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Organic soil geochemistry in southern Trøndelag, QC-report

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# REPORT

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Organic soil geochemistry in southern Trøndelag, QC - report

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**Summary:**

This survey constitutes a continuation of corresponding surveys undertaken in Finnmark, Troms and Nordland Counties, as well as in North Trøndelag and on Fosen. During the main field work in 2018, and the complementary field work in 2019, organic soil samples (humus) and mineral soil samples were collected in a grid of 6x6 km in the remaining part of south Trøndelag. In total 454 locations where sampled. The <2 mm dried size fraction of these samples were analysed by ICPMS for 53 elements following Aqua Regia digestion. In addition, loss of ignition (LOI) is determined at 480°C. In this report quality of analytical results of organic soil are documented in tables, descriptive statistics and by single element maps on a backdrop of bedrock geology. A separate QC-report for the mineral soil samples has been published previously.



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|---|---|---|
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| | | |

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## 1. INTRODUCTION

Till stored at NGUs storage at Løkken (The National archive for geological sample material) from Finnmark, Troms and Nordland County, collected with an approximate density of 1 sample/40 $km^2$, was re-analysed in 2011, (Reimann et al., 2011). North-Trøndelag with adjacent parts of South-Trøndelag in addition to Fosen were sampled in 2013 with a density of 1 sample/36 $km^2$ (Finne et al., 2014). During the 2013 survey organic soil samples, O-horizon, were collected with the same density as the mineral soil, usually at the same sites, (Finne and Eggen, 2014). The data from this sampling campaign have been further interpreted and documented by Reimann et al., 2015, Reimann et al., 2016, Reimann et al., 2019 and others. Given the potential to identify areas of interest for mineral exploration and/or environmentally impacted by anthropogenic activity it was decided to continue with the combined organic-bottom soil sampling when completing the sampling of Trøndelag County in 2018. The remaining part of Trøndelag County was sampled in 2018 and complementary re-sampling was done in 2019. The survey area with overlaid sampling grid of 6km x 6km, is shown in Figure 1.

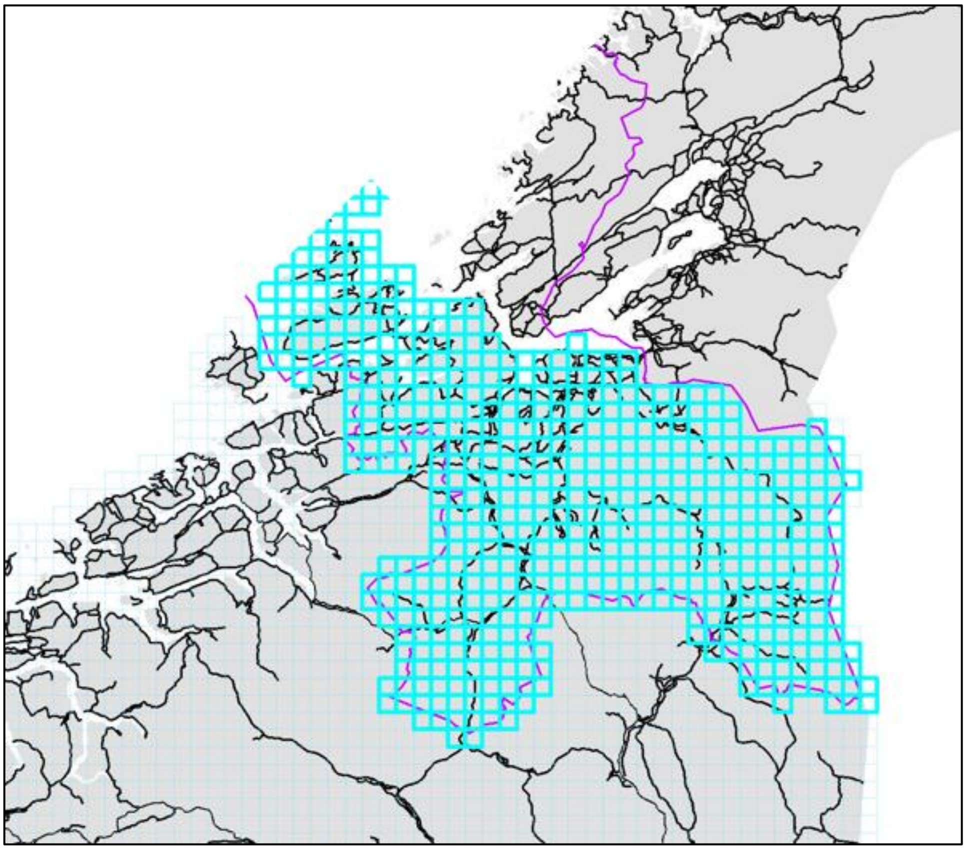

FIGURE 1. SURVEY AREA FOR THE NATIONAL GEOCHEMICAL MAPPING PROGRAM 2018 AND 2019. SAMPLING GRID 6KM X6KM.

In this report, the quality of analytical results of organic soil (herein also named humus) collected in the southern part of Trøndelag are documented in tables with descriptive statistics and by single element maps plotted on top of the bedrock geology. A separate QC-report for the mineral soil samples has been published previously (Flem et al., 2020)

## 2. DESCRIPTION OF THE SURVEY AREA

### 2.1 Bedrock

The north-western part of southern Trøndelag is mainly comprised by granites, granitic gneisses and gabbros which represent the geological basement in the Western Gneiss Region (Figure 2). These gneisses were strongly reworked during the Caledonian orogeny (Tveten et al., 1998). The Møre-Trøndelag Fault Zone (MTFZ), which is a major ENE -WSW feature consisting of faults and folds, can be seen running along the coastline as a series of parallel ductile, compressional shear zones.

The main part of the sampled area, however, comprises supracrustal bedrocks within the Trondheim Nappe complex, which consists of Caledonian nappes belonging to several tectonostratigraphic levels (Nilsen et al., 2007 and references therein). These were thrusted E-SE into several tectonic units, such as the Meråker, Gula and Støren nappes (e.g. McClellan, 2004). The Meråker and Støren nappes both contain ophiolite and island arc complexes overlain by sedimentary and volcanic successions of variable metamorphic grade (Corfu et al., 2014).

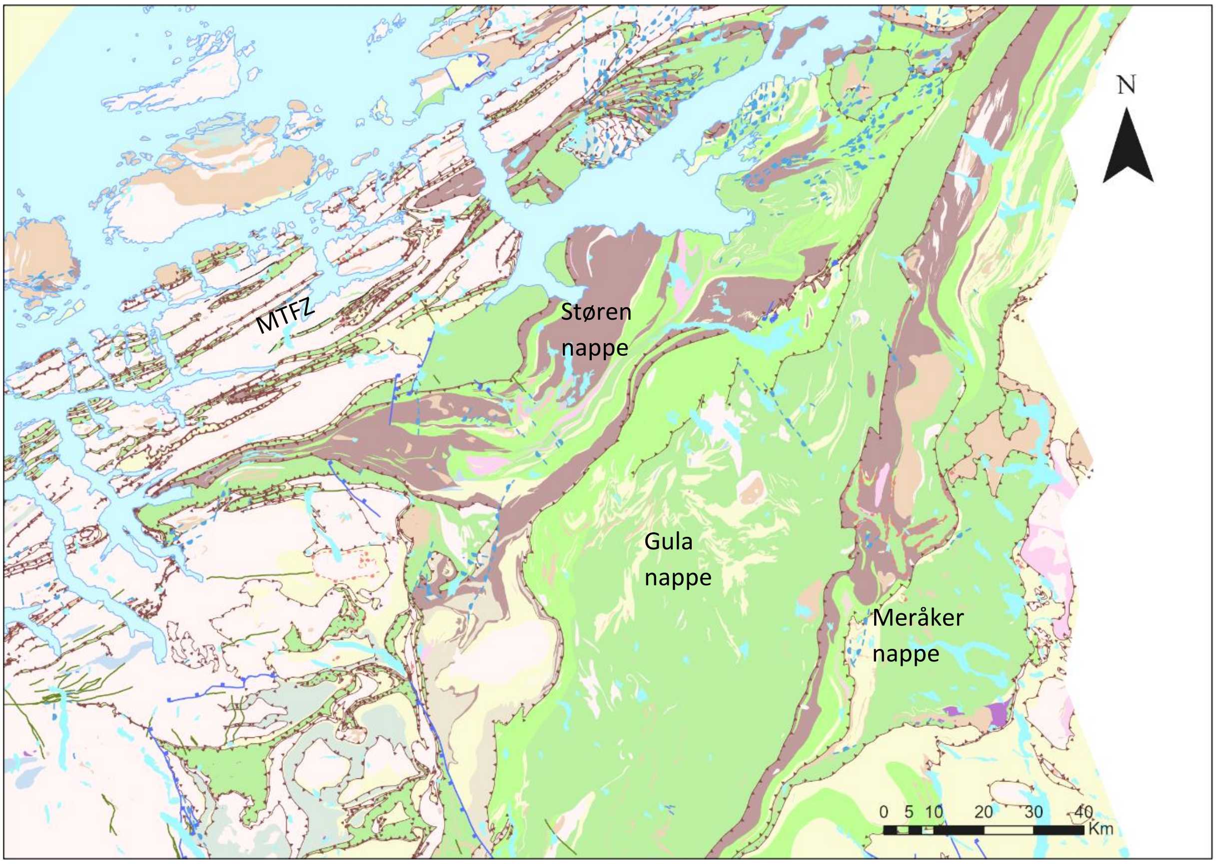


**FIGURE 2. BEDROCK MAP OF THE SAMPLED AREA. BEDROCK UNITS ON THE MAP ARE MERGED UNITS FROM NGU'S 1: 250 000 BEDROCK MAP. STRUCTURAL ELEMENTS IN BROWN DOTTED LINES REPRESENT DUCTILE, COMPRESSIONAL SHEAR ZONES, WHILE BRITTLE STRUCTURES ARE REPRESENTED WITH BLUE DOTTED LINES.**

## 2.2 Known mineral resources.

Particularly striking, within many of the Palaeozoic volcano-sedimentary successions of the central Caledonides, is the occurrence of major base metal volcanogenic massive sulfide deposits (VMS), for example Løkken and Røros (Cu, Zn). The most prominent occurrences are VMS deposits in metasedimentary successions associated with gabbroic intrusions, such as in Røros (Zn, Cu, Pb). The other most significant VMS deposits within the southern part of Trøndelag are within the Kvikne-Singsås (Cu, Zn, Ni) and Folldal-Meråker (Cu, Zn) metallogenic areas. These metallic mineral deposits were formed during rifting to subduction and collision within the Caledonian orogeny, during 600–390 Ma (Sandstad et al., 2012). Figure 3 shows the metallogenic areas and deposits identified within southern Trøndelag (Sandstad et al., 2012). In Figure 4 the deposits are further divided into the most prominent elements.

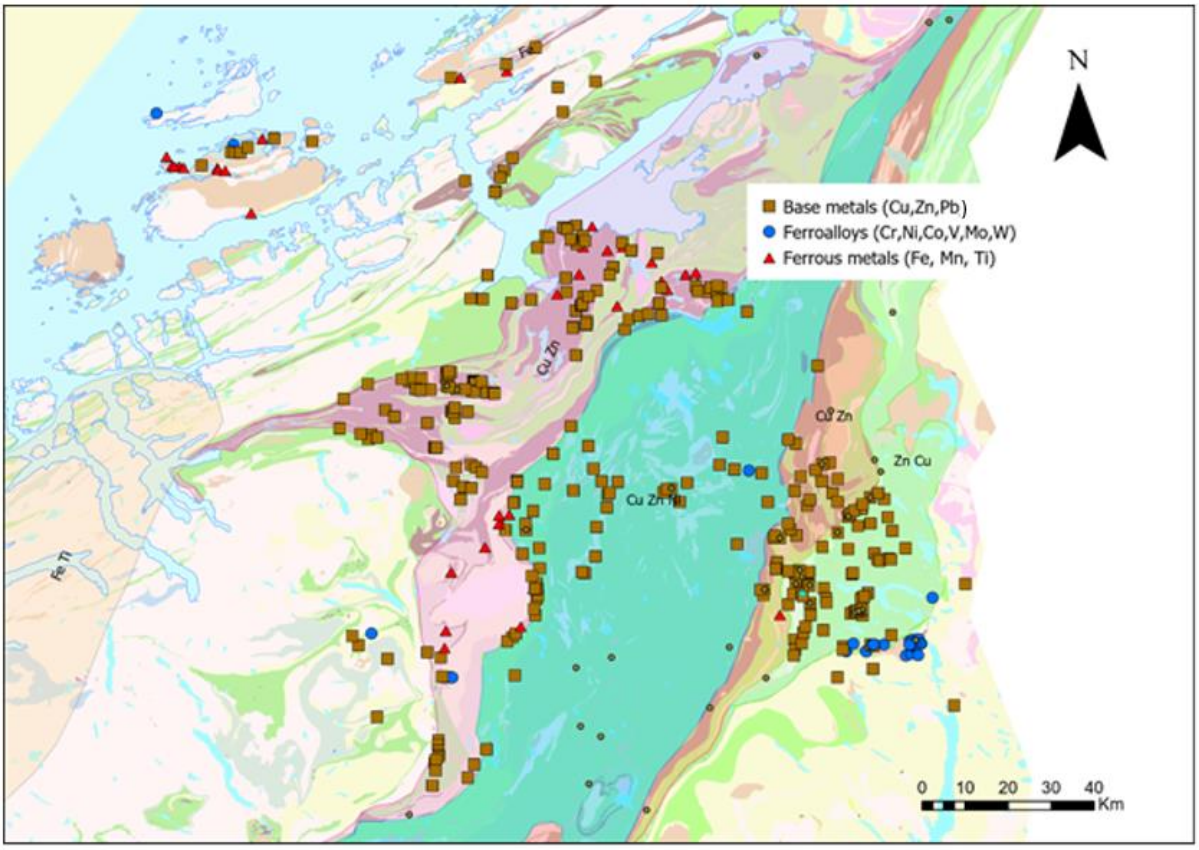


FIGURE 3. MAP OF METALLIC MINERAL RESOURCES WITHIN THE SOUTHERN PART OF TRØNDELAG. DATA FROM NGU'S ORE DATABASE.

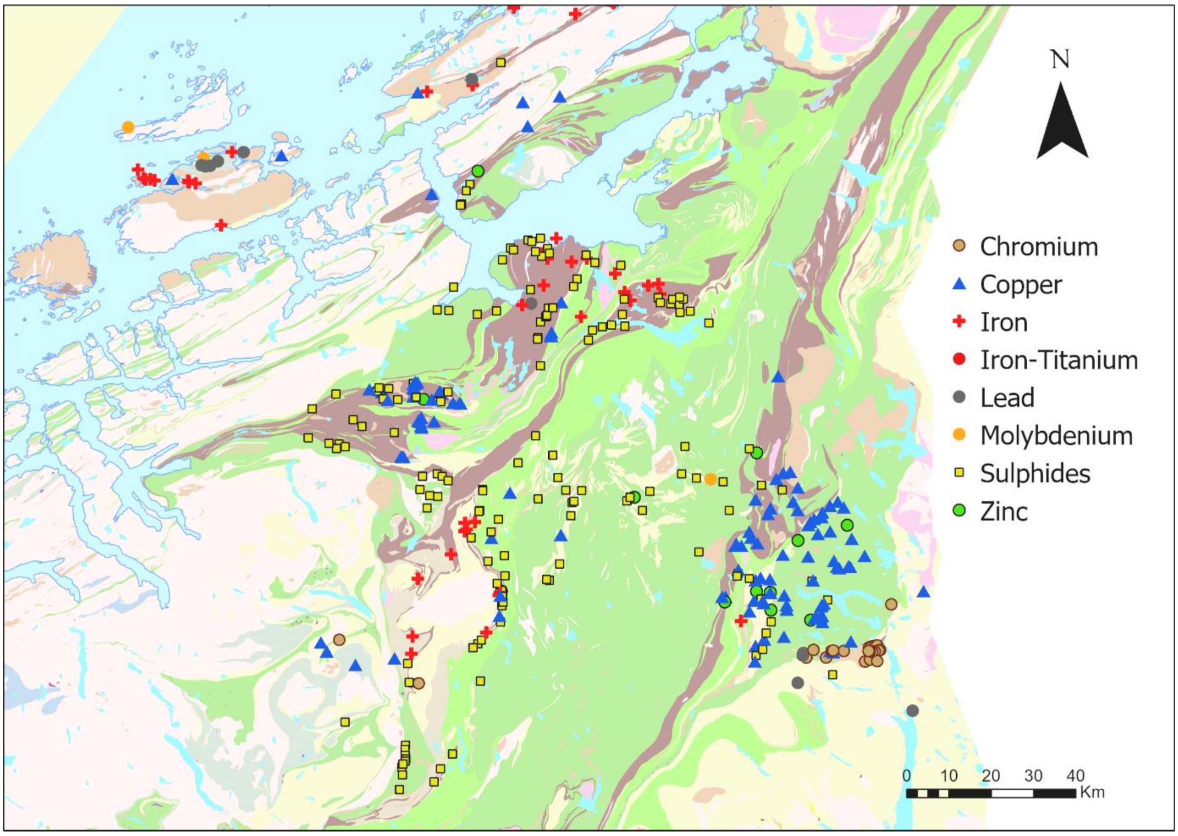


FIGURE 4. GEOLOGICAL MAP SHOWING THE SAME MINERAL RESOURCES AS IN FIGURE 2 BUT DIVIDED INTO SUBSETS. DATA FROM NGU'S ORE DATABASE.

### 2.3 Quaternary deposits

The quaternary deposits of the area towards the coastline are dominated by areas of bare bedrock or thin, discontinuous till material, interspersed with weathered rock of local origin. Figure 5 shows areas of till, mostly confined to lower altitudes in the mountain regions towards the Swedish border. The area surrounding Trondheim is characterized by marine deposits in the form of clay and fluvial deposits. Rivers discharging into the sea by Trondheim and Orkanger have given rise to substantial fluvial deposits in the river valleys.

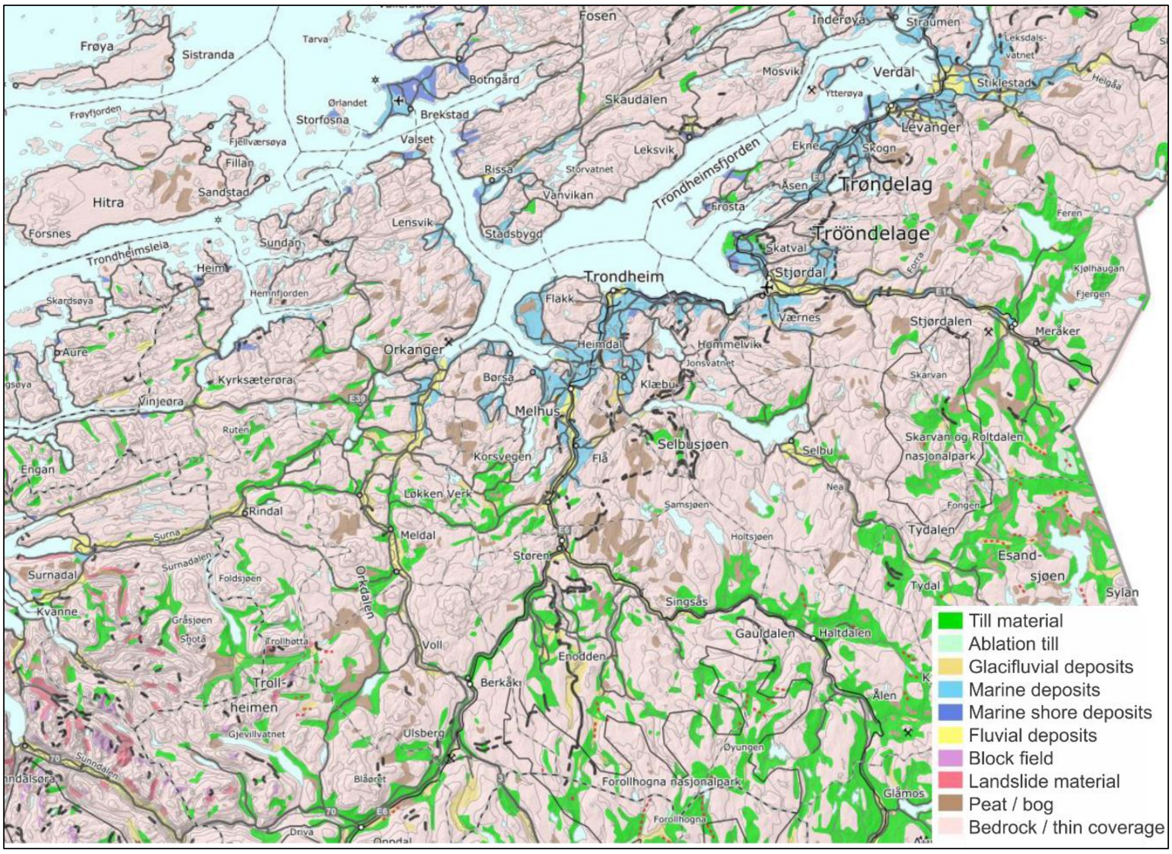


FIGURE 5. GEOLOGICAL MAP SHOWING LARGE SCALE QUATERNARY DEPOSITS. DATA FROM NGU'S DATABASE.

# 3 METHODS

## 3.1 Field work

A 6x6 km grid covering the remaining part of the Trøndelag County following the survey conducted in 2013 (Finne et al., 2014; Finne and Eggen, 2014) was used for the selection of sample sites (Figure 1). The exact location of each sample site within a grid cell was determined in the field based largely on accessibility, trying to come as close as practically possible to the centre of the cell. Though most sites could be reached by car, some required long walking trips. A Quaternary geology base map was always on hand in order to avoid sampling on top of glaciofluvial and marine deposits. All samples were taken on undeveloped land. The size of the survey area was approximately 17,000 km$^2$. At each sample site, soil samples representing the C- and O-horizons were taken in the same way as described by Finne et al., 2014 and Finne and Eggen, 2014.

Whenever possible a location where soil was developed on till was chosen and preferably where Podzol was the dominant soil type. Each soil O-horizon sample consists of a minimum of five sub-samples collected within an area of approximately 100 m$^2$. The organic material was acquired with a special steel tool or cut out with a steel spade. The steel tool was used to cut out a cylindrical sample with a diameter of 10 cm and a depth of 14 cm at each sub-site; when the spade was used a square piece of soil of about 15x15x10 cm was cut out (example shown Figure 6). Living plant material was removed from the top of each sub-sample and any non-organic material was removed from the bottom so that only the uppermost 2–5 cm of the humus and litter layer was retained. Sampling and all sample handling of the organic soil were carried out using vinyl gloves. The samples were stored in white Hubco soil sample bags, 7″ × 12-1/2″, made of a poly/cotton blend cloth obtained from Forestry Suppliers, Inc., US. These contamination-free bags allow organic samples to partially air-dry during transport without starting to develop moulds. At each sample site, the vegetation and the general landscape were documented in a number of photos.

FIGURE 6. EXAMPLE OF ORGANIC SOIL SAMPLE TAKEN WITH A SPADE IN A MOUNTAIN LANDSCAPE ABOVE THE TREE-LINE.

## 3.2 Sample preparation/pre-analysis

All soil samples were air dried at temperatures below 30 °C upon arrival at the laboratory of the Geological Survey of Norway (NGU) in Trondheim within days after sampling. They were subsequently sieved using a <2 mm nylon mesh (lumps were disaggregated by hand) and the passing fraction was retained for analysis. All samples were randomised before submission to the laboratory, and a project standard, field duplicates and sample duplicates were inserted in such a way that they were not recognisable by the laboratory following methods of Eggen et al. (2019).

### 3.3 Laboratory analysis

The randomized sample series of the <2 mm fraction was shipped to Acme Labs (now doing business as Bureau Veritas Minerals) in Vancouver Canada for chemical analysis. The standard package 'VG105 Dry Plant Material Analysis' involving splits of 5 g was selected. The analytical packages involve a modified aqua regia digestion which consists of 1:1:1 v/v concentrated ACS grade HCl, $HNO_3$ and de-mineralized $H_2O$. The analyses were performed by using a Perkin Elmer Elan 6000/9000 inductively coupled plasma mass spectrometer (ICPMS) for 53 elements. Details on the analytical procedure can be found on Acme Labs home page, http://acmelab.com/.

Loss on ignition (LOI) determinations was done at NGU-Lab on 4 g sample sizes with exposure times 2 hours at 200°C then 20 hours at 480 ± 10 °C in a Thermolyne Large Chamber Muffle Furnace 45. Gravimetric data are obtained with an accredited weight with precision ± 0.1 mg. The overall analytical uncertainty is estimated to 15 % relatively.

### 3.4 Quality control

It was agreed with both laboratories that all instrumental readings had to be reported, independent of detection limit (DL) or quantification limit (QL) set by the laboratory. Reporting limits used by the laboratory are usually set higher than the real quantification limit, as laboratory limits must cover long time operation conditions – possibly years. In addition, the data should not be rounded off, and at least one significant figure containing uncertainty had to be retained.

A project in-house reference material was prepared from natural peat material and analysed after every 20$^{th}$ sample in the randomized sample sequence.

For possible analytical comparison with the previous surveys undertaken in North-Trøndelag and Fosen in 2013-2014 (Finne and Eggen, 2014), a collection of samples was evenly distributed into the new sample series and re-analysed. The same lab, Bureau Veritas Minerals, Vancouver, Canada, have been used for both surveys.

The sampling and analytical design follows the unbalanced ANOVA design used in earlier surveys (e.g., Eggen and Finne, 2014; Eggen et al., 2017). The same information can be obtained from a balanced or an unbalanced sampling and analysis design, but an unbalanced design makes a more efficient use of resources (Reimann et al., 2008; Eggen et al., 2019).

# 4 RESULTS

## 4.1 Analytical Quality Control, QC

### 4.1.1 In-house project standard

In Appendix 1, the analytical results for all samples; ordinary samples in addition to field duplicates and analytical duplicates and the in-house project standard Nmv (red circles), are shown in the order they were analysed in the lab. The x-axis shows the random number given to each sample before shipping to the laboratory. Negative concentration values reported by the lab are replaced by a low positive value, (e.g., 0.00001 mg/kg). For elements with low concentrations the laboratory detection limit is indicated by a green dashed line. The appropriateness of the in-house standard for this survey is good for most elements except Be and Bi (too low) and Ca, K and S (too high).

Germanium (Ge) might be out of analytical control (Appendix 1) as the in-house project standard shows a decreasing trend in the random plot (Figure 7). Performing ICPMS analysis, the Ge isotope is interfered by Fe-O and S-Ar ions and need proper correction procedures.

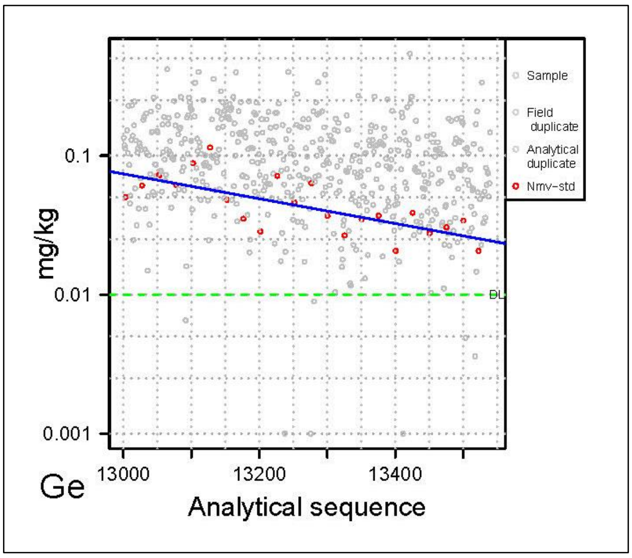


**FIGURE 7. RANDOM PLOT OF GE SHOWING THAT THERE MIGHT BE AN ANALYTICAL TREND IN THE DATA.**

Twenty-two splits of the in-house project standard were analysed along with the samples, one split after approximately every 20th sample. A statistical summary for the project in-house standard is given in Table 1. This includes the minimum, median, and maximum concentration values for all elements.  The elements: Be, Bi, In, Pd, Pt, Te and W have concentrations at or below the laboratory detection limit (DL). It is thus not possible to calculate the analytical repeatability for these elements. Most of the other elements show acceptable analytical repeatability with a robust coefficient of variation, CVR<15% for the in-house project standard (Table 1). However, the elements Th, Ta, Hf, Sn, Au, Re and Ge show a precision (CVR) in growing order from 18 to 42%, mainly due to proximity to DL (e.g., Re) and/or sample inhomogeneity (e.g. Au), see Appendix 1.

#### 4.1.2 Laboratory standards/reference materials

Two in-house laboratory reference materials have been reported along with the sample by ACME, CDV-1 and V16. The summary statistics for the ACME in-house standard CDV-1 is given in Table 2 and V16 in Table 3. These standard has been milled and have thus a more homogenic grain size distribution than the Nmv organic in-house reference material that is a <2 mm sieved fraction. Less variation in the analytical results is therefore expected, and as shown in Table 2, the analytical repeatability (CRV) for all elements is generally better.  V16 and CDV-1 show high CVR for Ge, 53.5% and 13.5% respectively, the later might be underestimated as some values are below detection limit. This might support the assumption on poor analytical control of Ge. Both ACMES standards are too low in concentration, below DL, for several elements to be a good reference material to validate precision.

According to ACMEs reports the same in-house reference materials, V16 and CDV-1, was used along with the analysis of the former survey of northern Trøndlag and Fosen (Finne and Eggen, 2014). Precision between median concentration values from the North Trøndelag and Fosen survey and this survey, which completes the Trøndelag County is given in Table 4. Most elements show less than 10% relative difference; however, some elements show larger deviation between the two contracts, e.g., B, Ge, Nb, Pb, Sb, Se, Sn V and Zn. ACME being a contract lab, we cannot be sure that it is the same batch of in-house standard that has been used for both surveys.

### 4.1.3 Samples re-analysed from previous surveys

A selection of 22 organic soil samples from the North Trøndelag and Fosen survey (Finne and Eggen, 2014) was reanalysed; 1134, 1265, 1372, 1474, 1502, 1505, 1509, 1511, 1517, 1519, 1523, 1531, 1540, 1559, 1580, 1593, 1657,1662, 1686, 1728, 1762, 1762_D along with the south Trøndelag samples. The results from the laboratory analyses for all 54 elements are shown in Appendix 2. Most elements show a very satisfactory reproducibility. However, B, Th and V is reported with a significant systematically too high concentration and Pb is systematically too low (Appendix 2) in the new analytical report.

## 4.2 Precision, locations with field duplicates and analytical duplicates

At approximately every twentieth sample location a field duplicate was collected. After drying and sieving, a split was prepared and analysed with the samples (an analytical duplicate of the field duplicate). Table 5 gives a precision estimate for all elements, with concentrations above DL, of the field and analytical duplicate pairs. In addition, the number of pairs above DL of the total of 21 pairs analysed are given. The estimated precision given by the coefficient of variation (CV) for the field duplicates (ordinary sample compared with the field duplicate) ranges from 14% (P and Hg) to 313% (Mn). Manganese, Mn, is the element with the largest regional variation, P=3.2, Table 5. The comparison of the ordinary sample and field duplicate (CV= 24%) indicate that Mn also show large local variation.  The analytical duplicate pairs (the duplicate field sample and the analytical duplicate) show a much smaller range and better precision. Again, P shows the best precision (CV=3.8%), while Au shows the poorest (48%).

The correlation between ordinary sample and duplicate sample, and the correlation between duplicate sample and analytical duplicate, are shown in Appendix 3. Poor correlation is usually due to low concentrations (e.g., Au, Be, Ta) or due to natural variation.

## 4.3 Loss on ignition, 480°C

Loss on ignition (LOI) was reported under contract number 2019.0162 (NGU-Lab). The summary statistics is given in Table 6 with minimum, mean, median and maximum value reported. The histogram and the one-dimensional scatterplot shown in Figure 8 (left) as well as the cumulative probability plot (right) shows a strong skewness of the data towards high LOI. The lowest measured LOI's might be influenced by mineral residues incorporated in the humus layer. EDA (exploratory data analysis) map for LOI is shown in Figure 9, giving an overview of the LOI data by location.

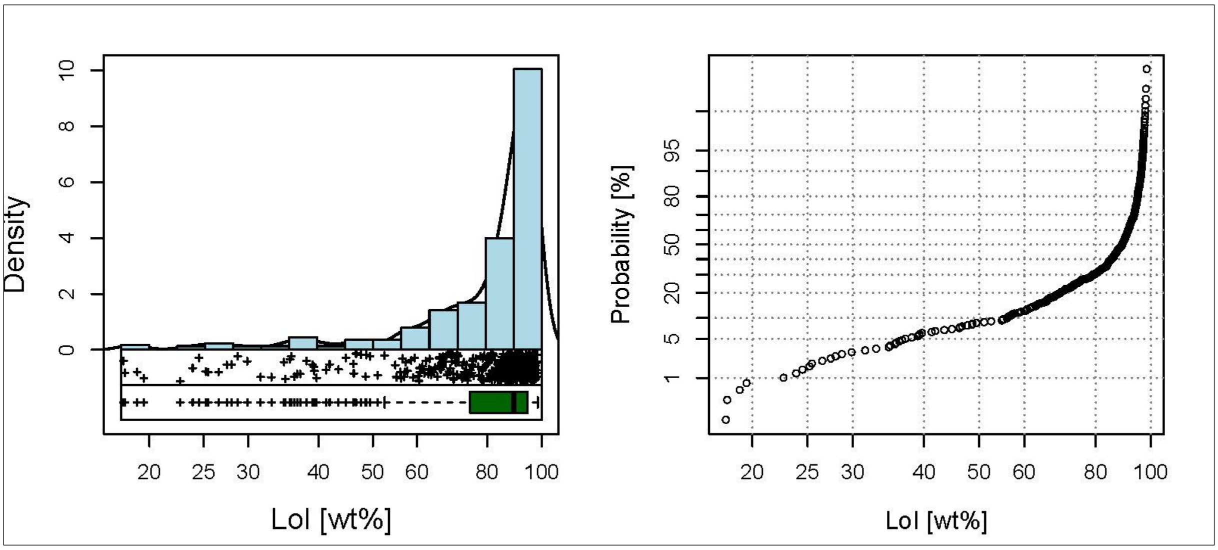


FIGURE 8 COMBINATION PLOTS OF HISTOGRAM, DENSITY TRACE, ONE-DIMENSIONAL SCATTERPLOT AND TURKEY BOXPLOT FOR DETERMINED LOSS OG IGNITION AT THE LEFT-HAND PICTURE AND CP PLOT IN THE RIGHT-HAND PICTURE.

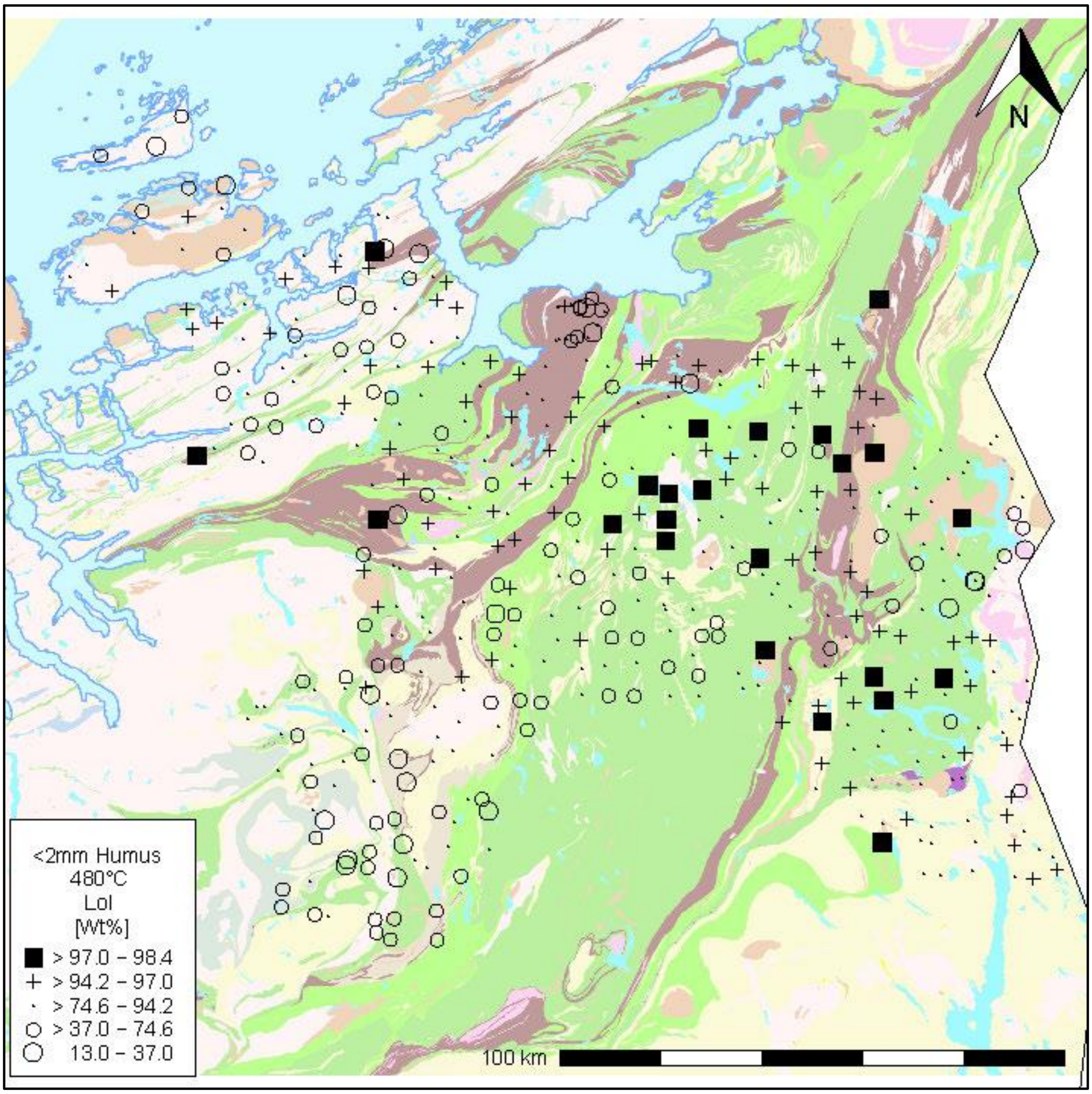


**FIGURE 9 EDA MAP SHOWING THE REGIONAL DISTRIBUTION OF LOI AT ALL LOCATION BY PERCENTILES (95-100%, 75-95%, 25-75%, 5-25%, 0-5%)**

### 4.4 Survey data and maps

The survey data, 454 locations in the southern part of Trøndelag county, can be downloaded from the geochemical database at NGU, at http//geo.ngu.no/kart/Geokjemi mobil/. An overview of the data is presented in Table 7 giving the number of samples above DL, minimum and maximum concentration values measured, and the 2, 5, 10, 25, 50, 75, 90, 95 and 98% quantiles. In addition, the powers (P) are given as a measure of variation. The powers provide a direct impression of the orders of magnitude each element varies.

Plots of the cumulative distribution function are one of the most informative displays of geochemical distributions (Reimann et al., 2008; Flem et al., 2018). These plots allow the direct visual recognition of breaks in the distribution which may indicate different geological or anthropogenic processes. Appendix 4 provides the plots of the empirical cumulative distribution function (ECDF-plots) for all 53 elements analysed. All laboratory readings are shown including those below detection limit, negative reading is however replaced by a low positive value. The detection limit is for those elements with low concentrations indicated by a dotted line.

Exploratory data analysis maps (EDA-maps) of all elements are given in Appendix 5, except for Be, In, Pd, Pt, Re, Te and W, which have too many samples below DL. Map of Ge is given, even though the data shows a decreasing trend in Figure 7. As the samples was randomised before analysis the lack of analytical control at the laboratory will not affect a specific area but the whole survey area. This will lead to a noisier map and high anomalies might be indicated by only one sample. The map of Ge should be used with this in mind. Figure 10 shows the EDA symbols used in Appendix 5 with percentiles for each class.

| | **EDA symbol set** | **Percentiles used** |
|---|---|---|
| Highest concentration values | ■ | 95-100% |
| Higher concentration values | + | 75-95% |
| Inner concentration values | • | 25-75% |
| Lower concentration values | ○ | 5-25% |
| Lowest concentration values | ◯ | 0-5% |

**FIGURE 10. THE EDA (EXPLORATORY DATA ANALYSIS) MAP SYMBOL SET USED IN THIS REPORT, APPENDIX 5.**

## 5 PRELIMINARY OBSERVATIONS

The aim of this report is to describe the soil sampling, analysis, and the quality of the data. However, a few first impressions of the data are considered necessary to state.

The shape of the survey area gives large contrasts as several lithological units are present (see Figure 2). Some elements, such as Se and Na, are clearly influenced by distance to the ocean, elevation, and main precipitation direction.

The elements Be, In, Pd, Pt, Re, Te and W, have too many samples below DL to construct EDA maps, however, their high anomal values is still interesting. For elements with few samples showing concentrations above DL a better visualisation is given by upper quantile maps. In Figure 11 the 98%ile map of Re and W are shown. High values og Re is concentrated at the coastline above felic lithologies such as granite and granitic gneisses. Interesting enough, some of the Re-rich samples roughly coincide with high Mo concentrations, perhaps suggesting the present of molybdenite in felsic lithologies from northwest portion of the study area. High values of W are concentrated in the city of Trondheim, this also applies to elements such as, Sb, Sn and Zn all used in metal alloys and paint.

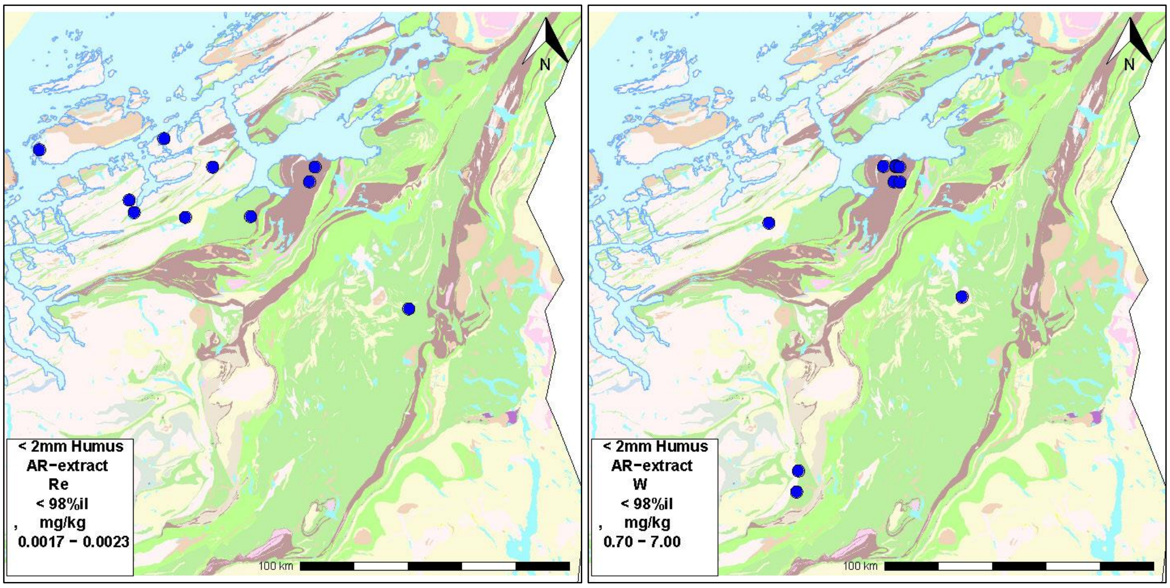


FIGURE 11. PERCENTILE MAP (98%IL) OF Re AND W.

Beryllium (Be) are delivered from the laboratory with too poor detection limit to construct sensible EDA maps, Table 7, however constructing a combined 95%ile map and 99%ile map gives useful information. Figure 12 shows that all high Be values are found above lithologies with granite and granitic gneisses. One area, around Stuggudalen close to the Swedish border, stands out with several samples showing high concentration values of Be. The same area stands also out with high Be concentrations in mineral soil (Flem et al., 2020).

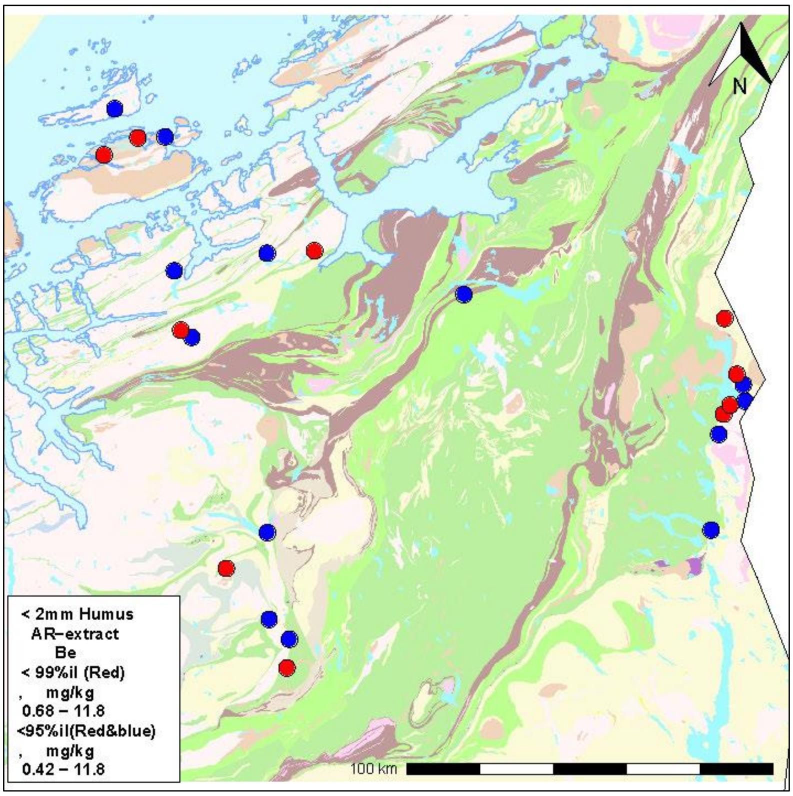


FIGURE 11. PERCENTILE MAP OF Be. ALL DOTS SHOW LOCATIONS OF SAMPLES WITH CONCENTRATIONS OF Be ABOVE THE 95 %IL WITH RED DOTS SHOWS ONLY THOSE ABOVE THE 99%IL.

## 6 CONCLUSION

The re-analysis of samples from the previously survey of the northern part of Trøndelag and Fosen (Finne and Eggen, 2014) demonstrate that data from the two datasets can be used together, particularly if working with quantiles. The exceptions are B, Th and V which are reported with significantly higher concentration values in this analytical contract compared with the analytical results given in 2014. The elements, Be, In, Pd, Pt, Re, Te and W, are delivered from the laboratory with too poor detection limit to construct sensible EDA-maps, but the concentrations reported above DL will still give useful information on the distribution of these elements.

## Acknowledgments

This project has received funding from the Trøndelag county council that covered the cost for laboratory analyses of the samples. The soil sampling team consisted of: Malin Andersson, Ola Eggen, Tor Erik Finne, Belinda Flem, Pål Gundersen, Åse Minde, Anna Seither and Guri Venvik. In addition to the soil sampling team, Mikal Danielsen, Sverre Iversen, Ane Bang-Kittelsen and Simon Risan participated in the pre-analysis/sieving of the samples after drying. Eirik Pettersen is acknowledged for assistance during the preparation of field maps. Clea Fabian, NGU-Lab is acknowledged for performing high quality LOI analysis.

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# TABLES

## Table 1: The MINS project organic soil standard Nmv.

Laboratory detection limit and summary statistics for the MINS project organic soil standard (Nmv). The minimum (MIN), median, maximum (MAX) is given. In addition, the interquartile range (IQR) and the robust coefficient of variation (CVR) is given as a measure of precision. All numbers given with 3 significant figures.

| MINS project organic soil standard (n=22) | | | | | | | Sorted by precision | |
|---|---|---|---|---|---|---|---|---|
| | Lab DL | MIN | MEDIAN | MAX | IQR | CVR | | CVR |
| Element | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | % | Element | % |
| Ag | 0.002 | 0.0275 | 0.0320 | 0.0695 | 0.00309 | 9.3 | Pb | 3.8 |
| Al | 100 | 3460 | 4050 | 4640 | 339 | 10.6 | V | 4.2 |
| As | 0.1 | 1.31 | 1.81 | 2.25 | 0.276 | 16.5 | Fe | 4.9 |
| Au | 0.0002 | <0.0002 | 0.000637 | 0.000952 | 0.000234 | 31.1 | Cr | 5.0 |
| B | 1 | 4.47 | 5.22 | 7.23 | 0.699 | 13.1 | Mn | 5.1 |
| Ba | 0.1 | 24.5 | 29.4 | 36.3 | 2.70 | 9.5 | Ca | 5.4 |
| Be | 0.1 | <0.1 | <0.1 | 0.134 | - | - | Sr | 5.6 |
| Bi | 0.02 | <0.02 | <0.02 | 0.221 | - | - | Zn | 5.8 |
| Ca | 100 | 14500 | 16700 | 18400 | 883 | 5.4 | Cu | 6.1 |
| Cd | 0.01 | 0.0978 | 0.114 | 0.148 | 0.0129 | 12.3 | Cs | 6.4 |
| Ce | 0.1 | 7.86 | 9.63 | 11.8 | 1.19 | 11.9 | Hg | 6.5 |
| Co | 0.01 | 3.14 | 3.85 | 4.52 | 0.349 | 9.6 | Y | 6.5 |
| Cr | 0.1 | 12.1 | 13.8 | 16.5 | 0.700 | 5.0 | Mo | 7.1 |
| Cs | 0.02 | 0.257 | 0.300 | 0.335 | 0.0205 | 6.4 | Rb | 7.2 |
| Cu | 0.01 | 13.7 | 15.5 | 18.4 | 1.00 | 6.1 | Se | 8.2 |
| Fe | 10 | 5340 | 6470 | 7770 | 372 | 4.9 | Ni | 8.4 |
| Ga | 0.1 | 0.847 | 1.03 | 1.24 | 0.104 | 10.1 | Mg | 8.6 |
| Ge | 0.01 | 0.0206 | 0.0378 | 0.114 | 0.0221 | 42.1 | U | 8.7 |
| Hf | 0.001 | 0.0179 | 0.0430 | 0.0567 | 0.00856 | 21.9 | Ag | 9.3 |
| Hg | 0.001 | 0.0356 | 0.0451 | 0.0528 | 0.00298 | 6.5 | Na | 9.3 |
| In | 0.02 | <0.02 | <0.02 | <0.02 | - | - | Ba | 9.5 |
| K | 100 | 1550 | 1790 | 2020 | 170 | 9.9 | Co | 9.6 |
| La | 0.01 | 3.63 | 4.43 | 5.19 | 0.508 | 11.1 | K | 9.9 |
| Li | 0.01 | 1.90 | 2.45 | 3.32 | 0.264 | 11.7 | Zr | 10.1 |
| Mg | 10 | 3450 | 3900 | 4390 | 311 | 8.6 | P | 10.1 |
| Mn | 1 | 133 | 150 | 168 | 6.56 | 5.1 | Ga | 10.1 |
| Mo | 0.01 | 0.510 | 0.591 | 0.686 | 0.0340 | 7.1 | Al | 10.6 |
| Na | 10 | 265 | 307 | 348 | 27.4 | 9.3 | S | 10.8 |
| Nb | 0.01 | 0.254 | 0.373 | 0.446 | 0.0452 | 16.0 | La | 11.1 |
| Ni | 0.1 | 6.86 | 8.03 | 9.79 | 0.627 | 8.4 | Li | 11.7 |
| P | 10 | 743 | 890 | 1030 | 90.4 | 10.1 | Ce | 11.9 |
| Pb | 0.01 | 3.38 | 3.63 | 8.87 | 0.133 | 3.8 | Cd | 12.3 |
| Pd | 0.002 | <0.002 | <0.002 | 0.00358 | - | - | B | 13.1 |
| Pt | 0.001 | <0.001 | <0.001 | 0.001809 | - | - | Tl | 13.3 |
| Rb | 0.1 | 3.34 | 3.94 | 4.60 | 0.269 | 7.2 | Sb | 14.0 |
| Re | 0.001 | <0.001 | 0.00213 | 0.00406 | 0.000557 | 31.5 | Sc | 15.8 |

| MINS project organic soil standard (n=22) | | | | | | | Sorted by precision | |
|---|---|---|---|---|---|---|---|---|
| | Lab DL | MIN | MEDIAN | MAX | IQR | CVR | | CVR |
| Element | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | % | Element | % |
| S | 500 | 2660 | 3300 | 3810 | 445 | 10.8 | Nb | 16.0 |
| Sb | 0.02 | 0.0567 | 0.0680 | 0.0986 | 0.00848 | 14.0 | As | 16.5 |
| Sc | 0.1 | 1.05 | 1.21 | 1.45 | 0.187 | 15.8 | Ti | 17.1 |
| Se | 0.1 | 1.00 | 1.20 | 1.55 | 0.0896 | 8.2 | Th | 18.3 |
| Sn | 0.02 | 0.713 | 1.13 | 2.14 | 0.255 | 24.8 | Ta | 19.1 |
| Sr | 0.5 | 33.7 | 39.4 | 43.4 | 2.95 | 5.6 | Hf | 21.9 |
| Ta | 0.001 | 0.00399 | 0.00729 | 0.0124 | 0.00134 | 19.1 | Sn | 24.8 |
| Te | 0.02 | <0.02 | <0.02 | 0.0347 | - | - | Au | 31.1 |
| Th | 0.1 | 0.562 | 0.807 | 1.50 | 0.141 | 18.3 | Re | 31.5 |
| Ti | 1 | 247 | 308 | 370 | 54.7 | 17.1 | Ge | 42.1 |
| Tl | 0.02 | 0.0268 | 0.0331 | 0.0398 | 0.00400 | 13.3 | Be | - |
| U | 0.01 | 0.285 | 0.331 | 0.395 | 0.0271 | 8.7 | Bi | - |
| V | 2 | 12.0 | 13.2 | 15.6 | 0.618 | 4.2 | In | - |
| W | 0.1 | <0.1 | <0.1 | <0.1 | - | - | Pd | - |
| Y | 0.001 | 1.63 | 1.87 | 2.14 | 0.119 | 6.5 | Pt | - |
| Zn | 0.1 | 28.6 | 31.0 | 42.5 | 1.39 | 5.8 | Te | - |
| Zr | 0.01 | 0.870 | 1.77 | 2.07 | 0.172 | 10.1 | W | - |

**Table 2: The ACME in-house standard CDV-1.**

Laboratory detection limit and summary statistics for ACMES in-house organic soil standard (CDV-1). The minimum (MIN), median, maximum (MAX) is given. In addition, the interquartile range (IQR) and the robust coefficient of variation (CVR) is given as a measure of precision. All numbers given with 3 significant figures.

| ACME in-house standard CDV-1 (n=17) | | | | | | | Sorted by precision | |
|---|---|---|---|---|---|---|---|---|
| | Lab DL | MIN | MEDIAN | MAX | IQR | CVR | | CVR |
| Element | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | % | Element | % |
| Ag | 0.002 | 0.00872 | 0.0106 | 0.0130 | 0.000760 | 9.5 | Sr | 1.9 |
| Al | 100 | 1140 | 1580 | 1930 | 159 | 10.2 | Fe | 2.1 |
| As | 0.1 | 1.16 | 1.37 | 1.90 | 0.195 | 16.3 | La | 3.0 |
| Au | 0.0002 | 0.00161 | 0.00265 | 0.00438 | 0.000738 | 30.3 | Na | 3.5 |
| B | 1 | 17.2 | 19.4 | 24.5 | 1.23 | 7.8 | Ce | 4.0 |
| Ba | 0.1 | 9.00 | 9.55 | 10.7 | 0.481 | 6.3 | Mn | 4.2 |
| Be | 0.1 | <0.1 | <0.1 | <0.1 | - | - | Y | 4.3 |
| Bi | 0.02 | <0.02 | <0.02 | 0.0217 | - | - | Cr | 4.4 |
| Ca | 100 | 18300 | 20500 | 22200 | 1110 | 5.1 | Cu | 4.8 |
| Cd | 0.01 | 0.0324 | 0.0407 | 0.0593 | 0.00578 | 15.4 | Rb | 4.9 |
| Ce | 0.1 | 4.91 | 5.41 | 5.74 | 0.210 | 4.0 | Ca | 5.1 |
| Co | 0.01 | 1.72 | 1.91 | 2.19 | 0.147 | 6.9 | Ni | 5.2 |
| Cr | 0.1 | 12.6 | 13.5 | 15.2 | 0.565 | 4.4 | P | 5.3 |
| Cs | 0.02 | 0.100 | 0.126 | 0.141 | 0.00801 | 7.2 | Mo | 5.7 |
| Cu | 0.01 | 7.76 | 8.57 | 9.17 | 0.353 | 4.8 | Zn | 5.9 |
| Fe | 10 | 2630 | 2980 | 3270 | 175 | 2.1 | U | 6.0 |
| Ga | 0.1 | 0.433 | 0.549 | 0.652 | 0.0718 | 10.6 | Ba | 6.3 |
| Ge | 0.01 | <0.01 | 0.0110 | 0.0731 | 0.00777 | 13.5 | Co | 6.9 |
| Hf | 0.001 | 0.0268 | 0.0488 | 0.0555 | 0.00693 | 13.5 | Sb | 6.9 |
| Hg | 0.001 | 0.0418 | 0.0489 | 0.0607 | 0.00387 | 8.1 | Pb | 7.0 |
| In | 0.02 | <0.02 | <0.02 | <0.02 | - | - | Cs | 7.2 |
| K | 100 | 1620 | 1740 | 2010 | 141 | 8.1 | Ti | 7.7 |
| La | 0.01 | 2.41 | 2.62 | 2.74 | 0.0711 | 3.0 | B | 7.8 |
| Li | 0.01 | 0.427 | 0.624 | 0.713 | 0.0937 | 13.1 | V | 7.9 |
| Mg | 10 | 1080 | 1270 | 1360 | 98.6 | 8.3 | Hg | 8.1 |
| Mn | 1 | 377 | 420 | 454 | 17.3 | 4.2 | K | 8.1 |
| Mo | 0.01 | 0.167 | 0.208 | 0.237 | 0.00896 | 5.7 | Mg | 8.3 |
| Na | 10 | 48.9 | 58.2 | 61.9 | 2.04 | 3.5 | Ag | 9.5 |
| Nb | 0.01 | 0.0192 | 0.0287 | 0.0425 | 0.00651 | 22.7 | Sc | 10.1 |
| Ni | 0.1 | 5.91 | 6.58 | 7.43 | 0.283 | 5.2 | Zr | 10.1 |
| P | 10 | 346 | 408 | 436 | 20.5 | 5.3 | Al | 10.2 |
| Pb | 0.01 | 0.935 | 1.03 | 1.12 | 0.0721 | 7.0 | Ga | 10.6 |
| Pd | 0.002 | <0.002 | <0.002 | <0.002 | - | - | Th | 10.9 |
| Pt | 0.001 | <0.001 | <0.001 | <0.001 | - | - | Se | 12.7 |
| Rb | 0.1 | 2.25 | 2.60 | 2.85 | 0.133 | 4.9 | Li | 13.1 |
| Re | 0.001 | <0.001 | <0.001 | 0.00215 | - | - | Hf | 13.5 |
| S | 500 | <500 | <500 | 1170 | - | - | Ge | 13.5 |
| Sb | 0.02 | <0.02 | 0.0210 | 0.0343 | 0.00216 | 6.9 | Cd | 15.4 |
| Sc | 0.1 | 0.716 | 0.849 | 1.01 | 0.0850 | 10.1 | As | 16.3 |

| | | | ACME in-house standard CDV-1 (n=17) | | | | Sorted by precision | |
|---|---|---|---|---|---|---|---|---|
| | Lab DL | MIN | MEDIAN | MAX | IQR | CVR | | CVR |
| Element | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | % | Element | % |
| Se | 0.1 | 0.237 | 0.501 | 0.688 | 0.0614 | 12.7 | Nb | 22.7 |
| Sn | 0.02 | <0.02 | 0.0414 | 0.0741 | 0.0169 | 35.3 | Au | 30.3 |
| Sr | 0.5 | 109 | 121 | 125 | 3.00 | 1.9 | Sn | 35.3 |
| Ta | 0.001 | <0.001 | <0.001 | 0.00194 | - | - | Be | - |
| Te | 0.02 | <0.02 | <0.02 | <0.02 | - | - | Bi | - |
| Th | 0.1 | 0.658 | 0.856 | 1.11 | 0.0745 | 10.9 | In | - |
| Ti | 1 | 26.6 | 28.7 | 32.7 | 2.18 | 7.7 | Pd | - |
| Tl | 0.02 | <0.02 | <0.02 | <0.02 | - | - | Pt | - |
| U | 0.01 | 0.164 | 0.178 | 0.192 | 0.0102 | 6.0 | Re | - |
| V | 2 | 9.08 | 10.2 | 11.0 | 0.768 | 7.9 | S | - |
| W | 0.1 | <0.1 | <0.1 | <0.1 | - | - | Ta | - |
| Y | 0.001 | 1.54 | 1.63 | 1.70 | 0.0651 | 4.3 | Te | - |
| Zn | 0.1 | 21.2 | 23.2 | 25.1 | 1.38 | 5.9 | Tl | - |
| Zr | 0.01 | 0.939 | 1.32 | 1.49 | 0.126 | 10.1 | W | - |

**Table 3: The ACME in-house standard V16.**

Laboratory detection limit and summary statistics for ACMES in-house organic soil standard (V16). The minimum (MIN), median, maximum (MAX) is given. In addition, the interquartile range (IQR) and the robust coefficient of variation (CVR) is given as a measure of precision. All numbers given with 3 significant figures.

| | ACME in-house standard V16 (n=17) | | | | | | Sorted by precision | |
|---|---|---|---|---|---|---|---|---|
| | Lab DL | MIN | MEDIAN | MAX | IQR | CVR | | CVR |
| Element | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | % | Element | % |
| Ag | 0.002 | 0.0362 | 0.0382 | 0.0459 | 0.00275 | 6.9 | Mg | 1.7 |
| Al | 100 | 437 | 506 | 567 | 48.1 | 9.4 | Pb | 2.1 |
| As | 0.1 | 1.17 | 1.64 | 1.93 | 0.199 | 9.2 | Mn | 3.5 |
| Au | 0.0002 | 0.000485 | 0.000974 | 0.00165 | 0.000240 | 25.0 | Ca | 3.8 |
| B | 1 | 5.86 | 7.52 | 9.35 | 0.442 | 6.9 | Sr | 3.8 |
| Ba | 0.1 | 1.92 | 2.17 | 2.56 | 0.0867 | 4.1 | Ba | 4.1 |
| Be | 0.1 | <0.1 | <0.1 | <0.1 | - | - | K | 4.3 |
| Bi | 0.02 | <0.02 | <0.02 | <0.02 | - | - | Rb | 4.5 |
| Ca | 100 | 3030 | 3260 | 3560 | 120 | 3.8 | P | 5.3 |
| Cd | 0.01 | 0.0754 | 0.0877 | 0.0996 | 0.00628 | 7.4 | Cs | 6.9 |
| Ce | 0.1 | 0.103 | 0.123 | 0.154 | 0.0137 | 12.2 | B | 6.9 |
| Co | 0.01 | 0.961 | 1.21 | 1.40 | 0.0846 | 10.6 | Ag | 6.9 |
| Cr | 0.1 | 276 | 338 | 418 | 23.7 | 7.7 | Fe | 7.1 |
| Cs | 0.02 | 0.0341 | 0.0374 | 0.0407 | 0.00243 | 6.9 | Zn | 7.4 |
| Cu | 0.01 | 5.75 | 6.78 | 7.68 | 0.515 | 7.8 | Cd | 7.4 |
| Fe | 10 | 3710 | 4580 | 5610 | 301 | 7.1 | Cr | 7.7 |
| Ga | 0.1 | <0.1 | <0.1 | 0.157 | - | - | V | 7.8 |
| Ge | 0.01 | 0.0289 | 0.0561 | 0.109 | 0.0350 | 53.5 | Cu | 7.8 |
| Hf | 0.001 | 0.00101 | 0.00630 | 0.0103 | 0.00318 | 50.3 | As | 9.2 |
| Hg | 0.001 | 0.0399 | 0.0542 | 0.0606 | 0.00674 | 10.6 | Al | 9.4 |
| In | 0.02 | <0.02 | <0.02 | <0.02 | - | - | Co | 10.6 |
| K | 100 | 2050 | 2300 | 2510 | 84.2 | 4.3 | Hg | 10.6 |
| La | 0.01 | 0.0432 | 0.0546 | 0.0629 | 0.00567 | 11.3 | Sb | 10.8 |
| Li | 0.01 | 0.0512 | 0.0665 | 0.0835 | 0.00765 | 16.9 | Zr | 11.2 |
| Mg | 10 | 514 | 570 | 611 | 9.92 | 1.7 | La | 11.3 |
| Mn | 1 | 670 | 773 | 806 | 30.0 | 3.5 | Ce | 12.2 |
| Mo | 0.01 | 1.36 | 1.77 | 2.22 | 0.247 | 15.3 | Ni | 12.2 |
| Na | 10 | 13.3 | 17.3 | 21.9 | 2.59 | 15.1 | Ti | 14.9 |
| Nb | 0.01 | 0.0453 | 0.0753 | 0.109 | 0.0168 | 25.8 | Na | 15.1 |
| Ni | 0.1 | 6.93 | 8.01 | 10.1 | 0.756 | 12.2 | Mo | 15.3 |
| P | 10 | 451 | 515 | 555 | 21.2 | 5.3 | Y | 16.1 |
| Pb | 0.01 | 2.67 | 2.97 | 3.15 | 0.0555 | 2.1 | Li | 16.9 |
| Pd | 0.002 | <0.002 | <0.002 | <0.002 | - | - | Sn | 19.4 |
| Pt | 0.001 | <0.001 | <0.001 | <0.001 | - | - | Au | 25.0 |
| Rb | 0.1 | 1.59 | 1.69 | 1.82 | 0.0702 | 4.5 | Nb | 25.8 |
| Re | 0.001 | <0.001 | <0.001 | 0.00103 | - | - | Se | 27.3 |
| S | 500 | <500 | <500 | <500 | - | - | Sc | 31.0 |
| Sb | 0.02 | 0.0423 | 0.0534 | 0.0720 | 0.00563 | 10.8 | Hf | 50.3 |
| Sc | 0.1 | 0.164 | 0.258 | 0.397 | 0.0756 | 31.0 | Ge | 53.5 |

| | ACME in-house standard V16 (n=17) | | | | | | Sorted by precision | |
|---|---|---|---|---|---|---|---|---|
| | Lab DL | MIN | MEDIAN | MAX | IQR | CVR | | CVR |
| Element | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | % | Element | % |
| Se | 0.1 | 0.134 | 0.340 | 0.569 | 0.0850 | 27.3 | Be | - |
| Sn | 0.02 | 0.111 | 0.181 | 0.231 | 0.0330 | 19.4 | Bi | - |
| Sr | 0.5 | 9.87 | 11.5 | 12.1 | 0.452 | 3.8 | Ga | - |
| Ta | 0.001 | <0.001 | <0.001 | 0.00166 | - | - | In | - |
| Te | 0.02 | <0.02 | <0.02 | 0.0243 | - | - | Pd | - |
| Th | 0.1 | <0.1 | <0.1 | 0.139 | - | - | Pt | - |
| Ti | 1 | 8.56 | 11.5 | 13.3 | 1.41 | 14.9 | Re | - |
| Tl | 0.02 | <0.02 | <0.02 | <0.02 | - | - | S | - |
| U | 0.01 | <0.01 | <0.01 | <0.01 | - | - | Ta | - |
| V | 2 | 134 | 163 | 198 | 12.0 | 7.8 | Te | - |
| W | 0.1 | <0.1 | <0.1 | <0.1 | - | - | Th | - |
| Y | 0.001 | 0.0369 | 0.0493 | 0.0601 | 0.00523 | 16.1 | Tl | - |
| Zn | 0.1 | 35.9 | 39.5 | 43.8 | 3.33 | 7.4 | U | - |
| Zr | 0.01 | 0.0942 | 0.171 | 0.199 | 0.0189 | 11.2 | W | - |

**Table 4: Comparison of reference in-house standards.**

Precision between median concentration values from the North Trøndelag and Fosen survey and this survey, which completes the Trøndelag County**.** All concentrations given with 3 significant figures.

| | ACME in-house standard V16 | | | ACME in-house standard CDV-1 | | |
|---|---|---|---|---|---|---|
| | 2014 | 2020 | Relativ diff. | 2014 | 2020 | Relativ diff. |
| | MEDIAN | MEDIAN | | MEDIAN | MEDIAN | |
| Element | mg/kg | mg/kg | % | mg/kg | mg/kg | % |
| Ag | 0.0409 | 0.0382 | -7.1 | 0.0109 | 0.0106 | -2.8 |
| Al | 535 | 506 | -5.7 | 1710 | 1580 | -8.2 |
| As | 1.65 | 1.64 | -0.6 | 1.52 | 1.37 | -11 |
| Au | 0.00121 | 0.000974 | *-24* | 0.00266 | 0.00265 | -0.4 |
| B | 4.99 | 7.52 | *34* | 12.6 | 19.4 | *35* |
| Ba | 2.19 | 2.17 | -0.9 | 9.86 | 9.55 | -3.2 |
| Be | <0.1 | <0.1 | - | <0.1 | <0.1 | - |
| Bi | <0.02 | <0.02 | - | <0.02 | <0.02 | - |
| Ca | 3470 | 3260 | -6.4 | 21300 | 20500 | -3.9 |
| Cd | 0.0898 | 0.0877 | -2.4 | 0.0389 | 0.0407 | 4.4 |
| Ce | 0.113 | 0.123 | 8.1 | 5.2 | 5.41 | 3.9 |
| Co | 1.21 | 1.21 | 0 | 2.08 | 1.91 | -8.9 |
| Cr | 364 | 338 | -7.7 | 13.8 | 13.5 | -2.2 |
| Cs | 0.0394 | 0.0374 | -5.3 | 0.129 | 0.126 | -2.4 |
| Cu | 7.5 | 6.78 | -11 | 9.37 | 8.57 | -9.3 |
| Fe | 4700 | 4580 | -2.6 | 2890 | 2980 | 3.0 |
| Ga | 0.256 | <0.1 | - | 0.678 | 0.549 | -24 |
| Ge | 0.0493 | 0.0561 | 12 | 0.0268 | 0.011 | -144 |
| Hf | 0.00806 | 0.0063 | *-28* | 0.0494 | 0.0488 | -1.2 |
| Hg | 0.0551 | 0.0542 | -1.7 | 0.054 | 0.0489 | -10 |
| In | <0.02 | <0.02 | - | <0.02 | <0.02 | - |
| K | 2310 | 2300 | -0.4 | 1780 | 1740 | -2.3 |
| La | 0.0504 | 0.0546 | 7.7 | 2.55 | 2.62 | 2.7 |
| Li | 0.066 | 0.0665 | 0.8 | 0.576 | 0.624 | 7.7 |
| Mg | 584 | 570 | -2.5 | 1310 | 1270 | -3.1 |
| Mn | 781 | 773 | -1.0 | 429 | 420 | -2.1 |
| Mo | 1.79 | 1.77 | -1.1 | 0.215 | 0.208 | -3.4 |
| Na | 18.6 | 17.3 | -7.5 | 60 | 58.2 | -3.1 |
| Nb | 0.108 | 0.0753 | *-43* | 0.0586 | 0.0287 | *-104* |
| Ni | 8.53 | 8.01 | -6.5 | 7.15 | 6.58 | -8.7 |
| P | 524 | 515 | -1.7 | 415 | 408 | -1.7 |
| Pb | 3.44 | 2.97 | -16 | 1.15 | 1.03 | -12 |
| Pd | <0.002 | <0.002 | - | <0.002 | <0.002 | - |
| Pt | <0.001 | <0.001 | - | <0.001 | <0.001 | - |
| Rb | 1.78 | 1.69 | -5.3 | 2.73 | 2.6 | -5.0 |
| Re | <0.001 | <0.001 | - | <0.001 | <0.001 | - |
| S | 500 | <500 | - | 1020 | <500 | - |
| Sb | 0.0765 | 0.0534 | *-43* | 0.0329 | 0.021 | *-57* |
| Sc | 0.207 | 0.258 | 20 | 0.92 | 0.849 | -8.4 |

| | ACME in-house standard V16 | | | ACME in-house standard CDV-1 | | |
|---|---|---|---|---|---|---|
| | 2014 | 2020 | Relativ diff. | 2014 | 2020 | Relativ diff. |
| | MEDIAN | MEDIAN | | MEDIAN | MEDIAN | |
| Element | mg/kg | mg/kg | % | mg/kg | mg/kg | % |
| Se | 0.124 | 0.34 | *64* | 0.323 | 0.501 | *36* |
| Sn | 0.239 | 0.181 | *-32* | 0.092 | 0.0414 | *-122* |
| Sr | 11.5 | 11.5 | 0.0 | 124 | 121 | -2.5 |
| Ta | 0.00106 | <0.001 | - | 0.00119 | <0.001 | - |
| Te | <0.02 | <0.02 | - | <0.02 | <0.02 | - |
| Th | <0.1 | <0.1 | - | 0.727 | 0.856 | 15 |
| Ti | 12.8 | 11.5 | -11 | 30.9 | 28.7 | -7.7 |
| Tl | <0.02 | <0.02 | - | <0.02 | <0.02 | - |
| U | <0.01 | <0.01 | - | 0.185 | 0.178 | -3.9 |
| V | <2 | 163 | - | 3.41 | 10.2 | *67* |
| W | <0.1 | <0.1 | - | <0.1 | <0.1 | - |
| Y | 0.0486 | 0.0493 | 1.4 | 1.56 | 1.63 | 4.3 |
| Zn | 44.9 | 39.5 | -14 | 26.2 | 23.2 | -13 |
| Zr | 0.17 | 0.171 | 0.6 | 1.26 | 1.32 | 4.5 |

## Table 5. Precision of duplicates

Precision (Pre.) estimate of field and analytical duplicates. The no. pair >DL gives the number of ordinary sample and field duplicate pairs, or field and analytical duplicate pairs, that shows concentrations above the detection limit.

| Ordinary sample and Field duplicate (21 pairs) | | | | | | Field and analytical duplicate (21 pairs) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Alphabetical | | | Sorted | | | Alphabetical | | | Sorted | | |
| Element | No. Pair >DL | Pre. (CV) % | Element | No. Pair >DL | Pre. (CV) % | Element | No. Pair >DL | Pre. (CV) % | Element | No. Pair >DL | Pre. (CV) % |
| Ag | 21 | 103 | P | 21 | 14 | Ag | 21 | 3.9 | P | 21 | 3.8 |
| Al | 21 | 25 | Hg | 21 | 14 | Al | 21 | 8.6 | Ag | 21 | 3.9 |
| As | 17 | 39 | Na | 21 | 15 | As | 18 | 29 | Sr | 21 | 4.5 |
| Au | 14 | 37 | Ni | 21 | 15 | Au | 14 | 48 | Ba | 21 | 5.2 |
| B | 21 | 21 | Be | 7 | 18 | B | 21 | 13 | Ti | 21 | 5.2 |
| Ba | 21 | 30 | Sc | 21 | 19 | Ba | 21 | 5.2 | Cd | 21 | 5.4 |
| Be | 7 | 18 | Se | 21 | 19 | Be | 8 | 18 | Ce | 21 | 5.5 |
| Bi | 20 | 28 | Ca | 21 | 20 | Bi | 21 | 5.7 | Na | 21 | 5.5 |
| Ca | 21 | 20 | Ta | 20 | 21 | Ca | 21 | 7.8 | Bi | 21 | 5.7 |
| Cd | 21 | 32 | B | 21 | 21 | Cd | 21 | 5.4 | Zn | 21 | 5.7 |
| Ce | 21 | 21 | Ce | 21 | 21 | Ce | 21 | 5.5 | Rb | 21 | 6.2 |
| Co | 21 | 241 | Sr | 21 | 21 | Co | 21 | 21 | Hg | 21 | 6.3 |
| Cr | 21 | 26 | Sb | 21 | 21 | Cr | 21 | 7.1 | K | 21 | 6.8 |
| Cs | 21 | 22 | Nb | 20 | 22 | Cs | 21 | 8.1 | V | 20 | 6.8 |
| Cu | 21 | 33 | K | 21 | 22 | Cu | 21 | 15 | Zr | 21 | 6.9 |
| Fe | 21 | 46 | Cs | 21 | 22 | Fe | 21 | 7.3 | Cr | 21 | 7.1 |
| Ga | 20 | 33 | Mg | 21 | 24 | Ga | 21 | 9.8 | Fe | 21 | 7.3 |
| Ge | 21 | 37 | Ti | 21 | 25 | Ge | 20 | 37 | Mo | 21 | 7.3 |
| Hf | 21 | 34 | Al | 21 | 25 | Hf | 21 | 27 | Ca | 21 | 7.8 |
| Hg | 21 | 14 | S | 20 | 26 | Hg | 21 | 6.3 | Mg | 21 | 8 |
| In | 0 | - | Th | 19 | 26 | In | 2 | - | Cs | 21 | 8.1 |
| K | 21 | 22 | Cr | 21 | 26 | K | 21 | 6.8 | Al | 21 | 8.6 |
| La | 21 | 73 | Bi | 20 | 28 | La | 21 | 14 | Li | 21 | 8.6 |
| Li | 21 | 40 | Ba | 21 | 30 | Li | 21 | 8.6 | Sb | 21 | 8.6 |
| Mg | 21 | 24 | Zr | 21 | 32 | Mg | 21 | 8 | Th | 21 | 9.1 |
| Mn | 21 | 313 | Cd | 21 | 32 | Mn | 21 | 24 | Se | 21 | 9.2 |
| Mo | 21 | 47 | Zn | 21 | 32 | Mo | 21 | 7.3 | Sc | 21 | 9.4 |
| Na | 21 | 15 | Cu | 21 | 33 | Na | 21 | 5.5 | Ga | 21 | 9.8 |
| Nb | 20 | 22 | Ga | 20 | 33 | Nb | 21 | 11 | Sn | 21 | 10 |
| Ni | 21 | 15 | Hf | 21 | 34 | Ni | 21 | 46 | Nb | 21 | 11 |
| P | 21 | 14 | Rb | 21 | 34 | P | 21 | 3.8 | Tl | 20 | 11 |
| Pb | 21 | 54 | V | 20 | 35 | Pb | 21 | 16 | B | 21 | 13 |
| Pd | 0 | - | Ge | 21 | 37 | Pd | 0 | - | La | 21 | 14 |
| Pt | 0 | - | Au | 14 | 37 | Pt | 0 | - | Cu | 21 | 15 |
| Rb | 21 | 34 | As | 17 | 39 | Rb | 21 | 6.2 | Pb | 21 | 16 |
| Re | 0 | - | Li | 21 | 40 | Re | 1 | - | U | 21 | 16 |
| S | 20 | 26 | Y | 21 | 44 | S | 19 | 17 | S | 19 | 17 |

| Ordinary sample and Field duplicate (21 pairs) | | | | | | Field and analytical duplicate (21 pairs) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Alphabetical | | | Sorted | | | Alphabetical | | | Sorted | | |
| Element | No. Pair >DL | Pre. (CV) % | Element | No. Pair >DL | Pre. (CV) % | Element | No. Pair >DL | Pre. (CV) % | Element | No. Pair >DL | Pre. (CV) % |
| Sb | 21 | 21 | Fe | 21 | 46 | Sb | 21 | 8.6 | Be | 8 | 18 |
| Sc | 21 | 19 | Mo | 21 | 47 | Sc | 21 | 9.4 | Co | 21 | 21 |
| Se | 21 | 19 | Pb | 21 | 54 | Se | 21 | 9.2 | Mn | 21 | 24 |
| Sn | 21 | 77 | U | 21 | 65 | Sn | 21 | 10 | Ta | 20 | 25 |
| Sr | 21 | 21 | La | 21 | 73 | Sr | 21 | 4.5 | Y | 21 | 25 |
| Ta | 20 | 21 | Sn | 21 | 77 | Ta | 20 | 25 | Hf | 21 | 27 |
| Te | 1 | - | Tl | 20 | 98 | Te | 2 | - | As | 18 | 29 |
| Th | 19 | 26 | Ag | 21 | 103 | Th | 21 | 9.1 | Ge | 20 | 37 |
| Ti | 21 | 25 | Co | 21 | 241 | Ti | 21 | 5.2 | Ni | 21 | 46 |
| Tl | 20 | 98 | Mn | 21 | 313 | Tl | 20 | 11 | Au | 14 | 48 |
| U | 21 | 65 | In | 0 | - | U | 21 | 16 | In | 2 | - |
| V | 20 | 35 | Pd | 0 | - | V | 20 | 6.8 | Pd | 0 | - |
| W | 3 | - | Pt | 0 | - | W | 3 | - | Pt | 0 | - |
| Y | 21 | 44 | Re | 0 | - | Y | 21 | 25 | Re | 1 | - |
| Zn | 21 | 32 | Te | 1 | - | Zn | 21 | 5.7 | Te | 2 | - |
| Zr | 21 | 32 | W | 3 | - | Zr | 21 | 6.9 | W | 3 | - |

**Table 6: Summary statistics LOI, 480 °C**

Summary statistics for measured LOI at 480 °C for all ordinary samples (N=454) giving the number of samples below the detection limit (DL), minimum (Min), mean, median and maximum (Max). In addition, the power is given as a measure on variation.

| | N | DL Wt% | N<DL | Min Wt% | Mean Wt% | Median Wt% | Max Wt% | Power |
|---|---|---|---|---|---|---|---|---|
| LOI | 454 | 0.4 | 0 | 17.98 | 81.51 | 89.17 | 98.40 | 0.7 |

## Table 7: The survey data

Summary statistics for the survey data (n=462) giving the number of samples above the detection limit (DL), minimum (Min), maximum (Max) concentration value measured and the 2, 5, 10, 25, 50, 75, 90, 95 and 90 % quantiles. In addition, the powers (P) are given as a measure on variation.

| Element | n>DL | Min mg/kg | Q2 mg/kg | Q5 mg/kg | Q10 mg/kg | Q25 mg/kg | Q50 mg/kg | Q75 mg/kg | Q90 mg/kg | Q95 mg/kg | Q98 mg/kg | Max mg/kg | P |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ag | 454 | 0.0136 | 0.0280 | 0.0359 | 0.0476 | 0.0828 | 0.154 | 0.307 | 0.599 | 0.895 | 1.36 | 9.73 | 2.9 |
| Al | 454 | 247 | 395 | 500 | 682 | 1120 | 2090 | 4830 | 8930 | 12700 | 16700 | 23100 | 2 |
| As | 390 | <0.1 | <0.1 | <0.1 | <0.1 | 0.273 | 0.532 | 0.880 | 1.31 | 1.90 | 2.87 | 27.6 | 2.7 |
| Au | 343 | <0.0002 | <0.0002 | <0.0002 | <0.0002 | 0.00020 | 0.00033 | 0.00052 | 0.00085 | 0.0012 | 0.0024 | 0.0064 | 1.8 |
| B | 430 | <1 | <1 | <1 | 1.34 | 1.92 | 2.66 | 3.62 | 4.65 | 5.55 | 7.10 | 17.9 | 1.6 |
| Ba | 454 | 5.91 | 11.9 | 16.3 | 21.5 | 32.1 | 45.5 | 69.4 | 105 | 133 | 193 | 491 | 1.9 |
| Be | 161 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.138 | 0.279 | 0.415 | 0.677 | 11.8 | 2.4 |
| Bi | 444 | <0.02 | <0.02 | 0.0258 | 0.0338 | 0.0555 | 0.0872 | 0.124 | 0.207 | 0.299 | 0.446 | 1.29 | 2.1 |
| Ca | 454 | 375 | 614 | 958 | 1420 | 2260 | 3070 | 4270 | 6100 | 8510 | 14300 | 25600 | 1.8 |
| Cd | 454 | 0.0494 | 0.0861 | 0.122 | 0.171 | 0.251 | 0.412 | 0.616 | 0.874 | 1.08 | 1.36 | 2.79 | 1.8 |
| Ce | 454 | 0.382 | 0.547 | 0.758 | 1.03 | 1.95 | 4.39 | 12.9 | 29.5 | 39.4 | 70.0 | 446 | 3.1 |
| Co | 454 | 0.161 | 0.300 | 0.390 | 0.544 | 0.972 | 1.88 | 3.98 | 7.26 | 10.0 | 17.4 | 47.5 | 2.5 |
| Cr | 454 | 1.46 | 1.86 | 2.07 | 2.22 | 2.84 | 4.63 | 10.3 | 23.3 | 35.3 | 53.3 | 93.5 | 1.8 |
| Cs | 454 | 0.0407 | 0.0678 | 0.0867 | 0.114 | 0.179 | 0.322 | 0.657 | 1.26 | 1.75 | 2.70 | 4.58 | 2.1 |
| Cu | 454 | 2.5 | 4.39 | 4.97 | 5.57 | 6.76 | 8.80 | 11.9 | 17.0 | 24.3 | 41.8 | 228 | 2 |
| Fe | 454 | 346 | 495 | 655 | 774 | 1370 | 2820 | 6600 | 12200 | 18700 | 28600 | 76800 | 2.3 |
| Ga | 449 | <0.1 | 0.121 | 0.176 | 0.244 | 0.359 | 0.621 | 1.47 | 3.10 | 4.63 | 6.02 | 8.64 | 2.2 |
| Ge | 448 | <0.01 | 0.0116 | 0.0198 | 0.0307 | 0.0544 | 0.0914 | 0.144 | 0.205 | 0.243 | 0.330 | 0.539 | 2 |
| Hf | 450 | <0.001 | 0.00173 | 0.00343 | 0.00562 | 0.0113 | 0.0198 | 0.0335 | 0.0595 | 0.0780 | 0.110 | 0.478 | 3 |
| Hg | 454 | 0.0317 | 0.0737 | 0.0917 | 0.114 | 0.149 | 0.189 | 0.239 | 0.287 | 0.323 | 0.345 | 0.495 | 1.2 |
| In | 26 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 | 0.0210 | 0.0250 | 0.0846 | 0.9 |
| K | 454 | 217 | 390 | 449 | 525 | 714 | 894 | 1110 | 1300 | 1560 | 2170 | 5190 | 1.4 |
| La | 454 | 0.171 | 0.253 | 0.347 | 0.478 | 0.894 | 2.04 | 6.32 | 14.3 | 18.4 | 36.7 | 129 | 2.9 |
| Li | 454 | 0.0206 | 0.0568 | 0.0687 | 0.0841 | 0.128 | 0.281 | 1.22 | 5.34 | 8.36 | 11.8 | 28.2 | 3.1 |
| Mg | 454 | 303 | 424 | 532 | 682 | 962 | 1360 | 1860 | 3480 | 4710 | 6670 | 12100 | 1.6 |
| Mn | 454 | 3.15 | 7.39 | 10.4 | 13.7 | 27.1 | 70.2 | 195 | 458 | 748 | 1370 | 5410 | 3.2 |
| Mo | 454 | 0.0666 | 0.110 | 0.137 | 0.163 | 0.217 | 0.323 | 0.517 | 0.890 | 1.21 | 1.63 | 3.64 | 1.7 |
| Na | 454 | 56.2 | 79.0 | 95.8 | 108 | 131 | 166 | 227 | 305 | 381 | 463 | 986 | 1.2 |
| Nb | 445 | 0.005 | 0.0118 | 0.0285 | 0.0479 | 0.0986 | 0.225 | 0.631 | 1.42 | 2.17 | 3.27 | 6.24 | 3.1 |
| Ni | 454 | 0.812 | 1.25 | 1.67 | 2.15 | 3.36 | 5.33 | 9.69 | 17.1 | 23.8 | 37.3 | 206 | 2.4 |
| P | 454 | 253 | 485 | 535 | 613 | 707 | 824 | 1000 | 1220 | 1380 | 1510 | 2050 | 0.9 |
| Pb | 454 | 1.53 | 4.20 | 5.27 | 6.34 | 9.47 | 14.7 | 20.9 | 30.2 | 37.7 | 58.1 | 477 | 2.5 |
| Pd | 29 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | 0.00259 | 0.00393 | 0.00765 | 0.9 |
| Pt | 11 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | 0.00105 | 0.00784 | 1.2 |
| Rb | 454 | 0.678 | 1.41 | 1.80 | 2.33 | 3.43 | 5.50 | 8.22 | 12.1 | 15.9 | 22.2 | 87.3 | 2.1 |
| Re | 22 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | 0.00167 | 0.00230 | 0.7 |
| S | 403 | <500 | <500 | <500 | <500 | 783 | 1190 | 1590 | 1920 | 2120 | 2510 | 3210 | 1.1 |
| Sb | 454 | 0.0446 | 0.0617 | 0.0758 | 0.0989 | 0.138 | 0.206 | 0.281 | 0.374 | 0.467 | 0.736 | 9.27 | 2.3 |
| Sc | 454 | 0.18 | 0.274 | 0.326 | 0.399 | 0.521 | 0.703 | 1.08 | 1.63 | 2.11 | 3.00 | 4.49 | 1.4 |
| Se | 454 | 0.281 | 0.379 | 0.464 | 0.532 | 0.636 | 0.828 | 1.09 | 1.45 | 1.86 | 2.38 | 4.04 | 1.2 |

| Element | n>DL | Min mg/kg | Q2 mg/kg | Q5 mg/kg | Q10 mg/kg | Q25 mg/kg | Q50 mg/kg | Q75 mg/kg | Q90 mg/kg | Q95 mg/kg | Q98 mg/kg | Max mg/kg | P |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sn | 454 | 0.0414 | 0.126 | 0.155 | 0.198 | 0.304 | 0.457 | 0.603 | 0.824 | 1.01 | 1.28 | 5.33 | 2.1 |
| Sr | 454 | 4.73 | 6.63 | 9.26 | 11.9 | 18.4 | 25.3 | 33.9 | 45.3 | 53.1 | 71.9 | 132 | 1.4 |
| Ta | 441 | <0.001 | <0.001 | 0.00179 | 0.00270 | 0.00448 | 0.00763 | 0.0117 | 0.0155 | 0.0186 | 0.0238 | 0.0492 | 2 |
| Te | 69 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 | 0.0227 | 0.0290 | 0.0381 | 0.127 | 1.1 |
| Th | 442 | <0.1 | <0.1 | 0.120 | 0.161 | 0.220 | 0.332 | 0.530 | 1.03 | 1.99 | 3.31 | 10.0 | 2.3 |
| Ti | 454 | 14.5 | 22.4 | 28.8 | 37.4 | 63.1 | 114 | 252 | 606 | 803 | 1190 | 2130 | 2.2 |
| Tl | 440 | <0.02 | <0.02 | 0.0285 | 0.0371 | 0.0519 | 0.0801 | 0.121 | 0.193 | 0.258 | 0.395 | 0.954 | 2 |
| U | 454 | 0.0107 | 0.0203 | 0.0275 | 0.0385 | 0.0710 | 0.146 | 0.408 | 1.14 | 1.74 | 2.87 | 11.3 | 3 |
| V | 408 | <2 | <2 | <2 | <2 | 2.81 | 4.76 | 10.6 | 22.6 | 36.9 | 52.5 | 76.3 | 1.9 |
| W | 75 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.146 | 0.270 | 0.698 | 7.00 | 2.1 |
| Y | 454 | 0.0606 | 0.129 | 0.160 | 0.219 | 0.429 | 0.964 | 2.88 | 6.35 | 9.90 | 14.5 | 126 | 3.3 |
| Zn | 454 | 3.81 | 7.83 | 11.8 | 16.7 | 25.7 | 36.5 | 53.7 | 78.0 | 101 | 142 | 569 | 2.2 |
| Zr | 454 | 0.02 | 0.0963 | 0.169 | 0.240 | 0.399 | 0.655 | 1.17 | 2.29 | 3.12 | 5.44 | 19.6 | 3 |

# APPENDIXES

**Appendix 1: Random plots**

**Appendix 2: Samples re-analysed from previous surveys**

**Appendix 3: Correlation plots duplicates**

**Appendix 4: ECDF-plot**

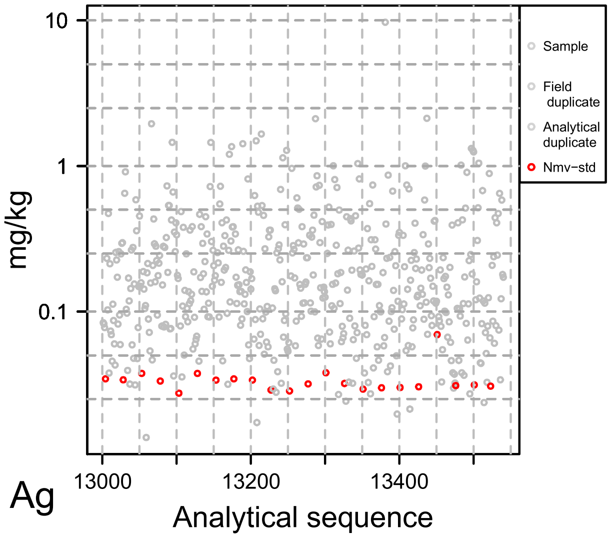
**Appendix 5: Geochemical maps**

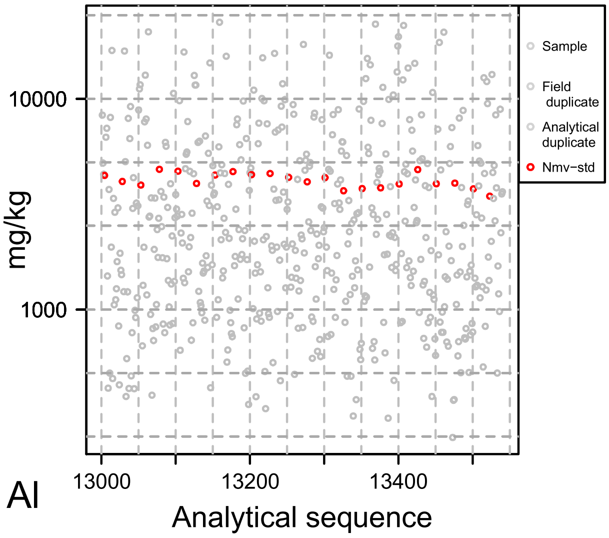
# Appendix 1: Random plots

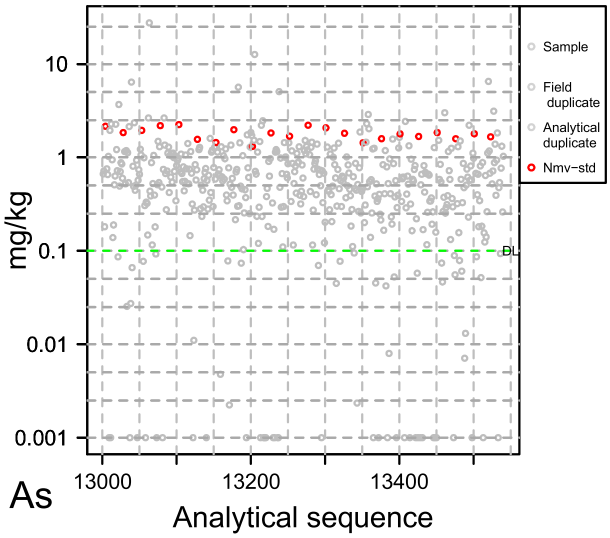
Random plots of all samples with field and analytical duplicates in addition to the in-house standards Nmv.

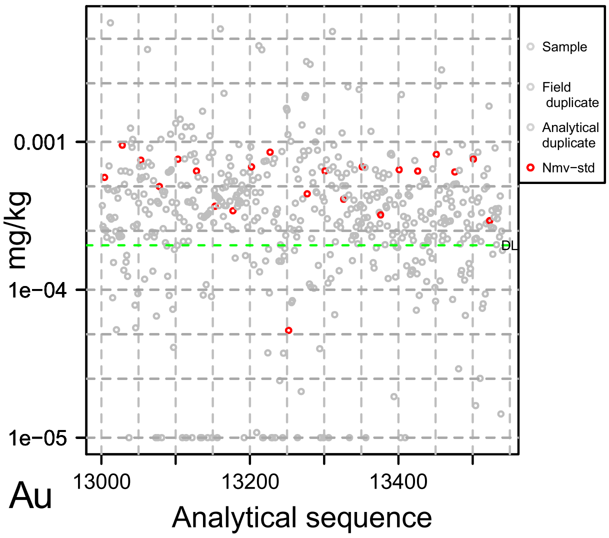
The laboratory detection limit (DL) is indicated by a green dotted line for elements showing concentrations values close to and/or below DL.

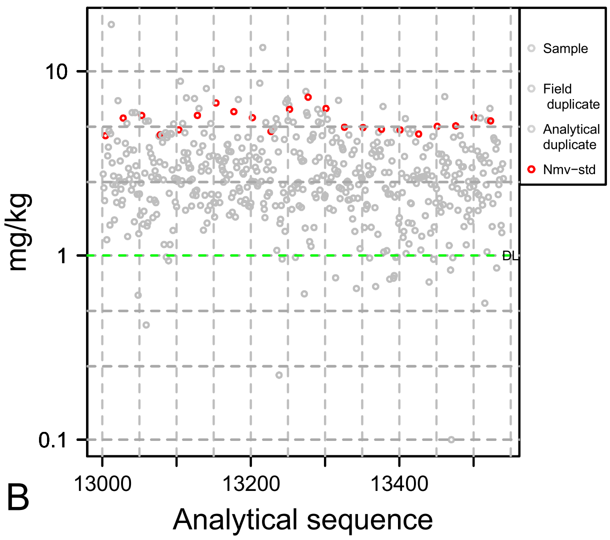
X-axis shows the random number given the sample before they were sent the laboratory.

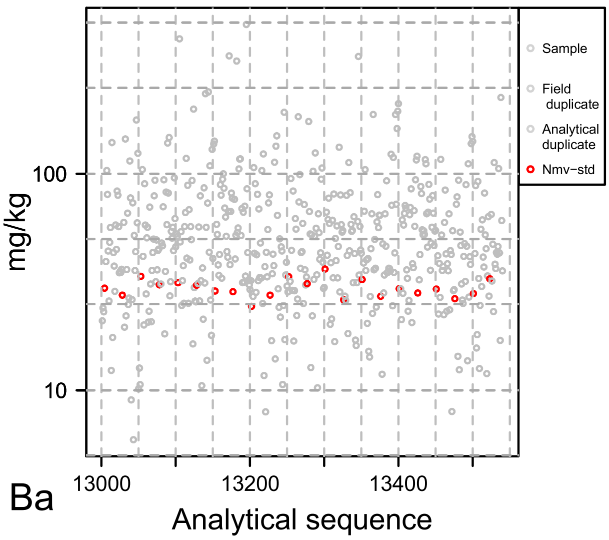

Ag
mg/kg
10
1
0.1
13000
13200
13400
Analytical sequence
Sample
Field duplicate
Analytical duplicate
Nmv−std

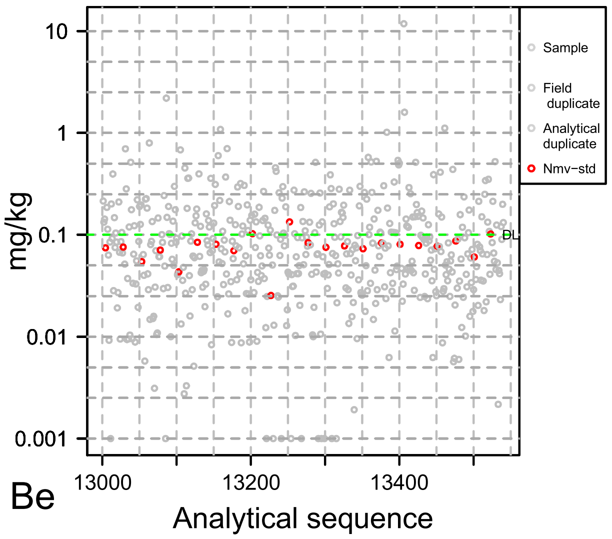

Al
mg/kg
10000
1000
13000
13200
13400
Analytical sequence
Sample
Field duplicate
Analytical duplicate
Nmv−std

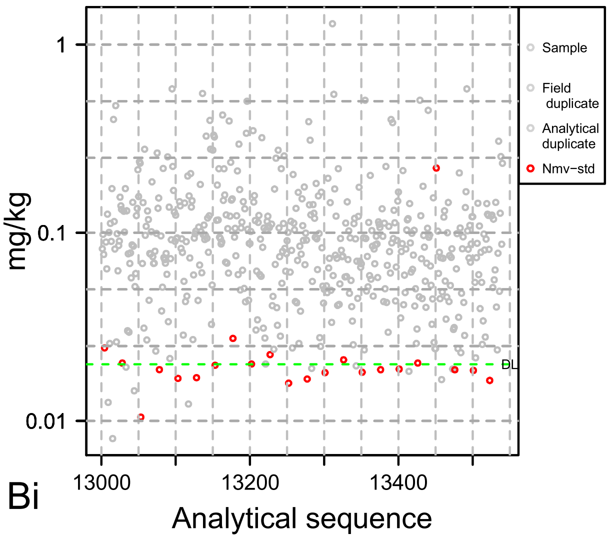

As
mg/kg
10
1
0.1
0.01
0.001
DL
13000
13200
13400
Analytical sequence
Sample
Field duplicate
Analytical duplicate
Nmv−std

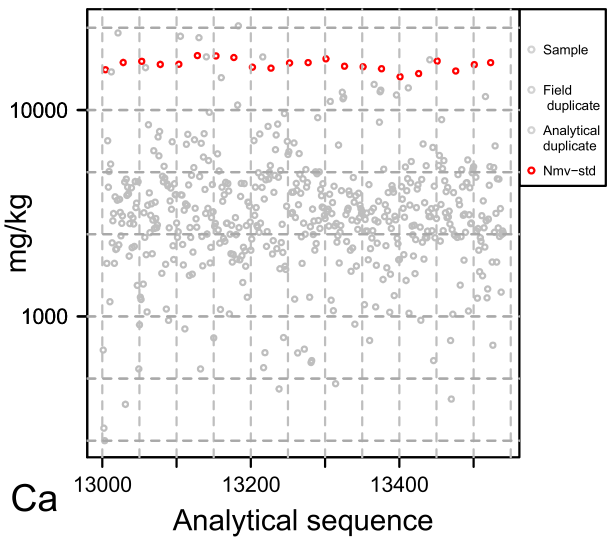

Au
mg/kg
0.001
1e−04
1e−05
DL
13000
13200
13400
Analytical sequence
Sample
Field duplicate
Analytical duplicate
Nmv−std

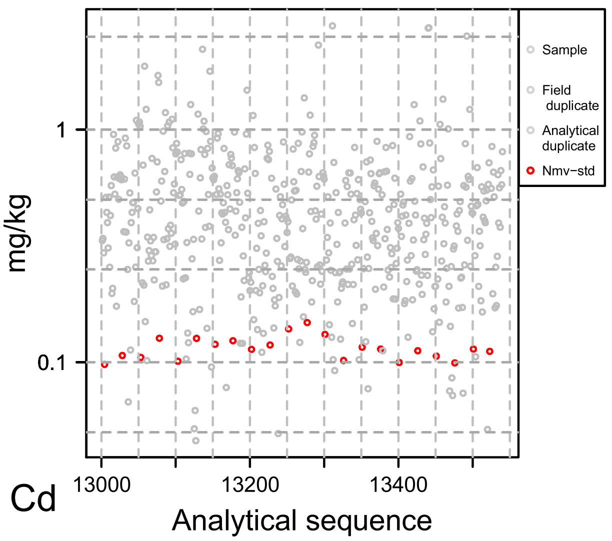

B
mg/kg
10
1
0.1
DL
13000
13200
13400
Analytical sequence
Sample
Field duplicate
Analytical duplicate
Nmv−std

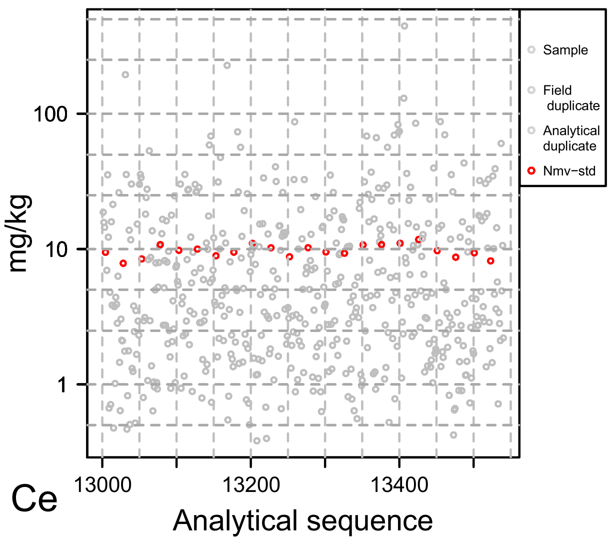

Ba
mg/kg
100
10
13000
13200
13400
Analytical sequence
Sample
Field duplicate
Analytical duplicate
Nmv−std

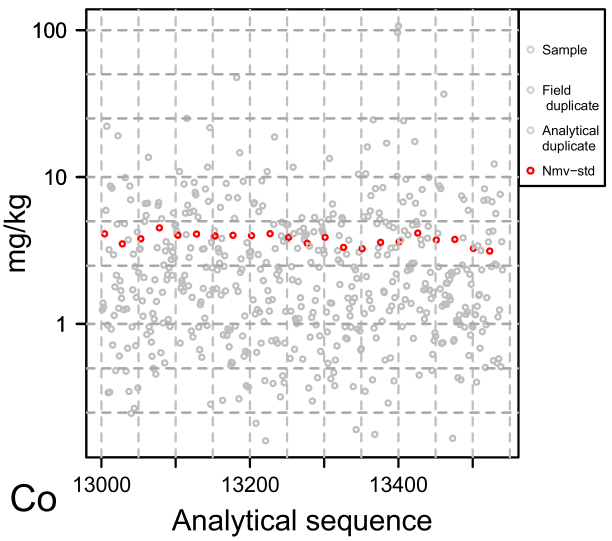

10
1
0.1
0.01
0.001
mg/kg
DL
Sample
Field duplicate
Analytical duplicate
Nmv−std
13000
13200
13400
Be
Analytical sequence

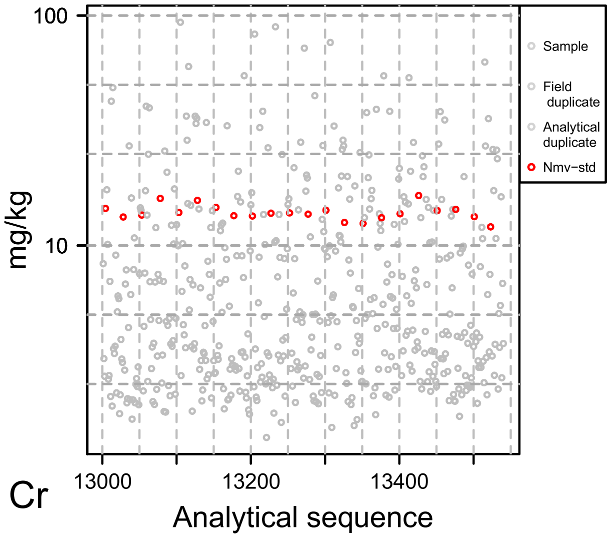

1
0.1
0.01
mg/kg
DL
Sample
Field duplicate
Analytical duplicate
Nmv−std
13000
13200
13400
Bi
Analytical sequence

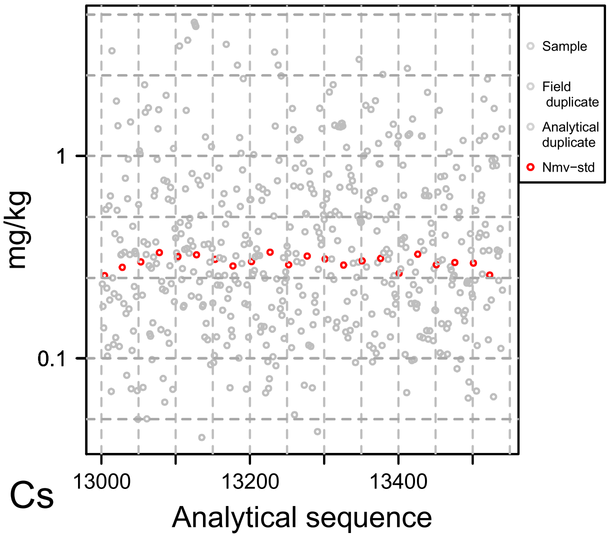

10000
1000
mg/kg
Sample
Field duplicate
Analytical duplicate
Nmv−std
13000
13200
13400
Ca
Analytical sequence

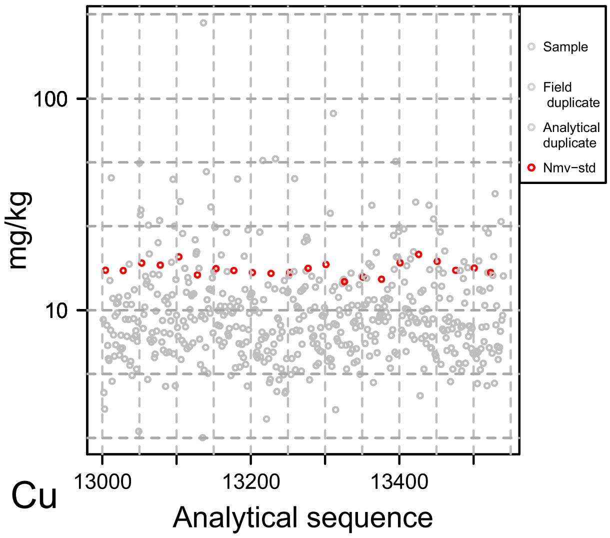

1
0.1
mg/kg
Sample
Field duplicate
Analytical duplicate
Nmv−std
13000
13200
13400
Cd
Analytical sequence

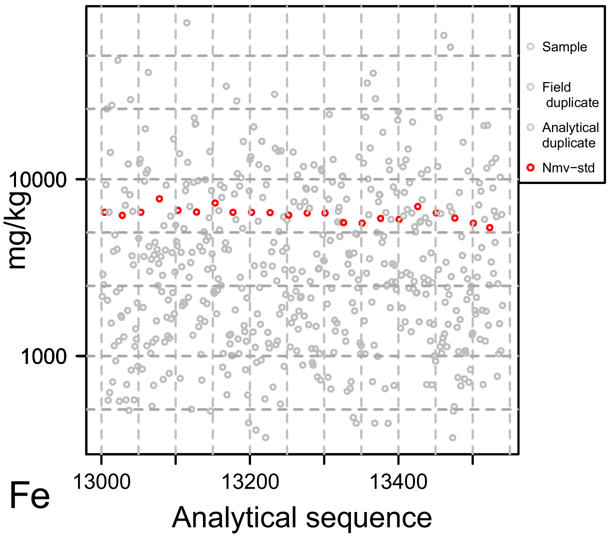

100
10
1
mg/kg
Sample
Field duplicate
Analytical duplicate
Nmv−std
13000
13200
13400
Ce
Analytical sequence

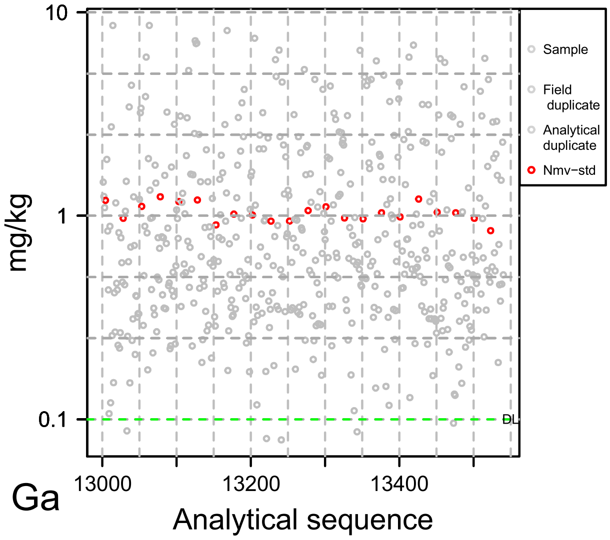

100
10
1
mg/kg
Sample
Field duplicate
Analytical duplicate
Nmv−std
13000
13200
13400
Co
Analytical sequence

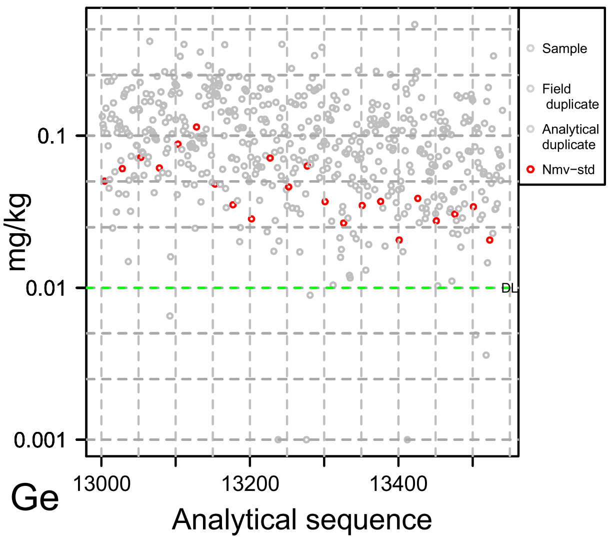

100
10
mg/kg
Sample
Field duplicate
Analytical duplicate
Nmv-std
13000
13200
13400
Cr
Analytical sequence

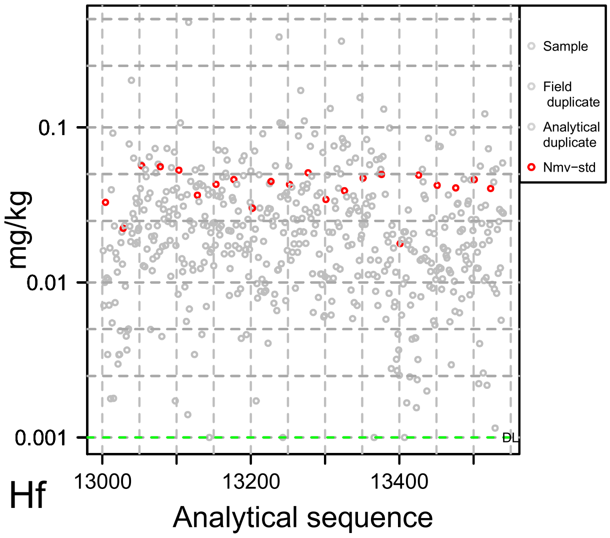

1
0.1
mg/kg
Sample
Field duplicate
Analytical duplicate
Nmv-std
13000
13200
13400
Cs
Analytical sequence

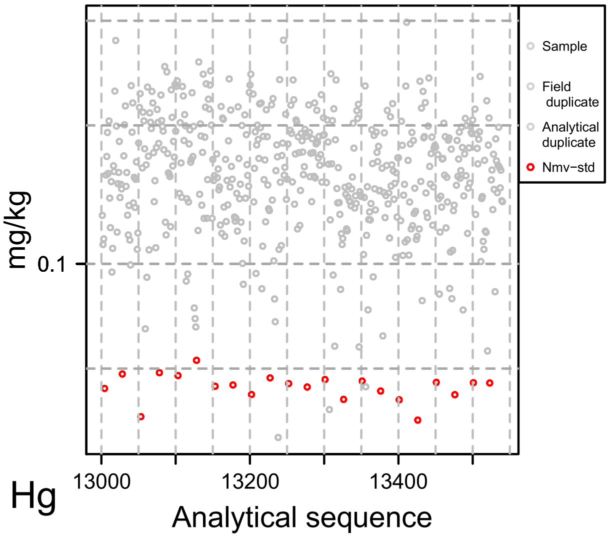

100
10
mg/kg
Sample
Field duplicate
Analytical duplicate
Nmv-std
13000
13200
13400
Cu
Analytical sequence

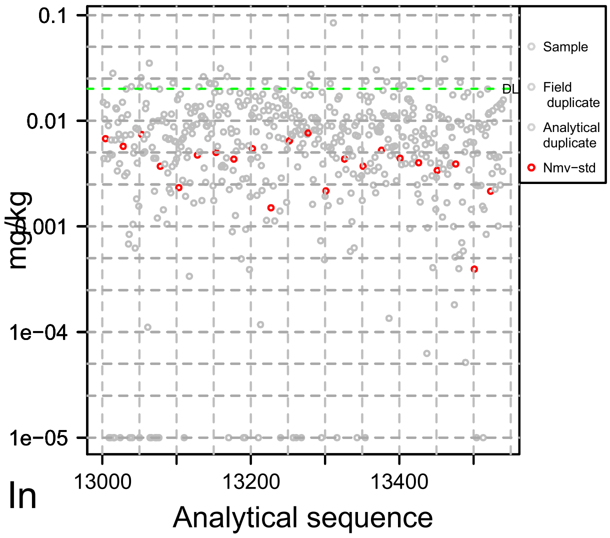

10000
1000
mg/kg
Sample
Field duplicate
Analytical duplicate
Nmv-std
13000
13200
13400
Fe
Analytical sequence

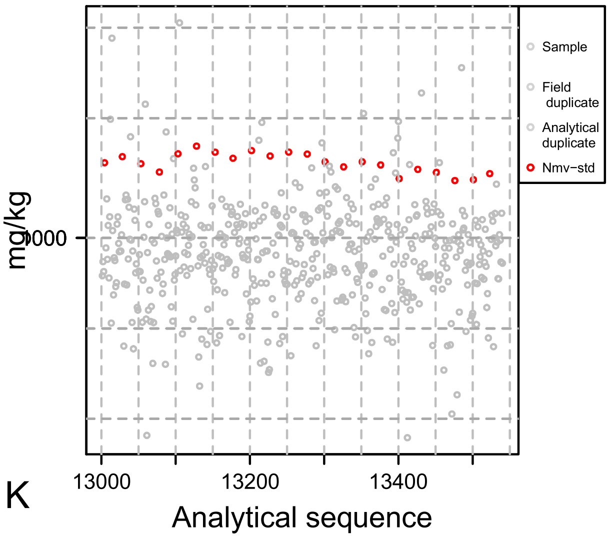

10
1
0.1
mg/kg
DL
Sample
Field duplicate
Analytical duplicate
Nmv-std
13000
13200
13400
Ga
Analytical sequence

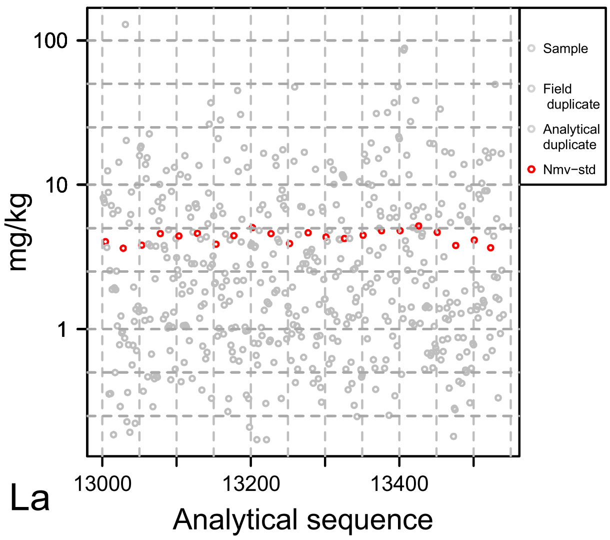

0.1
0.01
0.001
mg/kg
DL
Sample
Field duplicate
Analytical duplicate
Nmv-std
13000
13200
13400
Ge
Analytical sequence

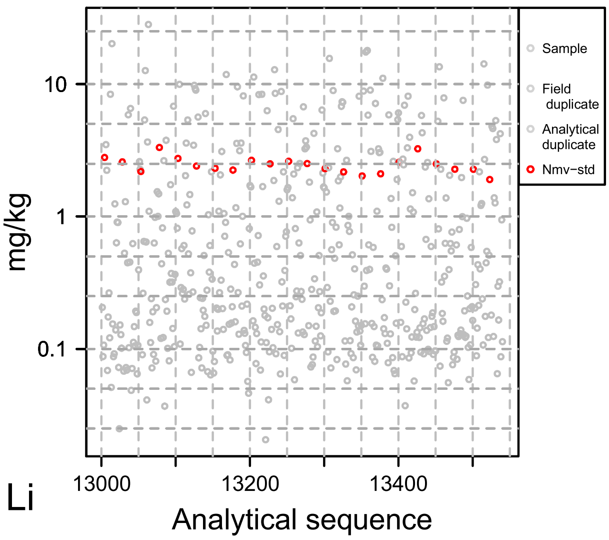

Sample
Field duplicate
Analytical duplicate
Nmv-std
0.1
0.01
0.001
DL
mg/kg
13000
13200
13400
Hf
Analytical sequence

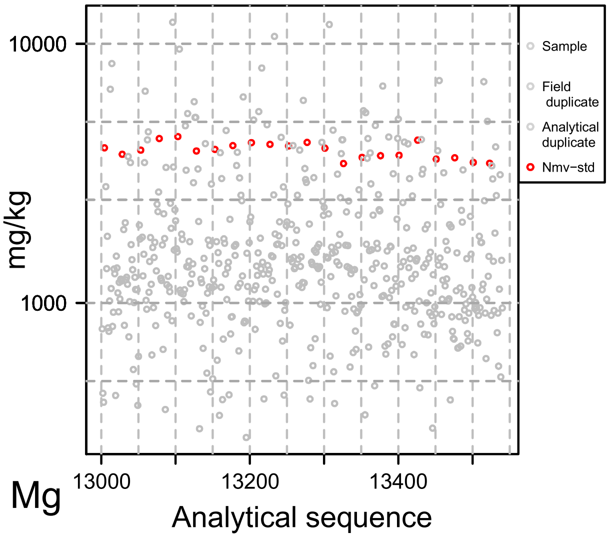

Sample
Field duplicate
Analytical duplicate
Nmv-std
0.1
mg/kg
13000
13200
13400
Hg
Analytical sequence


Sample
Field duplicate
Analytical duplicate
Nmv-std
0.1
0.01
0.001
1e-04
1e-05
DL
mg/kg
13000
13200
13400
In
Analytical sequence

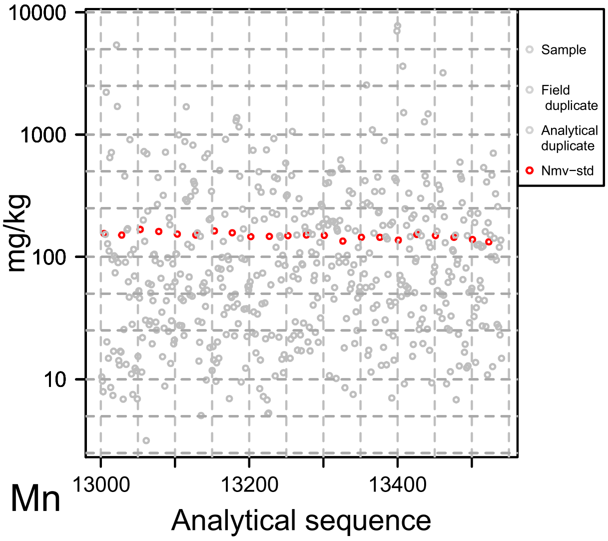

Sample
Field duplicate
Analytical duplicate
Nmv-std
mg/kg
13000
13200
13400
K
Analytical sequence


Sample
Field duplicate
Analytical duplicate
Nmv-std
100
10
1
mg/kg
13000
13200
13400
La
Analytical sequence

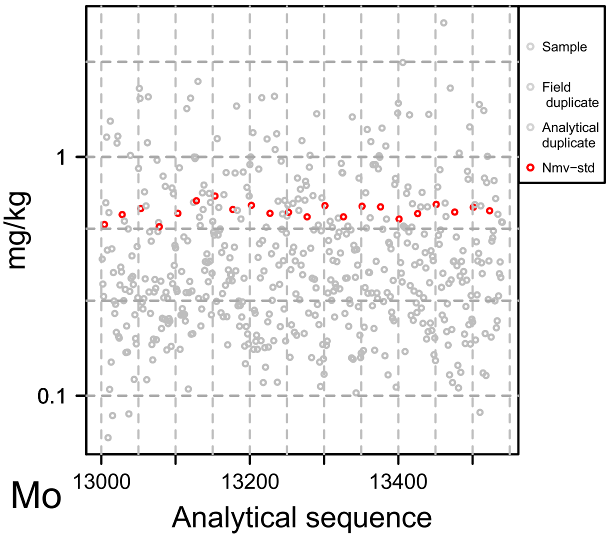

Sample
Field duplicate
Analytical duplicate
Nmv-std
10
1
0.1
mg/kg
13000
13200
13400
Li
Analytical sequence



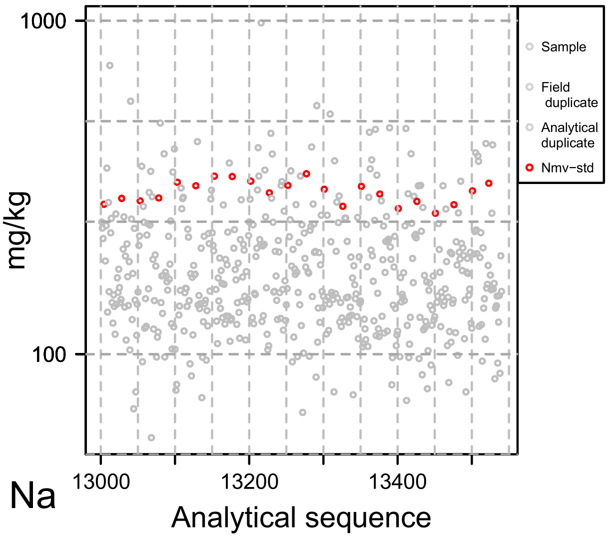
10000
1000
mg/kg
Sample
Field duplicate
Analytical duplicate
Nmv−std
13000
13200
13400
Mg
Analytical sequence

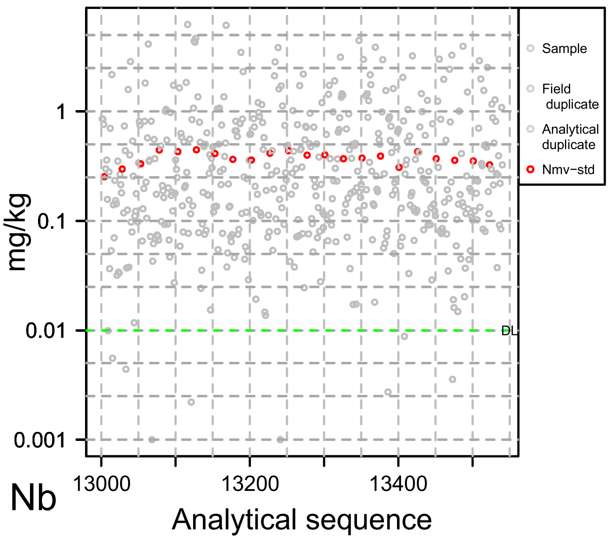
10000
1000
100
10
mg/kg
Sample
Field duplicate
Analytical duplicate
Nmv−std
13000
13200
13400
Mn
Analytical sequence

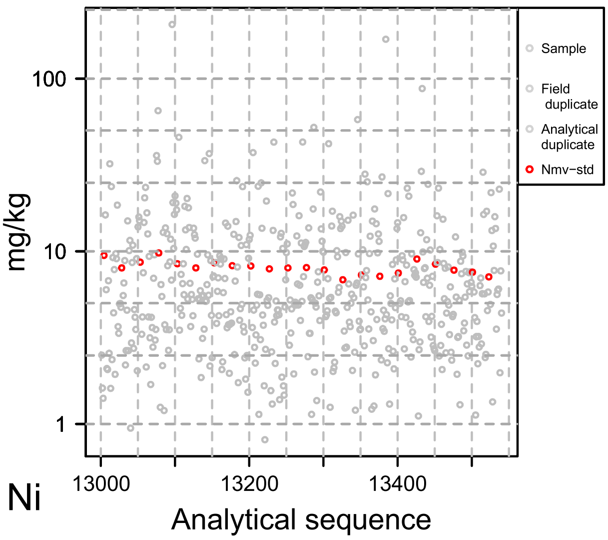
1
0.1
mg/kg
Sample
Field duplicate
Analytical duplicate
Nmv−std
13000
13200
13400
Mo
Analytical sequence

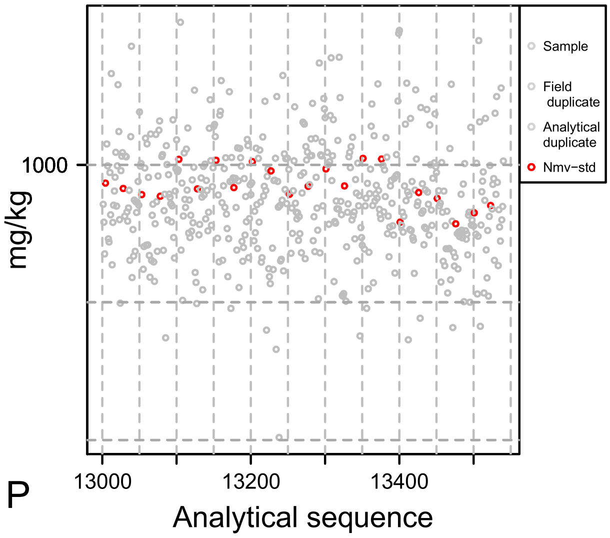
1000
100
mg/kg
Sample
Field duplicate
Analytical duplicate
Nmv−std
13000
13200
13400
Na
Analytical sequence

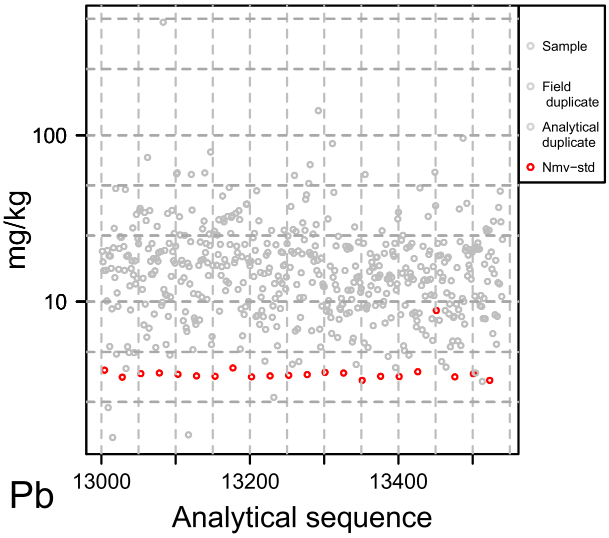



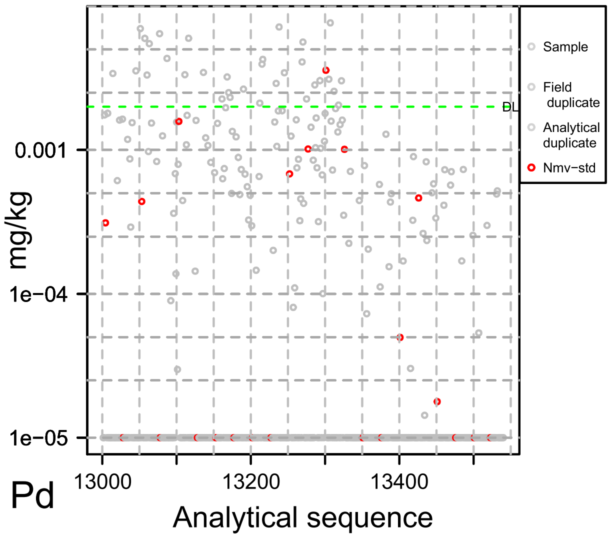
1
0.1
0.01
0.001
mg/kg
DL
Sample
Field duplicate
Analytical duplicate
Nmv−std
13000
13200
13400
Nb
Analytical sequence

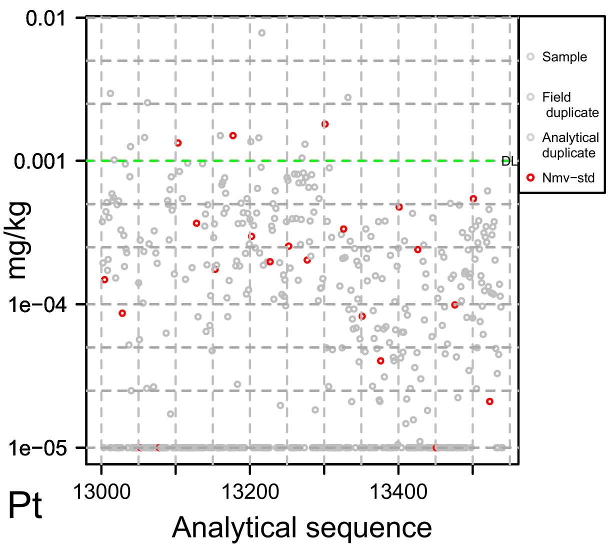



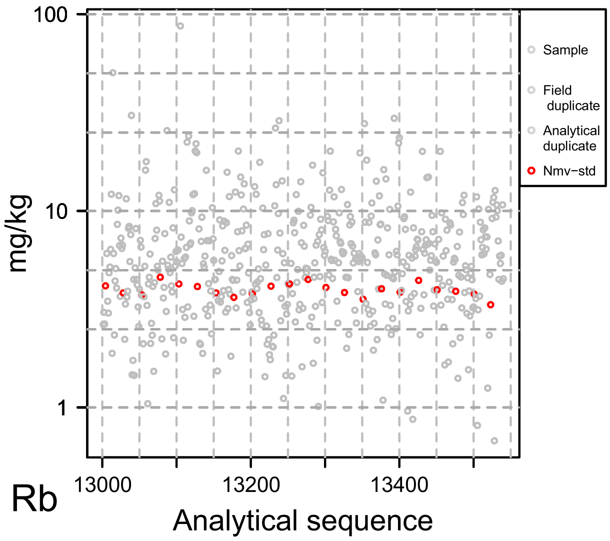
100
10
1
mg/kg
Sample
Field duplicate
Analytical duplicate
Nmv−std
13000
13200
13400
Ni
Analytical sequence

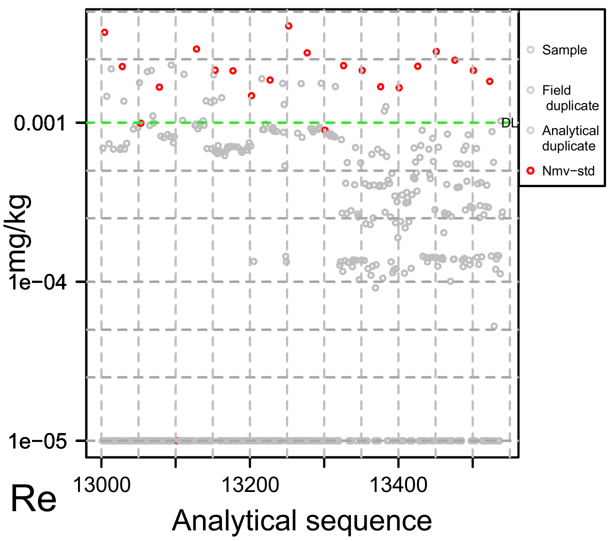

Sample
Field duplicate
Analytical duplicate
Nmv−std
1000
mg/kg
13000
13200
13400
P
Analytical sequence

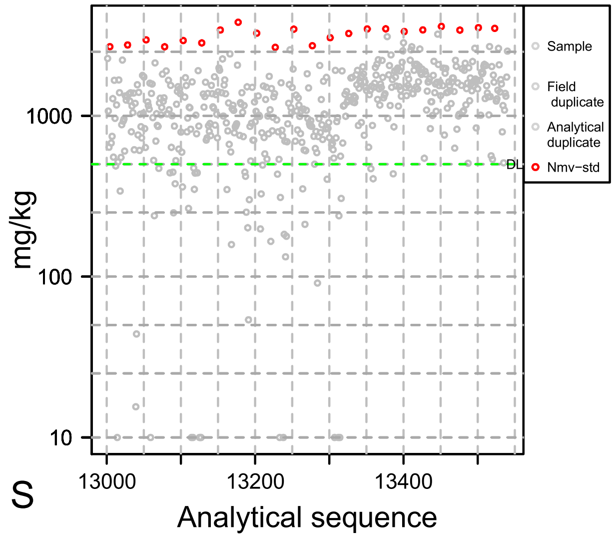

Sample
Field duplicate
Analytical duplicate
Nmv−std
100
10
mg/kg
13000
13200
13400
Pb
Analytical sequence

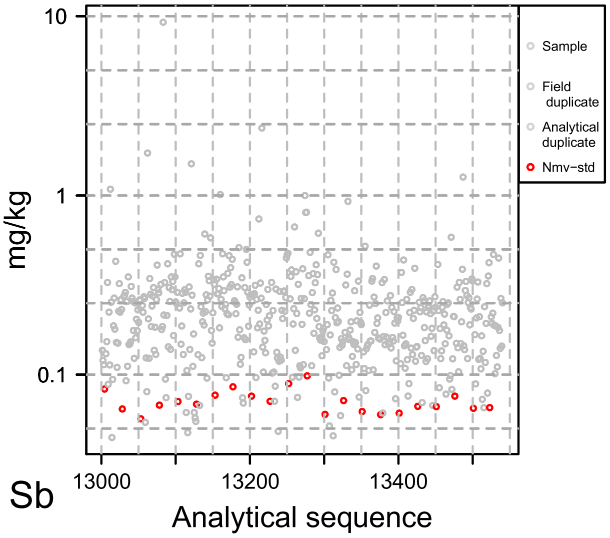

Sample
Field duplicate
Analytical duplicate
Nmv−std
DL
0.001
1e−04
1e−05
mg/kg
13000
13200
13400
Pd
Analytical sequence

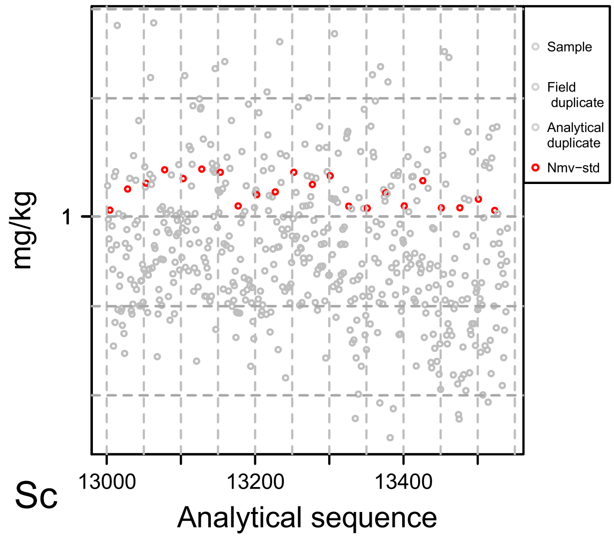

Sample
Field duplicate
Analytical duplicate
Nmv−std
DL
0.01
0.001
1e−04
1e−05
mg/kg
13000
13200
13400
Pt
Analytical sequence

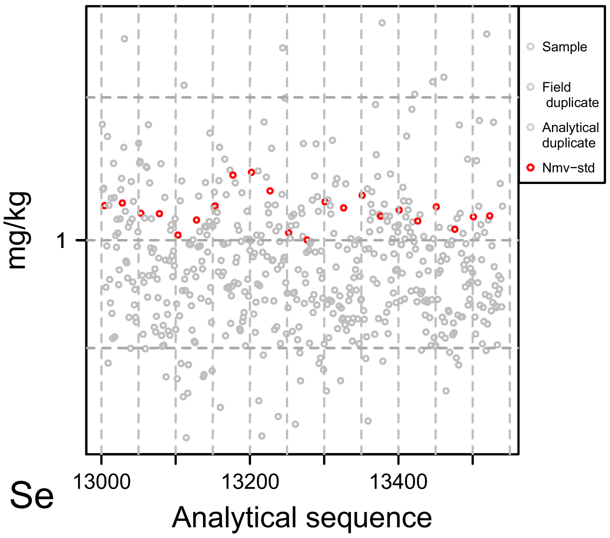

Sample
Field duplicate
Analytical duplicate
Nmv−std
100
10
1
mg/kg
13000
13200
13400
Rb
Analytical sequence

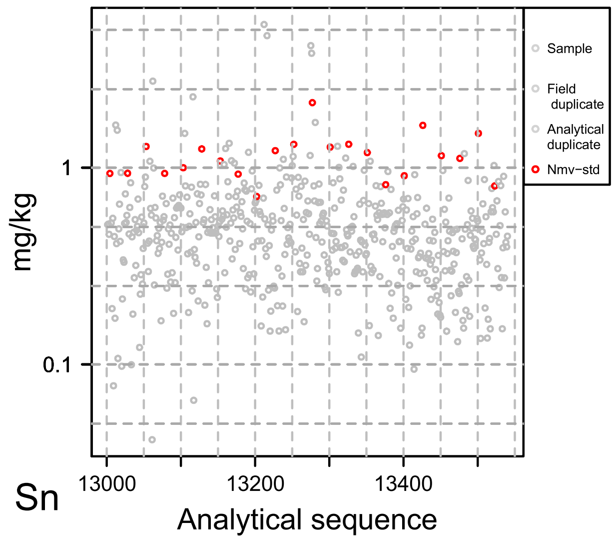

Sample
Field duplicate
Analytical duplicate
Nmv−std
DL
0.001
1e−04
1e−05
mg/kg
13000
13200
13400
Re
Analytical sequence

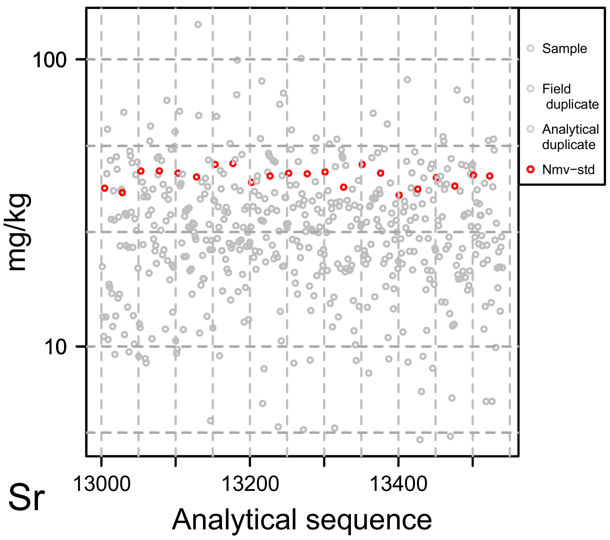

Sample
Field duplicate
Analytical duplicate
Nmv−std
DL
mg/kg
10
100
1000
13000
13200
13400
S
Analytical sequence

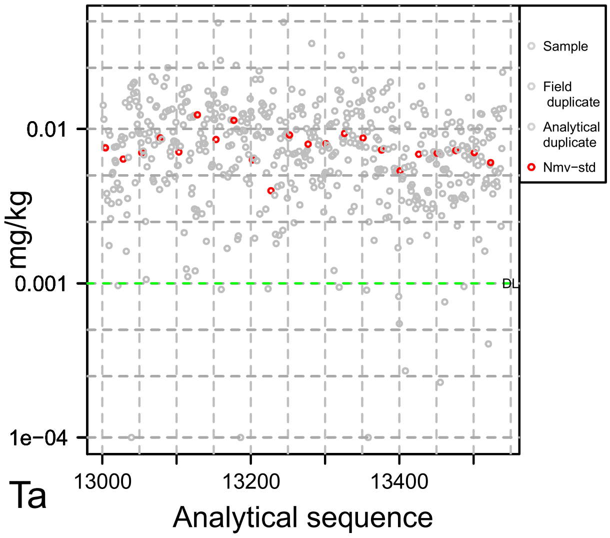

Sample
Field duplicate
Analytical duplicate
Nmv−std
mg/kg
0.1
1
10
13000
13200
13400
Sb
Analytical sequence

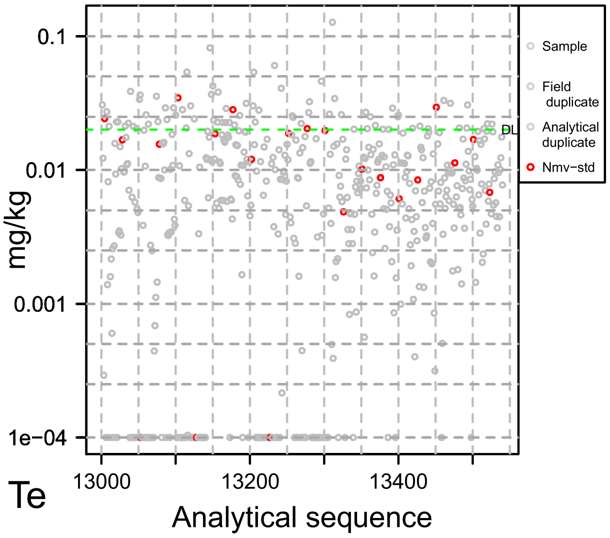

Sample
Field duplicate
Analytical duplicate
Nmv−std
mg/kg
1
13000
13200
13400
Sc
Analytical sequence

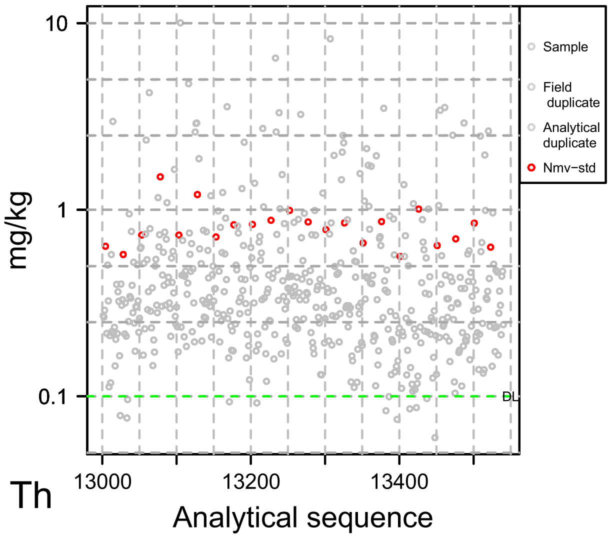

Sample
Field duplicate
Analytical duplicate
Nmv−std
mg/kg
1
13000
13200
13400
Se
Analytical sequence

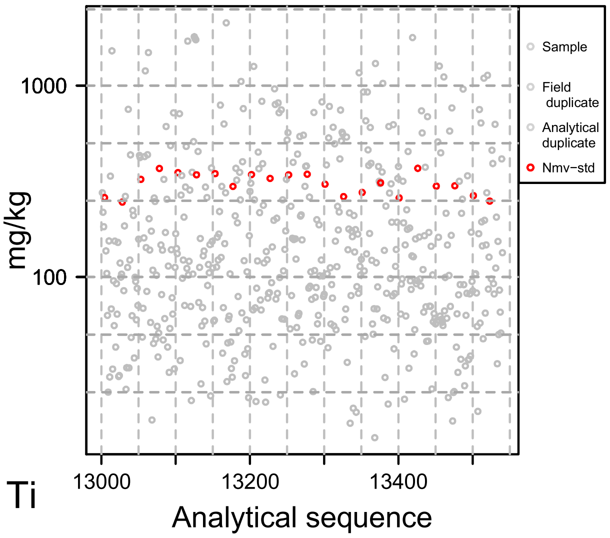

Sample
Field duplicate
Analytical duplicate
Nmv−std
mg/kg
0.1
1
13000
13200
13400
Sn
Analytical sequence

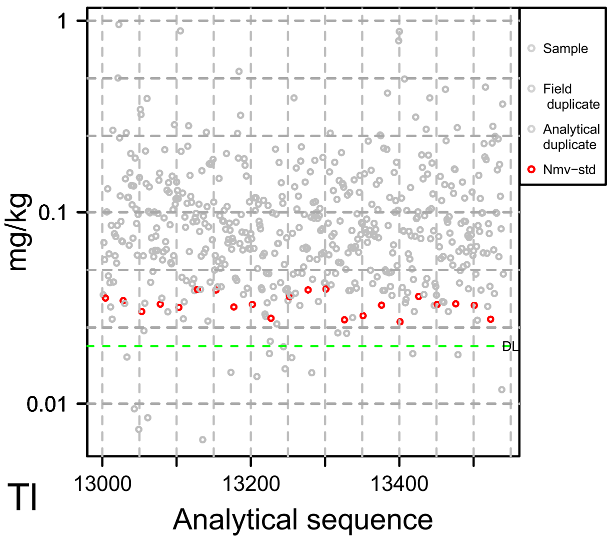

Sample
Field duplicate
Analytical duplicate
Nmv−std
mg/kg
10
100
13000
13200
13400
Sr
Analytical sequence

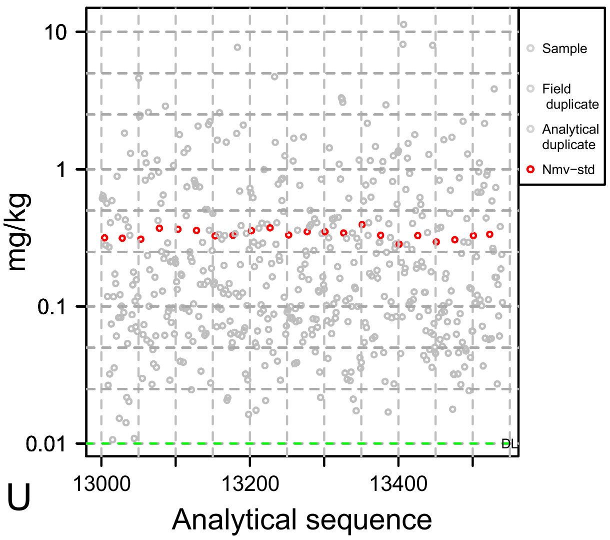

mg/kg
0.01
0.001
1e−04
13000
13200
13400
Analytical sequence
DL
Sample
Field duplicate
Analytical duplicate
Nmv−std
Ta

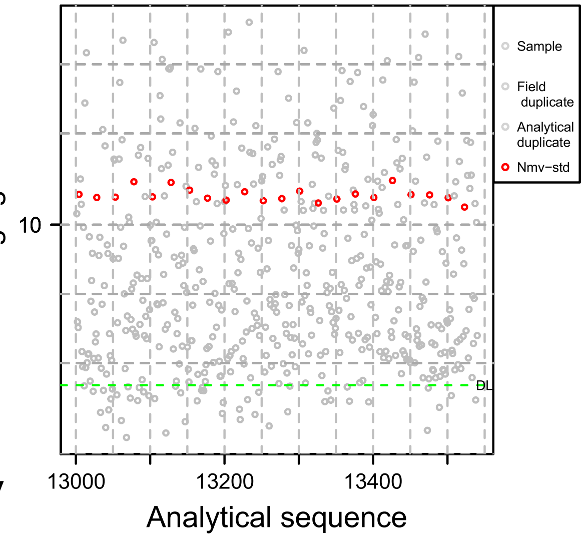

mg/kg
0.1
0.01
0.001
1e−04
13000
13200
13400
Analytical sequence
DL
Sample
Field duplicate
Analytical duplicate
Nmv−std
Te

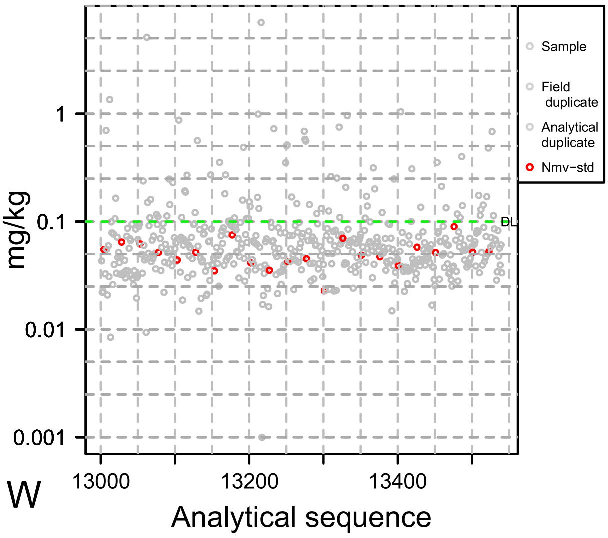

mg/kg
10
1
0.1
13000
13200
13400
Analytical sequence
DL
Sample
Field duplicate
Analytical duplicate
Nmv−std
Th

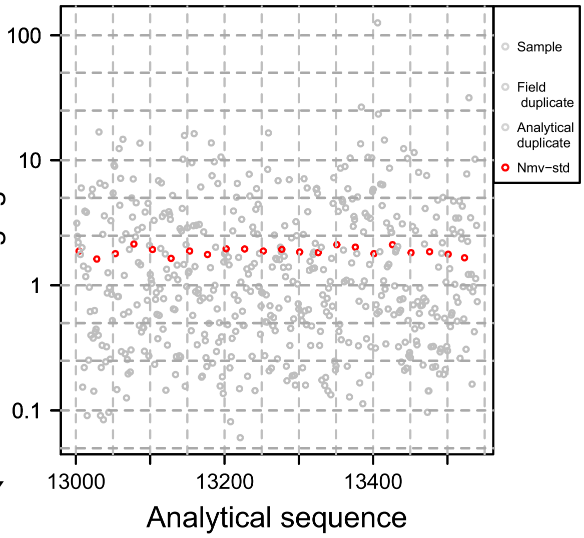

mg/kg
1000
100
13000
13200
13400
Analytical sequence
Sample
Field duplicate
Analytical duplicate
Nmv−std
Ti

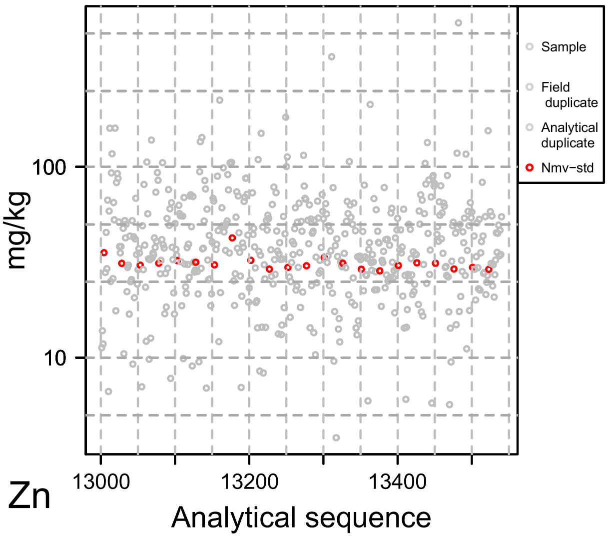

mg/kg
1
0.1
0.01
13000
13200
13400
Analytical sequence
DL
Sample
Field duplicate
Analytical duplicate
Nmv−std
Tl

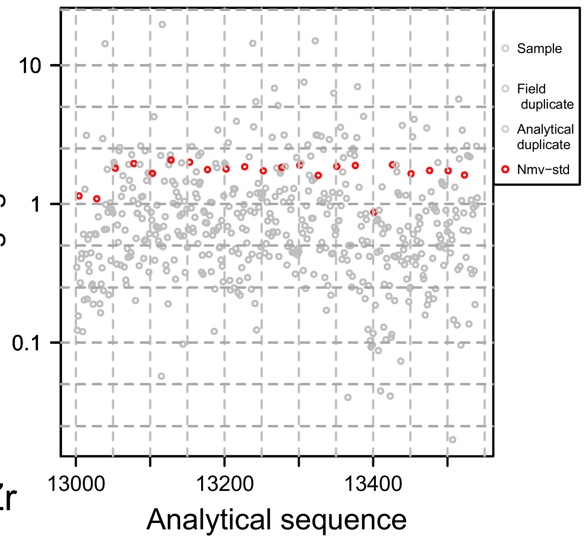

mg/kg
10
1
0.1
0.01
13000
13200
13400
Analytical sequence
DL
Sample
Field duplicate
Analytical duplicate
Nmv−std
U


mg/kg
10
13000
13200
13400
Analytical sequence
DL
Sample
Field duplicate
Analytical duplicate
Nmv−std
V


mg/kg
1
0.1
0.01
0.001
13000
13200
13400
Analytical sequence
DL
Sample
Field duplicate
Analytical duplicate
Nmv−std
W


mg/kg
100
10
1
0.1
13000
13200
13400
Analytical sequence
Sample
Field duplicate
Analytical duplicate
Nmv−std
Y


mg/kg
100
10
13000
13200
13400
Analytical sequence
Sample
Field duplicate
Analytical duplicate
Nmv−std
Zn

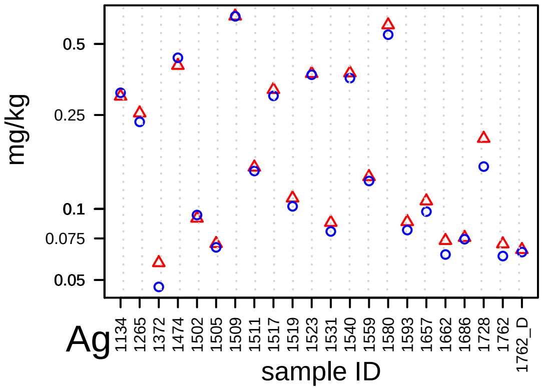

mg/kg
10
1
0.1
13000
13200
13400
Analytical sequence
Sample
Field duplicate
Analytical duplicate
Nmv−std
Zr

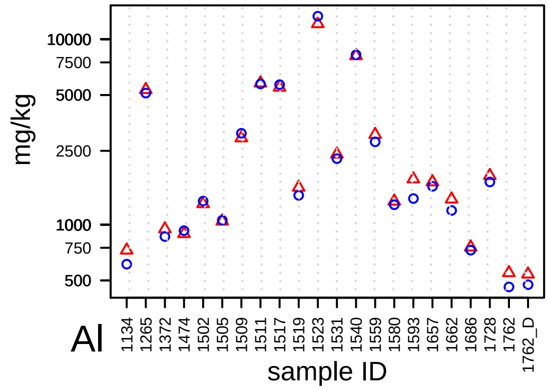
# Appendix 2: Samples re-analysed from previous surveys

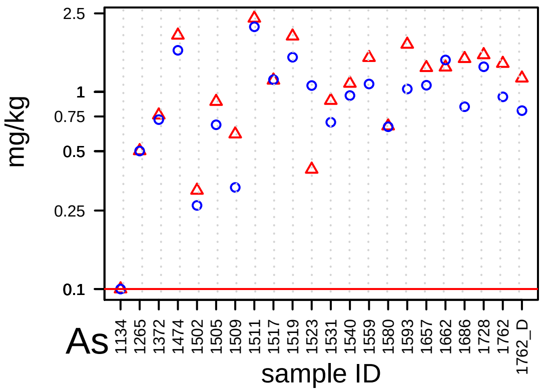
A selection of 22 organic soil samples from the North Trøndelag and Fosen survey (Finne and Eggen, 2014) was reanalysed; 1134, 1265, 1372, 1474, 1502, 1505, 1509, 1511, 1517, 1519, 1523, 1531, 1540, 1559, 1580, 1593, 1657,1662, 1686, 1728, 1762, 1762_D along with the samples from this survey, South Trøndelag samples.

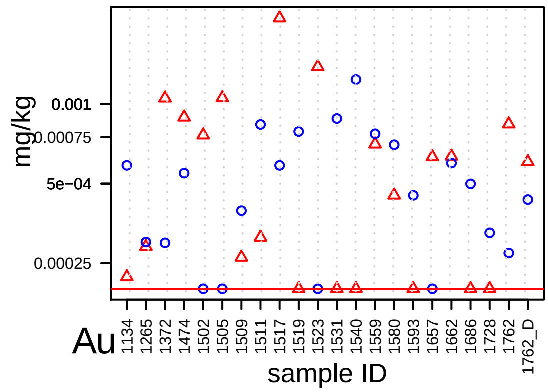
The same lab, Bureau Veritas Minerals, Vancouver, Canada, (ACME) have been used for both sample collections.

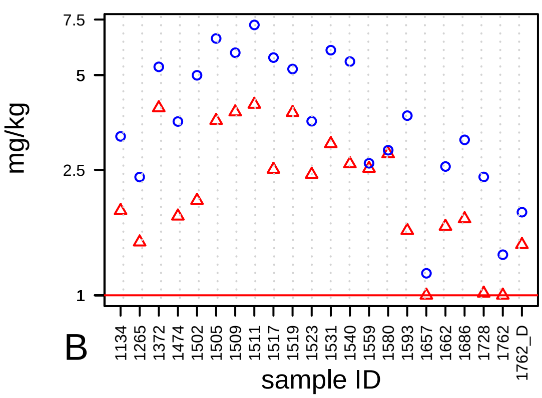
| **Sample collection** | **Symbology** |
|---|---|
| The North Trøndelag and Fosen survey (2014) | Δ |
| Re-analysis, this survey | ○ |
| Laboratory detection limit | —— |

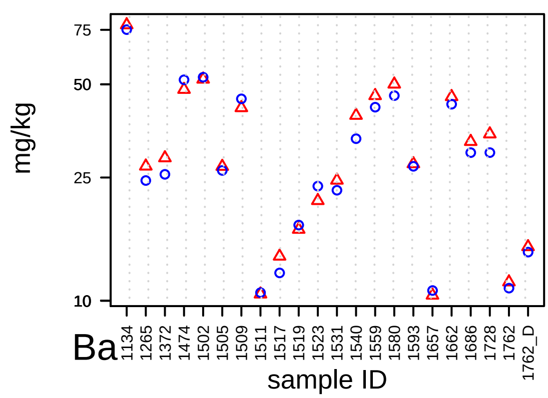

Ag
mg/kg
0.5
0.25
0.1
0.075
0.05
1134 1265 1372 1474 1502 1505 1509 1511 1517 1519 1523 1531 1540 1559 1580 1593 1657 1662 1686 1728 1762 1762_D
sample ID

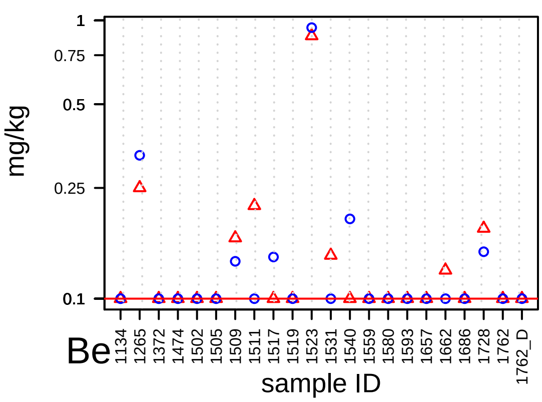

Al
mg/kg
10000
7500
5000
2500
1000
750
500
1134 1265 1372 1474 1502 1505 1509 1511 1517 1519 1523 1531 1540 1559 1580 1593 1657 1662 1686 1728 1762 1762_D
sample ID

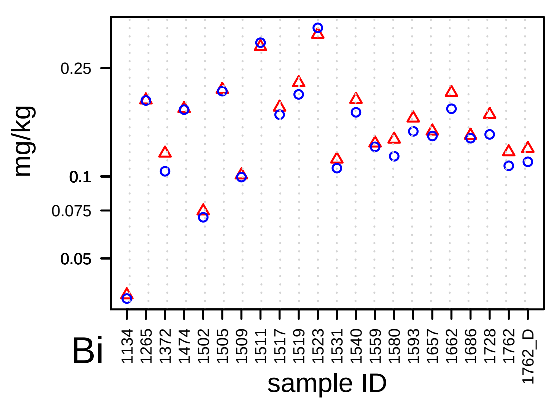

As
mg/kg
2.5
1
0.75
0.5
0.25
0.1
1134 1265 1372 1474 1502 1505 1509 1511 1517 1519 1523 1531 1540 1559 1580 1593 1657 1662 1686 1728 1762 1762_D
sample ID

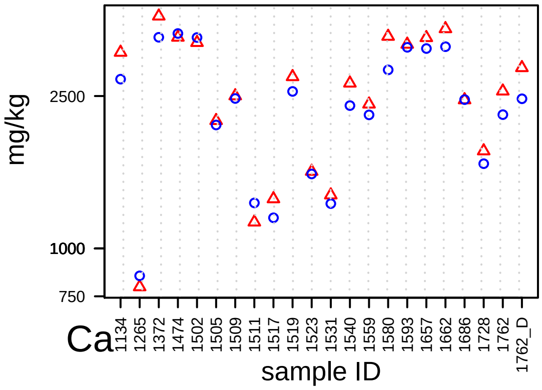

Au
mg/kg
0.001
0.00075
5e−04
0.00025
1134 1265 1372 1474 1502 1505 1509 1511 1517 1519 1523 1531 1540 1559 1580 1593 1657 1662 1686 1728 1762 1762_D
sample ID

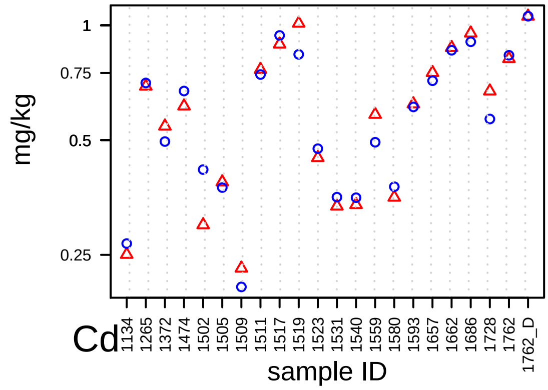

B
mg/kg
7.5
5
2.5
1
1134 1265 1372 1474 1502 1505 1509 1511 1517 1519 1523 1531 1540 1559 1580 1593 1657 1662 1686 1728 1762 1762_D
sample ID

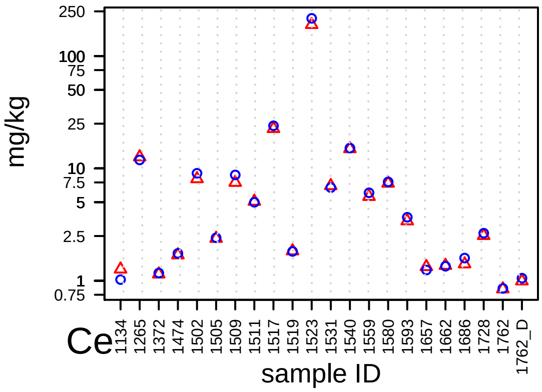

Ba
mg/kg
75
50
25
10
1134 1265 1372 1474 1502 1505 1509 1511 1517 1519 1523 1531 1540 1559 1580 1593 1657 1662 1686 1728 1762 1762_D
sample ID

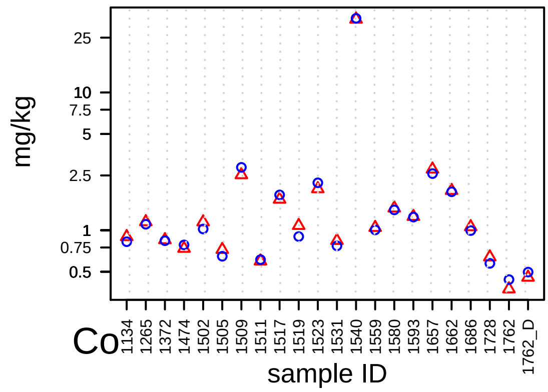

Be
mg/kg
1
0.75
0.5
0.25
0.1
1134 1265 1372 1474 1502 1505 1509 1511 1517 1519 1523 1531 1540 1559 1580 1593 1657 1662 1686 1728 1762 1762_D
sample ID

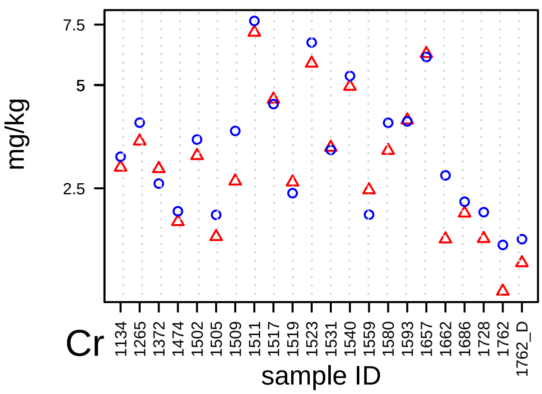

Bi
mg/kg
0.25
0.1
0.075
0.05
1134 1265 1372 1474 1502 1505 1509 1511 1517 1519 1523 1531 1540 1559 1580 1593 1657 1662 1686 1728 1762 1762_D
sample ID

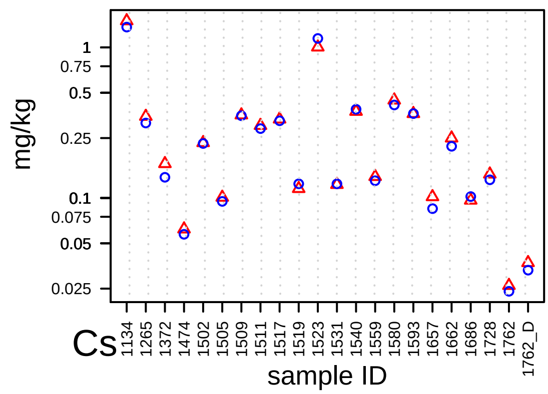

mg/kg
2500
1000
750
Ca
1134 1265 1372 1474 1502 1505 1509 1511 1517 1519 1523 1531 1540 1559 1580 1593 1657 1662 1686 1728 1762 1762_D
sample ID

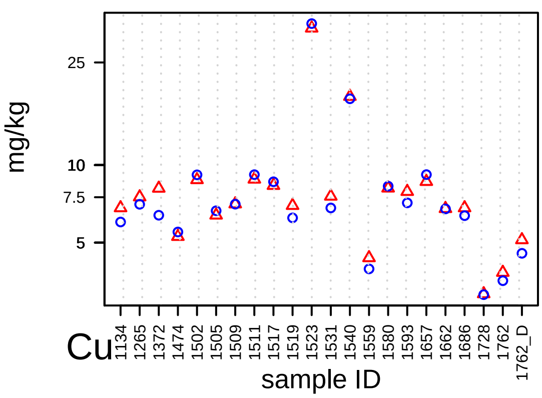

mg/kg
1
0.75
0.5
0.25
Cd
1134 1265 1372 1474 1502 1505 1509 1511 1517 1519 1523 1531 1540 1559 1580 1593 1657 1662 1686 1728 1762 1762_D
sample ID

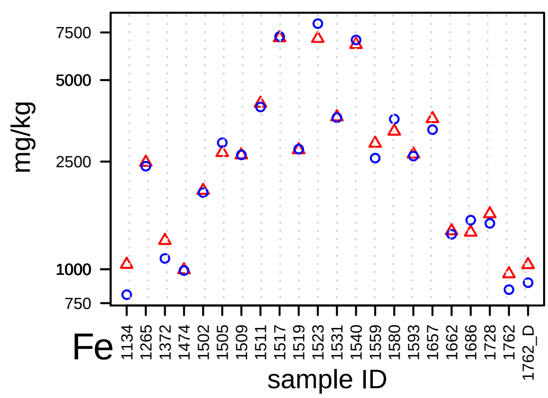

mg/kg
250
100
75
50
25
10
7.5
5
2.5
1
0.75
Ce
1134 1265 1372 1474 1502 1505 1509 1511 1517 1519 1523 1531 1540 1559 1580 1593 1657 1662 1686 1728 1762 1762_D
sample ID

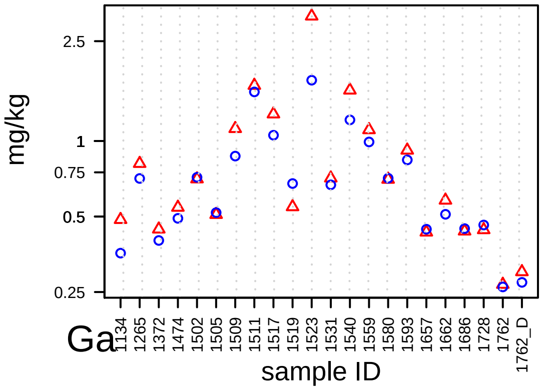

mg/kg
25
10
7.5
5
2.5
1
0.75
0.5
Co
1134 1265 1372 1474 1502 1505 1509 1511 1517 1519 1523 1531 1540 1559 1580 1593 1657 1662 1686 1728 1762 1762_D
sample ID

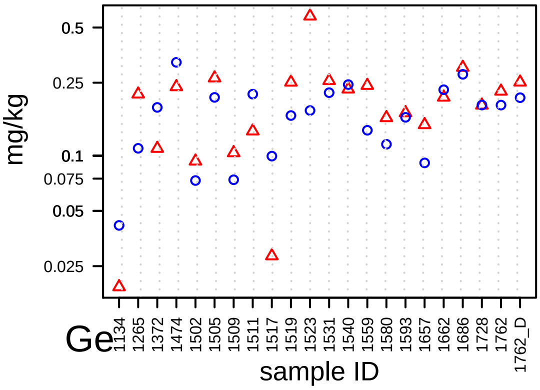

mg/kg
7.5
5
2.5
Cr
1134 1265 1372 1474 1502 1505 1509 1511 1517 1519 1523 1531 1540 1559 1580 1593 1657 1662 1686 1728 1762 1762_D
sample ID

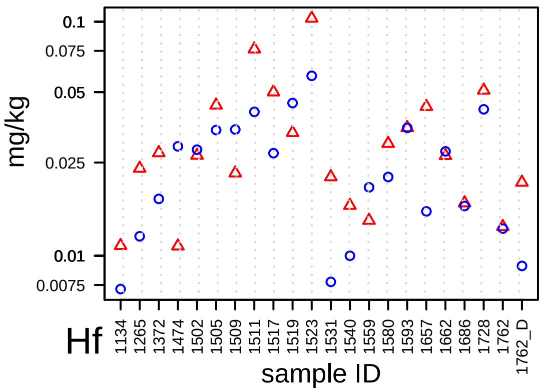

mg/kg
1
0.75
0.5
0.25
0.1
0.075
0.05
0.025
Cs
1134 1265 1372 1474 1502 1505 1509 1511 1517 1519 1523 1531 1540 1559 1580 1593 1657 1662 1686 1728 1762 1762_D
sample ID

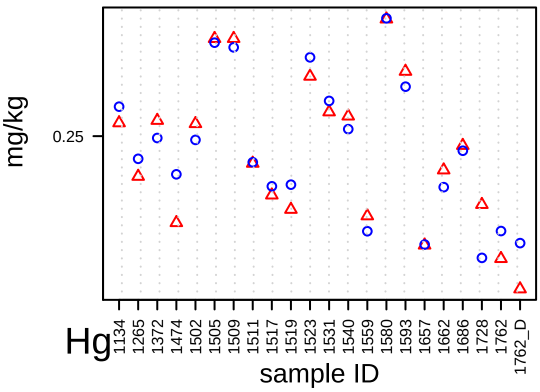

mg/kg
25
10
7.5
5
Cu
1134 1265 1372 1474 1502 1505 1509 1511 1517 1519 1523 1531 1540 1559 1580 1593 1657 1662 1686 1728 1762 1762_D
sample ID

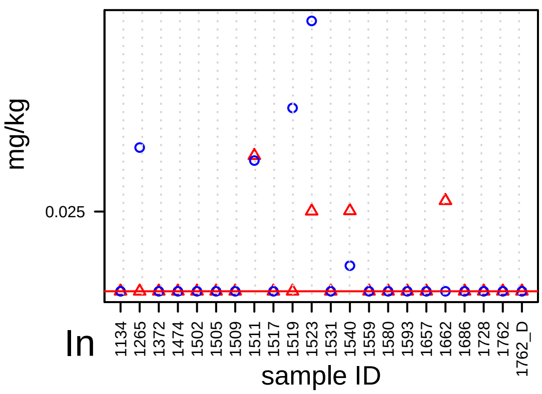

mg/kg
7500
5000
2500
1000
750
Fe
1134 1265 1372 1474 1502 1505 1509 1511 1517 1519 1523 1531 1540 1559 1580 1593 1657 1662 1686 1728 1762 1762_D
sample ID

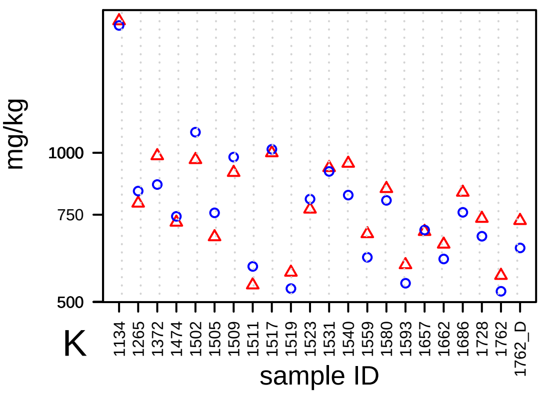

mg/kg
2.5
1
0.75
0.5
0.25
Ga
1134 1265 1372 1474 1502 1505 1509 1511 1517 1519 1523 1531 1540 1559 1580 1593 1657 1662 1686 1728 1762 1762_D
sample ID

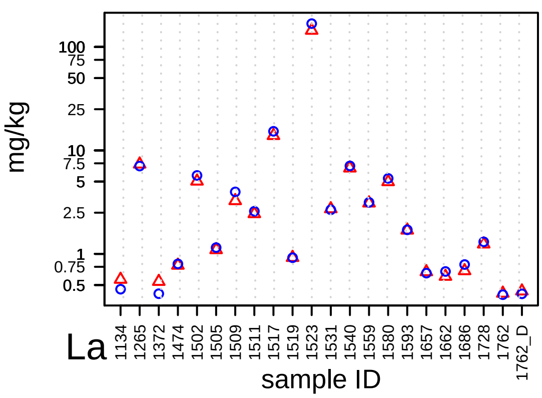

mg/kg
0.5
0.25
0.1
0.075
0.05
0.025
Ge
1134 1265 1372 1474 1502 1505 1509 1511 1517 1519 1523 1531 1540 1559 1580 1593 1657 1662 1686 1728 1762 1762_D
sample ID

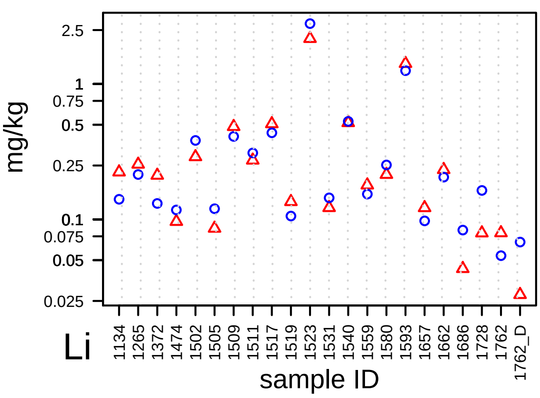

mg/kg
0.1
0.075
0.05
0.025
0.01
0.0075
Hf
1134 1265 1372 1474 1502 1505 1509 1511 1517 1519 1523 1531 1540 1559 1580 1593 1657 1662 1686 1728 1762 1762_D
sample ID

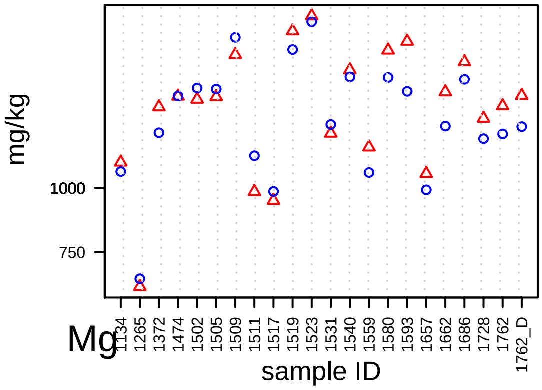

mg/kg
0.25
Hg
1134 1265 1372 1474 1502 1505 1509 1511 1517 1519 1523 1531 1540 1559 1580 1593 1657 1662 1686 1728 1762 1762_D
sample ID

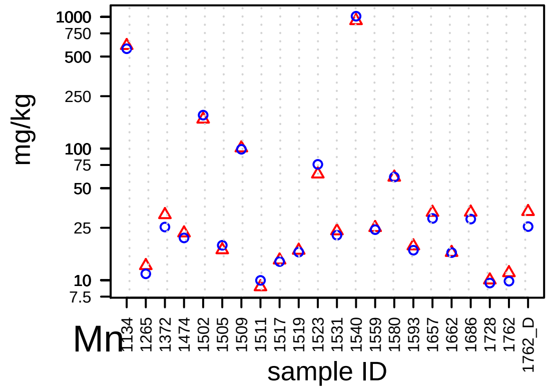

mg/kg
0.025
In
1134 1265 1372 1474 1502 1505 1509 1511 1517 1519 1523 1531 1540 1559 1580 1593 1657 1662 1686 1728 1762 1762_D
sample ID

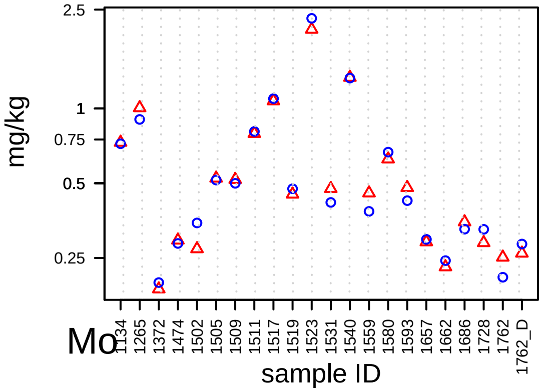

mg/kg
1000
750
500
K
1134 1265 1372 1474 1502 1505 1509 1511 1517 1519 1523 1531 1540 1559 1580 1593 1657 1662 1686 1728 1762 1762_D
sample ID

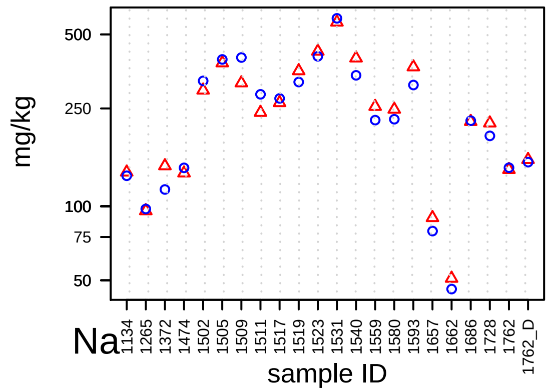

mg/kg
100
75
50
25
10
7.5
5
2.5
1
0.75
0.5
La
1134 1265 1372 1474 1502 1505 1509 1511 1517 1519 1523 1531 1540 1559 1580 1593 1657 1662 1686 1728 1762 1762_D
sample ID

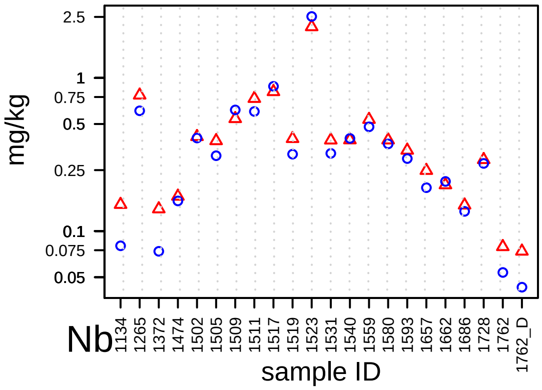

mg/kg
2.5
1
0.75
0.5
0.25
0.1
0.075
0.05
0.025
Li
1134 1265 1372 1474 1502 1505 1509 1511 1517 1519 1523 1531 1540 1559 1580 1593 1657 1662 1686 1728 1762 1762_D
sample ID

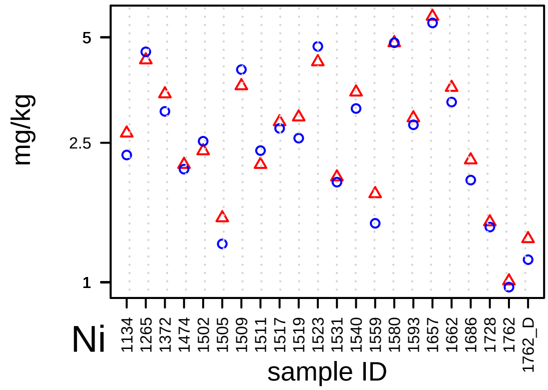

mg/kg
1000
750
1134 1265 1372 1474 1502 1505 1509 1511 1517 1519 1523 1531 1540 1559 1580 1593 1657 1662 1686 1728 1762 1762_D
Mg
sample ID

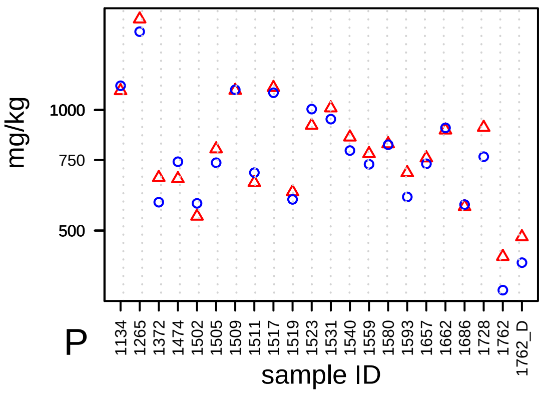

mg/kg
1000
750
500
250
100
75
50
25
10
7.5
1134 1265 1372 1474 1502 1505 1509 1511 1517 1519 1523 1531 1540 1559 1580 1593 1657 1662 1686 1728 1762 1762_D
Mn
sample ID

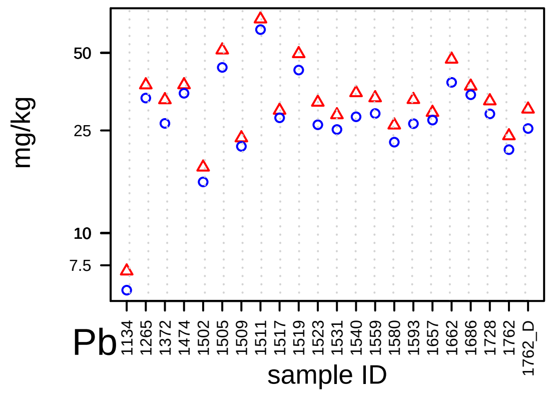

mg/kg
2.5
1
0.75
0.5
0.25
1134 1265 1372 1474 1502 1505 1509 1511 1517 1519 1523 1531 1540 1559 1580 1593 1657 1662 1686 1728 1762 1762_D
Mo
sample ID

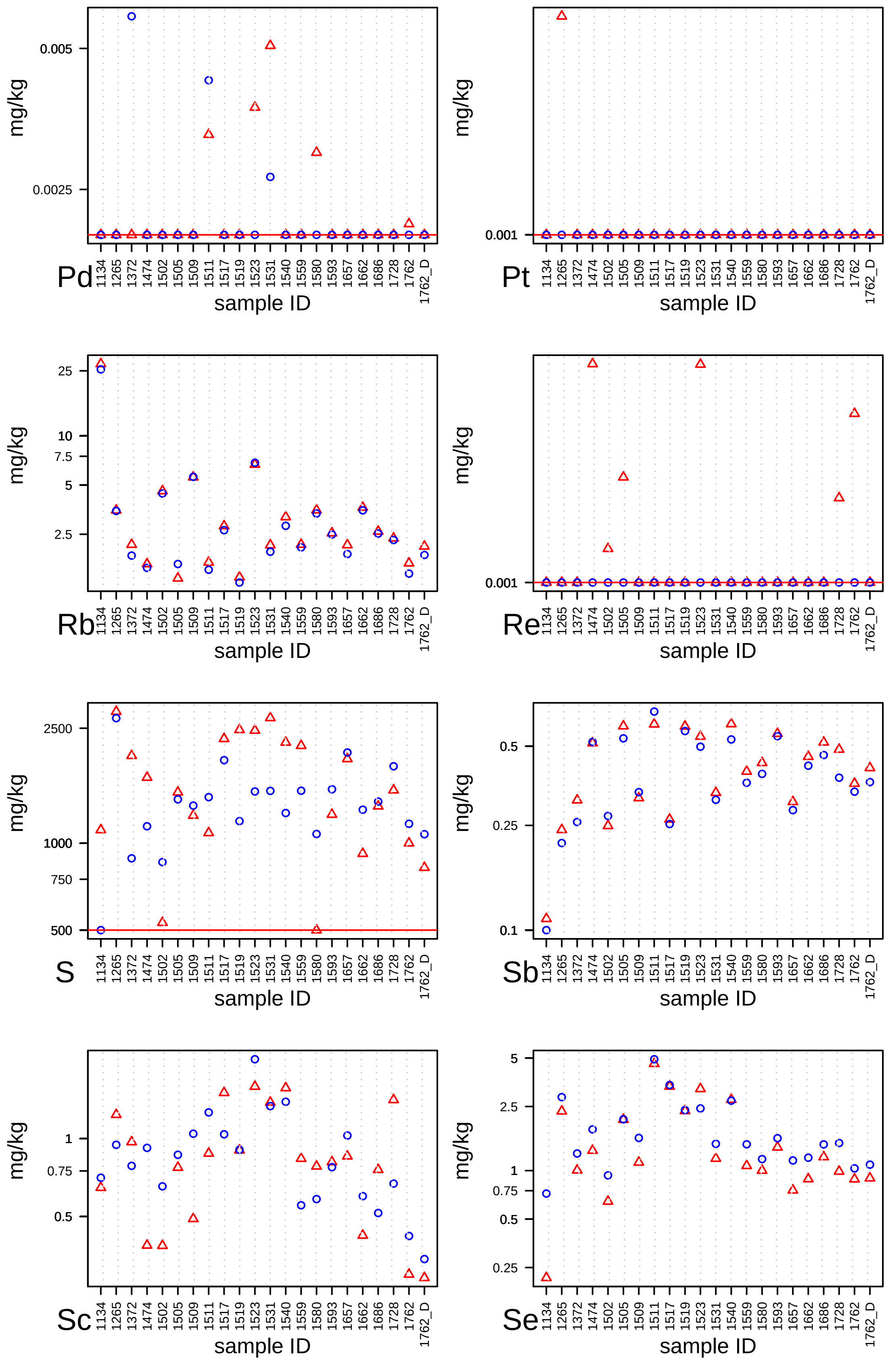

mg/kg
500
250
100
75
50
1134 1265 1372 1474 1502 1505 1509 1511 1517 1519 1523 1531 1540 1559 1580 1593 1657 1662 1686 1728 1762 1762_D
Na
sample ID

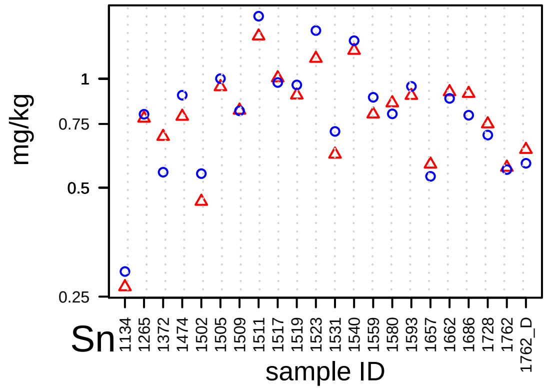

mg/kg
2.5
1
0.75
0.5
0.25
0.1
0.075
0.05
1134 1265 1372 1474 1502 1505 1509 1511 1517 1519 1523 1531 1540 1559 1580 1593 1657 1662 1686 1728 1762 1762_D
Nb
sample ID

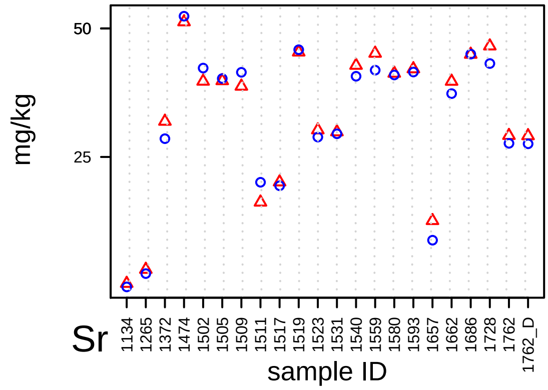

mg/kg
5
2.5
1
1134 1265 1372 1474 1502 1505 1509 1511 1517 1519 1523 1531 1540 1559 1580 1593 1657 1662 1686 1728 1762 1762_D
Ni
sample ID

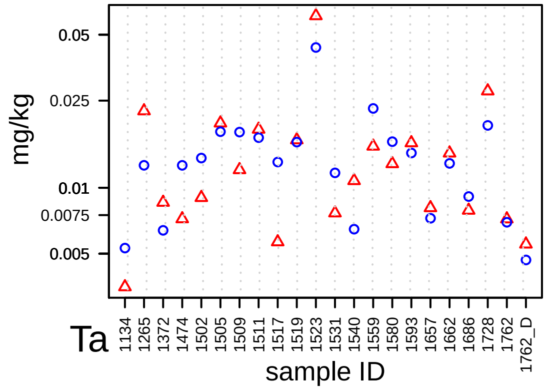

mg/kg
1000
750
500
1134 1265 1372 1474 1502 1505 1509 1511 1517 1519 1523 1531 1540 1559 1580 1593 1657 1662 1686 1728 1762 1762_D
P
sample ID

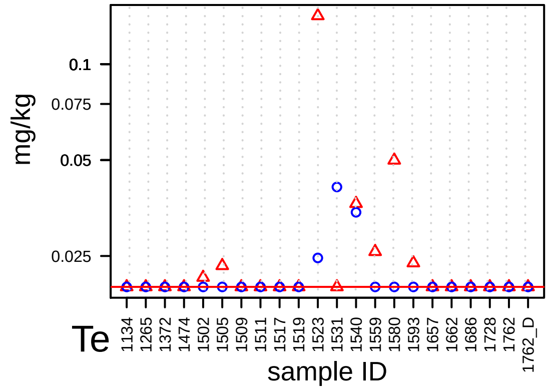

mg/kg
50
25
10
7.5
1134 1265 1372 1474 1502 1505 1509 1511 1517 1519 1523 1531 1540 1559 1580 1593 1657 1662 1686 1728 1762 1762_D
Pb
sample ID

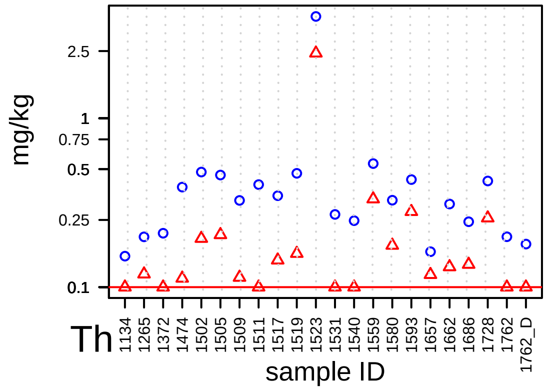

Pd
mg/kg
0.005
0.0025
sample ID
Pt
0.001
Rb
25
10
7.5
5
2.5
Re
S
2500
1000
750
500
Sb
0.5
0.25
0.1
Sc
1
0.75
0.5
Se
5
2.5
1
0.75
0.5
0.25
1134
1265
1372
1474
1502
1505
1509
1511
1517
1519
1523
1531
1540
1559
1580
1593
1657
1662
1686
1728
1762
1762_D

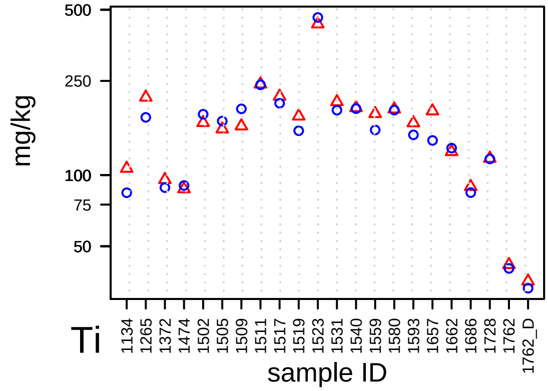

mg/kg
1
0.75
0.5
0.25
Sn
1134 1265 1372 1474 1502 1505 1509 1511 1517 1519 1523 1531 1540 1559 1580 1593 1657 1662 1686 1728 1762 1762_D
sample ID

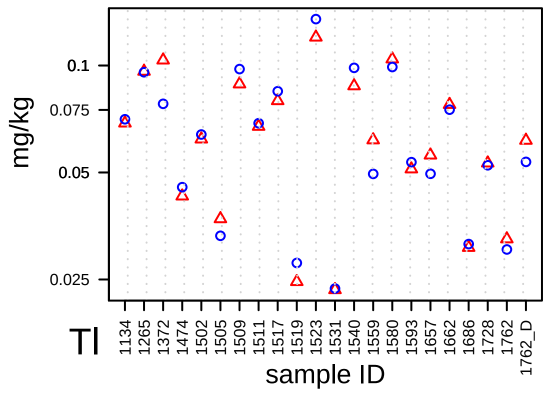

mg/kg
50
25
Sr
1134 1265 1372 1474 1502 1505 1509 1511 1517 1519 1523 1531 1540 1559 1580 1593 1657 1662 1686 1728 1762 1762_D
sample ID

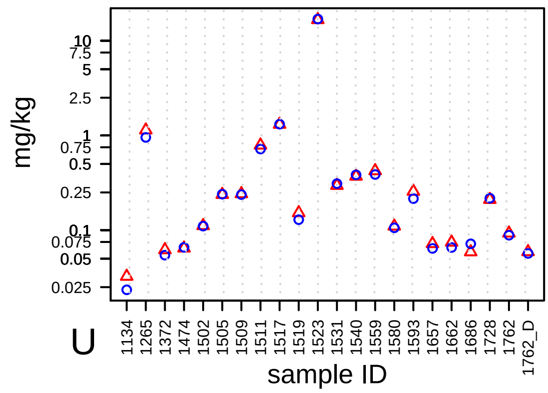

mg/kg
0.05
0.025
0.01
0.0075
0.005
Ta
1134 1265 1372 1474 1502 1505 1509 1511 1517 1519 1523 1531 1540 1559 1580 1593 1657 1662 1686 1728 1762 1762_D
sample ID

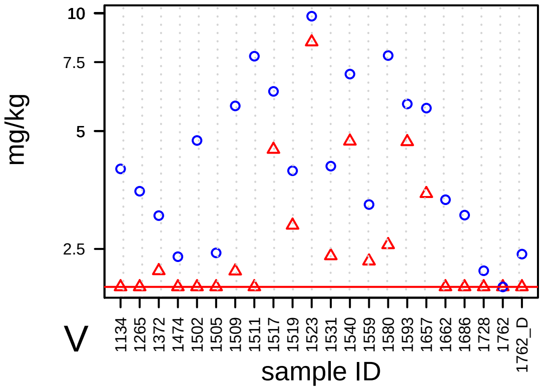

mg/kg
0.1
0.075
0.05
0.025
Te
1134 1265 1372 1474 1502 1505 1509 1511 1517 1519 1523 1531 1540 1559 1580 1593 1657 1662 1686 1728 1762 1762_D
sample ID


mg/kg
2.5
1
0.75
0.5
0.25
0.1
Th
1134 1265 1372 1474 1502 1505 1509 1511 1517 1519 1523 1531 1540 1559 1580 1593 1657 1662 1686 1728 1762 1762_D
sample ID

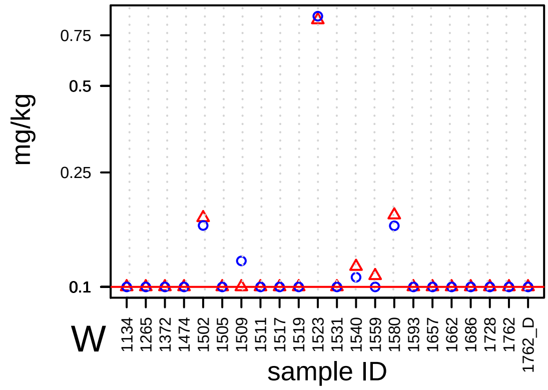

mg/kg
500
250
100
75
50
Ti
1134 1265 1372 1474 1502 1505 1509 1511 1517 1519 1523 1531 1540 1559 1580 1593 1657 1662 1686 1728 1762 1762_D
sample ID


mg/kg
0.1
0.075
0.05
0.025
Tl
1134 1265 1372 1474 1502 1505 1509 1511 1517 1519 1523 1531 1540 1559 1580 1593 1657 1662 1686 1728 1762 1762_D
sample ID

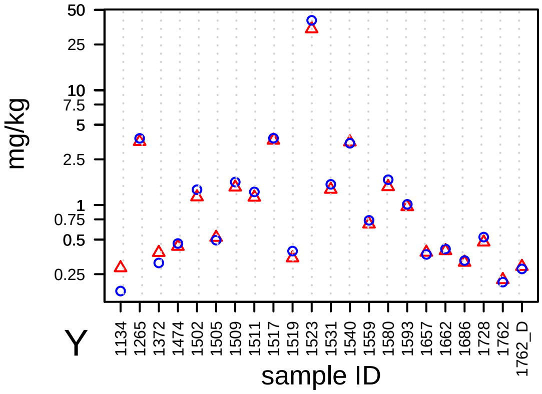

mg/kg
10
7.5
5
2.5
1
0.75
0.5
0.25
0.1
0.075
0.05
0.025
U
1134 1265 1372 1474 1502 1505 1509 1511 1517 1519 1523 1531 1540 1559 1580 1593 1657 1662 1686 1728 1762 1762_D
sample ID



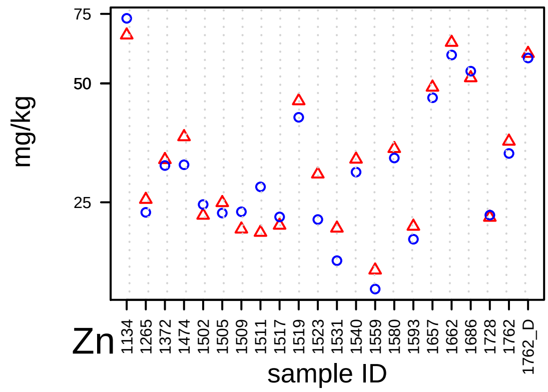
V
mg/kg
10
7.5
5
2.5
sample ID
1134 1265 1372 1474 1502 1505 1509 1511 1517 1519 1523 1531 1540 1559 1580 1593 1657 1662 1686 1728 1762 1762_D

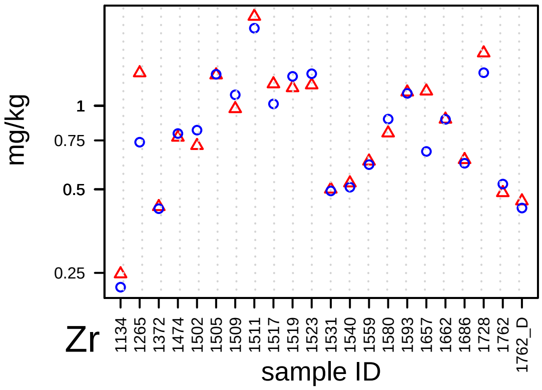
W
mg/kg
0.75
0.5
0.25
0.1
sample ID
1134 1265 1372 1474 1502 1505 1509 1511 1517 1519 1523 1531 1540 1559 1580 1593 1657 1662 1686 1728 1762 1762_D

Y
mg/kg
50
25
10
7.5
5
2.5
1
0.75
0.5
0.25
sample ID
1134 1265 1372 1474 1502 1505 1509 1511 1517 1519 1523 1531 1540 1559 1580 1593 1657 1662 1686 1728 1762 1762_D

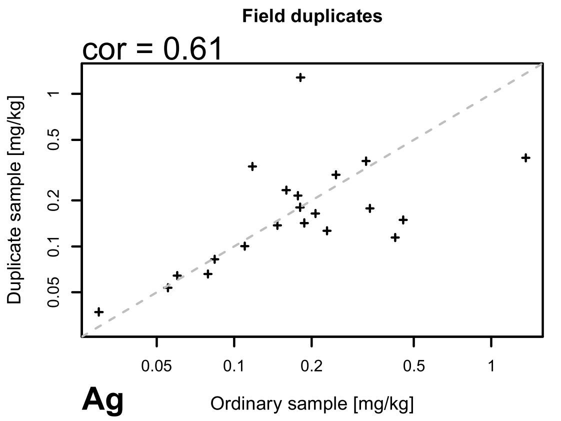
Zn
mg/kg
75
50
25
sample ID
1134 1265 1372 1474 1502 1505 1509 1511 1517 1519 1523 1531 1540 1559 1580 1593 1657 1662 1686 1728 1762 1762_D

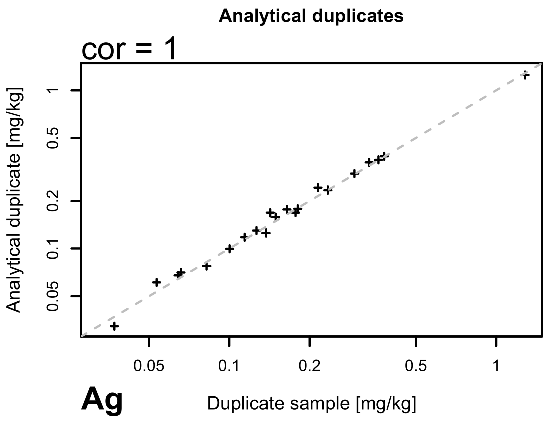



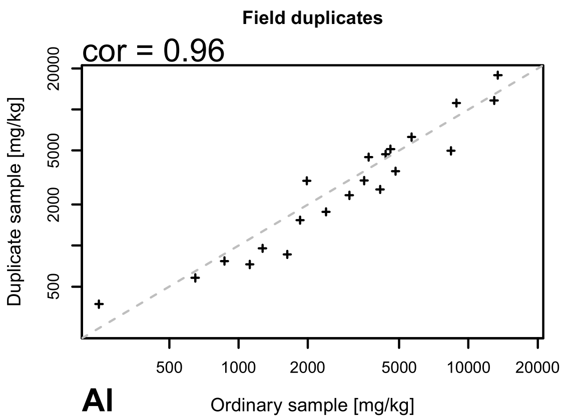
Zr
mg/kg
1
0.75
0.5
0.25
sample ID
1134 1265 1372 1474 1502 1505 1509 1511 1517 1519 1523 1531 1540 1559 1580 1593 1657 1662 1686 1728 1762 1762_D

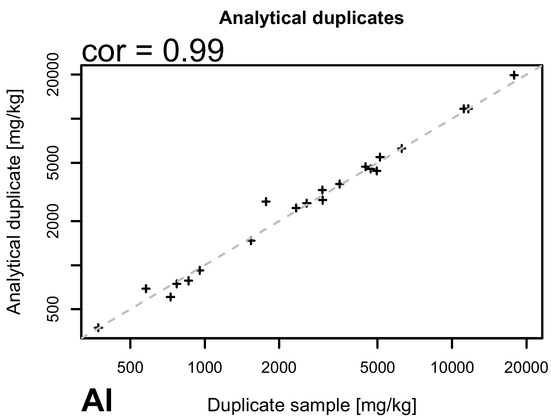
# Appendix 3: Correlation plots duplicates

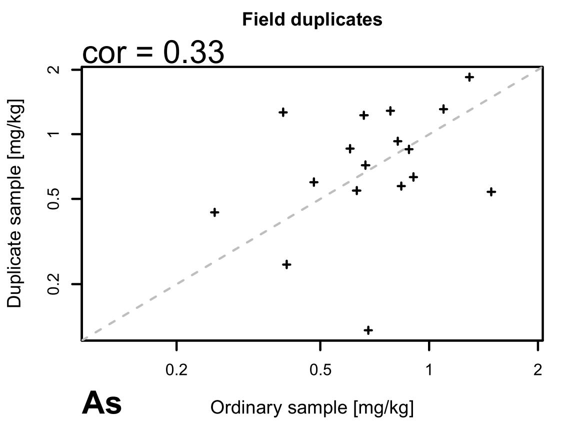
The correlation between ordinary sample and duplicate sample (left hand figure) and the correlation between duplicate sample and analytical duplicate (right hand figure) shown for all elements that have at least five duplicate pairs above DL. Above each plot the covariance or correlation (cor) is given.

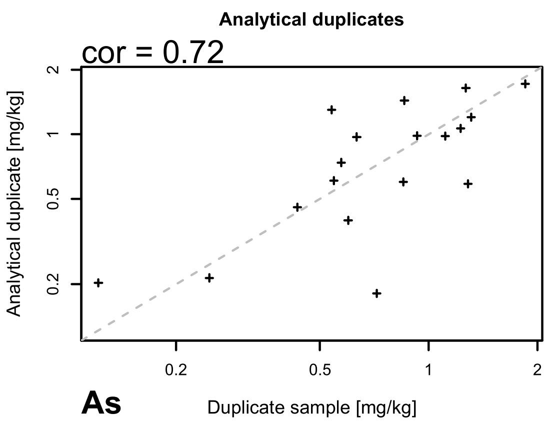

Field duplicates
cor = 0.61
Duplicate sample [mg/kg]
0.05 0.1 0.2 0.5 1
Ordinary sample [mg/kg]
Ag

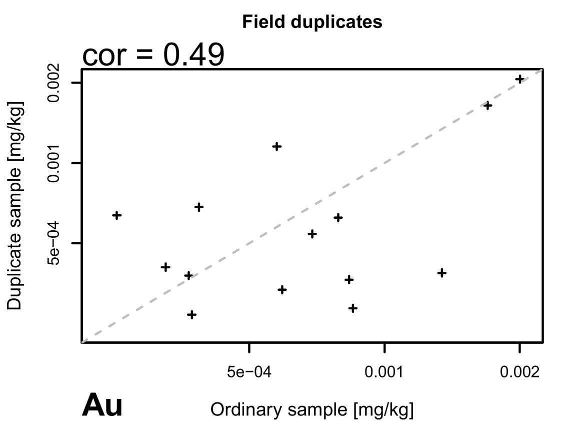

Analytical duplicates
cor = 1
Analytical duplicate [mg/kg]
0.05 0.1 0.2 0.5 1
Duplicate sample [mg/kg]
Ag

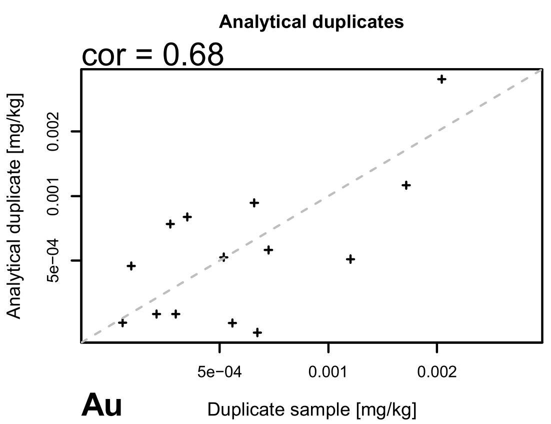

Field duplicates
cor = 0.96
Duplicate sample [mg/kg]
500 2000 5000 20000
500 1000 2000 5000 10000 20000
Ordinary sample [mg/kg]
Al

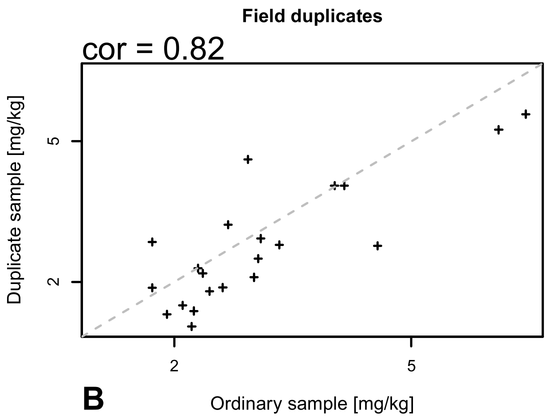

Analytical duplicates
cor = 0.99
Analytical duplicate [mg/kg]
500 2000 5000 20000
500 1000 2000 5000 10000 20000
Duplicate sample [mg/kg]
Al

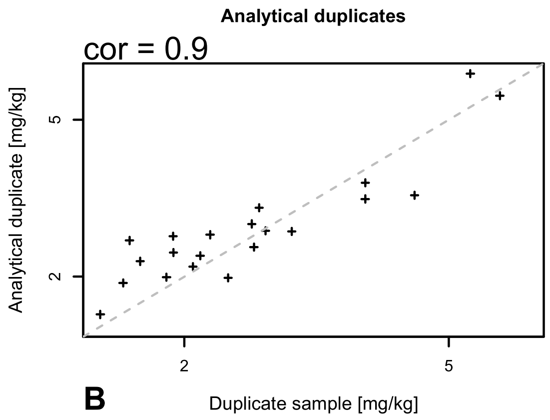

Field duplicates
cor = 0.33
Duplicate sample [mg/kg]
0.2 0.5 1 2
Ordinary sample [mg/kg]
As

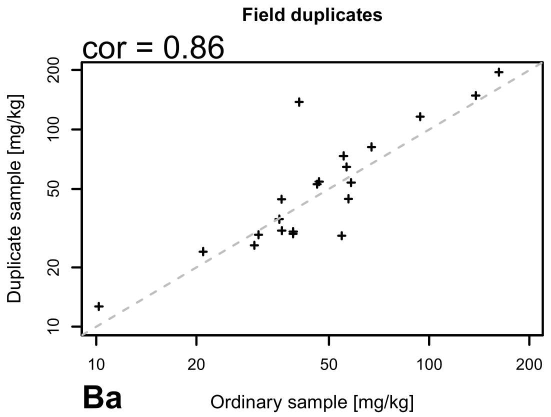

Analytical duplicates
cor = 0.72
Analytical duplicate [mg/kg]
0.2 0.5 1 2
Duplicate sample [mg/kg]
As

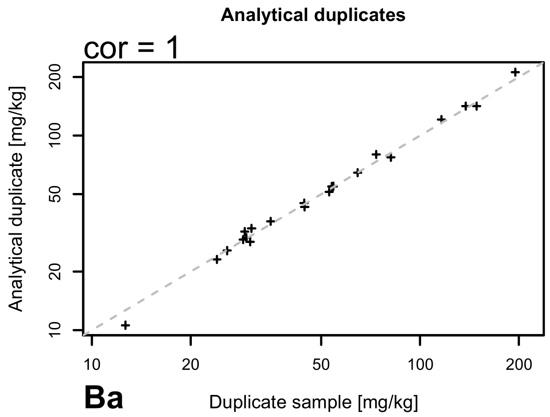

Field duplicates
cor = 0.49
Duplicate sample [mg/kg]
5e−04 0.001 0.002
Ordinary sample [mg/kg]
Au

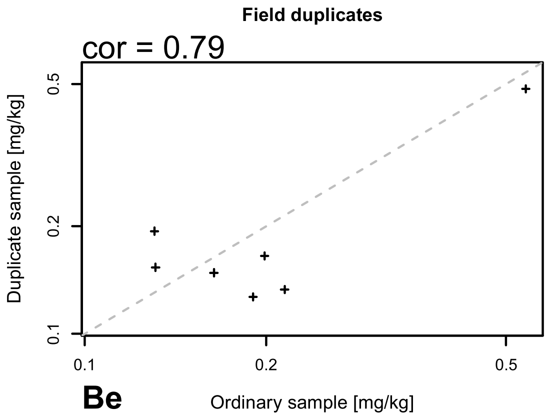

Analytical duplicates
cor = 0.68
Analytical duplicate [mg/kg]
5e−04 0.001 0.002
Duplicate sample [mg/kg]
Au

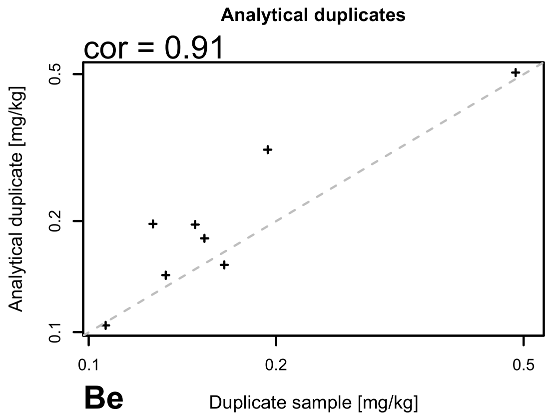

Field duplicates
cor = 0.82
Duplicate sample [mg/kg]
2
5
Ordinary sample [mg/kg]
B

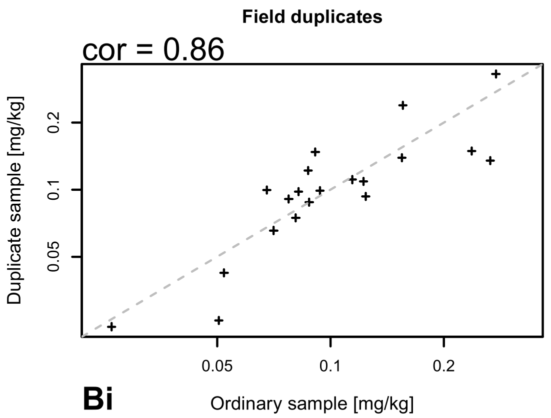

Analytical duplicates
cor = 0.9
Analytical duplicate [mg/kg]
2
5
Duplicate sample [mg/kg]
B

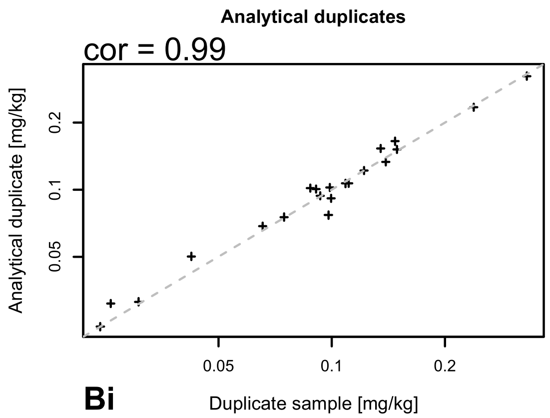

Field duplicates
cor = 0.86
Duplicate sample [mg/kg]
10
20
50
100
200
Ordinary sample [mg/kg]
Ba

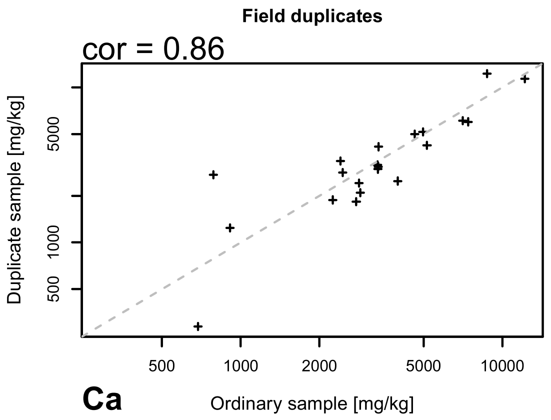

Analytical duplicates
cor = 1
Analytical duplicate [mg/kg]
10
20
50
100
200
Duplicate sample [mg/kg]
Ba

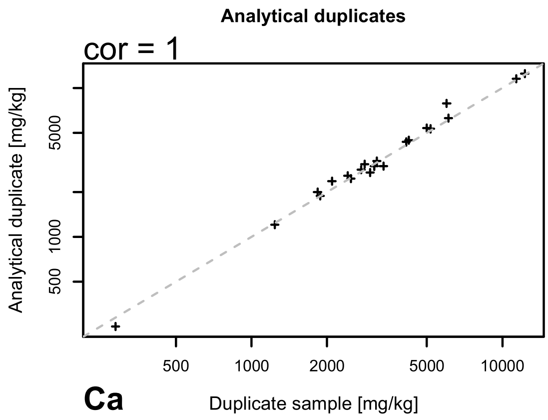

Field duplicates
cor = 0.79
Duplicate sample [mg/kg]
0.1
0.2
0.5
Ordinary sample [mg/kg]
Be

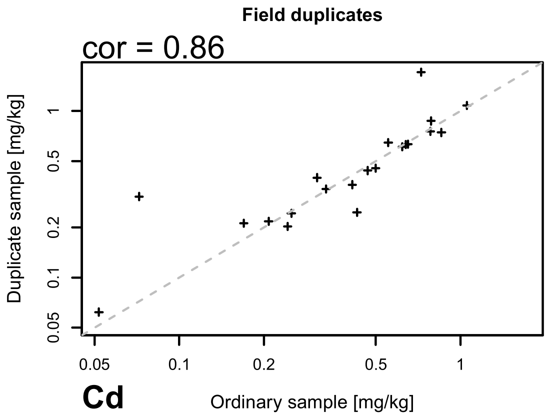

Analytical duplicates
cor = 0.91
Analytical duplicate [mg/kg]
0.1
0.2
0.5
Duplicate sample [mg/kg]
Be

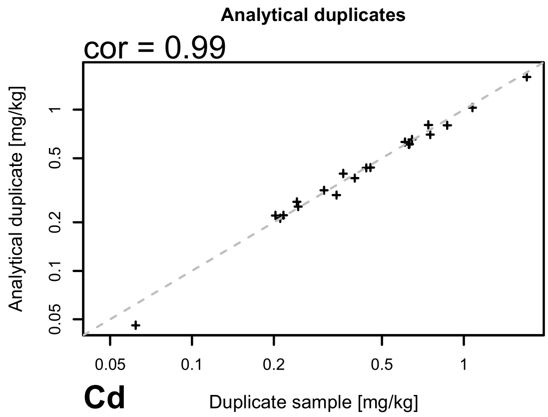

Field duplicates
cor = 0.86
Duplicate sample [mg/kg]
0.05
0.1
0.2
Ordinary sample [mg/kg]
Bi

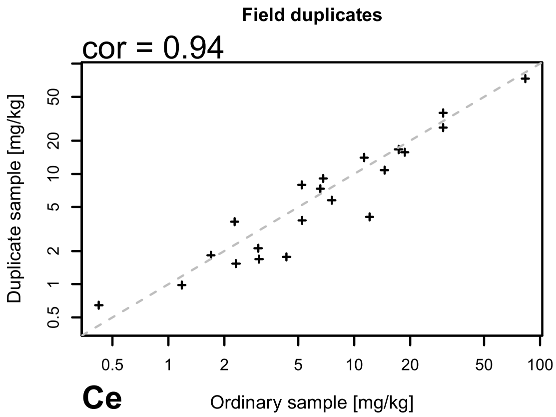

Analytical duplicates
cor = 0.99
Analytical duplicate [mg/kg]
0.05
0.1
0.2
Duplicate sample [mg/kg]
Bi

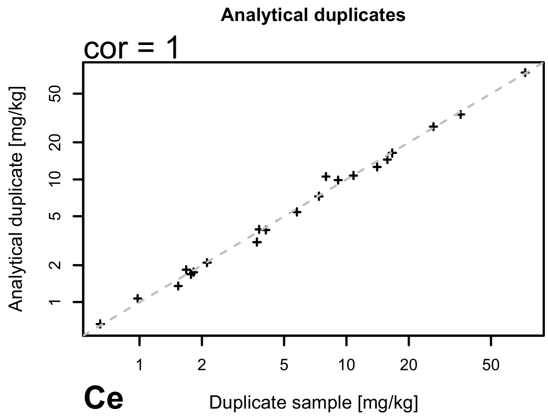

Field duplicates
cor = 0.86
Duplicate sample [mg/kg]
500
1000
5000
500
1000
2000
5000
10000
Ca
Ordinary sample [mg/kg]

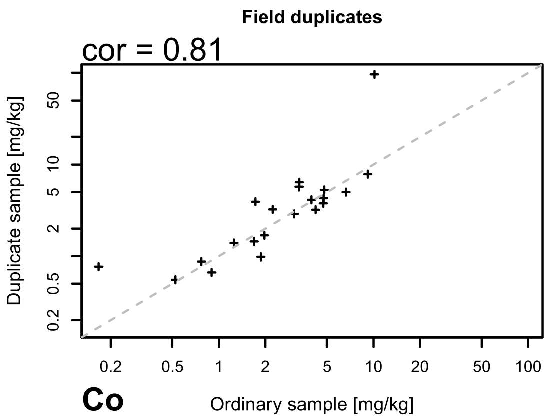

Analytical duplicates
cor = 1
Analytical duplicate [mg/kg]
500
1000
5000
500
1000
2000
5000
10000
Ca
Duplicate sample [mg/kg]

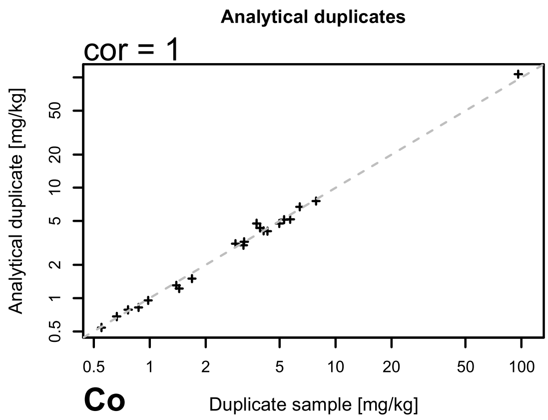

Field duplicates
cor = 0.86
Duplicate sample [mg/kg]
0.05
0.1
0.2
0.5
1
0.05
0.1
0.2
0.5
1
Cd
Ordinary sample [mg/kg]

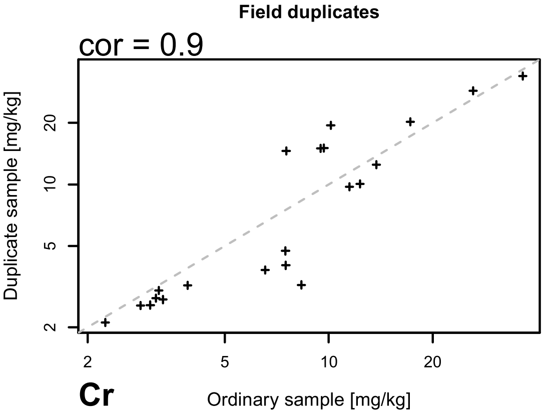

Analytical duplicates
cor = 0.99
Analytical duplicate [mg/kg]
0.05
0.1
0.2
0.5
1
0.05
0.1
0.2
0.5
1
Cd
Duplicate sample [mg/kg]

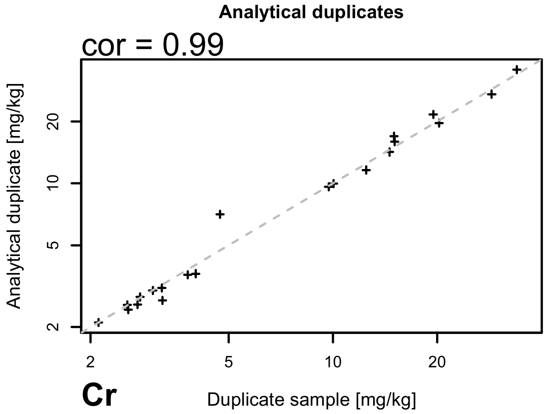

Field duplicates
cor = 0.94
Duplicate sample [mg/kg]
0.5
1
2
5
10
20
50
0.5
1
2
5
10
20
50
100
Ce
Ordinary sample [mg/kg]

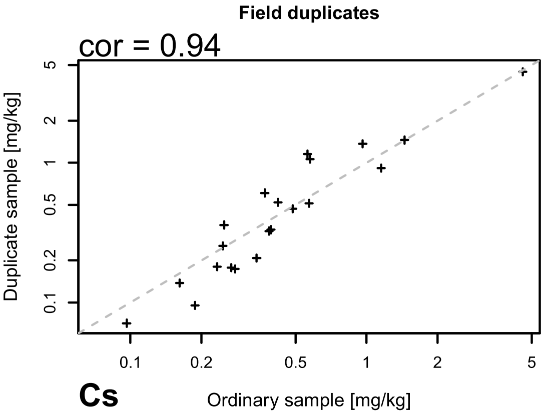

Analytical duplicates
cor = 1
Analytical duplicate [mg/kg]
1
2
5
10
20
50
1
2
5
10
20
50
Ce
Duplicate sample [mg/kg]

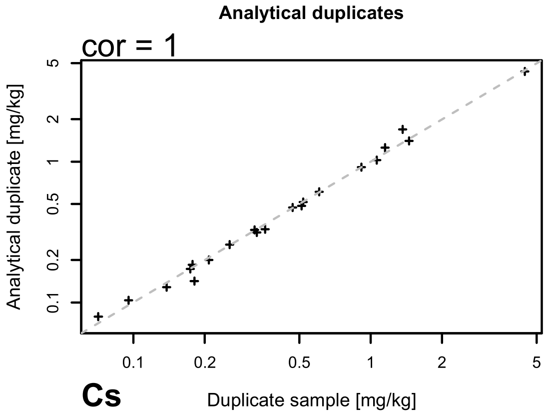

Field duplicates
cor = 0.81
Duplicate sample [mg/kg]
0.2
0.5
2
5
10
50
0.2
0.5
1
2
5
10
20
50
100
Co
Ordinary sample [mg/kg]

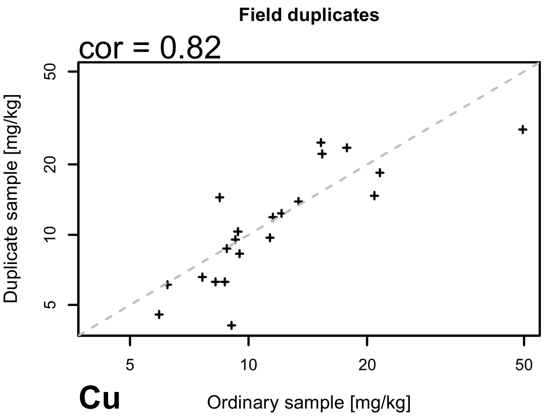

Analytical duplicates
cor = 1
Analytical duplicate [mg/kg]
0.5
1
2
5
10
20
50
0.5
1
2
5
10
20
50
100
Co
Duplicate sample [mg/kg]

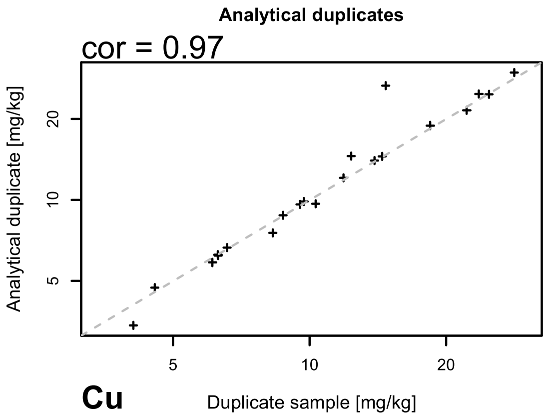

Field duplicates
cor = 0.9
Duplicate sample [mg/kg]
2
5
10
20
Cr
Ordinary sample [mg/kg]

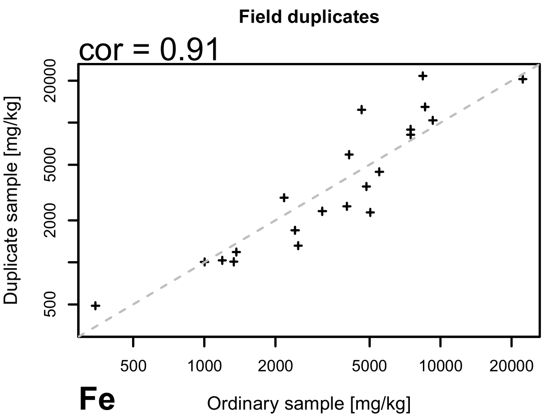

Analytical duplicates
cor = 0.99
Analytical duplicate [mg/kg]
2
5
10
20
Cr
Duplicate sample [mg/kg]

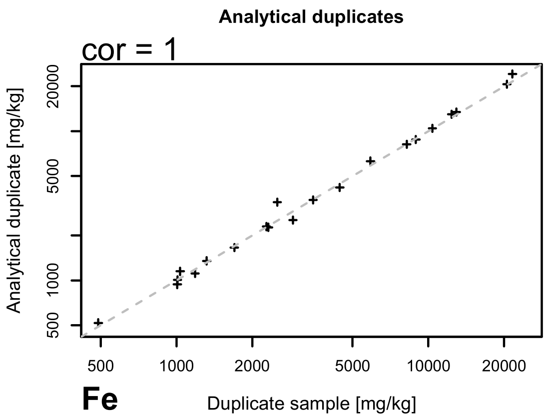

Field duplicates
cor = 0.94
Duplicate sample [mg/kg]
0.1
0.2
0.5
1
2
5
Cs
Ordinary sample [mg/kg]

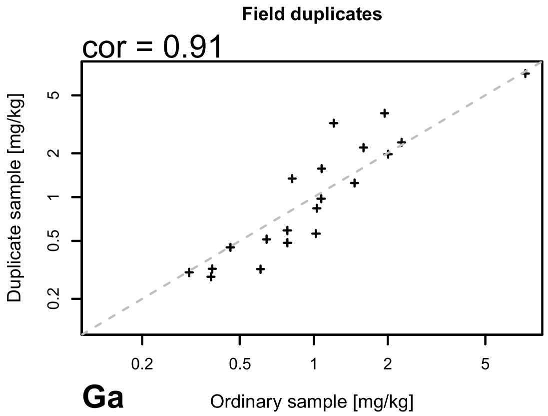

Analytical duplicates
cor = 1
Analytical duplicate [mg/kg]
0.1
0.2
0.5
1
2
5
Cs
Duplicate sample [mg/kg]

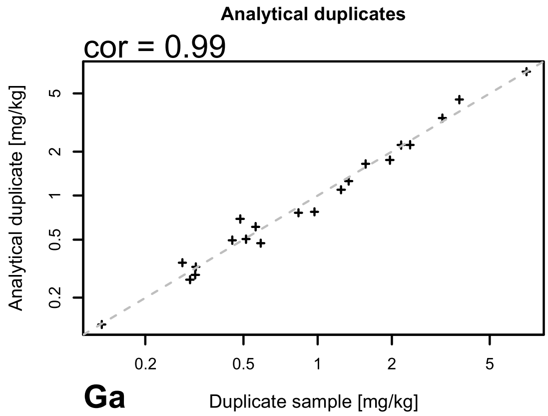

Field duplicates
cor = 0.82
Duplicate sample [mg/kg]
5
10
20
50
Cu
Ordinary sample [mg/kg]

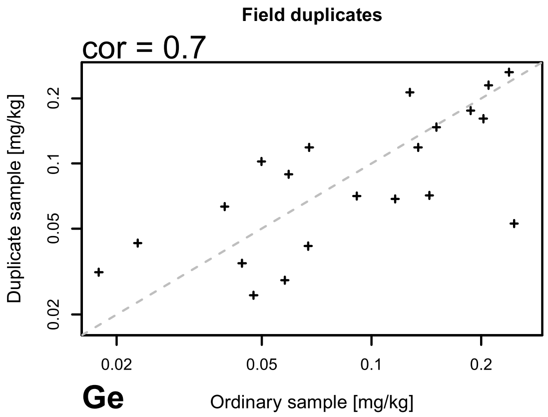

Analytical duplicates
cor = 0.97
Analytical duplicate [mg/kg]
5
10
20
Cu
Duplicate sample [mg/kg]

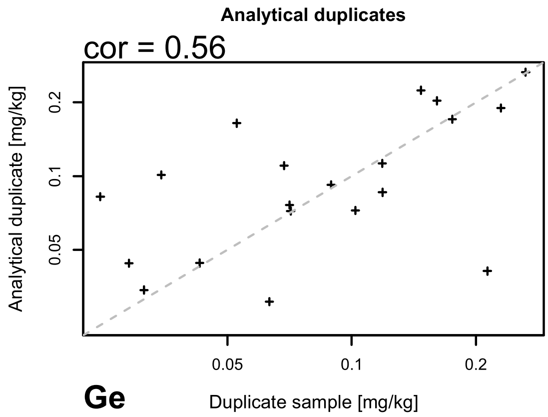

Field duplicates
cor = 0.91
Duplicate sample [mg/kg]
500
1000
2000
5000
10000
20000
Fe
Ordinary sample [mg/kg]

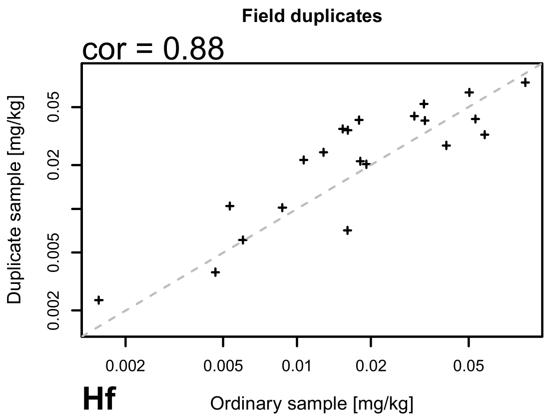

Analytical duplicates
cor = 1
Analytical duplicate [mg/kg]
500
1000
2000
5000
10000
20000
Fe
Duplicate sample [mg/kg]

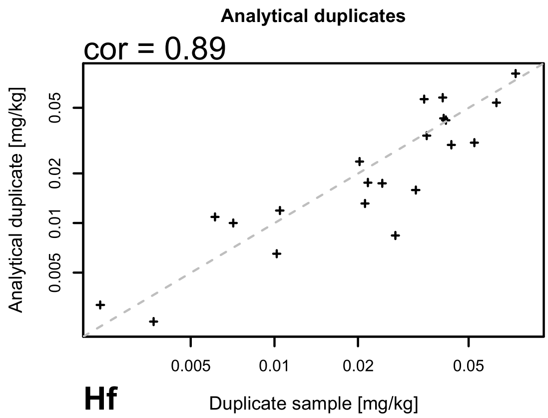

Field duplicates
cor = 0.91
Duplicate sample [mg/kg]
Ordinary sample [mg/kg]
Ga

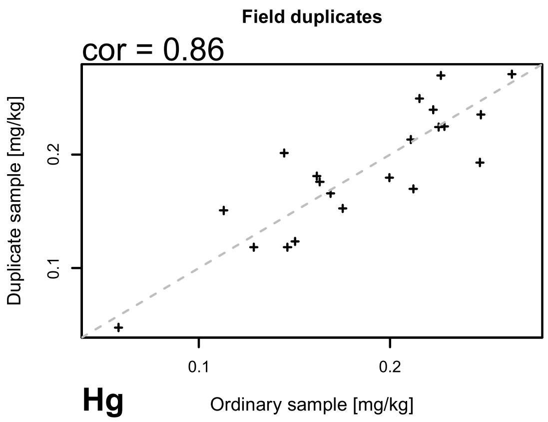

Analytical duplicates
cor = 0.99
Analytical duplicate [mg/kg]
Duplicate sample [mg/kg]
Ga

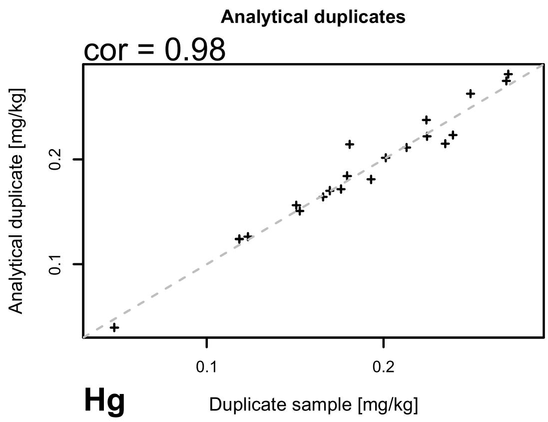

Field duplicates
cor = 0.7
Duplicate sample [mg/kg]
Ordinary sample [mg/kg]
Ge

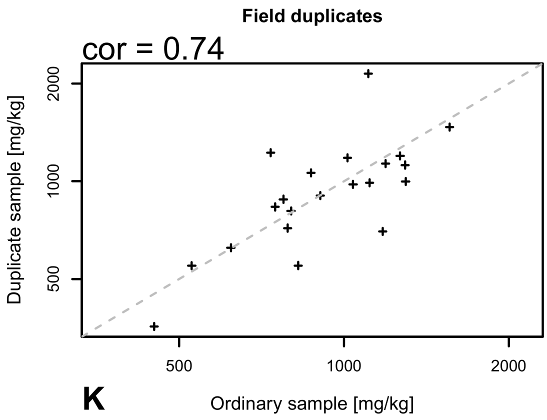

Analytical duplicates
cor = 0.56
Analytical duplicate [mg/kg]
Duplicate sample [mg/kg]
Ge

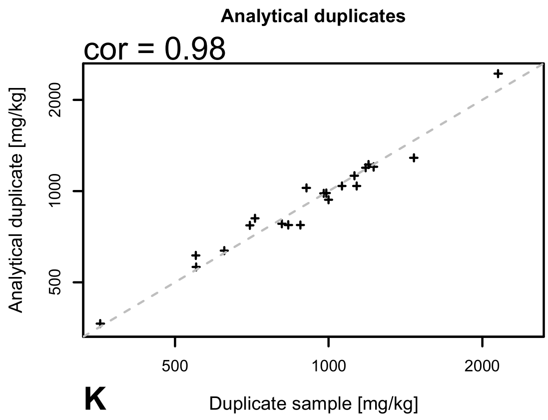

Field duplicates
cor = 0.88
Duplicate sample [mg/kg]
Ordinary sample [mg/kg]
Hf

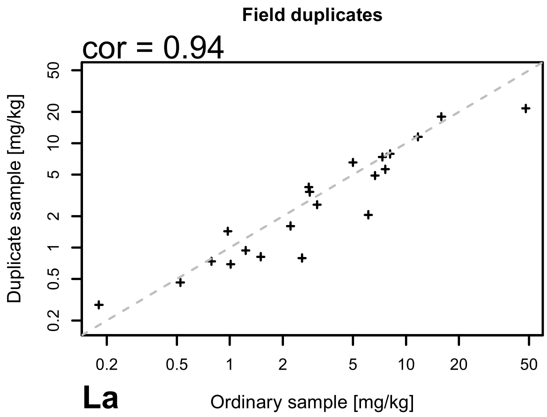

Analytical duplicates
cor = 0.89
Analytical duplicate [mg/kg]
Duplicate sample [mg/kg]
Hf

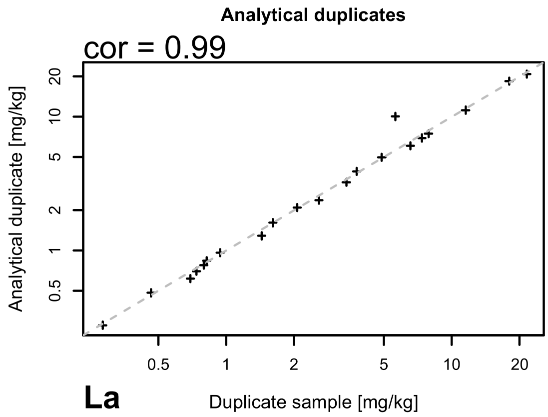

Field duplicates
cor = 0.86
Duplicate sample [mg/kg]
Ordinary sample [mg/kg]
Hg

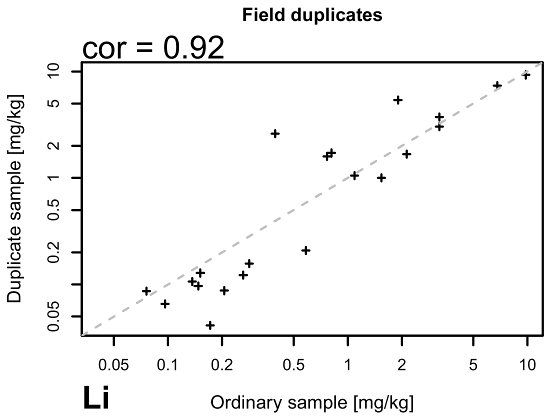

Analytical duplicates
cor = 0.98
Analytical duplicate [mg/kg]
Duplicate sample [mg/kg]
Hg

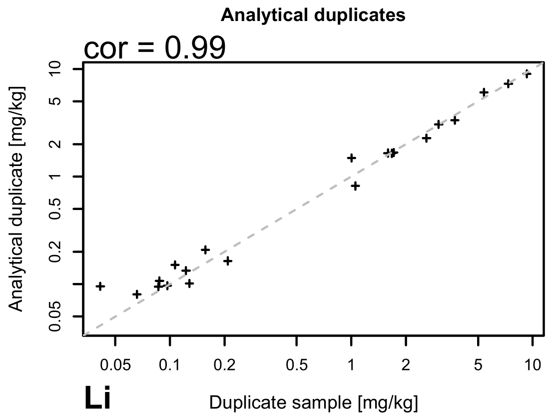

Field duplicates
cor = 0.74
Duplicate sample [mg/kg]
500
1000
2000
500
1000
2000
K
Ordinary sample [mg/kg]

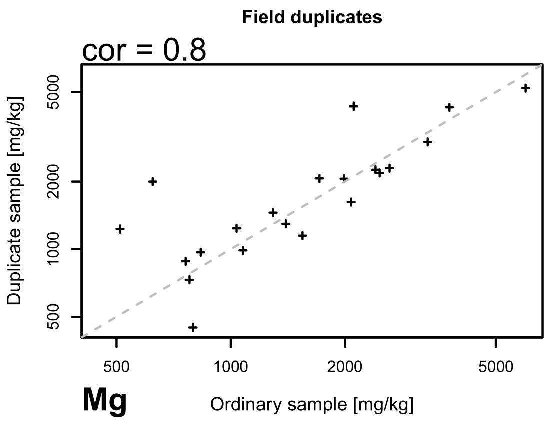

Analytical duplicates
cor = 0.98
Analytical duplicate [mg/kg]
500
1000
2000
500
1000
2000
K
Duplicate sample [mg/kg]

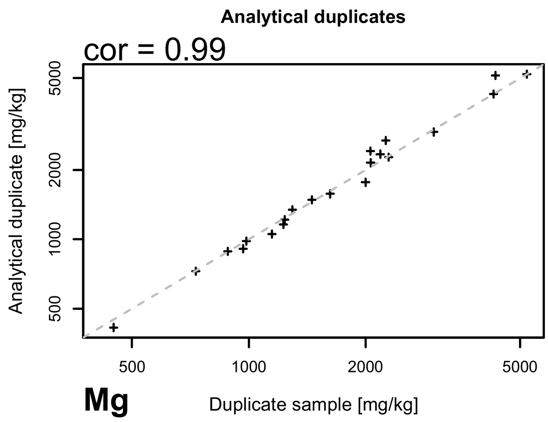

Field duplicates
cor = 0.94
Duplicate sample [mg/kg]
0.2
0.5
1
2
5
10
20
50
0.2
0.5
1
2
5
10
20
50
La
Ordinary sample [mg/kg]

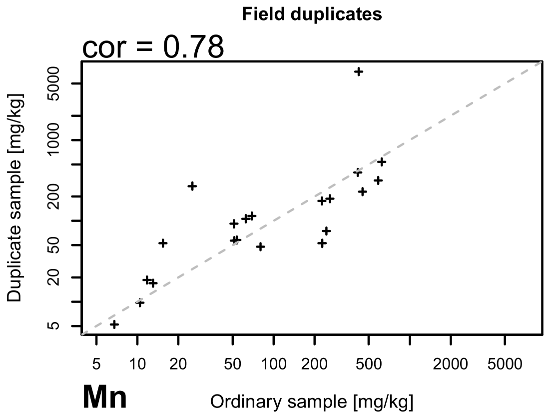

Analytical duplicates
cor = 0.99
Analytical duplicate [mg/kg]
0.5
1
2
5
10
20
0.5
1
2
5
10
20
La
Duplicate sample [mg/kg]

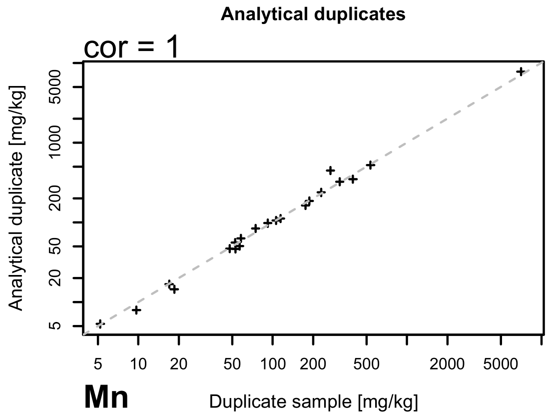

Field duplicates
cor = 0.92
Duplicate sample [mg/kg]
0.05
0.2
0.5
1
2
5
10
0.05
0.1
0.2
0.5
1
2
5
10
Li
Ordinary sample [mg/kg]

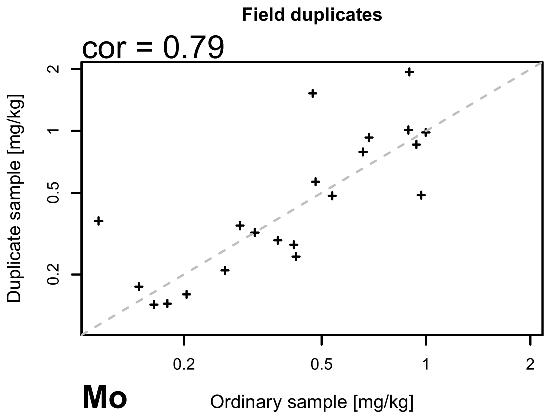

Analytical duplicates
cor = 0.99
Analytical duplicate [mg/kg]
0.05
0.2
0.5
1
2
5
10
0.05
0.1
0.2
0.5
1
2
5
10
Li
Duplicate sample [mg/kg]

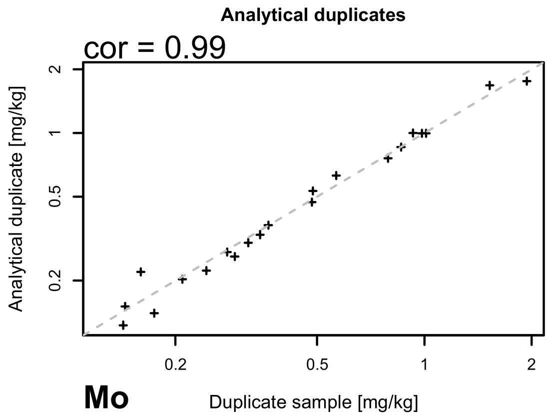

Field duplicates
cor = 0.8
Duplicate sample [mg/kg]
500
1000
2000
5000
500
1000
2000
5000
Mg
Ordinary sample [mg/kg]

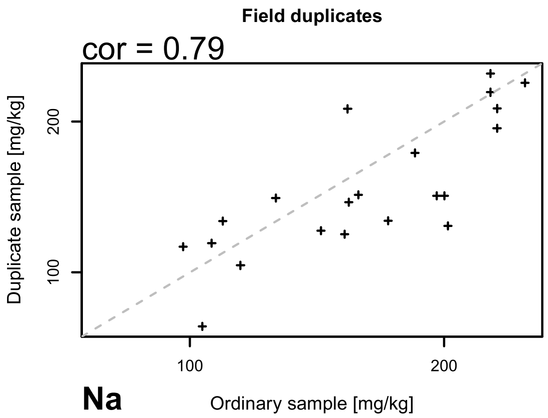

Analytical duplicates
cor = 0.99
Analytical duplicate [mg/kg]
500
1000
2000
5000
500
1000
2000
5000
Mg
Duplicate sample [mg/kg]

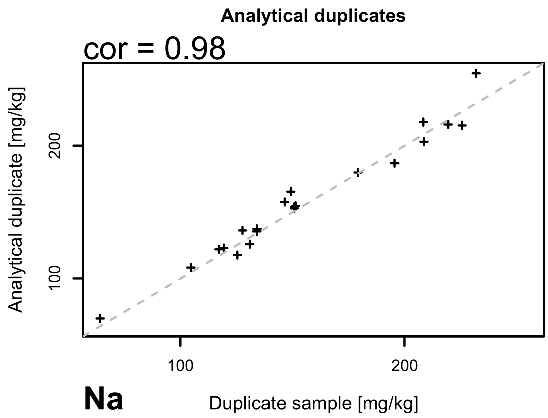

Field duplicates
cor = 0.78
Duplicate sample [mg/kg]
Ordinary sample [mg/kg]
Mn

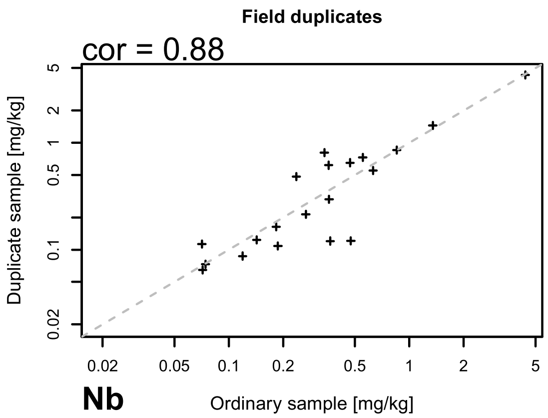

Analytical duplicates
cor = 1
Analytical duplicate [mg/kg]
Duplicate sample [mg/kg]
Mn

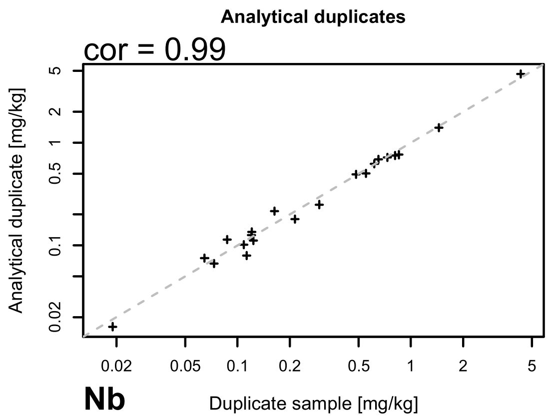

Field duplicates
cor = 0.79
Duplicate sample [mg/kg]
Ordinary sample [mg/kg]
Mo

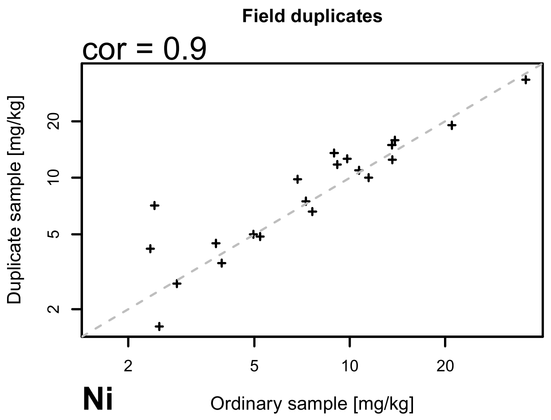

Analytical duplicates
cor = 0.99
Analytical duplicate [mg/kg]
Duplicate sample [mg/kg]
Mo

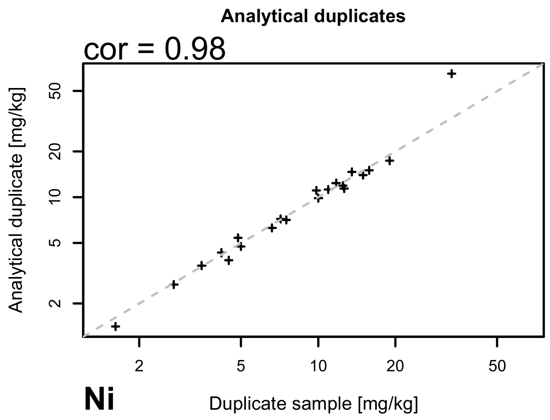

Field duplicates
cor = 0.79
Duplicate sample [mg/kg]
Ordinary sample [mg/kg]
Na

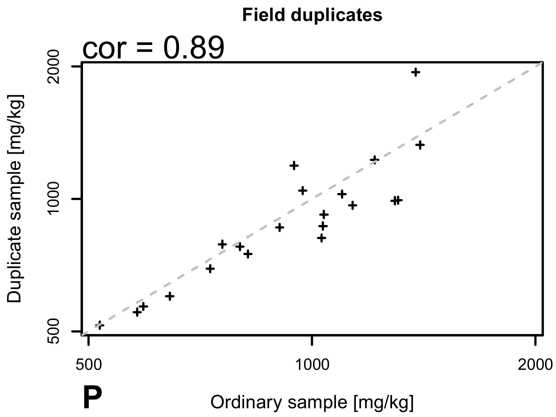

Analytical duplicates
cor = 0.98
Analytical duplicate [mg/kg]
Duplicate sample [mg/kg]
Na

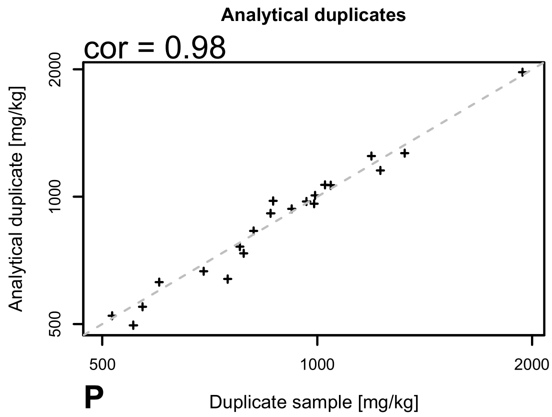

Field duplicates
cor = 0.88
Duplicate sample [mg/kg]
Ordinary sample [mg/kg]
Nb

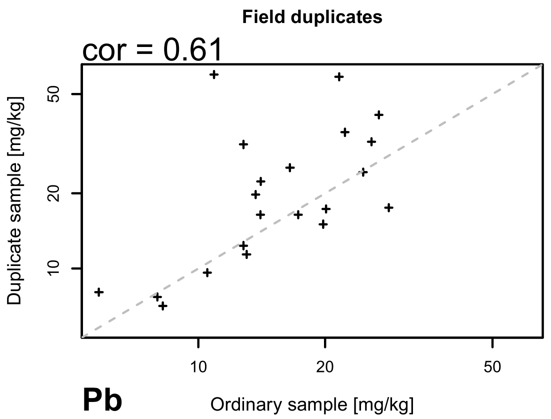

Analytical duplicates
cor = 0.99
Analytical duplicate [mg/kg]
Duplicate sample [mg/kg]
Nb

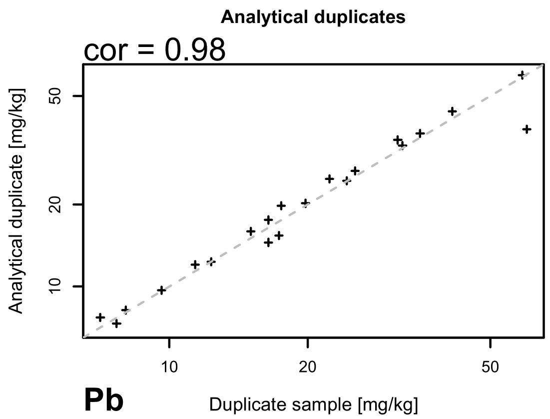

Field duplicates
cor = 0.9
Duplicate sample [mg/kg]
Ordinary sample [mg/kg]
Ni

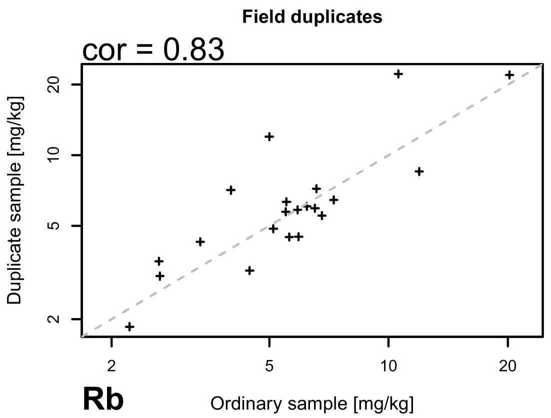

Analytical duplicates
cor = 0.98
Analytical duplicate [mg/kg]
Duplicate sample [mg/kg]
Ni

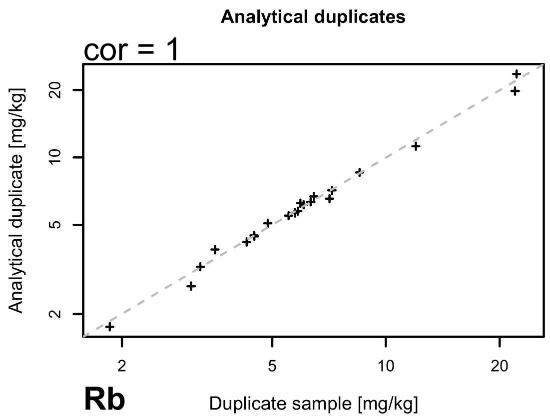

Field duplicates
cor = 0.89
Duplicate sample [mg/kg]
Ordinary sample [mg/kg]
P

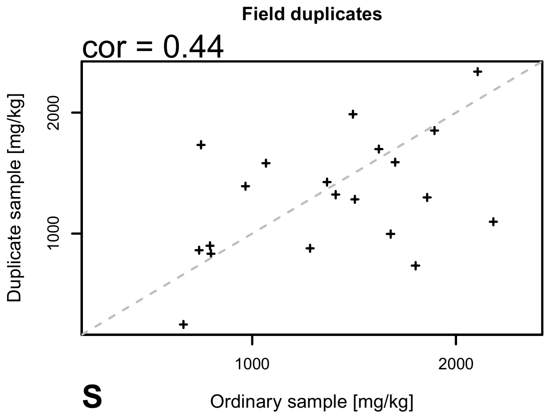

Analytical duplicates
cor = 0.98
Analytical duplicate [mg/kg]
Duplicate sample [mg/kg]
P

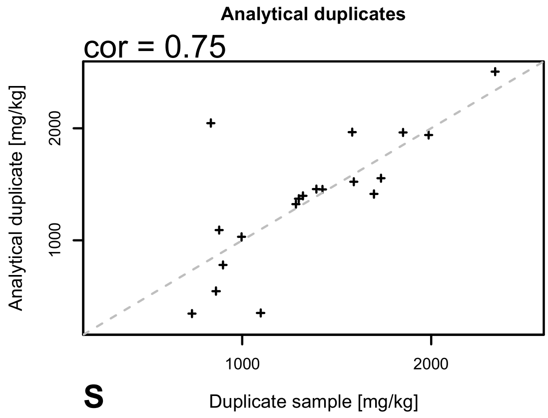

Field duplicates
cor = 0.61
Duplicate sample [mg/kg]
Ordinary sample [mg/kg]
Pb

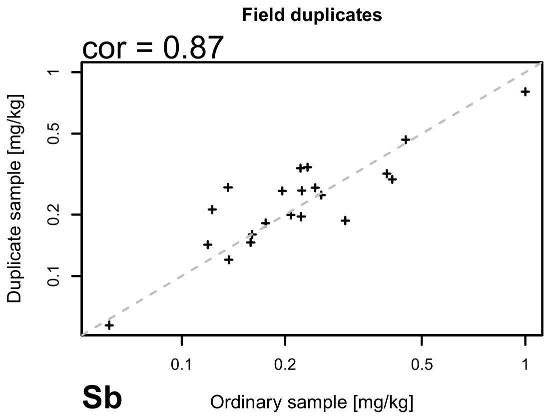

Analytical duplicates
cor = 0.98
Analytical duplicate [mg/kg]
Duplicate sample [mg/kg]
Pb

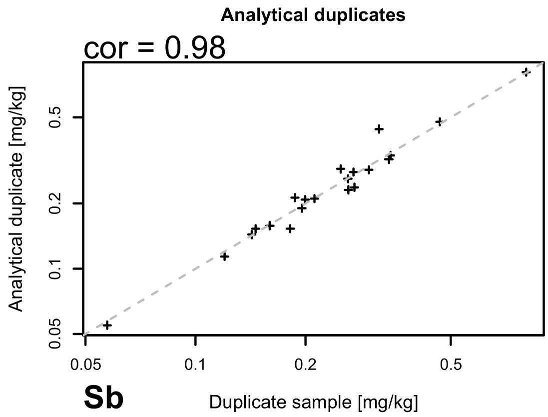

Field duplicates
cor = 0.83
Duplicate sample [mg/kg]
Ordinary sample [mg/kg]
Rb

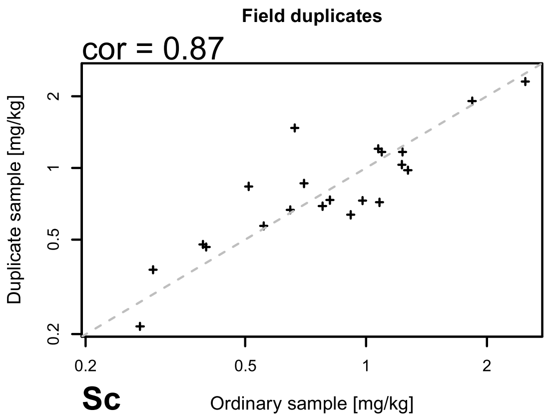

Analytical duplicates
cor = 1
Analytical duplicate [mg/kg]
Duplicate sample [mg/kg]
Rb

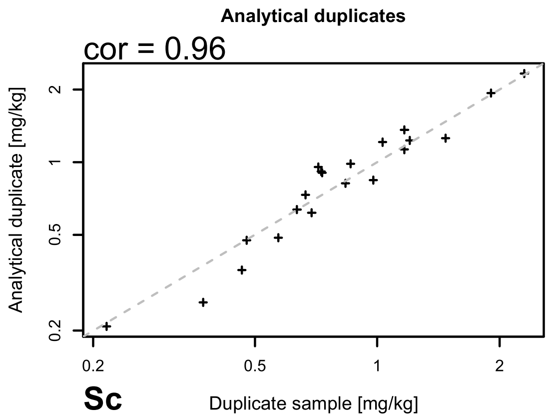

Field duplicates
cor = 0.44
Duplicate sample [mg/kg]
1000
2000
1000
2000
S
Ordinary sample [mg/kg]

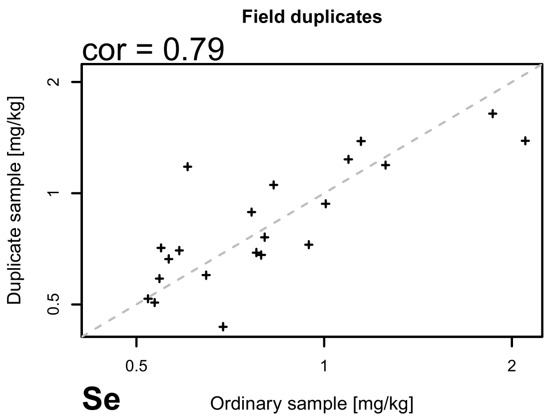

Analytical duplicates
cor = 0.75
Analytical duplicate [mg/kg]
1000
2000
1000
2000
S
Duplicate sample [mg/kg]

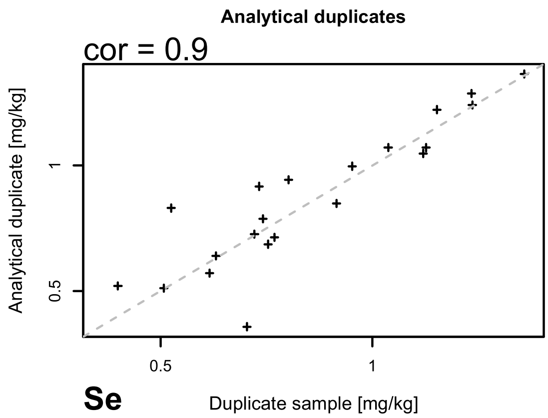

Field duplicates
cor = 0.87
Duplicate sample [mg/kg]
0.1
0.2
0.5
1
0.1
0.2
0.5
1
Sb
Ordinary sample [mg/kg]

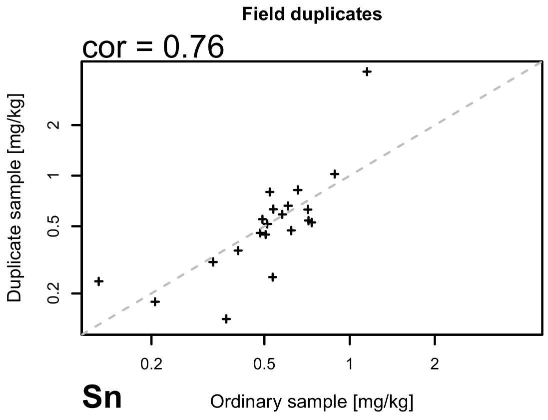

Analytical duplicates
cor = 0.98
Analytical duplicate [mg/kg]
0.05
0.1
0.2
0.5
0.05
0.1
0.2
0.5
Sb
Duplicate sample [mg/kg]

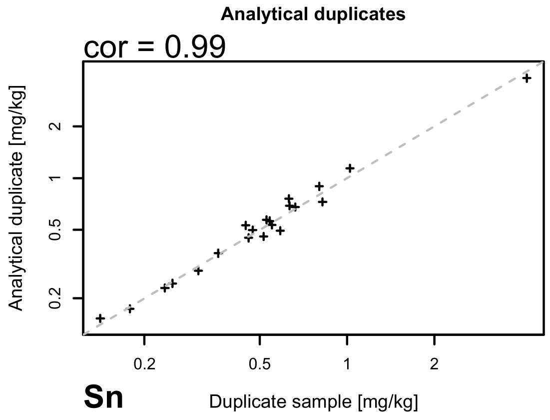

Field duplicates
cor = 0.87
Duplicate sample [mg/kg]
0.2
0.5
1
2
0.2
0.5
1
2
Sc
Ordinary sample [mg/kg]

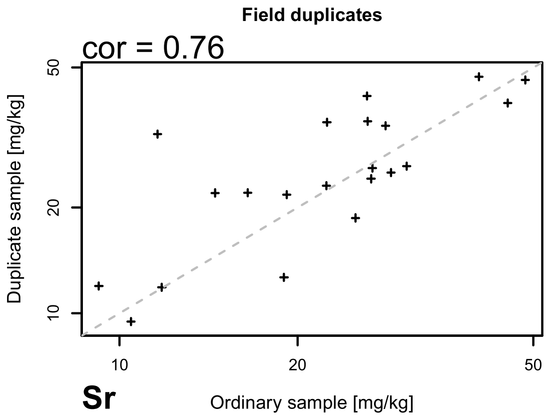

Analytical duplicates
cor = 0.96
Analytical duplicate [mg/kg]
0.2
0.5
1
2
0.2
0.5
1
2
Sc
Duplicate sample [mg/kg]

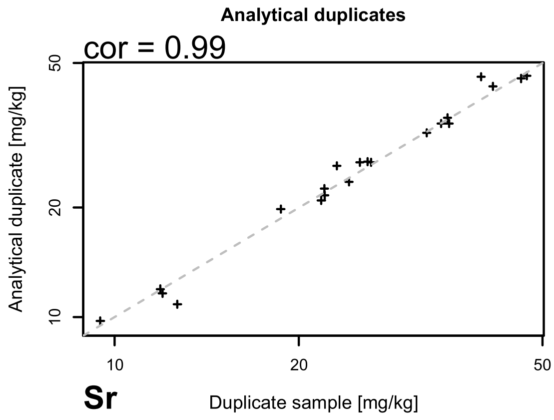

Field duplicates
cor = 0.79
Duplicate sample [mg/kg]
0.5
1
2
0.5
1
2
Se
Ordinary sample [mg/kg]

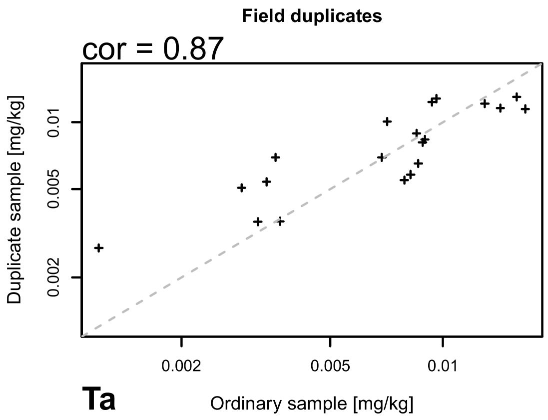

Analytical duplicates
cor = 0.9
Analytical duplicate [mg/kg]
0.5
1
0.5
1
Se
Duplicate sample [mg/kg]

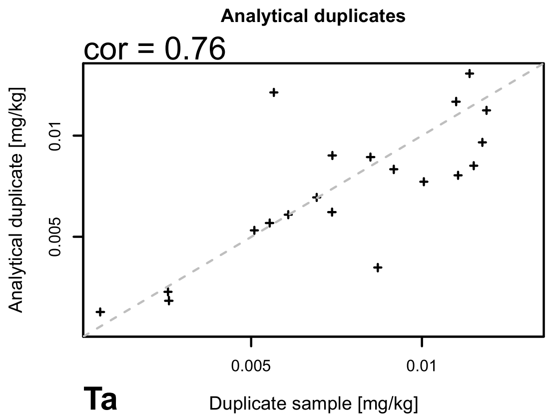

Field duplicates
cor = 0.76
Duplicate sample [mg/kg]
Ordinary sample [mg/kg]
Sn

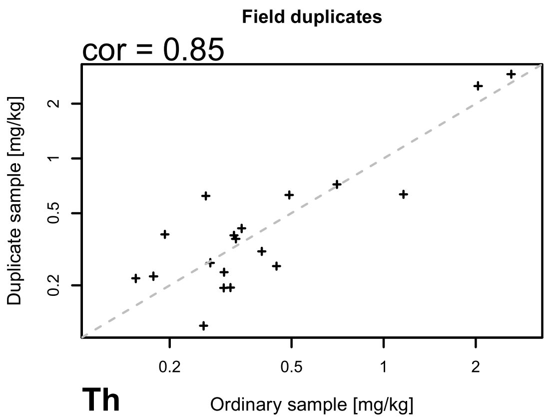

Analytical duplicates
cor = 0.99
Analytical duplicate [mg/kg]
Duplicate sample [mg/kg]
Sn

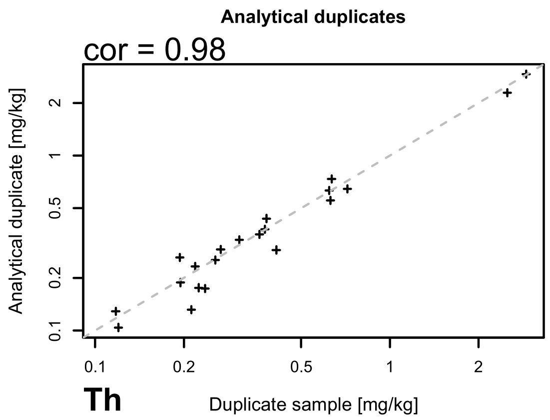

Field duplicates
cor = 0.76
Duplicate sample [mg/kg]
Ordinary sample [mg/kg]
Sr

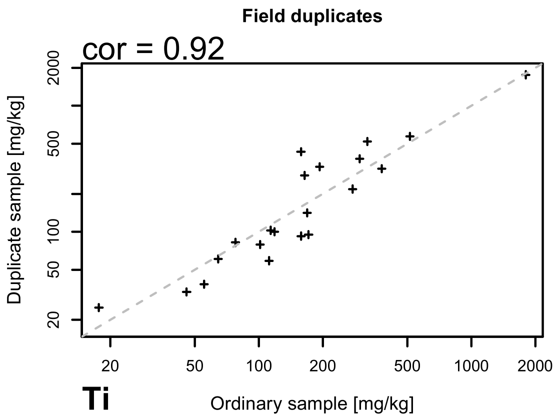

Analytical duplicates
cor = 0.99
Analytical duplicate [mg/kg]
Duplicate sample [mg/kg]
Sr

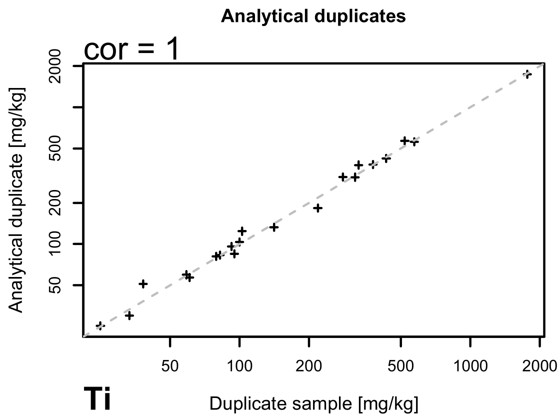

Field duplicates
cor = 0.87
Duplicate sample [mg/kg]
Ordinary sample [mg/kg]
Ta

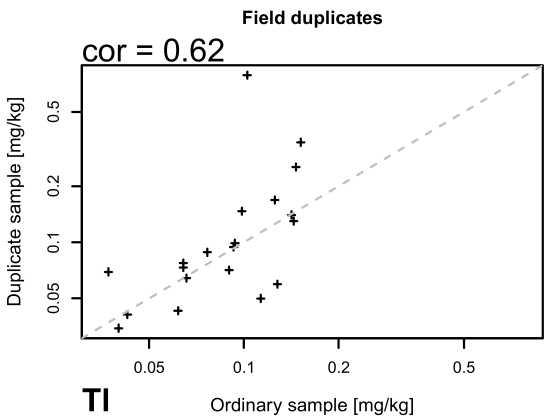

Analytical duplicates
cor = 0.76
Analytical duplicate [mg/kg]
Duplicate sample [mg/kg]
Ta

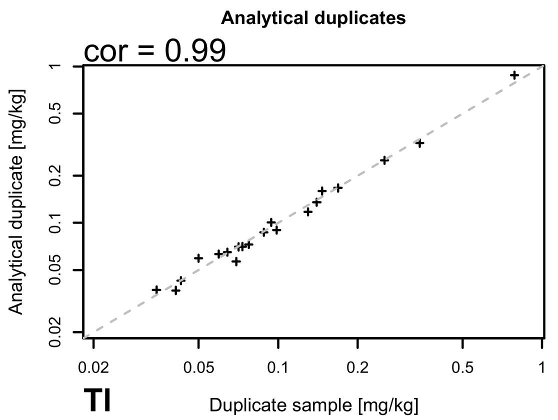

Field duplicates
cor = 0.85
Duplicate sample [mg/kg]
Ordinary sample [mg/kg]
Th

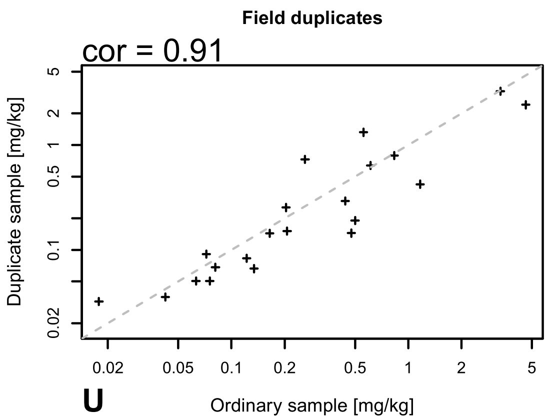

Analytical duplicates
cor = 0.98
Analytical duplicate [mg/kg]
Duplicate sample [mg/kg]
Th

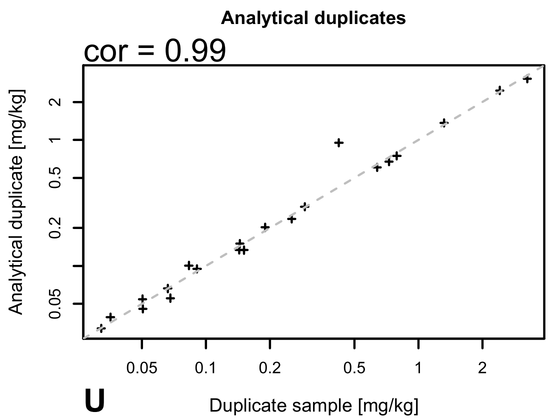

Field duplicates
cor = 0.92
Duplicate sample [mg/kg]
20 50 100 200 500 2000
20 50 100 200 500 1000 2000
Ti
Ordinary sample [mg/kg]

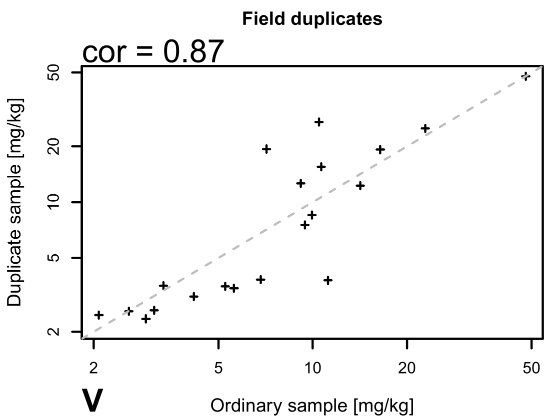

Analytical duplicates
cor = 1
Analytical duplicate [mg/kg]
50 100 200 500 2000
50 100 200 500 1000 2000
Ti
Duplicate sample [mg/kg]

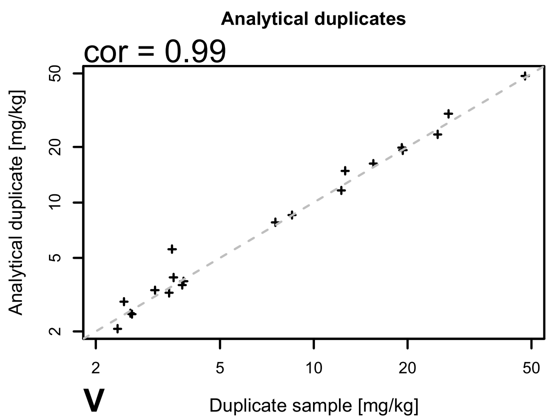

Field duplicates
cor = 0.62
Duplicate sample [mg/kg]
0.05 0.1 0.2 0.5
0.05 0.1 0.2 0.5
Tl
Ordinary sample [mg/kg]

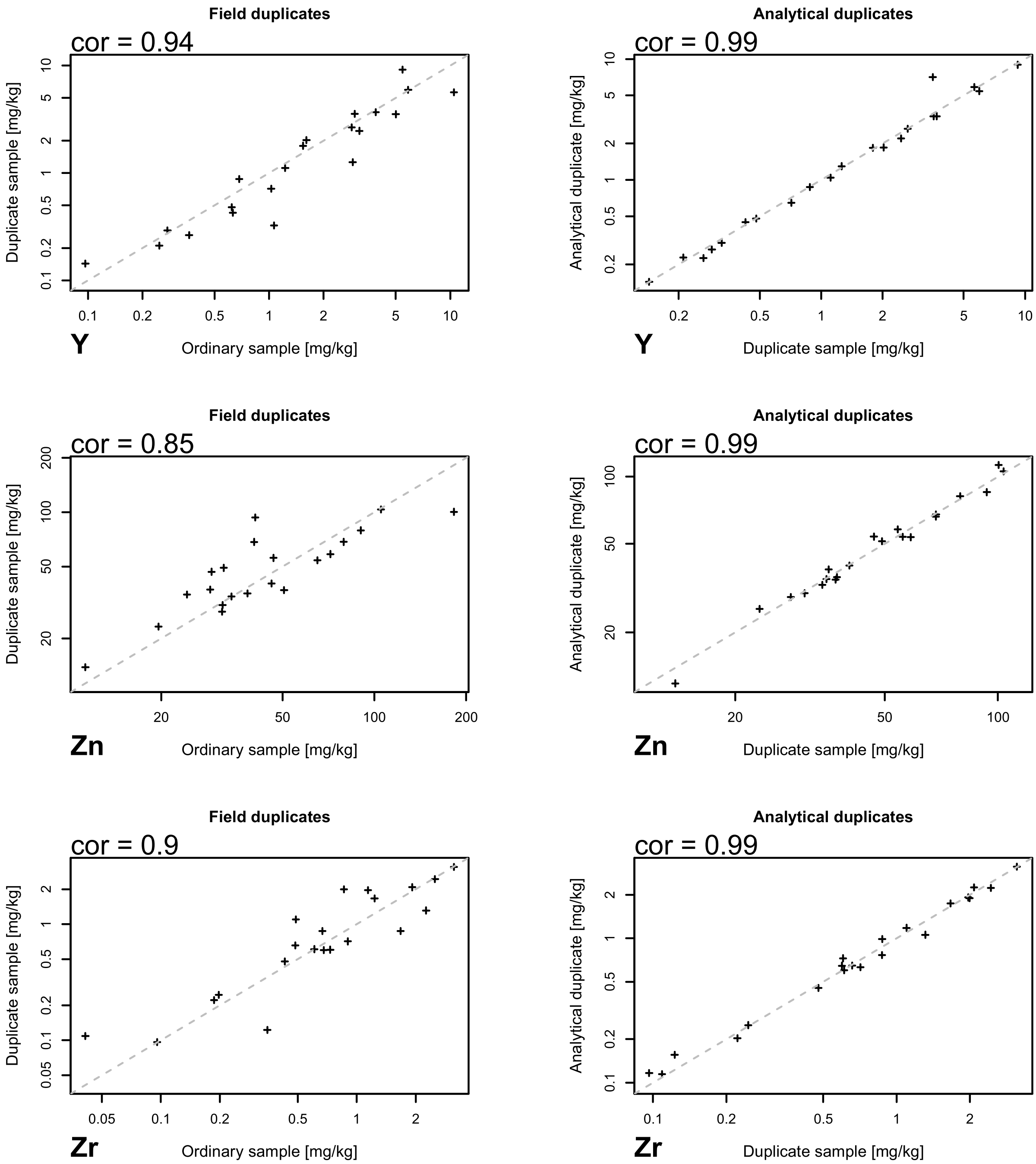

Analytical duplicates
cor = 0.99
Analytical duplicate [mg/kg]
0.02 0.05 0.1 0.2 0.5 1
0.02 0.05 0.1 0.2 0.5 1
Tl
Duplicate sample [mg/kg]


Field duplicates
cor = 0.91
Duplicate sample [mg/kg]
0.02 0.1 0.5 1 2 5
0.02 0.05 0.1 0.2 0.5 1 2 5
U
Ordinary sample [mg/kg]


Analytical duplicates
cor = 0.99
Analytical duplicate [mg/kg]
0.05 0.2 0.5 1 2
0.05 0.1 0.2 0.5 1 2
U
Duplicate sample [mg/kg]


Field duplicates
cor = 0.87
Duplicate sample [mg/kg]
2 5 10 20 50
2 5 10 20 50
V
Ordinary sample [mg/kg]

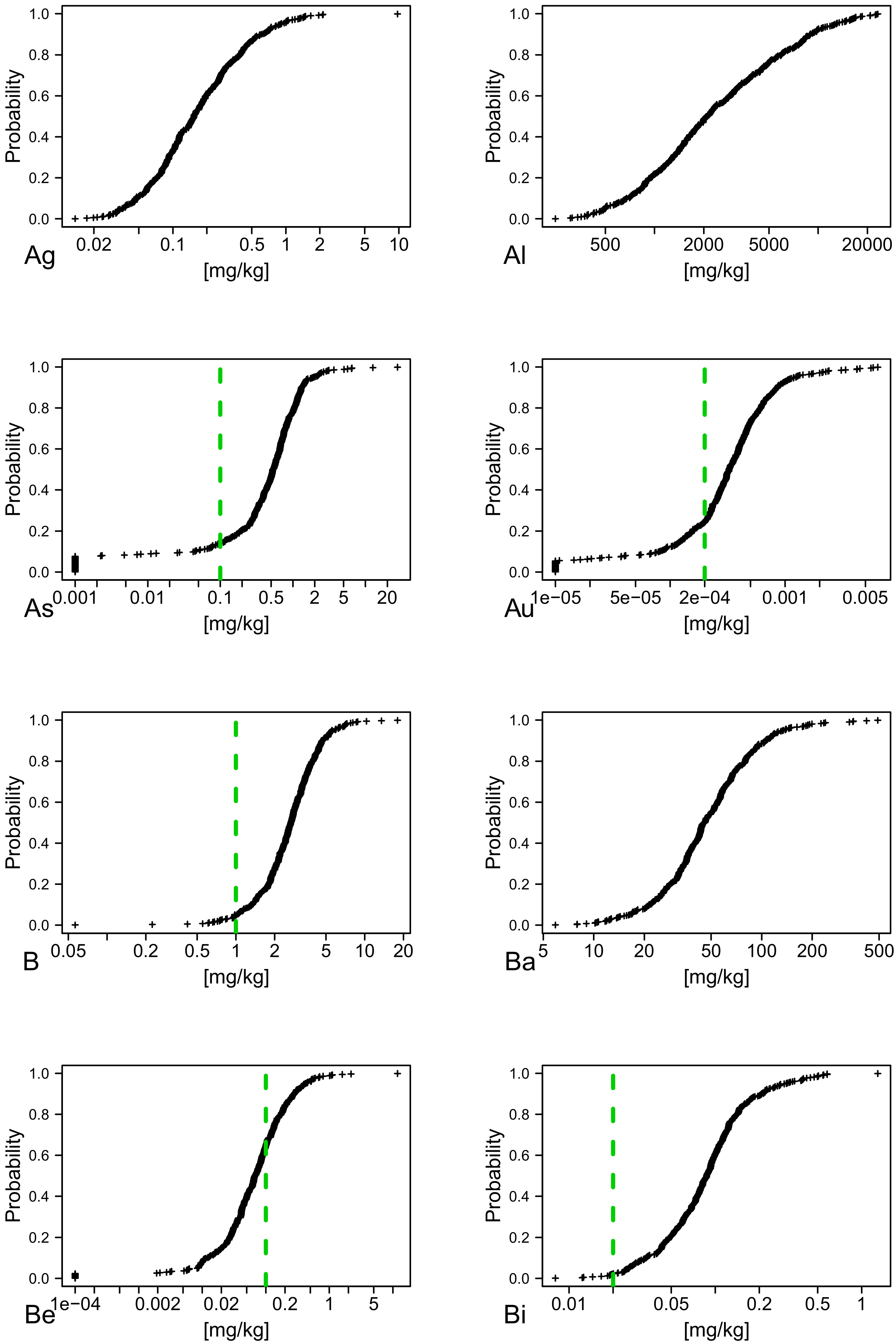

Analytical duplicates
cor = 0.99
Analytical duplicate [mg/kg]
2 5 10 20 50
2 5 10 20 50
V
Duplicate sample [mg/kg]

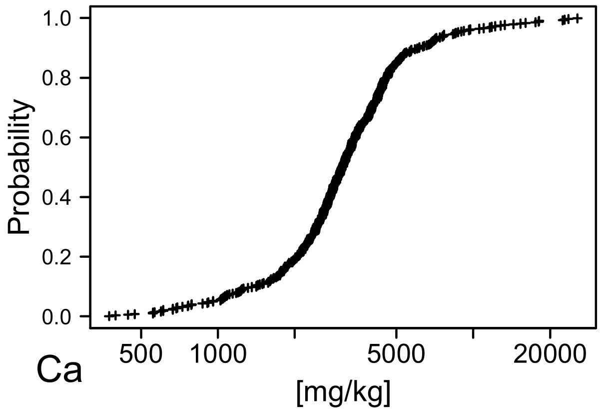

Field duplicates
cor = 0.94
Duplicate sample [mg/kg]
Ordinary sample [mg/kg]
Y
Analytical duplicates
cor = 0.99
Analytical duplicate [mg/kg]
Duplicate sample [mg/kg]
Y
Field duplicates
cor = 0.85
Duplicate sample [mg/kg]
Ordinary sample [mg/kg]
Zn
Analytical duplicates
cor = 0.99
Analytical duplicate [mg/kg]
Duplicate sample [mg/kg]
Zn
Field duplicates
cor = 0.9
Duplicate sample [mg/kg]
Ordinary sample [mg/kg]
Zr
Analytical duplicates
cor = 0.99
Analytical duplicate [mg/kg]
Duplicate sample [mg/kg]
Zr

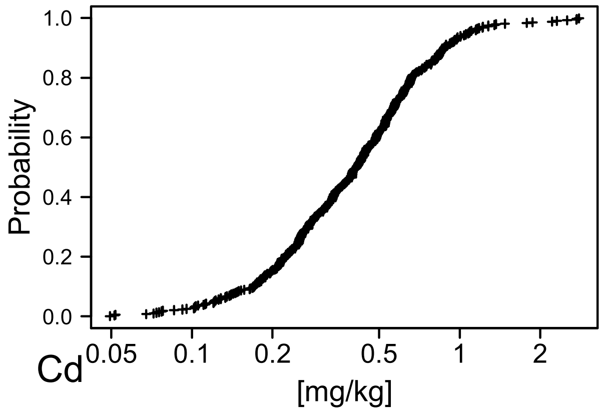
# Appendix 4: ECDF-plot

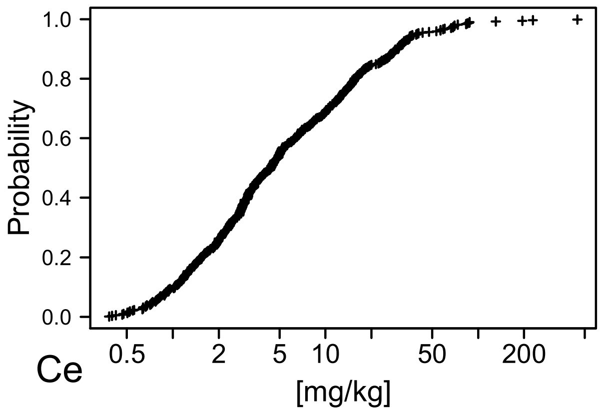
Plots of the empirical cumulative distribution function (ECDF-plots) for all 53 elements analysed. All laboratory readings are shown also those below detection limit, negative reading is however replaced by a low positive value.

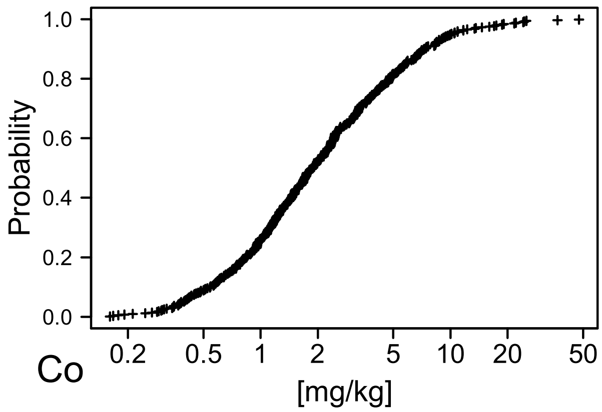
The laboratory detection limit (DL) is indicated by a green dotted line for elements showing concentrations values close to and/or below DL.

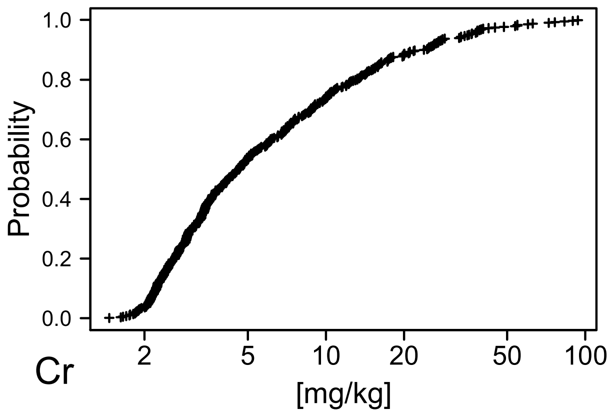

Ag
Al
As
Au
B
Ba
Be
Bi
Probability
[mg/kg]

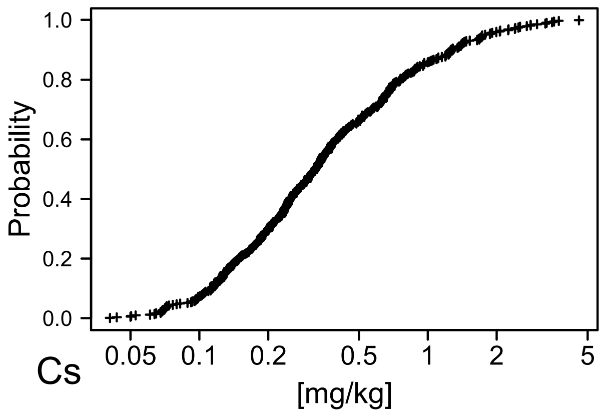

Probability
1.0
0.8
0.6
0.4
0.2
0.0
500 1000 5000 20000
Ca
[mg/kg]

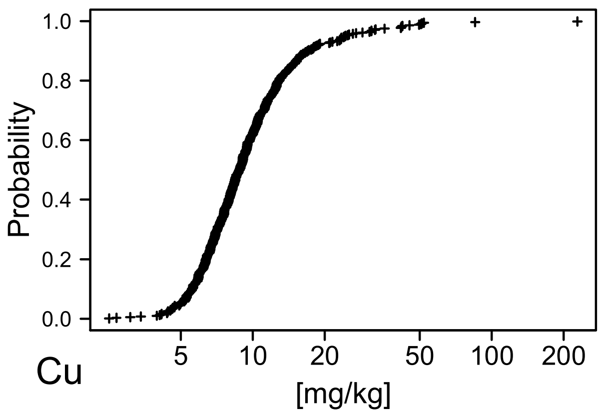

Probability
1.0
0.8
0.6
0.4
0.2
0.0
0.05 0.1 0.2 0.5 1 2
Cd
[mg/kg]

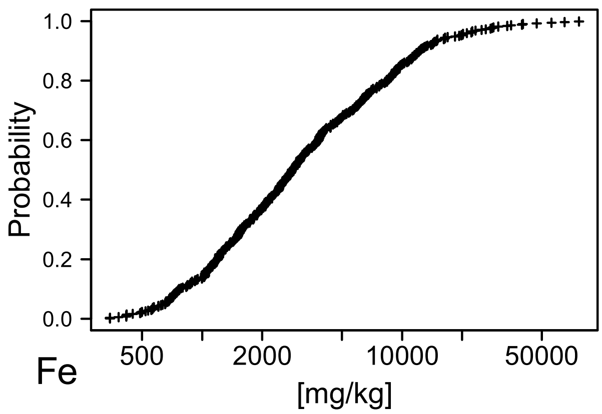

Probability
1.0
0.8
0.6
0.4
0.2
0.0
0.5 2 5 10 50 200
Ce
[mg/kg]

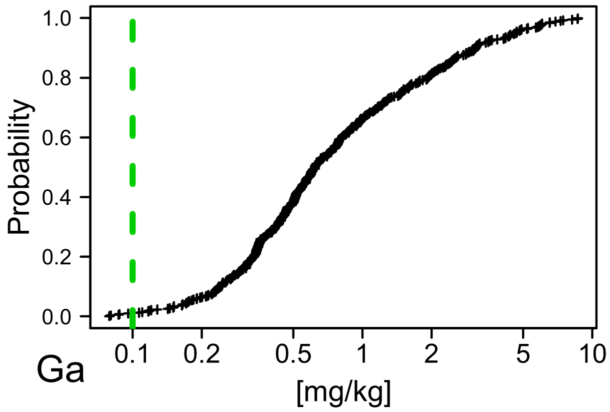

Probability
1.0
0.8
0.6
0.4
0.2
0.0
0.2 0.5 1 2 5 10 20 50
Co
[mg/kg]

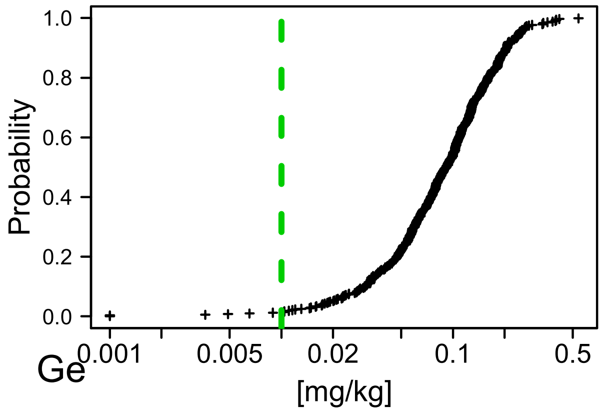

Probability
1.0
0.8
0.6
0.4
0.2
0.0
2 5 10 20 50 100
Cr
[mg/kg]

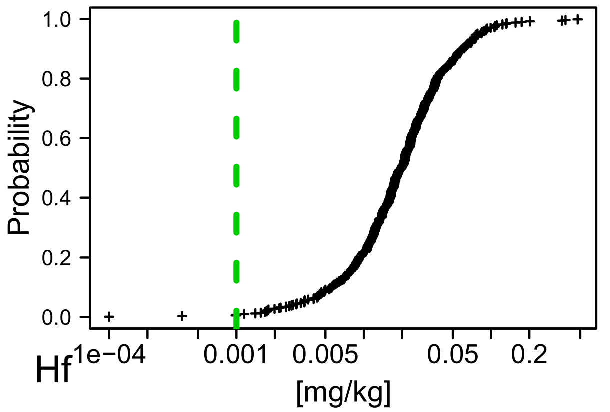

Probability
1.0
0.8
0.6
0.4
0.2
0.0
0.05 0.1 0.2 0.5 1 2 5
Cs
[mg/kg]

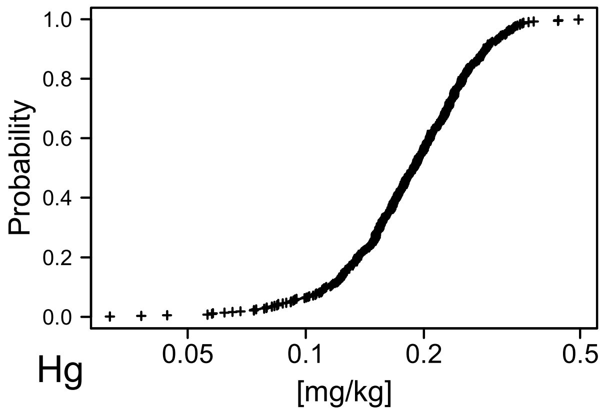

Probability
1.0
0.8
0.6
0.4
0.2
0.0
5 10 20 50 100 200
Cu
[mg/kg]

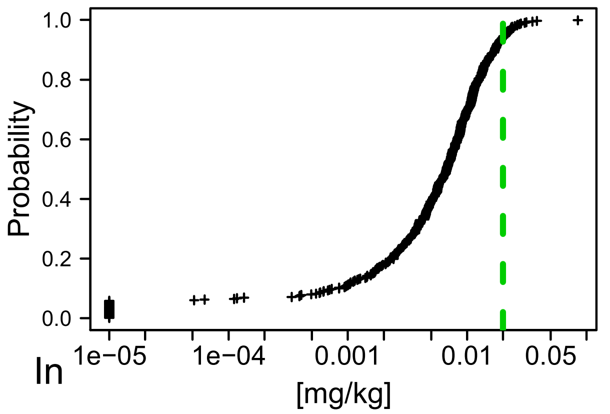

Probability
1.0
0.8
0.6
0.4
0.2
0.0
500 2000 10000 50000
Fe
[mg/kg]

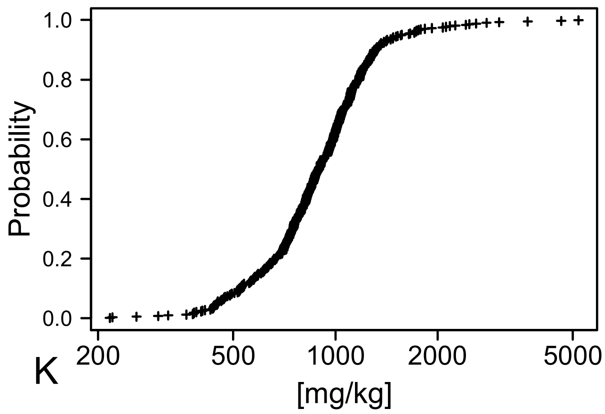

Probability
1.0
0.8
0.6
0.4
0.2
0.0
0.1 0.2 0.5 1 2 5 10
Ga
[mg/kg]

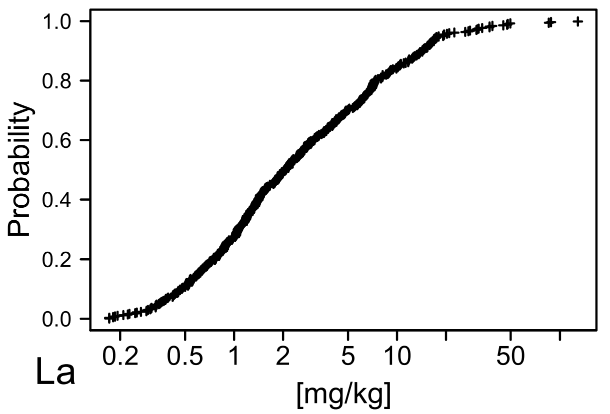

Probability
1.0
0.8
0.6
0.4
0.2
0.0
0.001 0.005 0.02 0.1 0.5
Ge
[mg/kg]

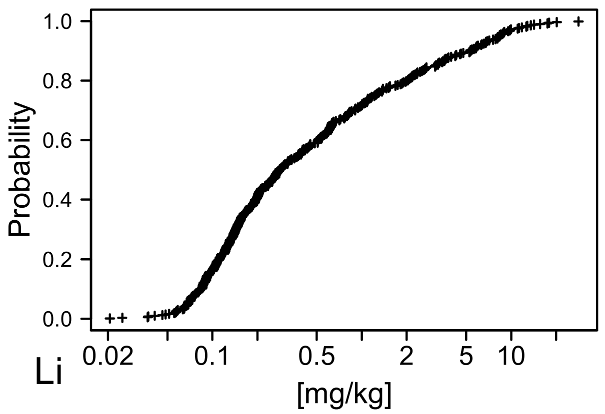

Probability
1.0
0.8
0.6
0.4
0.2
0.0
1e−04 0.001 0.005 0.05 0.2
Hf
[mg/kg]

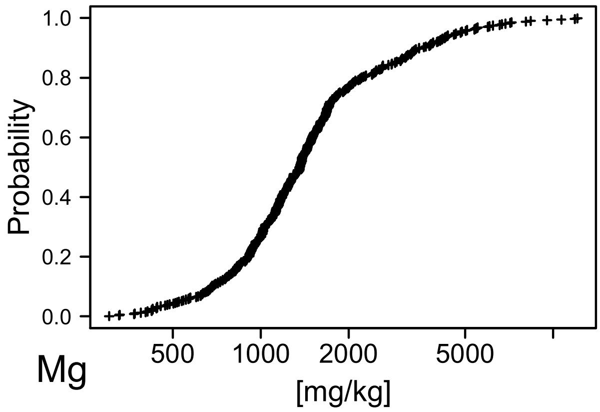

Probability
1.0
0.8
0.6
0.4
0.2
0.0
0.05 0.1 0.2 0.5
Hg
[mg/kg]

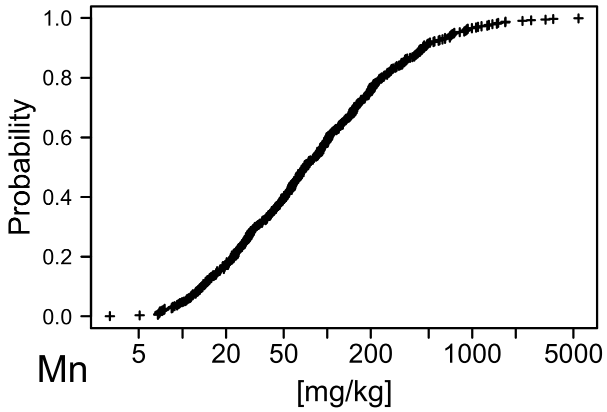

Probability
1.0
0.8
0.6
0.4
0.2
0.0
1e−05 1e−04 0.001 0.01 0.05
In
[mg/kg]

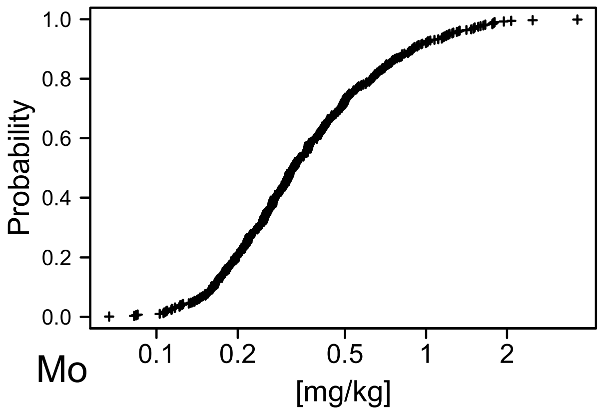

Probability
1.0
0.8
0.6
0.4
0.2
0.0
200 500 1000 2000 5000
K
[mg/kg]

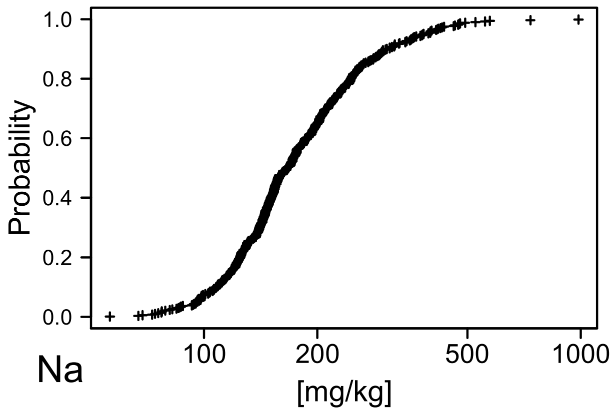

Probability
1.0
0.8
0.6
0.4
0.2
0.0
0.2 0.5 1 2 5 10 50
La
[mg/kg]

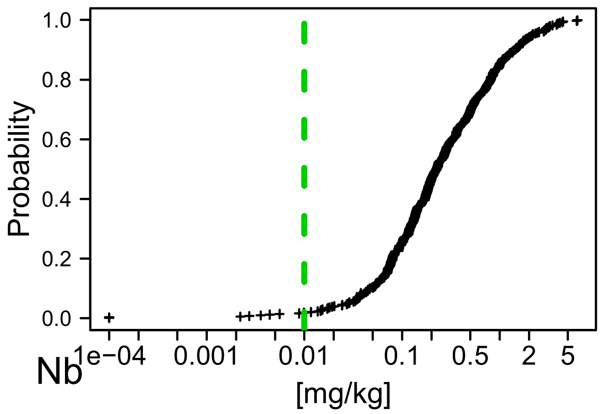

Probability
1.0
0.8
0.6
0.4
0.2
0.0
0.02 0.1 0.5 2 5 10
Li
[mg/kg]

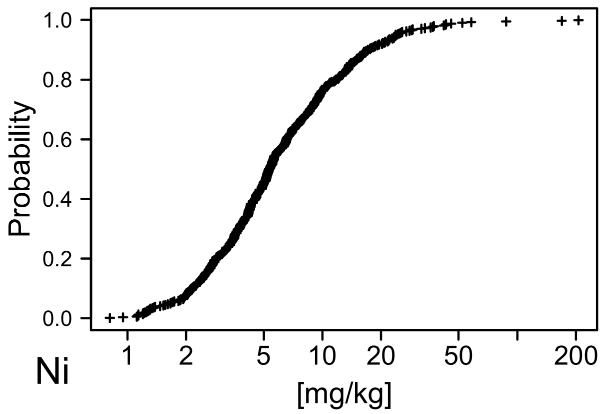

Probability
1.0
0.8
0.6
0.4
0.2
0.0
500 1000 2000 5000
Mg
[mg/kg]

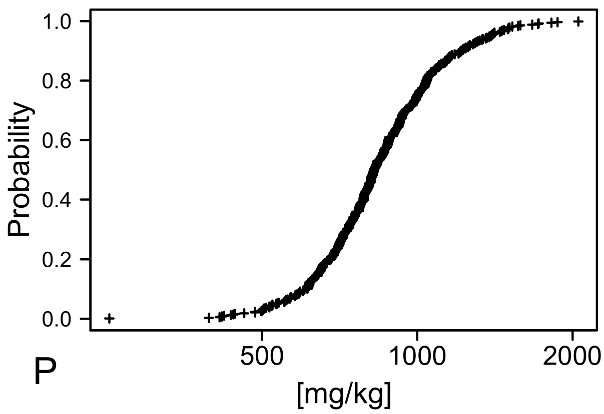

Probability
1.0
0.8
0.6
0.4
0.2
0.0
5 20 50 200 1000 5000
Mn
[mg/kg]

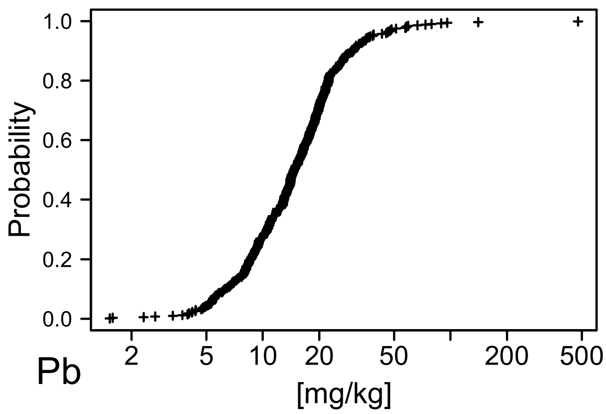

Probability
1.0
0.8
0.6
0.4
0.2
0.0
0.1 0.2 0.5 1 2
Mo
[mg/kg]

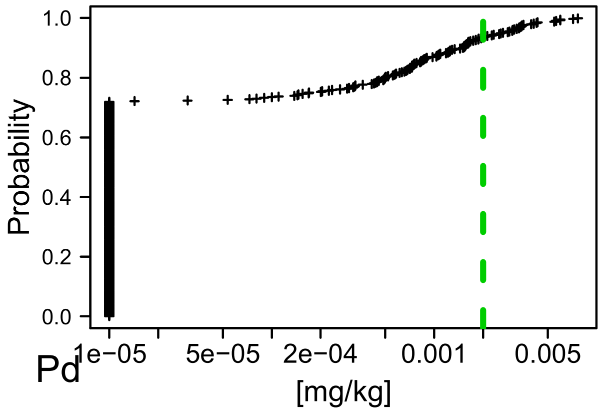

Probability
1.0
0.8
0.6
0.4
0.2
0.0
100 200 500 1000
Na
[mg/kg]

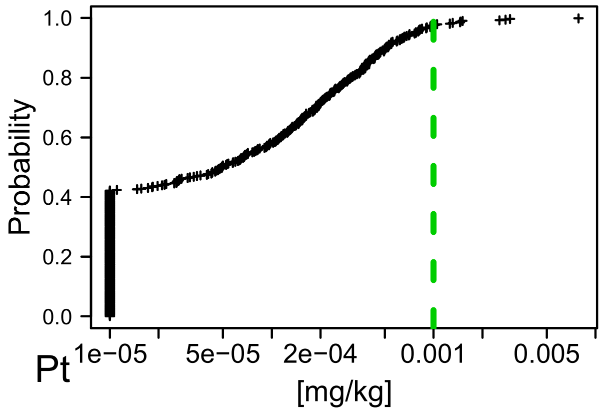

Probability
1.0
0.8
0.6
0.4
0.2
0.0
1e−04 0.001 0.01 0.1 0.5 2 5
Nb
[mg/kg]

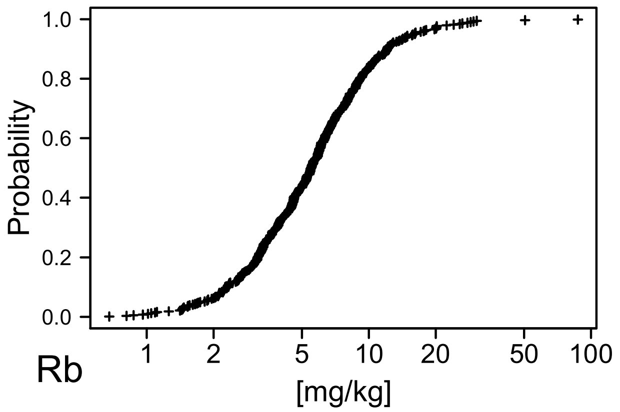

Probability
1.0
0.8
0.6
0.4
0.2
0.0
1 2 5 10 20 50 200
Ni
[mg/kg]

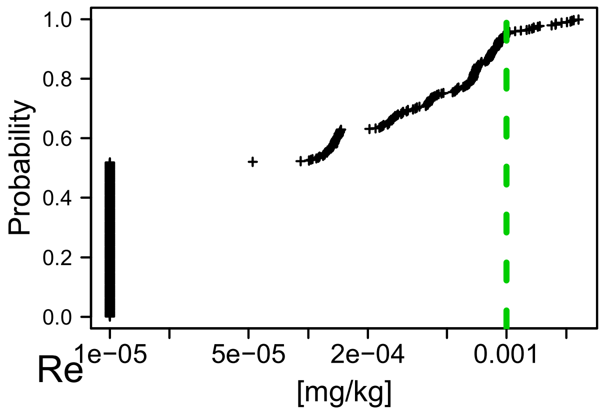

Probability
1.0
0.8
0.6
0.4
0.2
0.0
500 1000 2000
P
[mg/kg]

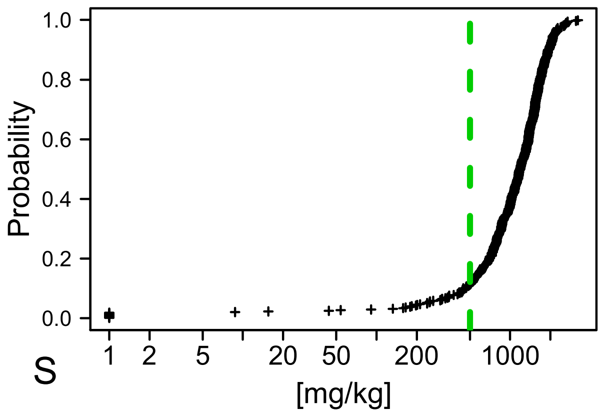

Probability
1.0
0.8
0.6
0.4
0.2
0.0
2 5 10 20 50 200 500
Pb
[mg/kg]

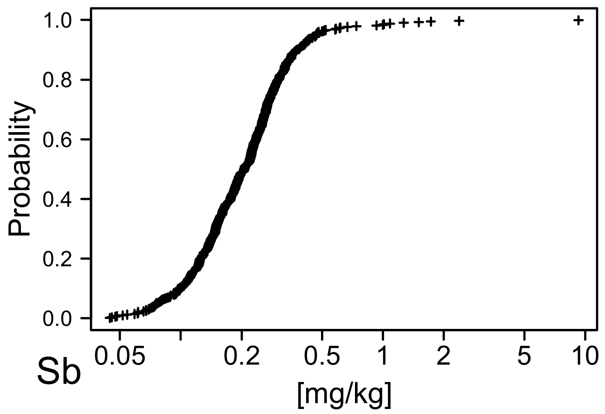

Probability
0.0 0.2 0.4 0.6 0.8 1.0
1e−05 5e−05 2e−04 0.001 0.005
[mg/kg]
Pd

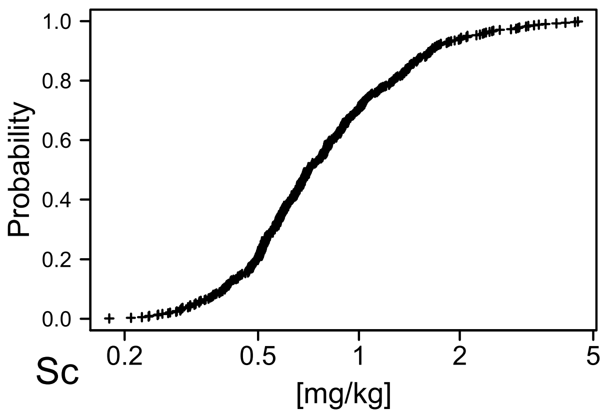

Probability
0.0 0.2 0.4 0.6 0.8 1.0
1e−05 5e−05 2e−04 0.001 0.005
[mg/kg]
Pt

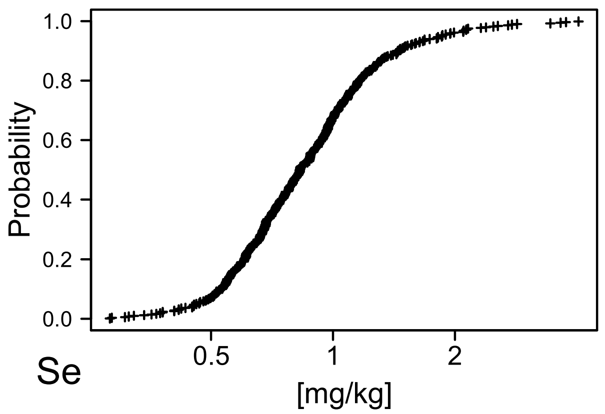

Probability
0.0 0.2 0.4 0.6 0.8 1.0
1 2 5 10 20 50 100
[mg/kg]
Rb

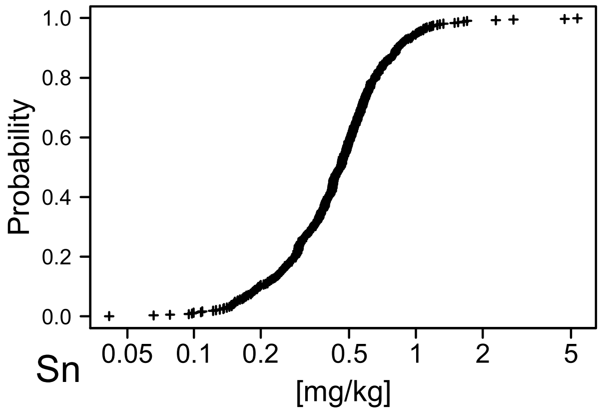

Probability
0.0 0.2 0.4 0.6 0.8 1.0
1e−05 5e−05 2e−04 0.001
[mg/kg]
Re

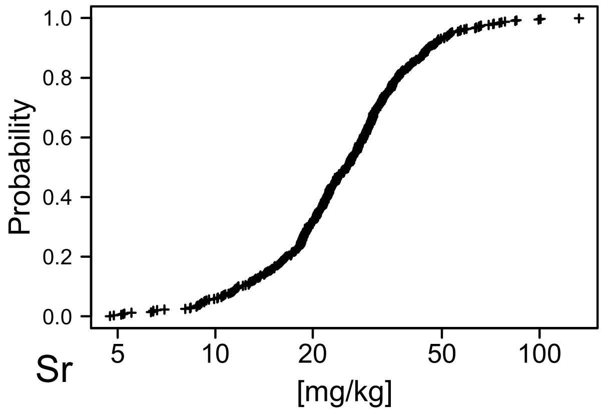

Probability
0.0 0.2 0.4 0.6 0.8 1.0
1 2 5 20 50 200 1000
[mg/kg]
S

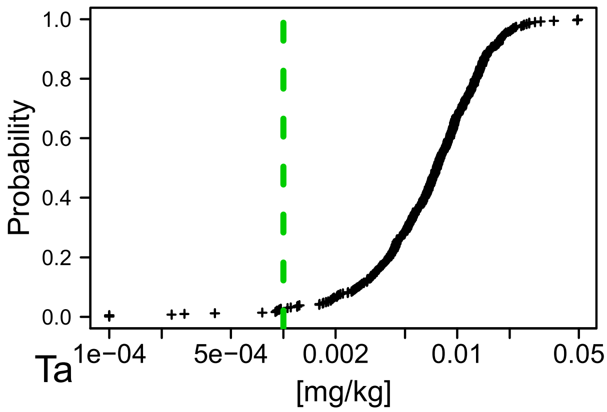

Probability
0.0 0.2 0.4 0.6 0.8 1.0
0.05 0.2 0.5 1 2 5 10
[mg/kg]
Sb

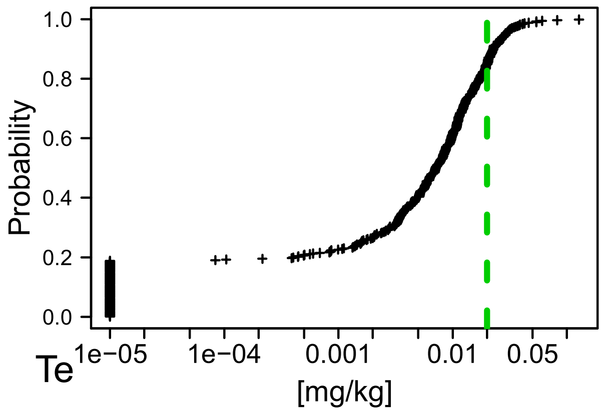

Probability
0.0 0.2 0.4 0.6 0.8 1.0
0.2 0.5 1 2 5
[mg/kg]
Sc

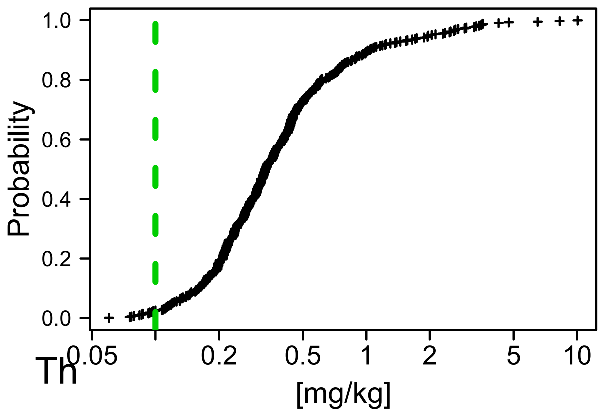

Probability
0.0 0.2 0.4 0.6 0.8 1.0
0.5 1 2
[mg/kg]
Se

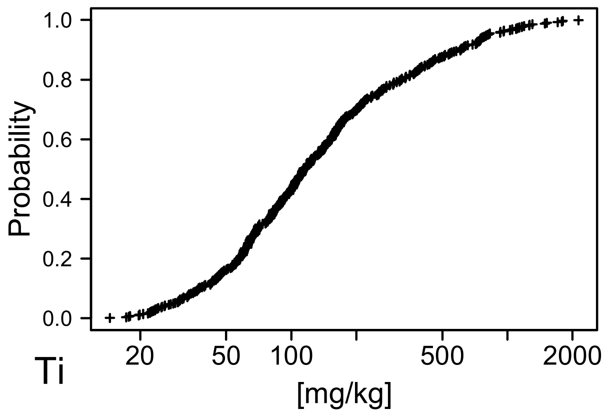

Probability
0.0
0.2
0.4
0.6
0.8
1.0
0.05
0.1
0.2
0.5
1
2
5
Sn
[mg/kg]

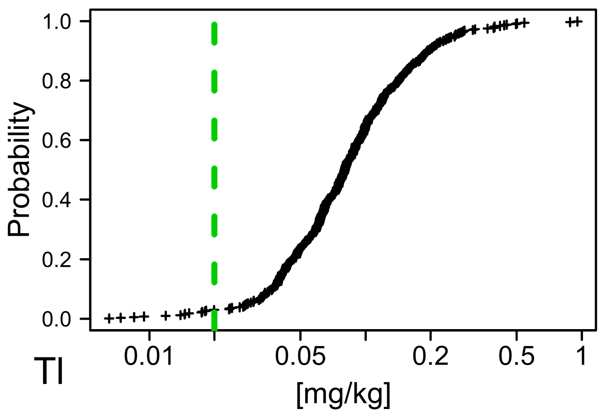

Probability
0.0
0.2
0.4
0.6
0.8
1.0
5
10
20
50
100
Sr
[mg/kg]

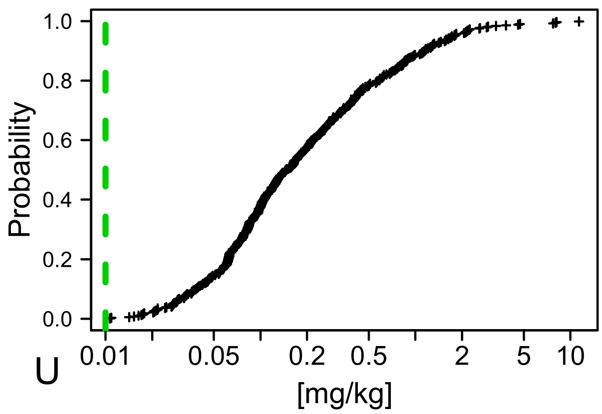

Probability
0.0
0.2
0.4
0.6
0.8
1.0
1e−04
5e−04
0.002
0.01
0.05
Ta
[mg/kg]

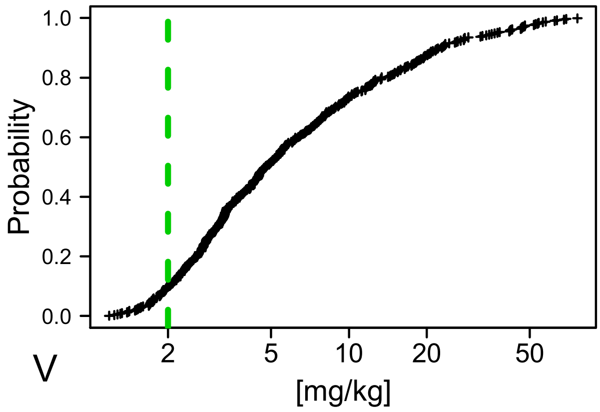

Probability
0.0
0.2
0.4
0.6
0.8
1.0
1e−05
1e−04
0.001
0.01
0.05
Te
[mg/kg]

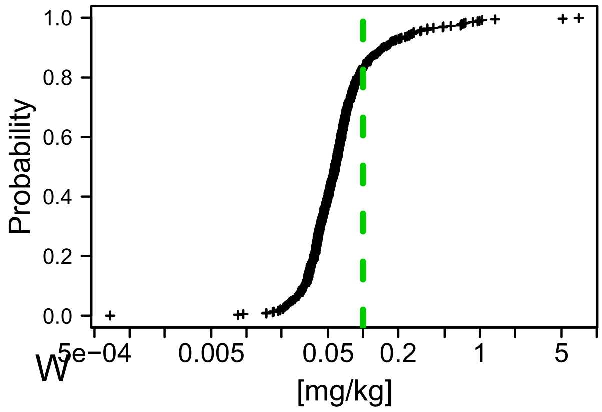

Probability
0.0
0.2
0.4
0.6
0.8
1.0
0.05
0.2
0.5
1
2
5
10
Th
[mg/kg]

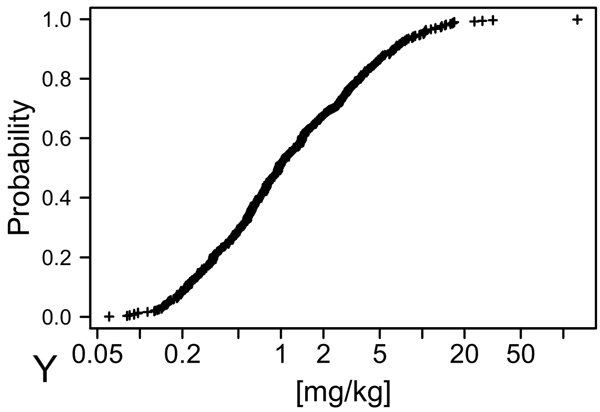

Probability
0.0
0.2
0.4
0.6
0.8
1.0
20
50
100
500
2000
Ti
[mg/kg]

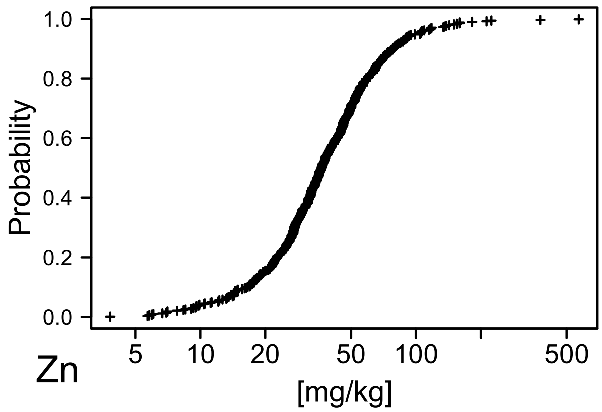

Probability
0.0
0.2
0.4
0.6
0.8
1.0
0.01
0.05
0.2
0.5
1
Tl
[mg/kg]

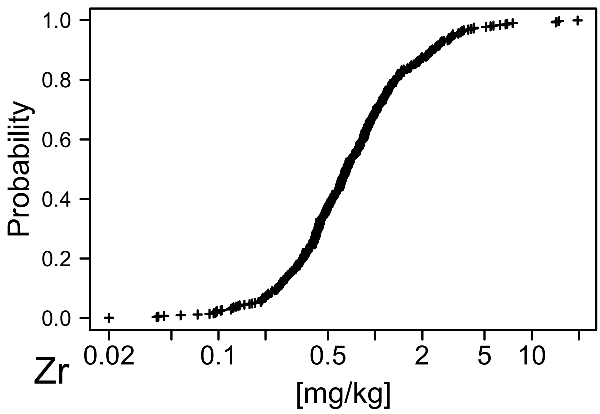

Probability
0.0
0.2
0.4
0.6
0.8
1.0
0.01
0.05
0.2
0.5
2
5
10
U
[mg/kg]


V
Probability
0.0
0.2
0.4
0.6
0.8
1.0
2
5
10
20
50
[mg/kg]


W
Probability
0.0
0.2
0.4
0.6
0.8
1.0
5e−04
0.005
0.05
0.2
1
5
[mg/kg]


Y
Probability
0.0
0.2
0.4
0.6
0.8
1.0
0.05
0.2
1
2
5
20
50
[mg/kg]

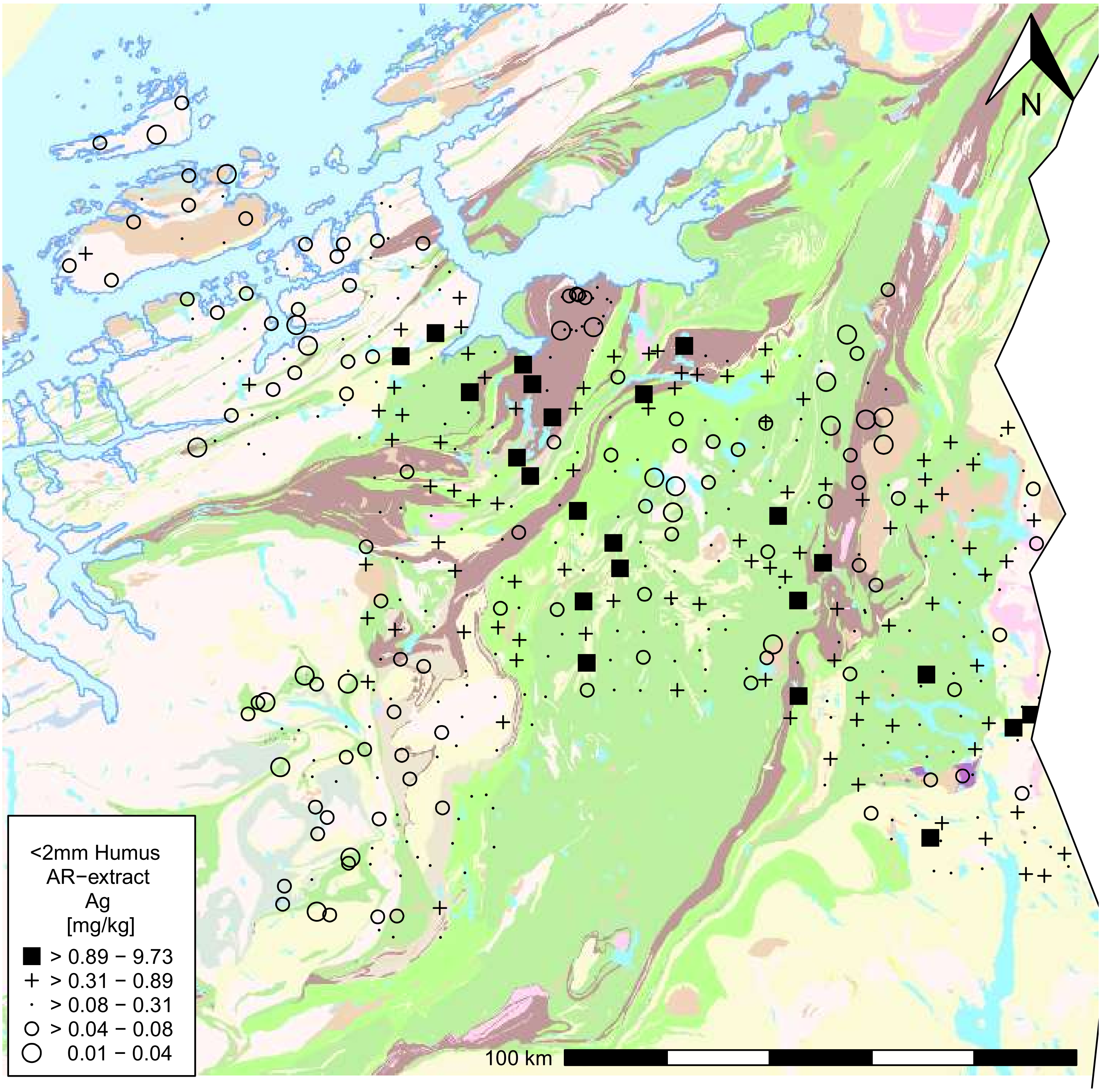

Zn
Probability
0.0
0.2
0.4
0.6
0.8
1.0
5
10
20
50
100
500
[mg/kg]

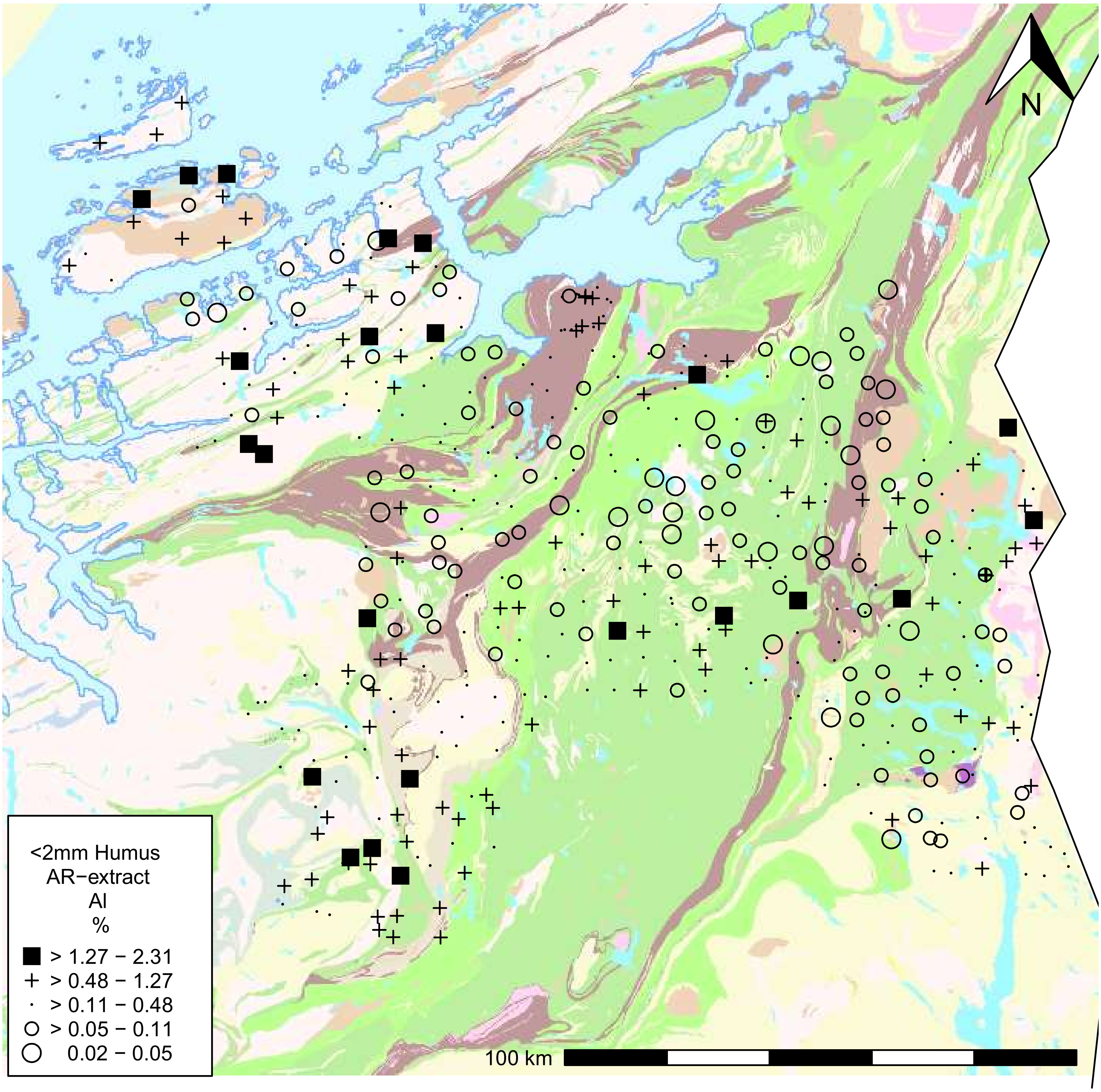

Zr
Probability
0.0
0.2
0.4
0.6
0.8
1.0
0.02
0.1
0.5
2
5
10
[mg/kg]

# Appendix 5: Geochemical maps

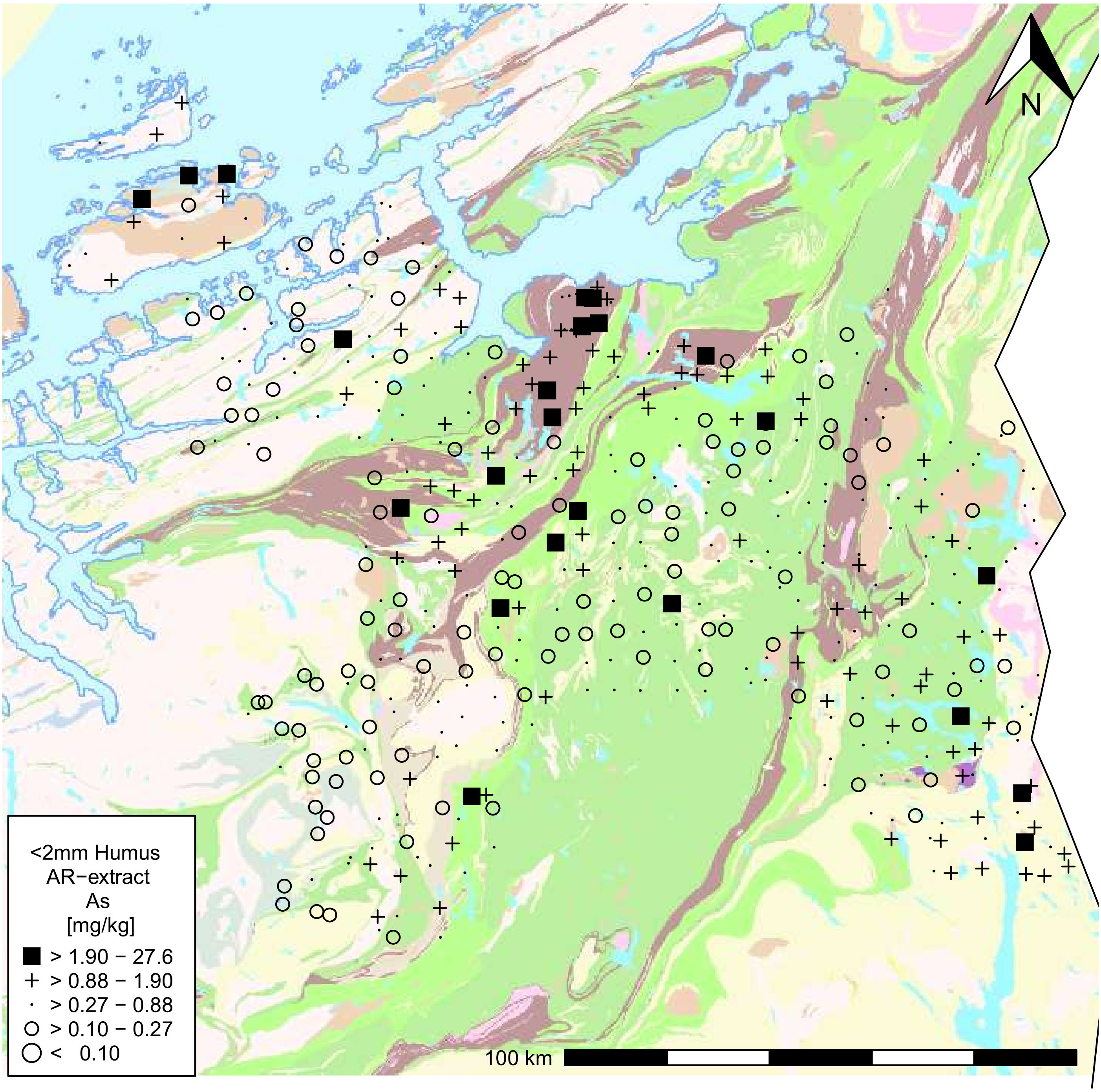
Geochemical maps of the survey area for all elements except Au, B, Ge, In, Pd, Pt, Re, Ta and Ta due to poor data quality plotted on top of bedrock map.

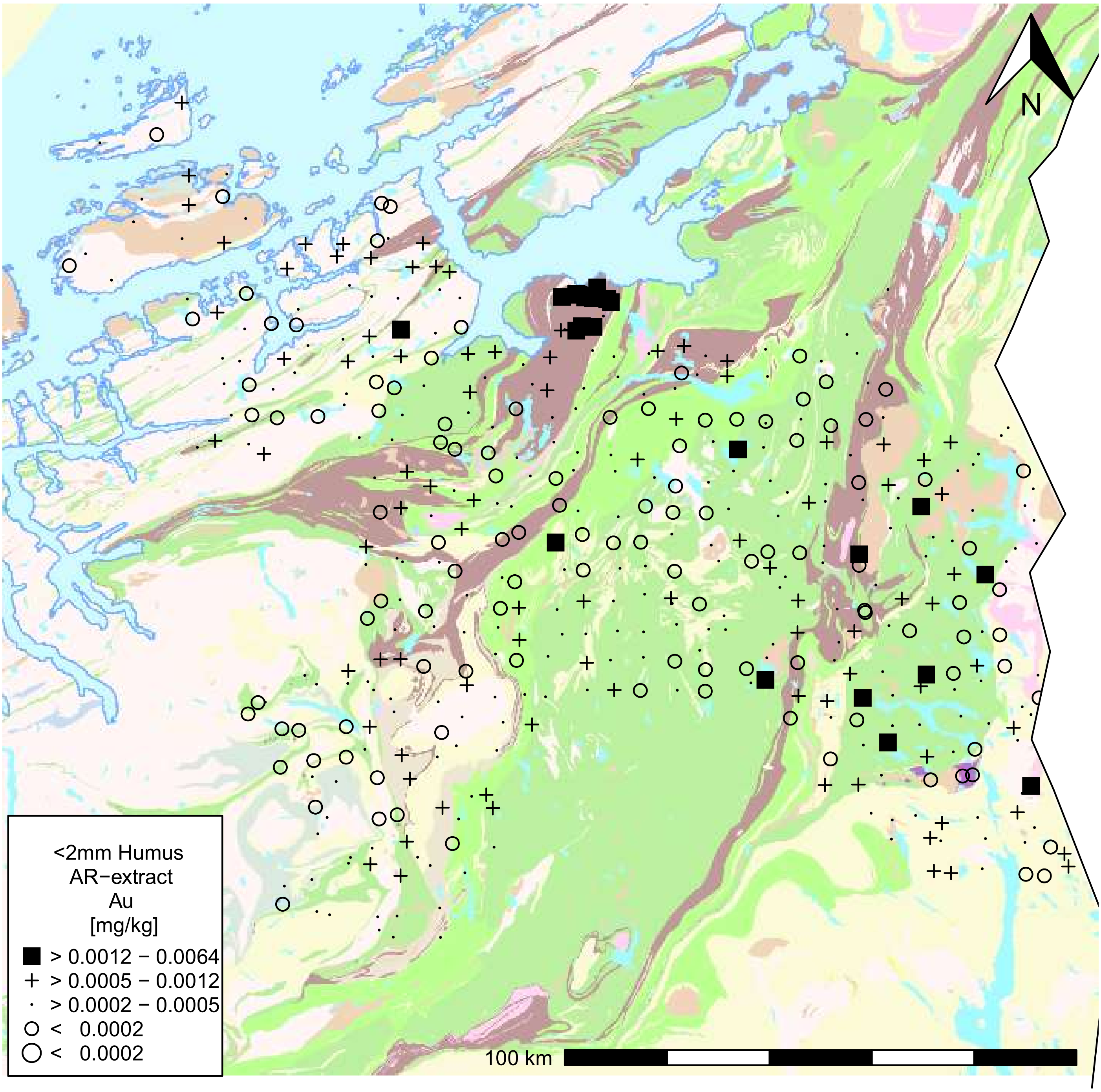
EDA map interval: 0-5%, 5-25%, 25-75%, 75-95%, 95-100%

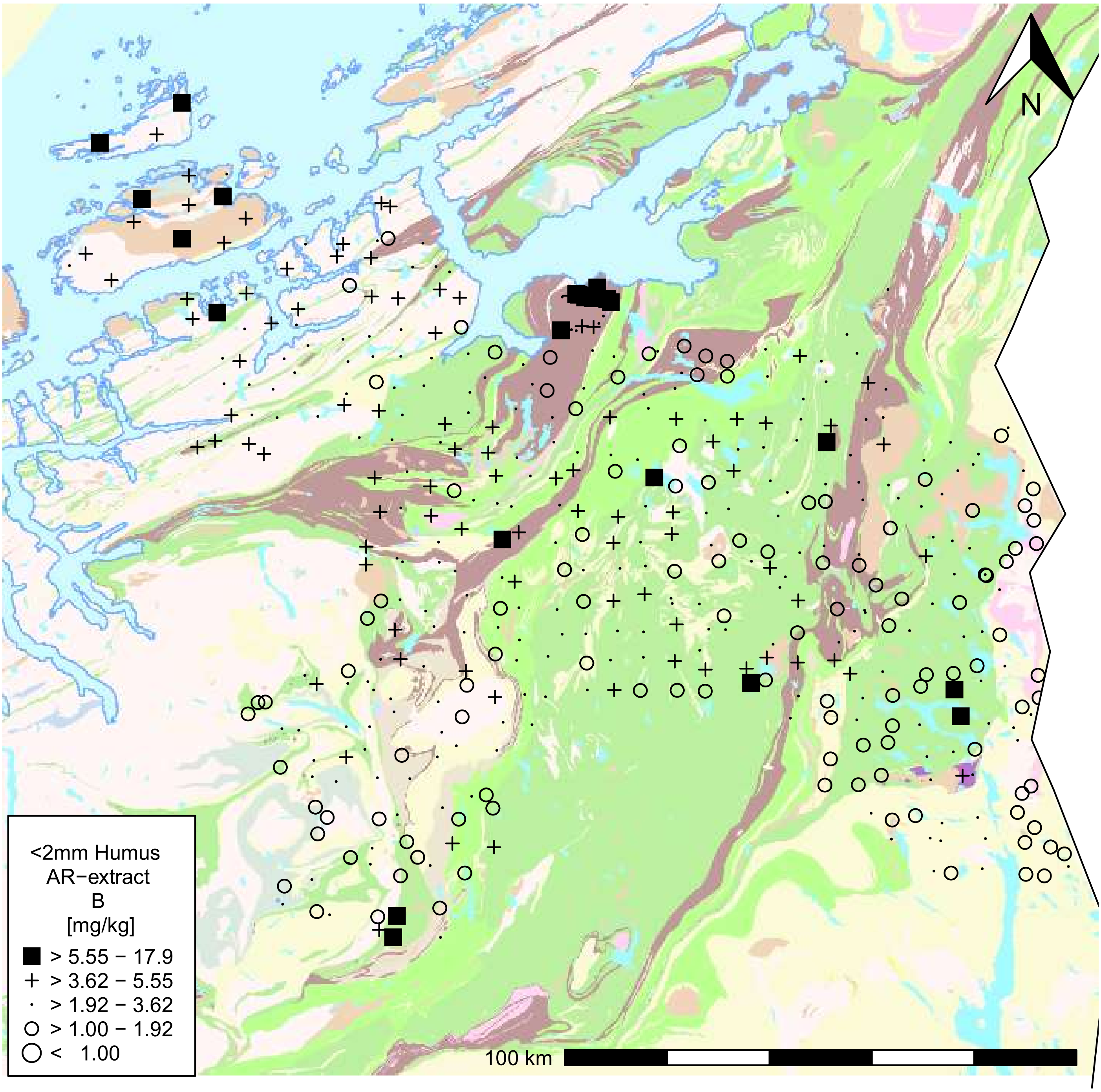

N
<2mm Humus
AR−extract
Ag
[mg/kg]
> 0.89 − 9.73
> 0.31 − 0.89
> 0.08 − 0.31
> 0.04 − 0.08
0.01 − 0.04
100 km

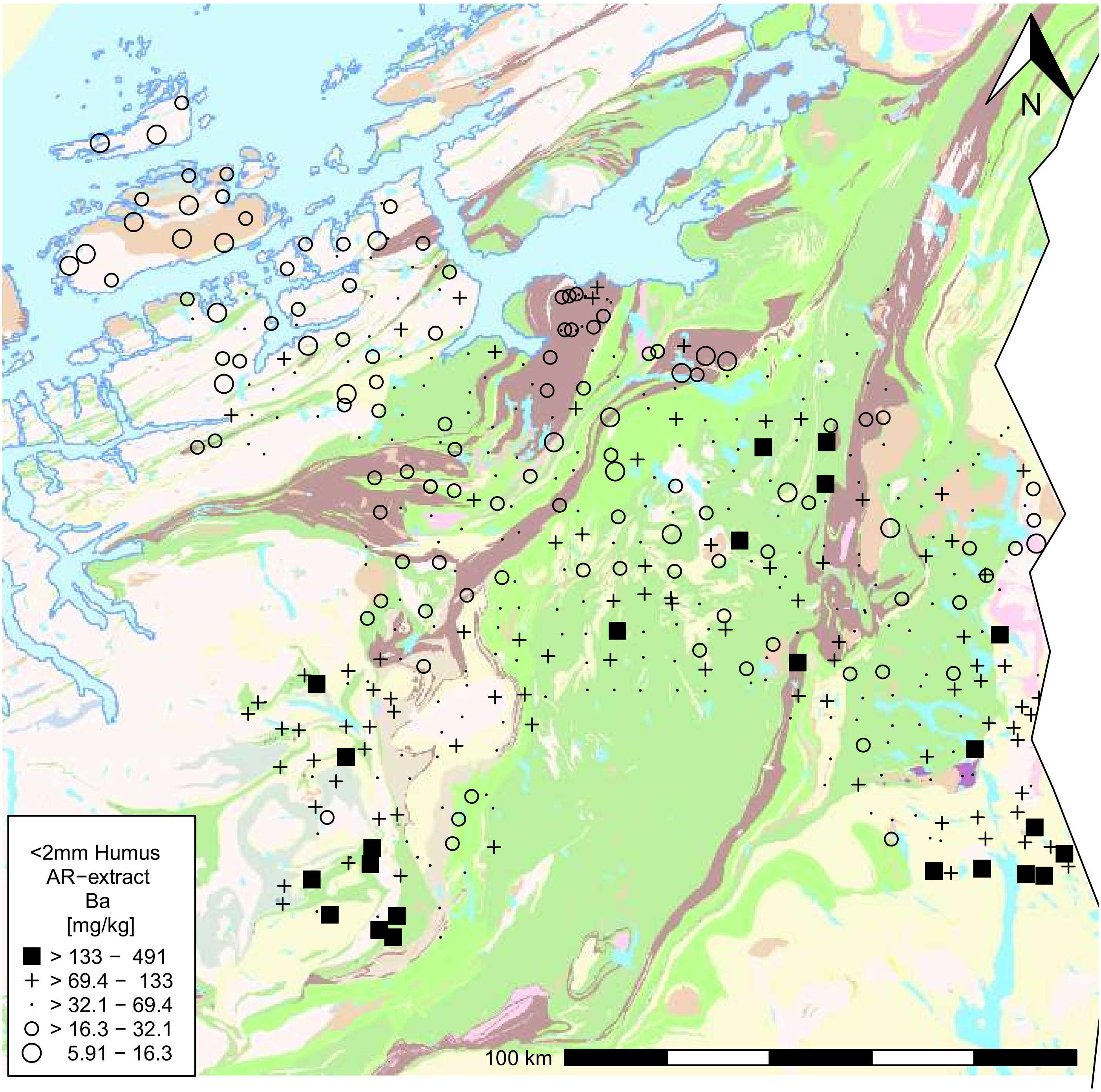


N
<2mm Humus
AR−extract
Al
%
> 1.27 − 2.31
> 0.48 − 1.27
> 0.11 − 0.48
> 0.05 − 0.11
0.02 − 0.05
100 km

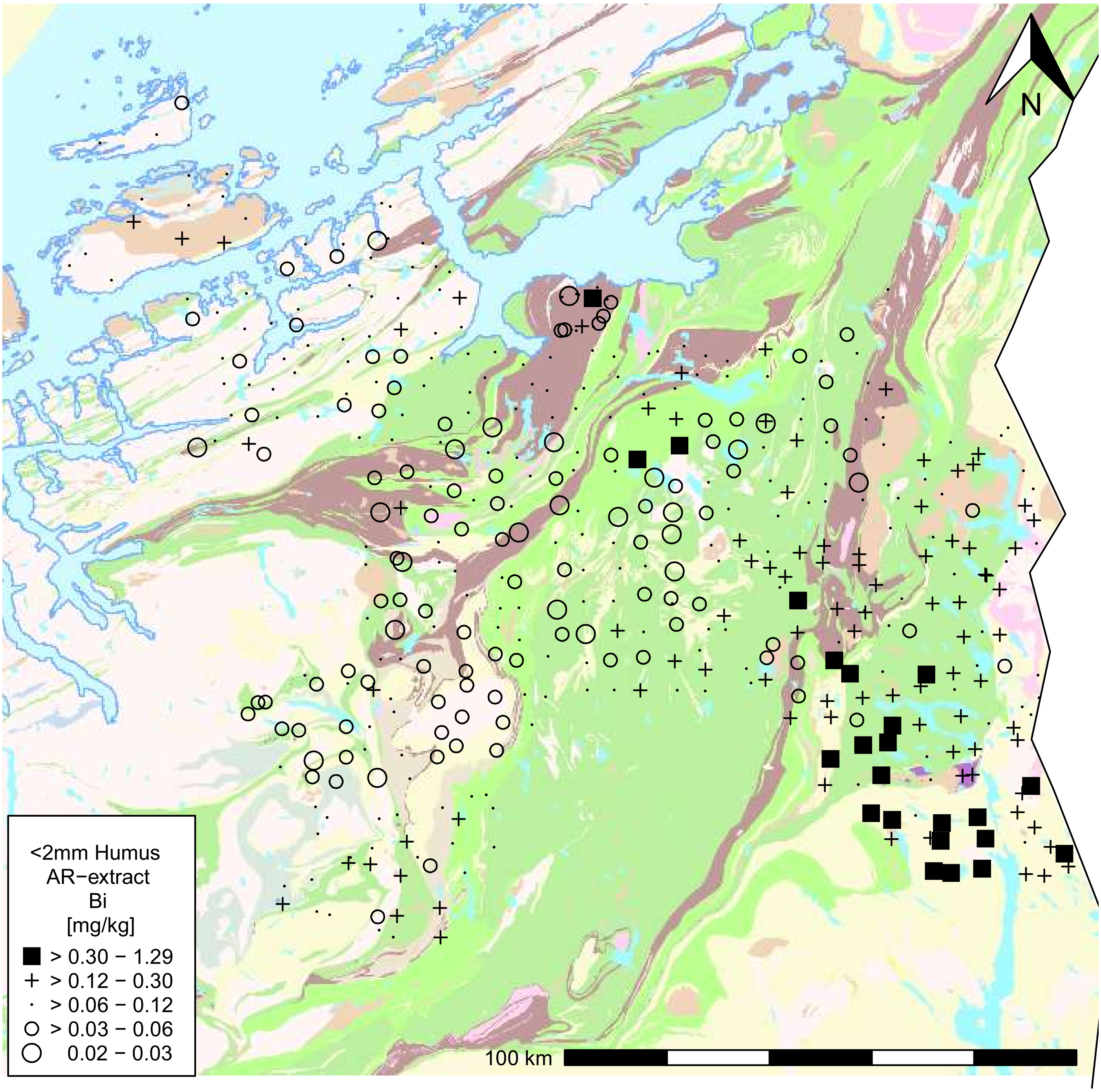

N
<2mm Humus
AR−extract
As
[mg/kg]
> 1.90 − 27.6
> 0.88 − 1.90
> 0.27 − 0.88
> 0.10 − 0.27
< 0.10
100 km

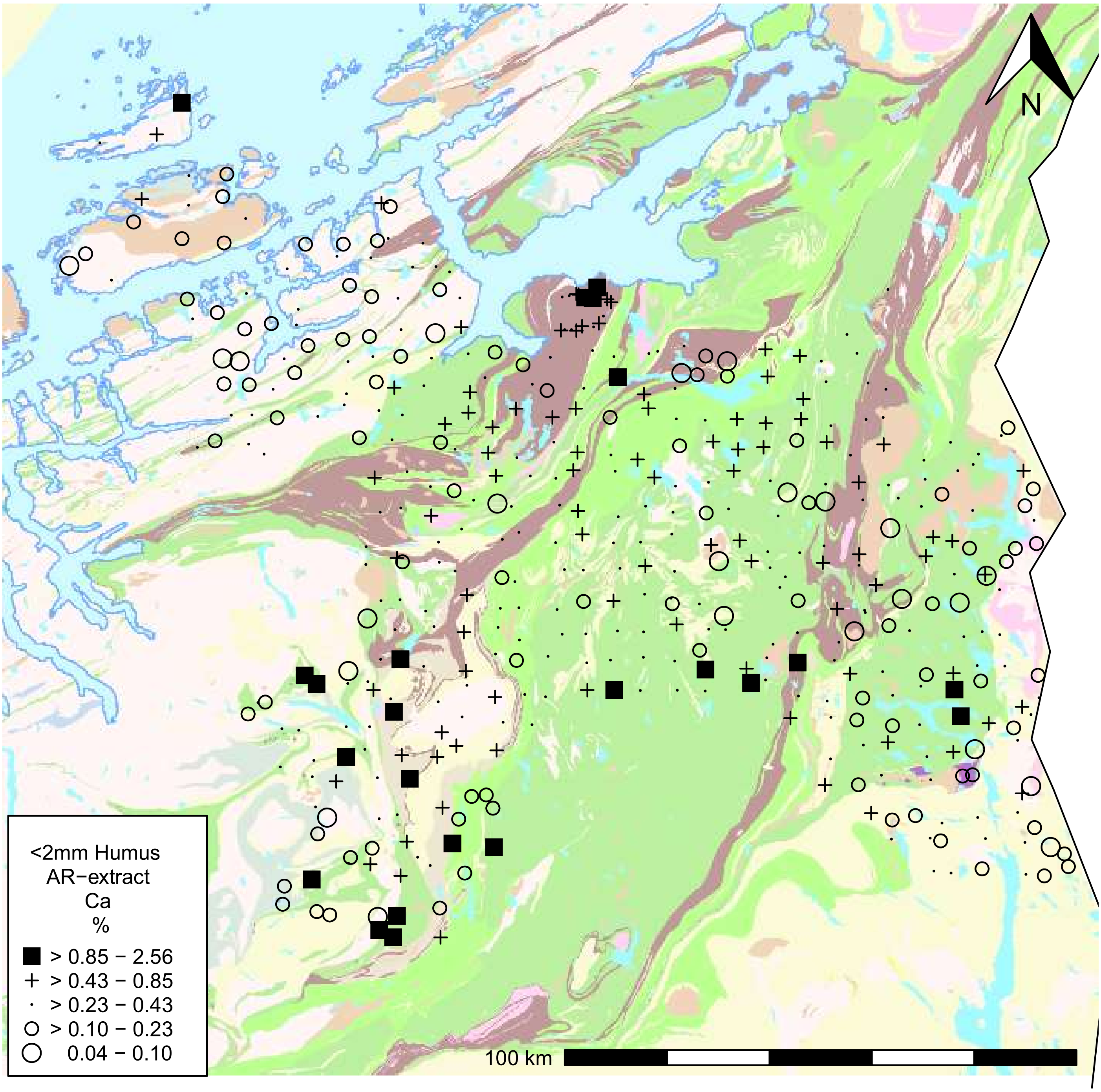

N
<2mm Humus
AR−extract
Au
[mg/kg]
> 0.0012 − 0.0064
> 0.0005 − 0.0012
> 0.0002 − 0.0005
< 0.0002
< 0.0002
100 km


N
<2mm Humus
AR−extract
B
[mg/kg]
> 5.55 − 17.9
> 3.62 − 5.55
> 1.92 − 3.62
> 1.00 − 1.92
<   1.00
100 km

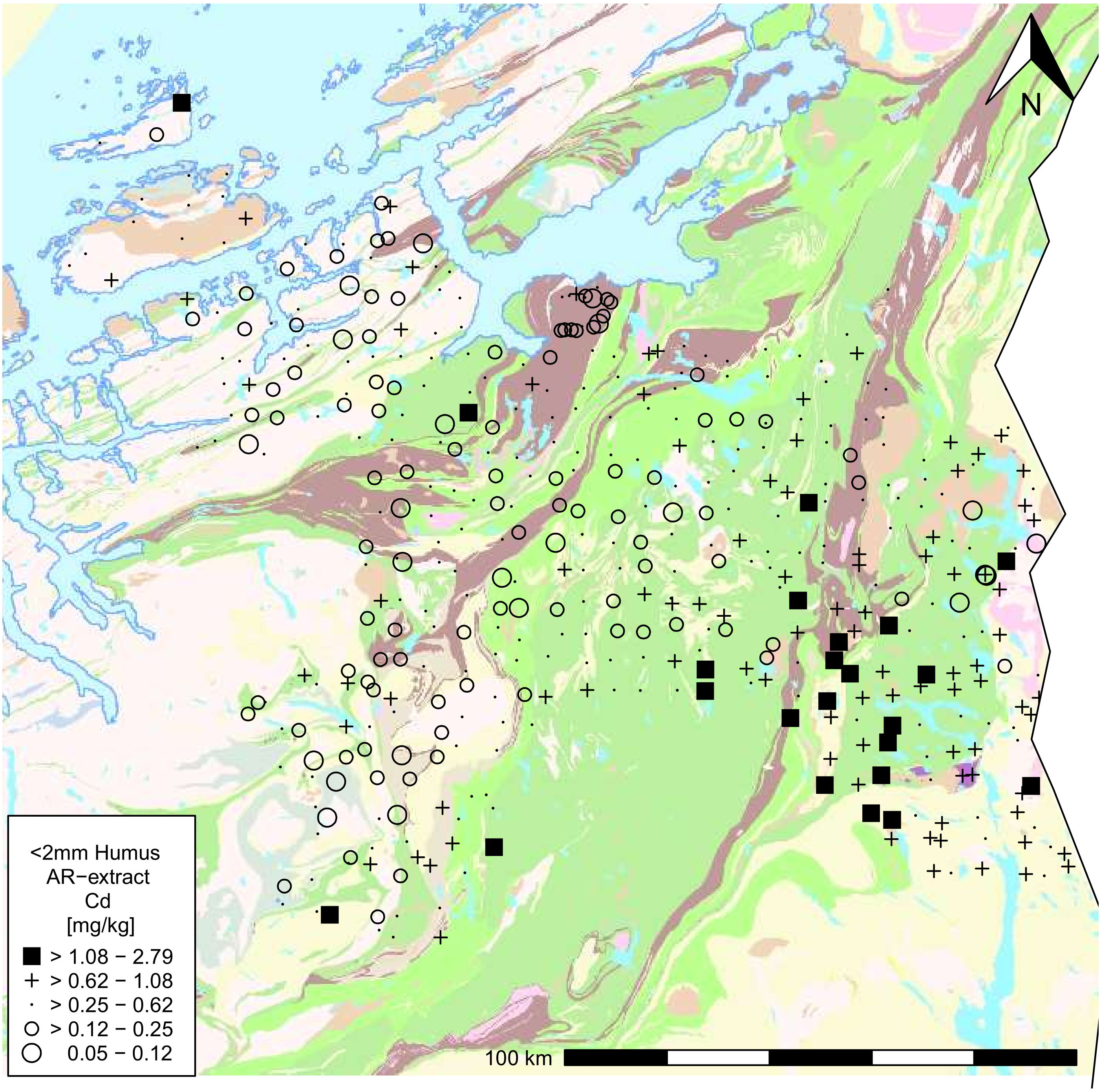


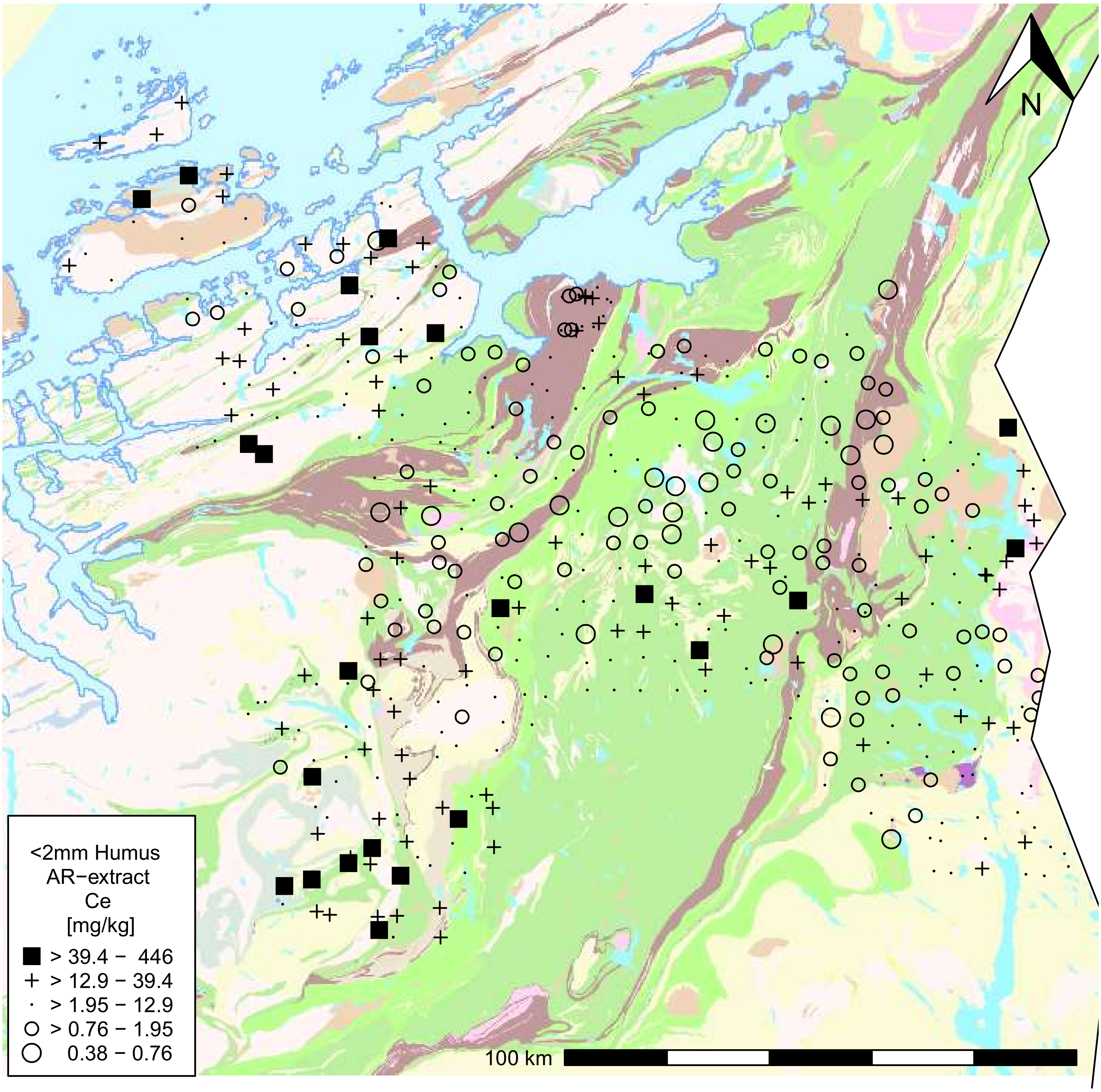
N
<2mm Humus
AR−extract
Ba
[mg/kg]
> 133 − 491
> 69.4 − 133
> 32.1 − 69.4
> 16.3 − 32.1
5.91 − 16.3
100 km

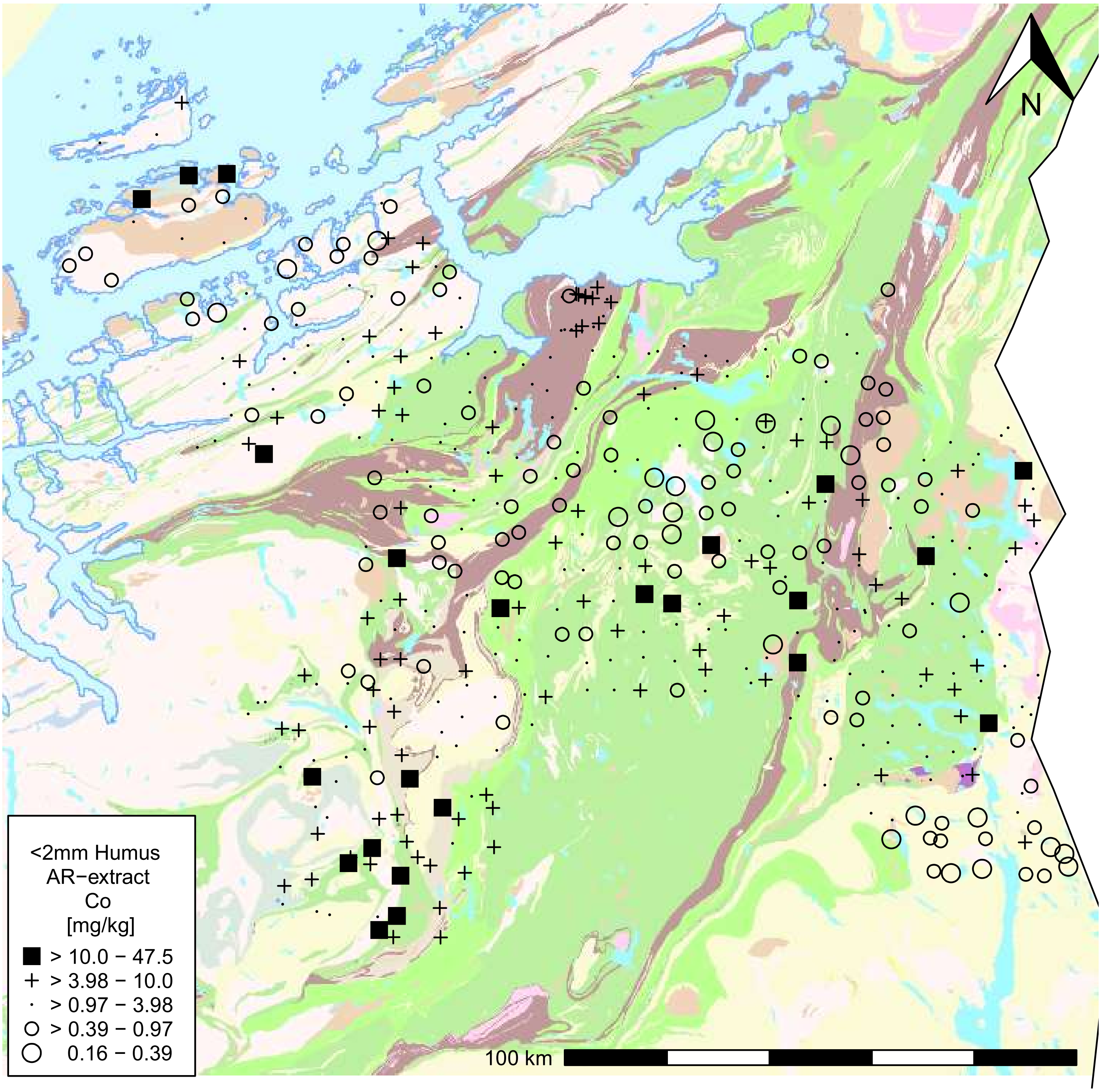

N
<2mm Humus
AR−extract
Bi
[mg/kg]
> 0.30 − 1.29
> 0.12 − 0.30
> 0.06 − 0.12
> 0.03 − 0.06
0.02 − 0.03
100 km

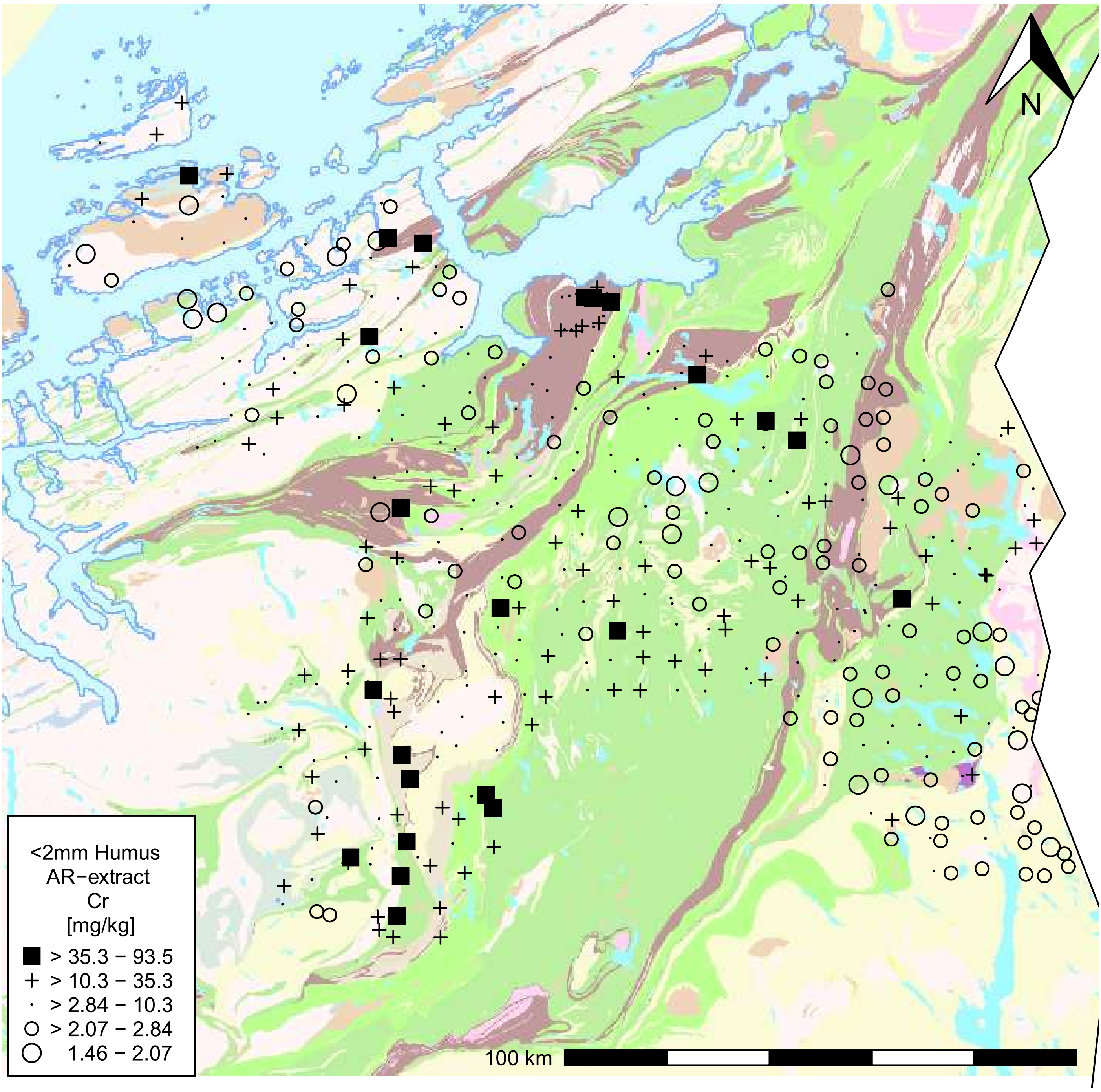


N
<2mm Humus
AR−extract
Ca
%
> 0.85 − 2.56
> 0.43 − 0.85
> 0.23 − 0.43
> 0.10 − 0.23
0.04 − 0.10
100 km

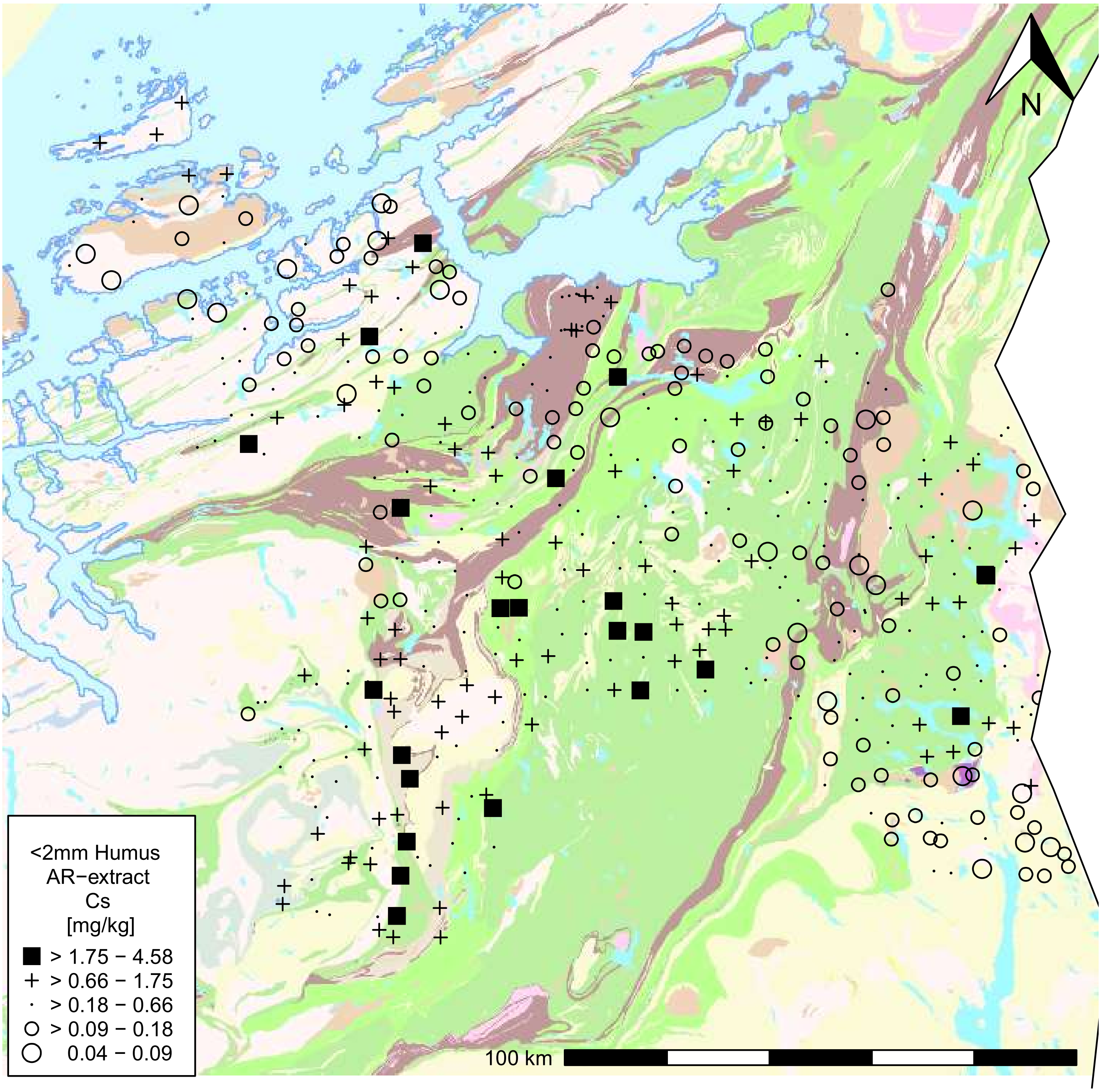

N
<2mm Humus
AR−extract
Cd
[mg/kg]
> 1.08 − 2.79
> 0.62 − 1.08
> 0.25 − 0.62
> 0.12 − 0.25
0.05 − 0.12
100 km

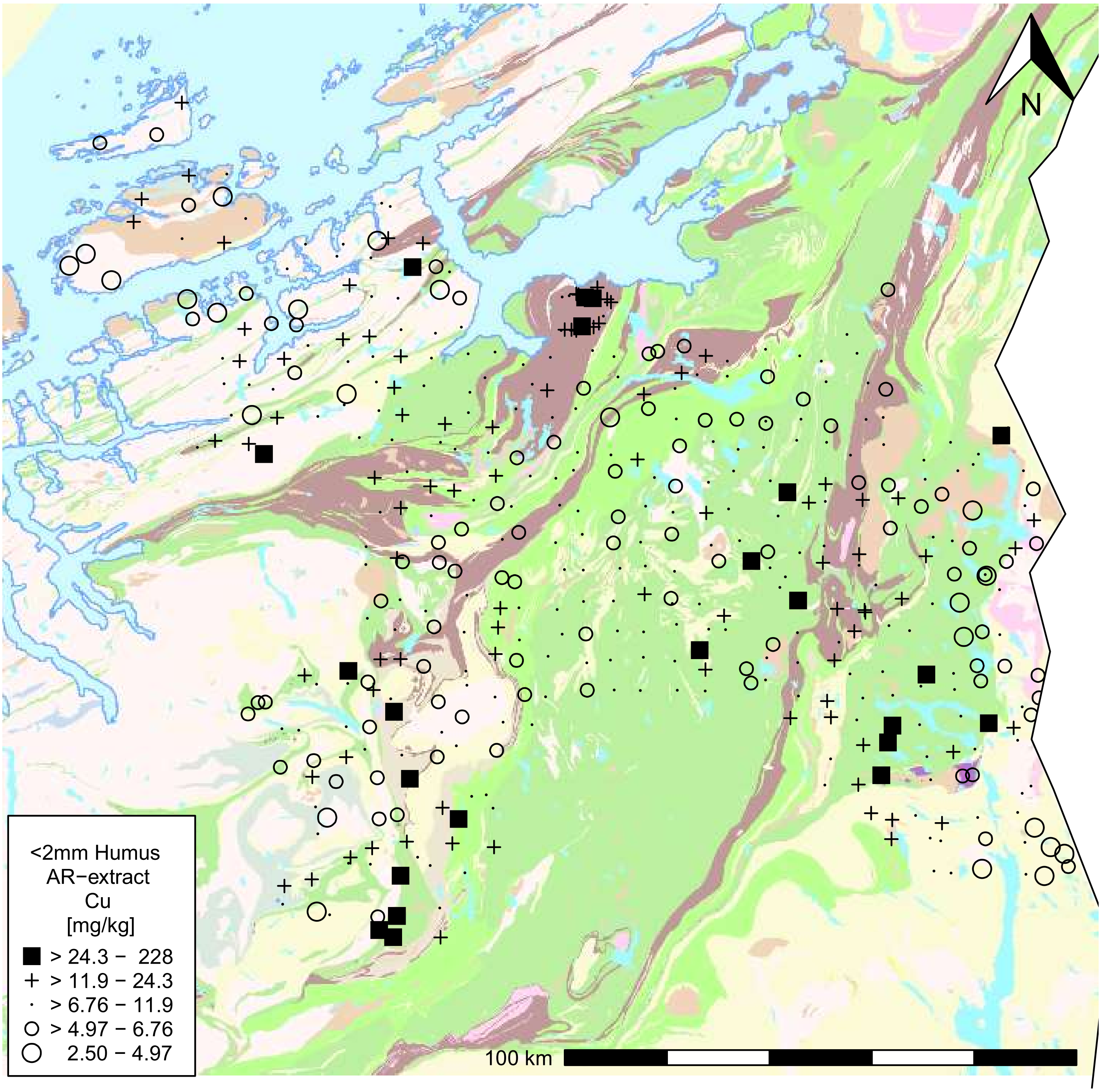

N
<2mm Humus
AR−extract
Ce
[mg/kg]
> 39.4 − 446
> 12.9 − 39.4
> 1.95 − 12.9
> 0.76 − 1.95
0.38 − 0.76
100 km

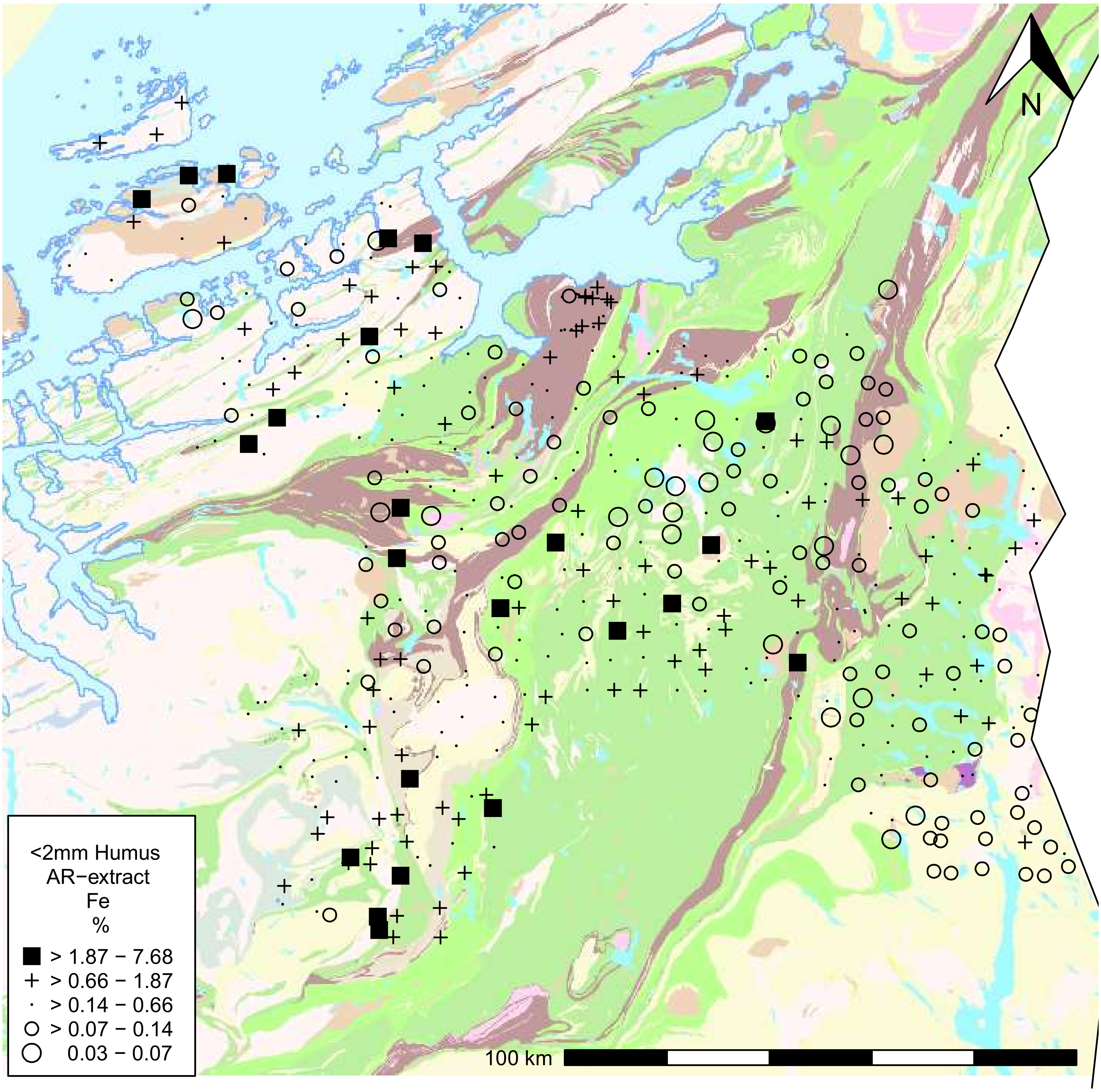

N
<2mm Humus
AR−extract
Co
[mg/kg]
> 10.0 − 47.5
> 3.98 − 10.0
> 0.97 − 3.98
> 0.39 − 0.97
0.16 − 0.39
100 km

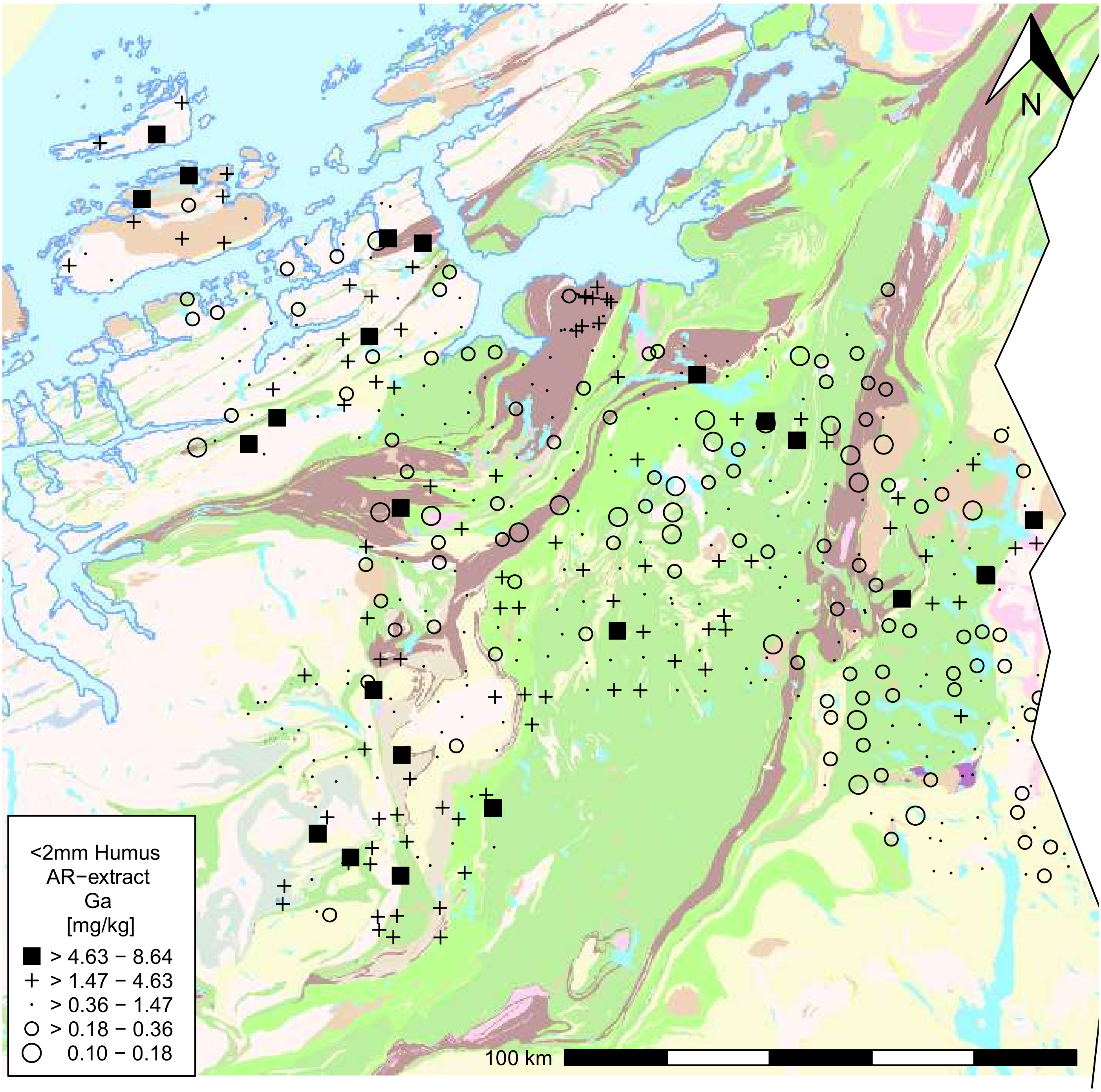


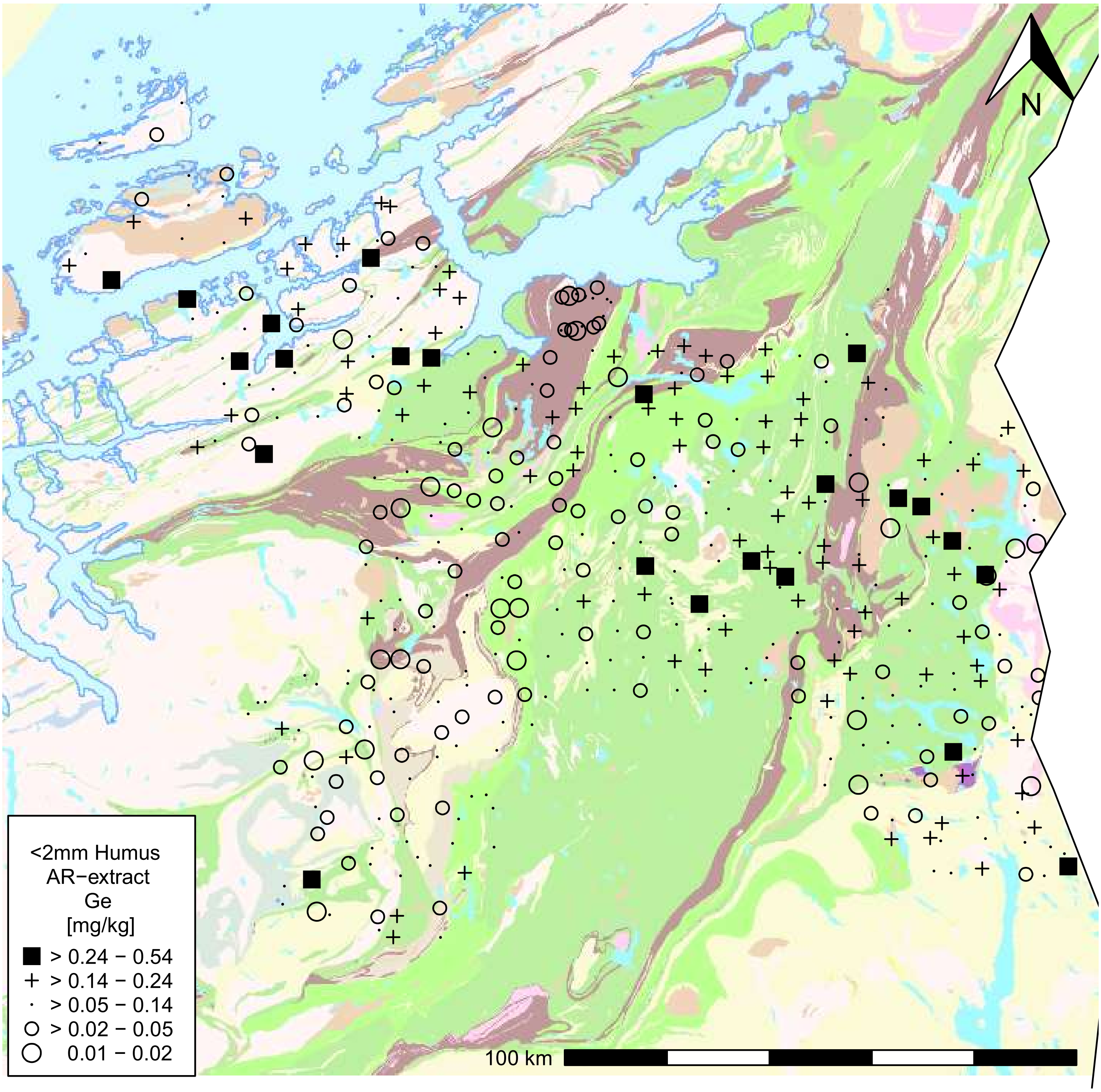
N
<2mm Humus
AR−extract
Cr
[mg/kg]
> 35.3 − 93.5
> 10.3 − 35.3
> 2.84 − 10.3
> 2.07 − 2.84
1.46 − 2.07
100 km

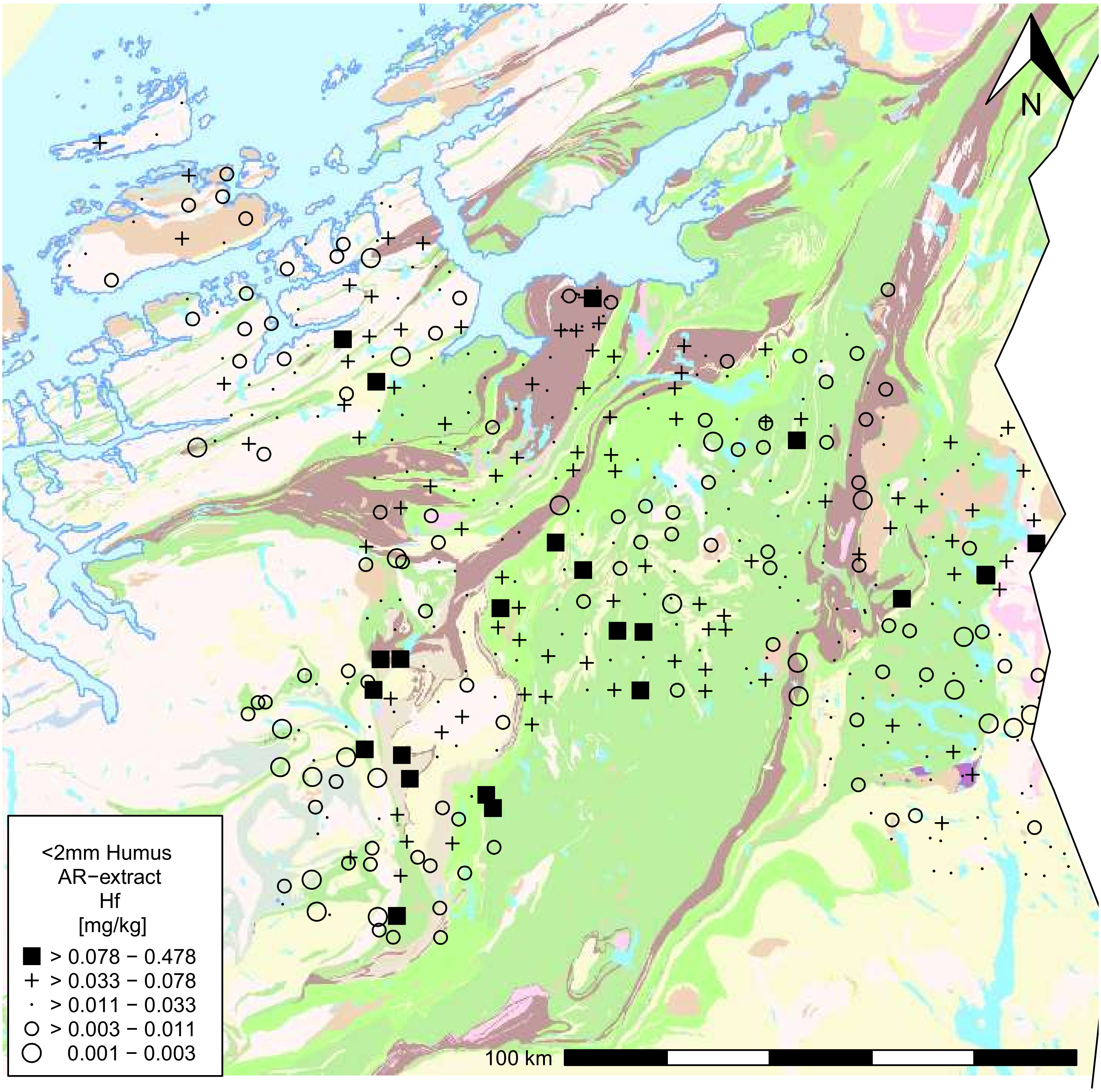

N
<2mm Humus
AR−extract
Cs
[mg/kg]
> 1.75 − 4.58
> 0.66 − 1.75
> 0.18 − 0.66
> 0.09 − 0.18
0.04 − 0.09
100 km


N
<2mm Humus
AR−extract
Cu
[mg/kg]
> 24.3 − 228
> 11.9 − 24.3
> 6.76 − 11.9
> 4.97 − 6.76
2.50 − 4.97
100 km

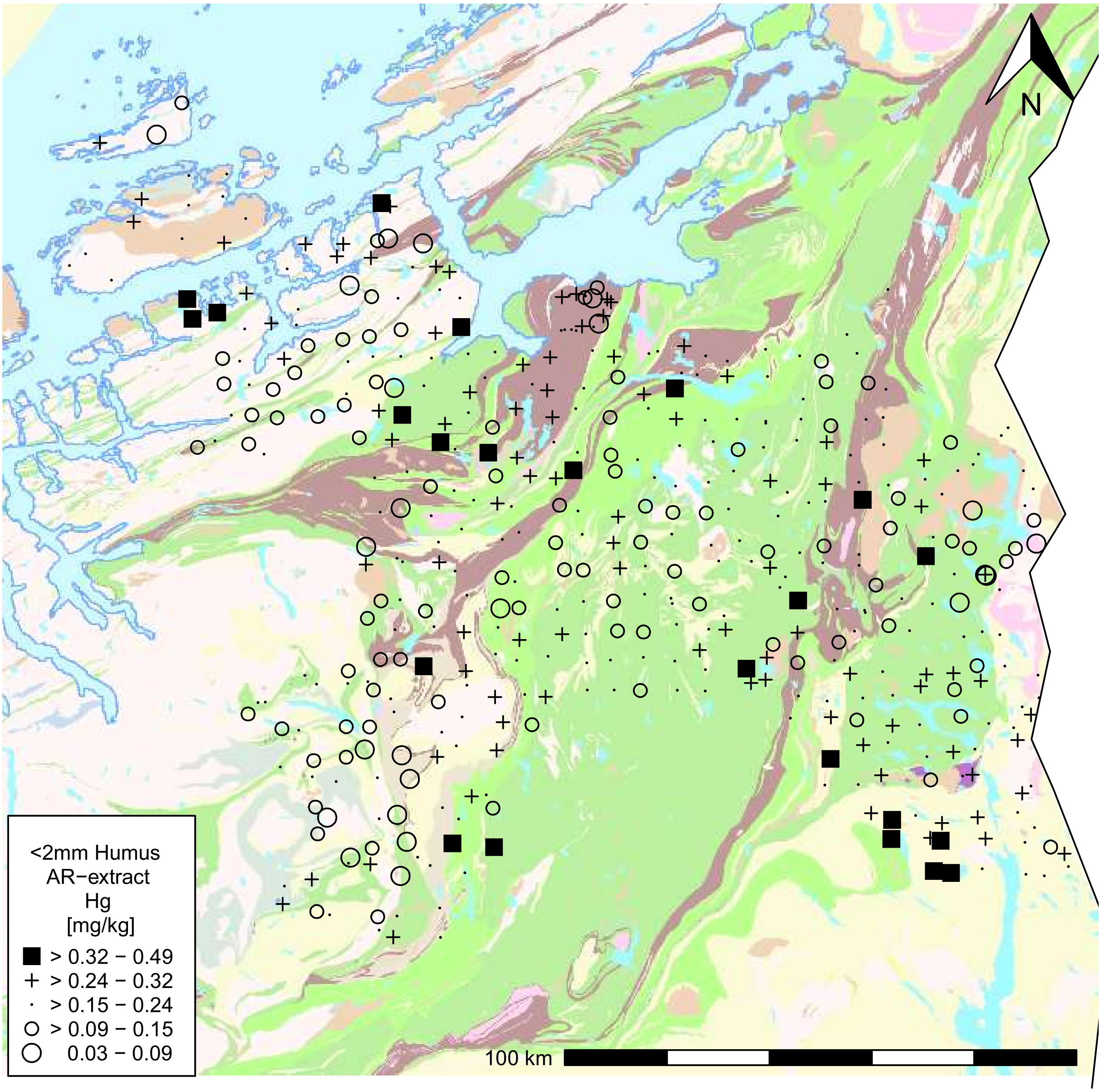

N
<2mm Humus
AR−extract
Fe
%
> 1.87 − 7.68
> 0.66 − 1.87
> 0.14 − 0.66
> 0.07 − 0.14
0.03 − 0.07
100 km

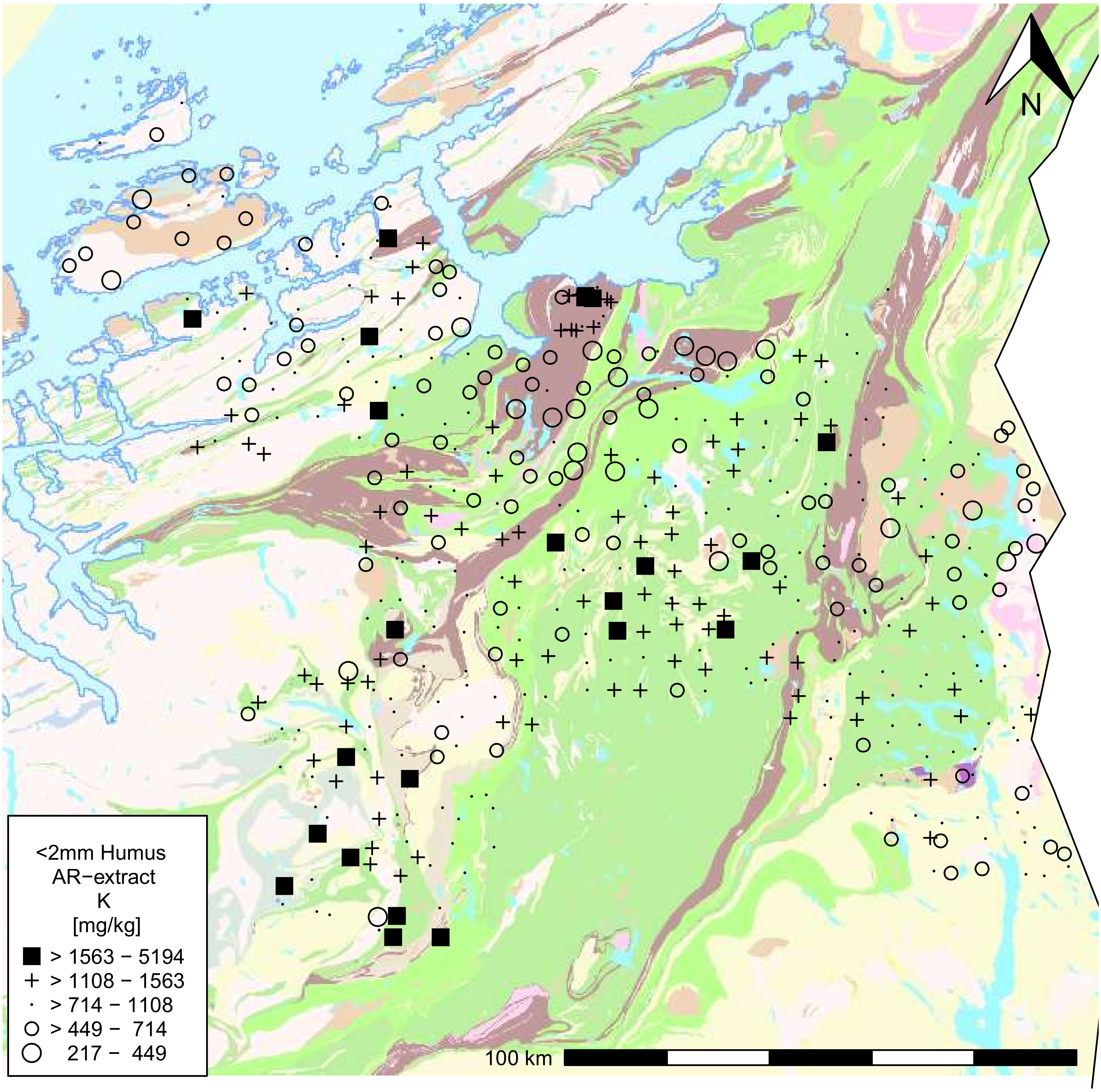

N
<2mm Humus
AR−extract
Ga
[mg/kg]
> 4.63 − 8.64
> 1.47 − 4.63
> 0.36 − 1.47
> 0.18 − 0.36
0.10 − 0.18
100 km

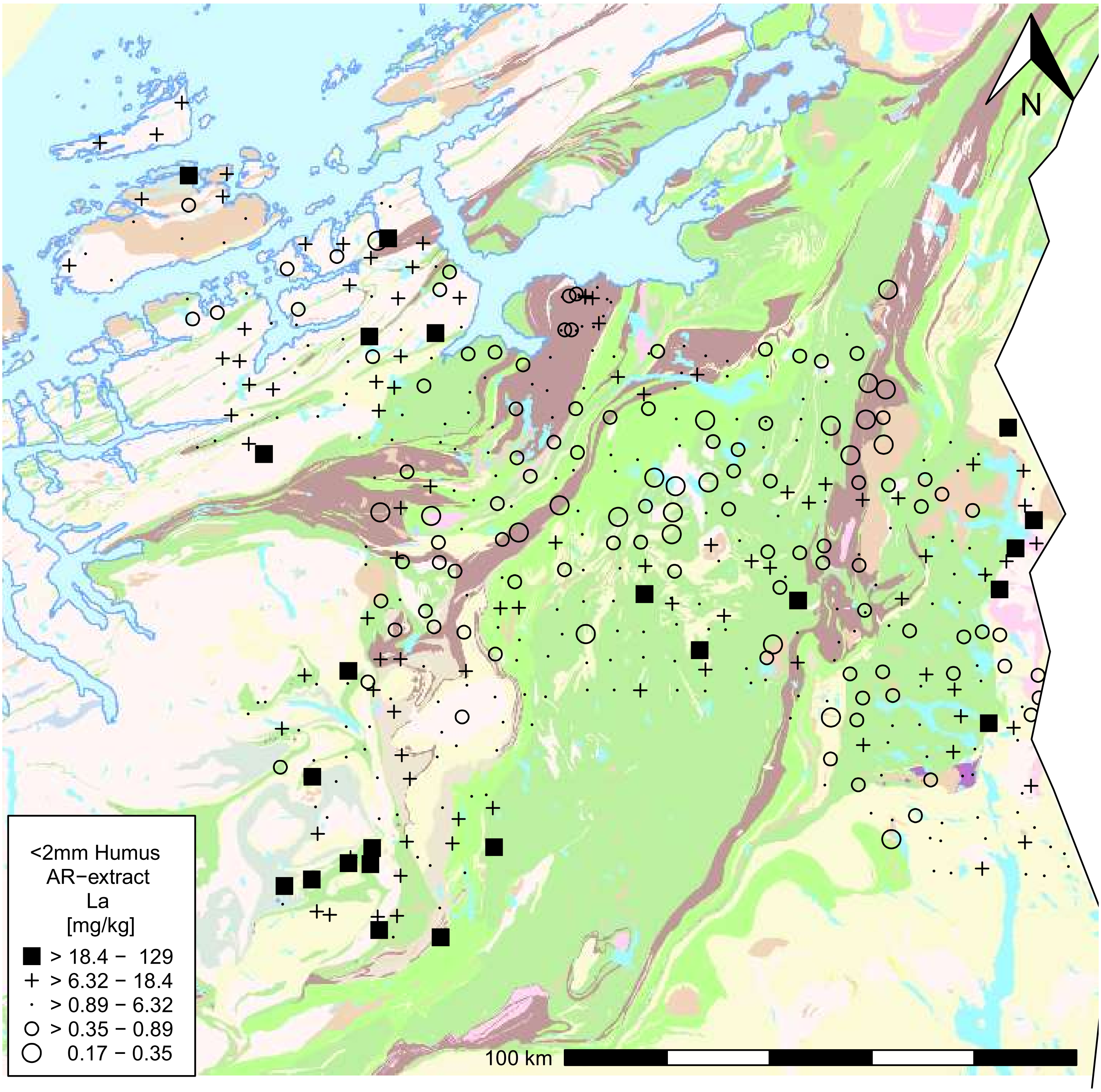

N
<2mm Humus
AR−extract
Ge
[mg/kg]
> 0.24 − 0.54
> 0.14 − 0.24
> 0.05 − 0.14
> 0.02 − 0.05
0.01 − 0.02
100 km

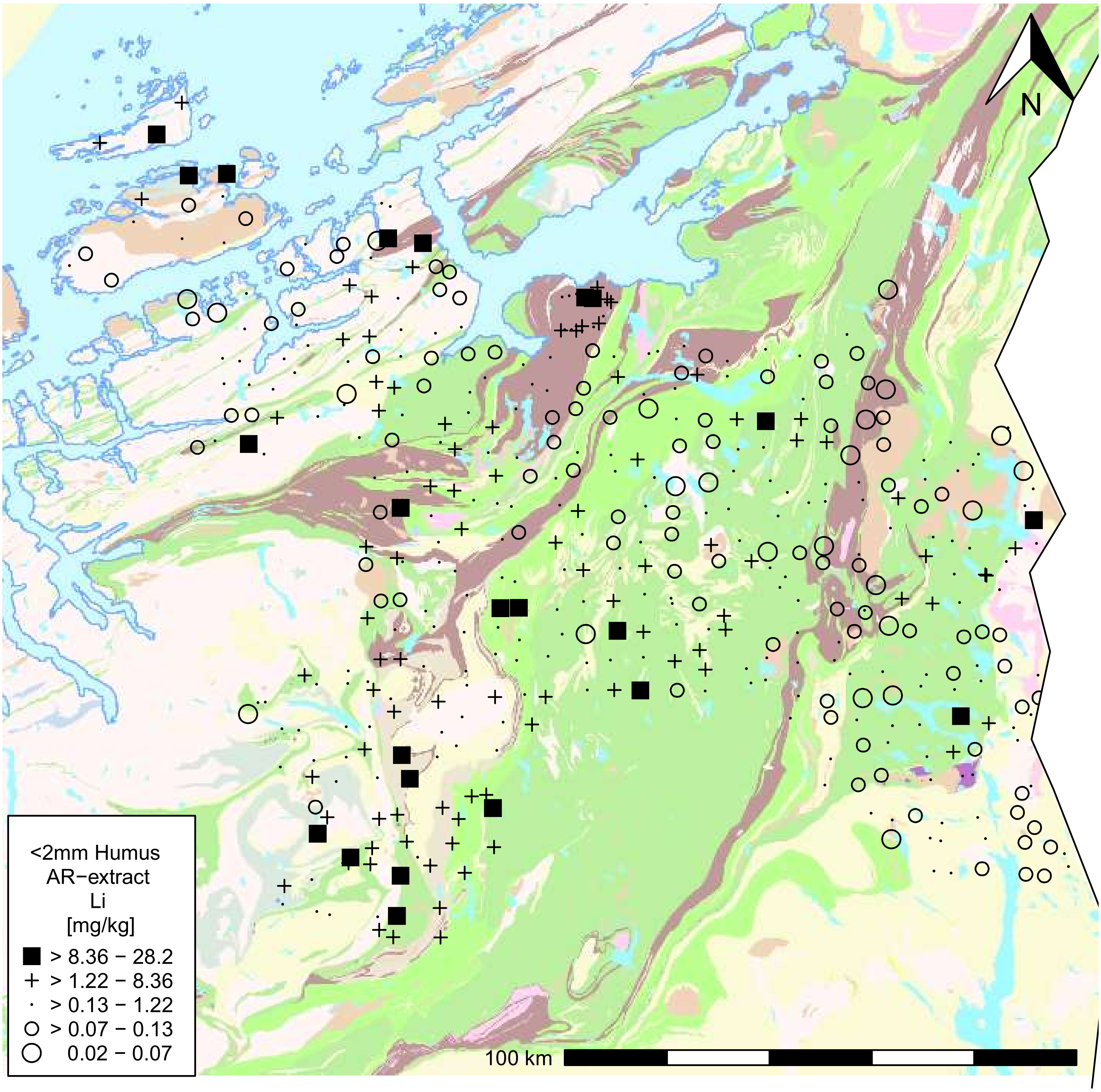


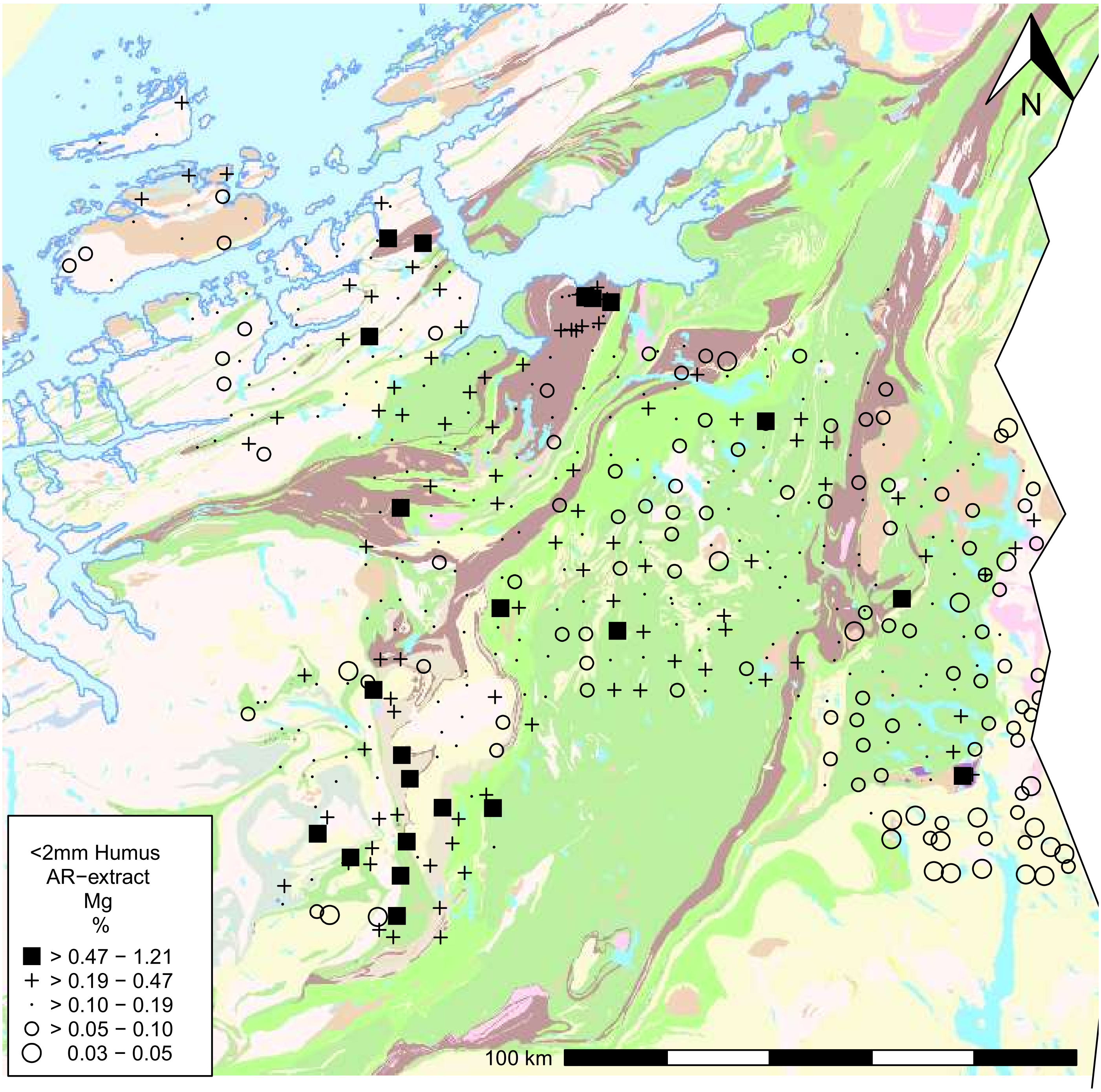
N
<2mm Humus
AR−extract
Hf
[mg/kg]
> 0.078 − 0.478
> 0.033 − 0.078
> 0.011 − 0.033
> 0.003 − 0.011
0.001 − 0.003
100 km

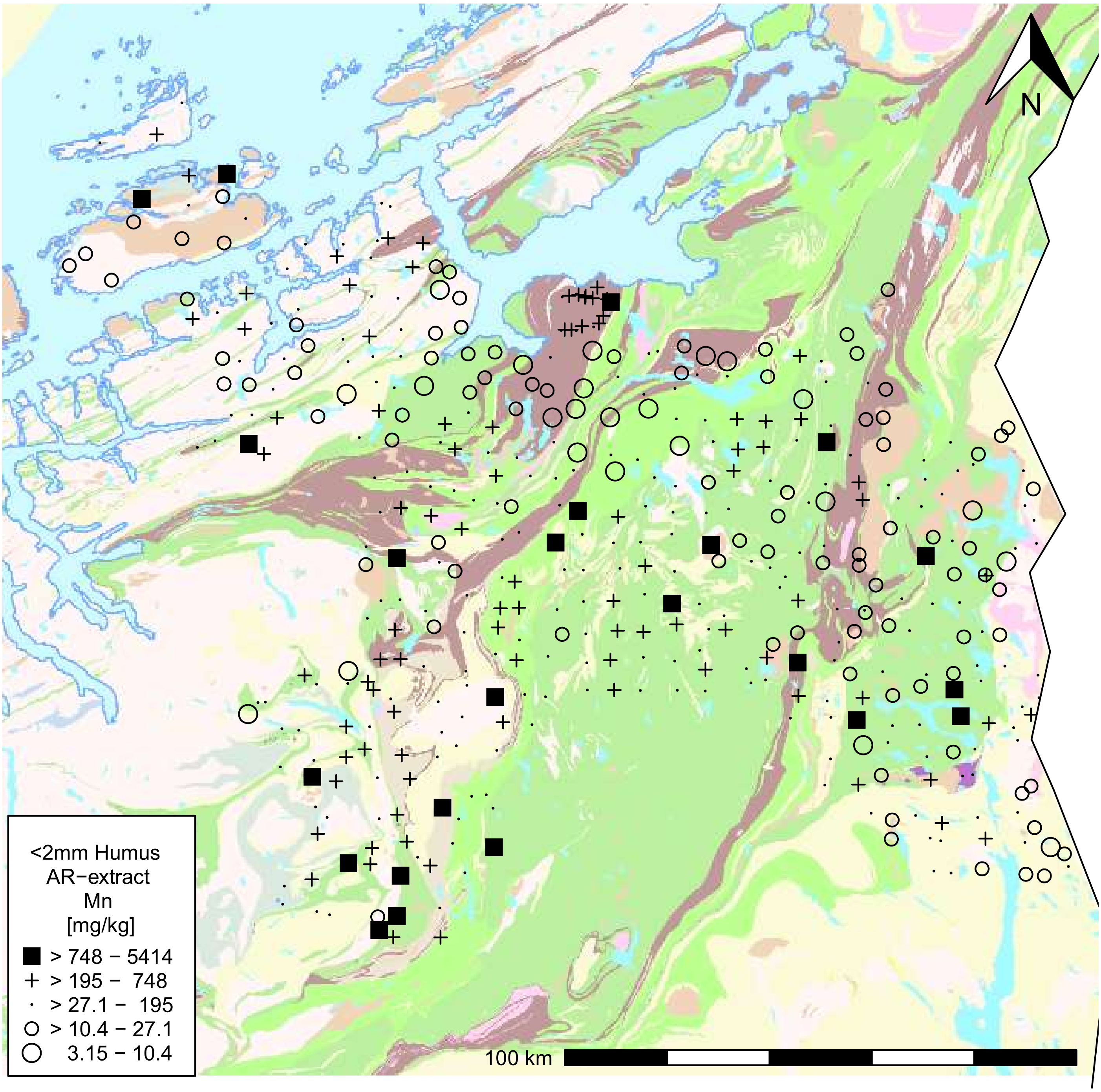

N
<2mm Humus
AR−extract
Hg
[mg/kg]
> 0.32 − 0.49
> 0.24 − 0.32
> 0.15 − 0.24
> 0.09 − 0.15
0.03 − 0.09
100 km

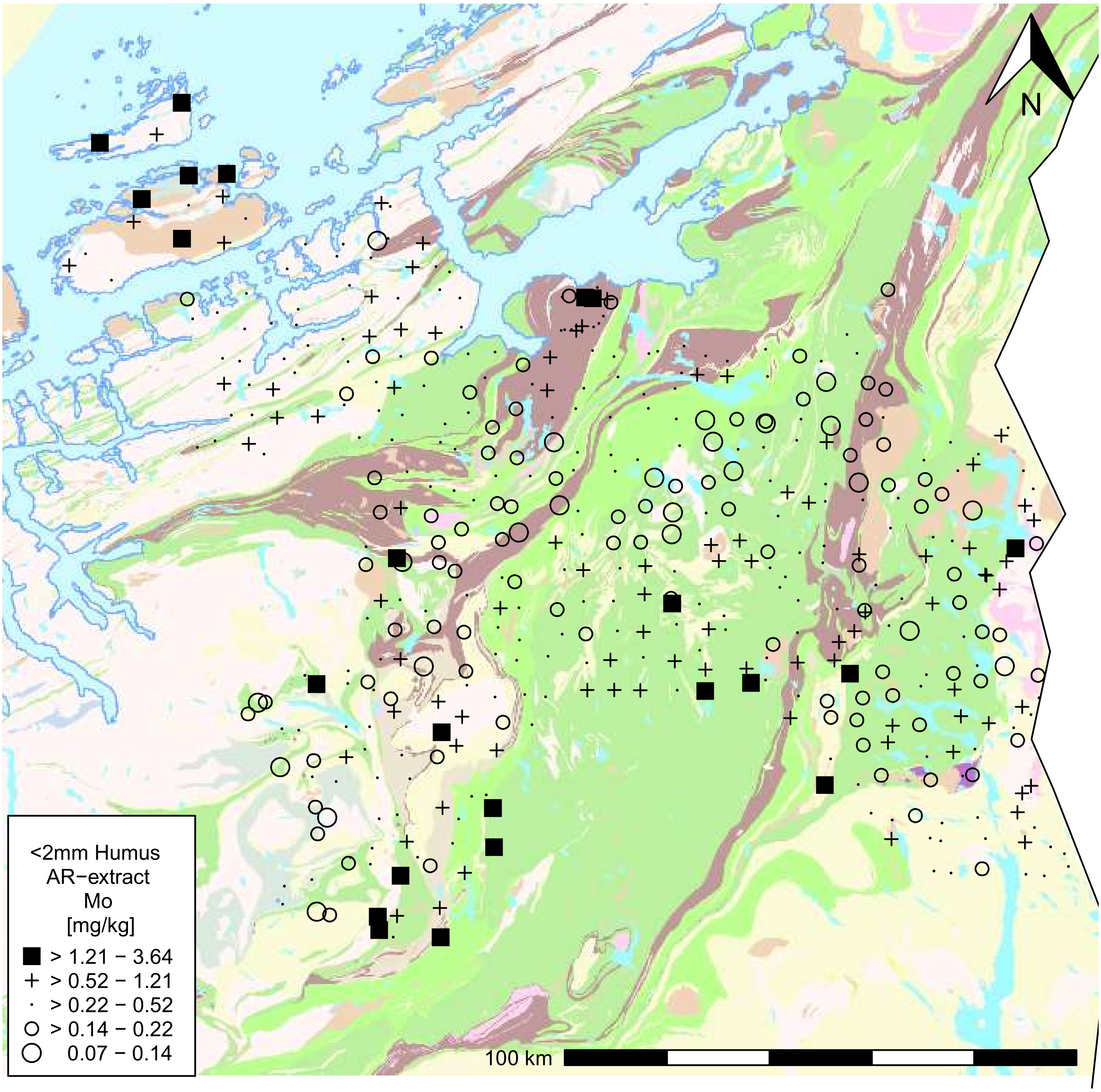

N
<2mm Humus
AR−extract
K
[mg/kg]
> 1563 − 5194
> 1108 − 1563
> 714 − 1108
> 449 − 714
217 − 449
100 km

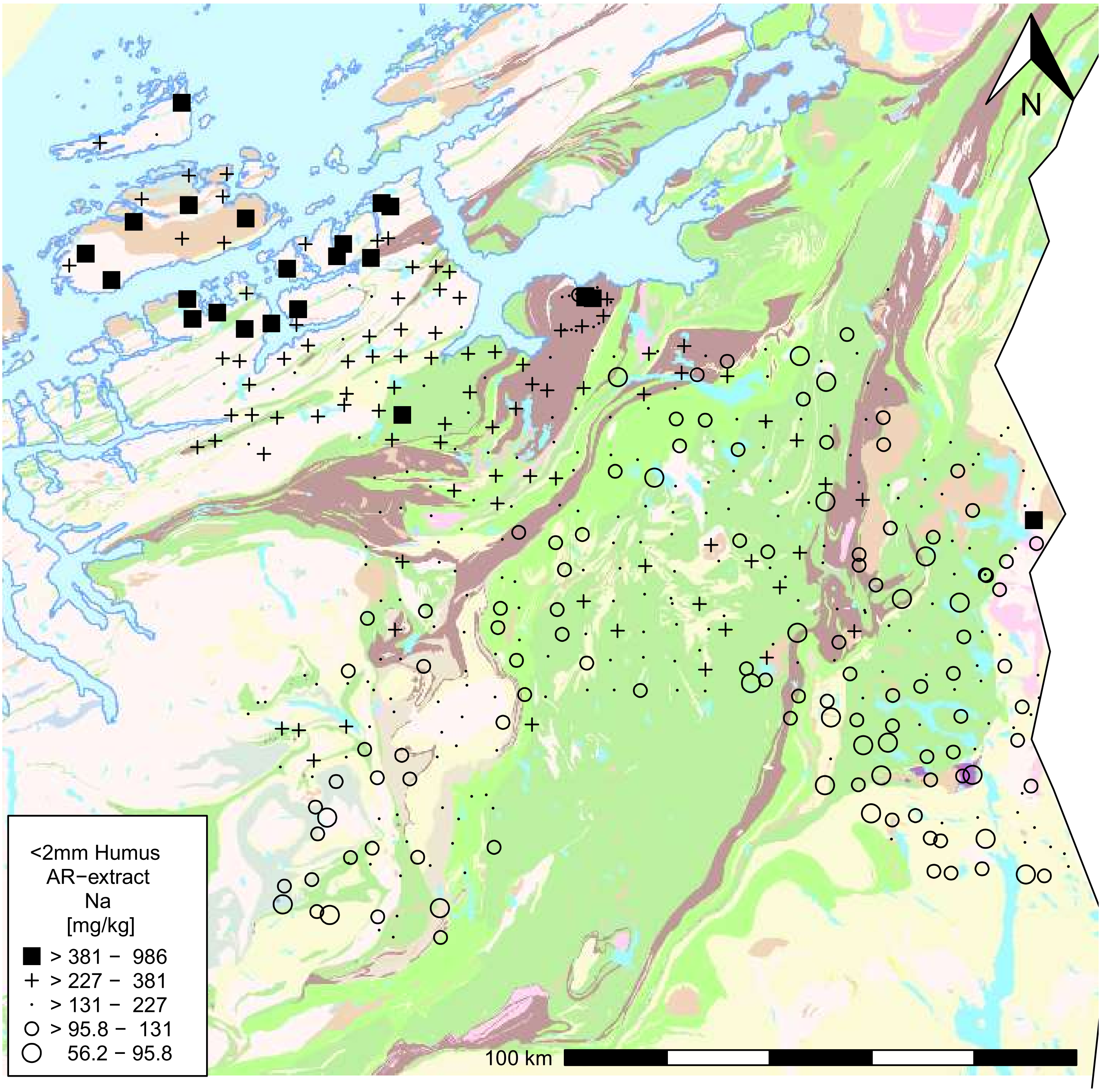

N
<2mm Humus
AR−extract
La
[mg/kg]
> 18.4 − 129
> 6.32 − 18.4
> 0.89 − 6.32
> 0.35 − 0.89
0.17 − 0.35
100 km

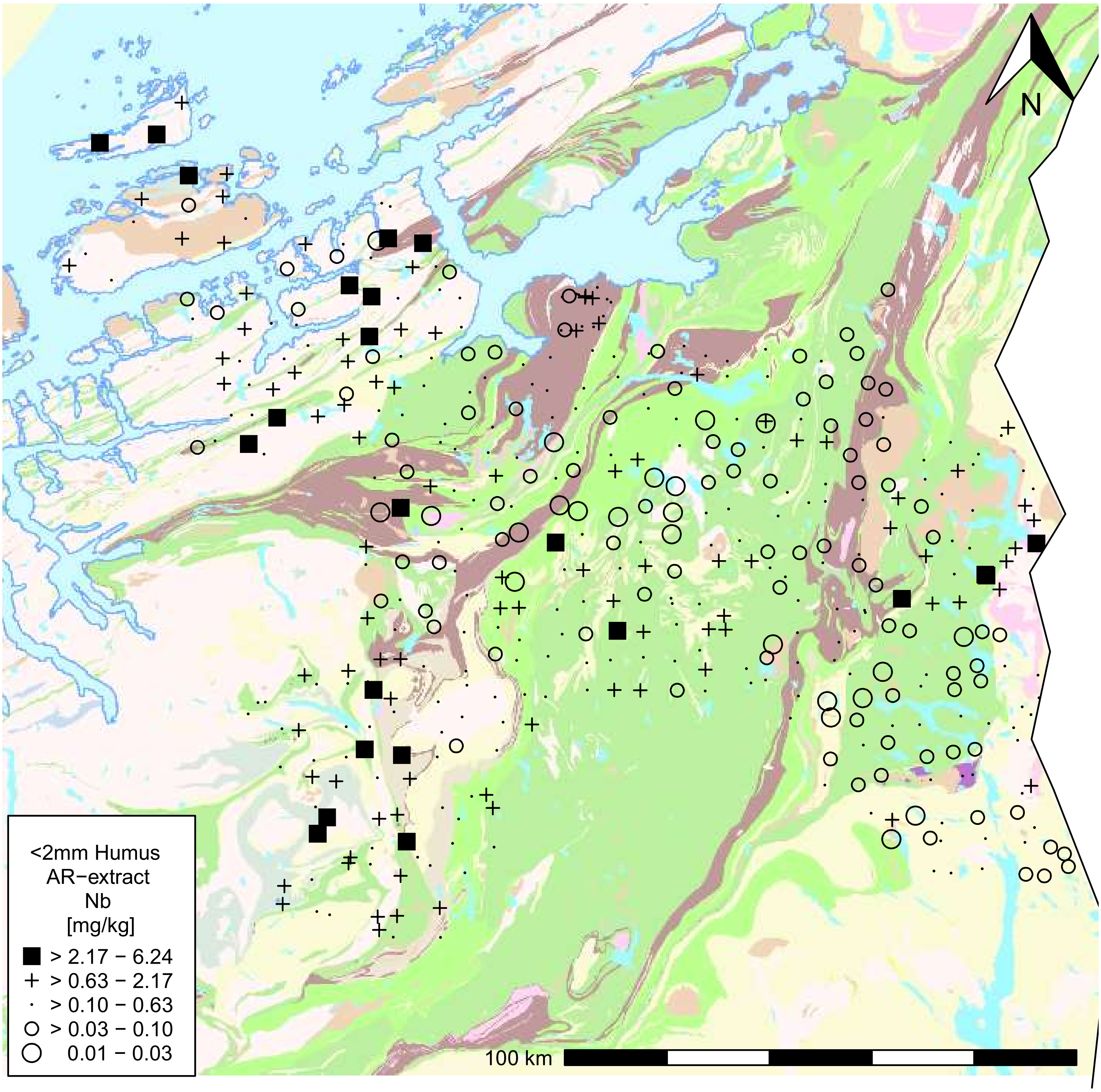

N
<2mm Humus
AR−extract
Li
[mg/kg]
> 8.36 − 28.2
> 1.22 − 8.36
> 0.13 − 1.22
> 0.07 − 0.13
0.02 − 0.07
100 km

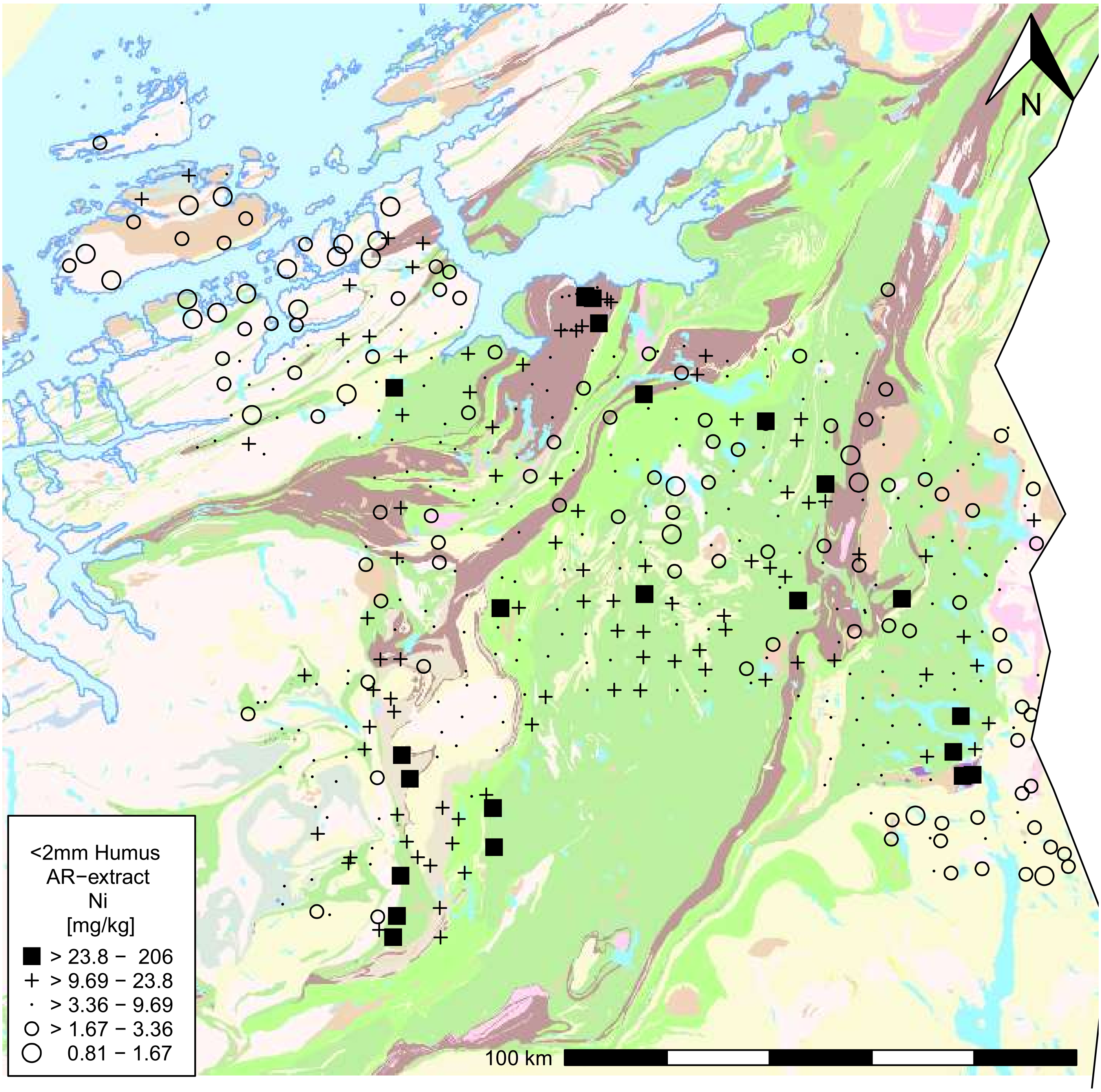

N
<2mm Humus
AR−extract
Mg
%
> 0.47 − 1.21
> 0.19 − 0.47
> 0.10 − 0.19
> 0.05 − 0.10
0.03 − 0.05
100 km

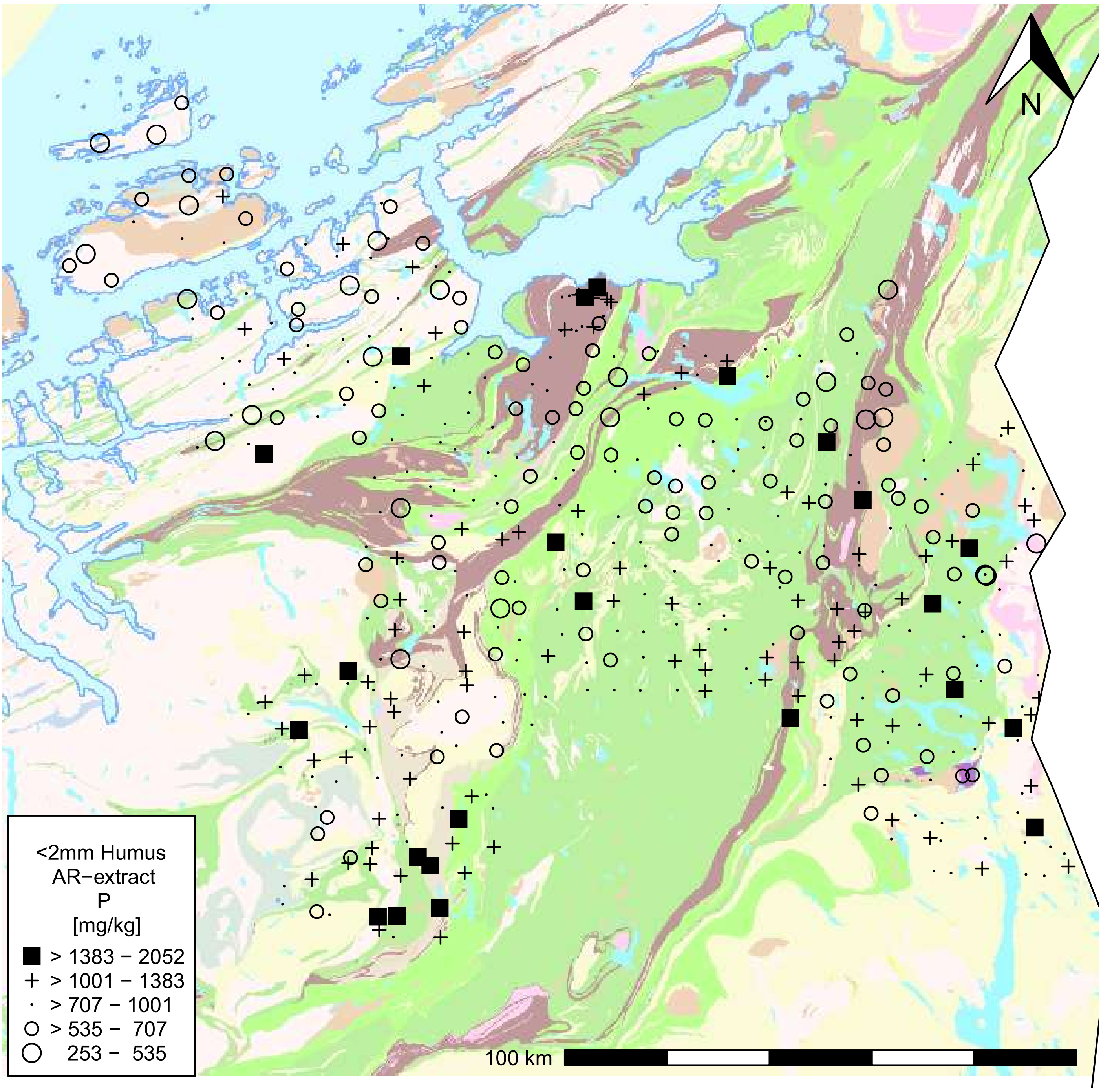

N
<2mm Humus
AR−extract
Mn
[mg/kg]
> 748 − 5414
> 195 − 748
> 27.1 − 195
> 10.4 − 27.1
3.15 − 10.4
100 km

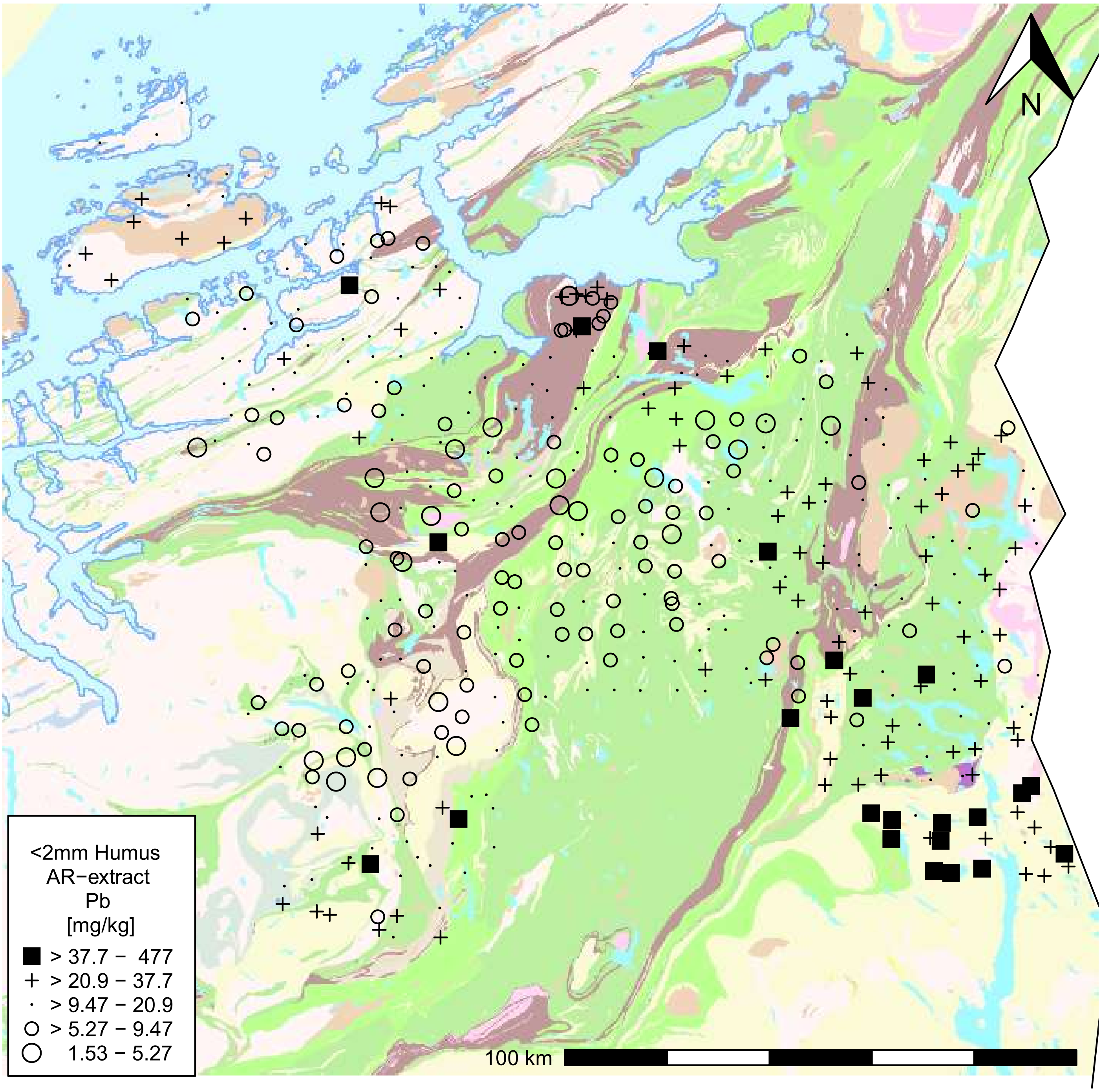

N
<2mm Humus
AR−extract
Mo
[mg/kg]
> 1.21 − 3.64
> 0.52 − 1.21
> 0.22 − 0.52
> 0.14 − 0.22
0.07 − 0.14
100 km

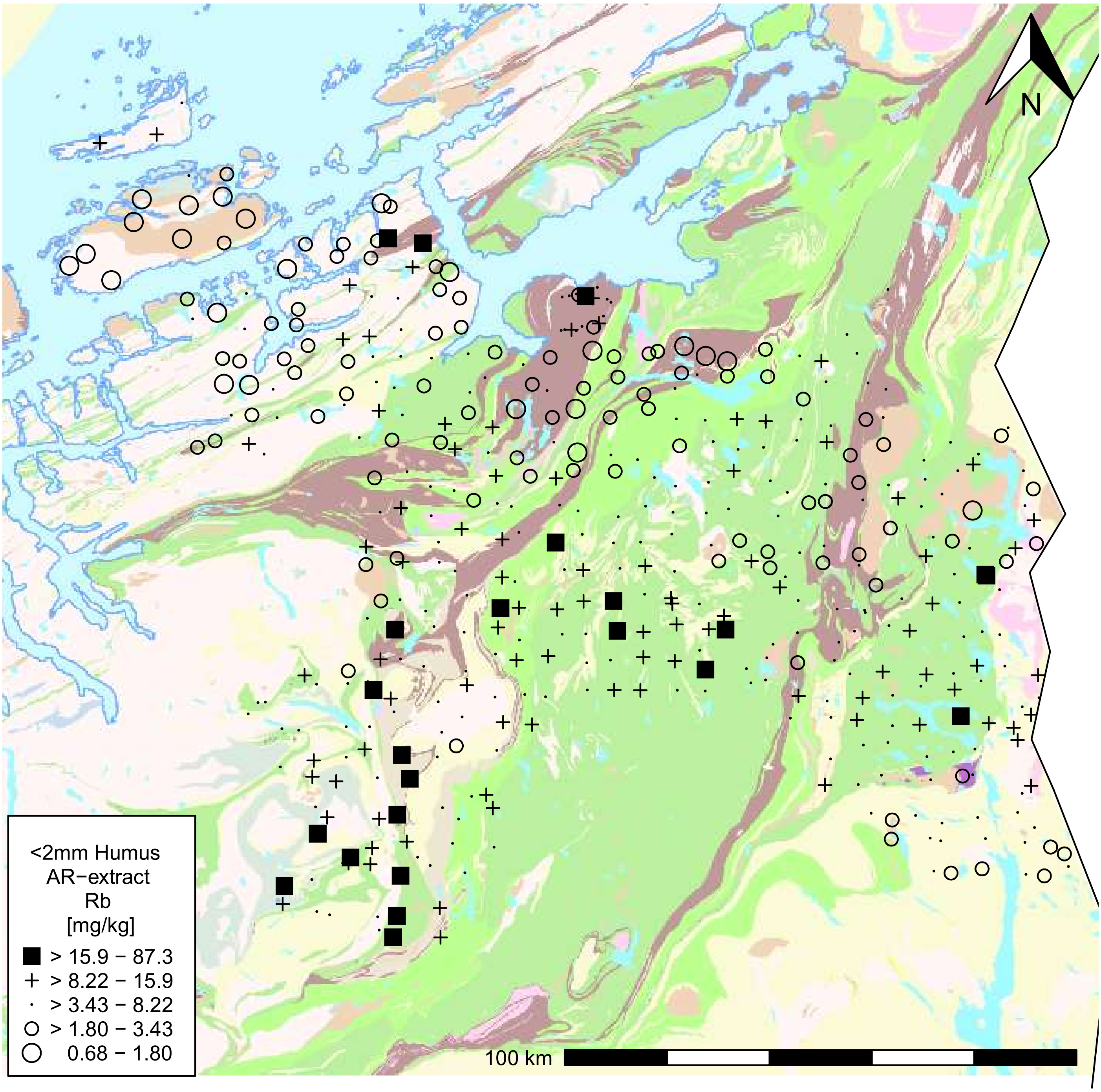

N
<2mm Humus
AR−extract
Na
[mg/kg]
> 381 − 986
> 227 − 381
> 131 − 227
> 95.8 − 131
56.2 − 95.8
100 km


N
<2mm Humus
AR−extract
Nb
[mg/kg]
> 2.17 − 6.24
> 0.63 − 2.17
> 0.10 − 0.63
> 0.03 − 0.10
0.01 − 0.03
100 km

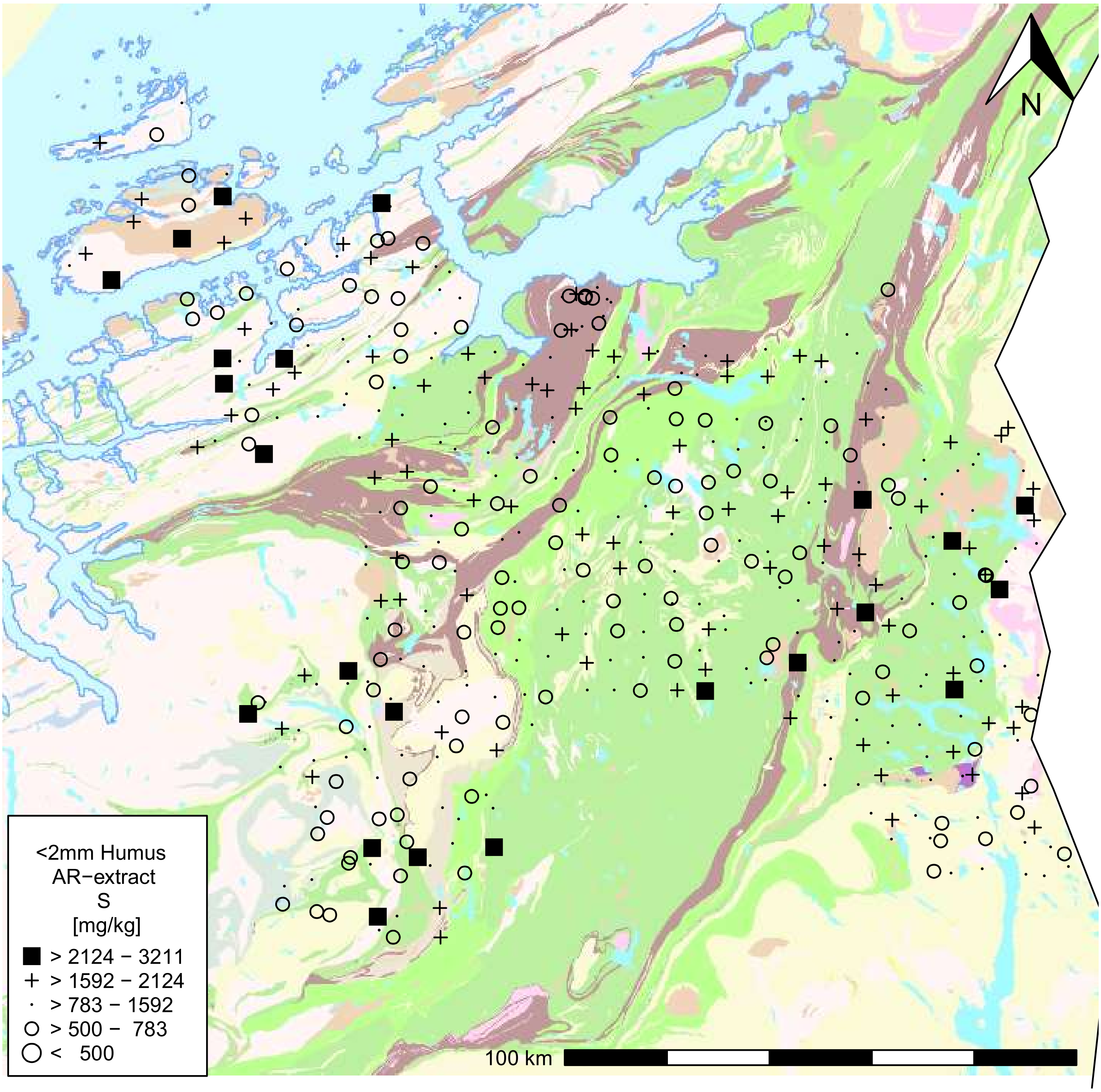

N
<2mm Humus
AR−extract
Ni
[mg/kg]
> 23.8 − 206
> 9.69 − 23.8
> 3.36 − 9.69
> 1.67 − 3.36
0.81 − 1.67
100 km


N
<2mm Humus
AR−extract
P
[mg/kg]
> 1383 − 2052
> 1001 − 1383
> 707 − 1001
> 535 − 707
253 − 535
100 km

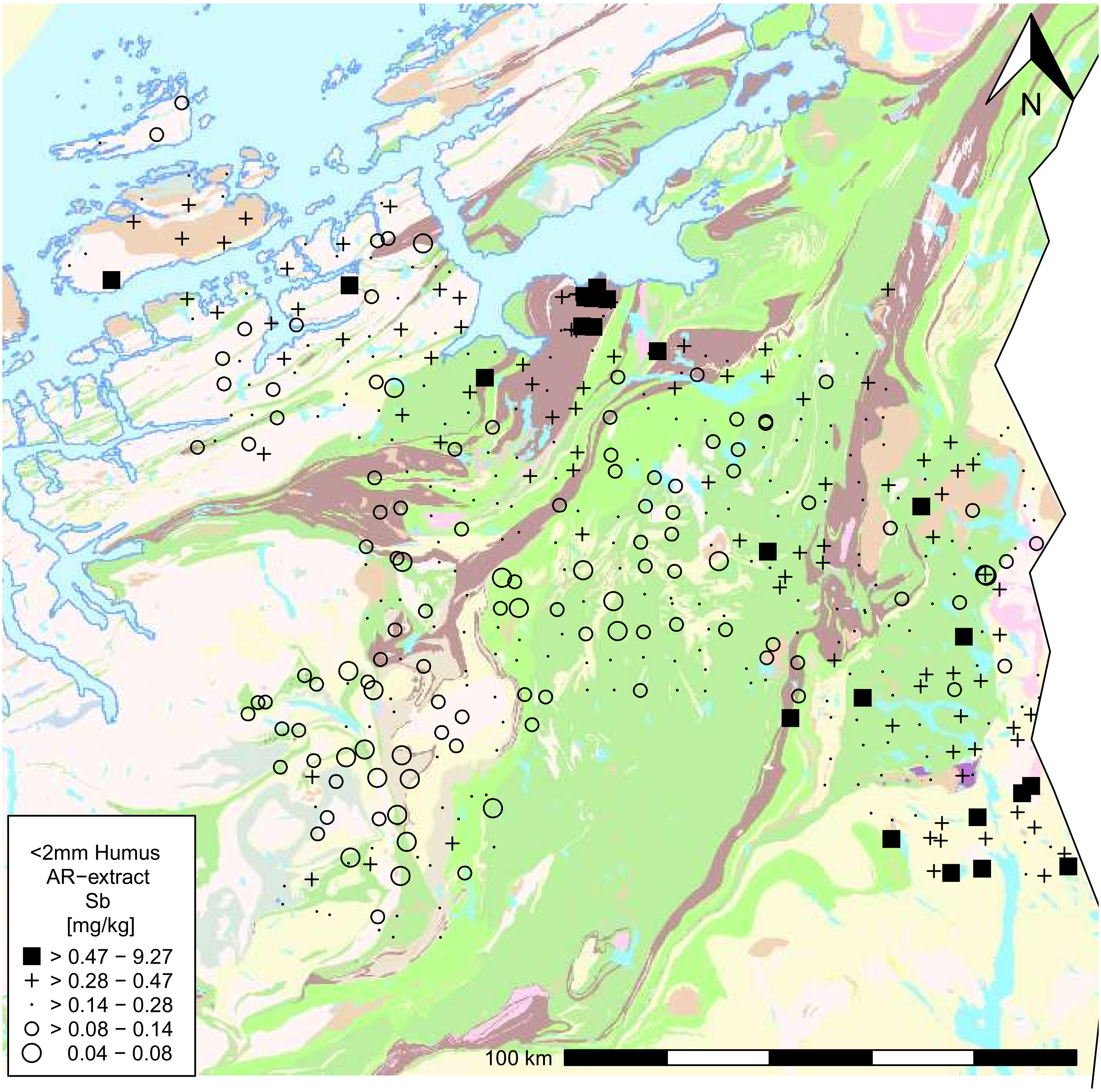

N
<2mm Humus
AR−extract
Pb
[mg/kg]
> 37.7 − 477
> 20.9 − 37.7
> 9.47 − 20.9
> 5.27 − 9.47
1.53 − 5.27
100 km

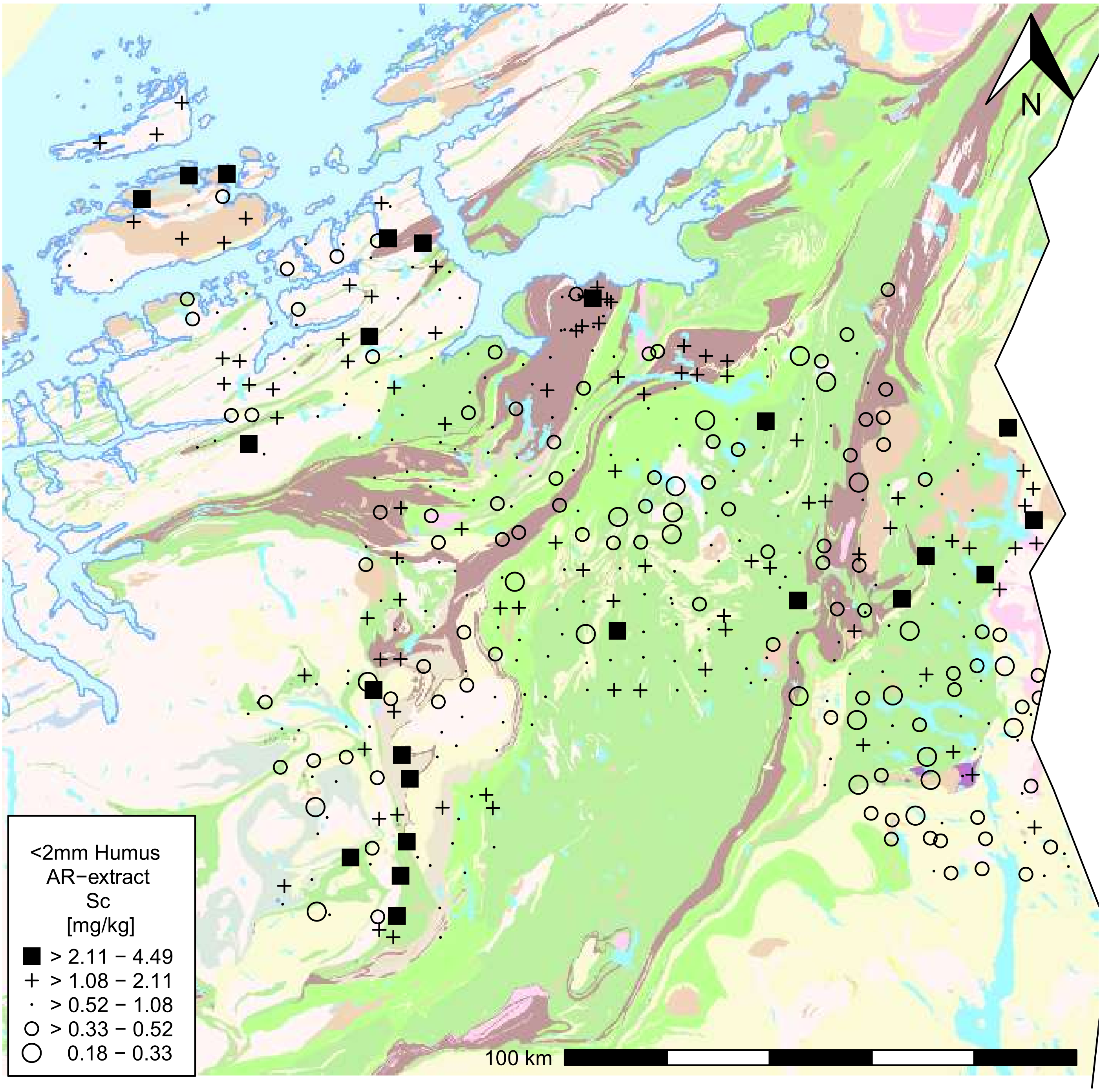


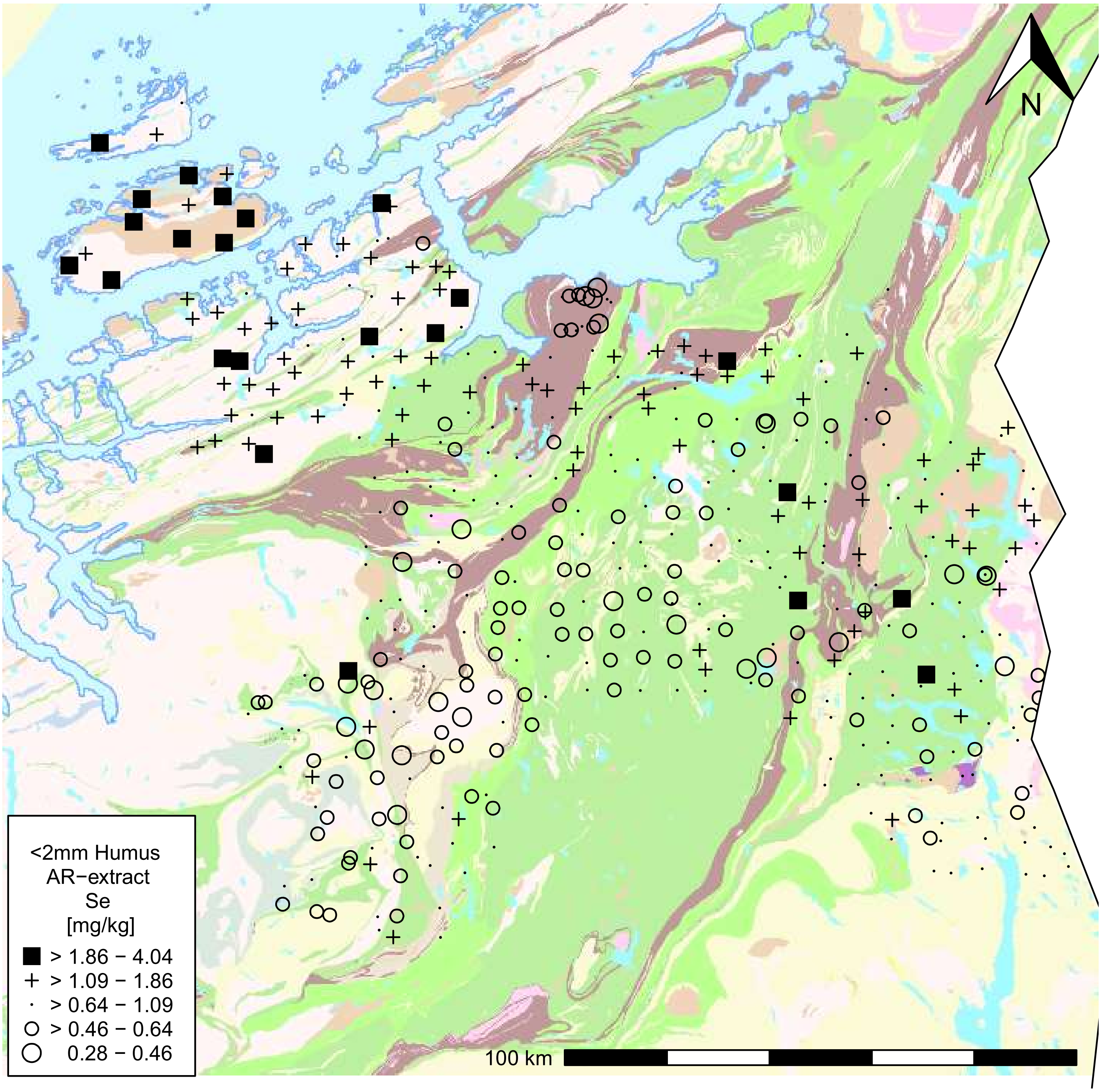
N
<2mm Humus
AR−extract
Rb
[mg/kg]
> 15.9 − 87.3
> 8.22 − 15.9
> 3.43 − 8.22
> 1.80 − 3.43
0.68 − 1.80
100 km

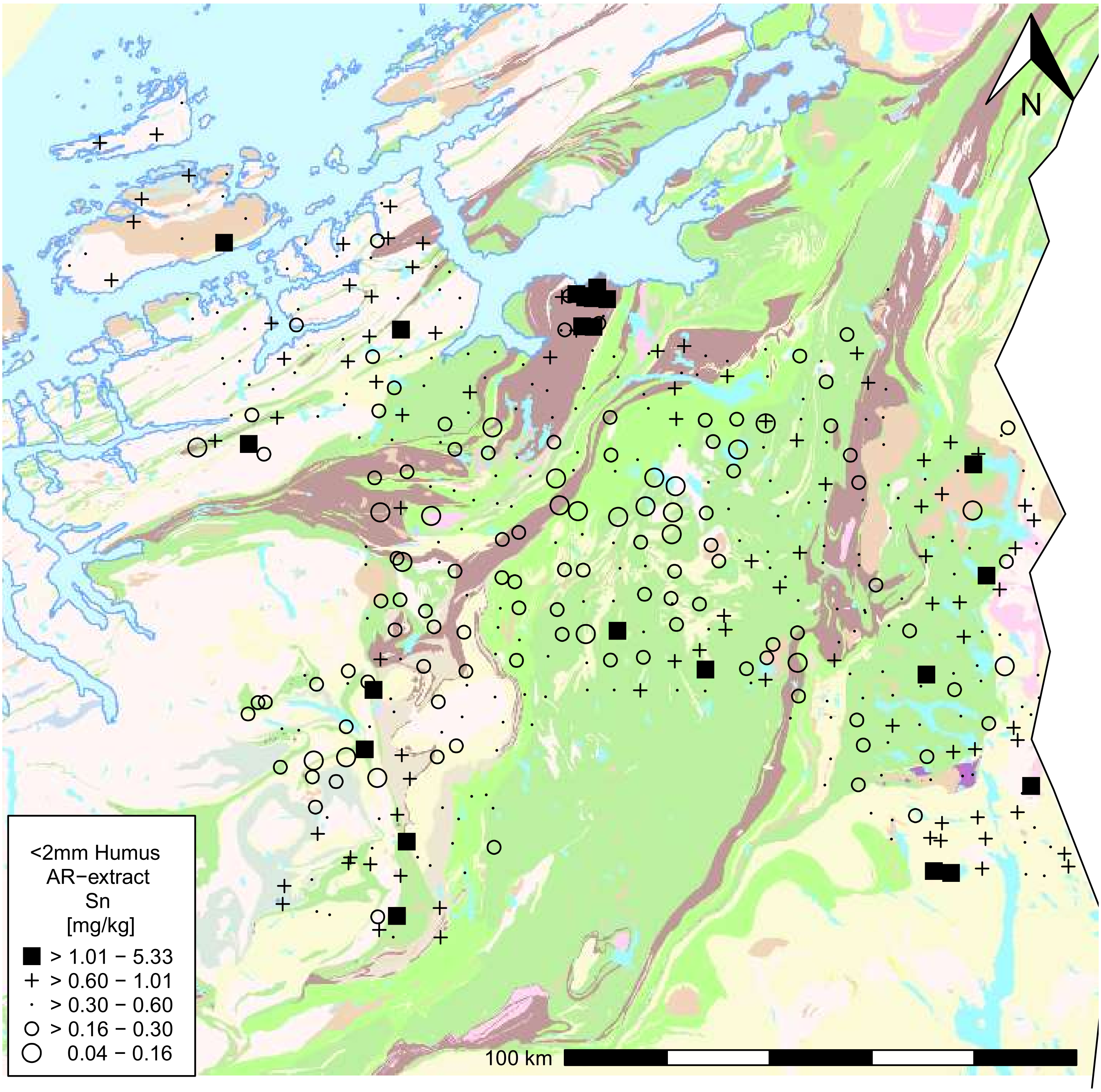


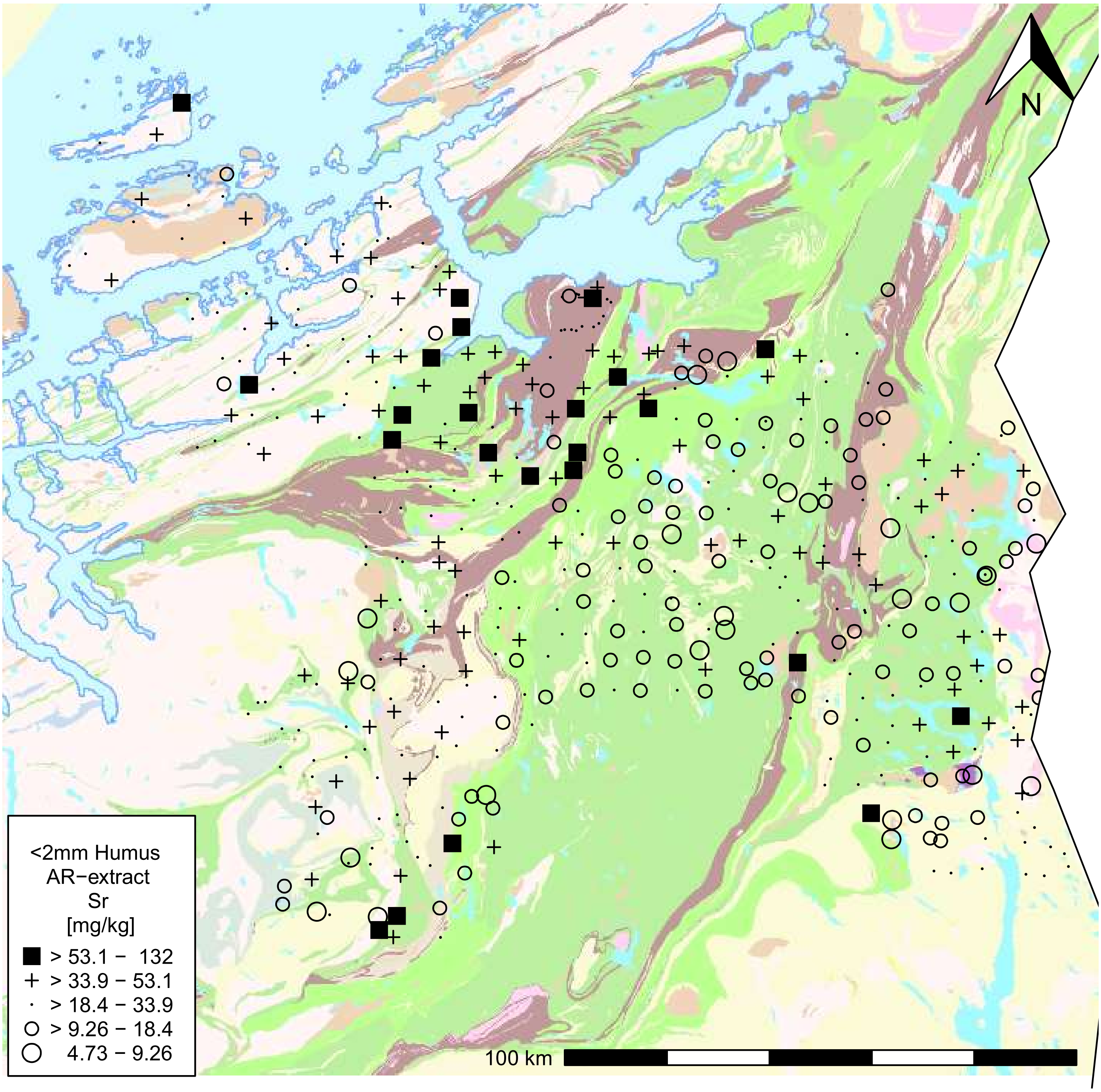
N
<2mm Humus
AR−extract
S
[mg/kg]
> 2124 − 3211
> 1592 − 2124
> 783 − 1592
> 500 − 783
< 500
100 km

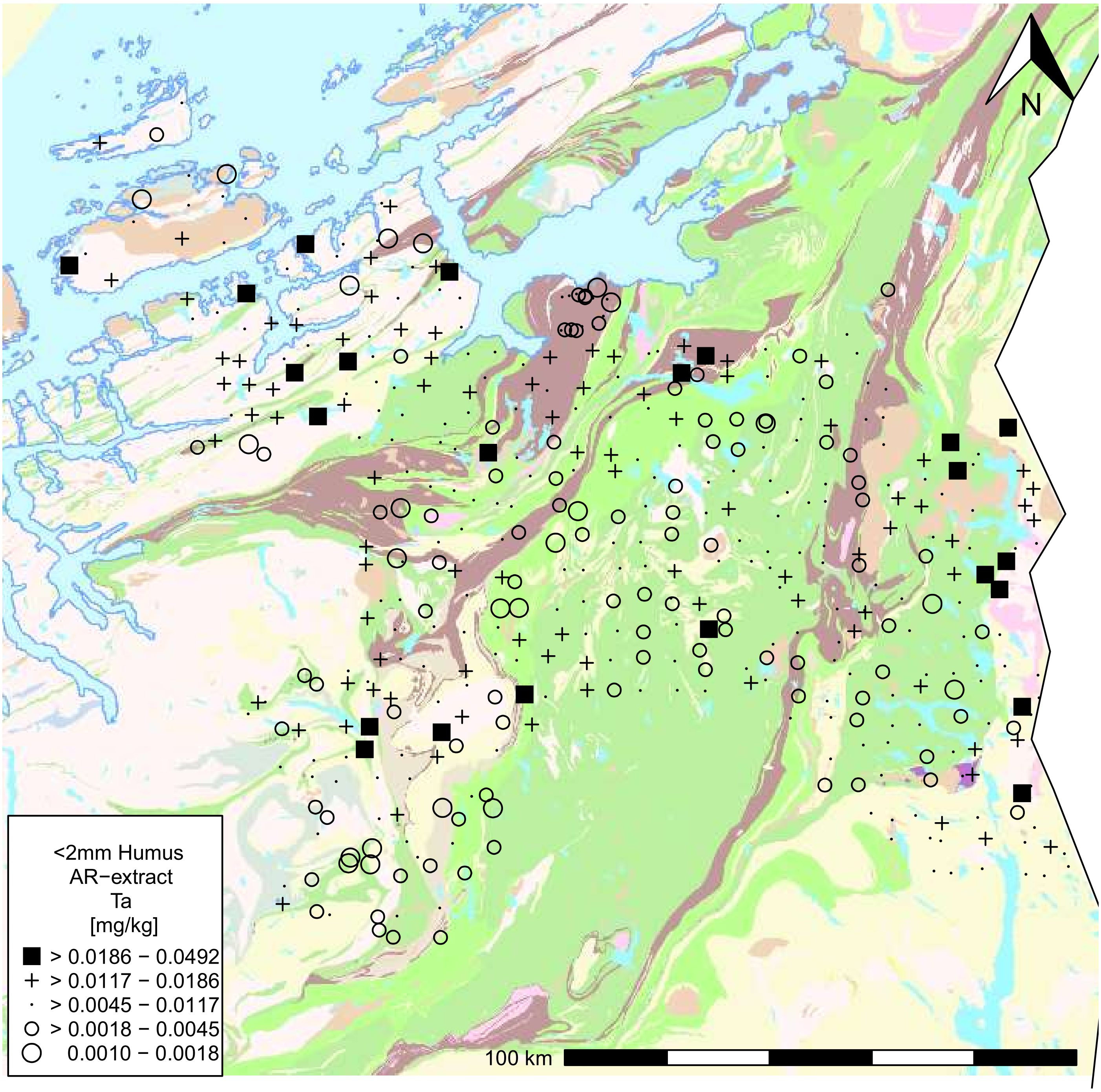

N
<2mm Humus
AR−extract
Sb
[mg/kg]
> 0.47 − 9.27
> 0.28 − 0.47
> 0.14 − 0.28
> 0.08 − 0.14
0.04 − 0.08
100 km

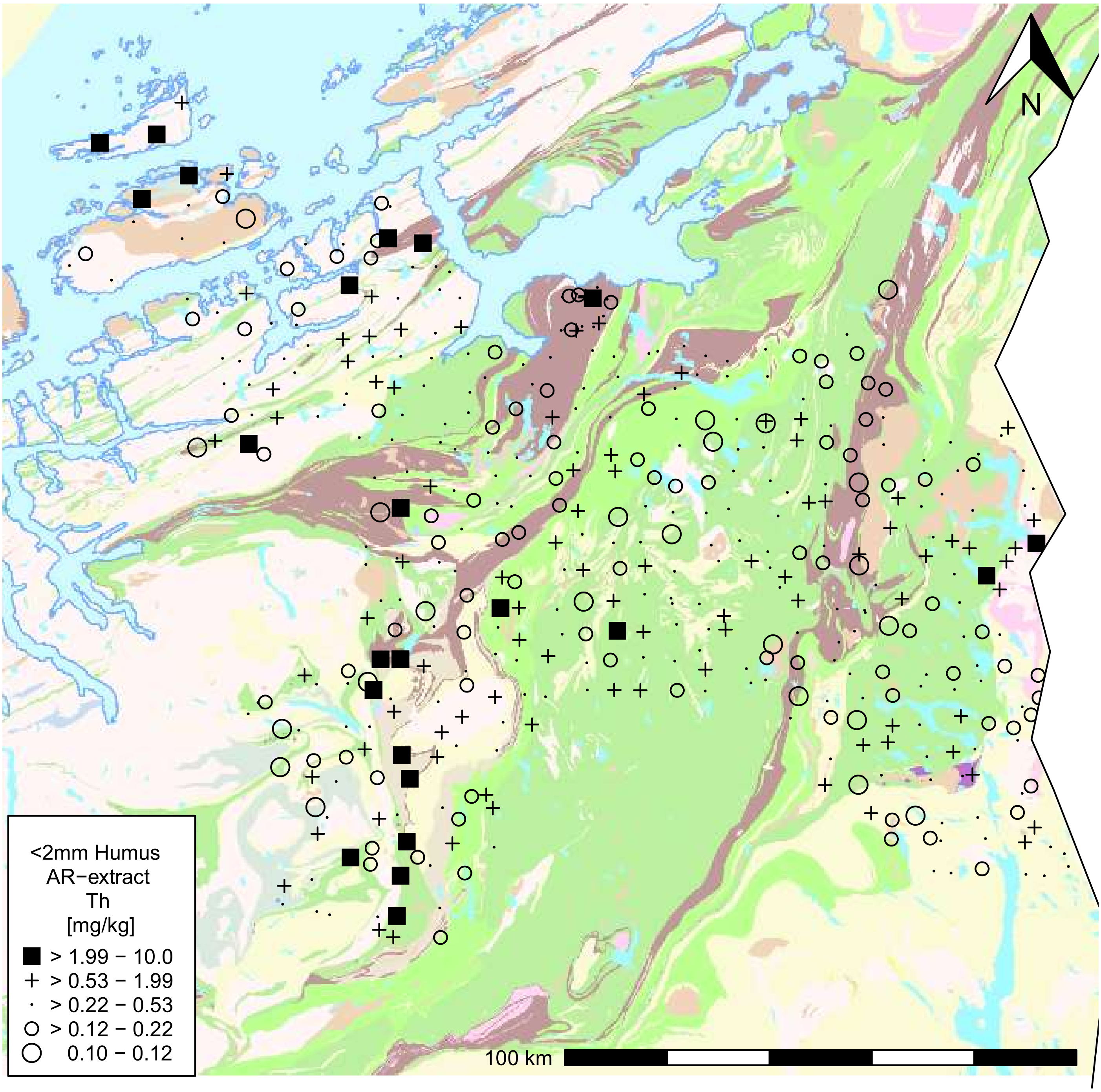

N
<2mm Humus
AR−extract
Sc
[mg/kg]
> 2.11 − 4.49
> 1.08 − 2.11
> 0.52 − 1.08
> 0.33 − 0.52
0.18 − 0.33
100 km

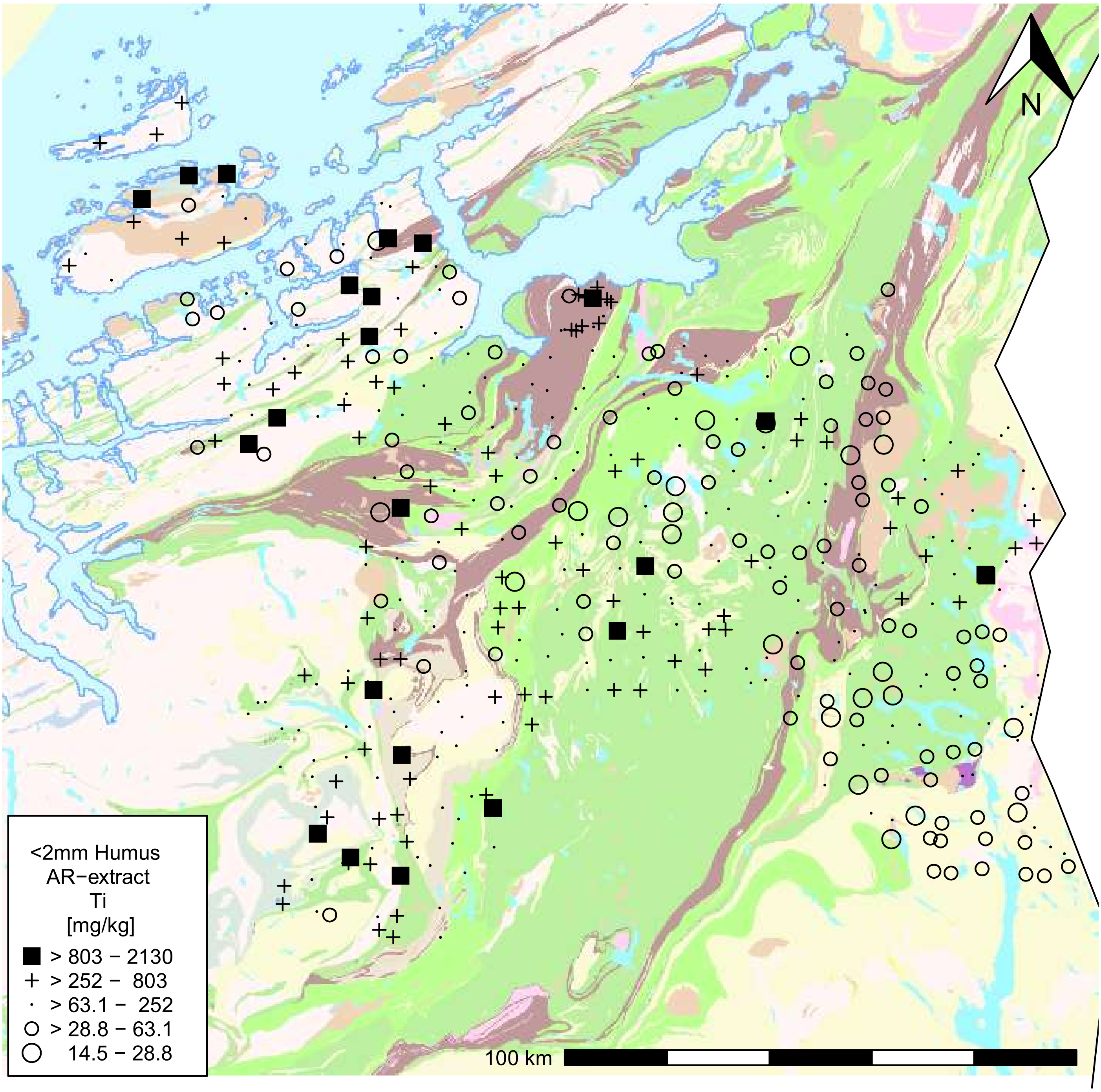

<2mm Humus
AR−extract
Se
[mg/kg]
> 1.86 − 4.04
> 1.09 − 1.86
> 0.64 − 1.09
> 0.46 − 0.64
0.28 − 0.46
100 km
N

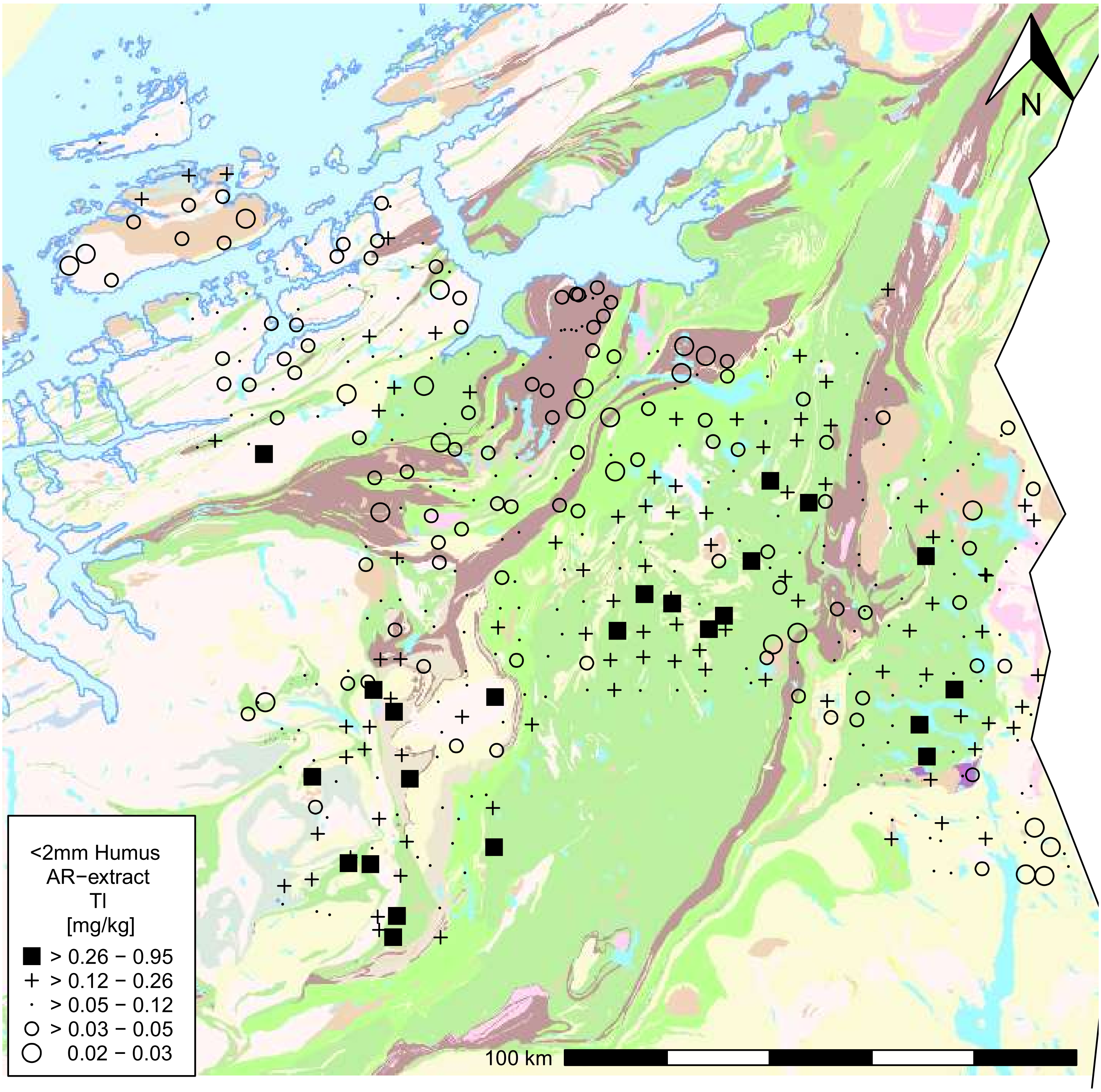

N
<2mm Humus
AR−extract
Sn
[mg/kg]
> 1.01 − 5.33
> 0.60 − 1.01
> 0.30 − 0.60
> 0.16 − 0.30
0.04 − 0.16
100 km

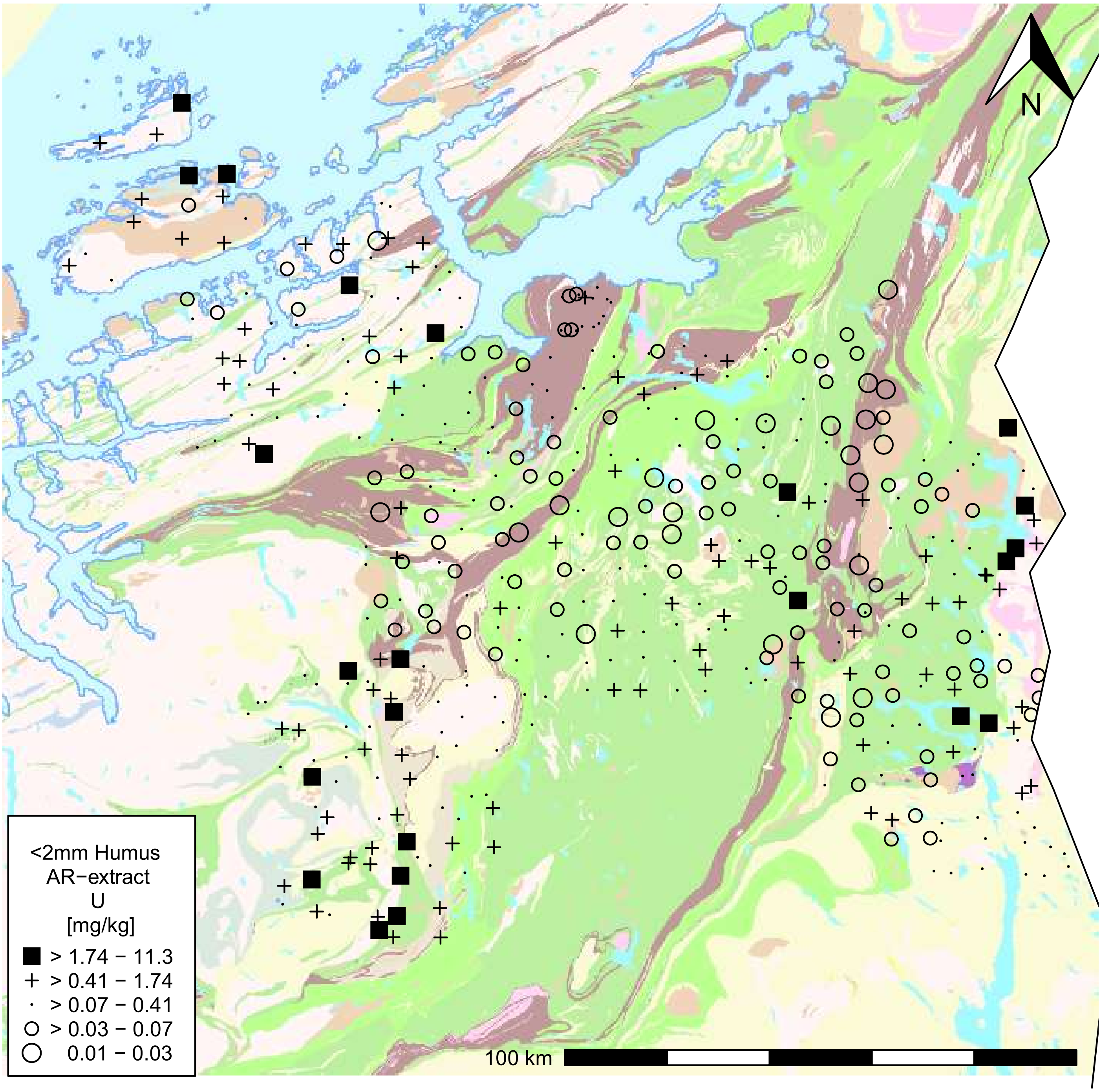

N
<2mm Humus
AR−extract
Sr
[mg/kg]
> 53.1 − 132
> 33.9 − 53.1
> 18.4 − 33.9
> 9.26 − 18.4
4.73 − 9.26
100 km

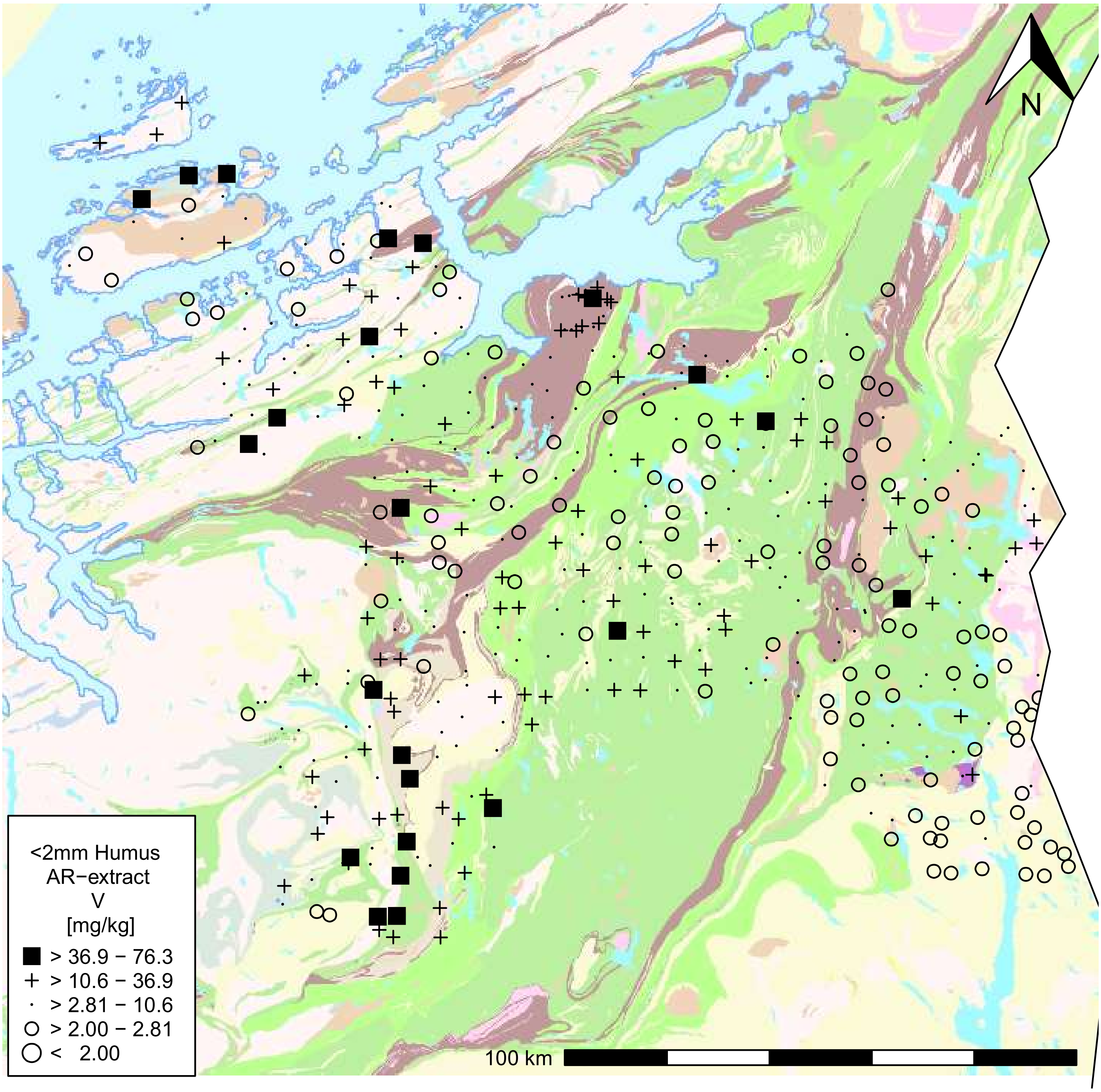

N
<2mm Humus
AR−extract
Ta
[mg/kg]
> 0.0186 − 0.0492
> 0.0117 − 0.0186
> 0.0045 − 0.0117
> 0.0018 − 0.0045
0.0010 − 0.0018
100 km

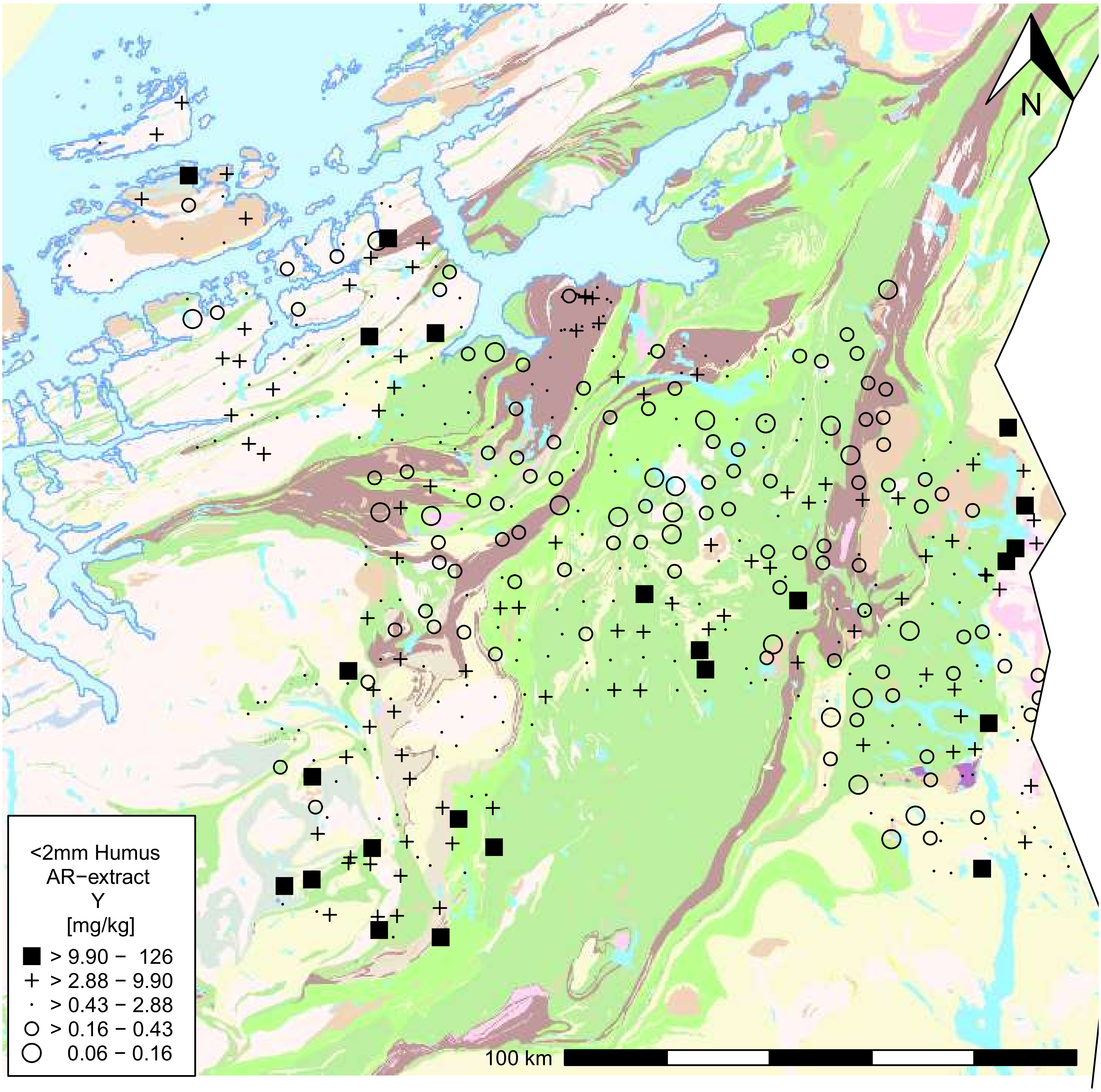

N
<2mm Humus
AR−extract
Th
[mg/kg]
> 1.99 − 10.0
> 0.53 − 1.99
> 0.22 − 0.53
> 0.12 − 0.22
0.10 − 0.12
100 km

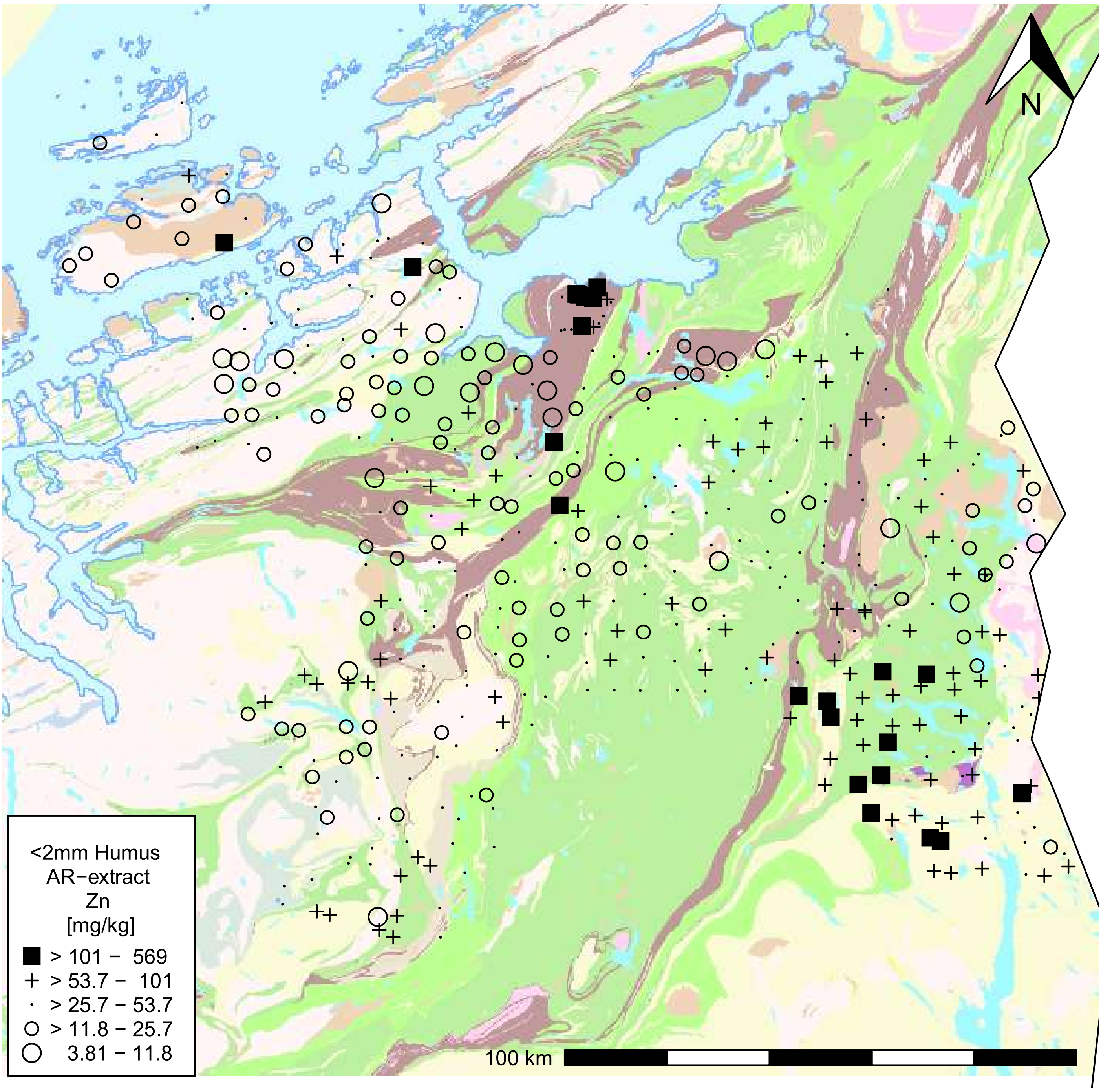

N
<2mm Humus
AR−extract
Ti
[mg/kg]
> 803 − 2130
> 252 − 803
> 63.1 − 252
> 28.8 − 63.1
14.5 − 28.8
100 km


N
<2mm Humus
AR−extract
Tl
[mg/kg]
> 0.26 − 0.95
> 0.12 − 0.26
> 0.05 − 0.12
> 0.03 − 0.05
0.02 − 0.03
100 km

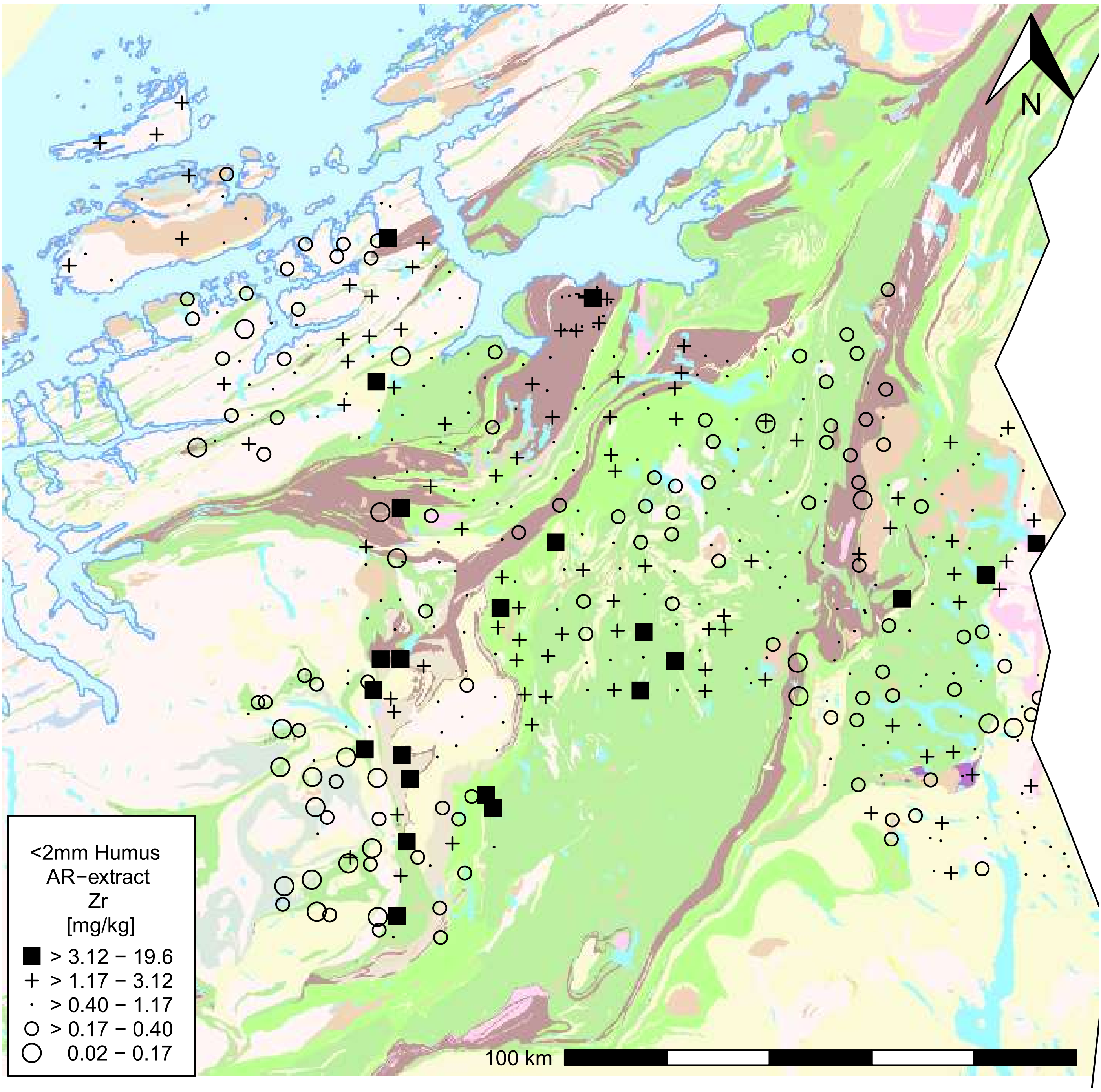

N
<2mm Humus
AR−extract
U
[mg/kg]
> 1.74 − 11.3
> 0.41 − 1.74
> 0.07 − 0.41
> 0.03 − 0.07
0.01 − 0.03
100 km


N
<2mm Humus
AR−extract
V
[mg/kg]
> 36.9 − 76.3
> 10.6 − 36.9
> 2.81 − 10.6
> 2.00 − 2.81
< 2.00
100 km


N
<2mm Humus
AR−extract
Y
[mg/kg]
> 9.90 − 126
> 2.88 − 9.90
> 0.43 − 2.88
> 0.16 − 0.43
0.06 − 0.16
100 km



N
<2mm Humus
AR−extract
Zn
[mg/kg]
> 101 − 569
> 53.7 − 101
> 25.7 − 53.7
> 11.8 − 25.7
3.81 − 11.8
100 km


N
<2mm Humus
AR−extract
Zr
[mg/kg]
> 3.12 − 19.6
> 1.17 − 3.12
> 0.40 − 1.17
> 0.17 − 0.40
0.02 − 0.17
100 km

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