0.22*	-0.03	0.09	-0.08	-0.12	-0.10	*0.19*	-0.03	0.09	-0.01
Calcite	*-0.78*	*-0.86*	*-0.63*	*-0.71*	*-0.53*	*0.93*	*-0.81*	*-0.75*	*-0.37*	*-0.44*	*0.84*	*-0.53*	*-0.24*	*-0.34*
Aragonite	*-0.67*	*-0.74*	*-0.53*	*-0.59*	*-0.39*	*0.84*	*-0.66*	*-0.62*	*-0.30*	*-0.36*	*0.63*	*-0.48*	*-0.20*	*-0.38*
Apatite	-0.08	-0.09	-0.10	-0.11	-0.09	0.08	-0.05	-0.11	-0.09	-0.06	0.11	-0.07	-0.05	-0.08
Garnet	0.01	-0.11	-0.10	-0.05	-0.06	-0.02	0.02	-0.06	-0.07	-0.05	0.07	-0.03	0.08	0.01
Troilite	-0.15	*-0.20*	-0.12	-0.16	-0.09	-0.03	*0.20*	-0.06	-0.08	-0.10	*0.25*	-0.12	-0.13	-0.15
Dolomite	-0.03	-0.02	0.03	0.03	0.02	0.02	-0.05	-0.08	-0.01	0.00	0.04	0.06	0.01	0.09
Epidote	0.03	*0.22*	*0.31*	*0.29*	*0.22*	-0.02	-0.08	-0.06	0.02	*0.31*	-0.18	-0.10	0.02	0.05
Diopside	0.04	0.02	-0.00	-0.01	-0.04	-0.07	0.04	0.08	-0.04	-0.01	-0.00	0.06	-0.04	0.08

Correlations (r)
Marked correlations are significant at p < .05000
N=109 (Casewise deletion of missing data)

Variable	Sr	Rb	Th	Pb	Cr	V	As_AA	Hg_AA	Cd_AA	Sc	S	Cl	Ba	Ga
Ni	*-0.41*	-0.01	0.04	*-0.23*	*0.75*	*0.73*	*0.27*	0.17	-0.05	-0.14	-0.13	-0.17	-0.12	*0.29*
Co	*-0.35*	*0.21*	*0.24*	-0.16	*0.34*	*0.76*	0.05	*0.19*	-0.08	-0.13	*-0.19*	*-0.22*	*0.25*	*0.33*
Ce	-0.07	*0.84*	*0.83*	0.10	*-0.26*	*0.33*	-0.04	-0.07	0.07	*-0.45*	-0.05	0.00	*0.83*	*0.28*
La	-0.07	*0.81*	*0.80*	0.14	*-0.30*	*0.30*	-0.05	-0.07	0.06	*-0.47*	-0.03	0.03	*0.85*	*0.27*
Nd	-0.01	*0.77*	*0.74*	0.18	*-0.39*	*0.22*	-0.11	-0.04	0.05	*-0.33*	-0.02	0.06	*0.86*	*0.19*
W	0.18	0.11	0.09	*0.29*	*-0.61*	*-0.38*	*-0.32*	0.06	-0.12	*0.26*	0.02	0.08	*0.36*	*-0.28*
Sulphur	-0.03	-0.05	0.01	0.14	-0.15	-0.00	*0.57*	-0.04	*0.83*	-0.01	*0.96*	*0.81*	-0.14	-0.16
TOC	-0.02	*-0.20*	-0.13	*0.59*	*-0.19*	-0.00	*0.60*	*0.29*	*0.48*	0.13	*0.71*	*0.79*	-0.13	*-0.29*
Carb-C	*0.65*	*-0.47*	*-0.42*	*0.29*	*-0.29*	*-0.57*	0.08	0.11	0.06	*0.66*	0.16	0.19	*-0.62*	*-0.37*
Clay (%)	-0.07	*0.24*	*0.32*	*0.52*	-0.12	0.13	*0.38*	*0.34*	*0.26*	0.09	*0.27*	*0.25*	-0.11	-0.15
Water depth (m)	0.05	-0.02	0.06	*0.30*	-0.01	0.04	0.14	*0.22*	-0.07	*0.31*	-0.17	-0.14	-0.12	*-0.25*
Quartz	-0.12	-0.01	-0.10	*-0.24*	0.09	*-0.33*	*-0.25*	*-0.41*	-0.17	-0.17	-0.18	*-0.23*	-0.07	-0.02
K-feldspar (Microcline, minor Orthoclase)	-0.05	*0.38*	*0.40*	0.04	*-0.29*	0.01	-0.03	0.01	0.08	*-0.36*	0.03	0.05	*0.43*	-0.03
Labradorite	-0.02	-0.06	-0.01	*-0.48*	*0.19*	0.18	-0.18	-0.16	-0.07	*-0.27*	*-0.20*	-0.15	*0.26*	*0.21*
Albite	-0.11	0.18	0.13	*0.20*	*-0.33*	-0.04	-0.04	0.06	0.03	-0.16	0.11	0.12	*0.33*	-0.05
Actinolite	*-0.24*	*-0.26*	*-0.26*	*-0.42*	*0.35*	*0.42*	0.02	0.09	-0.11	-0.12	-0.13	-0.15	0.02	*0.20*
Chlorite	*-0.42*	0.07	0.13	*0.20*	*0.53*	*0.51*	*0.33*	*0.23*	-0.04	-0.03	-0.06	-0.14	*-0.31*	0.19
Vermiculite/Smectite(high charge)	0.02	*-0.21*	*-0.19*	-0.15	-0.01	0.14	0.05	0.15	0.04	0.06	0.13	0.17	*0.21*	-0.11
Illite-smectite	-0.17	0.13	0.11	*0.47*	-0.07	-0.06	0.16	*0.24*	0.05	*0.22*	*0.21*	0.15	-0.10	*-0.19*
Illite/Mica	*-0.23*	*0.68*	*0.62*	0.01	0.03	*0.45*	0.02	-0.05	0.15	*-0.38*	-0.01	0.01	*0.52*	*0.38*
Kaolinite	*-0.22*	0.01	-0.05	-0.07	*0.29*	0.14	*0.28*	-0.02	-0.01	0.01	-0.01	-0.11	*-0.28*	0.15
Pyrite	-0.11	-0.06	-0.01	*0.27*	-0.14	-0.15	0.12	-0.07	*0.44*	0.02	*0.48*	*0.48*	-0.03	*-0.19*
Calcite	*0.58*	*-0.44*	*-0.39*	*0.38*	*-0.27*	*-0.56*	0.10	0.15	0.03	*0.65*	0.16	*0.20*	*-0.60*	*-0.41*
Aragonite	*0.64*	*-0.41*	*-0.37*	0.09	-0.16	*-0.43*	0.09	0.03	0.05	*0.48*	0.10	0.12	*-0.53*	*-0.22*
Apatite	0.08	-0.05	-0.01	0.06	-0.06	-0.12	-0.00	0.05	-0.00	0.10	0.04	0.02	-0.03	-0.10
Garnet	-0.04	-0.03	0.03	0.01	0.00	-0.10	-0.02	-0.05	-0.00	-0.05	0.08	0.12	-0.01	-0.09
Troilite	-0.09	-0.07	-0.04	0.12	-0.12	0.01	*0.27*	-0.06	*0.74*	0.01	*0.74*	*0.69*	-0.08	-0.12
Dolomite	-0.05	-0.03	-0.05	0.07	0.00	-0.01	-0.03	0.09	-0.05	0.06	0.01	0.06	-0.07	0.00
Epidote	-0.02	-0.15	-0.17	*-0.19*	-0.00	0.13	-0.17	-0.07	-0.04	*0.24*	-0.07	-0.14	-0.07	-0.01
Diopside	-0.04	0.05	0.04	0.09	-0.06	-0.00	0.04	0.06	-0.01	0.04	0.01	-0.00	0.09	-0.12

Correlations (r)
Marked correlations are significant at $p < .05000$
N=109 (Casewise deletion of missing data)

Variable	Zn	Cu	Ni	Co	Ce	La	Nd	W	Sulphur	TOC	Carb-C	Clay (%)
Ni	*0.27*	*0.68*	1.00	*0.72*	-0.01	-0.05	-0.11	*-0.51*	-0.09	-0.07	*-0.37*	0.10
Co	*0.62*	*0.86*	*0.72*	1.00	*0.34*	*0.32*	*0.29*	-0.10	-0.16	*-0.22*	*-0.55*	0.08
Ce	*0.80*	*0.23*	-0.01	*0.34*	1.00	*0.97*	*0.95*	*0.19*	0.02	-0.07	*-0.53*	0.15
La	*0.80*	*0.22*	-0.05	*0.32*	*0.97*	1.00	*0.94*	*0.24*	0.02	-0.03	*-0.54*	0.12
Nd	*0.78*	0.18	-0.11	*0.29*	*0.95*	*0.94*	1.00	*0.35*	0.01	-0.02	*-0.48*	0.10
W	0.17	-0.19	*-0.51*	-0.10	*0.19*	*0.24*	*0.35*	1.00	-0.04	0.03	-0.00	-0.06
Sulphur	-0.01	-0.10	-0.09	-0.16	0.02	0.02	0.01	-0.04	1.00	*0.68*	0.15	*0.37*
TOC	0.10	-0.14	-0.07	*-0.22*	-0.07	-0.03	-0.02	0.03	*0.68*	1.00	*0.25*	*0.44*
Carb-C	*-0.47*	*-0.46*	*-0.37*	*-0.55*	*-0.53*	*-0.54*	*-0.48*	-0.00	0.15	*0.25*	1.00	*0.22*
Clay (%)	*0.32*	0.06	0.10	0.08	0.15	0.12	0.10	-0.06	*0.37*	*0.44*	*0.22*	1.00
Water depth (m)	0.05	0.04	0.16	0.14	-0.07	-0.11	-0.06	-0.02	-0.18	0.03	0.17	*0.41*
Quartz	*-0.50*	*-0.47*	*-0.36*	*-0.47*	*-0.22*	*-0.20*	*-0.22*	-0.00	*-0.19*	*-0.32*	-0.07	*-0.44*
K-feldspar (Microcline, minor Orthoclase)	*0.28*	-0.05	*-0.21*	-0.00	*0.46*	*0.45*	*0.43*	*0.24*	0.07	-0.02	*-0.28*	0.14
Labradorite	0.01	*0.40*	*0.33*	*0.31*	0.11	0.12	0.07	-0.17	*-0.25*	*-0.32*	*-0.45*	*-0.38*
Albite	*0.21*	-0.19	*-0.32*	-0.11	*0.25*	*0.27*	*0.28*	*0.32*	0.11	0.18	-0.17	-0.09
Actinolite	0.07	*0.52*	*0.48*	*0.47*	-0.10	-0.12	-0.13	*-0.22*	-0.16	-0.18	*-0.42*	*-0.27*
Chlorite	*0.22*	*0.35*	*0.51*	*0.41*	-0.09	-0.11	*-0.20*	*-0.35*	-0.01	0.10	-0.03	*0.40*
Vermiculite/Smectite(high charge)	0.15	*0.27*	*0.23*	*0.24*	0.07	0.10	0.16	*0.23*	0.05	0.10	*-0.25*	*-0.30*
Illite-smectite	0.15	*-0.20*	-0.01	-0.06	0.00	0.01	0.10	*0.21*	*0.22*	*0.34*	0.13	*0.45*
Illite/Mica	*0.62*	*0.31*	0.19	*0.39*	*0.69*	*0.64*	*0.64*	-0.02	0.06	-0.08	*-0.45*	0.18
Kaolinite	-0.13	-0.12	0.14	-0.03	-0.18	*-0.21*	*-0.22*	-0.17	0.03	-0.04	0.10	0.12
Pyrite	-0.08	-0.12	-0.18	-0.19	-0.05	-0.03	0.01	0.18	*0.40*	*0.36*	0.02	0.02
Calcite	*-0.42*	*-0.46*	*-0.35*	*-0.54*	*-0.53*	*-0.52*	*-0.47*	0.01	0.15	*0.30*	*0.96*	*0.30*
Aragonite	*-0.43*	*-0.35*	*-0.26*	*-0.44*	*-0.43*	*-0.44*	*-0.44*	-0.14	0.10	0.12	*0.84*	0.06
Apatite	-0.05	-0.07	-0.05	-0.07	-0.05	-0.00	-0.05	0.06	0.06	0.11	0.08	0.08
Garnet	-0.07	-0.06	-0.05	-0.09	-0.03	0.01	0.00	-0.02	0.08	0.18	-0.00	0.03
Troilite	-0.06	-0.04	-0.12	-0.15	-0.06	-0.05	-0.02	0.01	*0.62*	*0.40*	0.01	0.05
Dolomite	-0.01	0.01	0.03	-0.02	-0.05	-0.04	0.00	-0.04	-0.02	0.05	0.00	-0.06
Epidote	0.04	*0.41*	*0.19*	*0.41*	-0.12	-0.09	-0.09	0.10	-0.09	*-0.22*	-0.10	-0.00
Diopside	0.05	-0.07	-0.05	0.00	0.08	0.07	0.12	0.15	0.01	0.10	-0.05	0.03

	Correlations (r) Marked correlations are significant at p < .05000 N=109 (Casewise deletion of missing data)						
Variable	Water depth (m)	Quartz	K-feldspar (Microcline, minor Orthoclase)	Labradorite	Albite	Actinolite	Chlorite
Ni	0.16	*-0.36*	*-0.21*	*0.33*	*-0.32*	*0.48*	*0.51*
Co	0.14	*-0.47*	-0.00	*0.31*	-0.11	*0.47*	*0.41*
Ce	-0.07	*-0.22*	*0.46*	0.11	*0.25*	-0.10	-0.09
La	-0.11	*-0.20*	*0.45*	0.12	*0.27*	-0.12	-0.11
Nd	-0.06	*-0.22*	*0.43*	0.07	*0.28*	-0.13	*-0.20*
W	-0.02	-0.00	*0.24*	-0.17	*0.32*	*-0.22*	*-0.35*
Sulphur	-0.18	*-0.19*	0.07	*-0.25*	0.11	-0.16	-0.01
TOC	0.03	*-0.32*	-0.02	*-0.32*	0.18	-0.18	0.10
Carb-C	0.17	-0.07	*-0.28*	*-0.45*	-0.17	*-0.42*	-0.03
Clay (%)	*0.41*	*-0.44*	0.14	*-0.38*	-0.09	*-0.27*	*0.40*
Water depth (m)	1.00	-0.17	-0.11	-0.01	*-0.32*	-0.07	*0.23*
Quartz	-0.17	1.00	-0.10	-0.03	0.07	*-0.27*	*-0.30*
K-feldspar (Microcline, minor Orthoclase)	-0.11	-0.10	1.00	-0.09	*0.25*	-0.07	*-0.19*
Labradorite	-0.01	-0.03	-0.09	1.00	*-0.51*	*0.52*	*-0.23*
Albite	*-0.32*	0.07	*0.25*	*-0.51*	1.00	*-0.20*	-0.17
Actinolite	-0.07	*-0.27*	-0.07	*0.52*	*-0.20*	1.00	0.00
Chlorite	*0.23*	*-0.30*	*-0.19*	*-0.23*	-0.17	0.00	1.00
Vermiculite/Smectite(high charge)	-0.11	*-0.24*	0.04	*0.33*	-0.02	*0.40*	*-0.31*
Illite-smectite	*0.23*	*-0.31*	0.07	*-0.40*	0.02	*-0.27*	*0.20*
Illite/Mica	-0.08	*-0.24*	0.15	-0.00	0.14	-0.05	0.06
Kaolinite	0.09	0.11	*-0.23*	-0.14	-0.18	-0.09	*0.26*
Pyrite	-0.02	0.12	-0.03	-0.02	-0.00	*-0.21*	0.03
Calcite	*0.23*	-0.05	*-0.29*	*-0.47*	-0.17	*-0.44*	0.02
Aragonite	0.11	0.01	*-0.34*	*-0.31*	-0.17	*-0.39*	0.01
Apatite	0.11	-0.00	-0.05	-0.00	-0.11	-0.16	0.01
Garnet	-0.16	0.07	0.05	0.03	-0.11	-0.10	0.13
Troilite	-0.07	-0.03	0.12	-0.04	0.04	-0.07	-0.06
Dolomite	0.09	-0.04	0.01	0.02	-0.06	0.03	-0.09
Epidote	0.09	-0.15	-0.06	0.10	-0.09	0.19	0.12
Diopside	0.03	-0.02	-0.03	-0.10	*0.19*	-0.13	-0.05

Variable	Correlations (r) Marked correlations are significant at p < .05000 N=109 (Casewise deletion of missing data) Vermiculite/Smectite(high charge)	Illite-smectite	Illite/Mica	Kaolinite	Pyrite	Calcite	Aragonite
Ni	*0.23*	-0.01	0.19	0.14	-0.18	*-0.35*	*-0.26*
Co	*0.24*	-0.06	*0.39*	-0.03	-0.19	*-0.54*	*-0.44*
Ce	0.07	0.00	*0.69*	-0.18	-0.05	*-0.53*	*-0.43*
La	0.10	0.01	*0.64*	*-0.21*	-0.03	*-0.52*	*-0.44*
Nd	0.16	0.10	*0.64*	*-0.22*	0.01	*-0.47*	*-0.44*
W	*0.23*	*0.21*	-0.02	-0.17	0.18	0.01	-0.14
Sulphur	0.05	*0.22*	0.06	0.03	*0.40*	0.15	0.10
TOC	0.10	*0.34*	-0.08	-0.04	*0.36*	*0.30*	0.12
Carb-C	*-0.25*	0.13	*-0.45*	0.10	0.02	*0.96*	*0.84*
Clay (%)	*-0.30*	*0.45*	0.18	0.12	0.02	*0.30*	0.06
Water depth (m)	-0.11	*0.23*	-0.08	0.09	-0.02	*0.23*	0.11
Quartz	*-0.24*	*-0.31*	*-0.24*	0.11	0.12	-0.05	0.01
K-feldspar (Microcline, minor Orthoclase)	0.04	0.07	0.15	*-0.23*	-0.03	*-0.29*	*-0.34*
Labradorite	*0.33*	*-0.40*	-0.00	-0.14	-0.02	*-0.47*	*-0.31*
Albite	-0.02	0.02	0.14	-0.18	-0.00	-0.17	-0.17
Actinolite	*0.40*	*-0.27*	-0.05	-0.09	*-0.21*	*-0.44*	*-0.39*
Chlorite	*-0.31*	*0.20*	0.06	*0.26*	0.03	0.02	0.01
Vermiculite/Smectite(high charge)	1.00	0.04	-0.04	-0.11	0.06	*-0.27*	*-0.22*
Illite-smectite	0.04	1.00	-0.02	0.04	0.08	0.19	-0.10
Illite/Mica	-0.04	-0.02	1.00	-0.06	-0.09	*-0.51*	*-0.38*
Kaolinite	-0.11	0.04	-0.06	1.00	-0.08	0.11	0.08
Pyrite	0.06	0.08	-0.09	-0.08	1.00	0.01	-0.04
Calcite	*-0.27*	0.19	*-0.51*	0.11	0.01	1.00	*0.80*
Aragonite	*-0.22*	-0.10	*-0.38*	0.08	-0.04	*0.80*	1.00
Apatite	-0.09	0.16	-0.02	0.00	-0.03	0.09	0.07
Garnet	-0.06	0.02	-0.09	-0.03	*0.26*	0.01	-0.04
Troilite	0.07	0.12	-0.07	-0.04	*0.65*	0.00	-0.05
Dolomite	0.18	*0.19*	-0.13	-0.03	-0.02	0.04	-0.04
Epidote	-0.02	-0.03	-0.15	0.05	-0.06	-0.11	-0.09
Diopside	0.03	0.18	0.02	-0.05	-0.03	-0.06	-0.06

Variable	Correlations (r) Marked correlations are significant at p < .05000 N=109 (Casewise deletion of missing data) Apatite	Garnet	Troilite	Dolomite	Epidote	Diopside
Ni	-0.05	-0.05	-0.12	0.03	*0.19*	-0.05
Co	-0.07	-0.09	-0.15	-0.02	*0.41*	0.00
Ce	-0.05	-0.03	-0.06	-0.05	-0.12	0.08
La	-0.00	0.01	-0.05	-0.04	-0.09	0.07
Nd	-0.05	0.00	-0.02	0.00	-0.09	0.12
W	0.06	-0.02	0.01	-0.04	0.10	0.15
Sulphur	0.06	0.08	*0.62*	-0.02	-0.09	0.01
TOC	0.11	0.18	*0.40*	0.05	*-0.22*	0.10
Carb-C	0.08	-0.00	0.01	0.00	-0.10	-0.05
Clay (%)	0.08	0.03	0.05	-0.06	-0.00	0.03
Water depth (m)	0.11	-0.16	-0.07	0.09	0.09	0.03
Quartz	-0.00	0.07	-0.03	-0.04	-0.15	-0.02
K-feldspar (Microcline, minor Orthoclase)	-0.05	0.05	0.12	0.01	-0.06	-0.03
Labradorite	-0.00	0.03	-0.04	0.02	0.10	-0.10
Albite	-0.11	-0.11	0.04	-0.06	-0.09	*0.19*
Actinolite	-0.16	-0.10	-0.07	0.03	0.19	-0.13
Chlorite	0.01	0.13	-0.06	-0.09	0.12	-0.05
Vermiculite/Smectite(high charge)	-0.09	-0.06	0.07	0.18	-0.02	0.03
Illite-smectite	0.16	0.02	0.12	*0.19*	-0.03	0.18
Illite/Mica	-0.02	-0.09	-0.07	-0.13	-0.15	0.02
Kaolinite	0.00	-0.03	-0.04	-0.03	0.05	-0.05
Pyrite	-0.03	*0.26*	*0.65*	-0.02	-0.06	-0.03
Calcite	0.09	0.01	0.00	0.04	-0.11	-0.06
Aragonite	0.07	-0.04	-0.05	-0.04	-0.09	-0.06
Apatite	1.00	-0.01	-0.02	-0.01	-0.03	-0.02
Garnet	-0.01	1.00	-0.01	-0.01	-0.02	-0.01
Troilite	-0.02	-0.01	1.00	-0.01	-0.03	-0.02
Dolomite	-0.01	-0.01	-0.01	1.00	-0.02	0.12
Epidote	-0.03	-0.02	-0.03	-0.02	1.00	-0.03
Diopside	-0.02	-0.01	-0.02	0.12	-0.03	1.00