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New geochemical data from a collection of till samples from Nordland, Troms and Finnmark

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REPORT

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Title:
New geochemical data from a collection of till samples from Nordland, Troms and Finnmark

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Summary:
For the whole area covered by the MINN project there exist collections of mineral soil (till) samples that were originally collected during the early to mid 1980s at an average density of 1 site/50 km^2 for the Nordkalott and Nordland-Troms projects. These samples were stored at NGU for 25-30 years. It was decided that it would be justified to retrieve remaining material from the sample store and test what kind of results can be found when re-analysing these samples using modern techniques. It was possible to retrieve 1144 small samples from Finnmark that were already sieved to <0.063 mm. For Nordland-Troms sieved material was no longer available. However, 979 original and untouched samples weighing 2 – 7 kg each could be retrieved from the NGU sample store. It was considered too time consuming to sieve these samples to <0.063 mm. In addition, several projects during the last 15 years had, with advantage, used the <2 mm fraction. It was thus decided to sieve these samples to <2 mm prior to analysis. When preparing all the samples for analysis they were randomised and standard samples and sample duplicates were introduced at a rate of one in twenty for quality control (QC) purposes. Based on previous good experience, analyses were carried out in a commercial laboratory in Canada (ACME) using an aqua regia extraction. For the Finnmark samples 7.5 g of sample were used for the extraction, for the coarser Nordland-Troms samples 15 g of sample were used for the extraction. The extracts were finished on a combination of ICP-MS and ICP-AES and concentrations for 65 elements were reported.
Results for re-analyses of 1144 till samples of the <0.063mm fraction (Finnmark) and 979 till samples of the <2 mm fraction (Nordland-Troms) are surprisingly comparable in terms of median concentration and variation and one can conclude that it is sufficient to use the <2 mm fraction.
Geochemical maps for all elements are provided in this report and the datasets are attached. QC indicates that, of the total of 65 elements, the maps for 12 should be viewed with care: Au, B, Be, Ge, Hf, Hg, In, Pd, Pt, Re, Se, Ta and Te. For these elements further improvements (lower detection limits) would be desirable. However, even for these elements, anomalies in the maps will be quite reliable, especially when more than one sample in any one area has returned high values. In general, the maps reveal a substantial number of multi-element anomalies, some indicating known mineral occurrences or mineral provinces, others indicating new areas that have so far not been considered as targets for mineral exploration. Due to the still low density of the samples, targeted follow-up surveys at a higher sample density appear justified in several areas. It can be concluded that the re-analysis of stored samples with modern techniques delivered important new knowledge for the survey area.

Keywords: Aqua Regia	Finnmark	Nordland-Troms
till	geochemistry	Geochemical mapping

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1. INTRODUCTION

The data presented in this report are based on recent chemical analyses of samples of surficial deposits (mainly C-horizon of till) collected by three NGU projects between 1980 and 1986. The sampling strategies and protocols were nearly identical throughout these three projects. The low areal density sampling was developed through the pioneering work of the geochemistry departments of the Norwegian, Finnish and Swedish geological surveys initiated in 1980 through the “Nordkalott Project” (Bølviken et.al., 1986). By the end of the Nordkalott project, coverage in the Norwegian part was incomplete compared to the initial plans (North of the Arctic Circle), and additional field work was carried out in 1985 to complete the coverage of Finnmark county. In 1986, with the financial support of the counties of Nordland and Troms, sampling of the remainder of the area that makes up North Norway was completed, and the immediate results were reported by Kjeldsen (1987), and Kjeldsen and Ottesen (1988). Following the different field campaigns, the samples were prepared in a similar manner, always including sieving a <63µm fraction. However, when funding for the “MINN” program was in place late 2010, the sample inventory turned out to be quite different for the three projects. Although some material was left for a vast majority of the samples, the only feasible sample collection from the two Finnmark projects was a series of small samples (1-50 g) of the <63µm fraction, whereas the Nordland and Troms collection consisted of large (2-7 kg) samples of unsieved material in addition to minute amounts of the <63µm fraction. Sieving sufficient material to <63µm from approximately 1000 samples was considered too time consuming, given the intention to present new geochemical data within the first year of the MINN project. A number of large scale geochemical projects producing good data from the <2mm fraction of surficial deposits (Reimann et.al 1996, Salminen et.al 2004, Salminen et.al 2005), so it was decided to go for the coarser fraction in the two southernmost counties of North Norway.

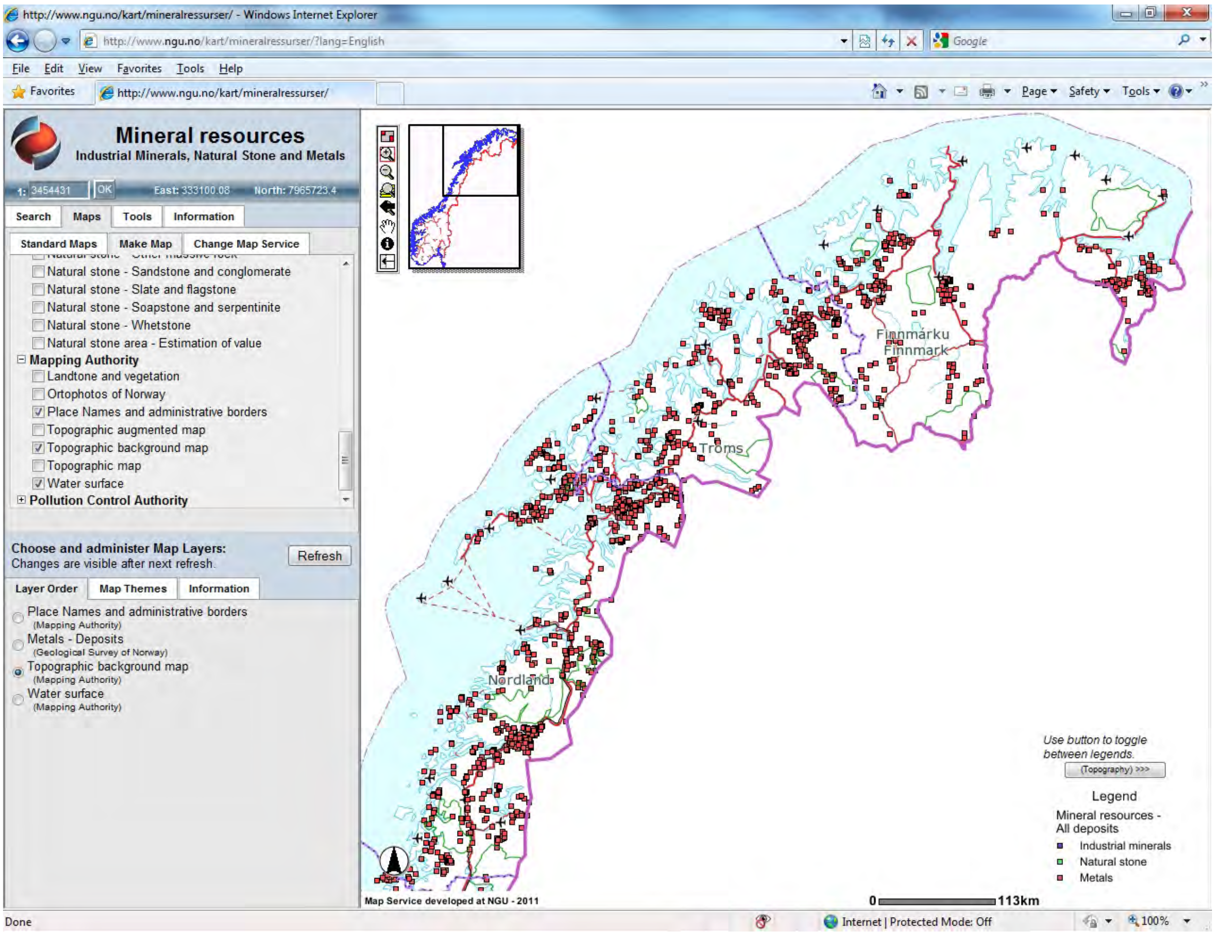

Figure 1. Map of the three counties of North Norway.
The red squares are locations of mineralizations according to NGU’s mineral resources database.

2. METHODS

A brief description of the initial fieldwork, and the recent activities on the around 30-year old samples is given below.

2.1 Field work

All three field campaigns followed the same procedures with regard to choice of sampling site locations and sampling techniques. The projects included collection of samples of a multitude of natural media, and for this reason, sampling sites were primarily chosen to accommodate the need for relatively uniform size drainage basins upstream of a stream water and sediment sampling point. When till (or other surficial material of presumably short transport history) was available, this material was collected. From the 1532 stations in Finnmark, a total of 1162 samples of till were collected. The number of stations in the Nordland-Troms project was 1303, from which 1053 till samples were collected.

Sample pits were dug by paint-free steel spade down to well below the B-horizon of the podzol profile most common in this region: samples were collected into cotton canvas bags using the spade or a smaller steel trowel. Field crews did not wear jewellery, or had it covered by gloves or tape while handling samples.

2.2 Sample preparation

Upon initial arrival at the NGU laboratories in the 1980s, samples were dried at temperatures below 40 °C, then split, and among other size fractions, a <63µm fraction was retained by dry sieving through nylon sieve cloth (Tyler 250mesh). Following the original projects' completion, all samples were stored at NGU's facilities at Løkken, either in their original canvas bags, or in HDPE vials.
After various earlier analytical activities, this was the only suitable collection of samples left from Finnmark, whereas the volumes of <63µm material from the Nordland-Troms area were too small to qualify for the analytical procedure chosen. The only other size fraction available from that area was large samples of unsieved material. Hence, during the winter of 2010/2011, (a split of) all samples were dry sieved to <2mm (9 mesh), again using nylon sieves, and no jewellery allowed during preparation work. Cross-contamination of the dusty samples was controlled by sieving samples one at a time in a vented box, and cleaning all tools in water in between every sample.

The number of ordinary samples in each of the two collections deviated slightly from the numbers mentioned above due to the lack of sufficient material in the old <63µm vials from Finnmark, or missing samples in the tons of samples from Nordland and Troms.

2.3 Analytical method

All samples were shipped to ACME laboratories in Vancouver, Canada. For the GEMAS project this laboratory had won the international tender for analysis in aqua regia extraction (Reimann et al., 2009). Because different amounts of material were available for the 2 sample sets, it was decided to base the analysis of the Finnmark samples (<0.063 mm) on 7.5 g sample material while for the Nordland-Troms samples (<2 mm) 15 g sample weight were used for the extraction. The sample weights of 7.5 (15) g of the sieved samples were digested in 45 (90) ml aqua regia and leached for one hour in a hot (95°C) water bath. After cooling, the solution was made up to a final volume of 150 (300) ml with 5% HCl. The sample weight to solution volume ratio is 1g per 20 ml. The solutions were analyzed using a Spectro Ciros Vision emission spectrometer (ICP-AES) and a Perkin Elmer Elan 6000/9000 inductively coupled plasma emission mass spectrometer (ICP-MS). Analytical results were returned within 14 days after receiving the samples.

2.4 Quality control

The samples were analysed in two different batches, first all Finnmark samples in one batch of ca. 1000 samples, and about one month later the Nordland-Troms samples in another batch of ca. 1000 samples. Prior to sending the samples to the laboratory all samples within each batch were randomized. A standard sample (NIDELV) was introduced at a rate of 1 in 20 among the samples. In addition, analytical duplicates were introduced at the same rate. Details of the QC procedure are provided in Reimann et al., 2009, where the authors used the same laboratory and analytical package as for the current project. Table 1 shows the analytical results for the standard NIDELV as hidden 49 and 53 times in the two batches. All in all, the results were satisfactory, Table 1 clearly identifies the "problematic" elements, where maps should be viewed with care: Au, B, Be, Ge, Hf, Hg, Pd, Pt, Re, S, Se, Ta and Te. In most cases the observed problems were due to the very low concentrations of these elements in the standard, i.e. analytical results at or below the limit of detection. However, the duplicate results reveal the same elements to have been plagued by poor reproducibility. The table also shows that although there are minor differences in the median value for the standard between the batches the results are still very comparable. The commonly slightly better precision for the standard hidden in the Nordland-Troms dataset is most likely due to the higher sample weight used for the extraction.

2.5 Data analysis

Geochemical data are compositional data (Aitchison, 1986; Filzmoser et al., 2009) and thus require special care during data analysis. Compositional data do not plot into the standard Euclidean room but rather on the Aitchison simplex. All statistical methods that are based on Euclidean distances (like calculating the mean and the standard deviation or calculating a correlation matrix) will thus return faulty results (Filzmoser et al., 2009, 2010). Thus here EDA (exploratory data analysis) techniques and simple order statistics as suggested by Reimann et al., (2008) are used.

3. RESULTS AND COMMENTS

3.1 Data tables

A statistical overview for both data sets is provided in Tables 2 and 3. The Tables are built around minimum, maximum and median value and provide the values for a number of additional quantiles (percentiles) of the distribution. When using (for the data at hand unsuited) classical statistical methods and calculating mean and standard deviation to derive at "thresholds" for anomalies in the case of a normal distribution 2.6% of all data will be identified as anomalies at both ends of the distribution – thus Q2 and Q98 (or Q5 and Q95) can be taken as lower and upper threshold for the data. However, quite often CP-Plots (see there) provide a better means of identifying anomalies in the data.
The "MAD" is the median absolute deviation (Reimann et al., 2008). For compositional data it should replace the standard deviation and is, as such, a measure of variation in the data. However, it is not allowed to calculate this measure for untransformed, "raw" data, they have to be either log-transformed (MAD.log) or, better still, "ilr" (isometric logratio, Egozcue et al., 2003) transformed (MAD.ilr) prior to the calculation. Unfortunately they cannot be back-transformed to the original data space because the log transformation changes the distances of the observations from the centre asymmetrically. The MAD.log (MAD.ilr) can thus not really replace the standard deviation. It rather informs about the stability of the part x on the remainder 1-x and small values indicate a high stability. As an additional measure of variation the "powers" are thus provided, they provide a direct impression of the orders of magnitude of variation for each variable.

Differences observed between the two data sets in terms of the central value (median) or variation (powers) can be due to the different grain size fraction analysed (one would expect higher central values for most metals in the finer fraction) or to differences in the predominant geology in the two survey areas.

3.2 Cumulative Probability (CP-) Plot

Plots of the cumulative distribution function are one of the most informative displays of geochemical distributions (Reimann et al., 2008). Here we have chosen to plot the cumulative distribution function for both, the Finnmark and the Nordland-Troms datasets, in just one graphic. It is thus possible to directly compare the two areas and the effect of the different grain-sizes used (Finnmark: <0.063 mm, Nordland-Troms: <2 mm). In the plots the concentration is plotted along the X-axis and the cumulative probability is plotted along the Y-axis. A CP-plot with a log-scale for the data is especially useful because it allows direct visual estimation of the median (50th percentile) or any other value from the x-axis or the percentage of samples falling below or above a certain threshold from the y-axis. It also allows the direct visual recognition of breaks in the curve which may be indicative of different geochemical processes. Breaks in the uppermost few percentiles of the distribution are often used as a threshold for anomaly identification.

As expected, the Finnmark data set based on the finer grain size fraction, shows higher analytical results for quite a number of elements; Al, Au, B, Cr, Cu, Hg, Nb, Pt, Ta and Zr are prominent examples. Variation is quite comparable for both datasets. In both datasets the same elements show detection limit problems (more than 5% of all data reported values below detection levels): Au, B, Be, Cd, Ge, Hf, Hg, In, Pd, Pt, Re, S, Sb, Se, Ta, Te, and W. Due to the finer grain size fraction analysed the proportion of samples “<DL” is usually smaller in the Finnmark data set.

3.3 Mapping

There exist many different methods for producing geochemical maps (see discussion in Reimann, 2005 or in Chapter 5 of Reimann et al., 2008). In mineral exploration so-called “growing dot maps” as introduced by Bjørklund and Gustavsson (1987) are probably most often used. However, they focus attention almost exclusively on the high values, the “anomalies” and are less well suited to study of the data in more detail, e.g., in relation to geology or to detect more local anomalies that may not be characterized by especially high values in relation to the whole dataset but rather display simply high values for their immediate surroundings.

To detect such, more subtle features in the dataset it has proved helpful to use classes and to base these classes on percentiles of the distribution. EDA has developed its own symbol set, which is based on 5 classes, and was developed to provide an even optical weight for the symbols associated with these classes in a map. Here the EDA symbol set, with accentuated outliers, was used (Reimann et al., 2008) and the symbols were plotted directly on geological maps. The percentiles for a change in the symbols are 2 – 25 – 75 – 98%. The lowest values (0-2 %) are marked by large open circles, the values from 2 – 25 % of the data by small open circles, the inner 50% of the dataset are marked by a dot, the values from 75 to 98% by a cross and all values above the 98th percentile by a black square that grows in proportion to the analytical result (in order to be able to detect the highest value in the maps). As all the maps are prepared on a backdrop of a simplified bedrock map (Koistinen et.al, 2001), the reader will note that for many elements the classes chosen are able to “depict” the geology more or less 1:1.

Because the data sets are provided with this report it is possible and up to the reader to use different mapping techniques. Note, however, that in the data files provided all values below detection are marked as “<DL” while NGU has the original instrument readings available, i.e. values for every sample. When using large datasets with 1000 samples and more, these results commonly still contain valuable information. For example, for S, the laboratories official detection limit is 200 mg/kg, while the QC results indicate that values down to 3 mg/kg are still reliable. Thus a full order of magnitude real, natural variation would have been lost when setting all values below the DL to ½ of the detection limit. For producing the maps in this report the dataset with all instrument readings was used (negative instrument readings were set to a very small positive value).

4. CONCLUSIONS

During the last twenty to thirty years the methods in analytical chemistry have improved tremendously. Many interesting elements that could not be analysed twenty years ago (or only at excessive cost) are now available in routine analytical packages from commercial laboratories. For many of the other elements the detection limits have been reduced by 1 to 2 orders of magnitude, providing a much better overall quality of the data. Today many laboratories offer analytical packages for more than 60 elements at a price below 20 Euro/sample and are able to analyse thousands of samples in a very short time frame.
Results for re-analyses of ca. 1000 till samples of the <0.063mm fraction (Finnmark) and 1000 till samples of the <2 mm fraction (Nordland-Troms) for 65 chemical elements are quite comparable and one can conclude that given sufficient sample size, it is no longer necessary to use the fine fraction. These days the detection limits for most elements are sufficiently low for the <2 mm fraction to be used, provided a sufficiently large aliquot (preferably 15g and more) is used for the extraction.
Quality control indicates that there are still a number of elements for which further improvements in standard analytical techniques would be required (most of these elements can be analysed at lower detection limits, but only at high cost). From the dataset presented here the elements Au, B, Be, Ge, Hf, Hg, In, Pd, Pt, Re, Se, Ta and Te should be viewed with care.
Based on the results of the aqua regia extraction it is concluded that it is not justified to spend extra money on a total extraction for the REE or for a lower detection limit for Pd and Pt.
This report releases the raw data and presents distribution maps for all the elements. The maps for many elements show a clear relationship to the geology and quite a few multi-element anomalies justifying follow-up work are indicated in the area.

5. ACKNOWLEDGEMENTS

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Table 1. Analytical results for project standard "Nidelv". Aqua regia extraction, all values in mg/kg (ppm)

	NORDLAND & TROMS 15g, N=53					FINNMARK 7.5g, N=49					
Element	DL	MINIMUM	MEDIAN	MAXIMUM	PRECISION (%)	DL	MINIMUM	MEDIAN	MAXIMUM	PRECISION (%)	Element
Ag	0.002	0.028	0.041	0.058	13	0.002	0.028	0.044	0.082	11	Ag
Al	100	6955	7883	9553	6	100	6934	8130	9129	7	Al
As	0.1	1.7	2.3	2.7	9	0.1	1.4	2.4	3.1	15	As
Au	0.0002	<0.0002	<0.0002	0.004		0.0002	<0.0002	0.001	0.0341		Au
B	1	<1	<1	2.4		1	<1	1.3	4.7	72	B
Ba	0.5	23	30	37	7	0.5	27	32	38	8	Ba
Be	0.1	<0.1	0.16	0.24	32	0.1	<0.1	0.14	0.35	63	Be
Bi	0.02	0.036	0.061	0.11	15	0.02	0.034	0.065	0.15	17	Bi
Ca	100	1701	2072	2608	8	100	1780	2343	4041	9	Ca
Cd	0.01	0.06	0.083	0.12	24	0.01	0.018	0.089	5.1	18	Cd
Ce	0.1	21	25	31	6	0.1	23	27	36	7	Ce
Co	0.1	6.7	8.1	10	8	0.1	7.5	8.7	10	9	Co
Cr	0.5	32	37	46	6	0.5	35	40	49	8	Cr
Cs	0.02	0.68	0.82	1.1	6	0.02	0.735	0.848	1.04	8	Cs
Cu	0.01	18	22	28	9	0.01	20	23	29	8	Cu
Dy	0.02	0.95	1.1	1.4	8	0.02	0.97	1.3	1.7	13	Dy
Er	0.02	0.48	0.59	0.75	9	0.02	0.47	0.63	0.78	10	Er
Eu	0.02	0.27	0.32	0.41	8	0.02	0.27	0.34	0.46	13	Eu
Fe	100	11627	13125	15389	5	100	11850	13643	15370	6	Fe
Ga	0.1	1.9	2.4	3.2	8	0.1	2.2	2.6	3.1	12	Ga
Gd	0.02	1.1	1.4	1.9	10	0.02	1.2	1.5	2.1	12	Gd
Ge	0.1	<0.1	0.041	0.096	48	0.1	<0.1	0.061	0.15	75	Ge
Hf	0.02	0.028	0.049	0.078	17	0.02	0.017	0.039	0.074	36	Hf
Hg	0.005	0.028	0.05	0.17	30	0.005	0.0074	0.042	0.31	34	Hg
Ho	0.02	0.17	0.22	0.27	9	0.02	0.16	0.24	0.34	13	Ho
In	0.02	<0.02	<0.02	<0.02		0.02	<0.02	<0.02	0.053		In
K	100	1187	1325	1695	6	100	1149	1340	1611	7	K
La	0.5	9.6	12	15	8	0.5	11	13	15	6	La
Li	0.1	8.1	9.1	12	8	0.1	8	10	12	8	Li
Lu	0.02	0.054	0.078	0.1	14	0.02	0.061	0.081	0.11	11	Lu
Mg	100	5085	5722	6632	4	100	5040	5870	6583	6	Mg
Mn	1	204	252	299	5	1	238	266	307	6	Mn
Mo	0.01	0.22	0.29	0.36	9	0.01	0.25	0.31	0.44	9	Mo
Na	10	80	105	135	12	10	86	121	485	12	Na
Nb	0.02	0.27	0.37	0.53	14	0.02	0.47	0.61	0.76	15	Nb
Nd	0.02	8.8	10	13	9	0.02	8.7	11	13	10	Nd
Ni	0.1	24	28	34	8	0.1	27	30	36	8	Ni
P	10	341	434	559	8	10	397	481	586	9	P
Pb	0.01	5.5	7	8.9	10	0.01	6.3	7.4	92	7	Pb
Pd	0.01	<0.01	<0.01	<0.01		0.01	<0.01	<0.01	<0.01		Pd
Pr	0.02	2.2	2.7	3.3	9	0.02	2.4	2.8	3.3	9	Pr
Pt	0.002	<0.002	<0.002	<0.002		0.002	<0.002	<0.002	0.004		Pt
Rb	0.1	9.6	12	14	7	0.1	10.7	12.4	15	8	Rb
Re	0.001	<0.001	<0.001	0.0013		0.001	<0.001	<0.001	<0.001		Re
S	200	<200	<200	<200		200	<200	<200	336		S
Sb	0.02	0.047	0.084	0.14	17	0.02	0.051	0.1	1.3	12	Sb
Sc	0.1	1.5	1.8	2.2	10	0.1	1.6	2	2.4	12	Sc
Se	0.1	<0.1	0.19	0.5	37	0.1	<0.1	0.2	0.54	101	Se
Sm	0.02	1.4	1.8	2.1	11	0.02	1.4	1.8	2.4	12	Sm
Sn	0.1	0.19	0.58	1.9	22	0.1	0.45	0.62	4	18	Sn
Sr	0.5	6.9	8.8	10	8	0.5	7.3	9.9	15	9	Sr
Ta	0.05	<0.05	<0.05	<0.05		0.05	<0.05	<0.05	<0.05		Ta
Tb	0.02	0.17	0.2	0.26	11	0.02	0.18	0.21	0.28	13	Tb
Te	0.02	<0.02	<0.02	0.034		0.02	<0.02	<0.02	0.08		Te
Th	0.1	2.6	3.1	3.8	9	0.1	2.5	3.1	3.8	10	Th
Ti	10	411	520	647	10	10	488	640	748	11	Ti
Tl	0.02	0.067	0.09	0.13	8	0.02	0.082	0.098	0.12	9	Tl
Tm	0.02	0.061	0.076	0.097	9	0.02	0.059	0.078	0.107	16	Tm
U	0.1	0.44	0.55	0.69	10	0.1	0.46	0.59	0.78	9	U
V	2	178	21	26	6	2	17	22	27	9	V
W	0.1	<0.1	0.14	0.18	19	0.1	0.14	0.17	0.25	18	W
Y	0.01	4.9	5.9	7	7	0.01	5.3	6.3	8	7	Y
Yb	0.02	0.4	0.52	0.65	11	0.02	0.47	0.58	0.73	8	Yb
Zn	0.1	33	38	52	7	0.1	35	42	56	8	Zn
Zr	0.1	2.1	3.2	4.6	13	0.1	2	2.6	4.9	12	Zr

Table 2 Statistical parameters NORDLAND & TROMS DATASET

Till, <2 mm, aqua regia extraction on 15 g sample material, N=979.

ELEMENT	DL	MIN	Q2	Q5	Q10	Q25	MEDIAN	Q75	Q90	Q95	Q98	MAX	MAD.log	MAD.ilr	Powers
Ag	0.002	<0.002	<0.002	<0.002	0.0035	0.0074	0.015	0.032	0.054	0.082	0.12	0.45	0.47	0.77	2.7
Al	100	199	1557	2769	3530	6354	9864	14154	19168	23226	27054	44069	0.26	0.42	2.3
As	0.1	<0.1	<0.1	0.20	0.33	0.77	1.9	4.0	8.1	12	18	376	0.53	0.87	3.9
Au	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.00056	0.0010	0.0017	0.0024	0.0038	0.026	0.47	0.76	2.4
B	1	<1	<1	<1	<1	<1	<1	<1	1.4	1.9	2.8	9.4			1.3
Ba	0.5	<0.5	4.2	6.2	9.7	18	31	53	90	117	165	405	0.36	0.58	3.2
Be	0.1	<0.1	<0.1	<0.1	<0.1	0.12	0.20	0.32	0.45	0.56	0.76	3.2	0.31	0.51	1.8
Bi	0.02	<0.02	<0.02	<0.02	<0.02	0.037	0.075	0.12	0.18	0.22	0.30	4.4	0.37	0.59	2.6
Ca	100	<100	208	380	625	1123	1687	2465	4143	7436	22245	207605	0.25	0.41	3.6
Cd	0.01	<0.01	<0.01	<0.01	<0.01	0.017	0.032	0.060	0.10	0.14	0.20	0.65	0.40	0.65	2.1
Ce	0.1	0.95	4.2	8.2	12	20	36	53	75	92	121	685	0.29	0.48	2.9
Co	0.1	<0.1	0.52	1.1	1.8	4.1	7.6	12	16	20	24	55	0.33	0.54	3
Cr	0.5	<0.5	1.1	2.4	4.8	12	21	33	48	61	88	475	0.32	0.53	3.3
Cs	0.02	0.023	0.091	0.16	0.27	0.64	1.2	1.9	2.8	3.5	4.6	8.4	0.34	0.55	2.6
Cu	0.01	0.11	0.50	1.1	2.2	6.8	16	28	41	51	73	123	0.44	0.71	3
Dy	0.02	0.033	0.18	0.30	0.46	0.77	1.2	1.9	2.8	3.5	4.6	20	0.28	0.46	2.8
Er	0.02	<0.02	0.085	0.14	0.21	0.35	0.56	0.84	1.29	1.6	2.2	9.2	0.28	0.46	3
Eu	0.02	<0.02	0.043	0.075	0.11	0.19	0.32	0.50	0.73	0.95	1.3	5.4	0.31	0.50	2.7
Fe	100	319	3444	5254	7636	12040	18037	24604	32117	36094	43188	89669	0.23	0.38	2.4
Ga	0.1	0.15	0.99	1.3	1.7	2.4	3.4	4.9	6.8	8.2	10	14	0.23	0.37	2
Gd	0.02	0.057	0.20	0.38	0.53	0.94	1.5	2.4	3.6	4.8	6.1	24	0.31	0.50	2.6
Ge	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.13	0.16	0.20	0.77			1.2
Hf	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.027	0.054	0.093	0.14	0.19	0.38	0.63	1.0	1.6
Hg	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0069	0.012	0.019	0.025	0.033	0.062	0.61	0.99	1.4
Ho	0.02	<0.02	0.036	0.053	0.082	0.14	0.22	0.33	0.51	0.63	0.85	3.4	0.29	0.46	2.5
In	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.028	0.036	0.048	0.12			1.1
K	100	<100	186	318	490	892	1659	2906	4691	6614	8487	13630	0.38	0.62	2.4
La	0.5	0.51	1.8	3.6	5.1	9.1	16	24	36	46	59	413	0.31	0.50	2.9
Li	0.1	0.13	1.2	2.1	3.6	6.4	11	17	25	31	37	76	0.31	0.51	2.8
Lu	0.02	<0.02	<0.02	<0.02	0.024	0.040	0.064	0.10	0.15	0.20	0.27	1.0	0.30	0.48	2
Mg	100	<100	458	826	1392	2814	5044	7698	11140	14056	17559	49350	0.31	0.51	3
Mn	1	5.0	26	46	72	116	195	320	467	592	751	1558	0.32	0.53	2.5
Mo	0.01	<0.01	0.054	0.091	0.13	0.22	0.41	0.75	1.5	2.4	4.2	40	0.39	0.63	3.9
Na	10	<10	22	28	33	48	74	115	170	215	347	2010	0.28	0.45	2.6
Nb	0.02	<0.02	0.082	0.14	0.19	0.32	0.52	0.95	1.7	2.2	3.0	6.5	0.35	0.56	2.8
Nd	0.02	0.52	1.6	3.1	4.2	7.2	13	19	28	38	48	256	0.30	0.49	2.7
Ni	0.1	<0.1	0.41	1.0	2.4	7.0	14	24	35	43	53	157	0.37	0.60	3.5
P	10	<10	55.7	107	190	360	518	678	853	1094	1550	7430	0.19	0.32	3.2
Pb	0.01	0.28	0.75	1.2	1.7	2.9	4.9	7.7	11	15	24	180	0.32	0.51	2.8
Pd	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.030			0.8
Pr	0.02	0.11	0.41	0.81	1.1	1.9	3.3	5.1	7.6	10	13	65	0.31	0.51	2.8
Pt	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.0022	0.0065			0.8
Rb	0.1	0.17	1.6	3.2	5.0	9.8	17	29	46	59	73	295	0.35	0.57	3.2
Re	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0014	0.0028			0.7
S	200	<200	<200	<200	<200	<200	<200	<200	<200	287	467	2655			1.4
Sb	0.02	<0.02	<0.02	<0.02	<0.02	0.022	0.042	0.077	0.13	0.20	0.33	0.96	0.41	0.66	2
Sc	0.1	<0.1	0.30	0.55	0.73	1.1	1.7	2.5	3.6	4.4	5.8	11	0.25	0.41	2.3
Se	0.1	<0.1	<0.1	<0.1	<0.1	0.14	0.26	0.44	0.67	0.88	1.2	4.3	0.36	0.59	1.9
Sm	0.02	0.092	0.30	0.53	0.72	1.2	2.0	3.1	4.6	6.0	8.0	33	0.31	0.50	2.6
Sn	0.1	<0.1	<0.1	0.10	0.13	0.20	0.32	0.52	0.82	1.1	1.5	3.5	0.30	0.49	1.8
Sr	0.5	<0.5	1.1	1.7	2.5	4.5	7.4	12	20	35	83	934	0.30	0.49	3.6
Ta	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.072			0.5
Tb	0.02	<0.02	0.034	0.055	0.083	0.14	0.22	0.35	0.51	0.66	0.82	3.9	0.30	0.48	2.6
Te	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.029	0.044	0.056	0.077	0.49			1.7
Th	0.1	<0.1	0.32	0.65	1.4	2.7	4.6	6.7	9.8	12	17	72	0.29	0.47	3.2
Ti	10	30	211	288	374	556	797	1142	1677	2071	2583	3629	0.23	0.38	2.1
Tl	0.02	<0.02	<0.02	<0.02	0.036	0.077	0.14	0.22	0.33	0.39	0.54	1.4	0.33	0.53	2.2
Tm	0.02	<0.02	<0.02	<0.02	0.025	0.042	0.069	0.10	0.16	0.20	0.28	1.2	0.29	0.47	2.1
U	0.1	<0.1	0.11	0.15	0.24	0.45	0.73	1.2	2.0	2.9	4.0	33	0.31	0.51	2.8
V	2	<2	3.4	6.1	8.4	16	24	36	51	64	92	209	0.26	0.43	2.3
W	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.075	0.19	0.29	0.44	0.94			1.3
Y	0.01	0.23	0.83	1.4	2.2	3.7	5.8	9.0	14	17	23	106	0.29	0.47	2.7
Yb	0.02	<0.02	0.062	0.11	0.17	0.28	0.45	0.69	1.0	1.3	1.9	7.7	0.29	0.47	2.9
Zn	0.1	0.42	3.4	8.0	12	21	32	48	67	77	107	230	0.27	0.44	2.7
Zr	0.1	<0.1	0.14	0.21	0.31	0.59	1.4	2.8	4.6	6.5	9.8	16	0.50	0.81	2.5

DL: detection limit; MIN: minimum; Q: quantile; MAX: maximum;
MAD: median absolute deviation; all in mg/kg (ppm).

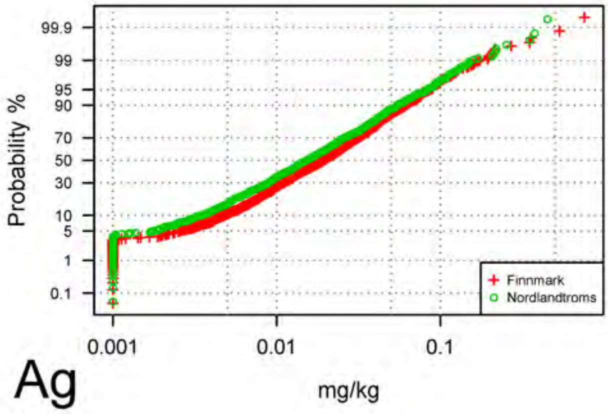
Table 3 Statistical parameters FINNMARK DATASET

Till, <0.063mm, aqua regia extraction on 7.5 g material, N=1144.

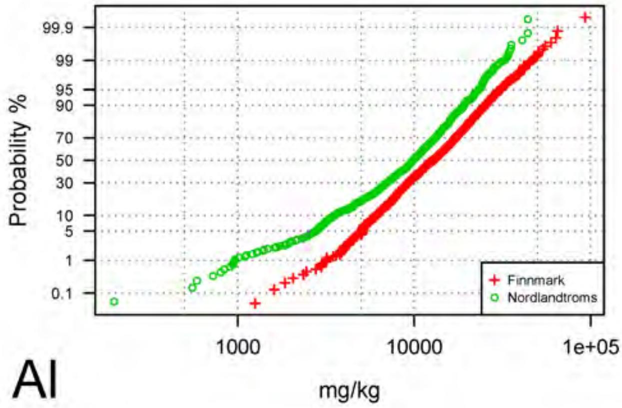
ELEMENT	DL	MIN	Q2	Q5	Q10	Q25	MEDIAN	Q75	Q90	Q95	Q98	MAX	MAD.log	MAD.ilr	Powers
Ag	0.002	<0.002	<0.002	0.0026	0.0048	0.0096	0.019	0.036	0.061	0.086	0.12	0.76	0.43	0.70	2.9
Al	100	1253	3963	5074	6110	8549	12784	18575	25172	30808	39743	93061	0.25	0.41	1.9
As	0.1	<0.1	<0.1	<0.1	0.16	0.55	1.4	3.3	7.0	12	21	311	0.58	0.95	3.8
Au	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.00055	0.0016	0.0038	0.0090	0.016	0.029	13	0.63	1.03	5.1
B	1	<1	<1	<1	<1	<1	<1	2.0	3.3	4.5	7.3	15			1.5
Ba	0.5	4.2	10	14	17	25	39	67	110	140	180	399	0.32	0.52	2
Be	0.1	<0.1	<0.1	<0.1	<0.1	0.16	0.30	0.48	0.73	0.96	1.4	13	0.34	0.55	2.4
Bi	0.02	<0.02	<0.02	0.02	0.032	0.049	0.084	0.15	0.23	0.31	0.44	3.5	0.36	0.58	2.5
Ca	100	<100	131	228	438	1239	2312	3344	4738	5896	7767	198671	0.29	0.47	3.6
Cd	0.01	<0.01	<0.01	<0.01	<0.01	0.02	0.04	0.07	0.11	0.16	0.26	2.2	0.36	0.59	2.6
Ce	0.1	2.5	12	16	19	26	36	53	90	136	226	740	0.24	0.38	2.5
Co	0.1	0.25	1.5	2.4	3.2	5.0	8.7	15	21	27	37	131	0.35	0.57	2.7
Cr	0.5	2.9	8.9	13	16	23	35	57	94	121	161	670	0.30	0.48	2.4
Cs	0.02	0.11	0.23	0.29	0.36	0.54	1.1	2.0	3.6	4.6	5.8	18	0.42	0.69	2.2
Cu	0.01	0.62	3.0	4.5	6.4	11	21	41	68	93	131	623	0.42	0.69	3
Dy	0.02	0.18	0.46	0.59	0.73	0.97	1.4	2.0	3.3	4.6	7.7	29	0.23	0.37	2.2
Er	0.02	0.068	0.19	0.28	0.34	0.44	0.61	0.91	1.4	2.0	3.4	9.2	0.23	0.38	2.1
Eu	0.02	0.049	0.12	0.16	0.21	0.28	0.38	0.55	0.83	1.2	1.8	7.6	0.21	0.35	2.2
Fe	100	1145	6940	8273	9835	14277	22411	31946	40575	47877	55993	107973	0.25	0.42	2
Ga	0.1	0.95	1.4	1.8	2.2	3.1	4.6	6.6	8.7	10	13	59	0.24	0.39	1.8
Gd	0.02	0.19	0.57	0.76	0.93	1.2	1.7	2.6	4.2	6.2	9.3	44	0.24	0.39	2.4
Ge	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.12	0.17	0.20	0.27	0.58			1.1
Hf	0.02	<0.02	<0.02	<0.02	<0.02	0.031	0.055	0.092	0.15	0.19	0.27	0.84	0.35	0.57	1.9
Hg	0.005	<0.005	<0.005	<0.005	<0.005	0.0057	0.015	0.027	0.043	0.053	0.074	5.69	0.46	0.74	3.4
Ho	0.02	0.026	0.081	0.11	0.13	0.17	0.24	0.35	0.57	0.78	1.3	4.6	0.23	0.38	2.2
In	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.024	0.036	0.045	0.065	0.14			1.1
K	100	<100	277	363	481	758	1291	2400	4320	5328	7819	35665	0.36	0.59	2.9
La	0.5	1.1	4.3	6.6	8.1	11	16	22	33	46	65	238	0.23	0.37	2.4
Li	0.1	0.17	1.4	2.6	3.5	5.5	9.2	17	25	32	42	73	0.35	0.56	2.6
Lu	0.02	<0.02	0.023	0.030	0.036	0.050	0.070	0.11	0.16	0.20	0.32	0.74	0.24	0.39	1.9
Mg	100	120	652	1094	1643	2600	4389	7341	11425	14117	18913	73741	0.34	0.55	2.8
Mn	1	11	38	60	76	111	178	309	519	770	1151	3372	0.33	0.54	2.5
Mo	0.01	0.020	0.059	0.078	0.11	0.19	0.36	0.69	1.3	1.9	2.7	22	0.43	0.69	3
Na	10	<10	25	34	43	73	138	215	310	403	683	2275	0.33	0.54	2.7
Nb	0.02	<0.02	0.15	0.24	0.36	0.65	1.0	1.6	2.8	3.8	5.4	11	0.29	0.48	3
Nd	0.02	1.1	4.1	5.6	7.2	9.4	13	20	30	42	62	267	0.23	0.38	2.4
Ni	0.1	0.43	3.0	4.9	6.9	11	18	34	56	73	103	595	0.37	0.60	3.1
P	10	63	135	189	262	403	594	819	1131	1413	1703	9448	0.22	0.36	2.2
Pb	0.01	0.79	1.8	2.1	2.7	3.9	6.5	10	16	20	29	115	0.32	0.52	2.2
Pd	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.013	0.034			0.8
Pr	0.02	0.27	1.0	1.4	1.8	2.4	3.4	4.9	7.6	11	16	59	0.23	0.38	2.3
Pt	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.0024	0.0032	0.0042	0.013			1.1
Rb	0.1	0.81	2.7	4.0	5.3	8.5	14	27	46	60	82	134	0.36	0.59	2.2
Re	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0014	0.0022	0.0035	0.0078			1.2
S	200	<200	<200	<200	<200	<200	<200	<200	329	456	676	2718			1.4
Sb	0.02	<0.02	<0.02	<0.02	<0.02	0.022	0.051	0.10	0.17	0.27	0.44	5.8	0.48	0.79	2.8
Sc	0.1	0.34	0.71	1.0	1.2	1.8	2.5	3.7	5.2	6.3	7.9	17	0.24	0.38	1.7
Se	0.1	<0.1	<0.1	<0.1	<0.1	0.17	0.36	0.60	0.96	1.3	1.8	4.2	0.39	0.63	1.9
Sm	0.02	0.24	0.67	0.93	1.2	1.5	2.2	3.3	5.0	7.3	11	47	0.24	0.40	2.3
Sn	0.1	<0.1	0.16	0.21	0.24	0.32	0.45	0.66	0.94	1.2	1.5	3.7	0.23	0.38	1.9
Sr	0.5	<0.5	3.1	3.9	4.8	6.9	9.9	16	23	30	43	845	0.26	0.42	3.5
Ta	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.055	0.13			0.7
Tb	0.02	0.027	0.079	0.10	0.12	0.17	0.23	0.36	0.57	0.83	1.4	5.2	0.23	0.38	2.3
Te	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.034	0.057	0.074	0.096	0.23			1.4
Th	0.1	0.117	0.82	1.4	2.1	3.0	4.4	6.2	9.8	12	17	43	0.23	0.38	2.6
Ti	10	20.9	74.1	136	323	764	1131	1654	2268	2734	3309	8950	0.25	0.41	2.6
Tl	0.02	<0.02	<0.02	0.025	0.036	0.057	0.1	0.19	0.36	0.47	0.61	1.1	0.38	0.62	2
Tm	0.02	<0.02	0.024	0.032	0.042	0.054	0.077	0.11	0.17	0.23	0.41	0.92	0.23	0.38	2
U	0.1	<0.1	0.32	0.40	0.47	0.62	0.89	1.4	2.3	3.5	7	59	0.26	0.42	3.1
V	2	5.1	11	14	17	24	36	54	74	89	109	286	0.26	0.42	1.7
W	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.11	0.18	0.26	0.36	2.0			1.6
Y	0.01	0.88	2.2	2.8	3.3	4.5	6.1	9.2	14	20	34	123	0.22	0.36	2.1
Yb	0.02	0.065	0.18	0.23	0.28	0.37	0.52	0.76	1.2	1.5	2.5	6.0	0.23	0.37	2
Zn	0.1	0.62	5.3	7.2	9.2	16	28	50	74	88	114	317	0.38	0.61	2.7
Zr	0.1	0.13	0.48	0.67	0.93	1.6	2.6	4.2	6.6	8.8	13	33	0.32	0.51	2.4

DL: detection limit; MIN: minimum; Q: quantile; MAX: maximum;
MAD: median absolute deviation; all in mg/kg (ppm).

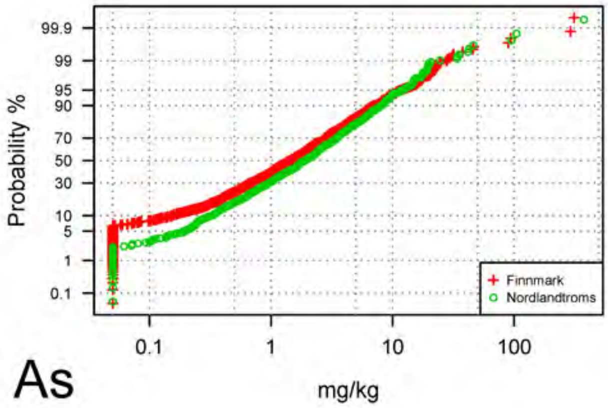
Figure 2 Bedrock map legend



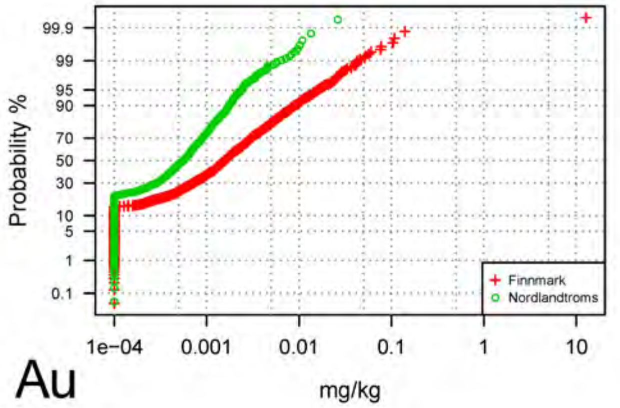
Ag



Al



As



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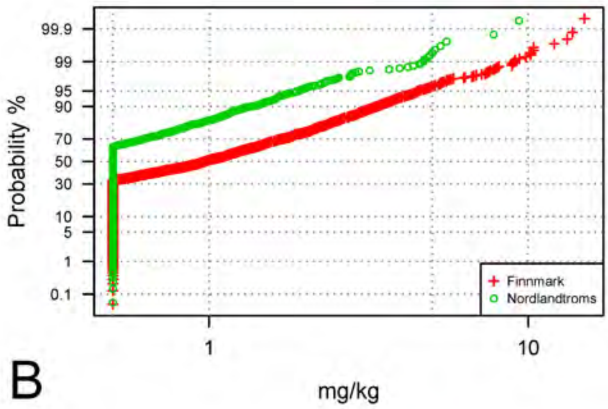

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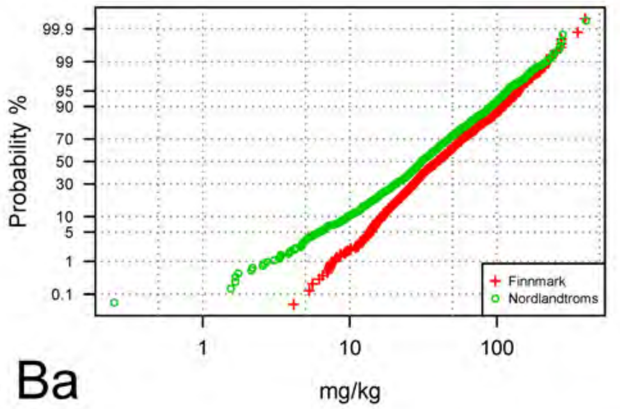

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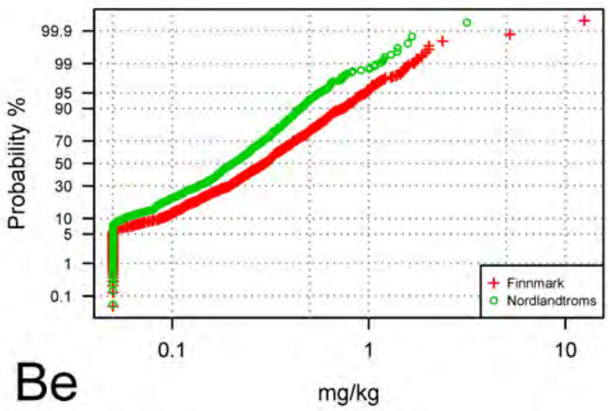

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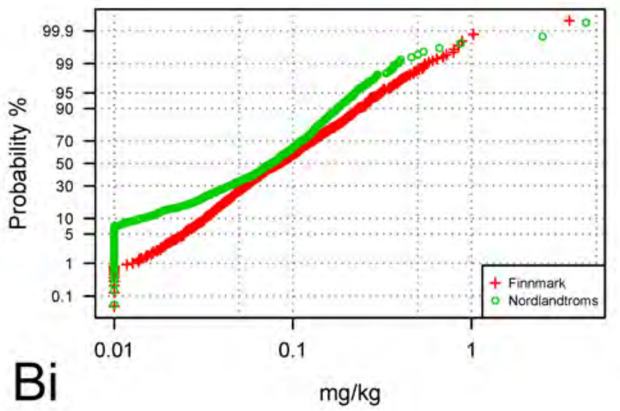

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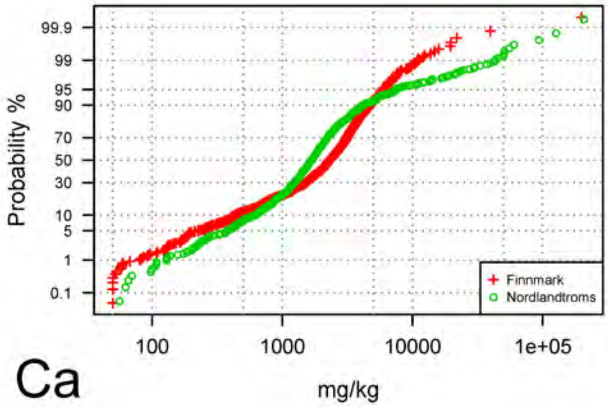

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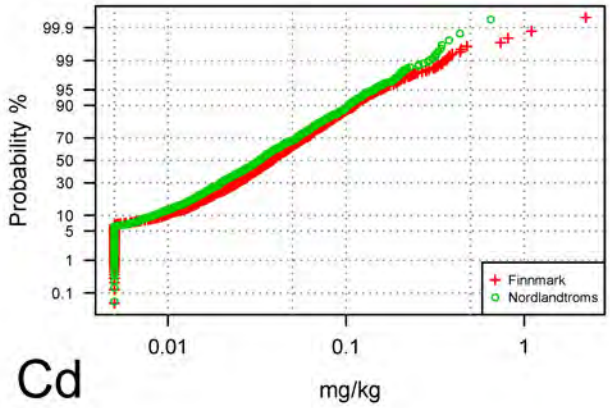

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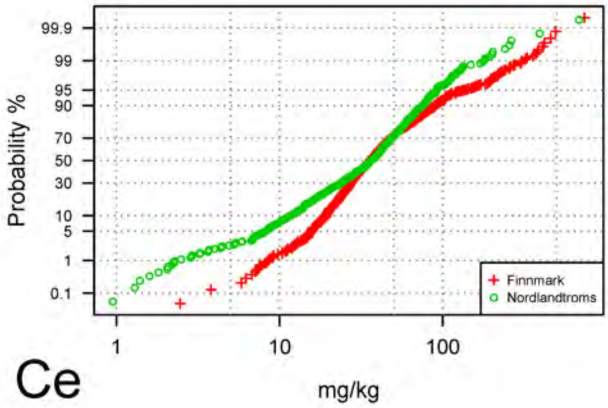

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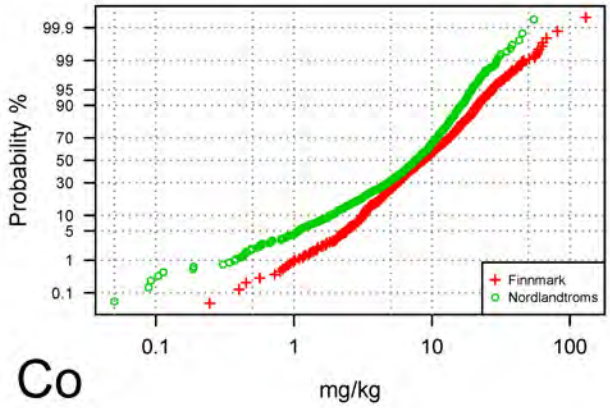

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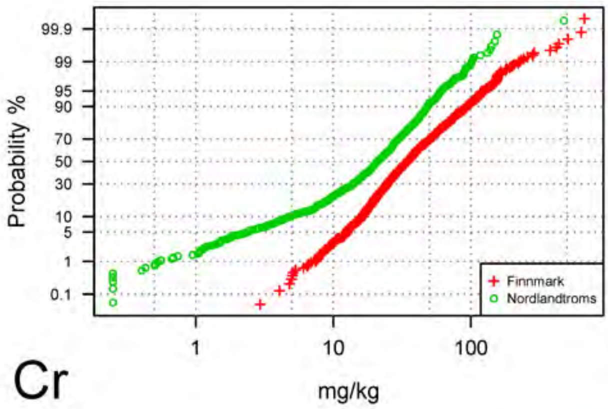

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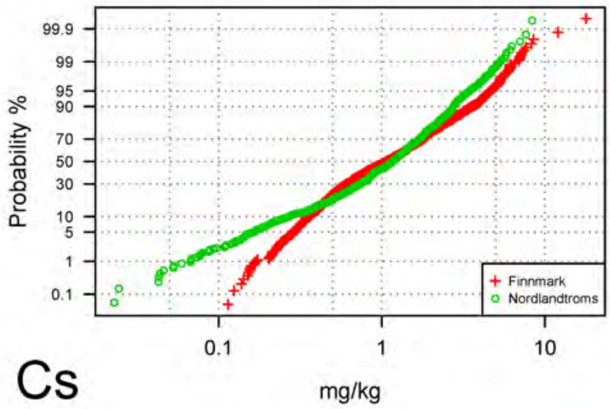

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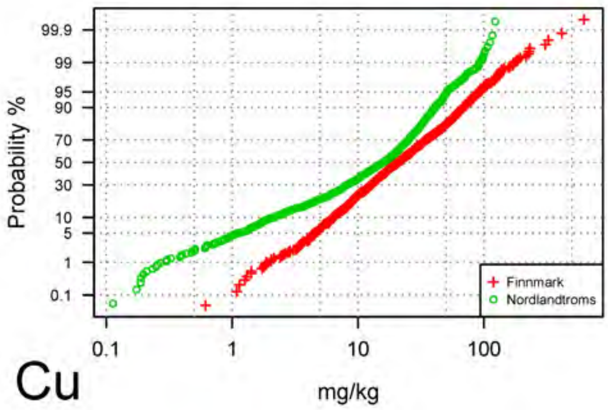

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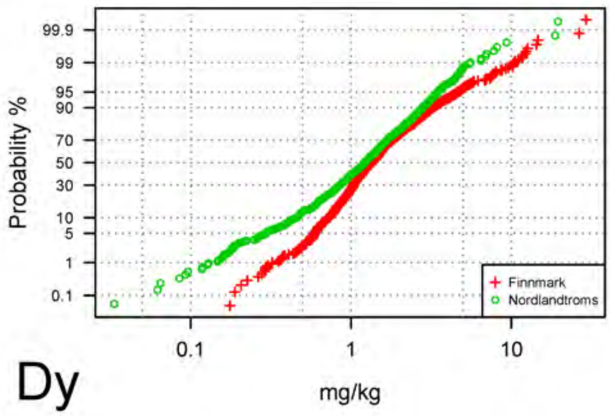

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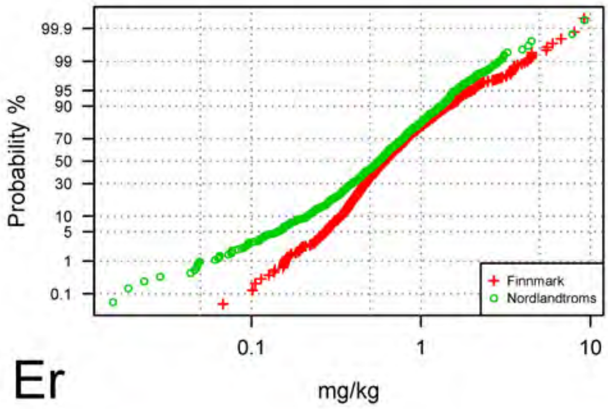

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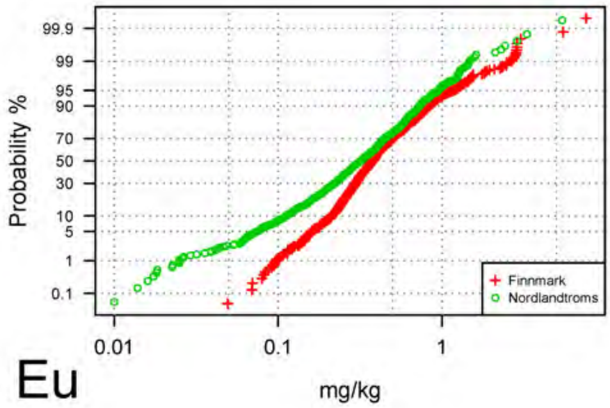

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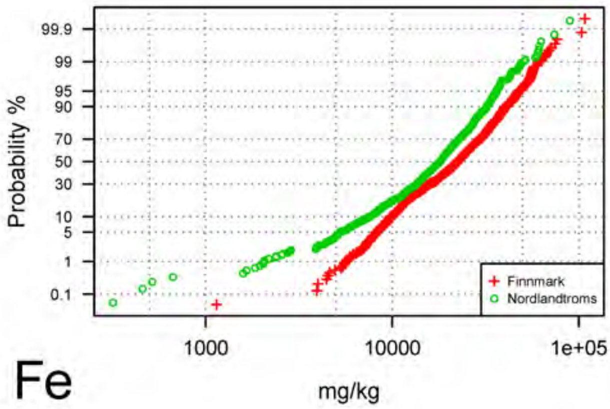

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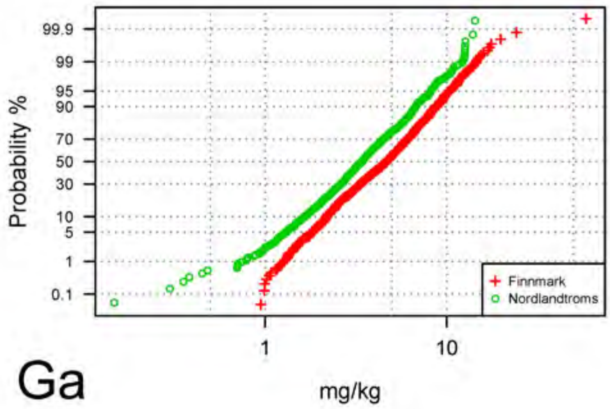

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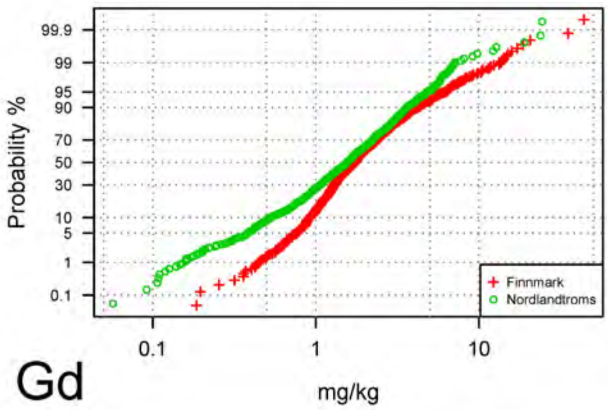

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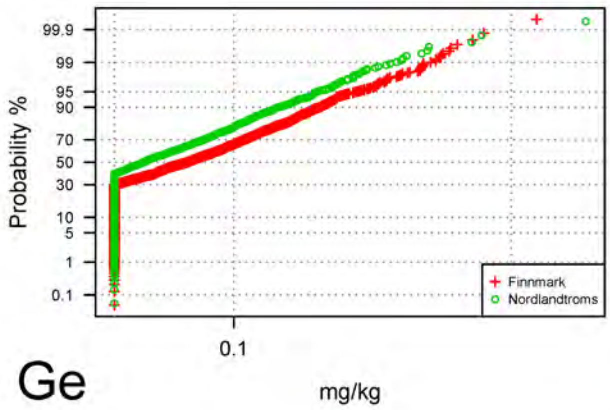

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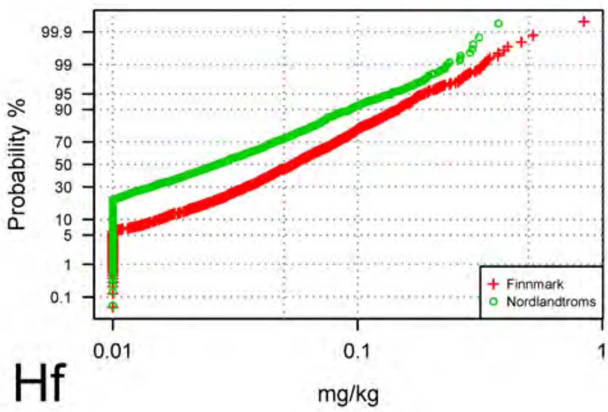

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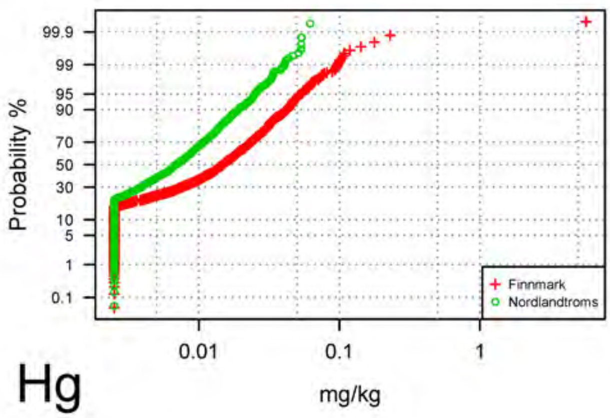

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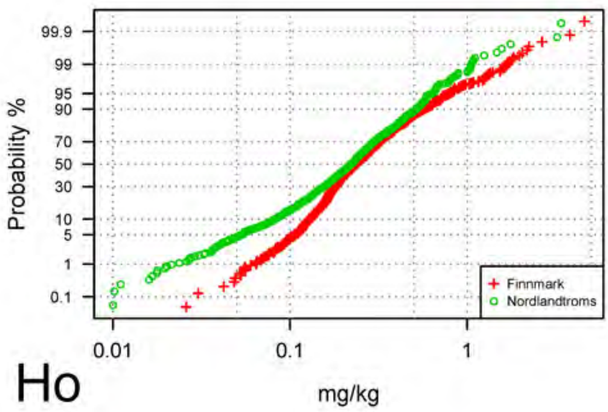
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0.1
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mg/kg
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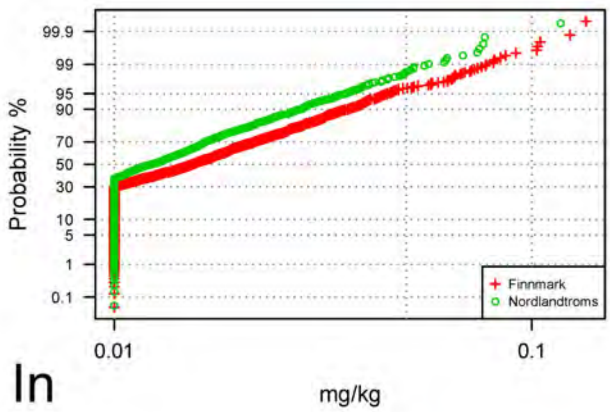
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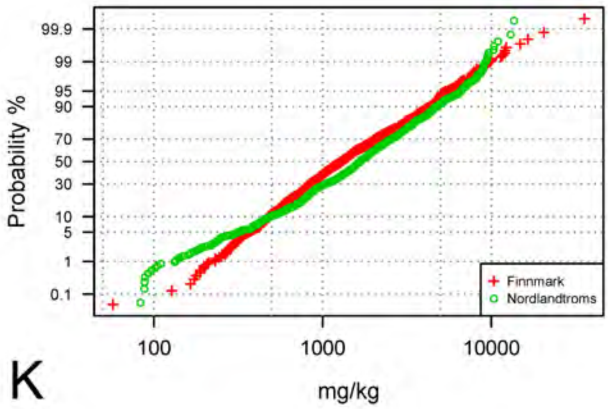
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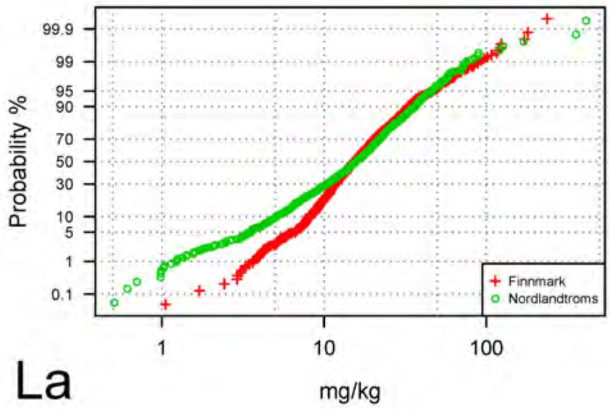
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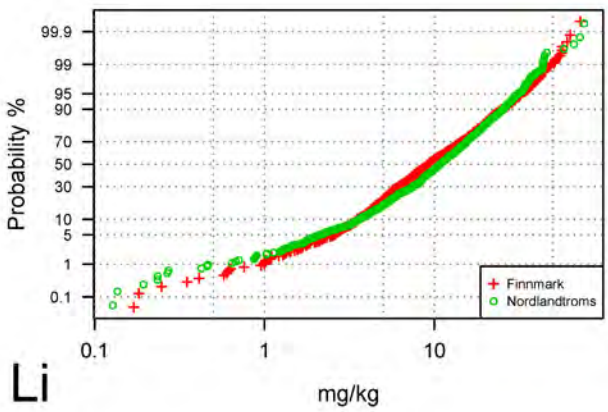
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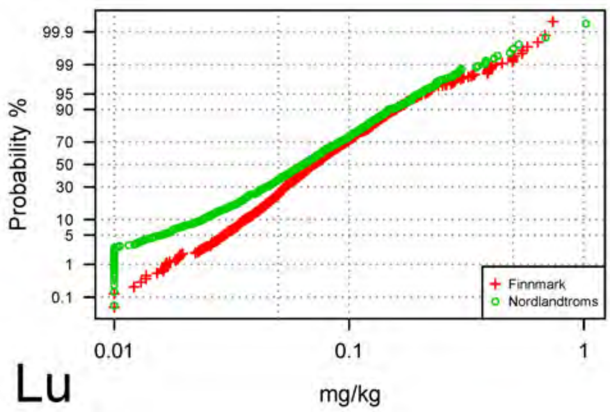
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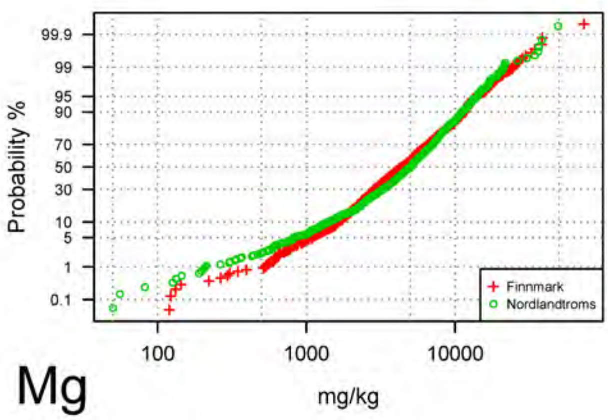
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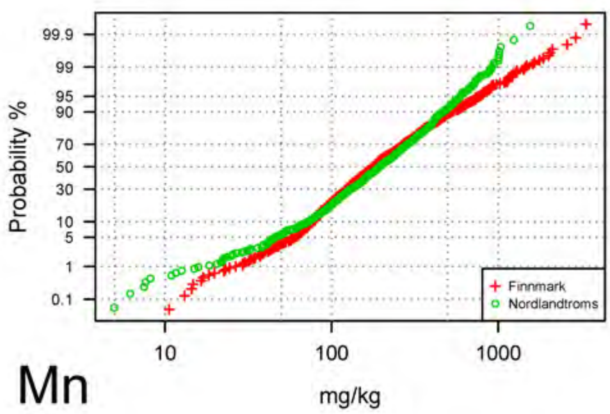
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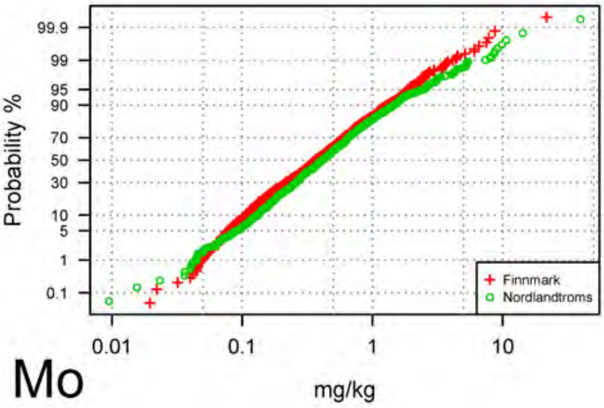
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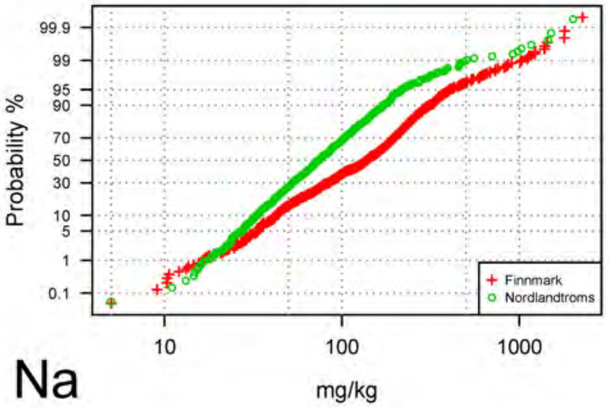
mg/kg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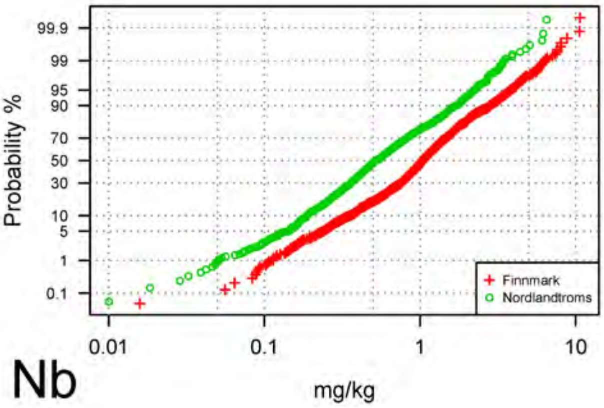
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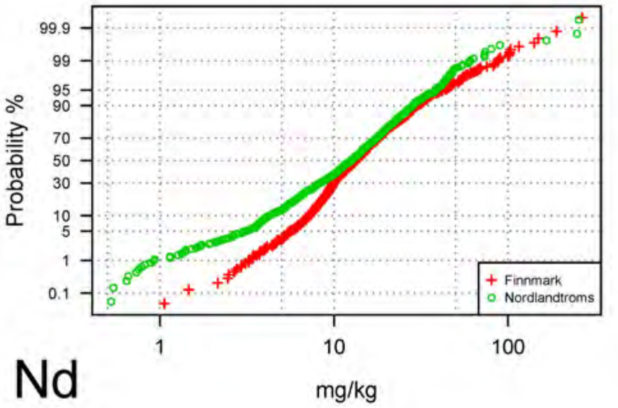
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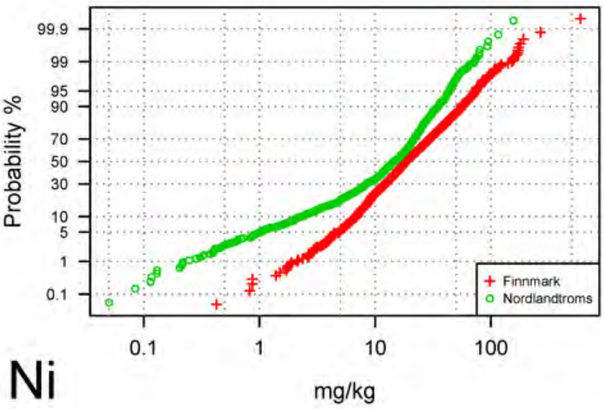
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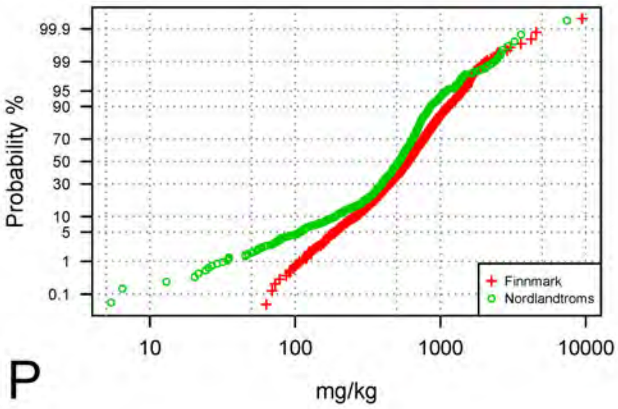
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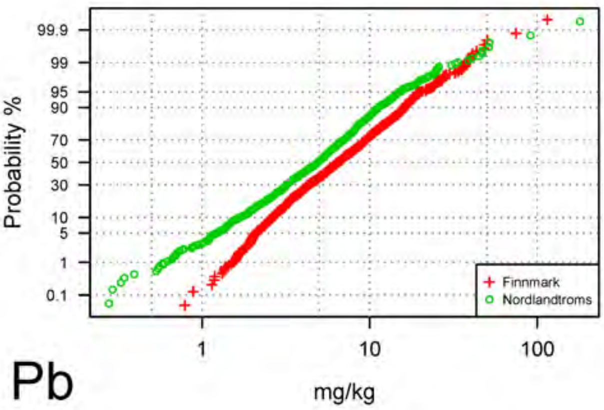
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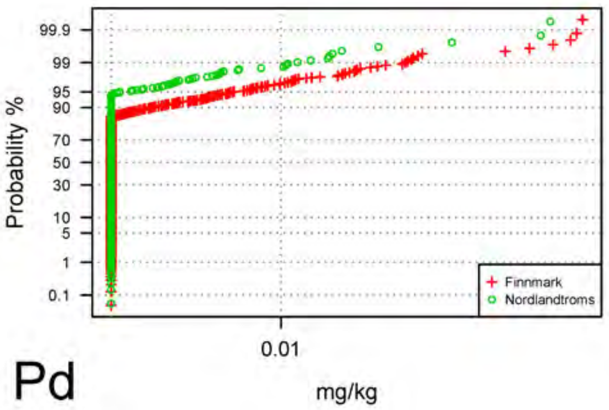
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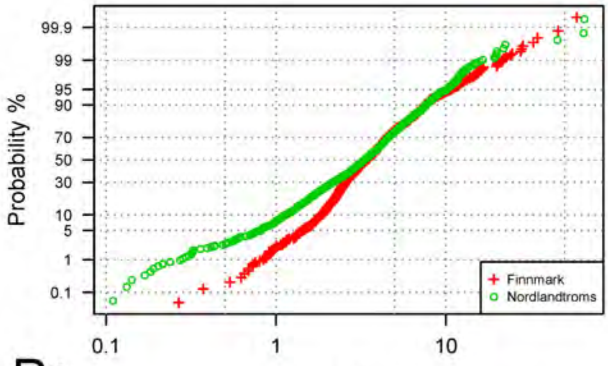

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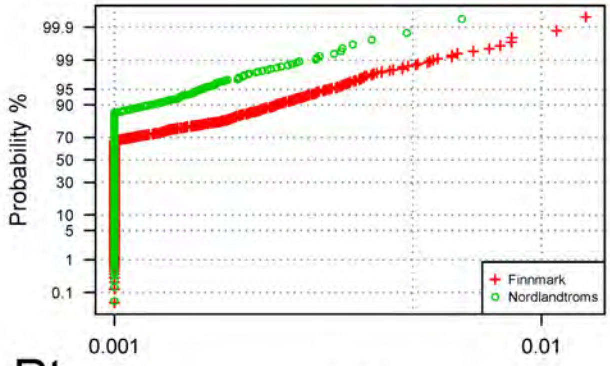

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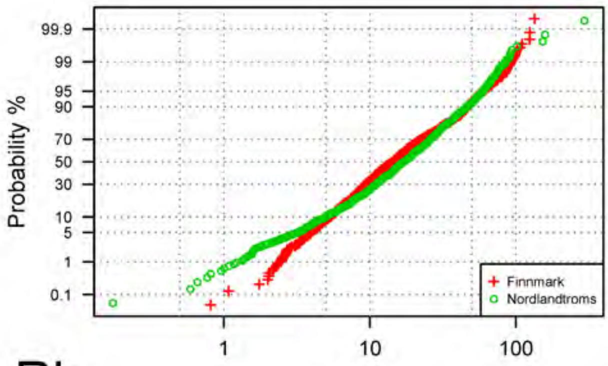

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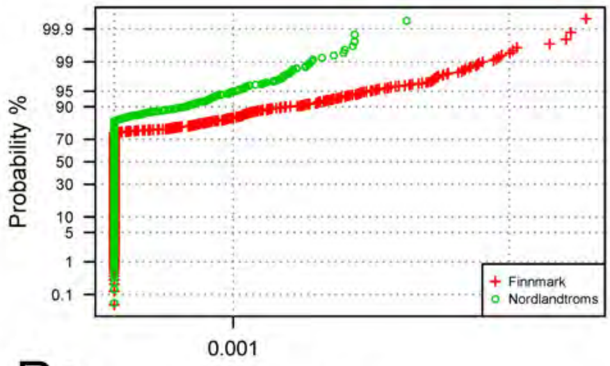

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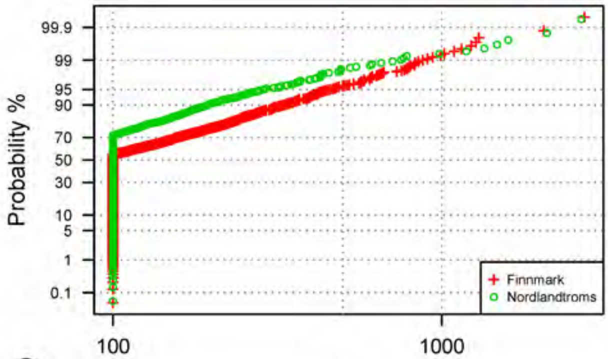

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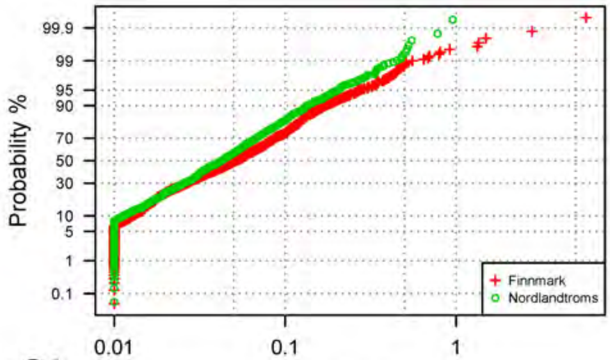

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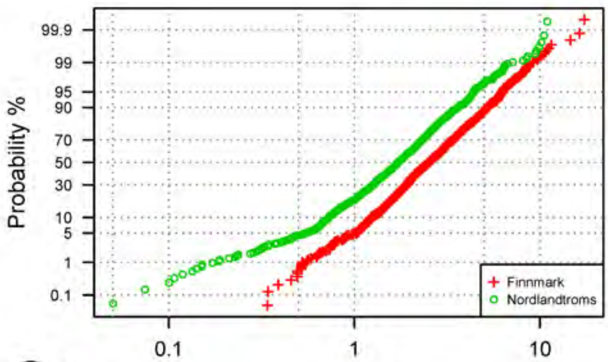

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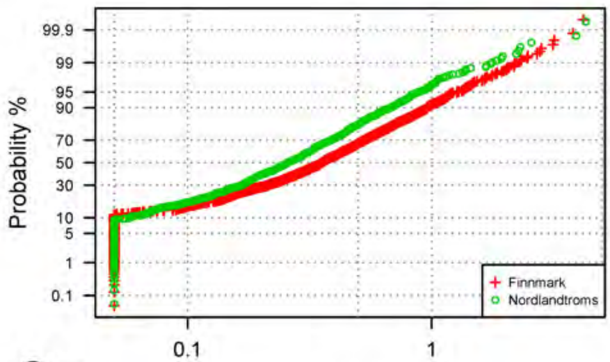

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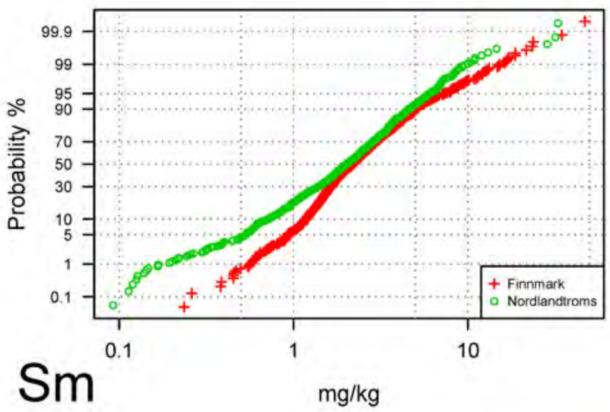
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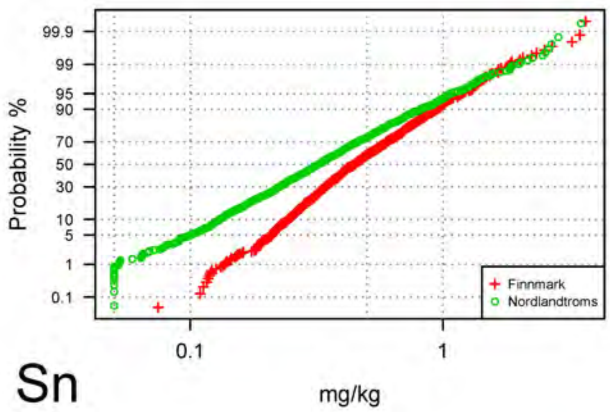
mg/kg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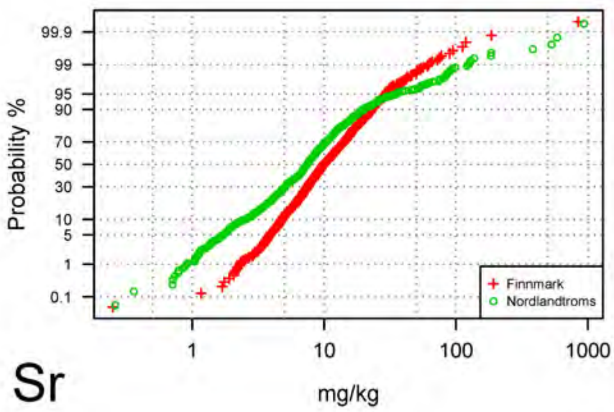
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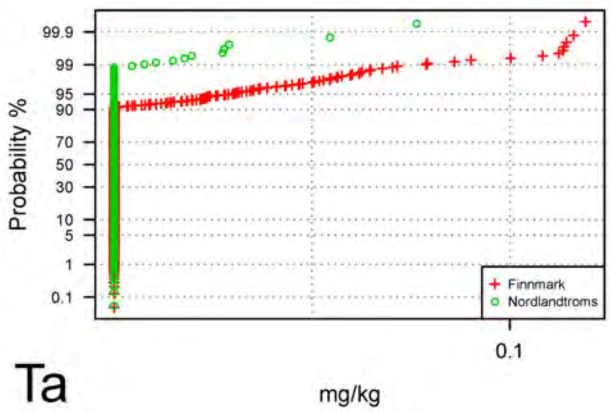
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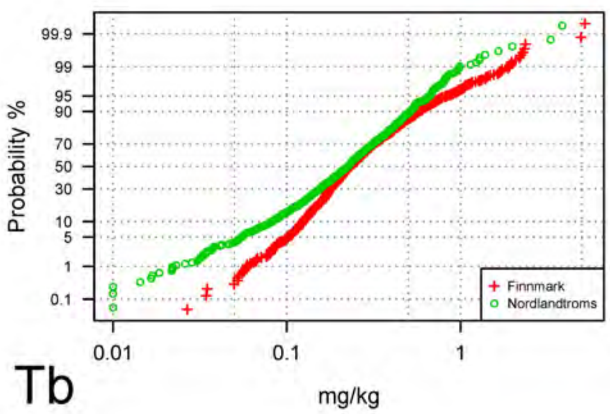
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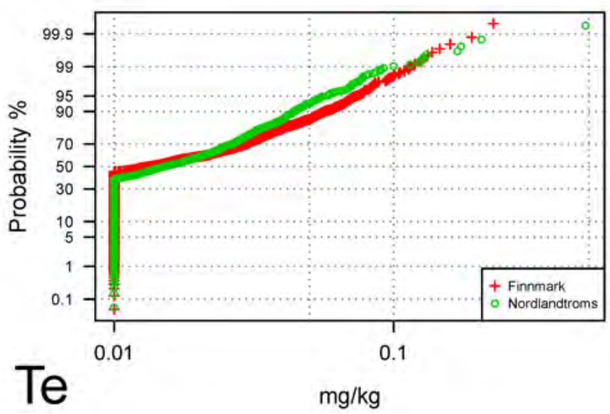
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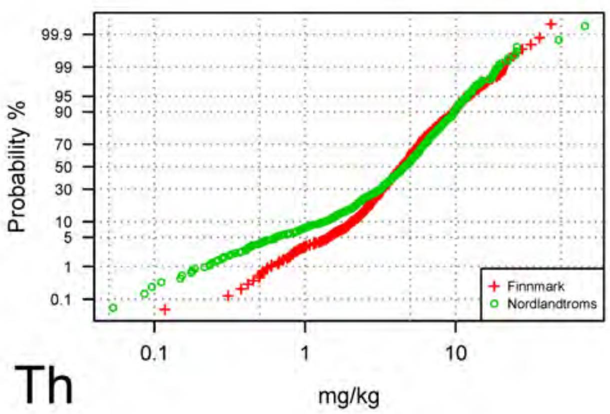
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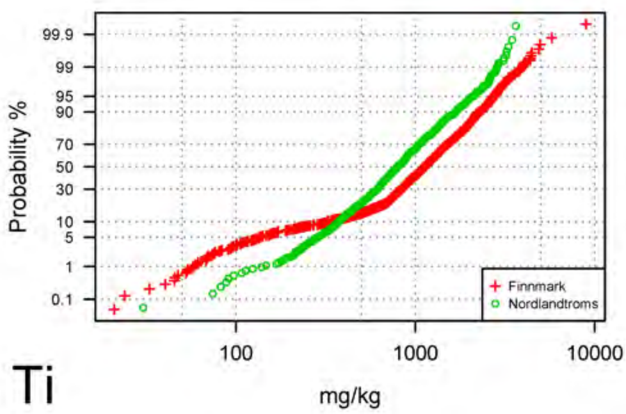
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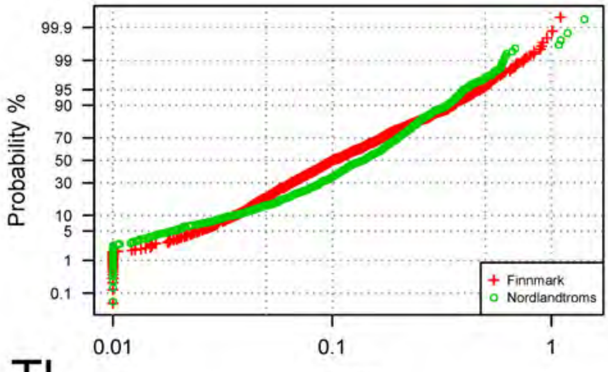

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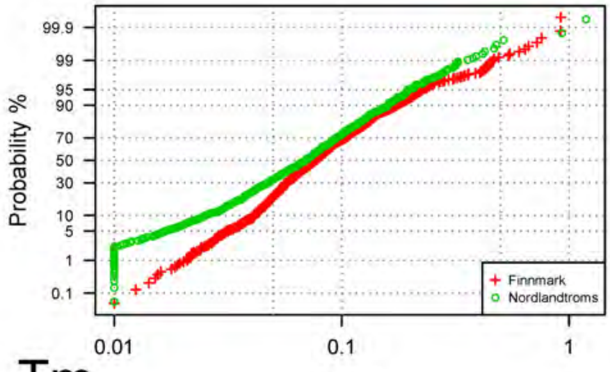

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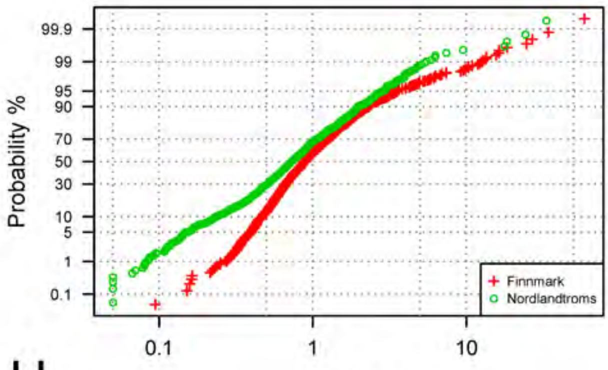

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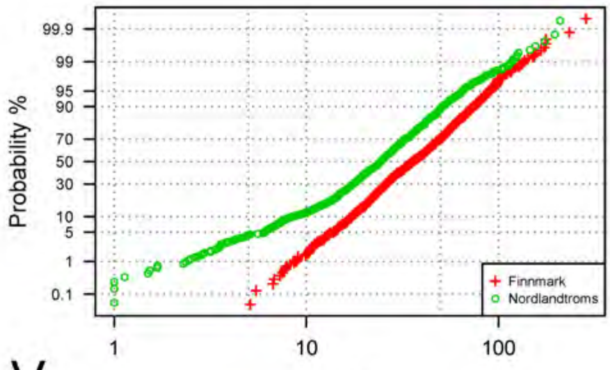

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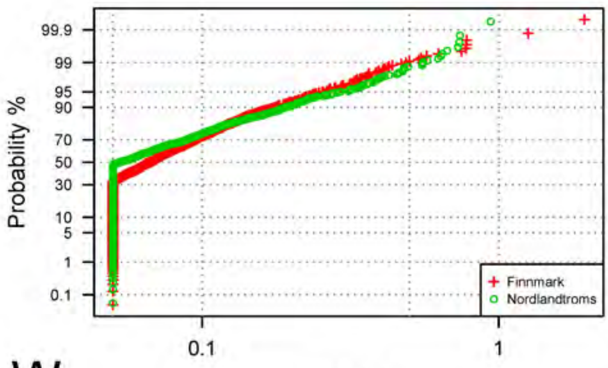

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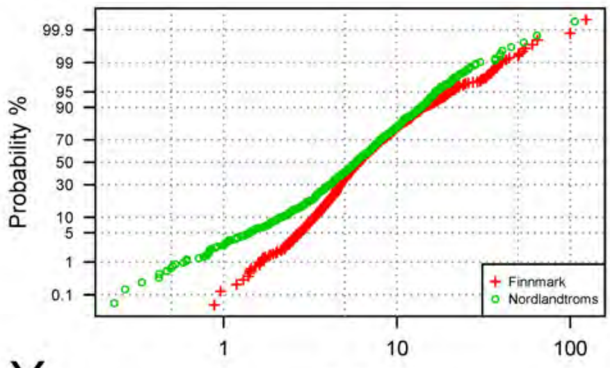

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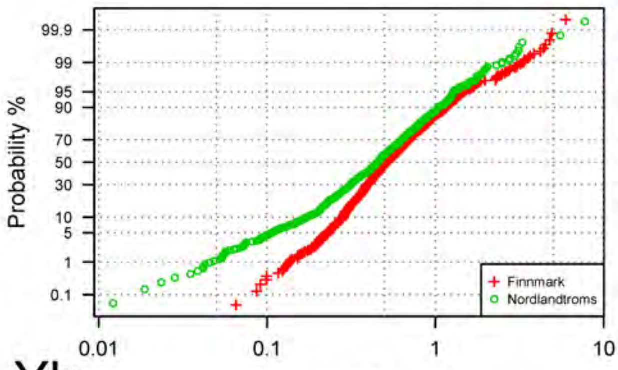

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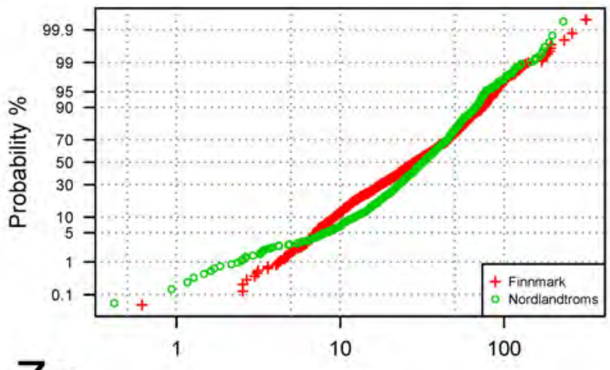

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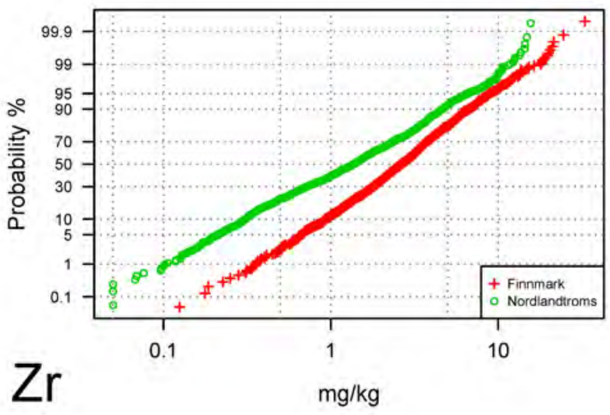
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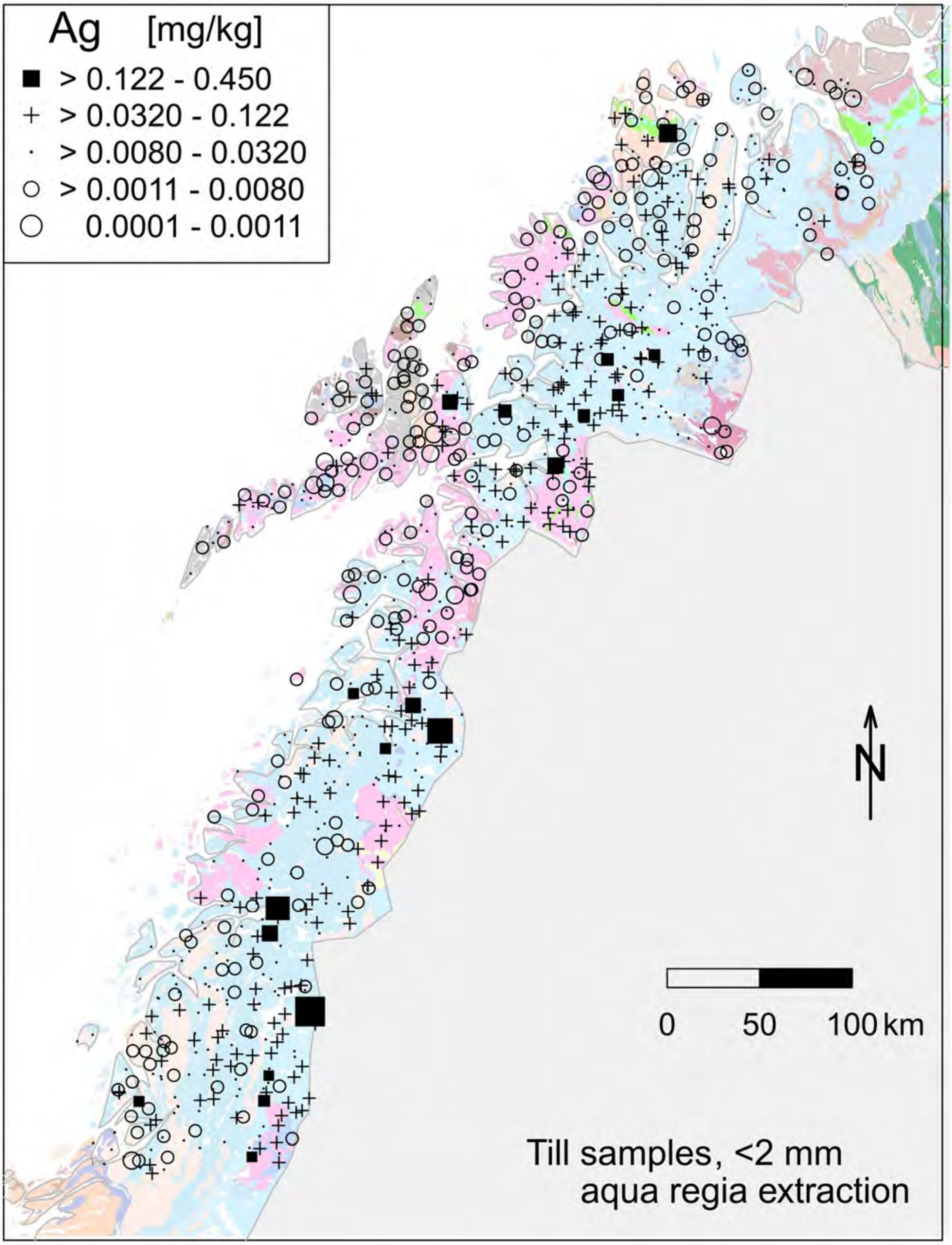
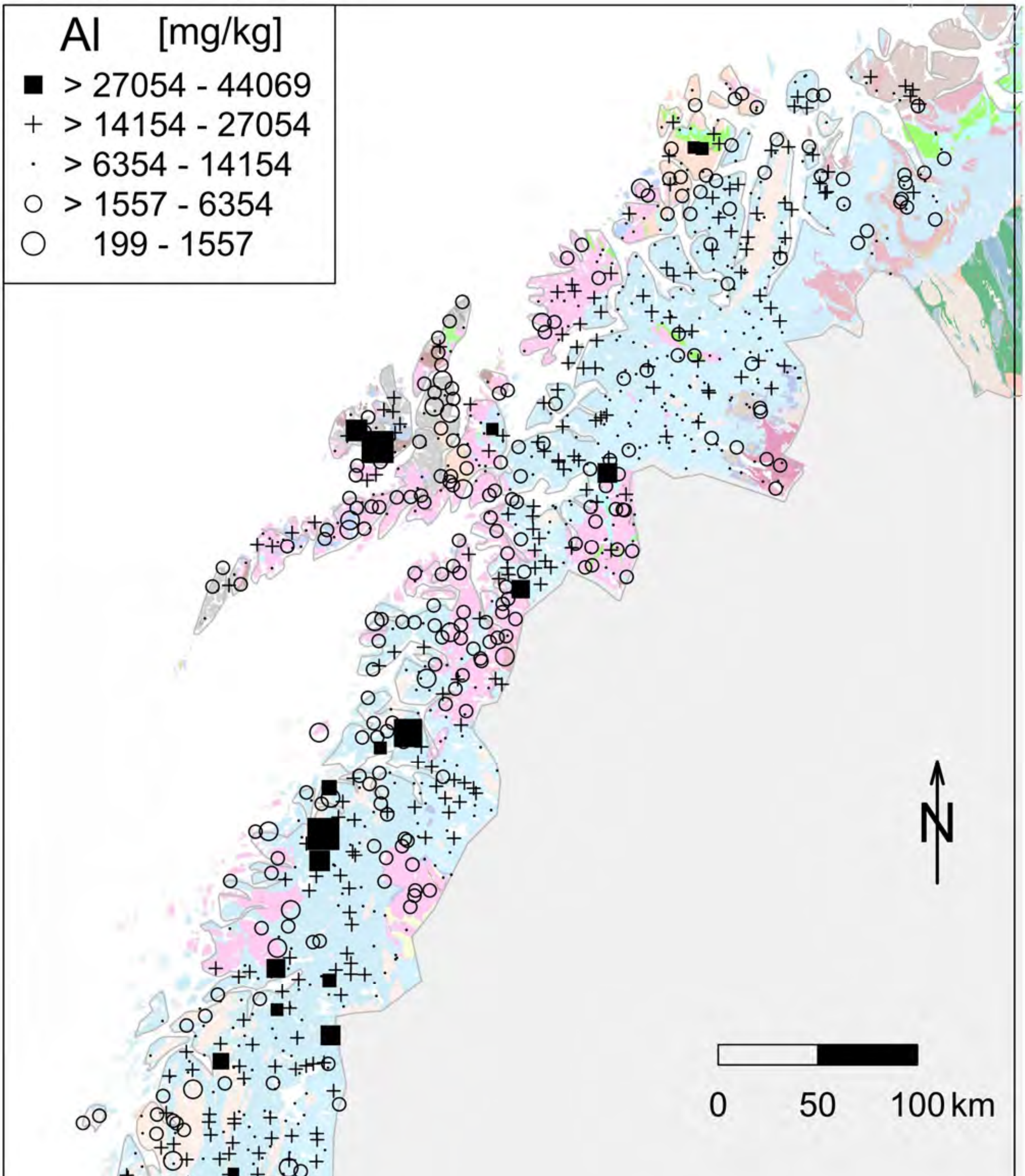
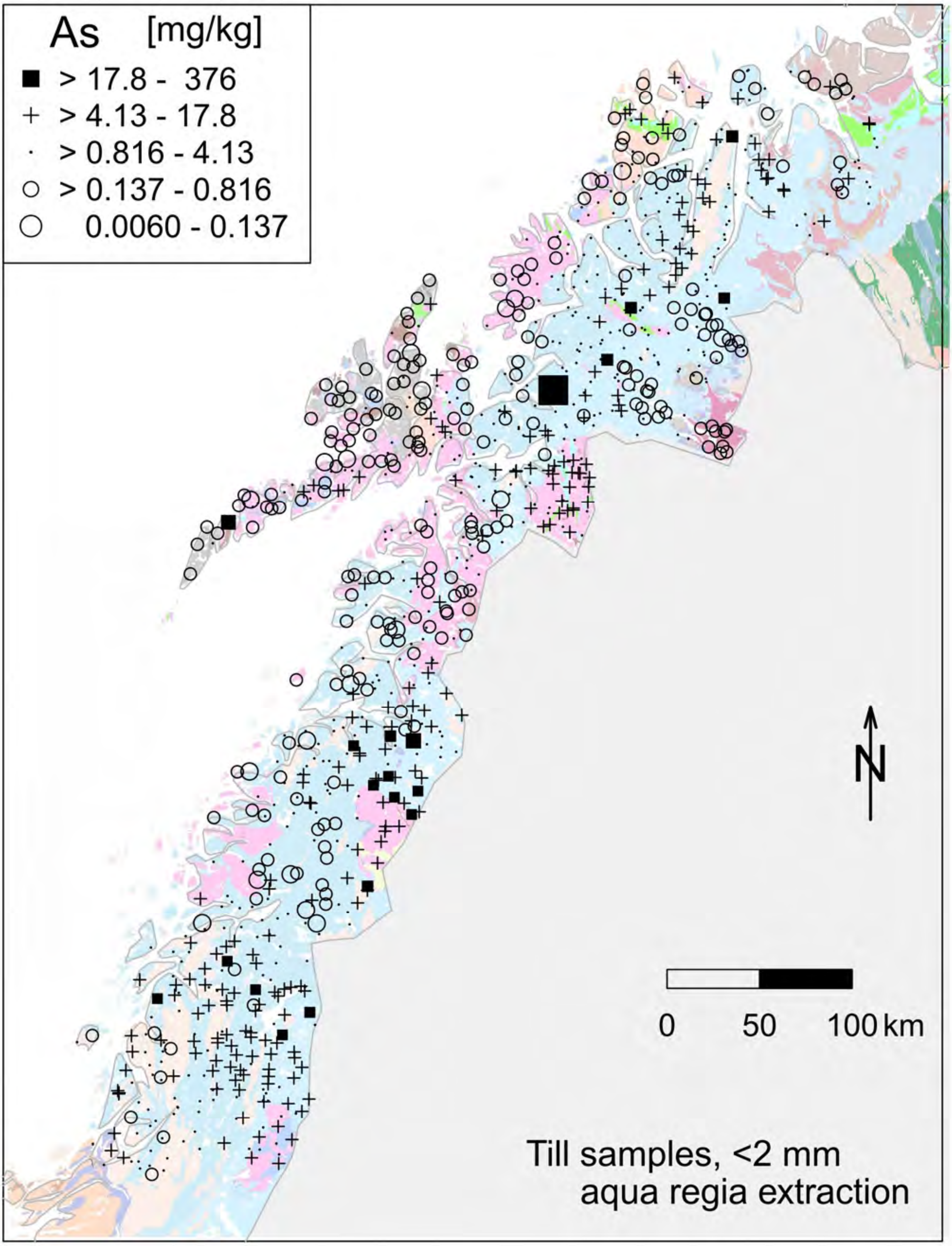
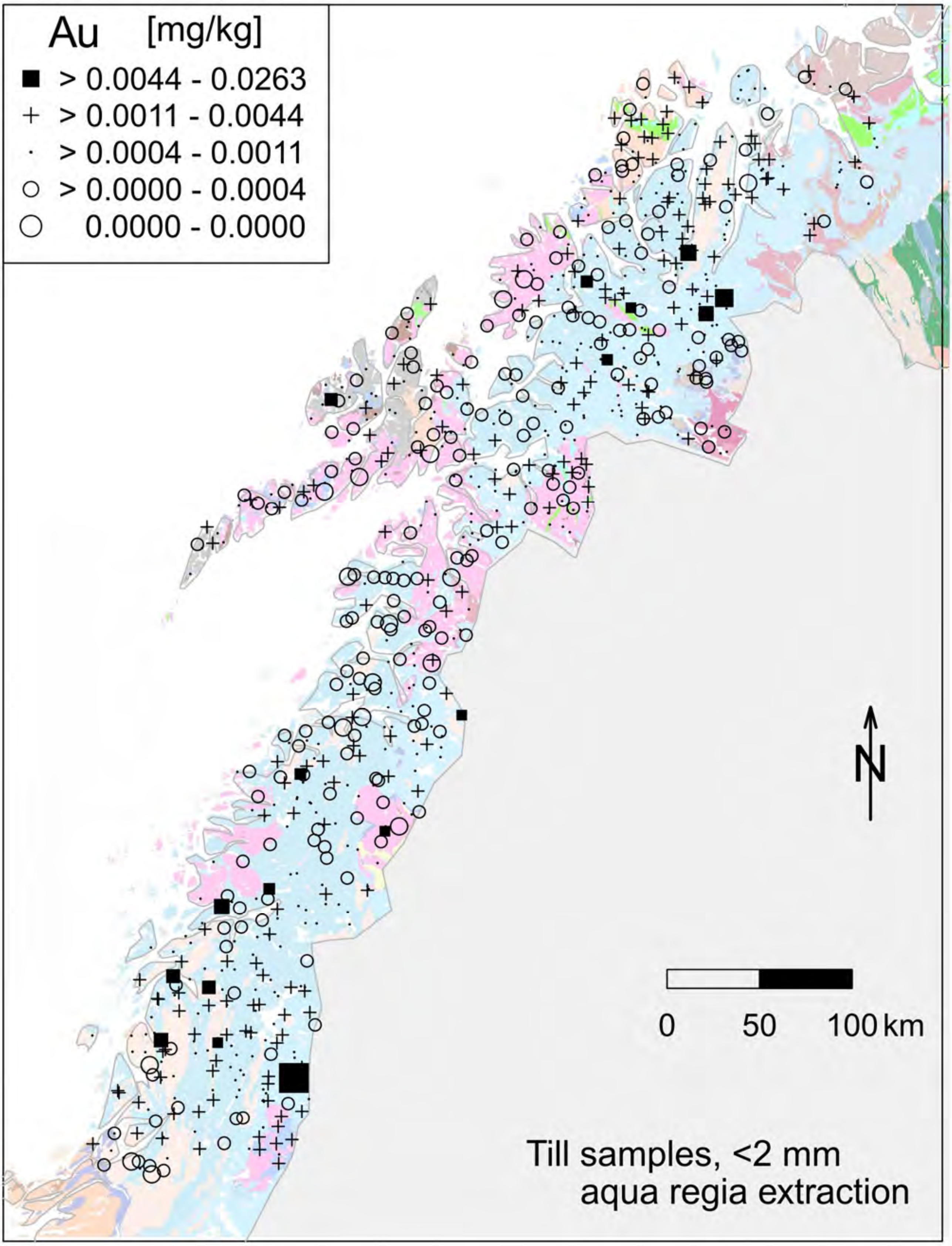
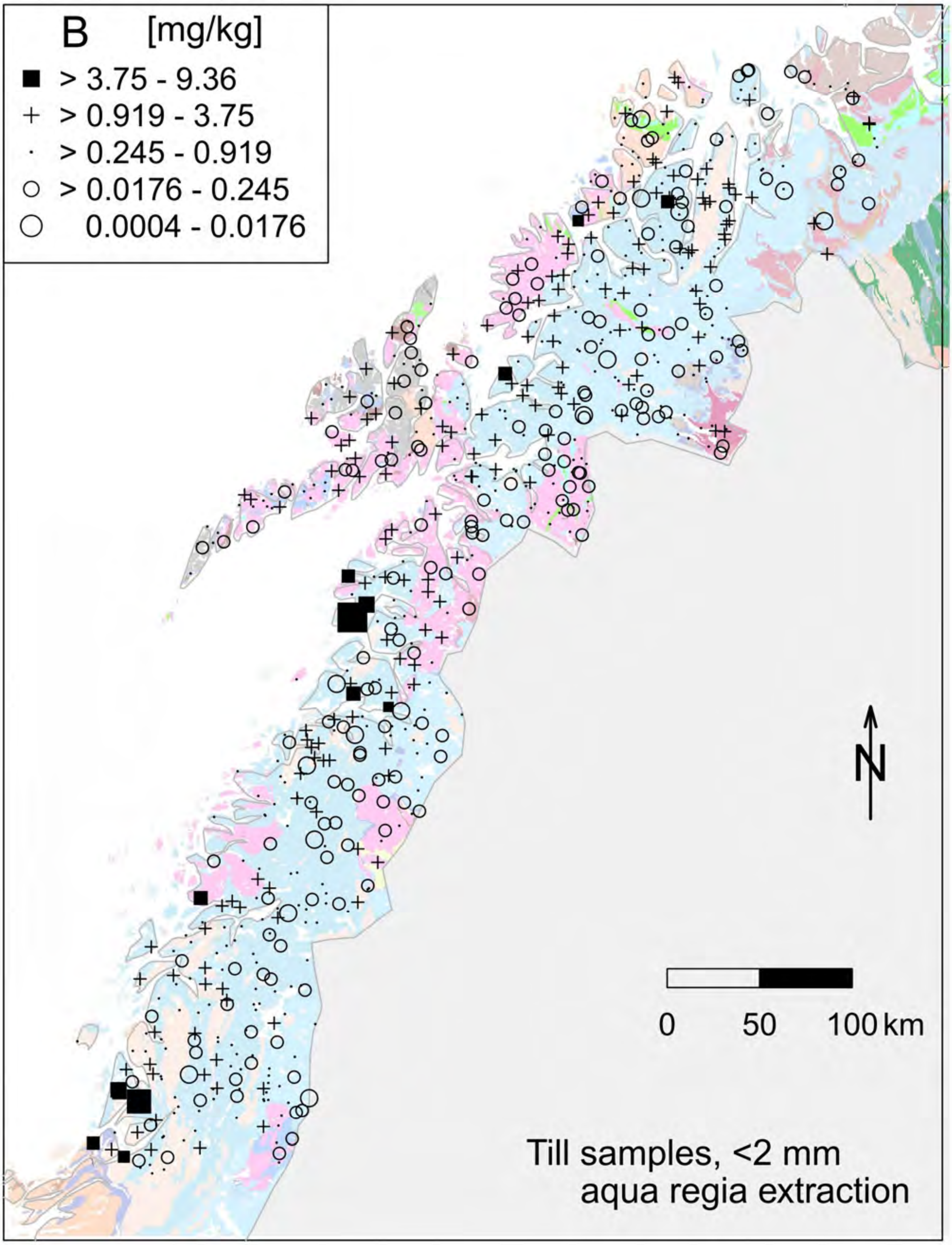
mg/kg
Finnmark
Nordlandtroms
Zr

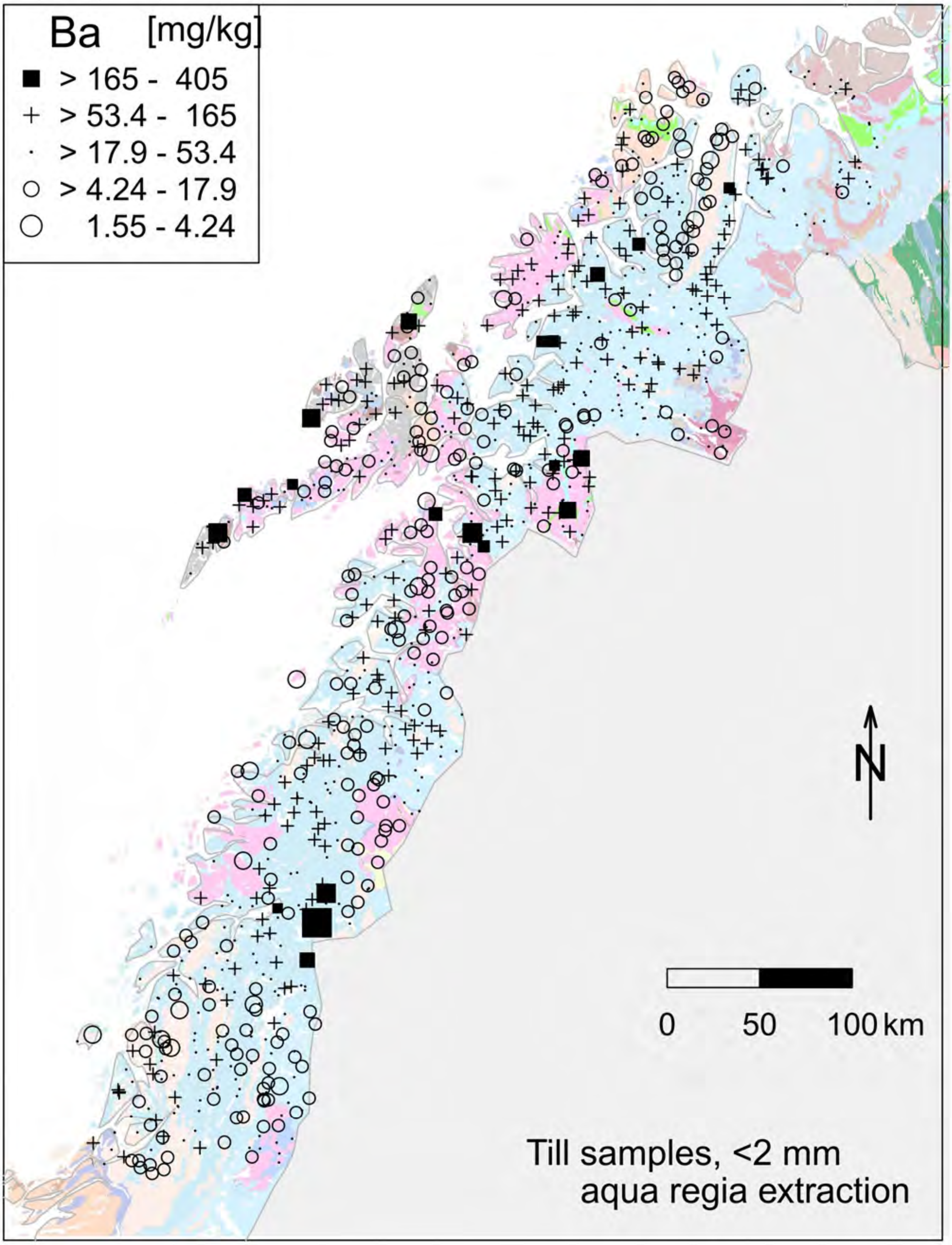

Ag [mg/kg]
> 0.122 - 0.450
> 0.0320 - 0.122
> 0.0080 - 0.0320
> 0.0011 - 0.0080
0.0001 - 0.0011
N
0 50 100 km
Till samples, <2 mm
aqua regia extraction

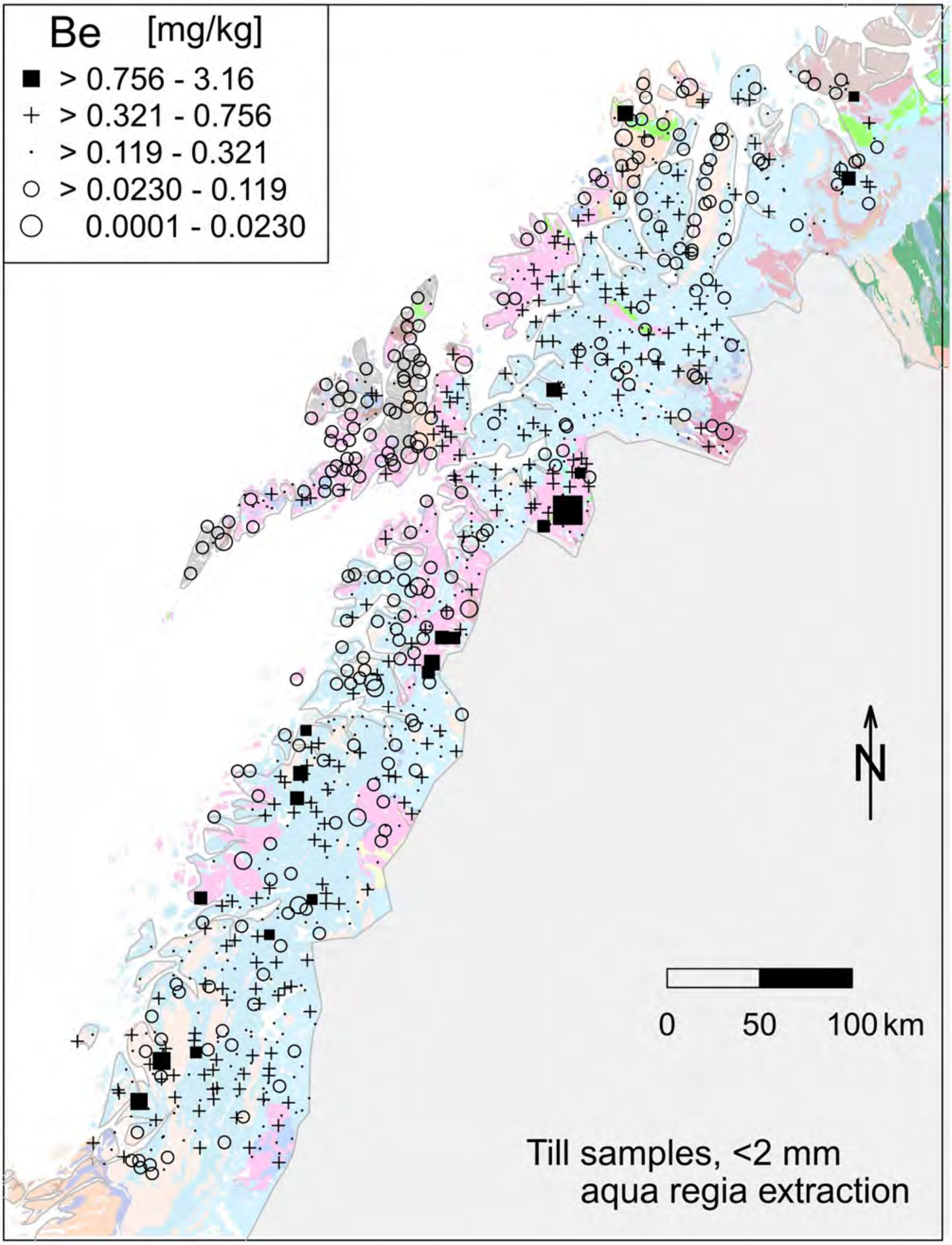

Al [mg/kg]
> 27054 - 44069
> 14154 - 27054
> 6354 - 14154
> 1557 - 6354
199 - 1557
N
0
50
100 km
Till samples, <2 mm
aqua regia extraction

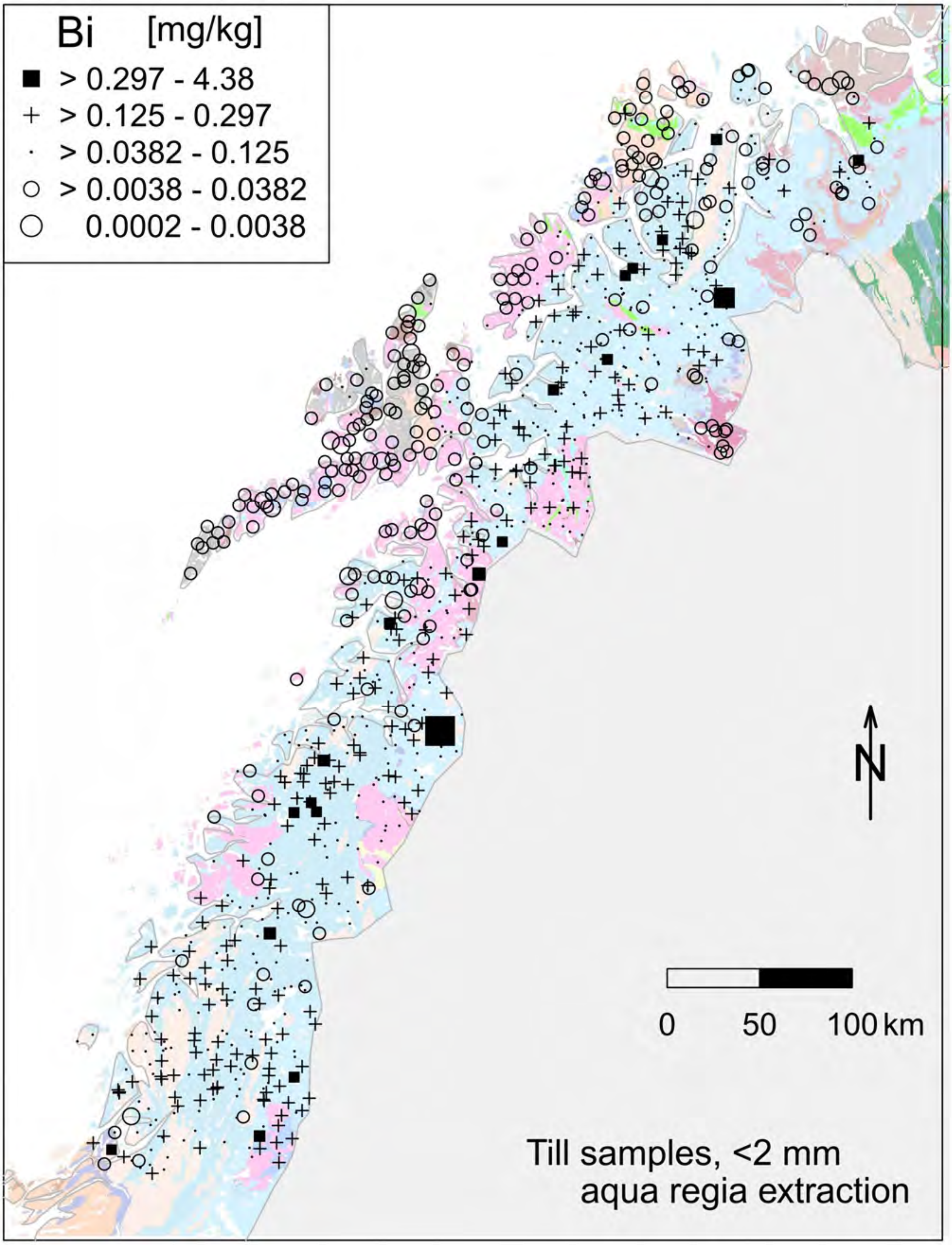

As [mg/kg]
> 17.8 - 376
> 4.13 - 17.8
> 0.816 - 4.13
> 0.137 - 0.816
0.0060 - 0.137
N
0
50
100 km
Till samples, <2 mm
aqua regia extraction

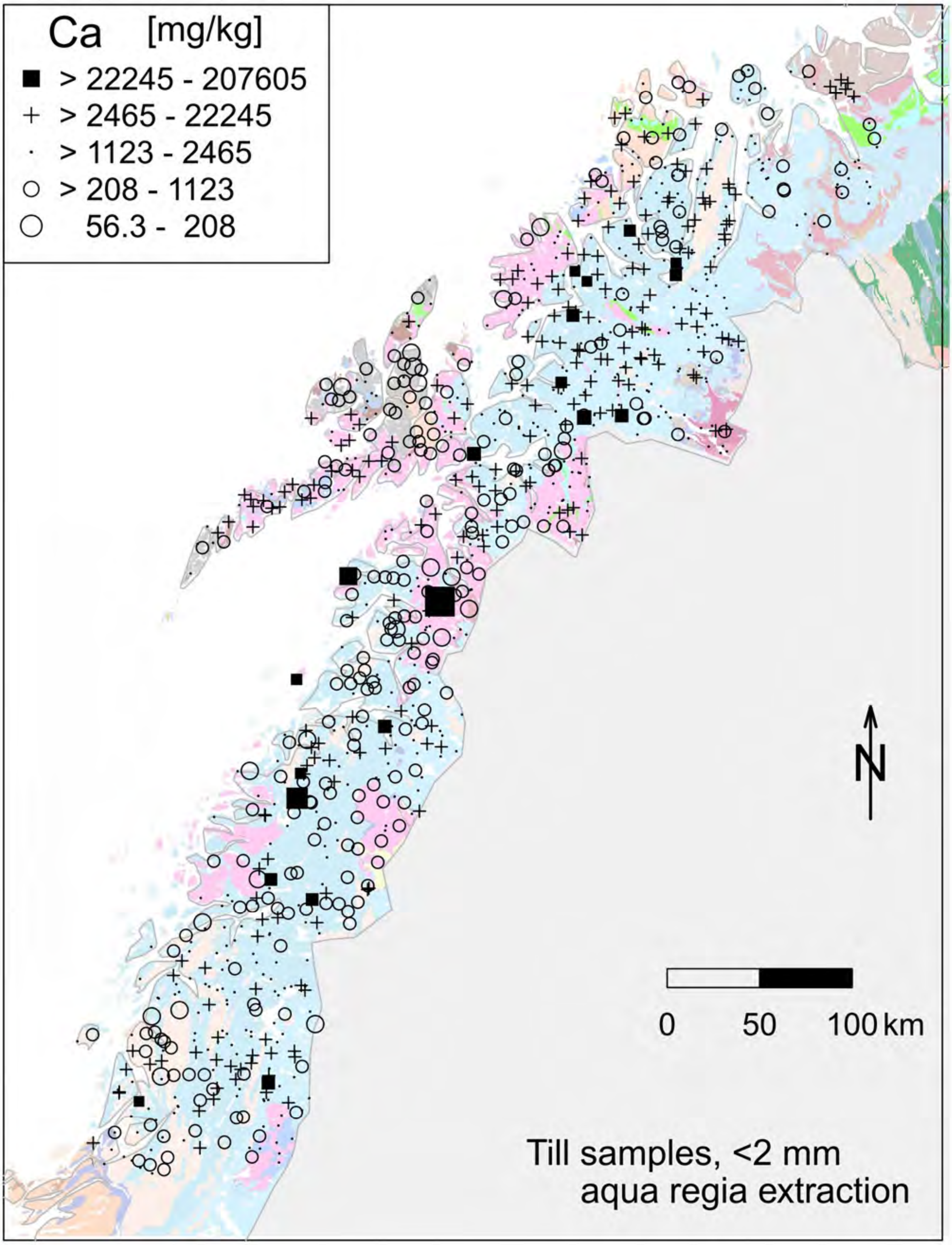

Au [mg/kg]
> 0.0044 - 0.0263
> 0.0011 - 0.0044
> 0.0004 - 0.0011
> 0.0000 - 0.0004
0.0000 - 0.0000
N
0
50
100 km
Till samples, <2 mm
aqua regia extraction

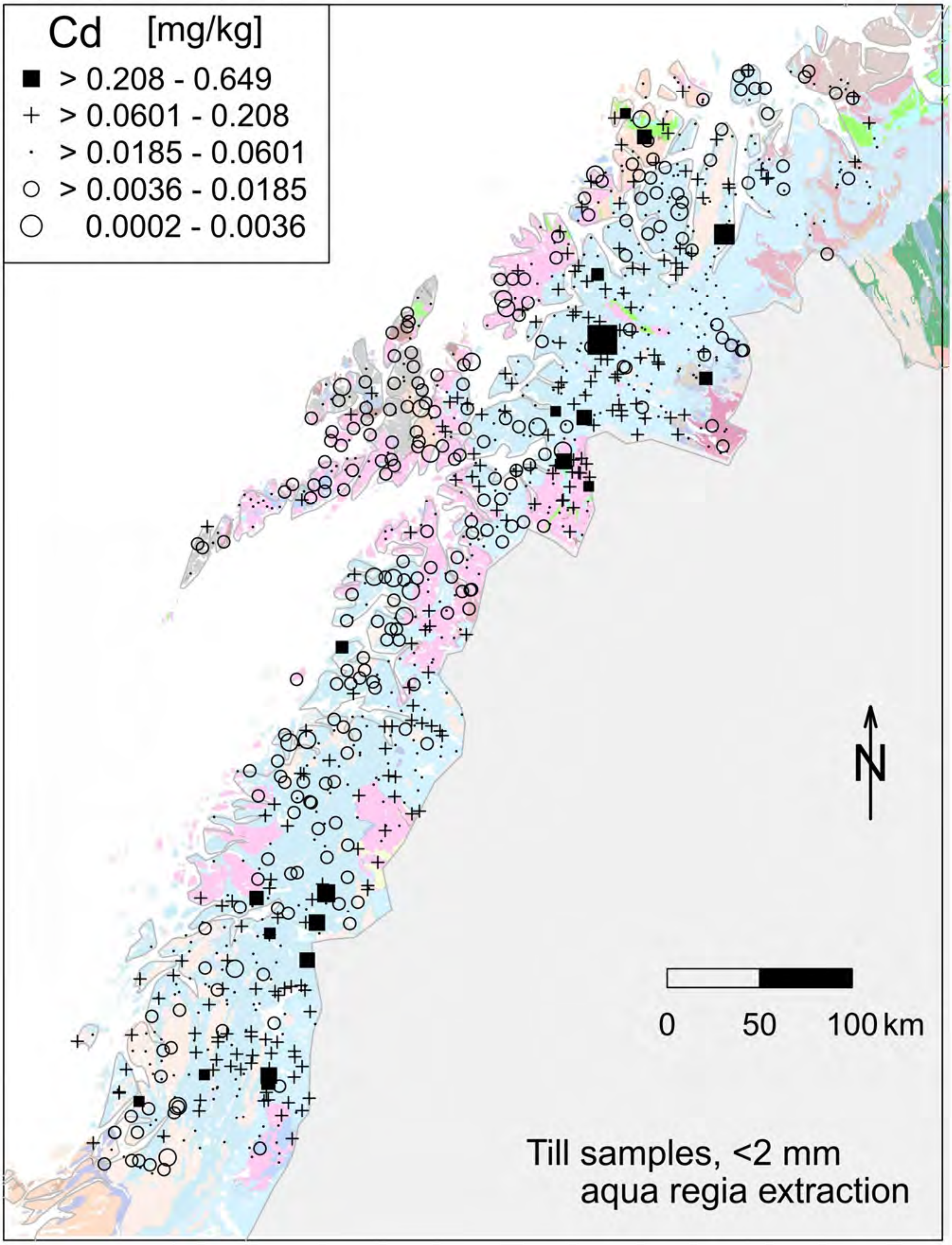

B [mg/kg]
> 3.75 - 9.36
> 0.919 - 3.75
> 0.245 - 0.919
> 0.0176 - 0.245
0.0004 - 0.0176
N
0 50 100 km
Till samples, <2 mm
aqua regia extraction

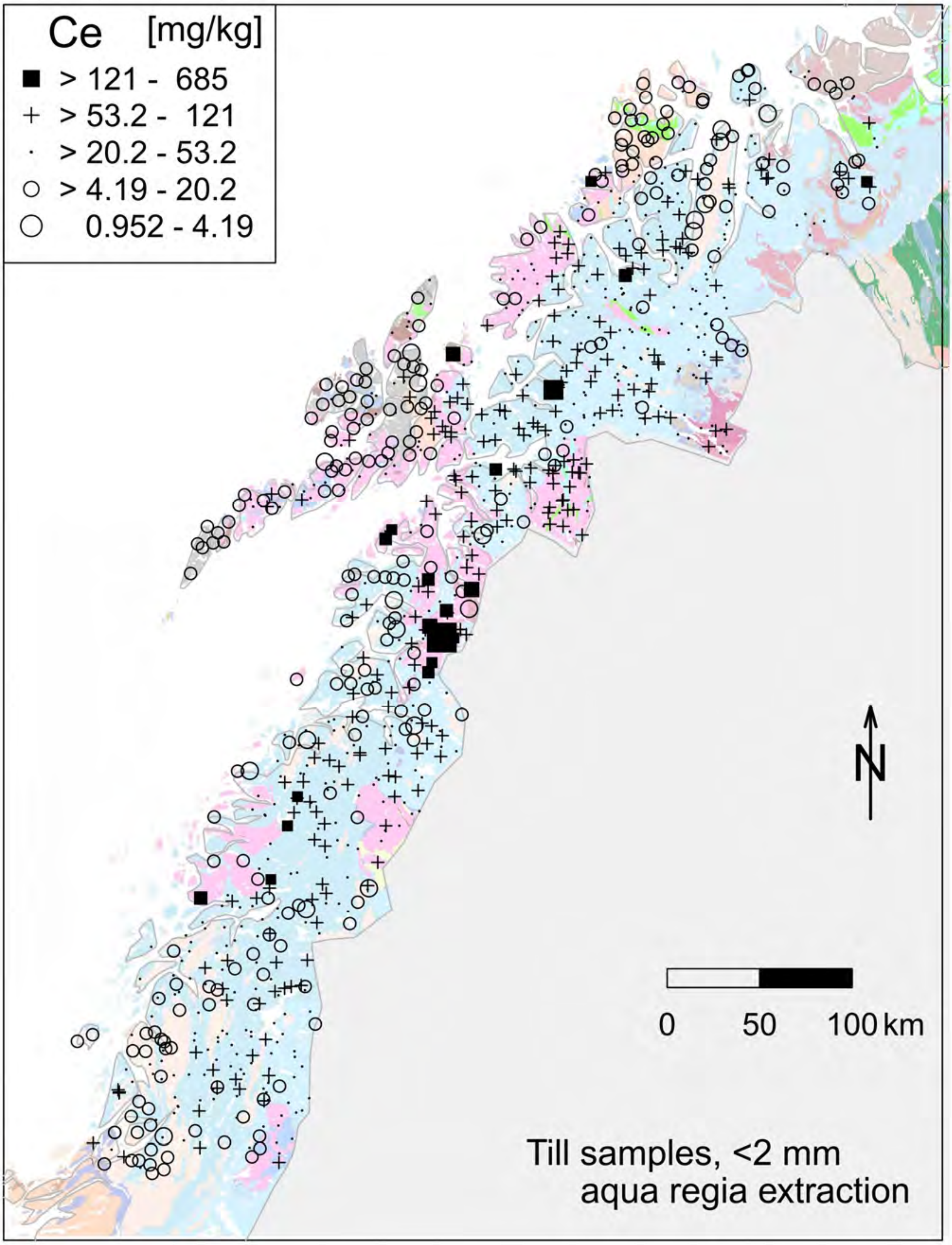

Ba [mg/kg]
> 165 - 405
> 53.4 - 165
> 17.9 - 53.4
> 4.24 - 17.9
1.55 - 4.24
N
0 50 100 km
Till samples, <2 mm
aqua regia extraction

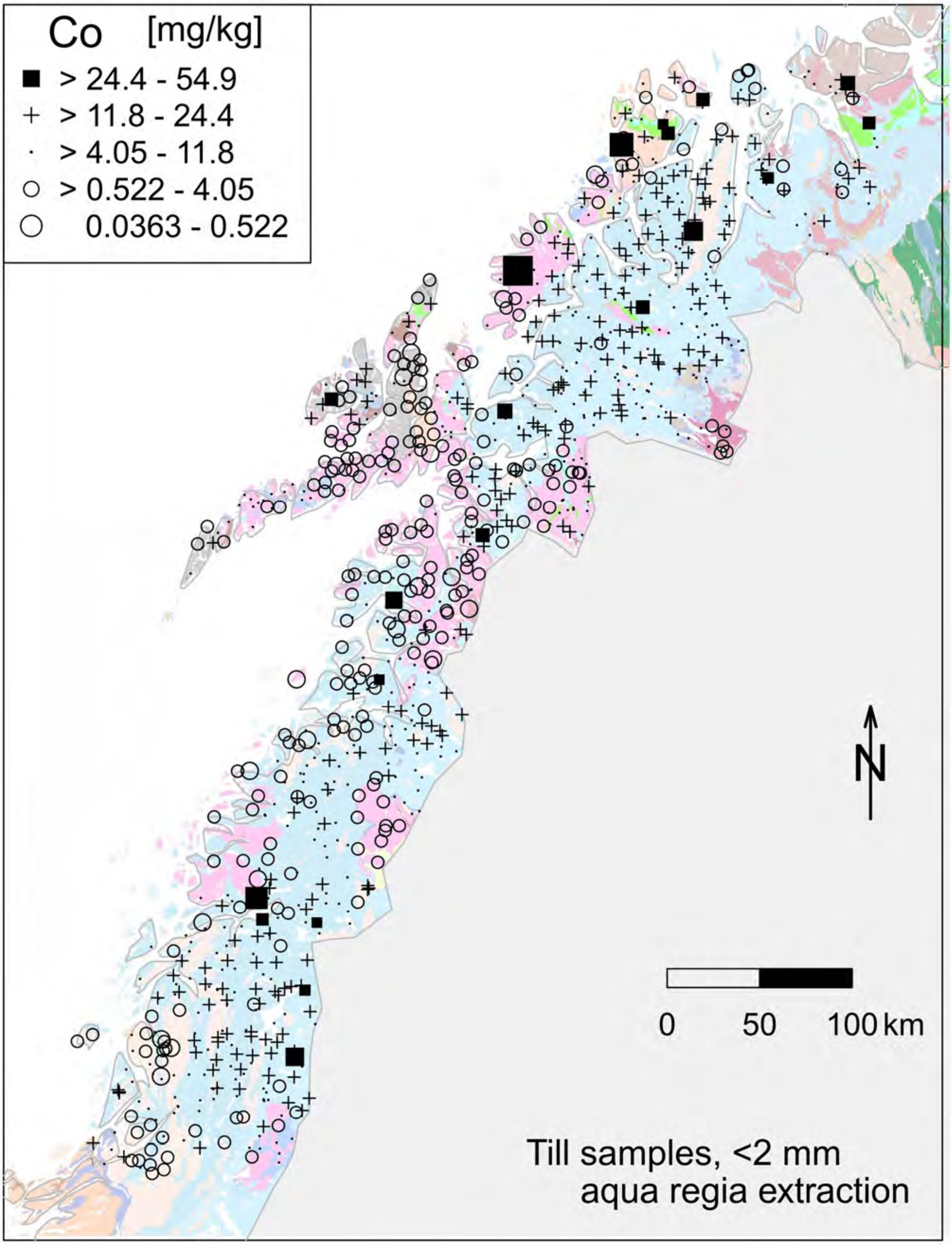

Be [mg/kg]
> 0.756 - 3.16
> 0.321 - 0.756
> 0.119 - 0.321
> 0.0230 - 0.119
0.0001 - 0.0230
N
0
50
100 km
Till samples, <2 mm
aqua regia extraction

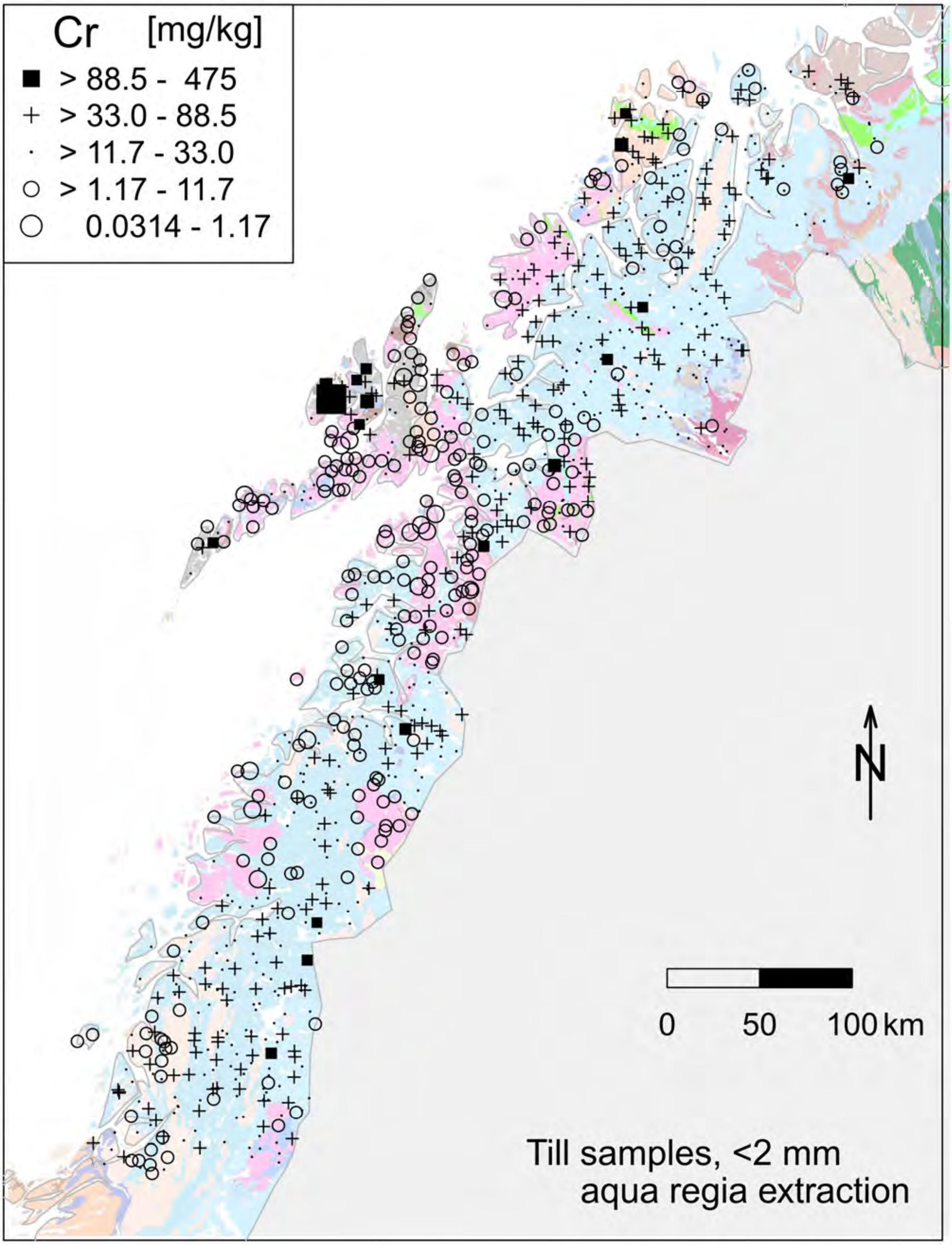

Bi [mg/kg]
> 0.297 - 4.38
> 0.125 - 0.297
> 0.0382 - 0.125
> 0.0038 - 0.0382
0.0002 - 0.0038
N
0 50 100 km
Till samples, <2 mm
aqua regia extraction

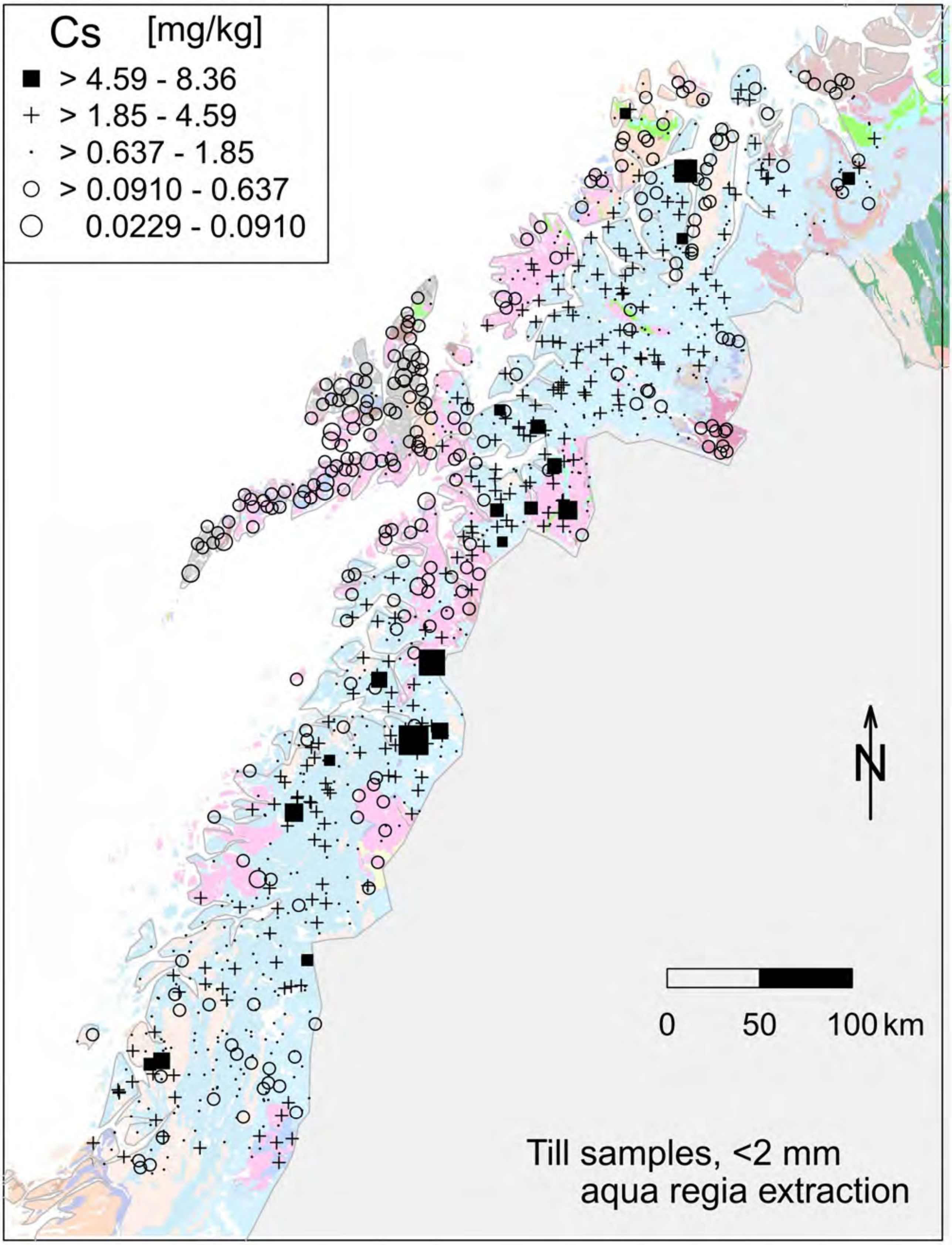

Ca [mg/kg]
> 22245 - 207605
> 2465 - 22245
> 1123 - 2465
> 208 - 1123
56.3 - 208
N
0 50 100 km
Till samples, <2 mm
aqua regia extraction

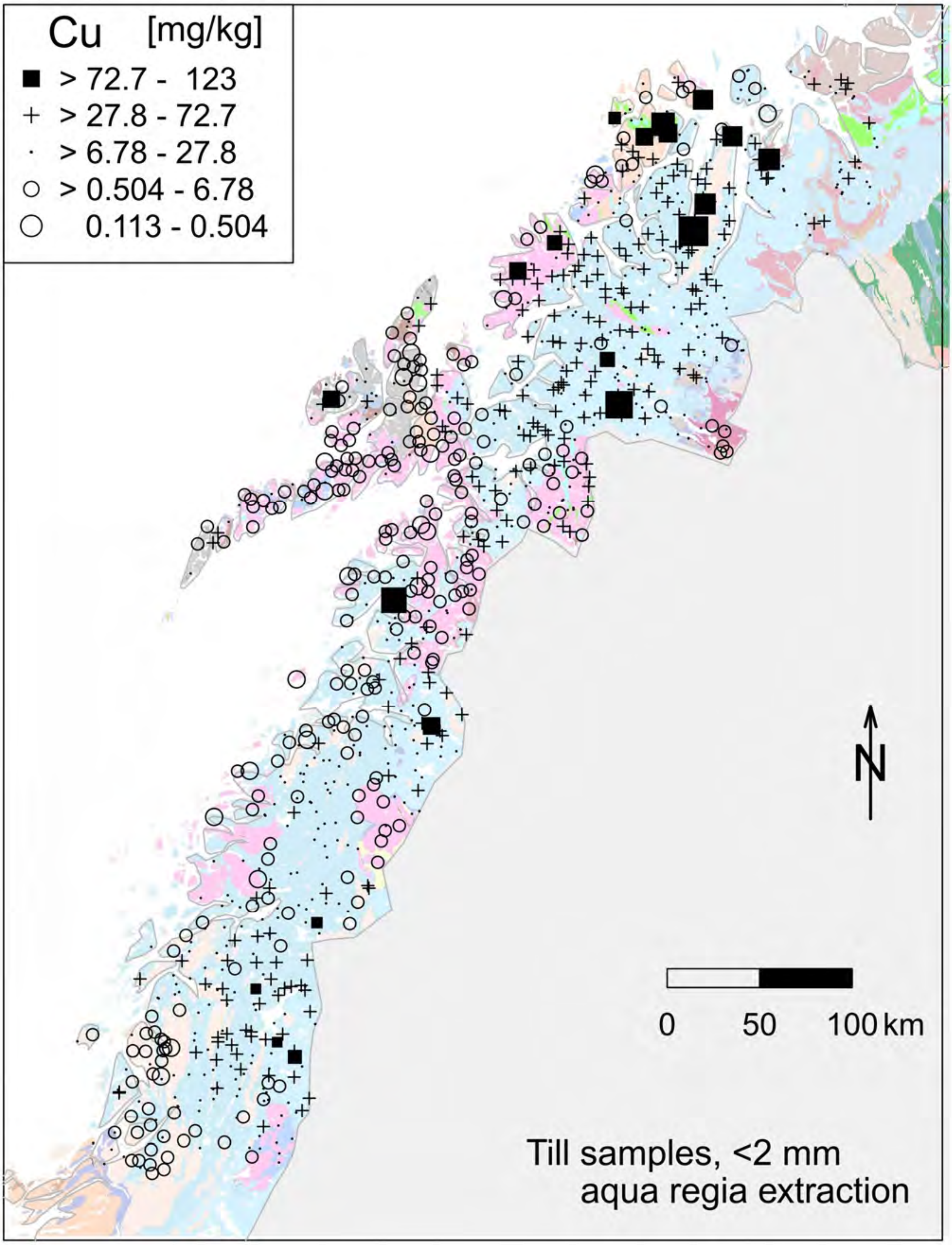

Cd [mg/kg]
> 0.208 - 0.649
> 0.0601 - 0.208
> 0.0185 - 0.0601
> 0.0036 - 0.0185
0.0002 - 0.0036
N
0 50 100 km
Till samples, <2 mm
aqua regia extraction

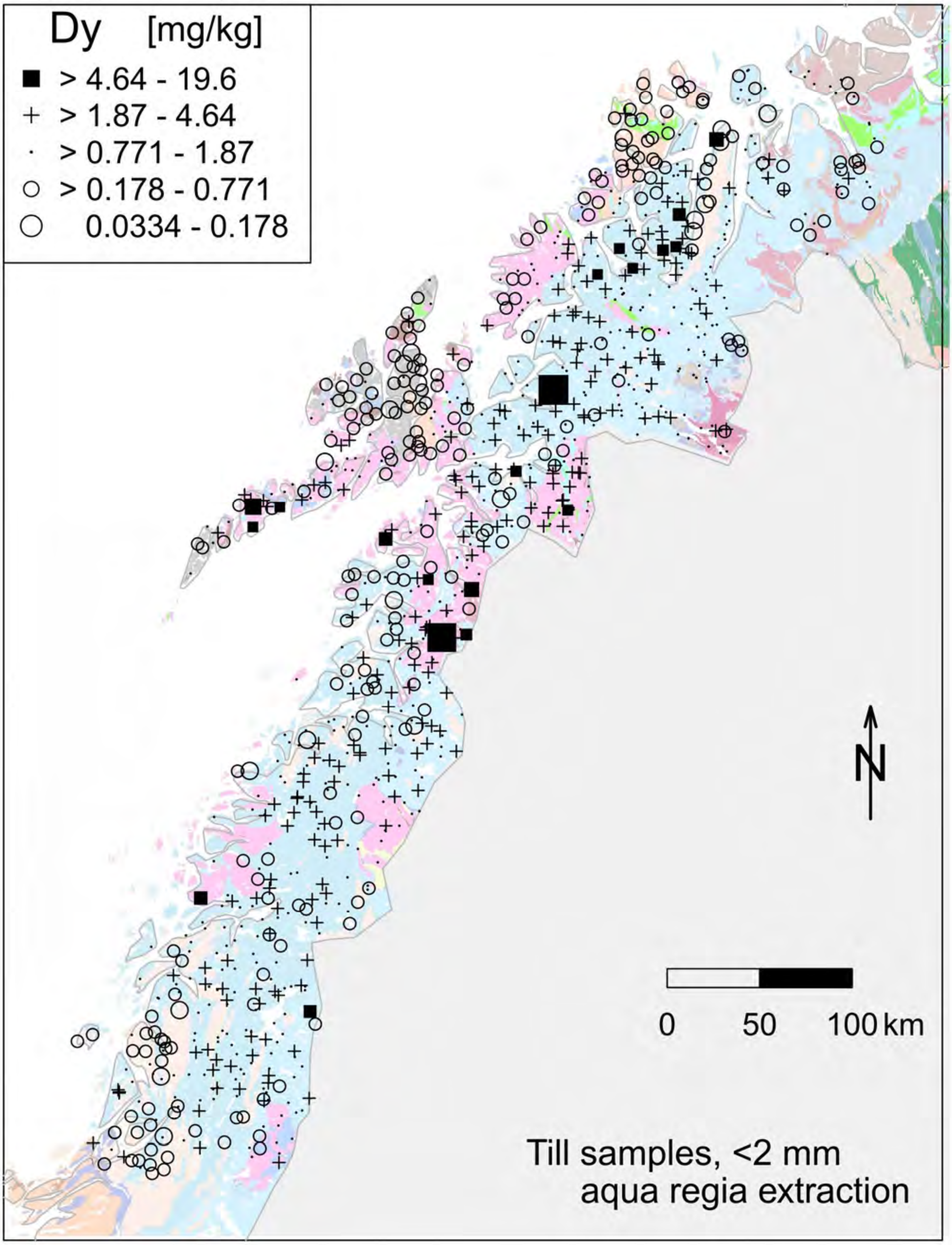

Ce [mg/kg]
> 121 - 685
> 53.2 - 121
> 20.2 - 53.2
> 4.19 - 20.2
0.952 - 4.19
N
0 50 100 km
Till samples, <2 mm
aqua regia extraction

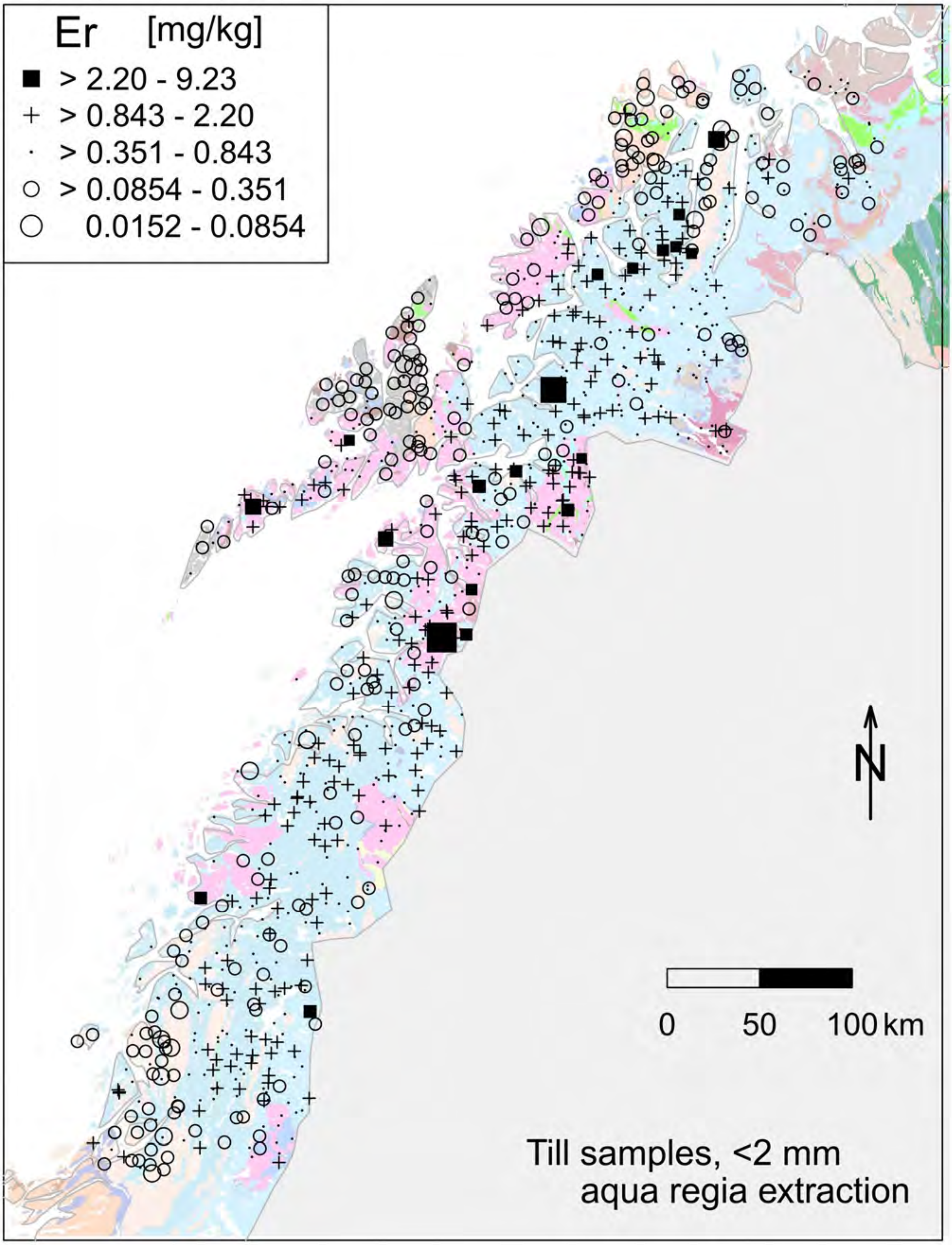

Co [mg/kg]
> 24.4 - 54.9
> 11.8 - 24.4
> 4.05 - 11.8
> 0.522 - 4.05
0.0363 - 0.522
N
0
50
100 km
Till samples, <2 mm
aqua regia extraction

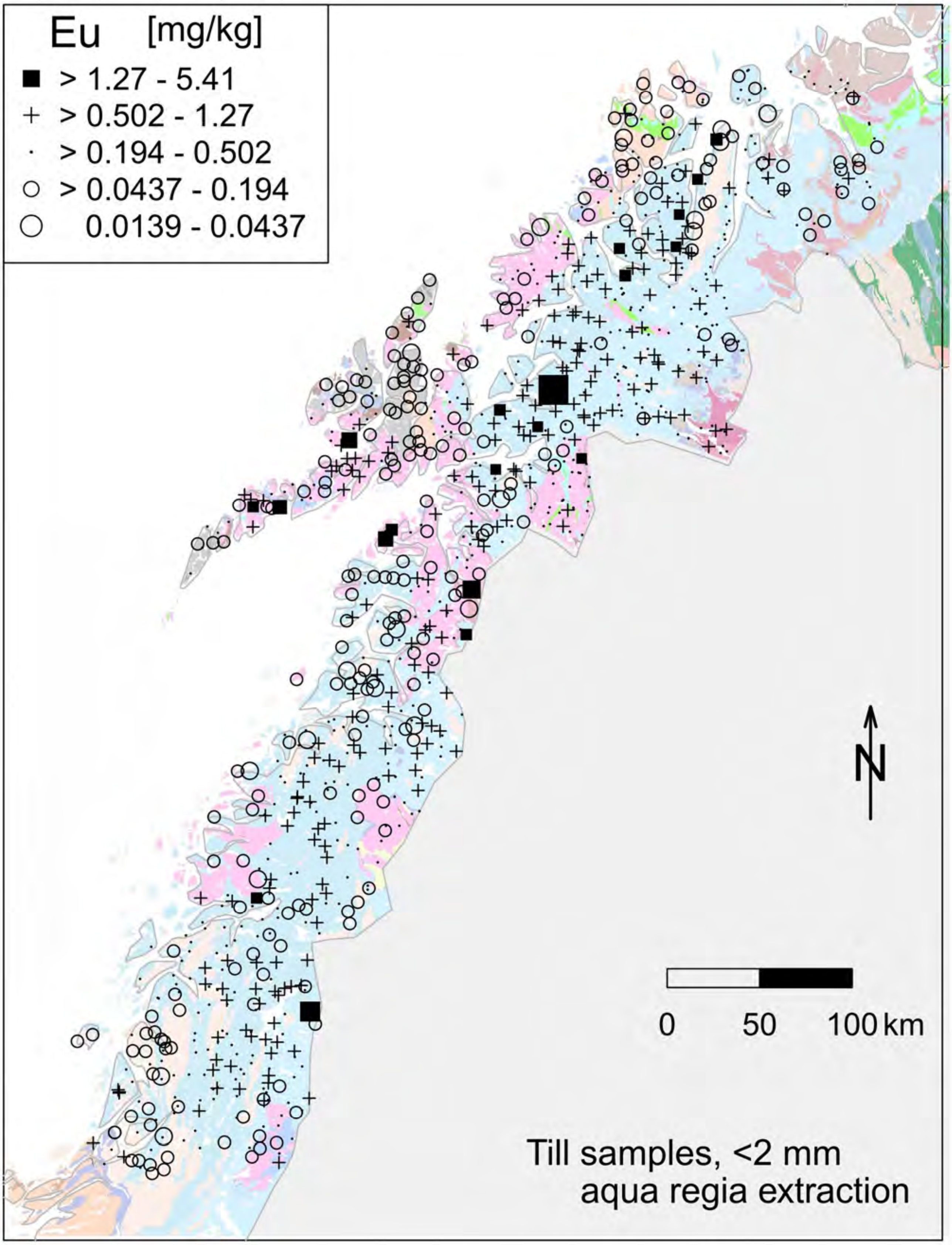

Cr [mg/kg]
> 88.5 - 475
> 33.0 - 88.5
> 11.7 - 33.0
> 1.17 - 11.7
0.0314 - 1.17
N
0 50 100 km
Till samples, <2 mm
aqua regia extraction

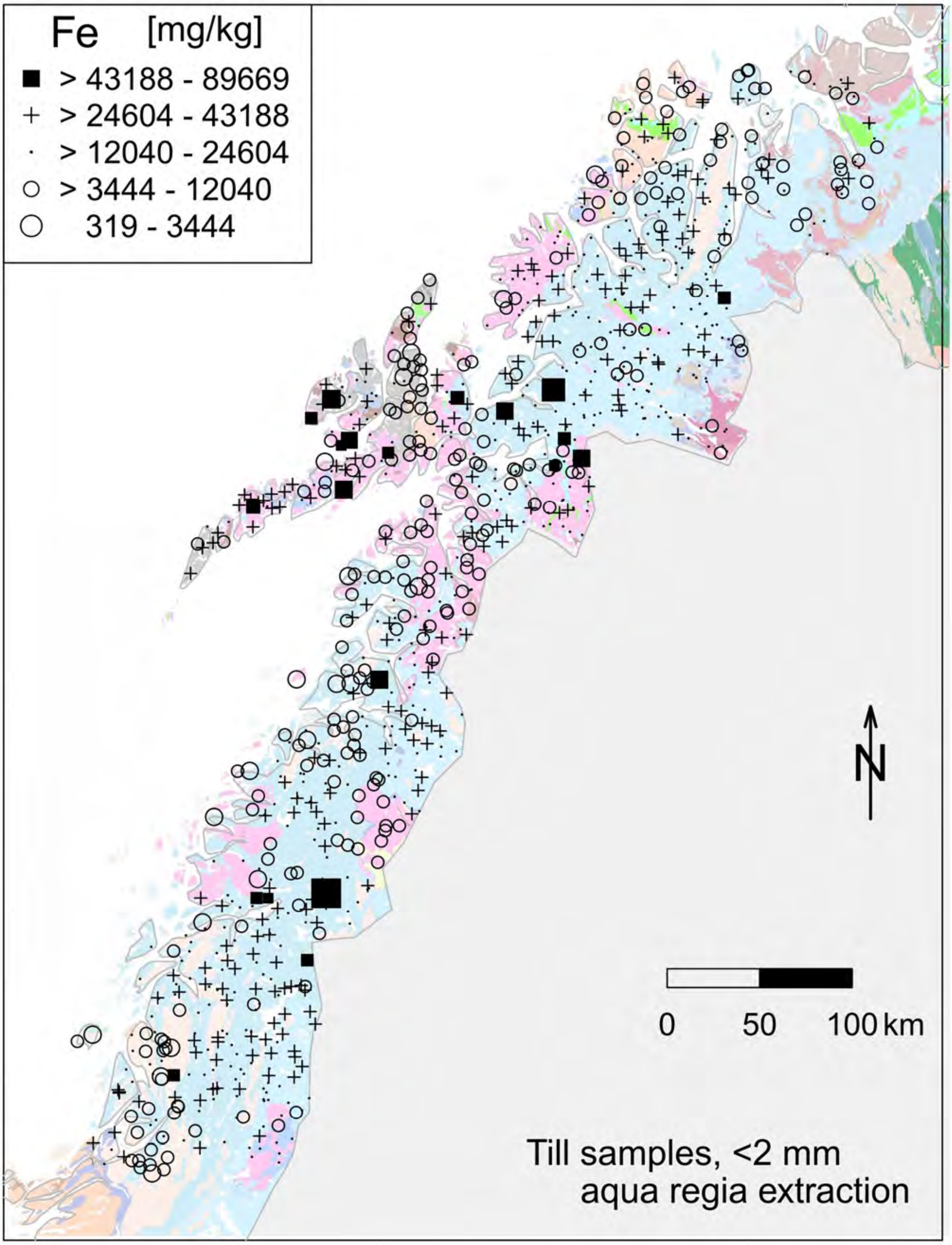

Cs [mg/kg]
> 4.59 - 8.36
> 1.85 - 4.59
> 0.637 - 1.85
> 0.0910 - 0.637
0.0229 - 0.0910
N
0 50 100 km
Till samples, <2 mm
aqua regia extraction

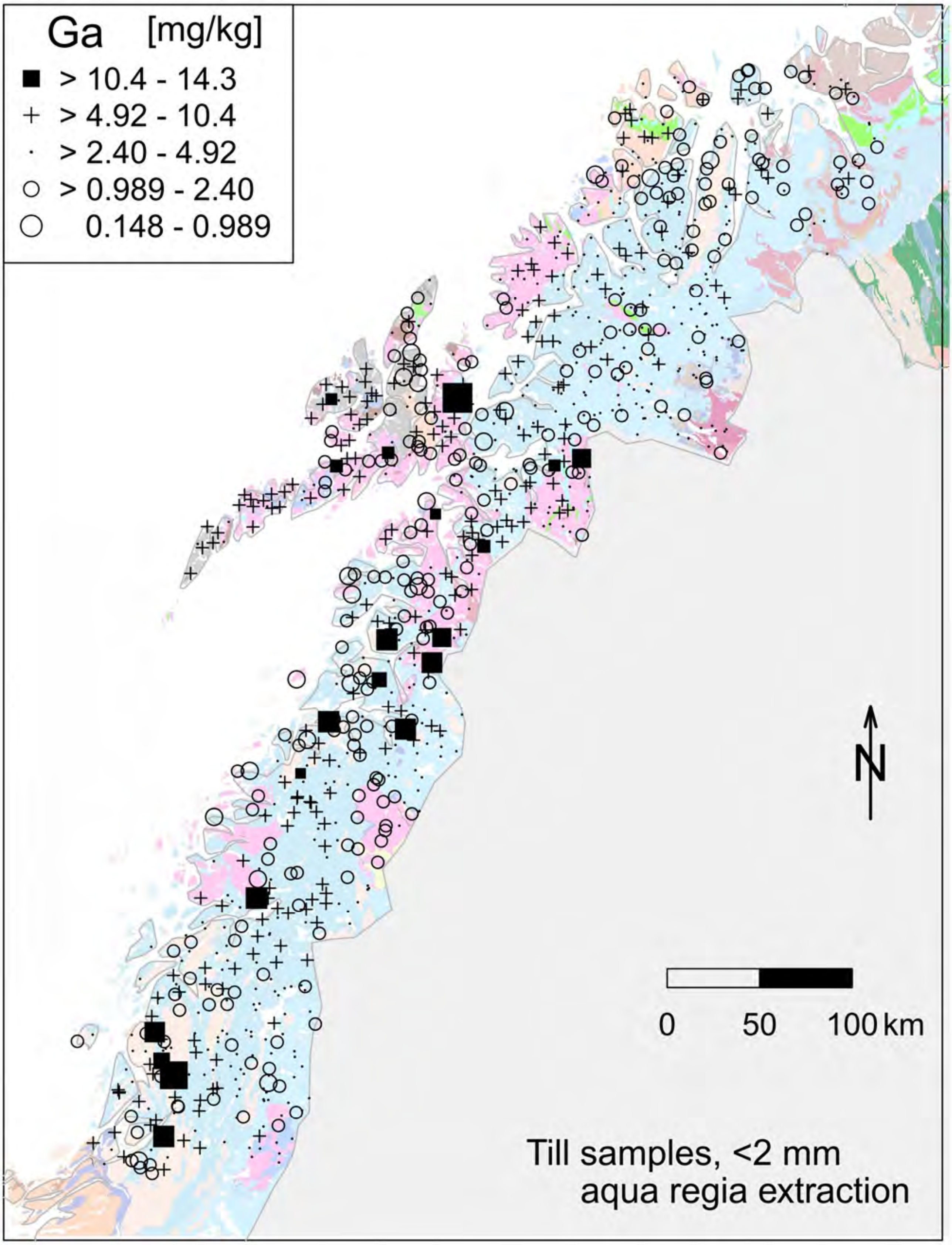

Cu [mg/kg]
> 72.7 - 123
> 27.8 - 72.7
> 6.78 - 27.8
> 0.504 - 6.78
0.113 - 0.504
N
0 50 100 km
Till samples, <2 mm
aqua regia extraction

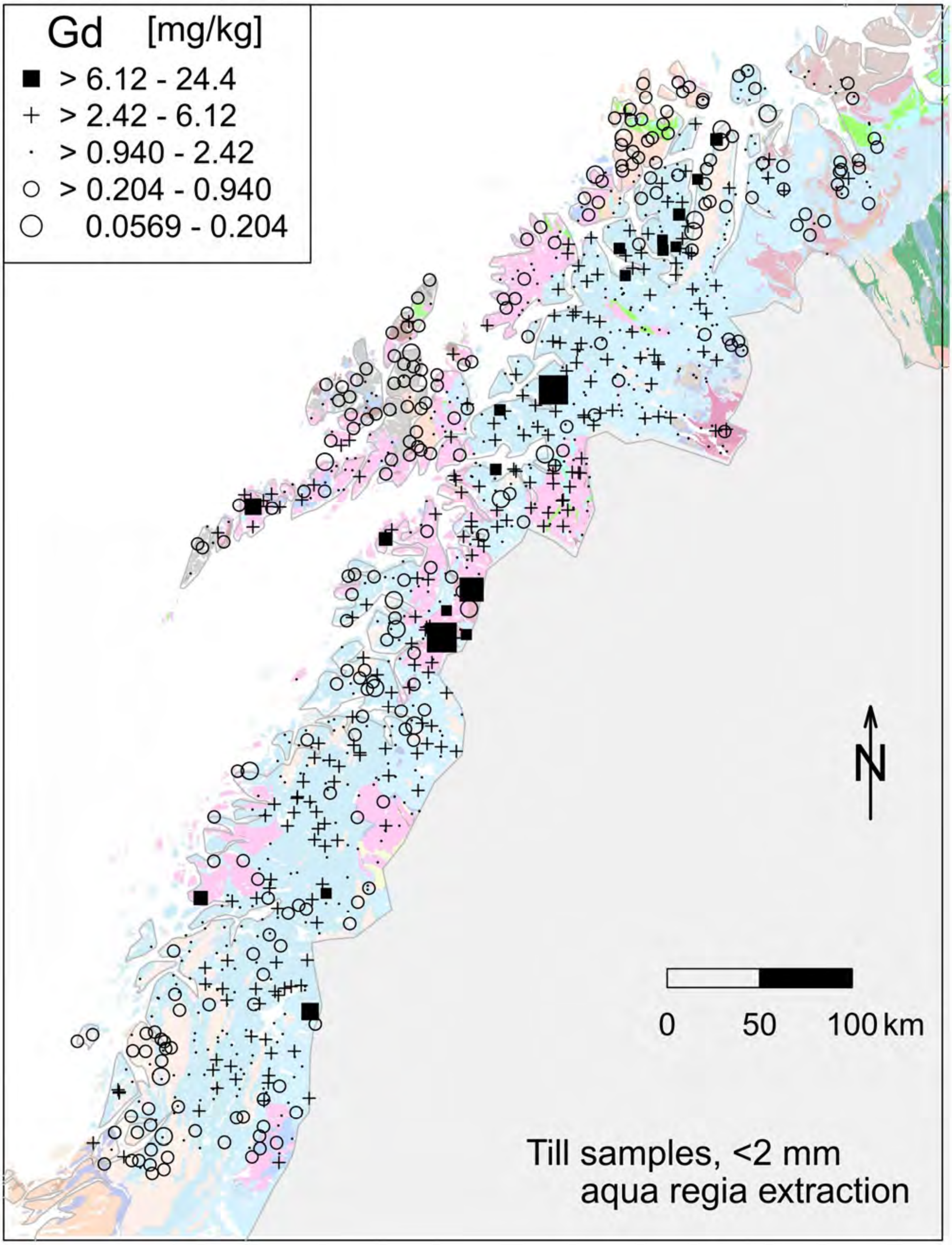

Dy [mg/kg]
> 4.64 - 19.6
> 1.87 - 4.64
> 0.771 - 1.87
> 0.178 - 0.771
0.0334 - 0.178
N
0 50 100 km
Till samples, <2 mm
aqua regia extraction

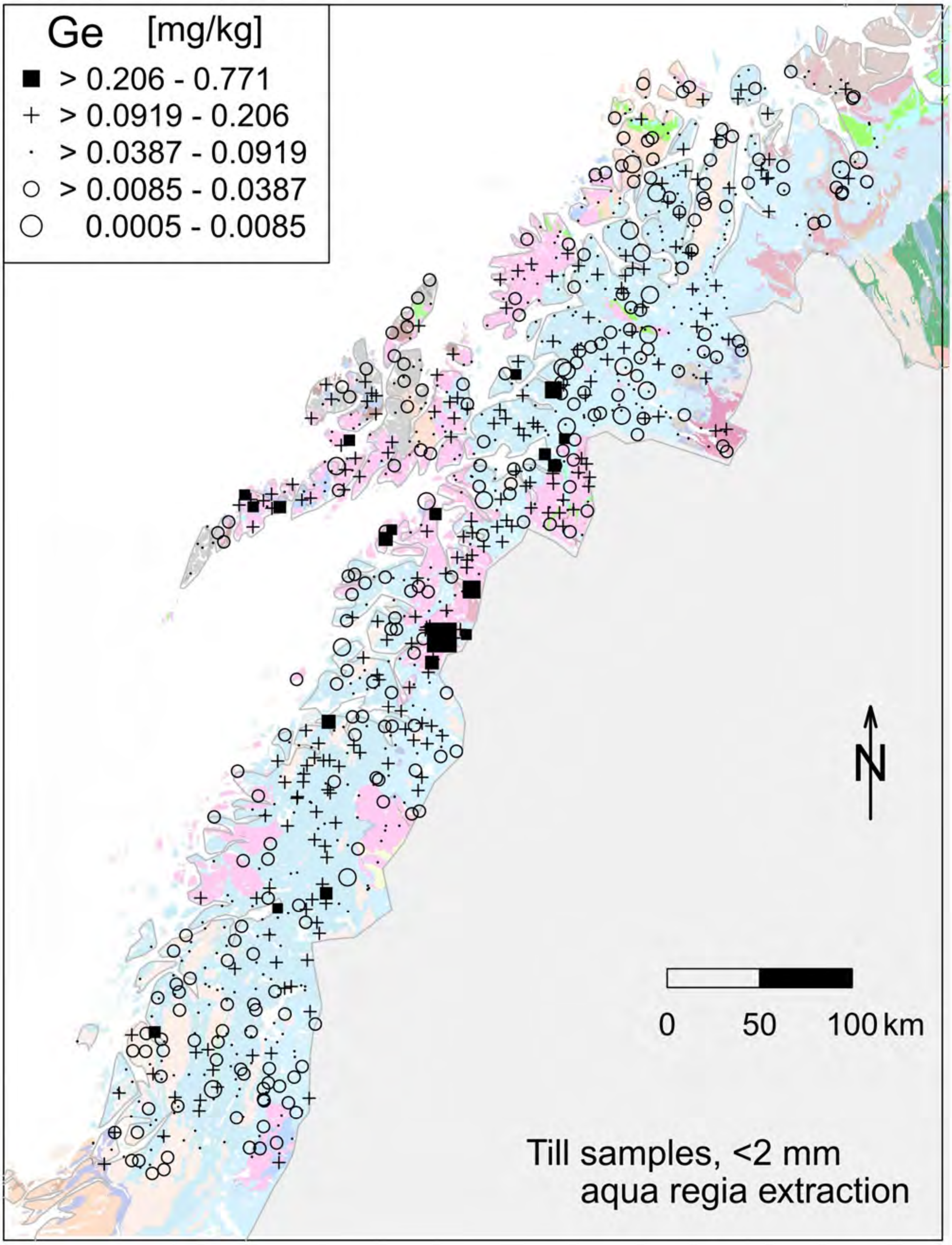

Er [mg/kg]
> 2.20 - 9.23
> 0.843 - 2.20
> 0.351 - 0.843
> 0.0854 - 0.351
0.0152 - 0.0854
N
0 50 100 km
Till samples, <2 mm
aqua regia extraction

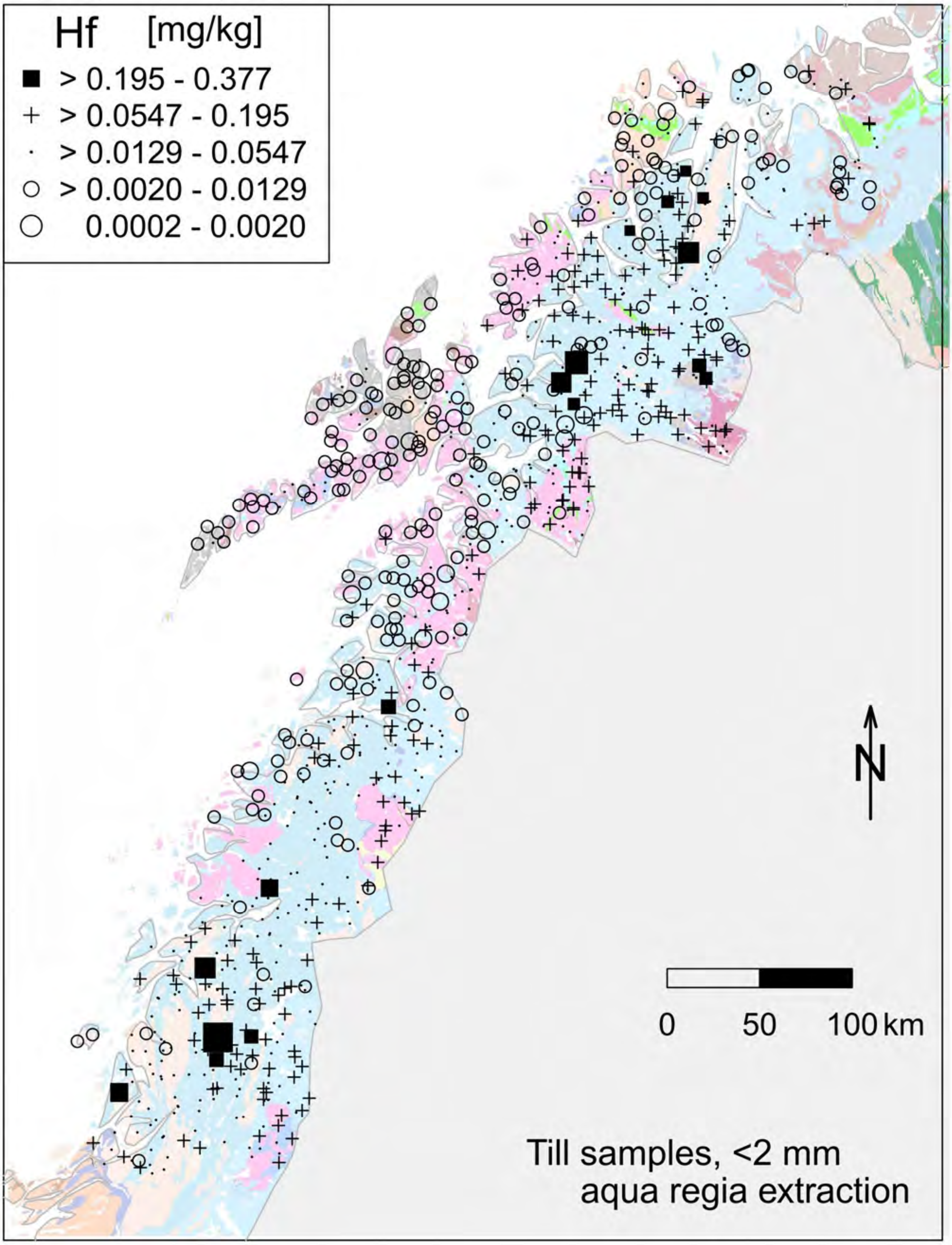

Eu [mg/kg]
> 1.27 - 5.41
> 0.502 - 1.27
> 0.194 - 0.502
> 0.0437 - 0.194
0.0139 - 0.0437
N
0 50 100 km
Till samples, <2 mm
aqua regia extraction

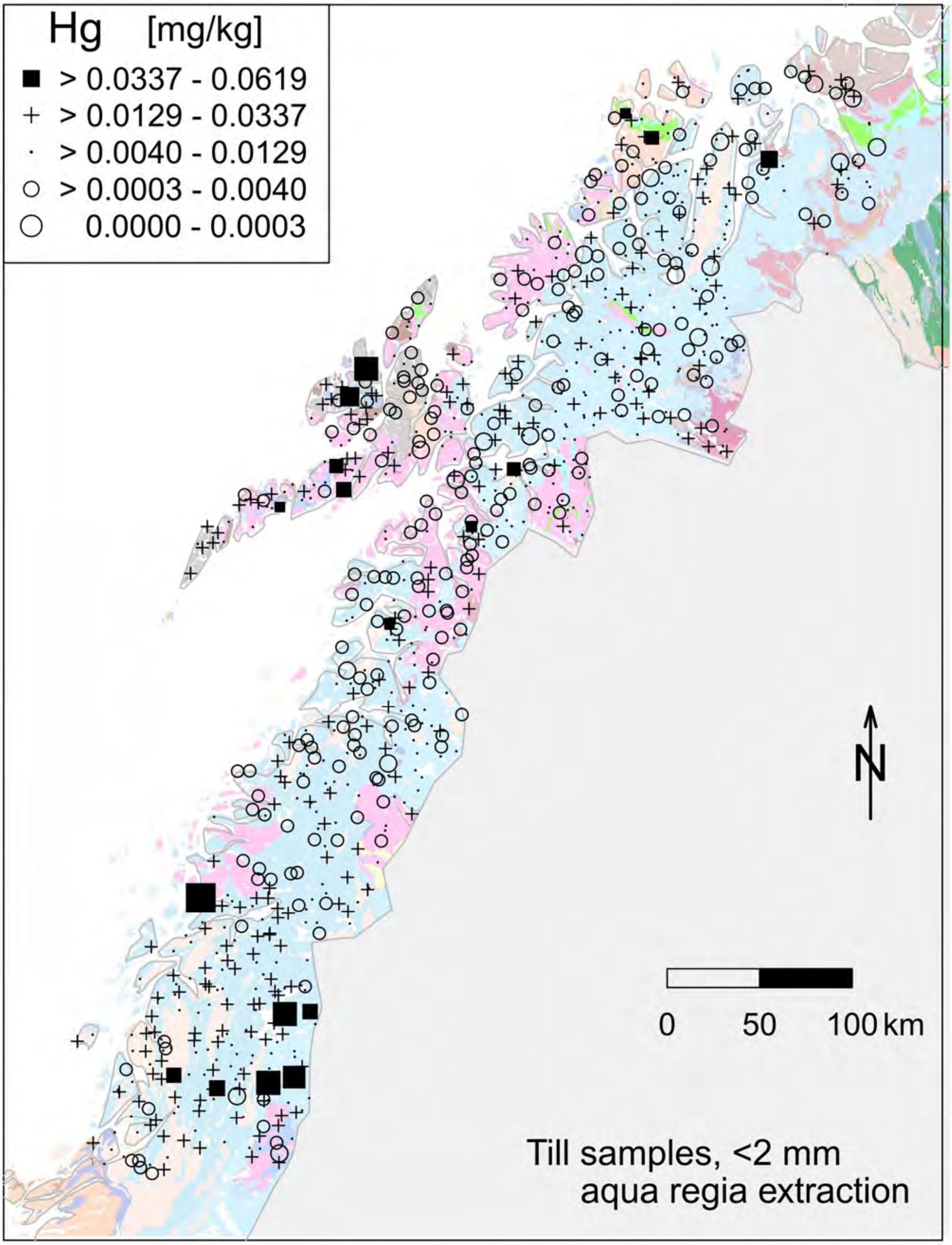

Fe [mg/kg]
> 43188 - 89669
> 24604 - 43188
> 12040 - 24604
> 3444 - 12040
319 - 3444
N
0 50 100 km
Till samples, <2 mm
aqua regia extraction

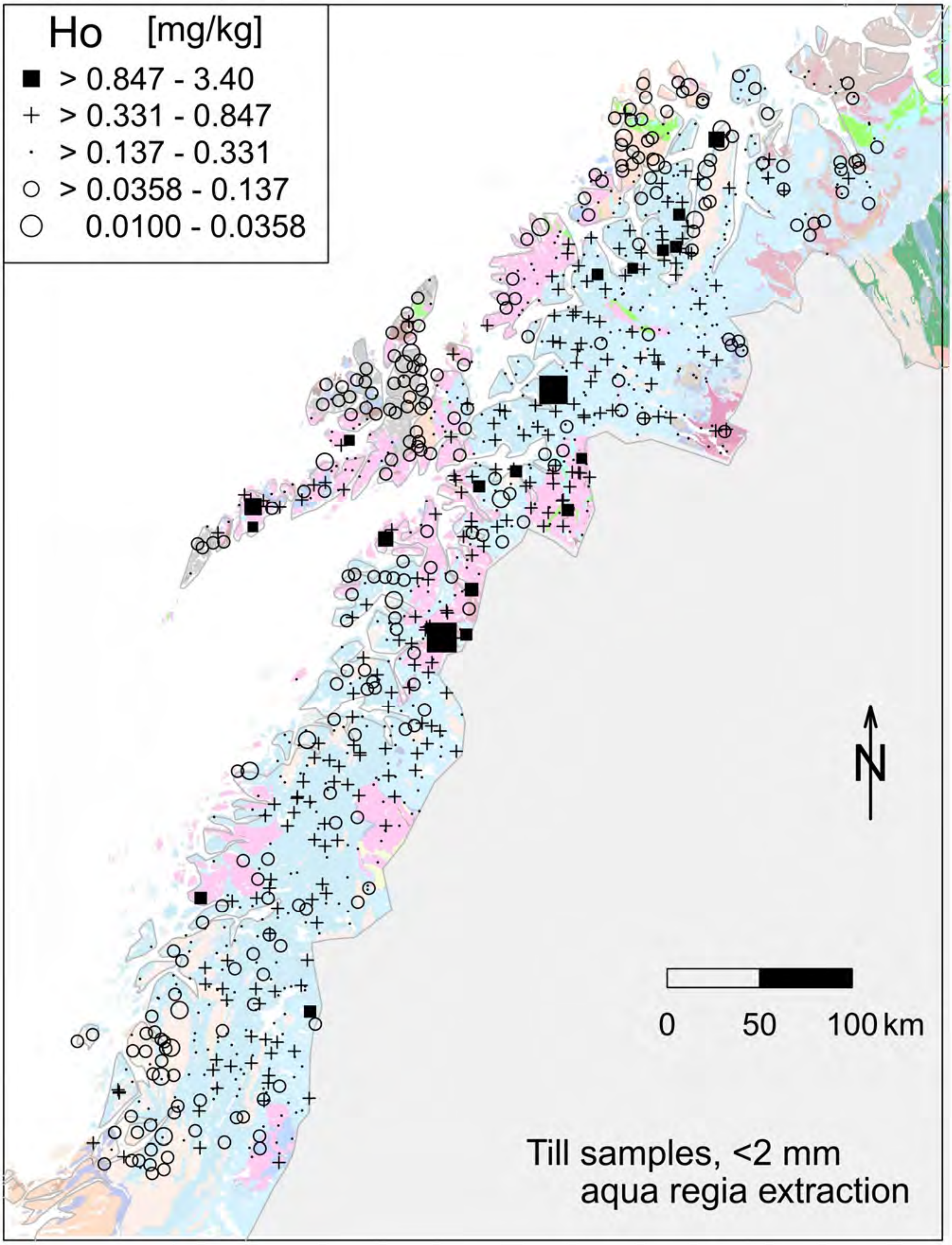

Ga [mg/kg]
■ > 10.4 - 14.3
+ > 4.92 - 10.4
· > 2.40 - 4.92
○ > 0.989 - 2.40
○ 0.148 - 0.989
N
0 50 100 km
Till samples, <2 mm
aqua regia extraction

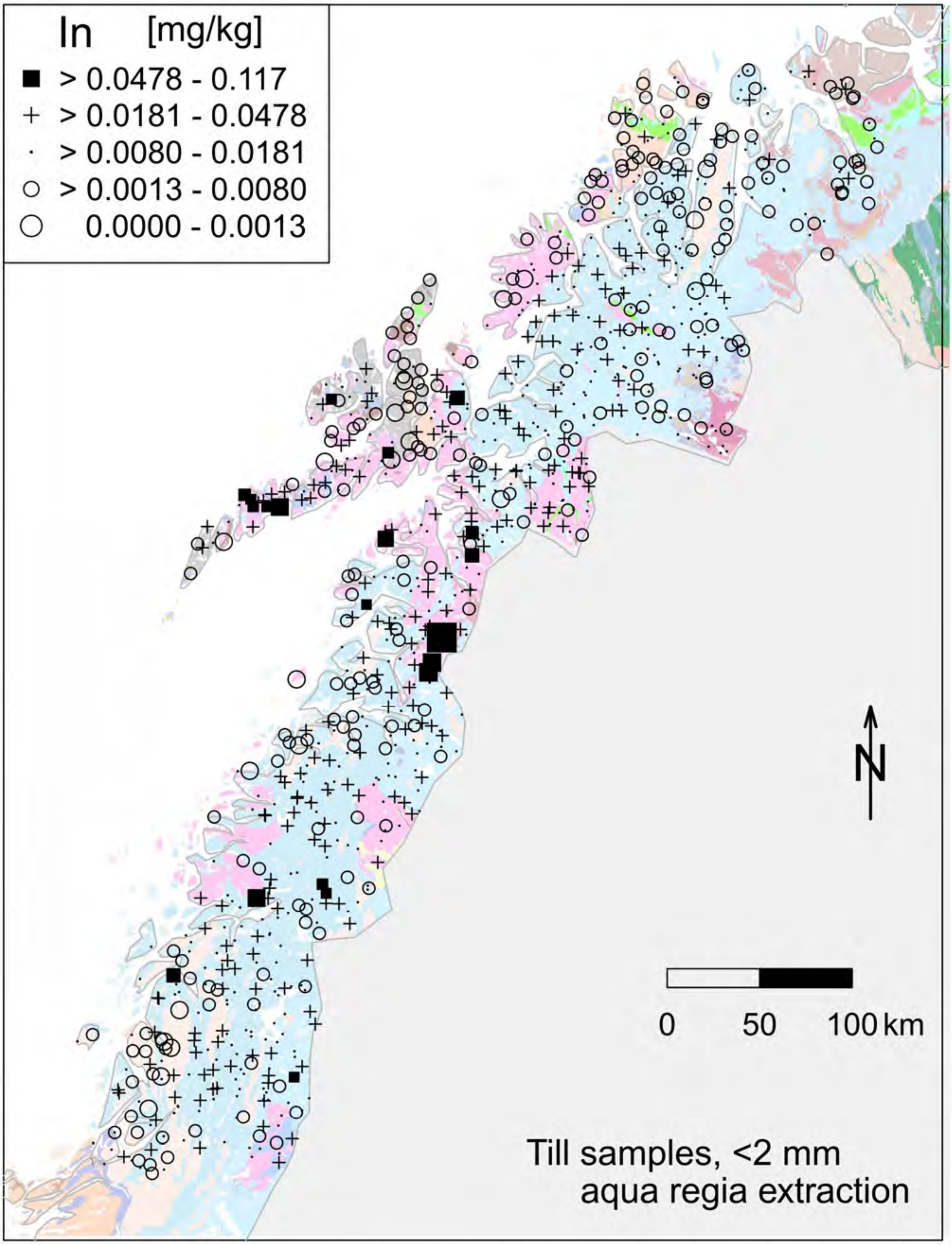

Gd [mg/kg]
> 6.12 - 24.4
> 2.42 - 6.12
> 0.940 - 2.42
> 0.204 - 0.940
0.0569 - 0.204
N
0 50 100 km
Till samples, <2 mm
aqua regia extraction

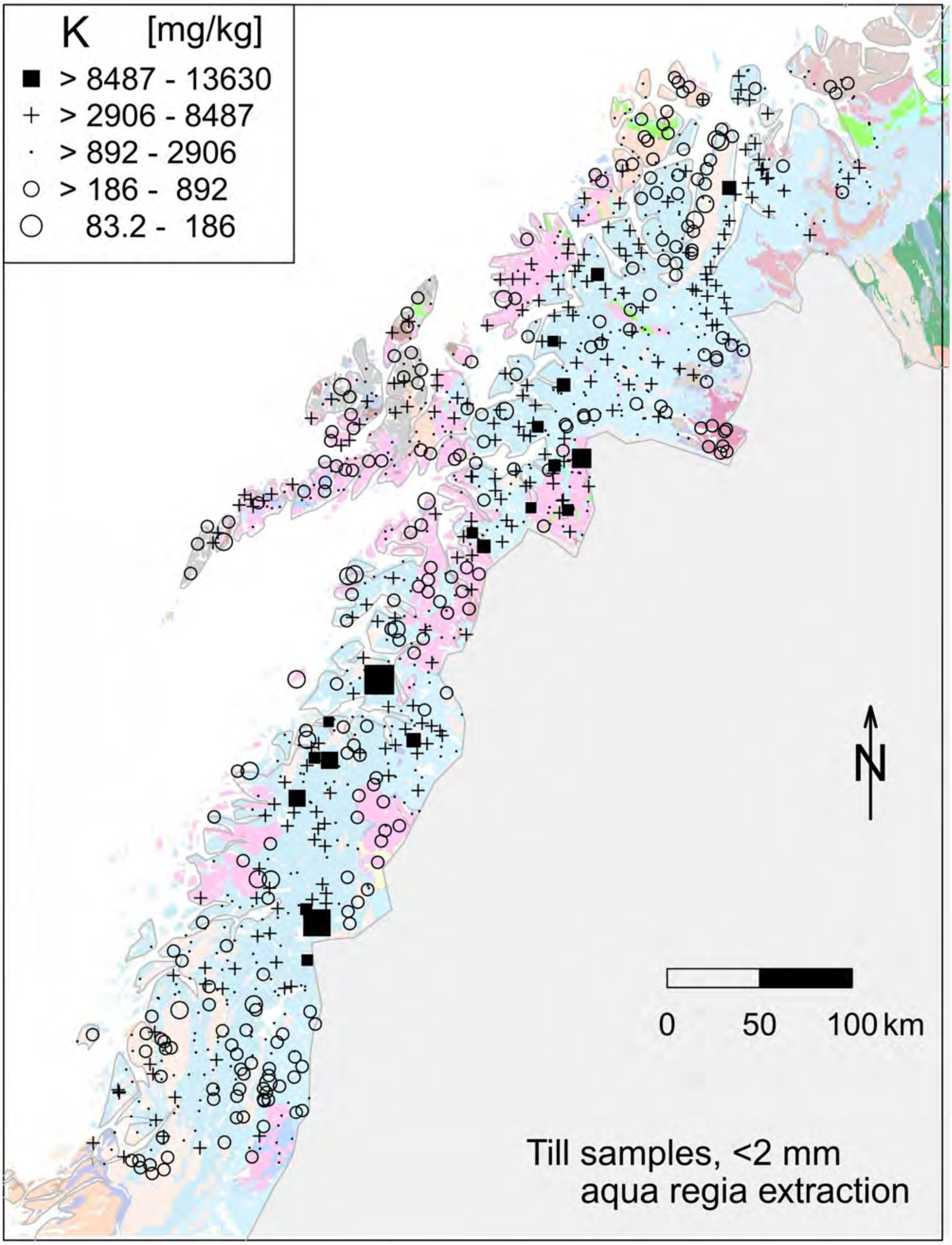

Ge [mg/kg]
> 0.206 - 0.771
> 0.0919 - 0.206
> 0.0387 - 0.0919
> 0.0085 - 0.0387
0.0005 - 0.0085
N
0 50 100 km
Till samples, <2 mm
aqua regia extraction

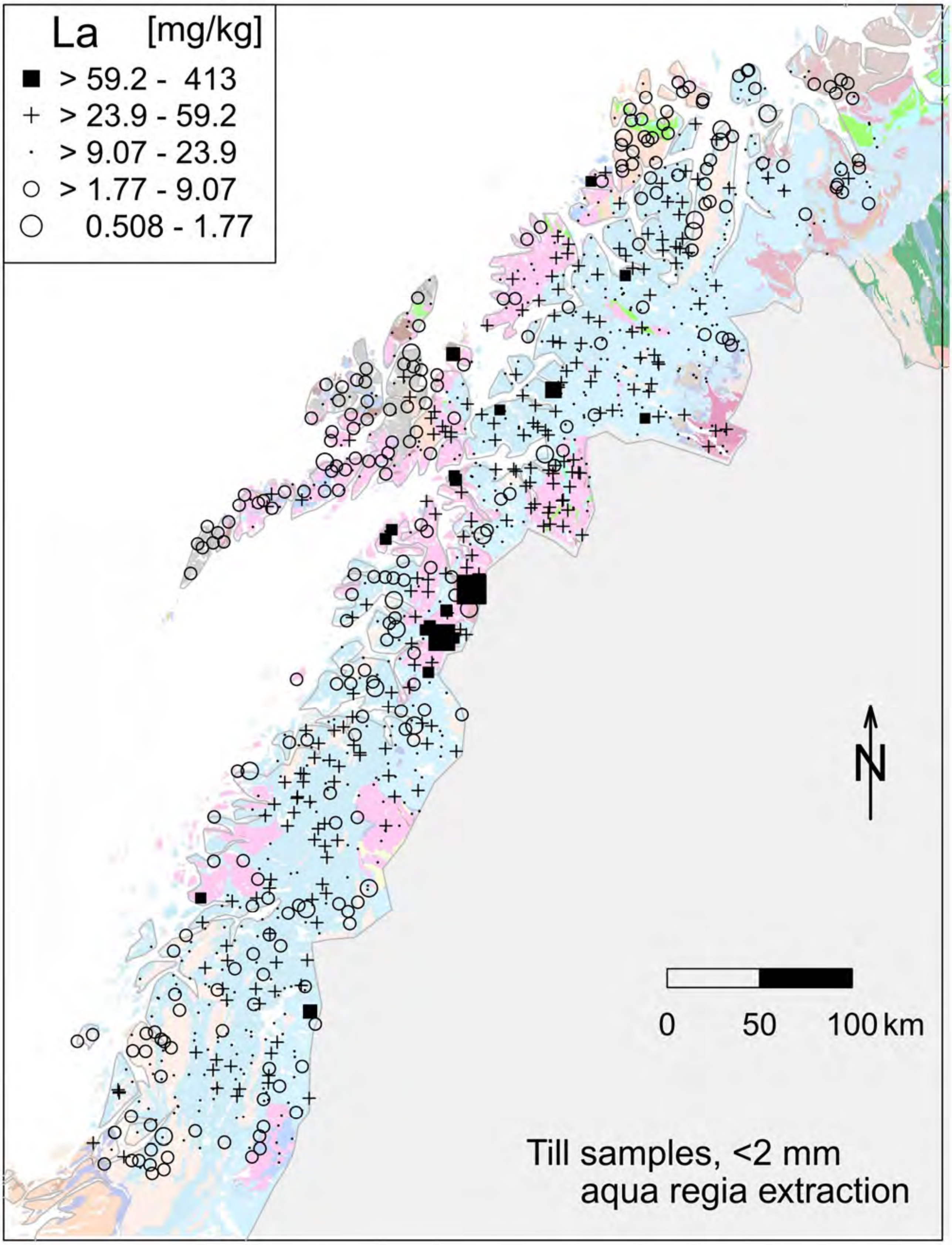

Hf [mg/kg]
> 0.195 - 0.377
> 0.0547 - 0.195
> 0.0129 - 0.0547
> 0.0020 - 0.0129
0.0002 - 0.0020
N
0
50
100 km
Till samples, <2 mm
aqua regia extraction

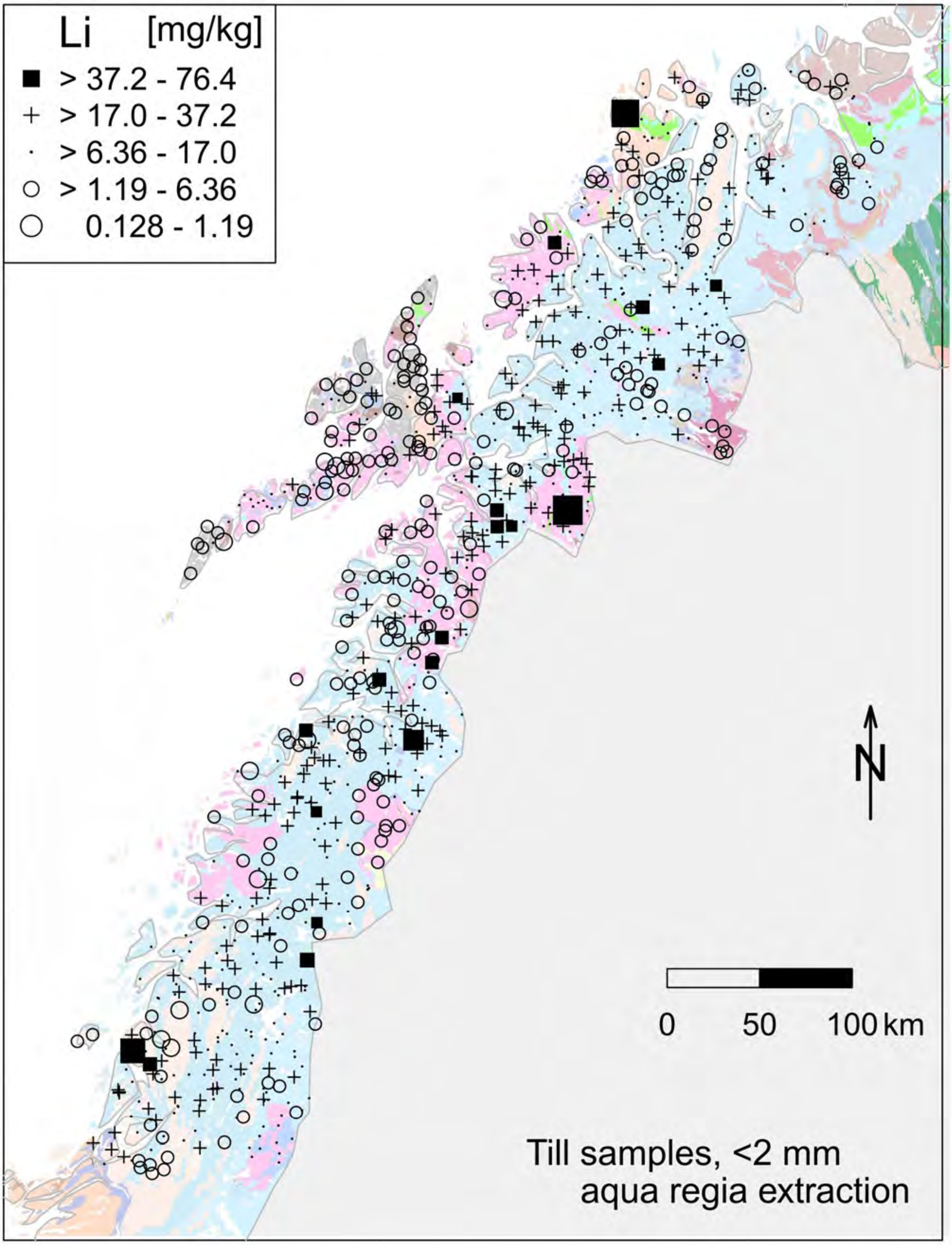

Hg [mg/kg]
> 0.0337 - 0.0619
> 0.0129 - 0.0337
> 0.0040 - 0.0129
> 0.0003 - 0.0040
0.0000 - 0.0003
N
0 50 100 km
Till samples, <2 mm
aqua regia extraction

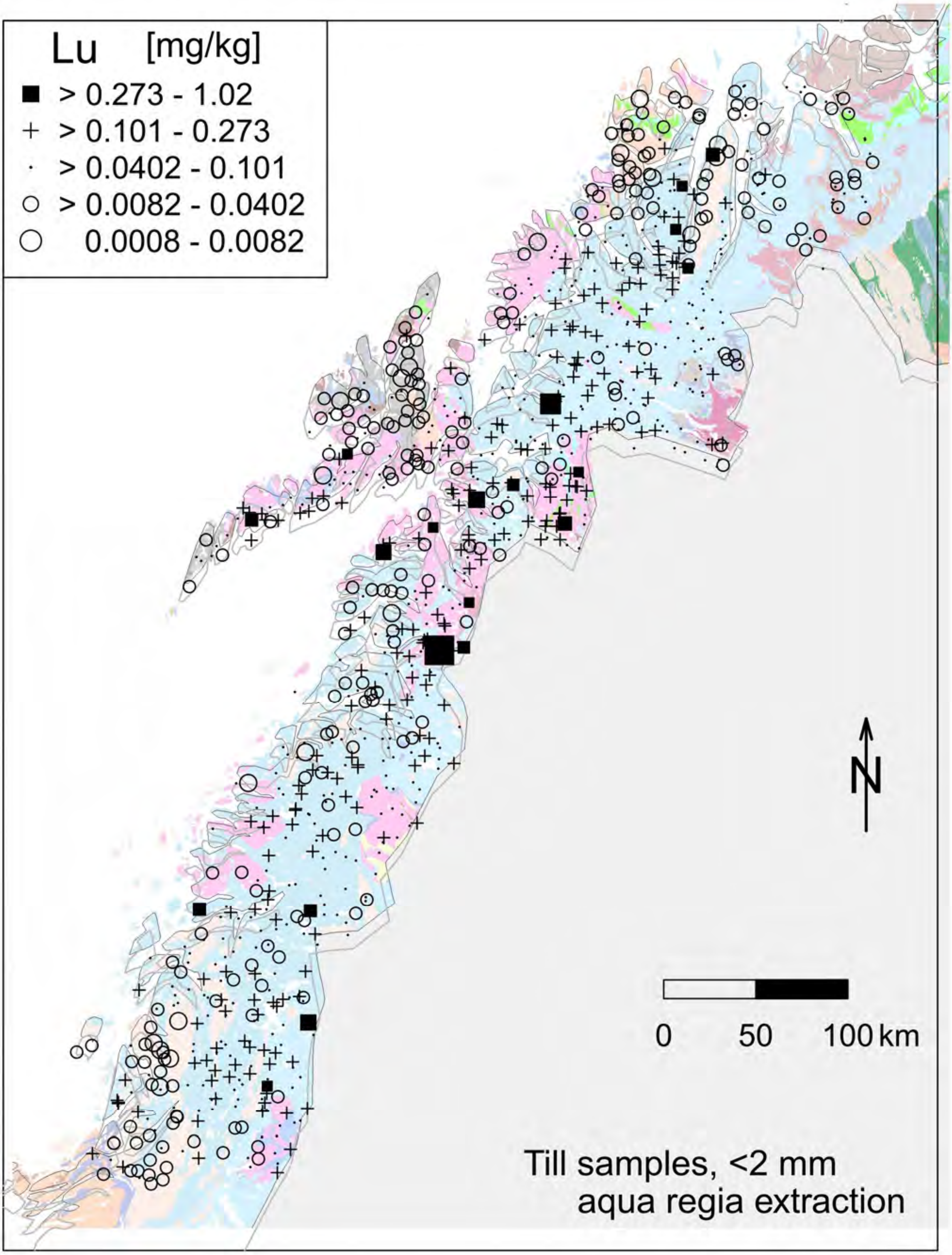

Ho [mg/kg]
> 0.847 - 3.40
> 0.331 - 0.847
> 0.137 - 0.331
> 0.0358 - 0.137
0.0100 - 0.0358
N
0 50 100 km
Till samples, <2 mm
aqua regia extraction

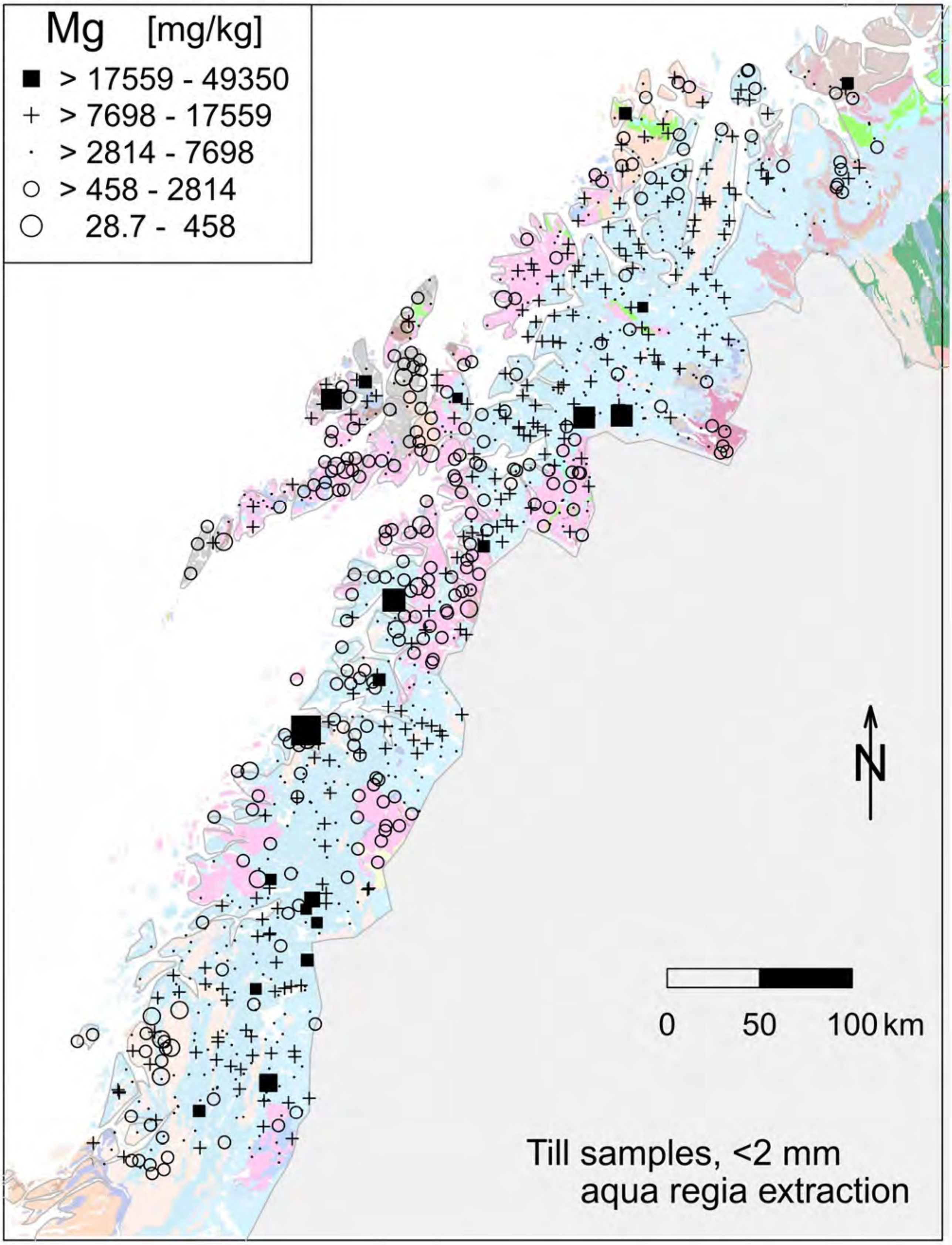

In [mg/kg]
> 0.0478 - 0.117
> 0.0181 - 0.0478
> 0.0080 - 0.0181
> 0.0013 - 0.0080
0.0000 - 0.0013
N
0
50
100 km
Till samples, <2 mm
aqua regia extraction

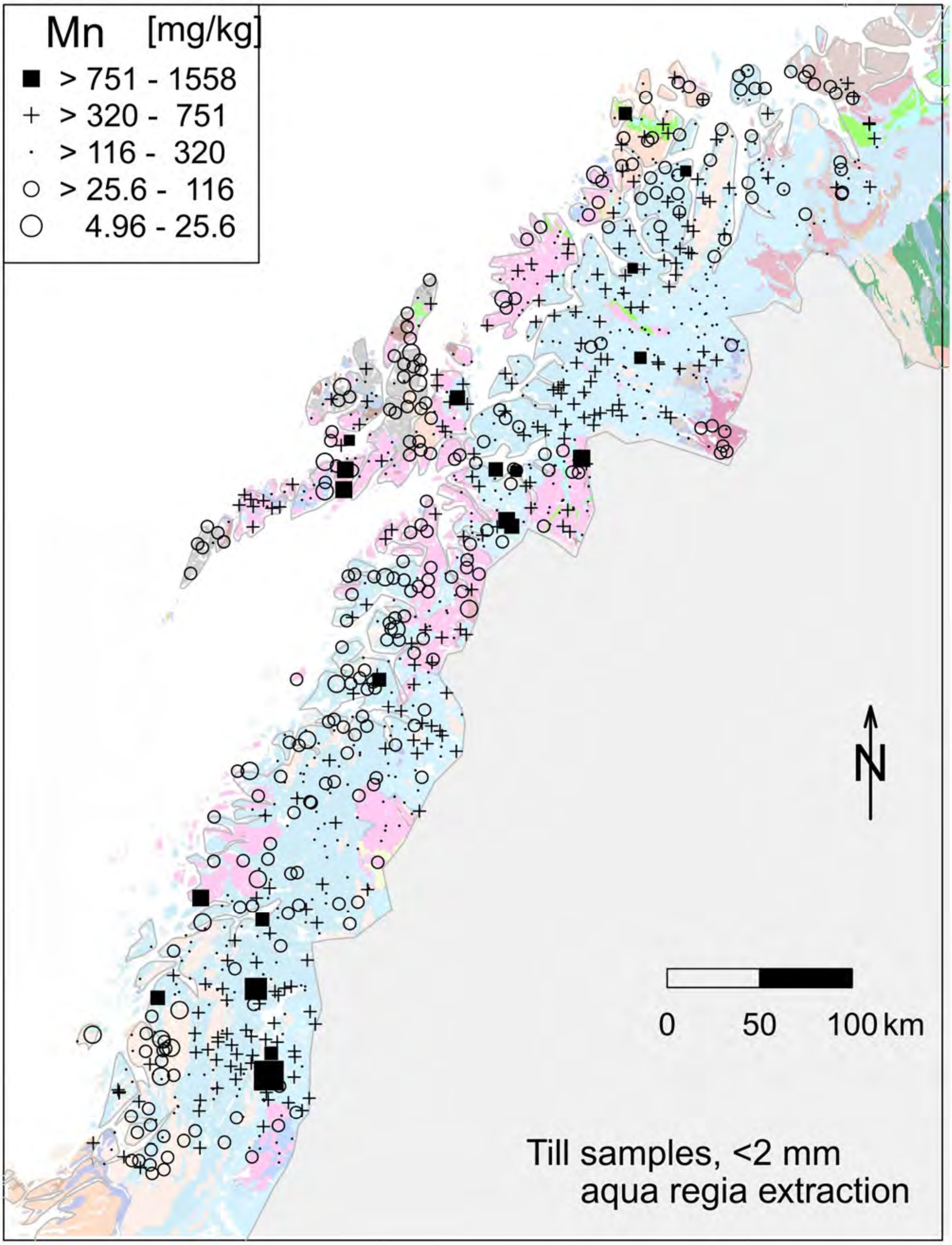

K [mg/kg]
> 8487 - 13630
> 2906 - 8487
> 892 - 2906
> 186 - 892
83.2 - 186
N
0
50
100 km
Till samples, <2 mm
aqua regia extraction

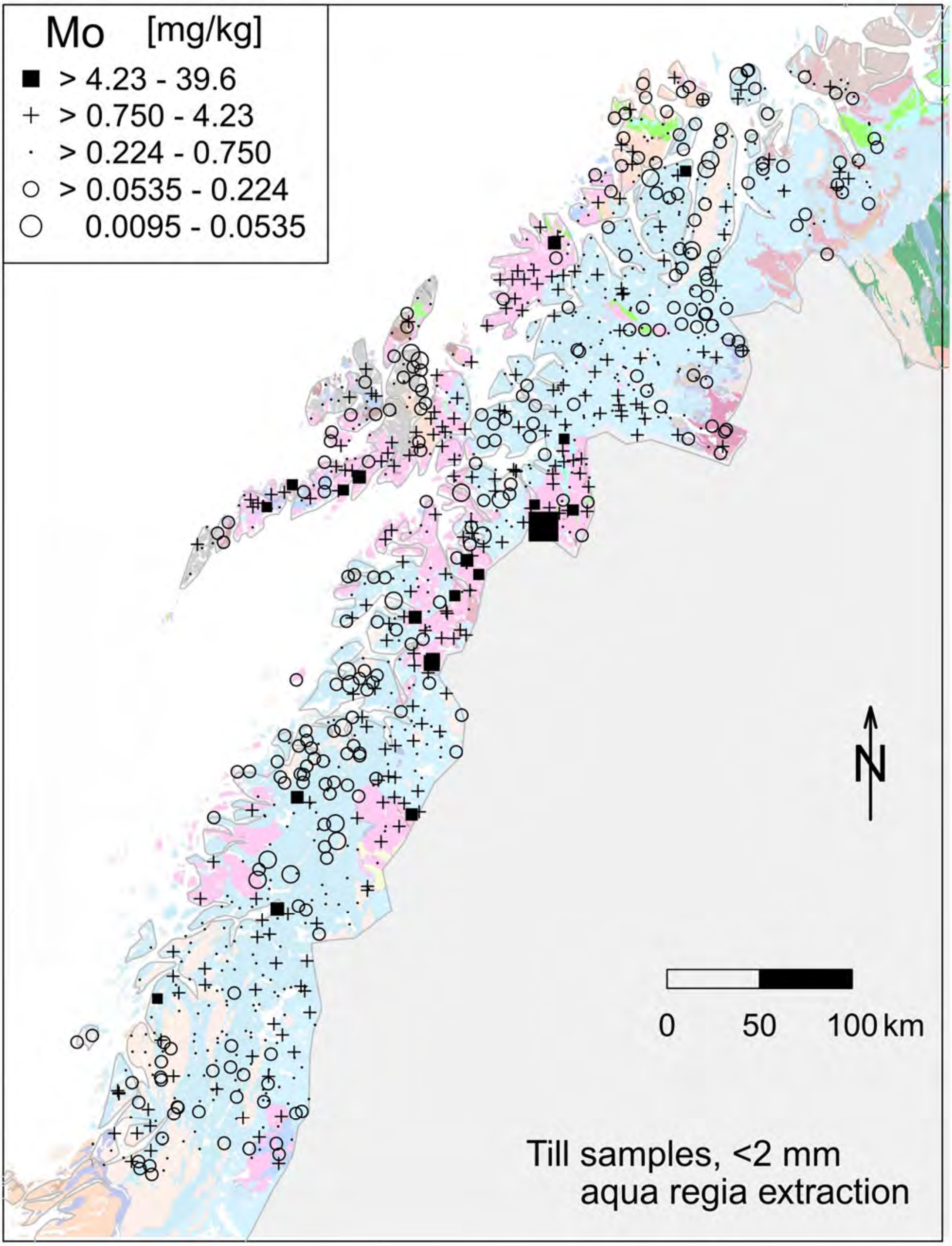

La [mg/kg]
> 59.2 - 413
> 23.9 - 59.2
> 9.07 - 23.9
> 1.77 - 9.07
0.508 - 1.77
N
0 50 100 km
Till samples, <2 mm
aqua regia extraction

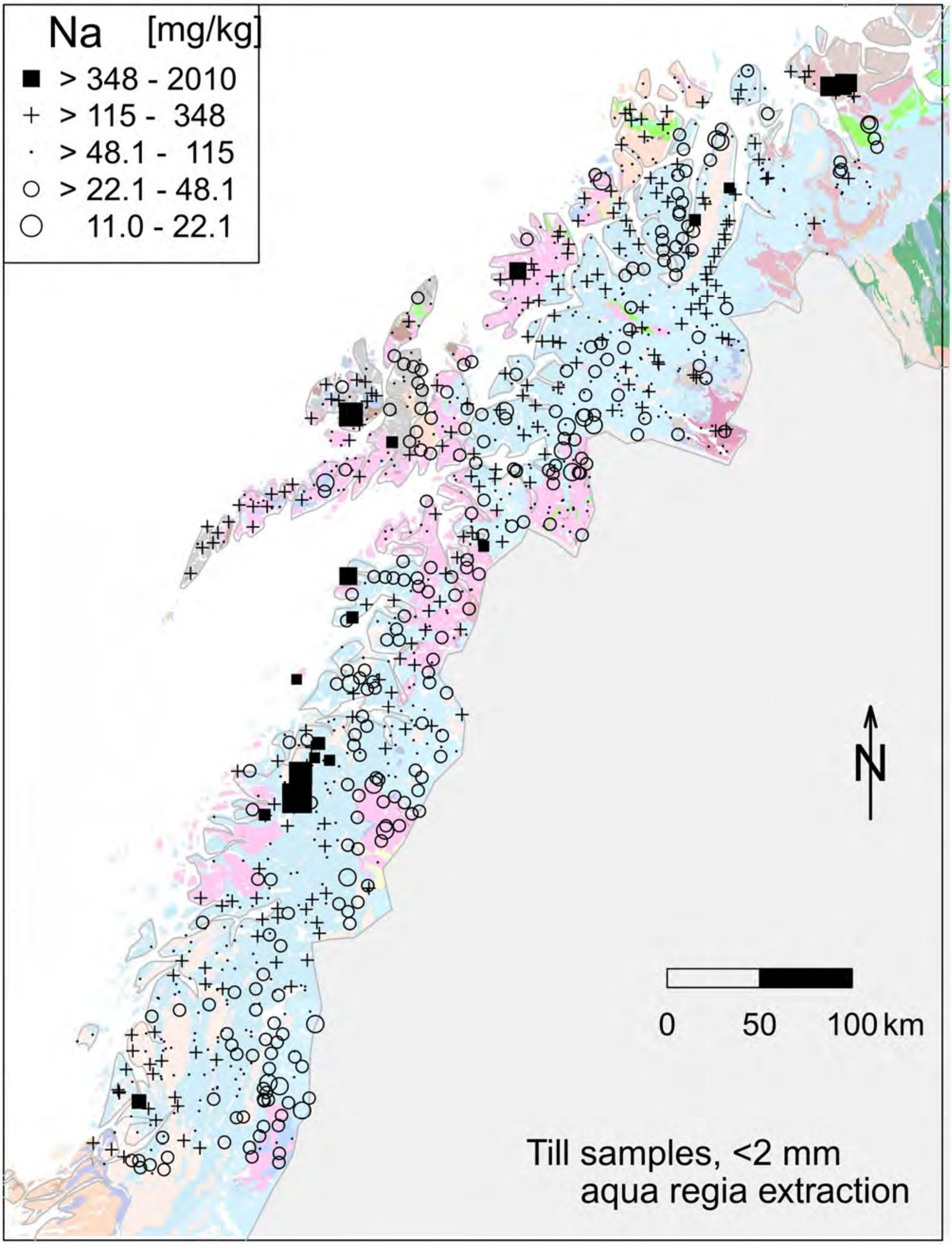

Li [mg/kg]
> 37.2 - 76.4
> 17.0 - 37.2
> 6.36 - 17.0
> 1.19 - 6.36
0.128 - 1.19
N
0 50 100 km
Till samples, <2 mm
aqua regia extraction

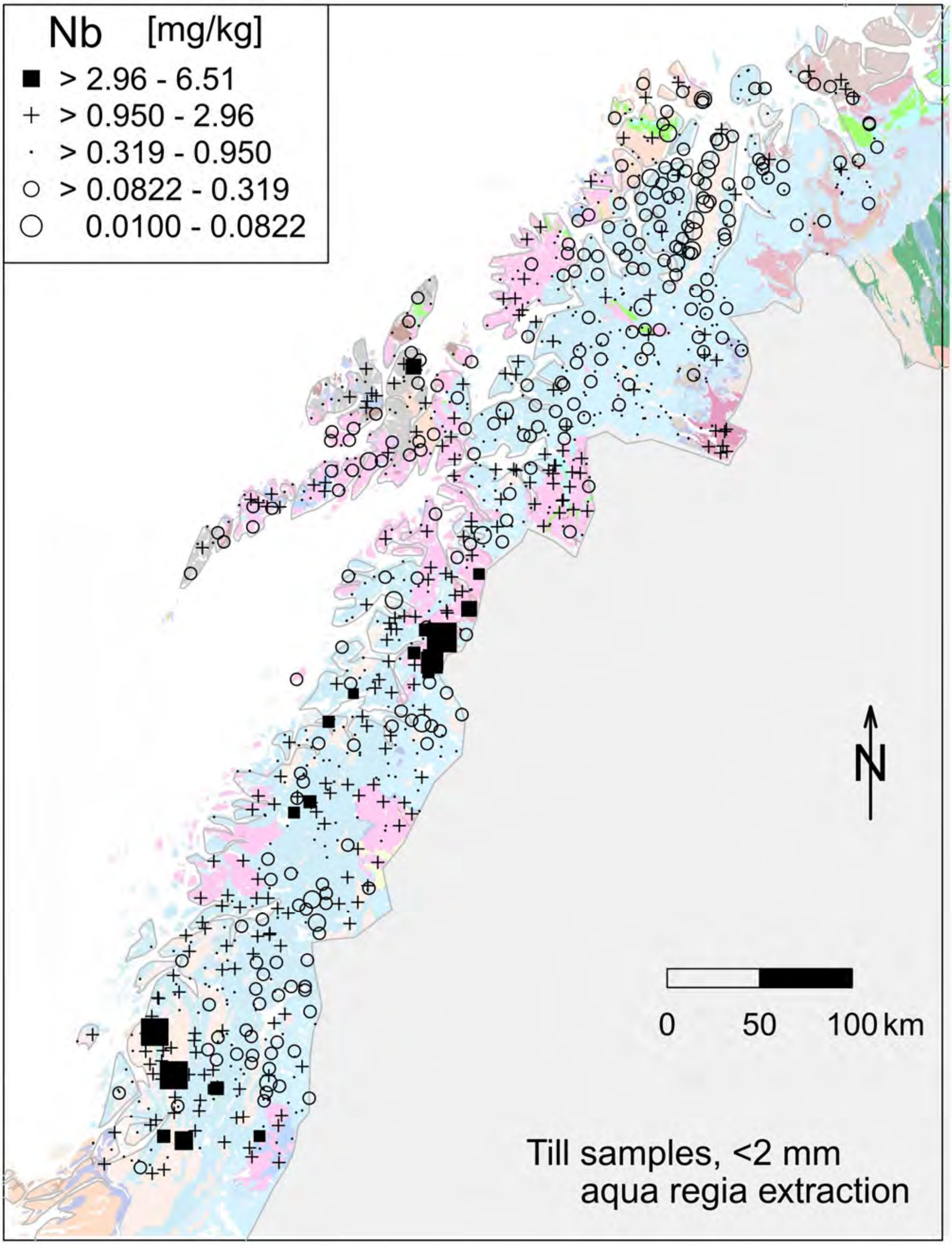

Lu [mg/kg]
> 0.273 - 1.02
> 0.101 - 0.273
> 0.0402 - 0.101
> 0.0082 - 0.0402
0.0008 - 0.0082
N
0 50 100 km
Till samples, <2 mm
aqua regia extraction

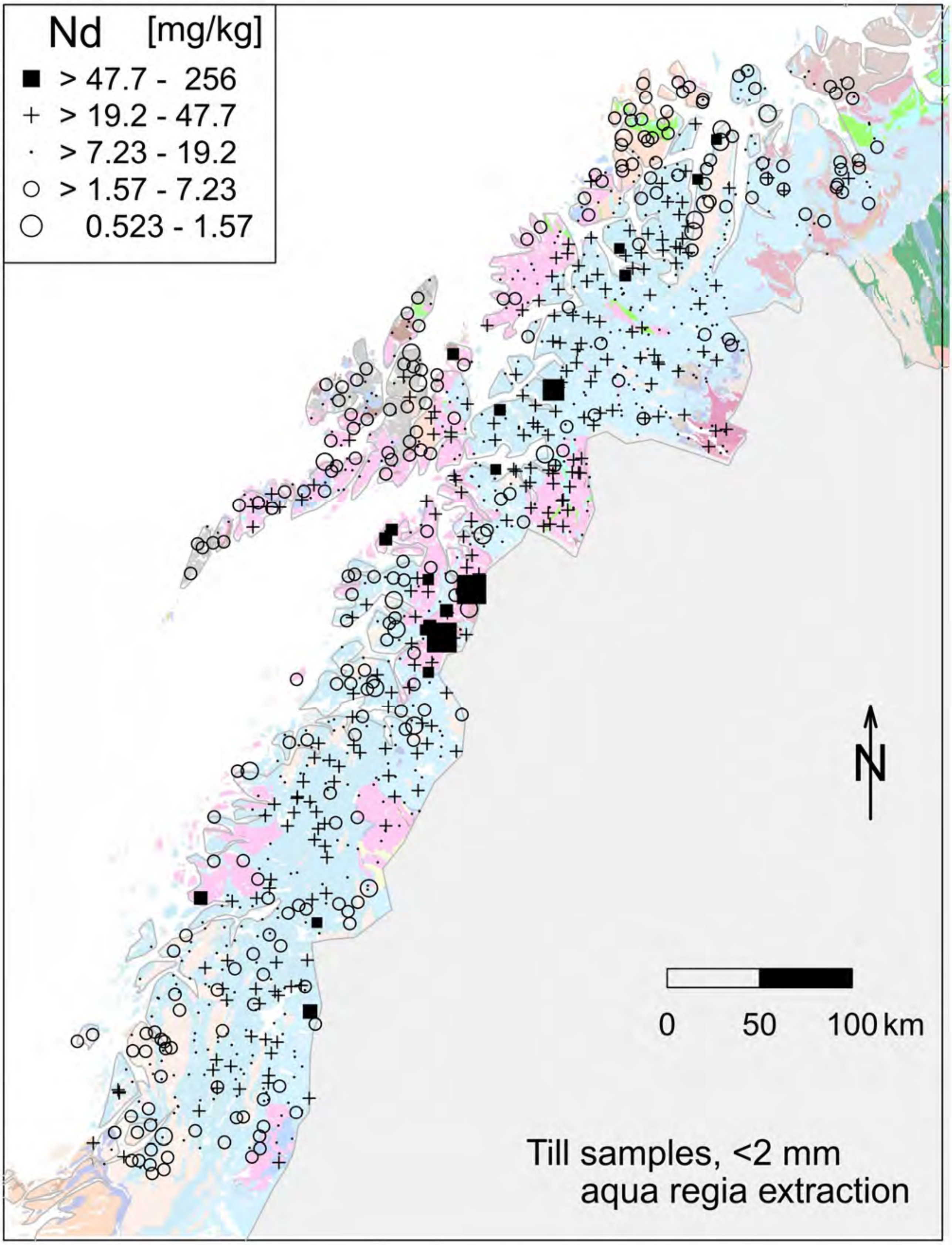

Mg [mg/kg]
> 17559 - 49350
> 7698 - 17559
> 2814 - 7698
> 458 - 2814
28.7 - 458
N
0 50 100 km
Till samples, <2 mm
aqua regia extraction

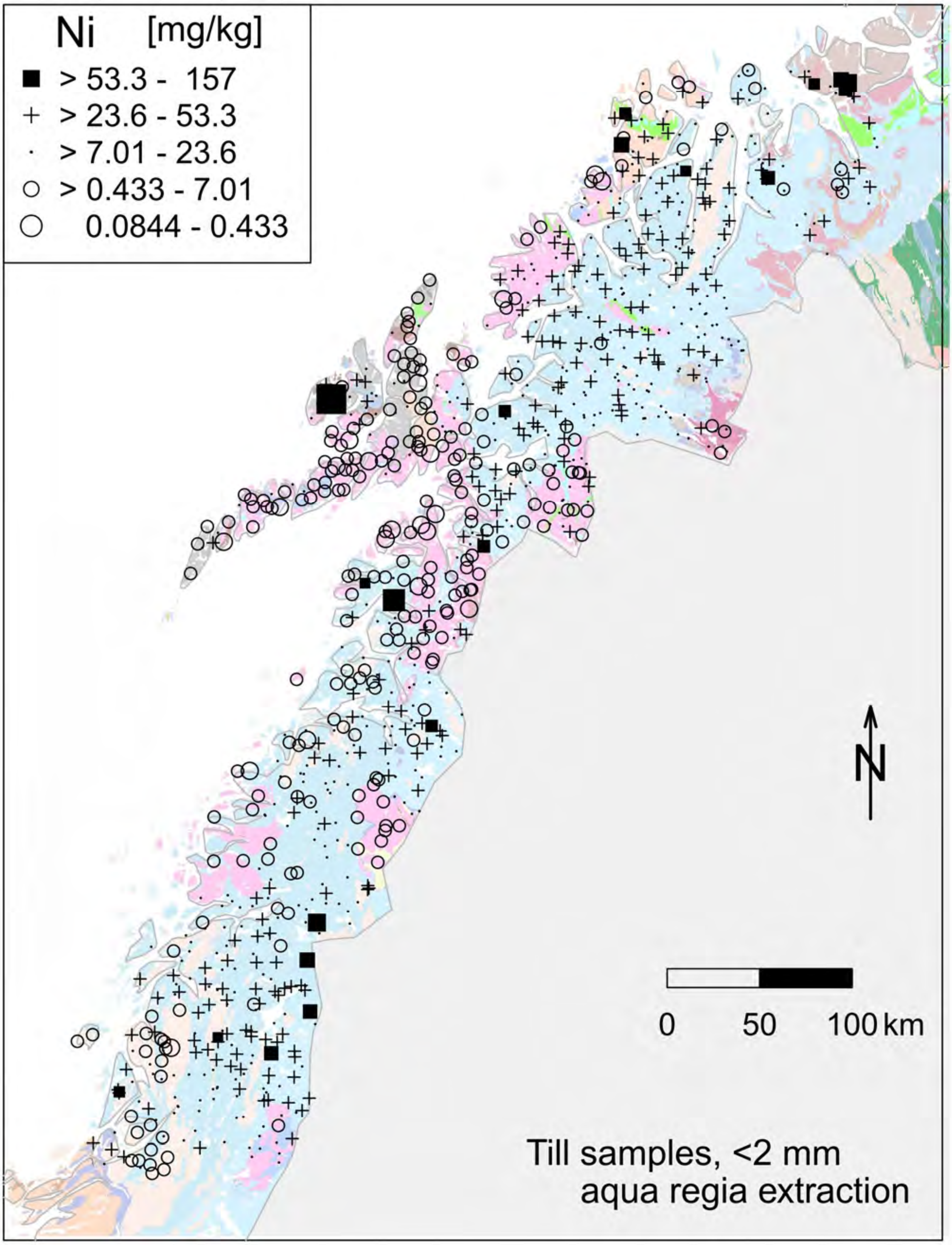

Mn [mg/kg]
> 751 - 1558
> 320 - 751
> 116 - 320
> 25.6 - 116
4.96 - 25.6
N
0 50 100 km
Till samples, <2 mm
aqua regia extraction

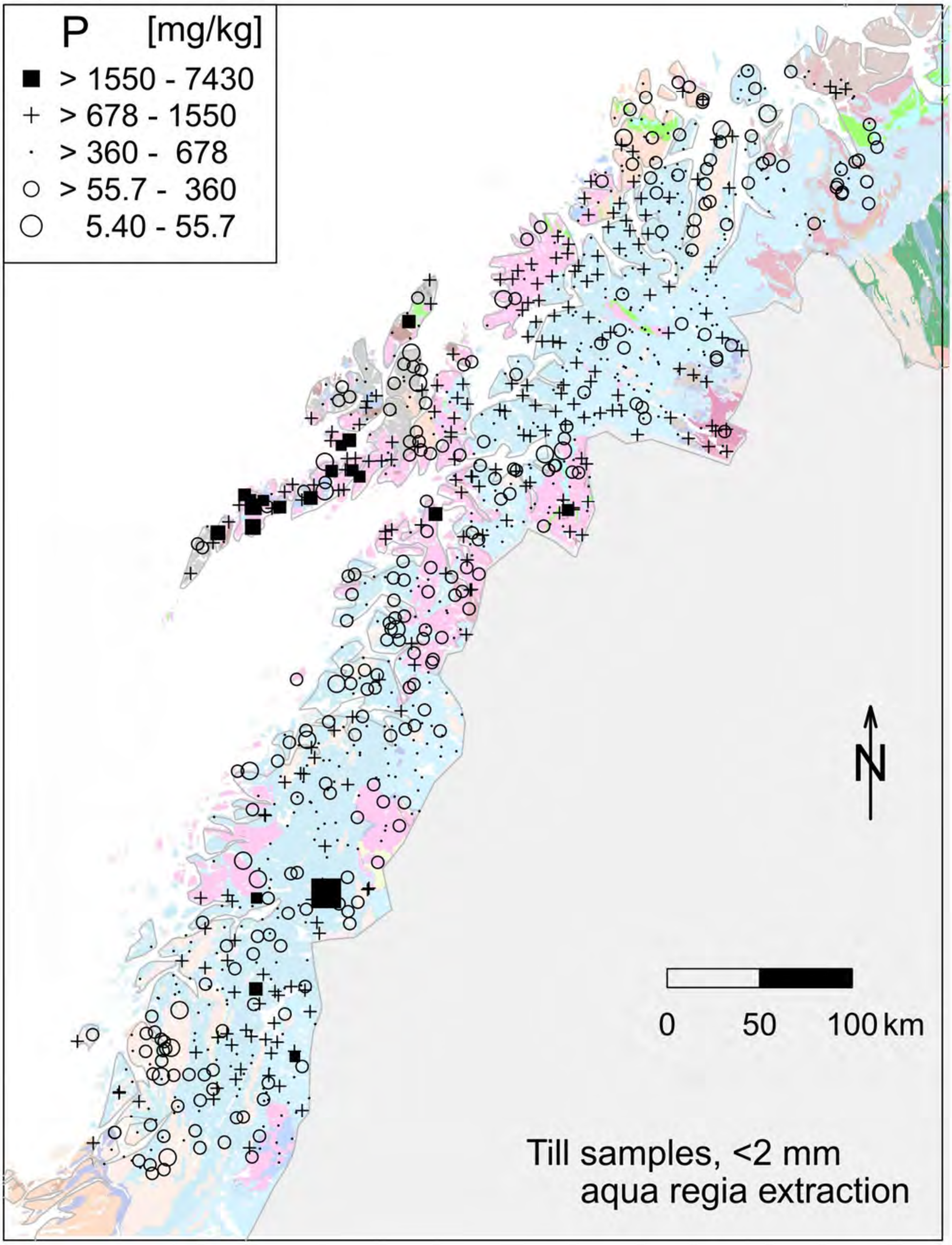

Mo [mg/kg]
■ > 4.23 - 39.6
+ > 0.750 - 4.23
· > 0.224 - 0.750
○ > 0.0535 - 0.224
○ 0.0095 - 0.0535
N
0 50 100 km
Till samples, <2 mm
aqua regia extraction

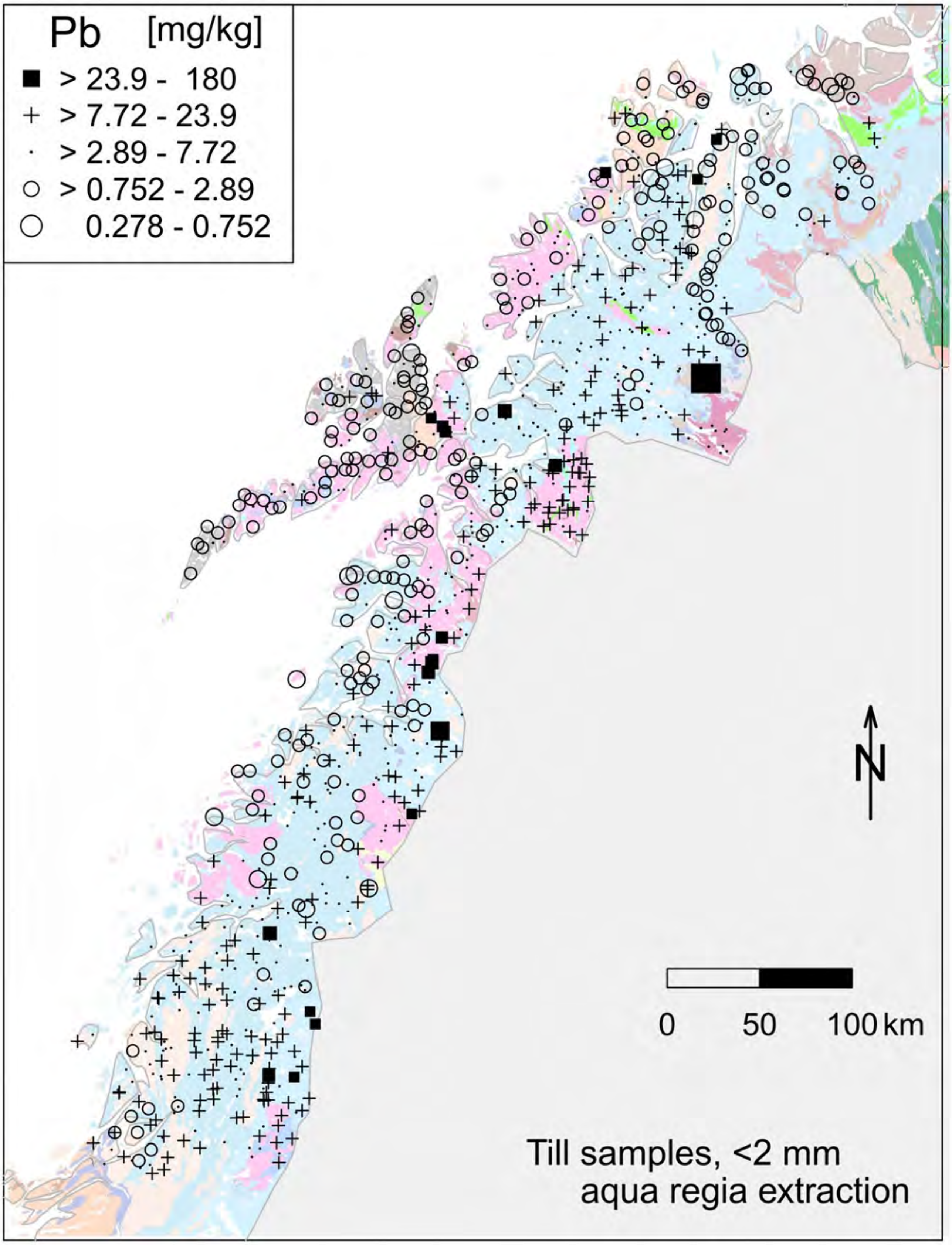

Na [mg/kg]
> 348 - 2010
> 115 - 348
> 48.1 - 115
> 22.1 - 48.1
11.0 - 22.1
N
0
50
100 km
Till samples, <2 mm
aqua regia extraction

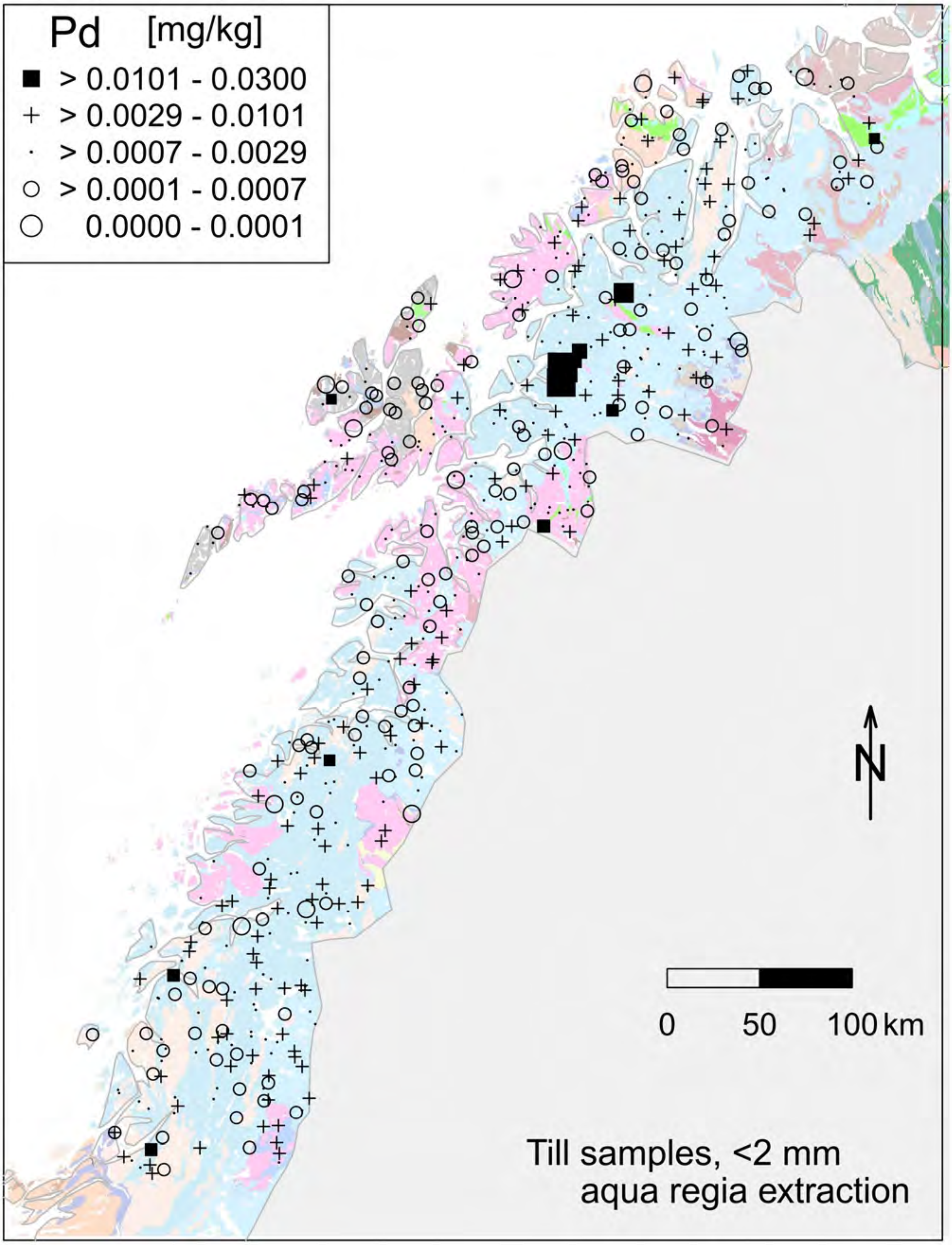

Nb [mg/kg]
> 2.96 - 6.51
> 0.950 - 2.96
> 0.319 - 0.950
> 0.0822 - 0.319
0.0100 - 0.0822
N
0 50 100 km
Till samples, <2 mm
aqua regia extraction

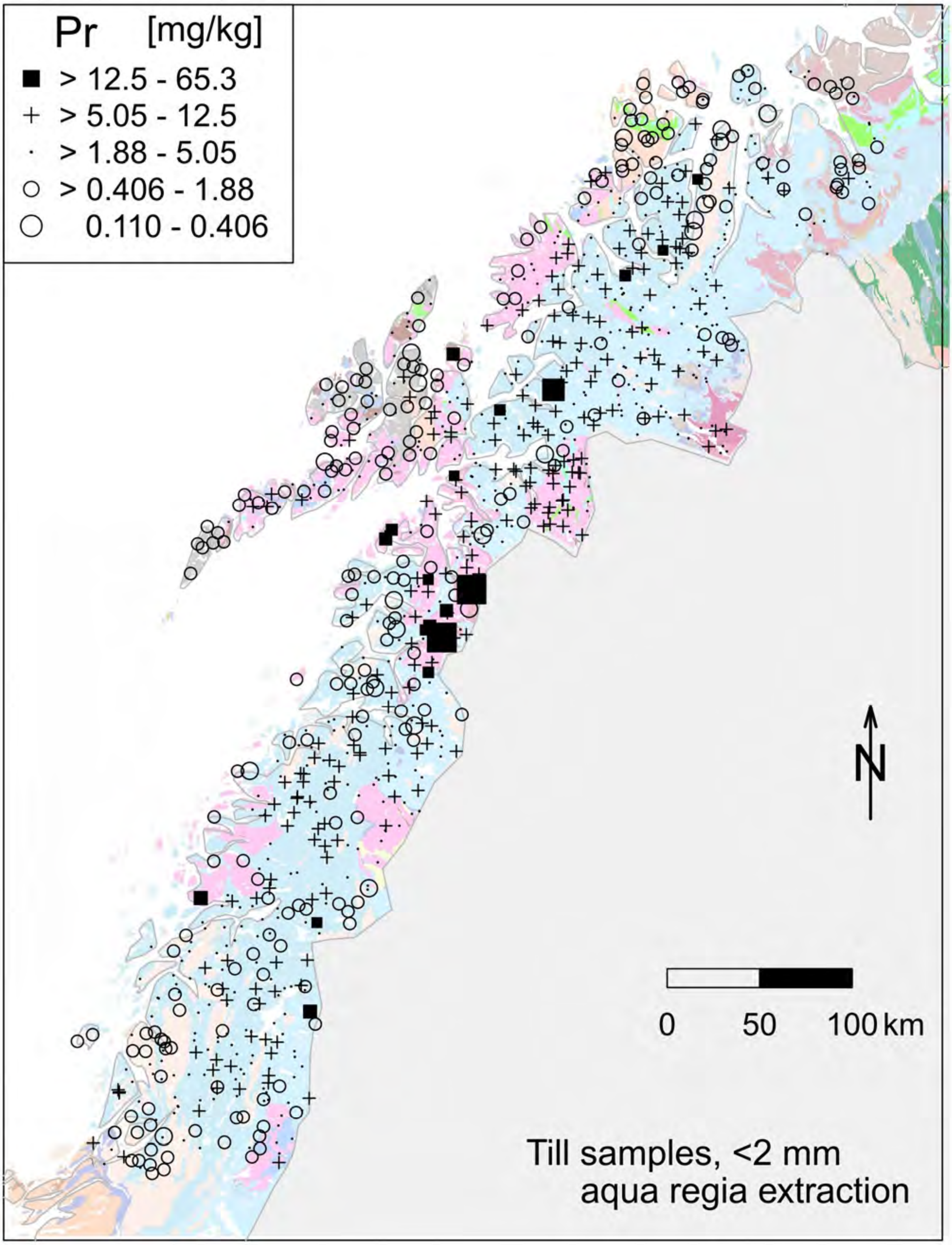

Nd [mg/kg]
> 47.7 - 256
> 19.2 - 47.7
> 7.23 - 19.2
> 1.57 - 7.23
0.523 - 1.57
N
0 50 100 km
Till samples, <2 mm
aqua regia extraction

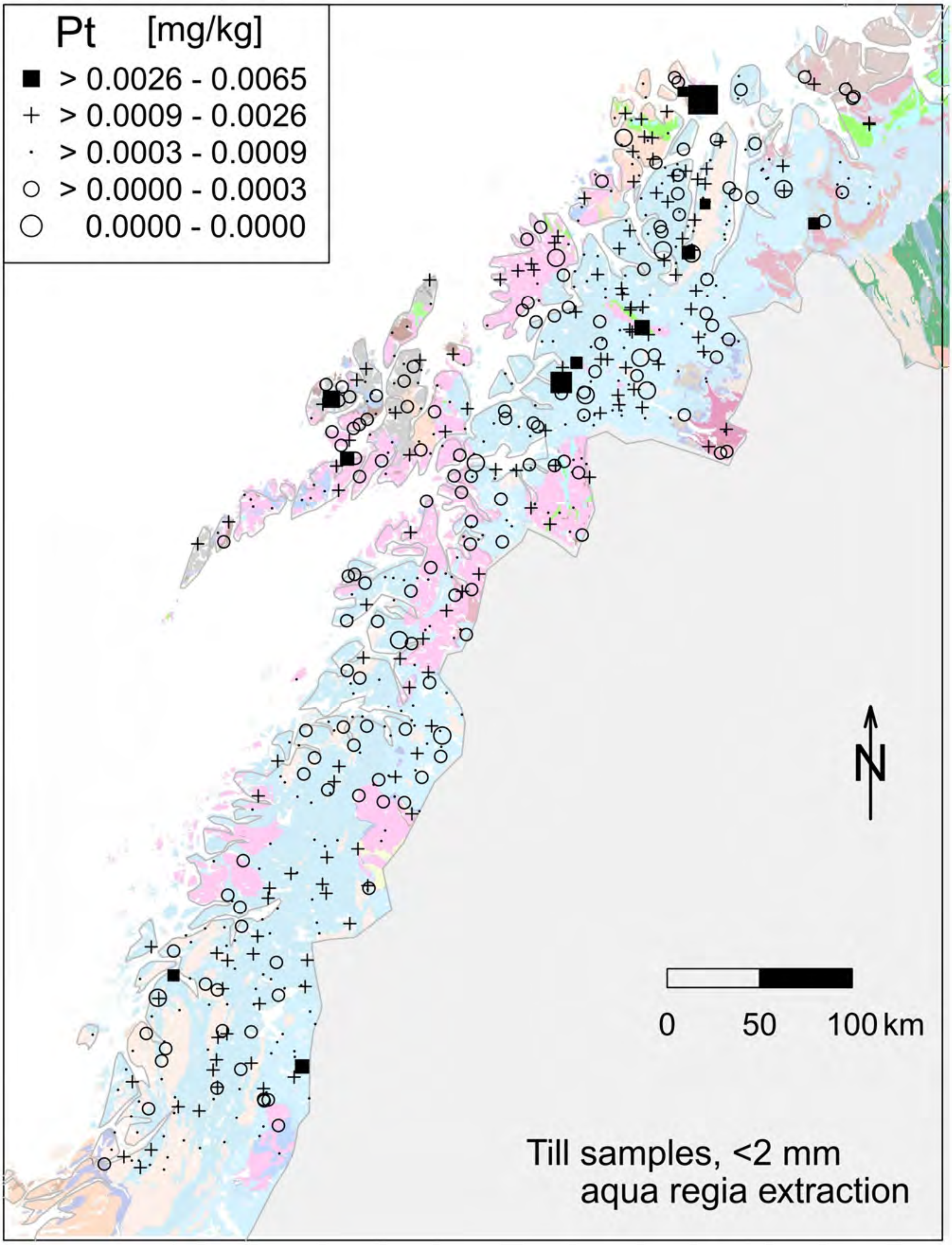

Ni [mg/kg]
> 53.3 - 157
> 23.6 - 53.3
> 7.01 - 23.6
> 0.433 - 7.01
0.0844 - 0.433
N
0 50 100 km
Till samples, <2 mm
aqua regia extraction

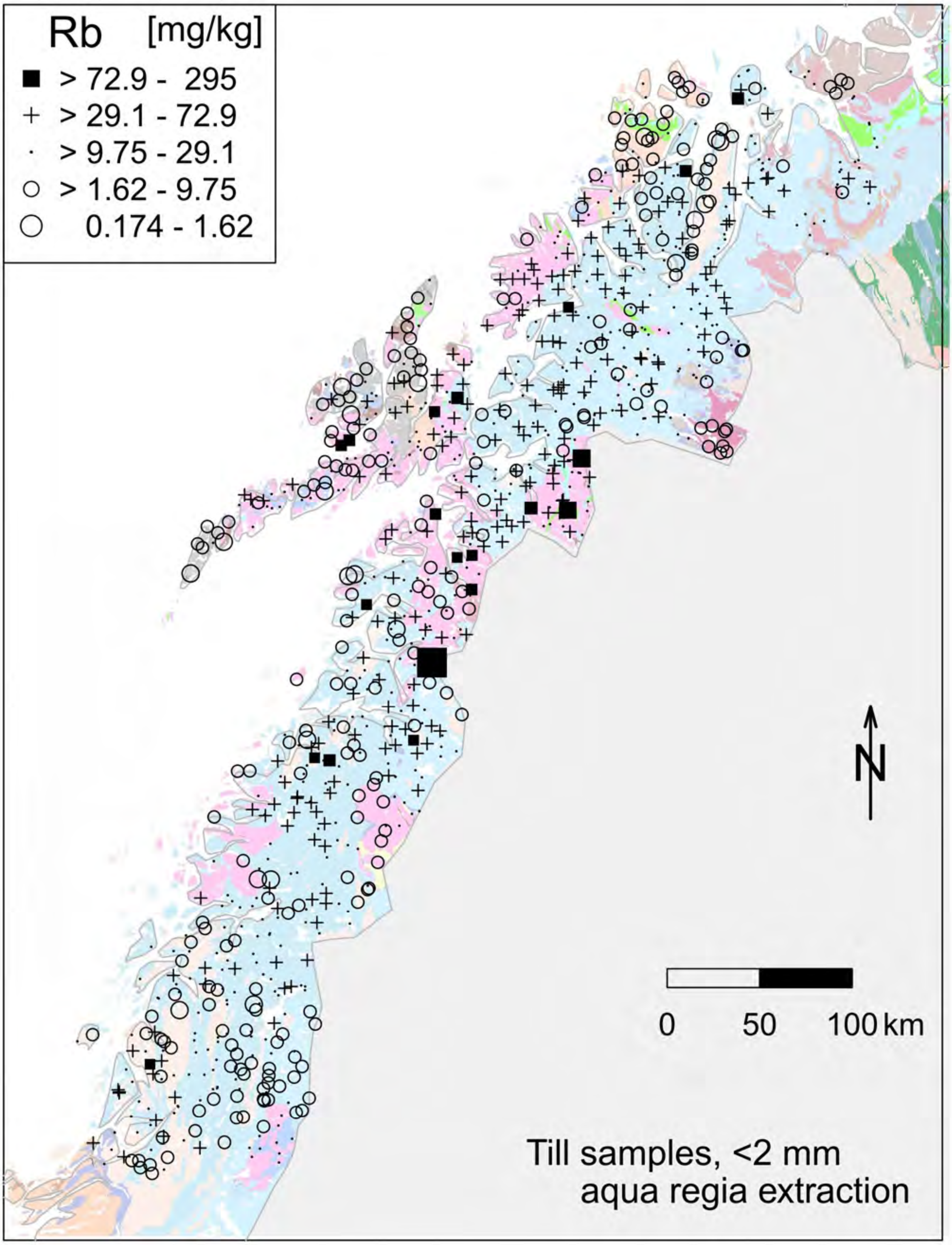

P [mg/kg]
> 1550 - 7430
> 678 - 1550
> 360 - 678
> 55.7 - 360
5.40 - 55.7
N
0 50 100 km
Till samples, <2 mm
aqua regia extraction

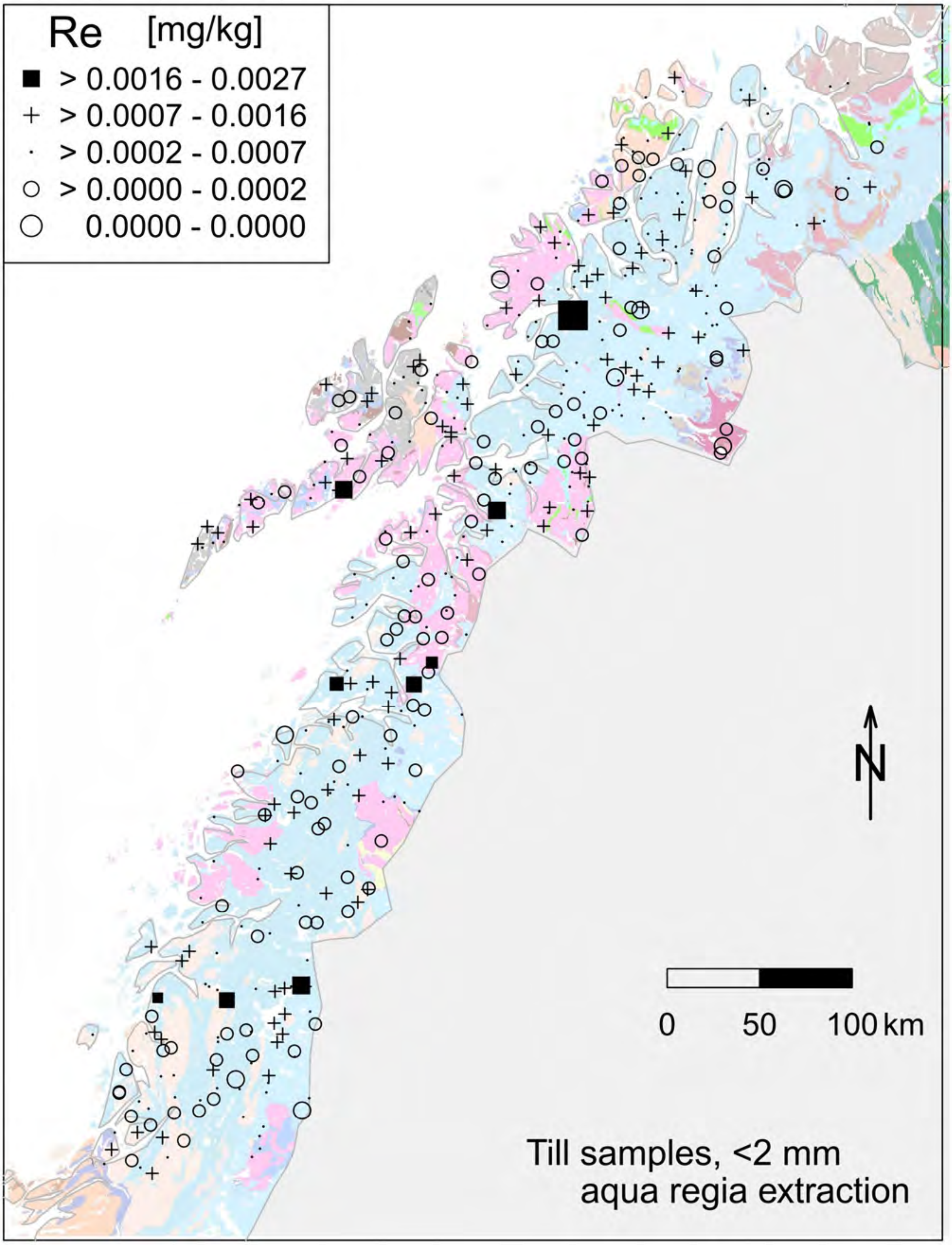

Pb [mg/kg]
> 23.9 - 180
> 7.72 - 23.9
> 2.89 - 7.72
> 0.752 - 2.89
0.278 - 0.752
N
0 50 100 km
Till samples, <2 mm
aqua regia extraction

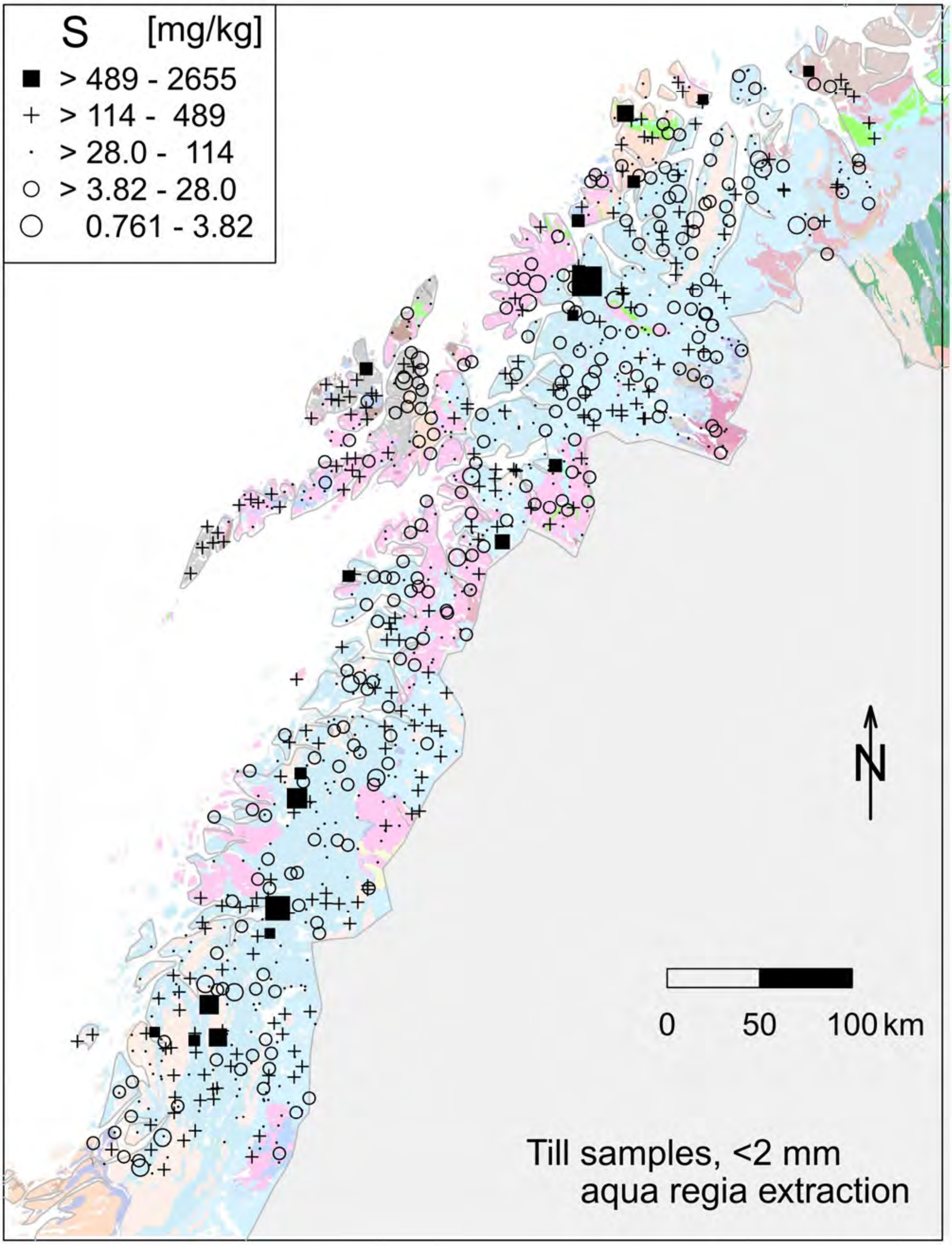

Pd [mg/kg]
> 0.0101 - 0.0300
> 0.0029 - 0.0101
> 0.0007 - 0.0029
> 0.0001 - 0.0007
0.0000 - 0.0001
N
0
50
100 km
Till samples, <2 mm
aqua regia extraction

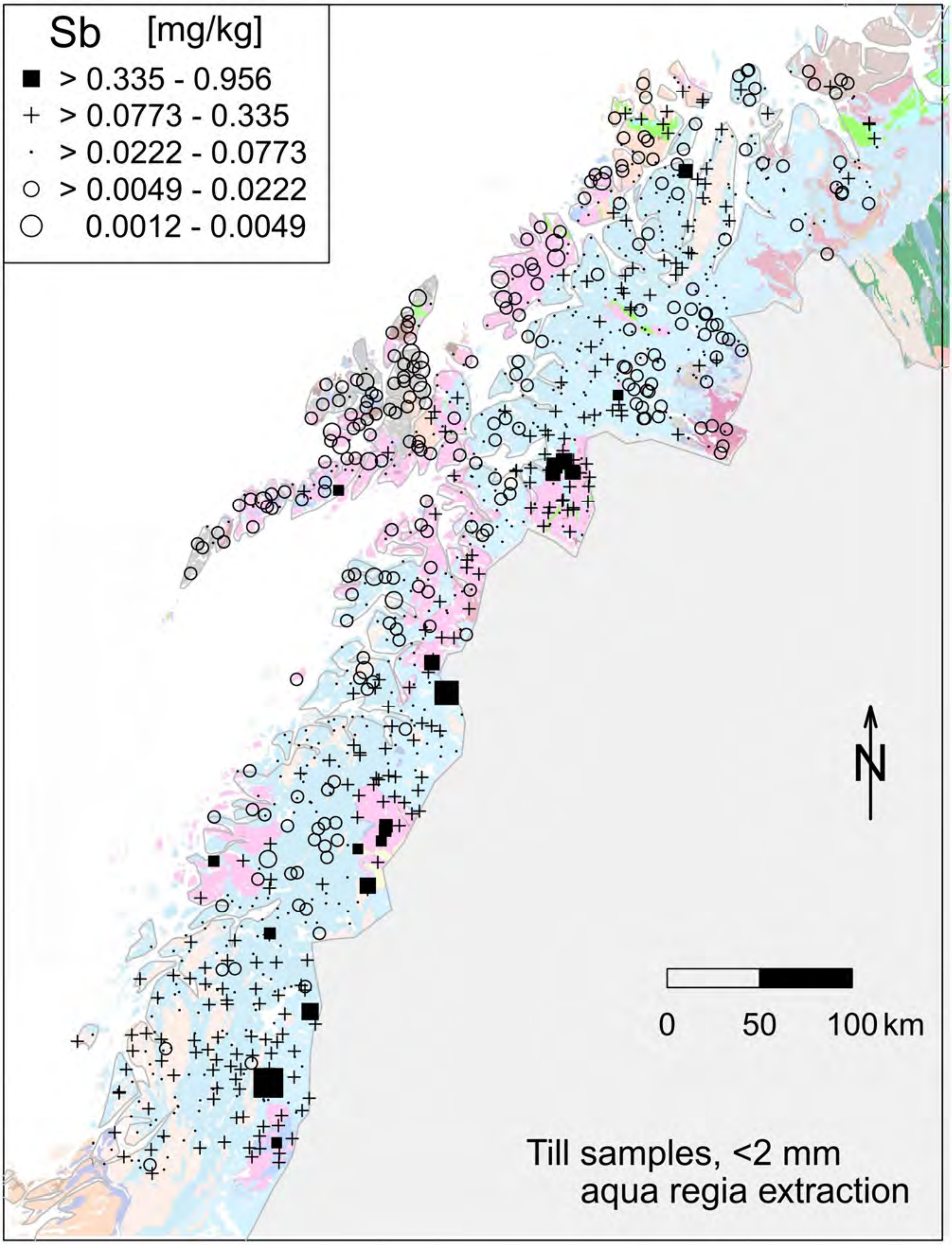

Pr [mg/kg]
> 12.5 - 65.3
> 5.05 - 12.5
> 1.88 - 5.05
> 0.406 - 1.88
0.110 - 0.406
N
0 50 100 km
Till samples, <2 mm
aqua regia extraction

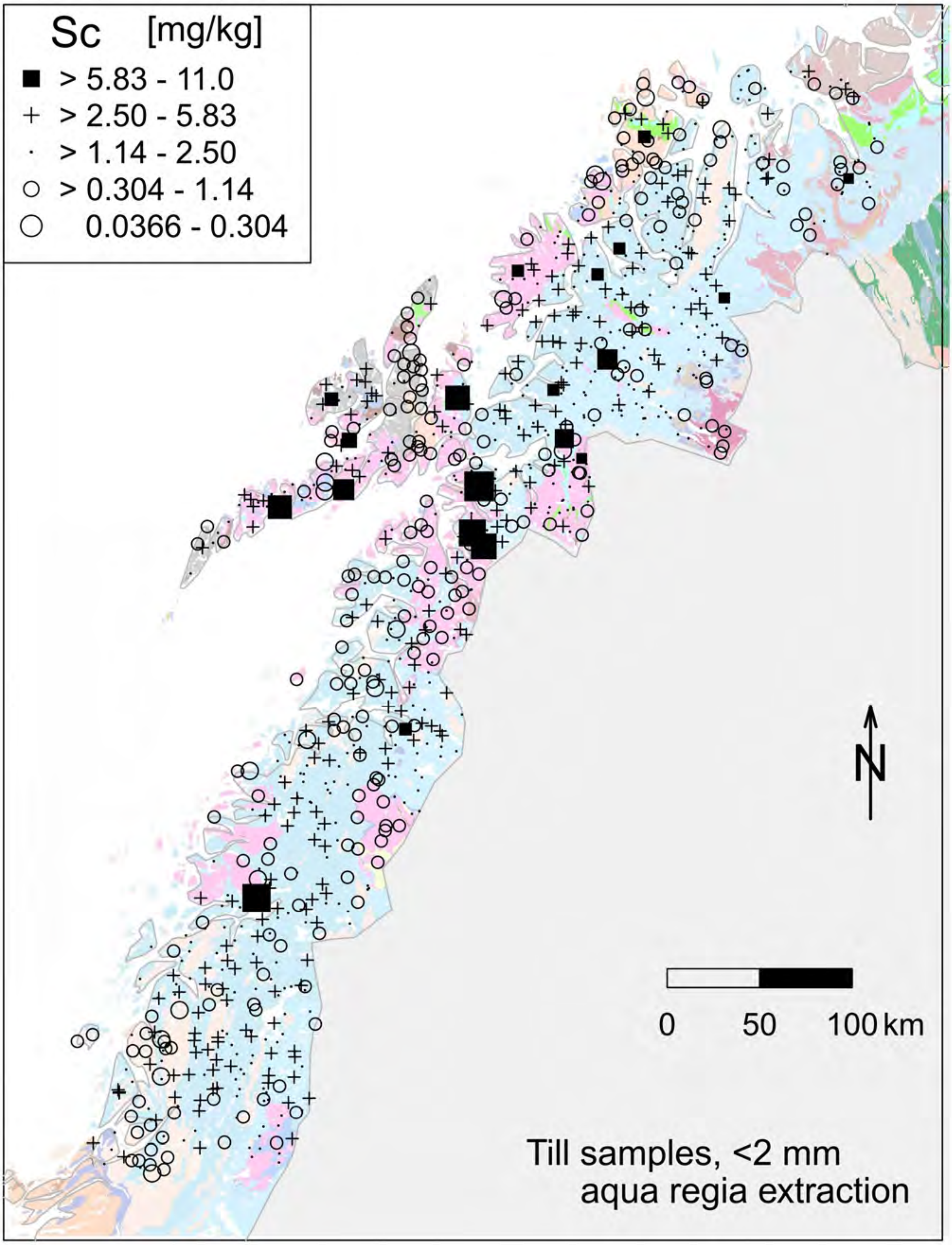

Pt [mg/kg]
> 0.0026 - 0.0065
> 0.0009 - 0.0026
> 0.0003 - 0.0009
> 0.0000 - 0.0003
0.0000 - 0.0000
N
0 50 100 km
Till samples, <2 mm
aqua regia extraction

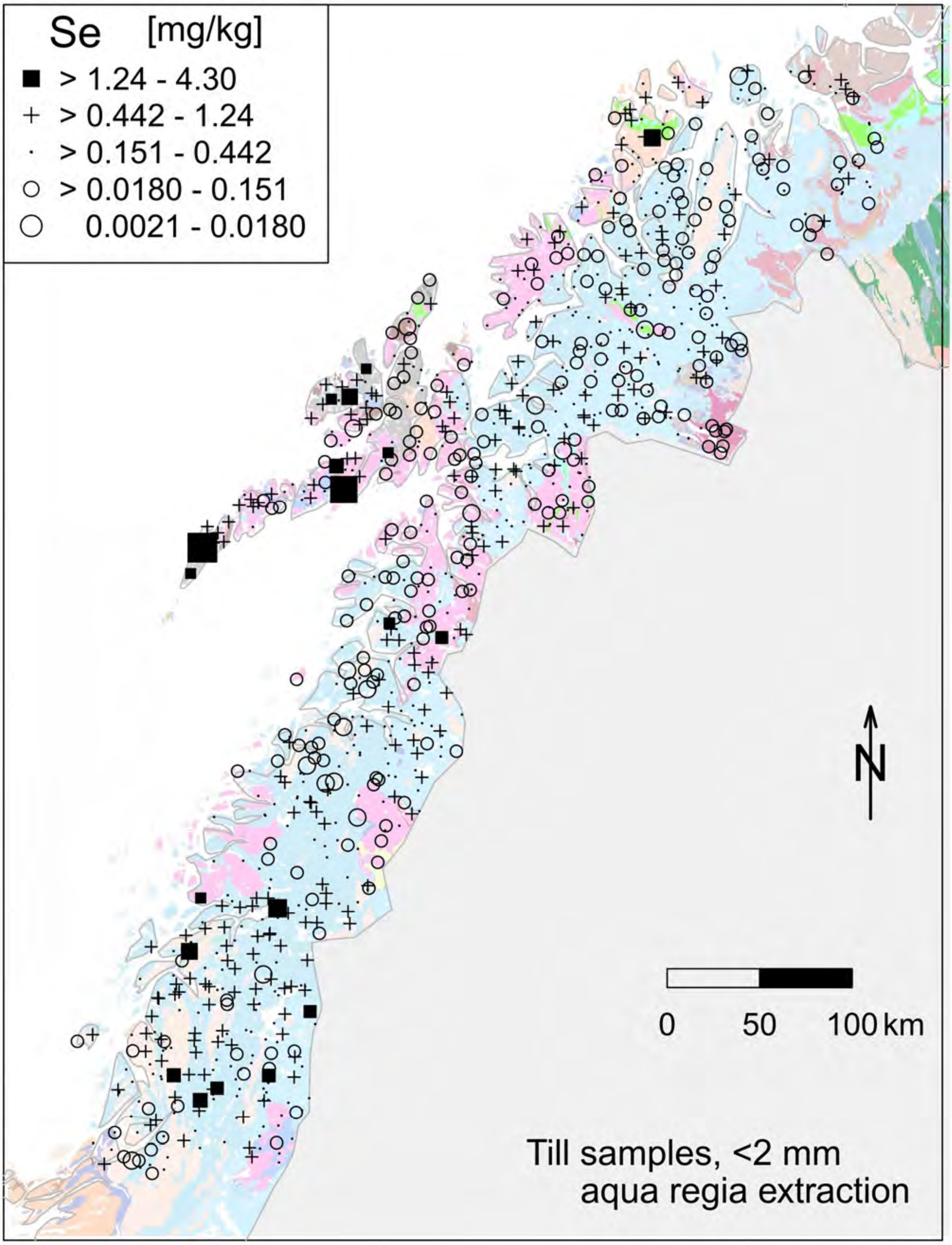

Rb [mg/kg]
■ > 72.9 - 295
+ > 29.1 - 72.9
· > 9.75 - 29.1
○ > 1.62 - 9.75
○ 0.174 - 1.62
N
0 50 100 km
Till samples, <2 mm
aqua regia extraction

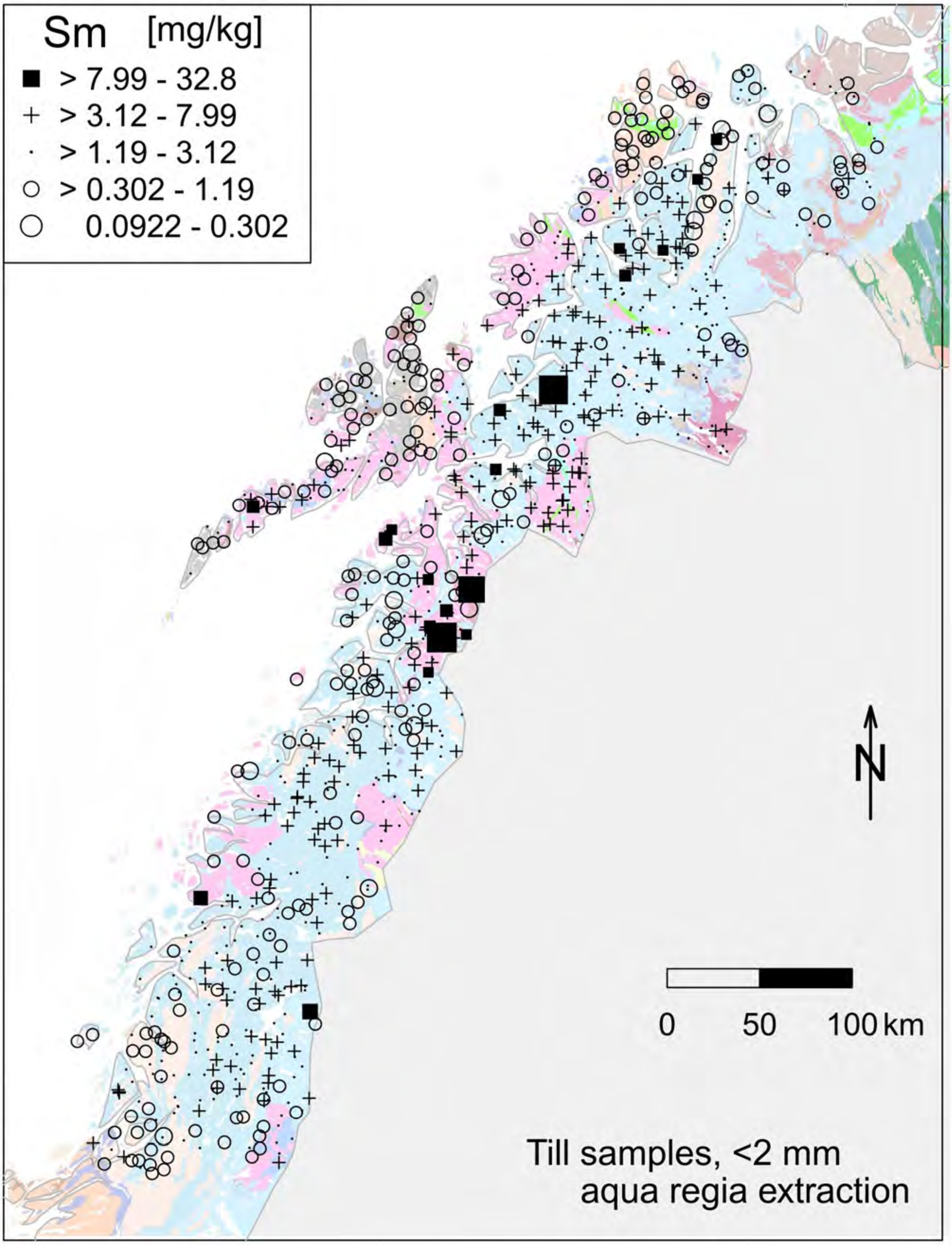

Re [mg/kg]
> 0.0016 - 0.0027
> 0.0007 - 0.0016
> 0.0002 - 0.0007
> 0.0000 - 0.0002
0.0000 - 0.0000
N
0 50 100 km
Till samples, <2 mm
aqua regia extraction

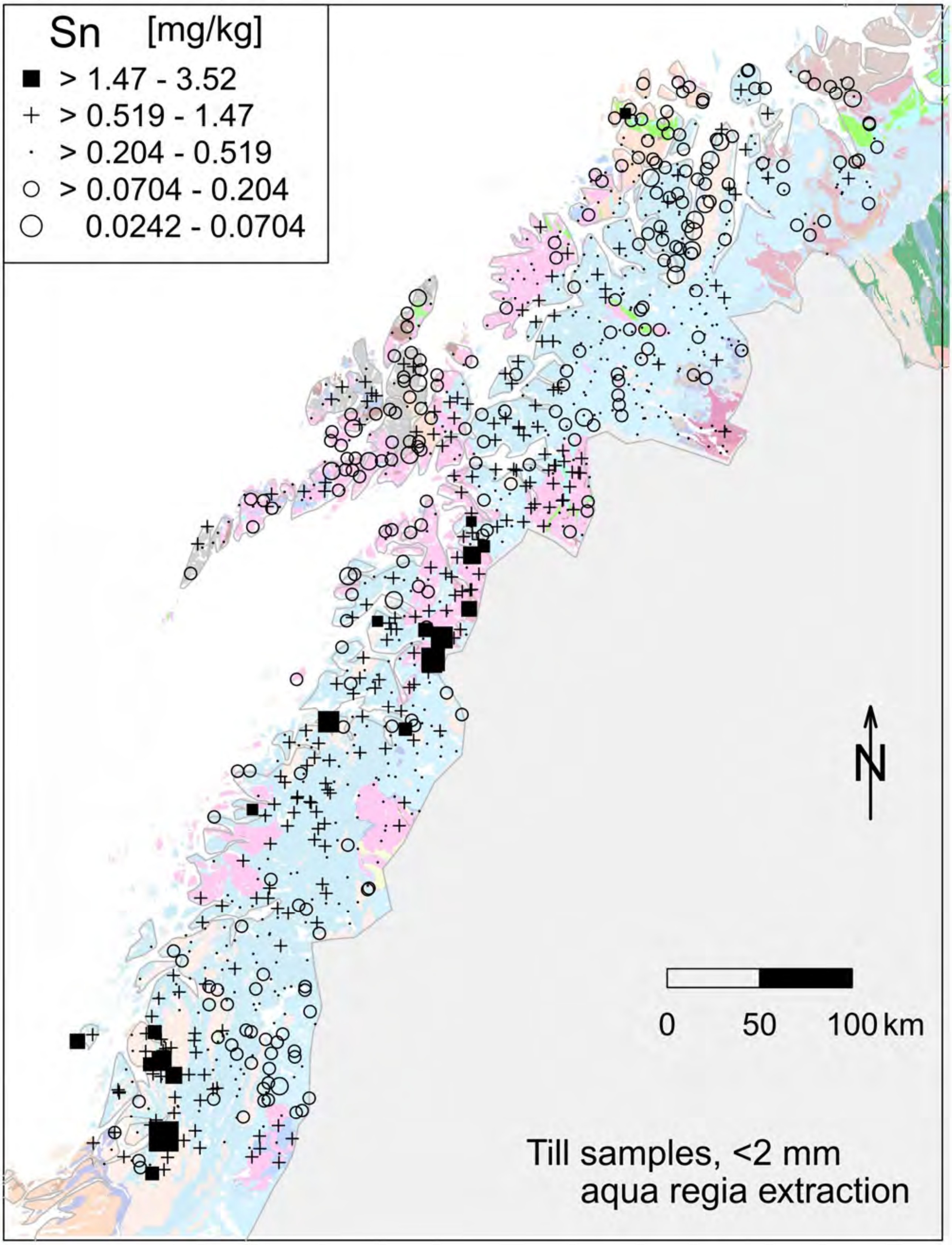

S [mg/kg]
> 489 - 2655
> 114 - 489
> 28.0 - 114
> 3.82 - 28.0
0.761 - 3.82
N
0
50
100 km
Till samples, <2 mm
aqua regia extraction

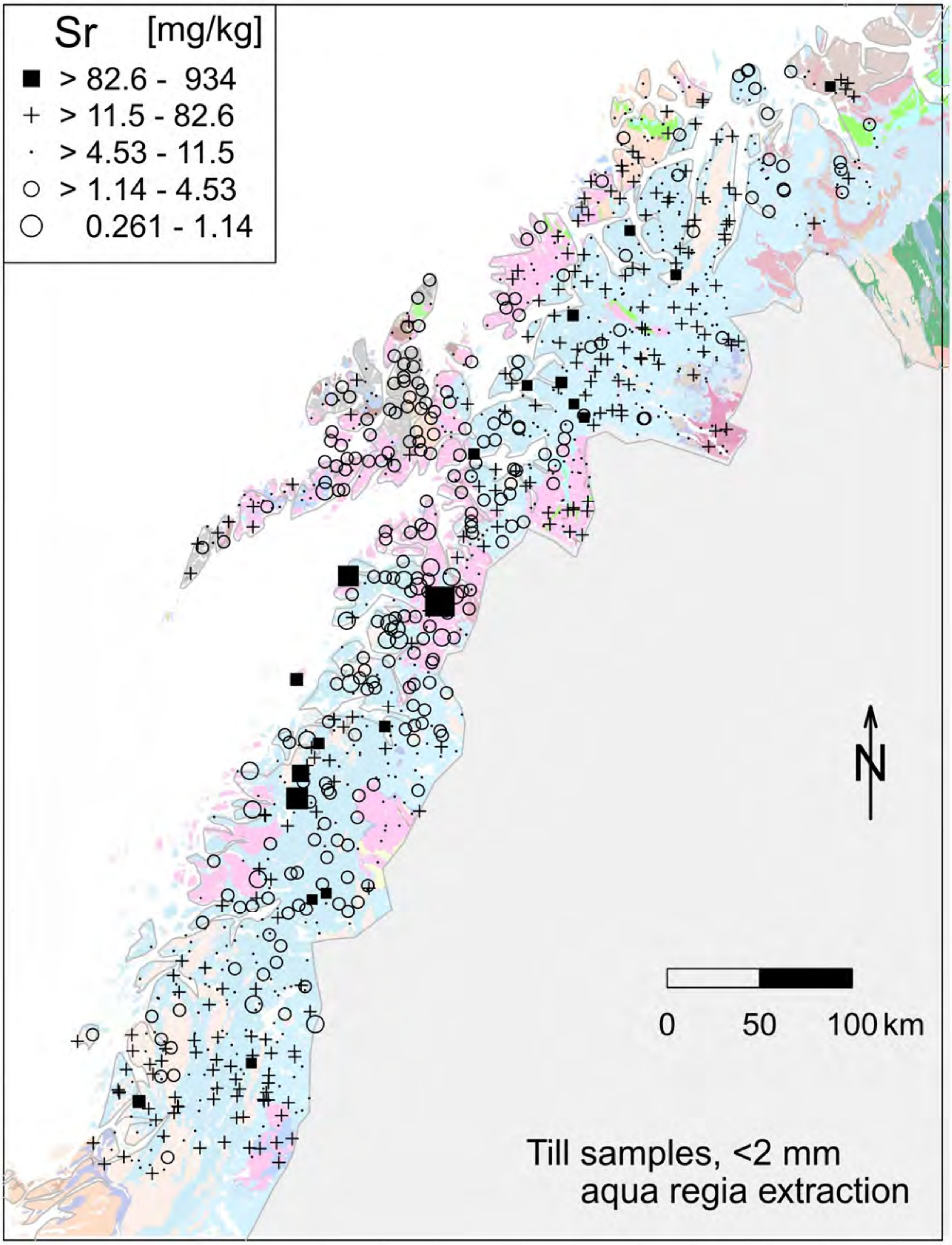

Sb [mg/kg]
> 0.335 - 0.956
> 0.0773 - 0.335
> 0.0222 - 0.0773
> 0.0049 - 0.0222
0.0012 - 0.0049
N
0
50
100 km
Till samples, <2 mm
aqua regia extraction

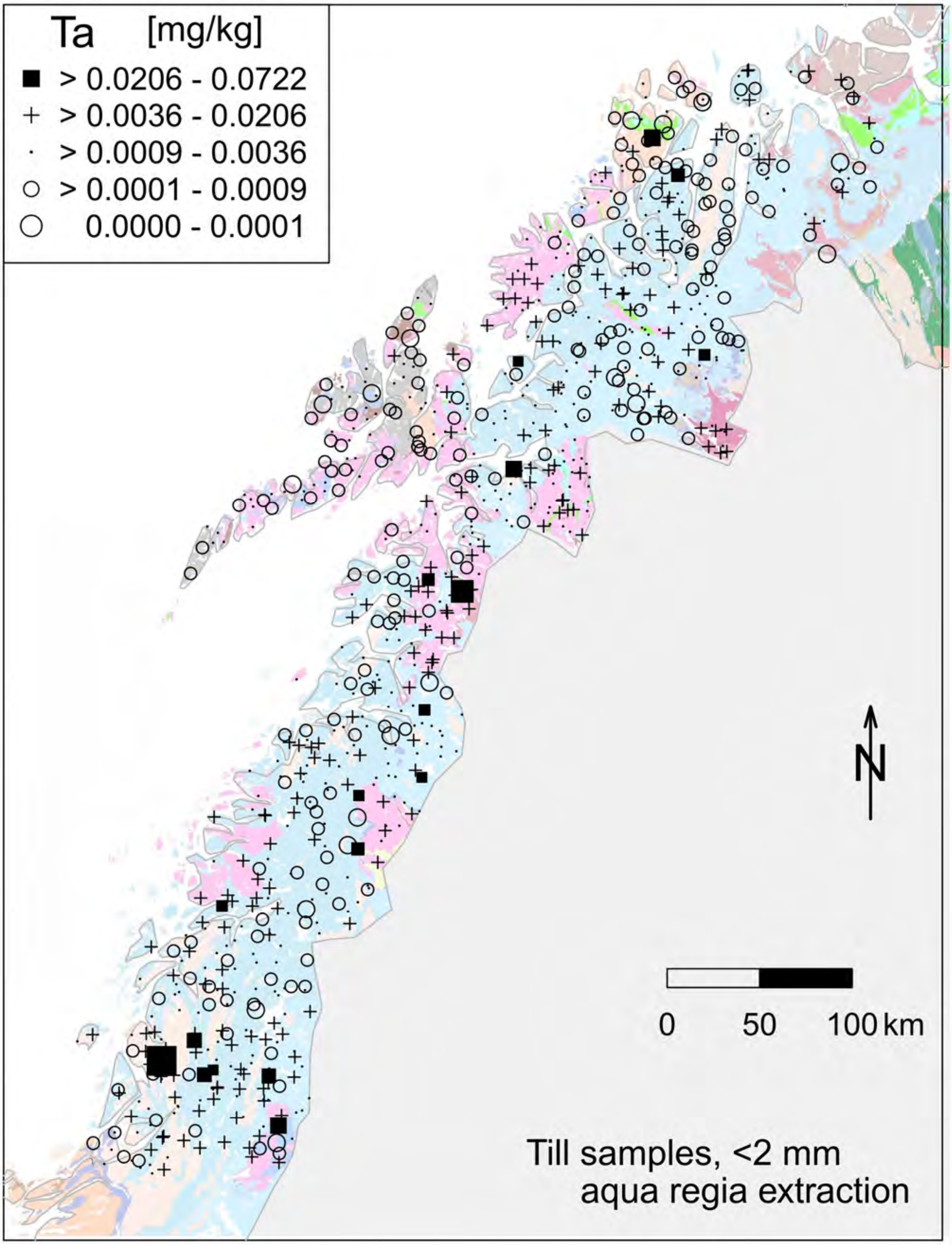

Sc [mg/kg]
> 5.83 - 11.0
> 2.50 - 5.83
> 1.14 - 2.50
> 0.304 - 1.14
0.0366 - 0.304
N
0 50 100 km
Till samples, <2 mm
aqua regia extraction

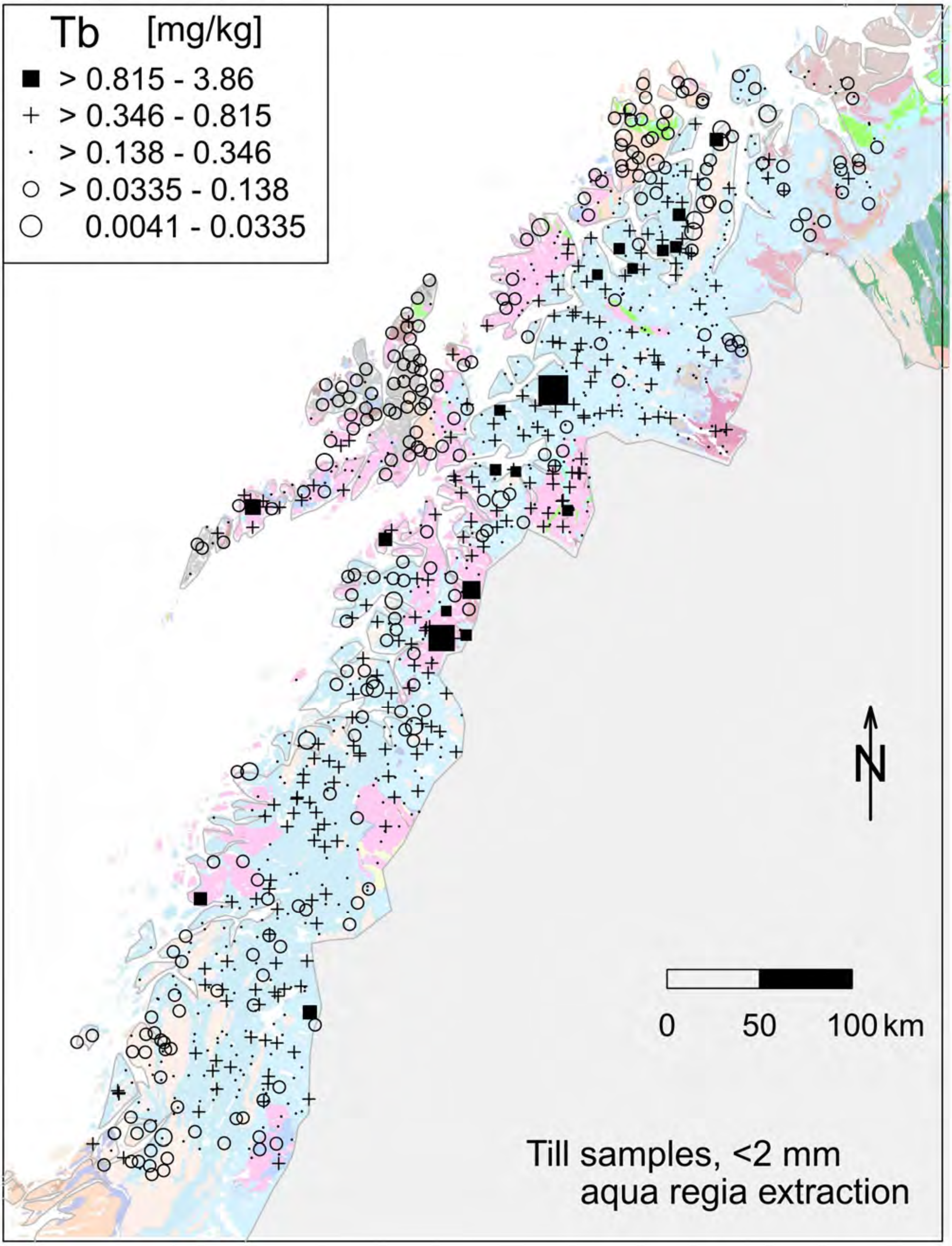

Se [mg/kg]
> 1.24 - 4.30
> 0.442 - 1.24
> 0.151 - 0.442
> 0.0180 - 0.151
0.0021 - 0.0180
N
0 50 100 km
Till samples, <2 mm
aqua regia extraction

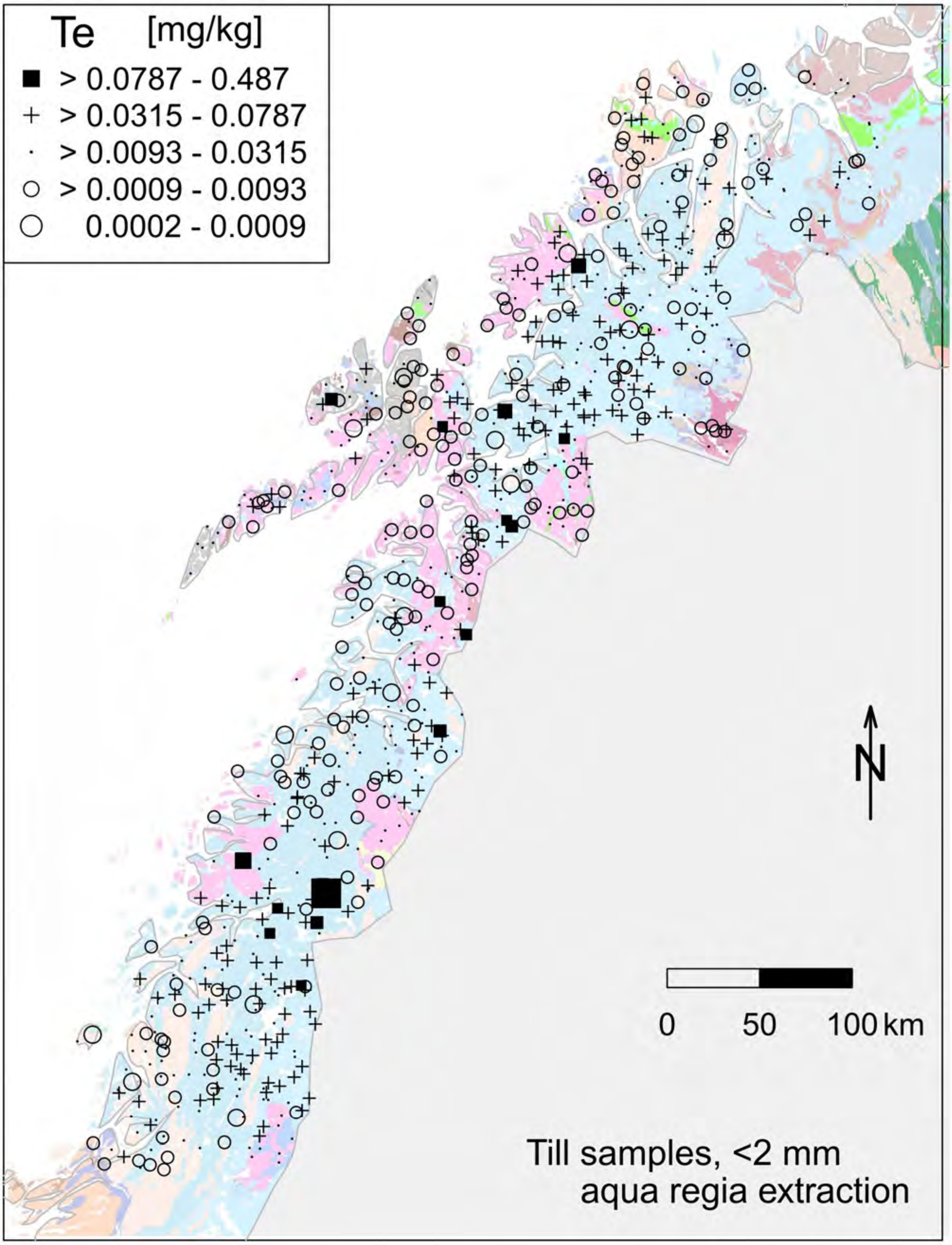

Sm [mg/kg]
> 7.99 - 32.8
> 3.12 - 7.99
> 1.19 - 3.12
> 0.302 - 1.19
0.0922 - 0.302
N
0 50 100 km
Till samples, <2 mm
aqua regia extraction

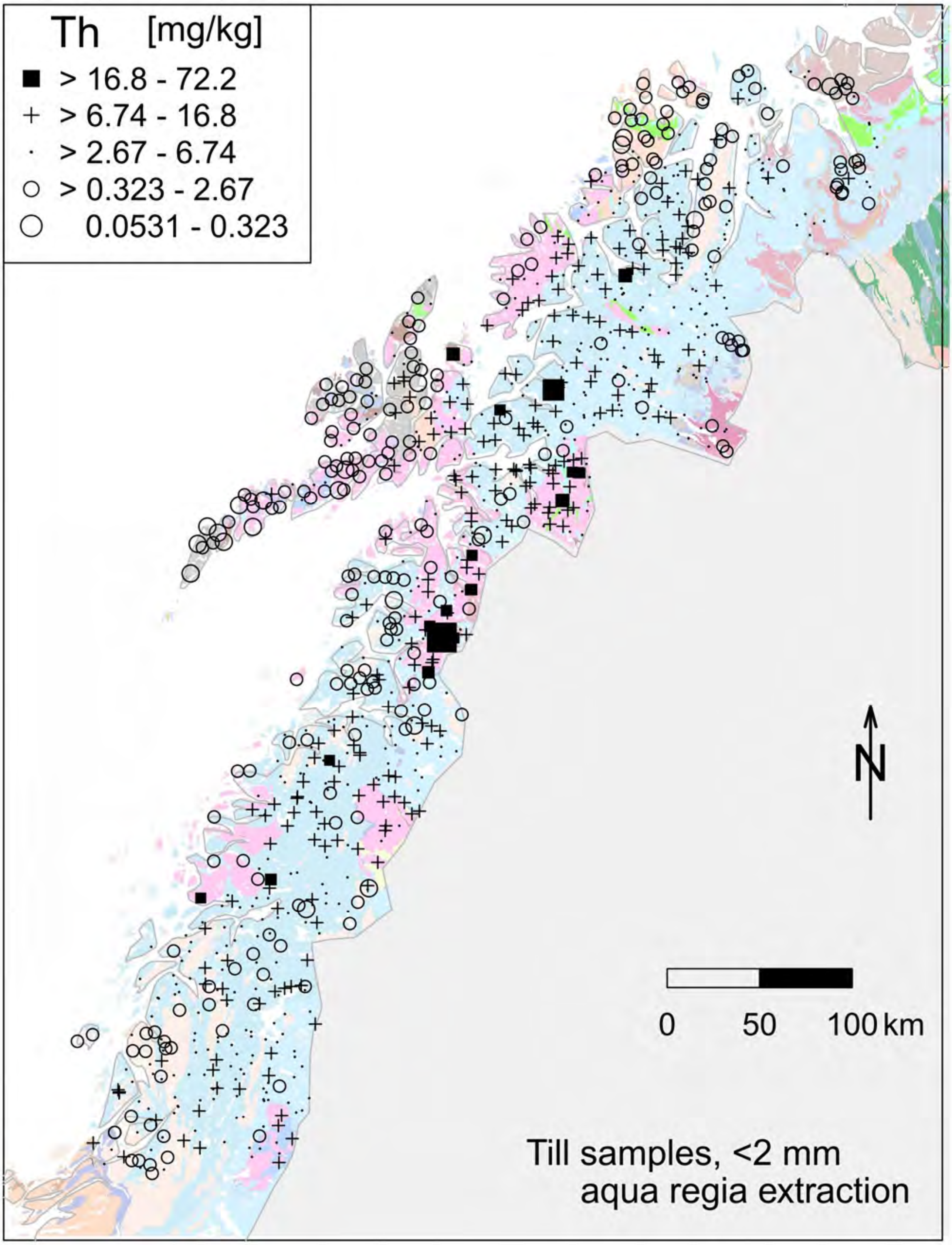

Sn [mg/kg]
> 1.47 - 3.52
> 0.519 - 1.47
> 0.204 - 0.519
> 0.0704 - 0.204
0.0242 - 0.0704
N
0 50 100 km
Till samples, <2 mm
aqua regia extraction

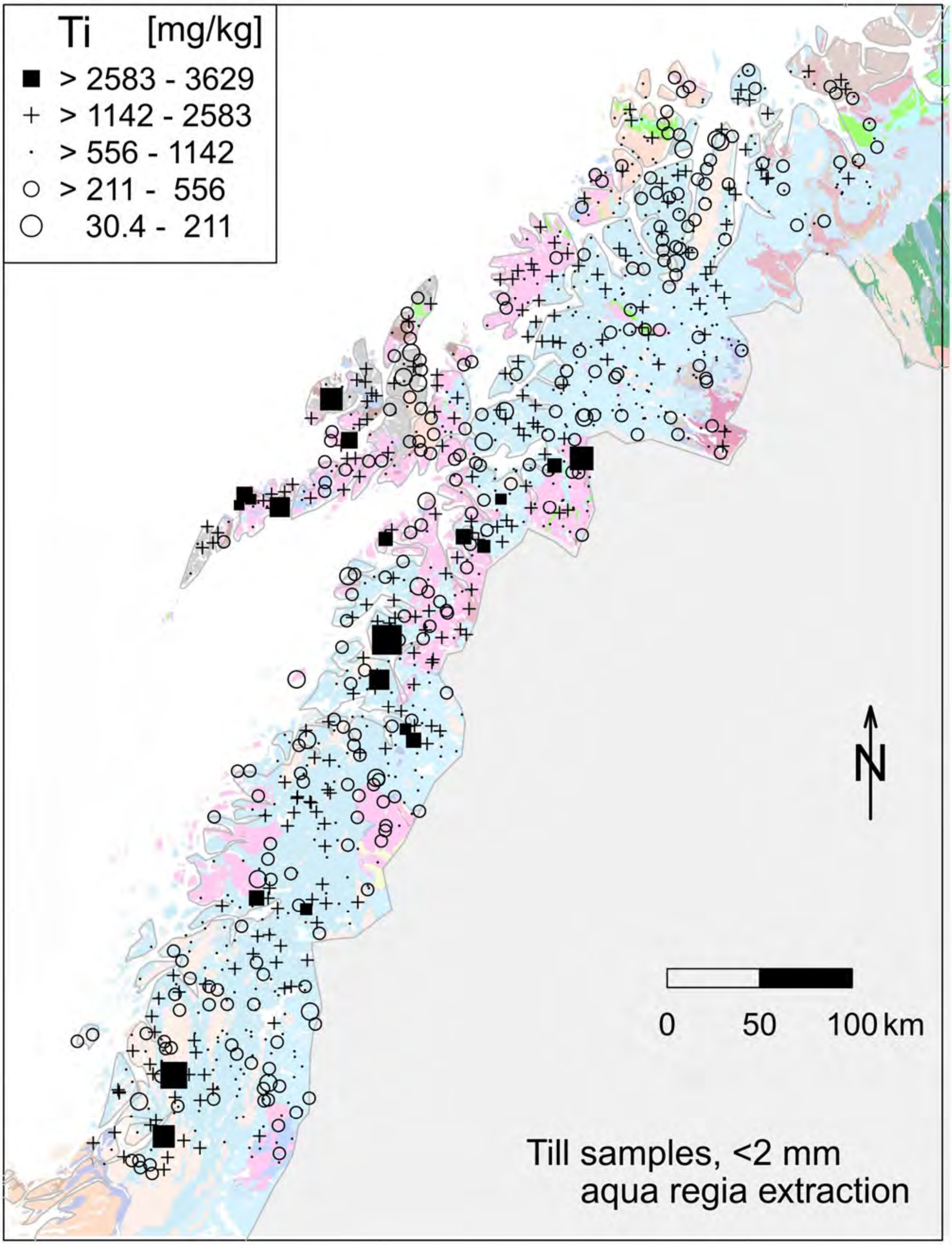

Sr [mg/kg]
> 82.6 - 934
> 11.5 - 82.6
> 4.53 - 11.5
> 1.14 - 4.53
0.261 - 1.14
N
0 50 100 km
Till samples, <2 mm
aqua regia extraction

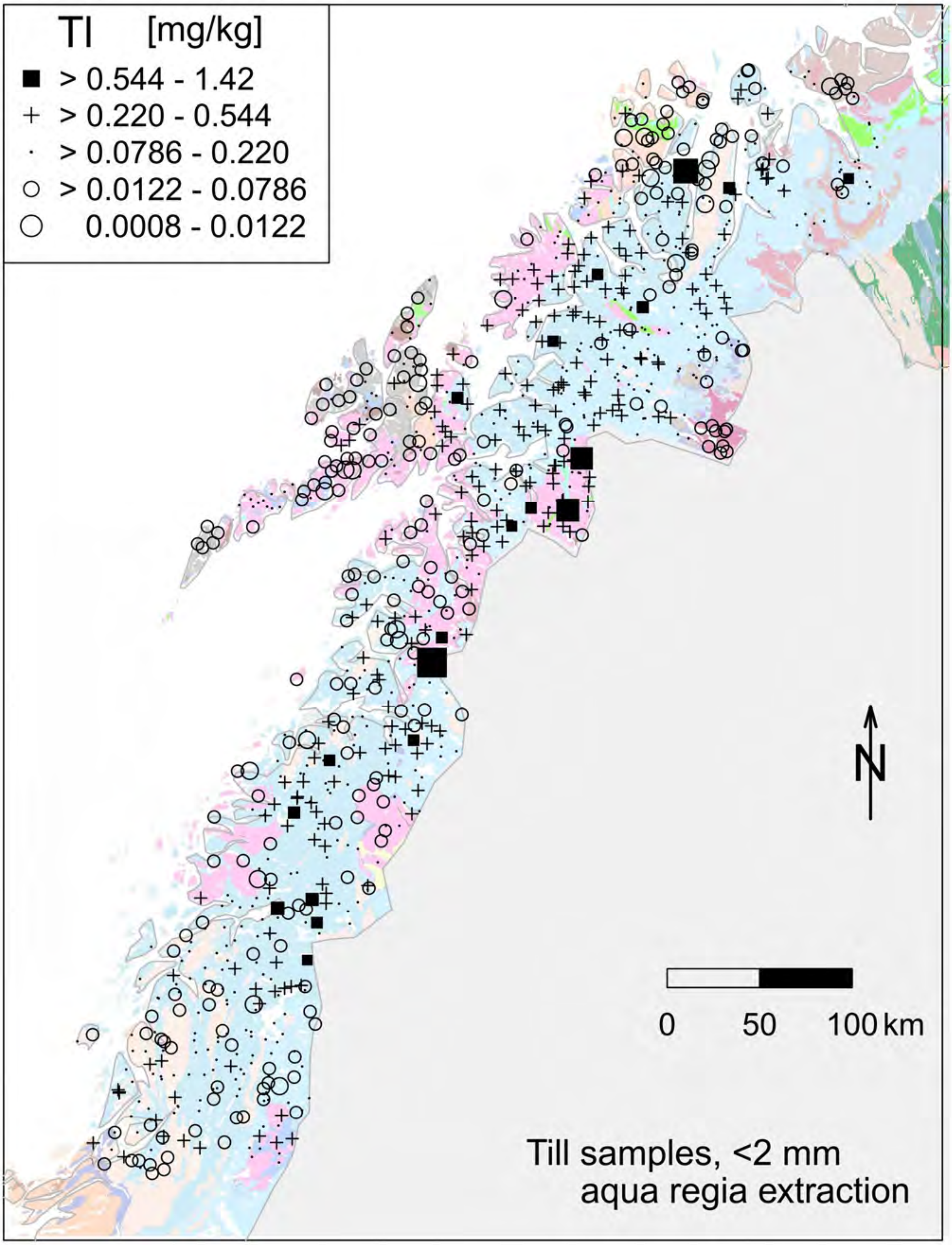

Ta [mg/kg]
> 0.0206 - 0.0722
> 0.0036 - 0.0206
> 0.0009 - 0.0036
> 0.0001 - 0.0009
0.0000 - 0.0001
N
0 50 100 km
Till samples, <2 mm
aqua regia extraction

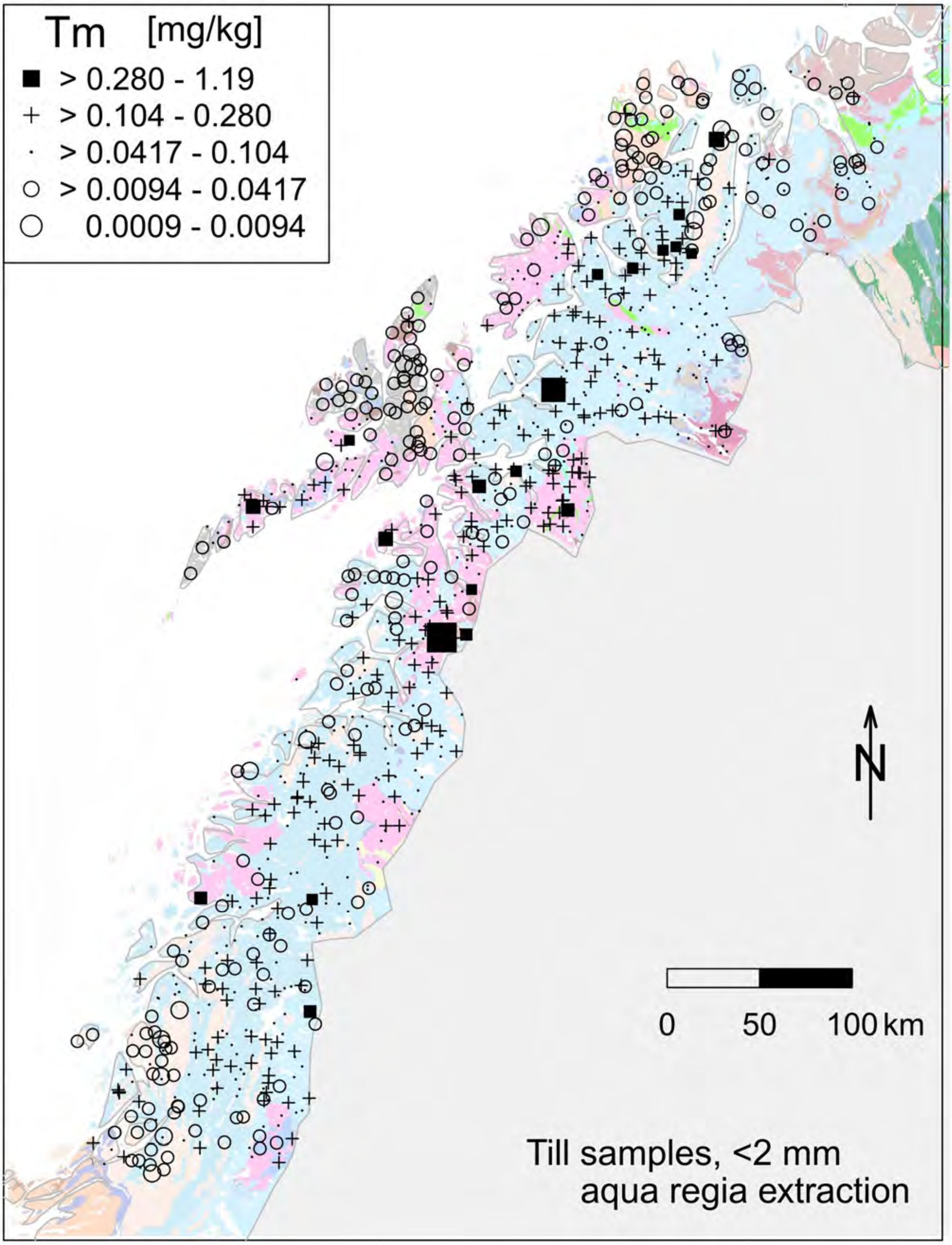

Tb [mg/kg]
> 0.815 - 3.86
> 0.346 - 0.815
> 0.138 - 0.346
> 0.0335 - 0.138
0.0041 - 0.0335
N
0 50 100 km
Till samples, <2 mm
aqua regia extraction

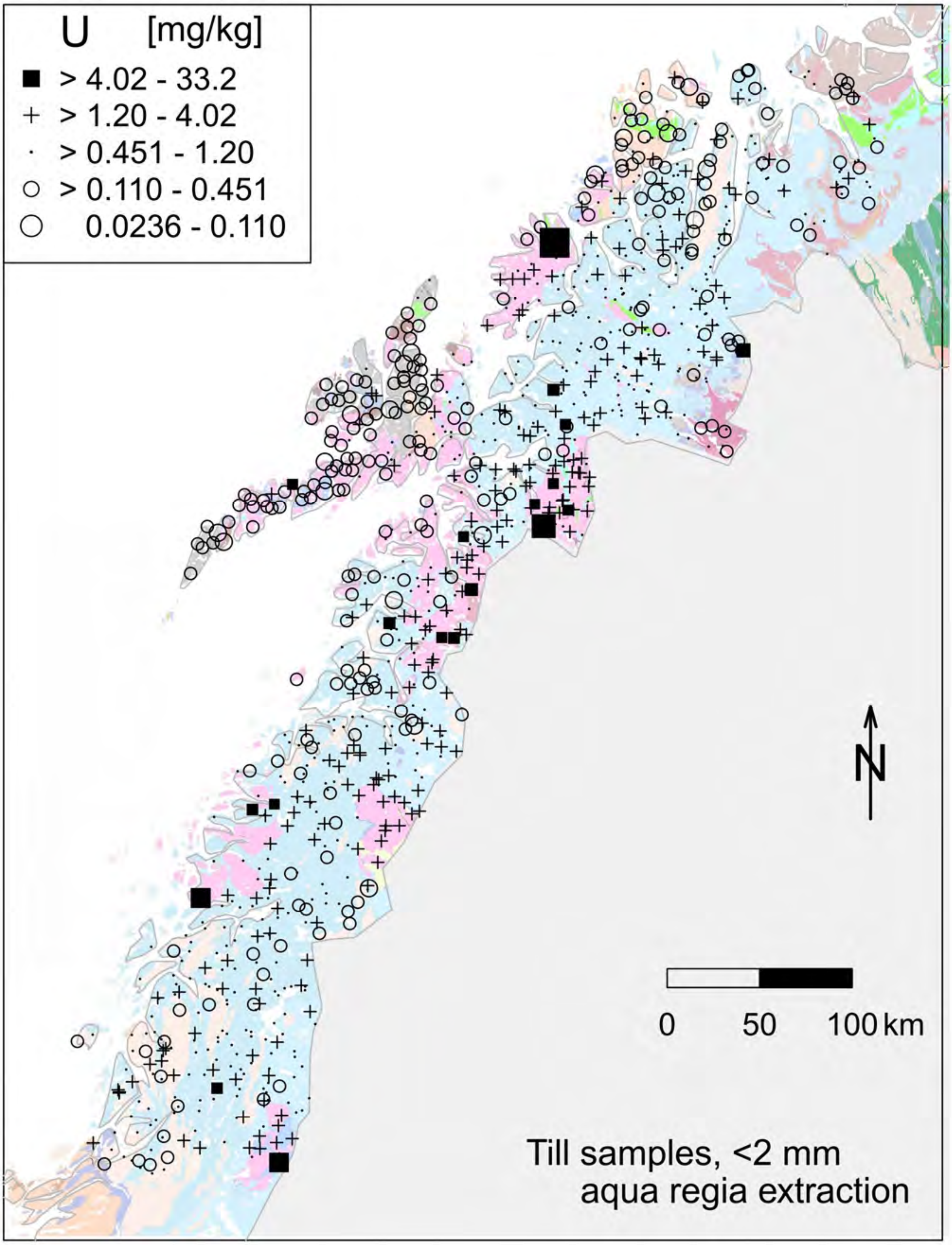

Te [mg/kg]
■ > 0.0787 - 0.487
+ > 0.0315 - 0.0787
· > 0.0093 - 0.0315
○ > 0.0009 - 0.0093
○ 0.0002 - 0.0009
N
0 50 100 km
Till samples, <2 mm
aqua regia extraction

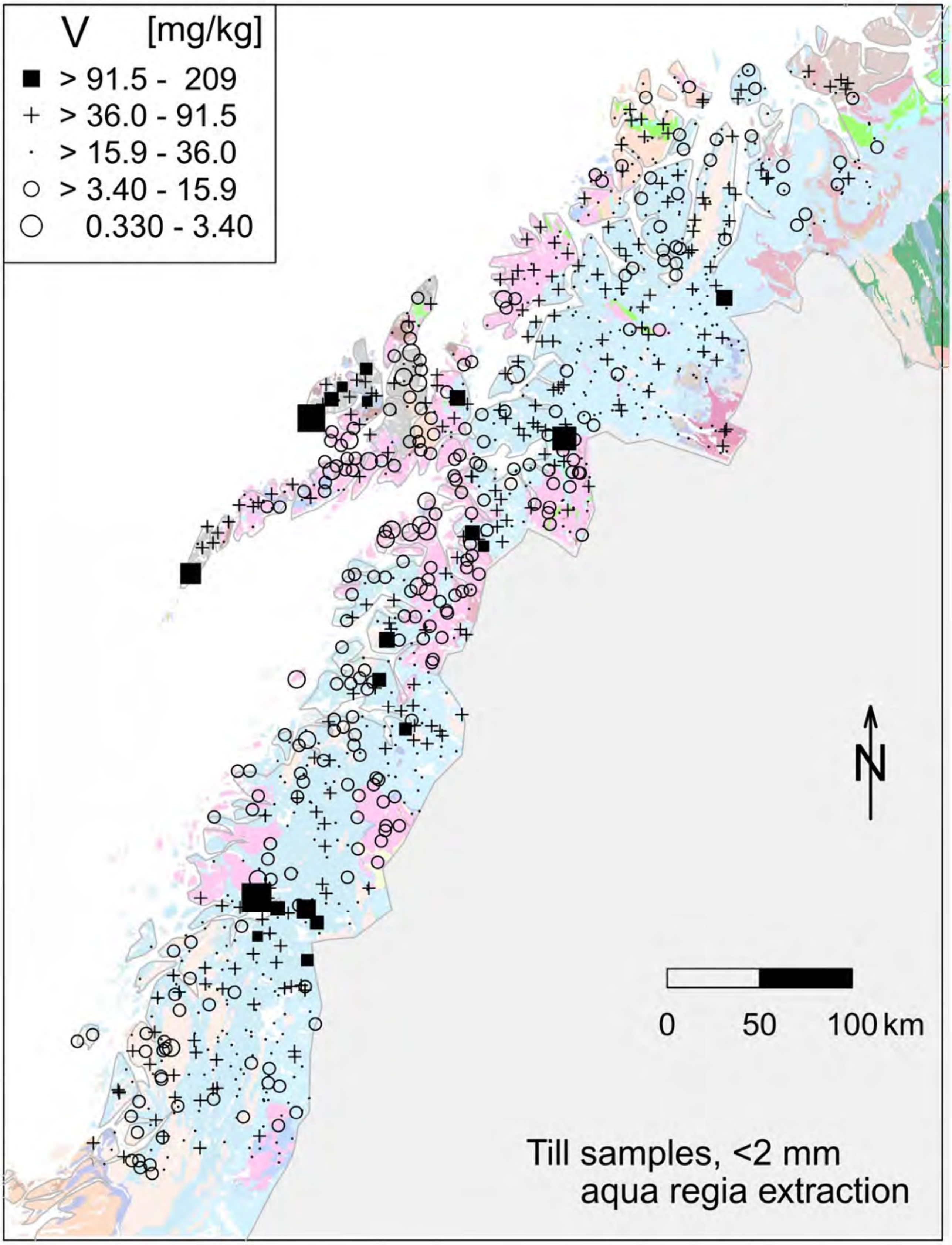

Th [mg/kg]
> 16.8 - 72.2
> 6.74 - 16.8
> 2.67 - 6.74
> 0.323 - 2.67
0.0531 - 0.323
N
0 50 100 km
Till samples, <2 mm
aqua regia extraction

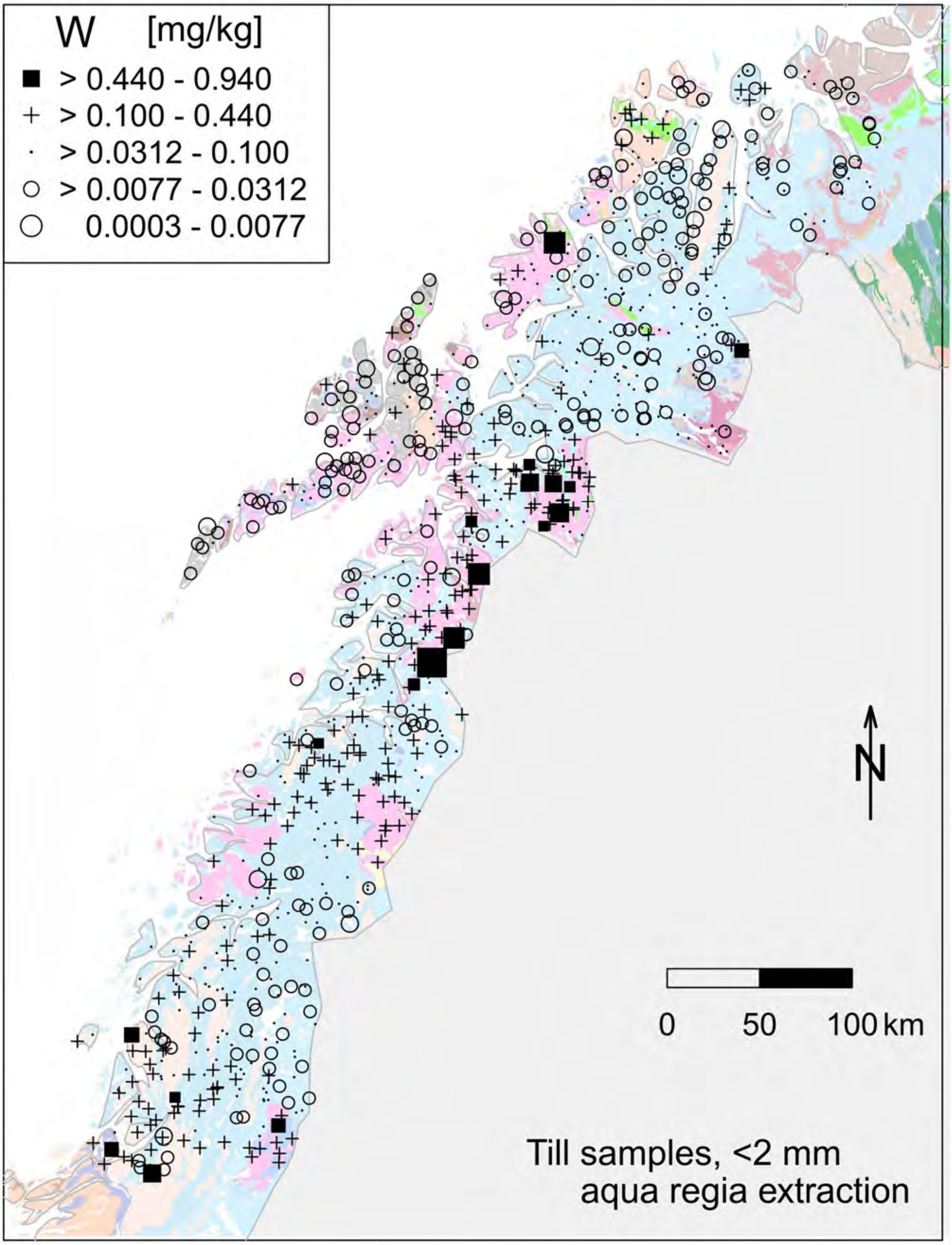

Ti [mg/kg]
> 2583 - 3629
> 1142 - 2583
> 556 - 1142
> 211 - 556
30.4 - 211
N
0 50 100 km
Till samples, <2 mm
aqua regia extraction

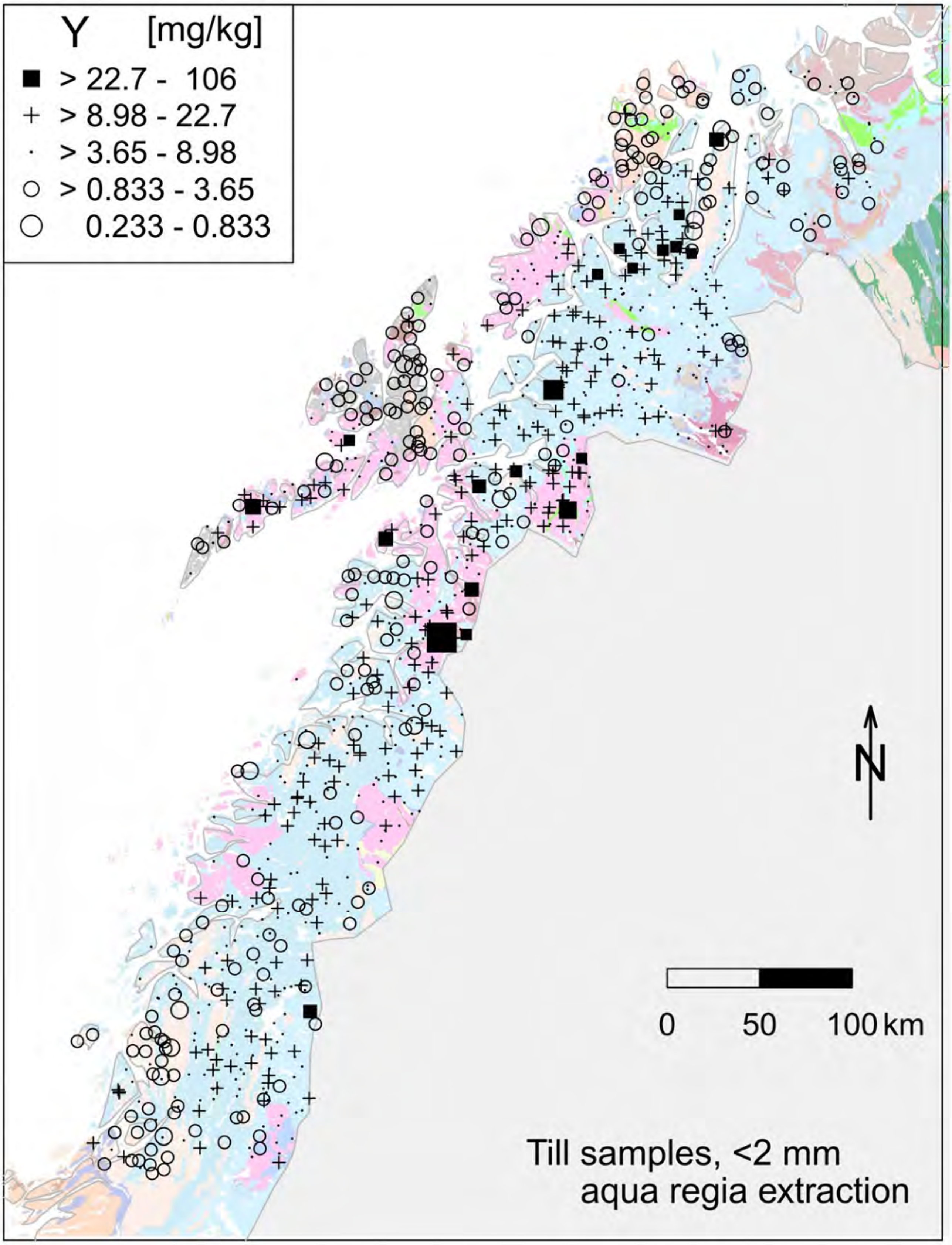

Tl [mg/kg]
> 0.544 - 1.42
> 0.220 - 0.544
> 0.0786 - 0.220
> 0.0122 - 0.0786
0.0008 - 0.0122
N
0 50 100 km
Till samples, <2 mm
aqua regia extraction

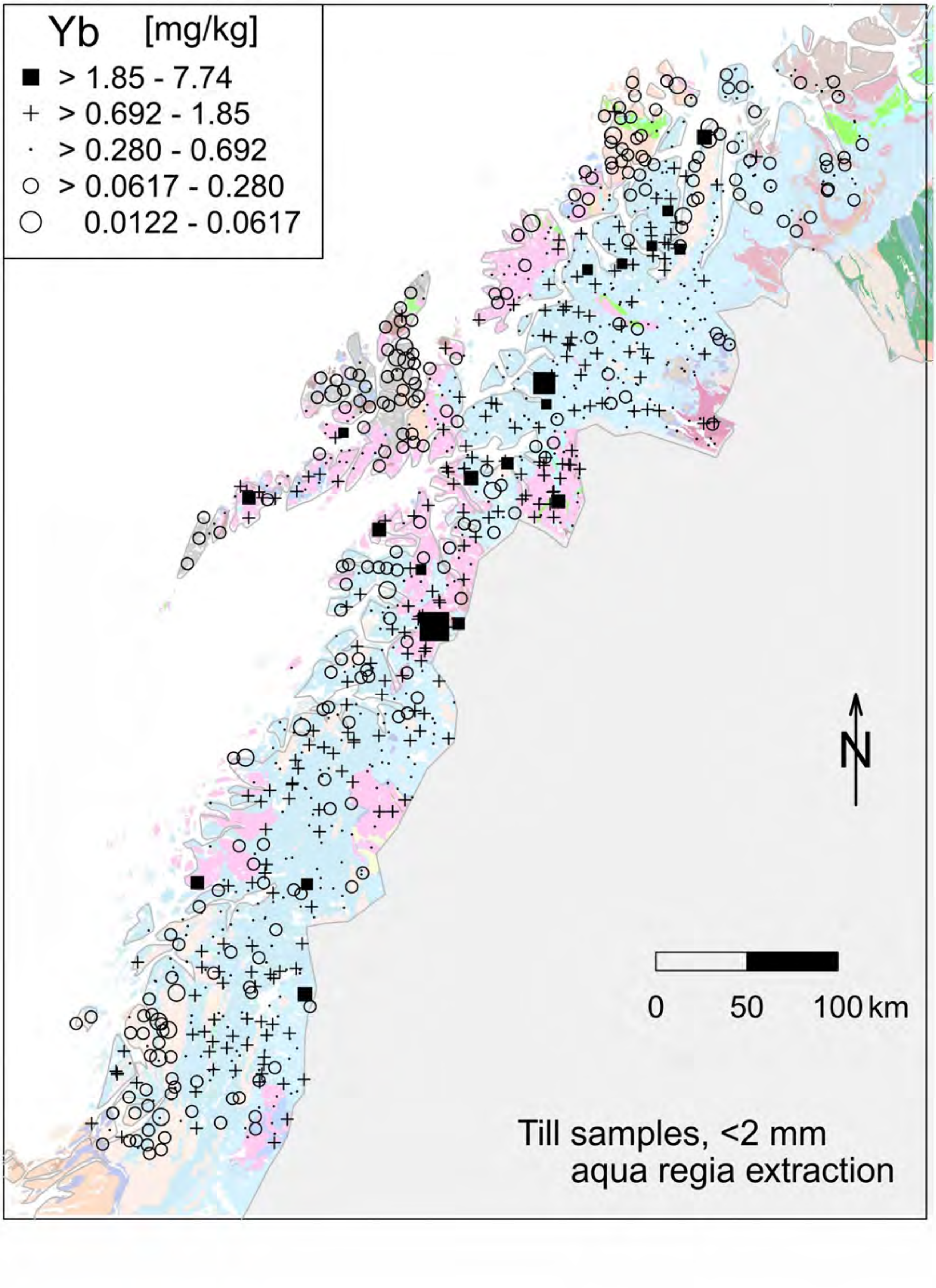

Tm [mg/kg]
> 0.280 - 1.19
> 0.104 - 0.280
> 0.0417 - 0.104
> 0.0094 - 0.0417
0.0009 - 0.0094
N
0 50 100 km
Till samples, <2 mm
aqua regia extraction

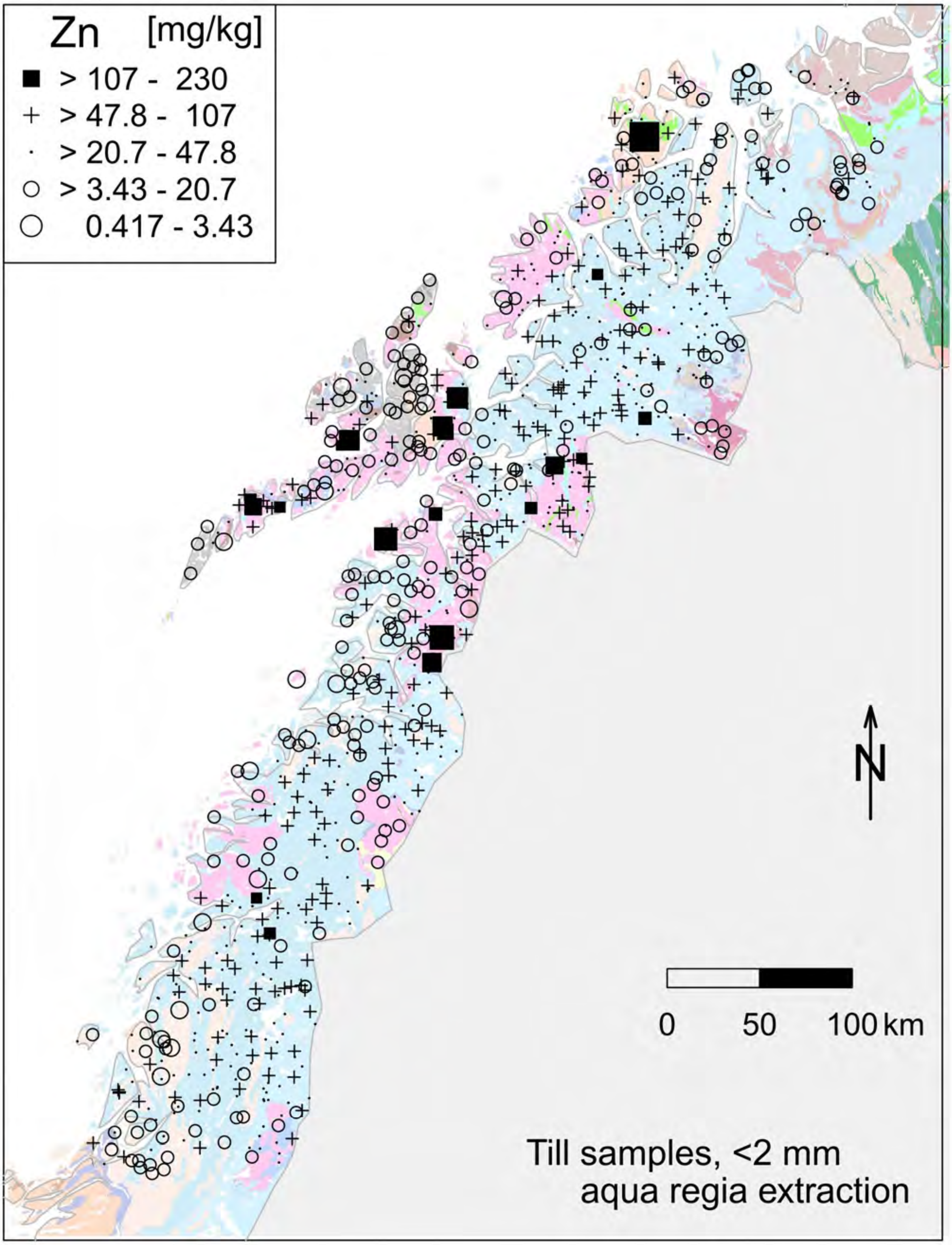

U [mg/kg]
> 4.02 - 33.2
> 1.20 - 4.02
> 0.451 - 1.20
> 0.110 - 0.451
0.0236 - 0.110
N
0
50
100 km
Till samples, <2 mm
aqua regia extraction

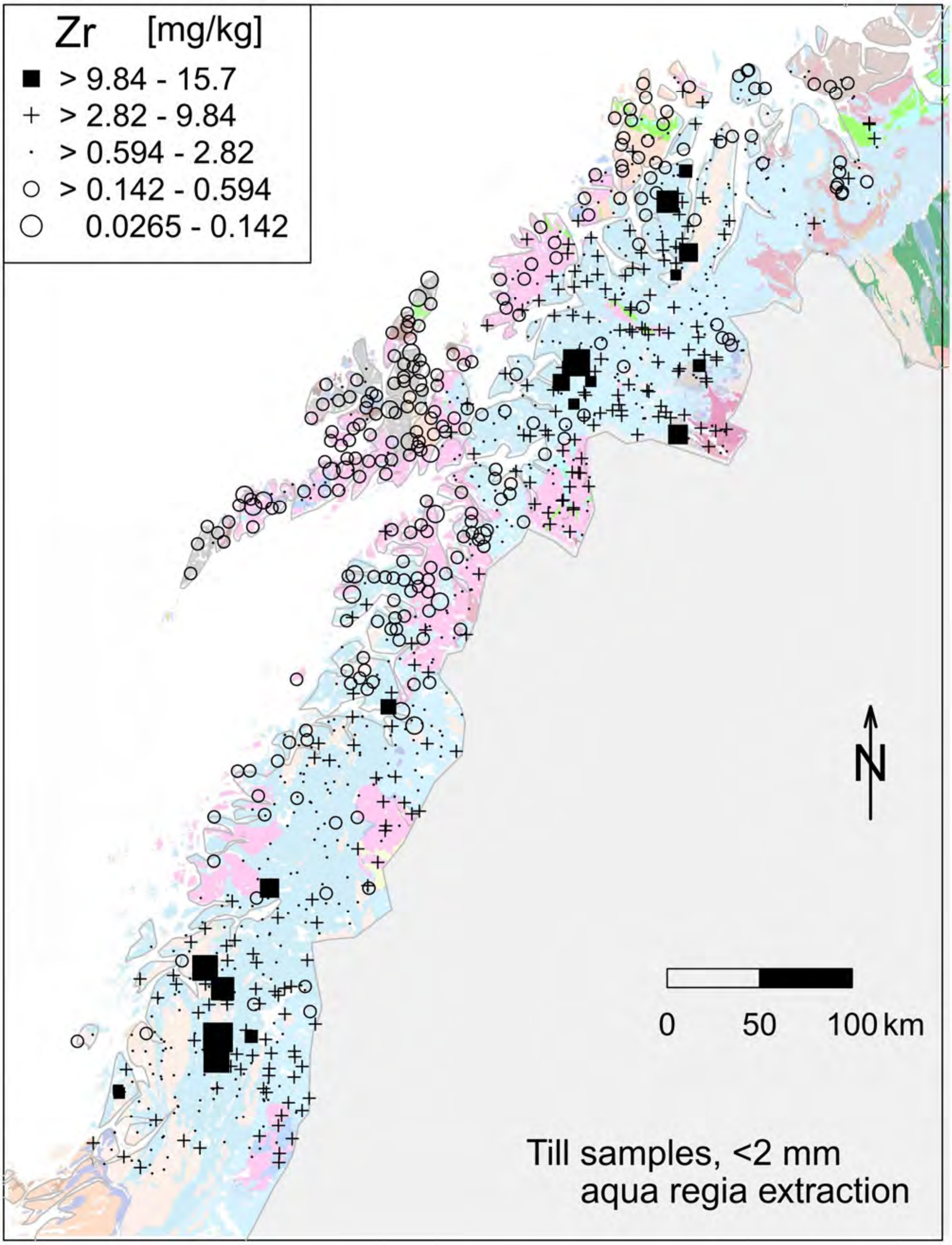

V [mg/kg]
> 91.5 - 209
> 36.0 - 91.5
> 15.9 - 36.0
> 3.40 - 15.9
0.330 - 3.40
N
0 50 100 km
Till samples, <2 mm
aqua regia extraction

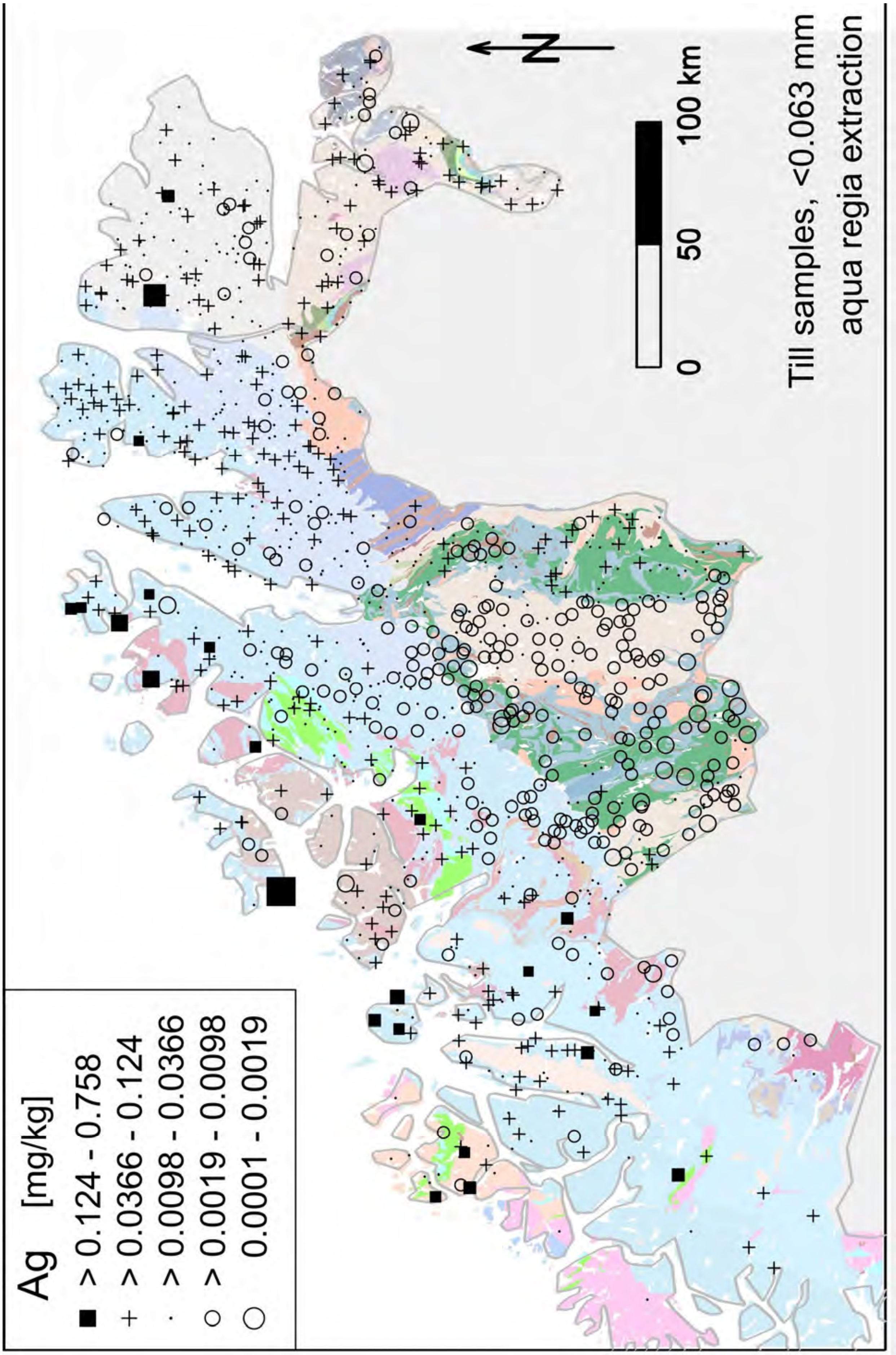

W [mg/kg]
> 0.440 - 0.940
> 0.100 - 0.440
> 0.0312 - 0.100
> 0.0077 - 0.0312
0.0003 - 0.0077
N
0 50 100 km
Till samples, <2 mm
aqua regia extraction

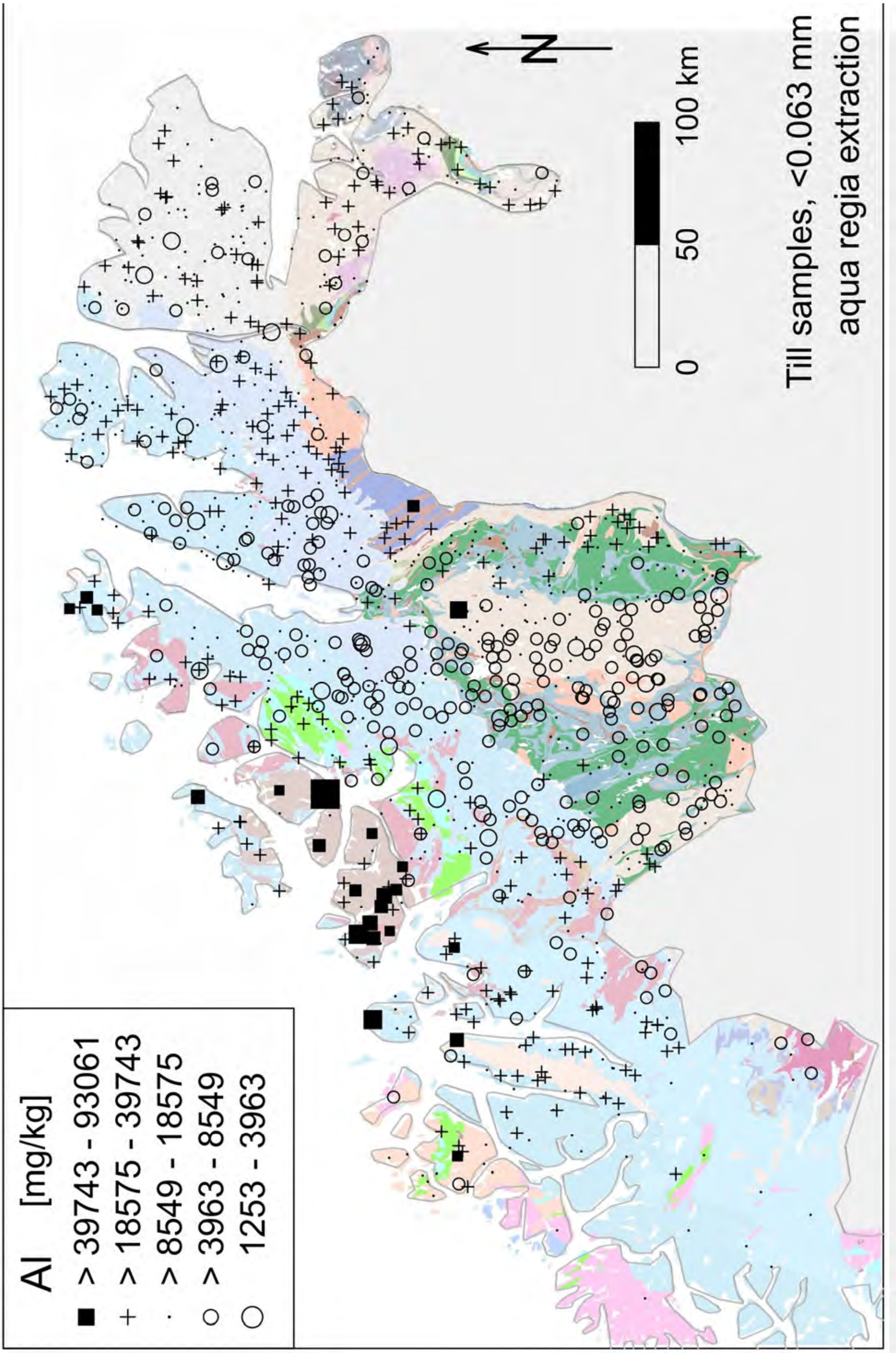

Y [mg/kg]
> 22.7 - 106
> 8.98 - 22.7
> 3.65 - 8.98
> 0.833 - 3.65
0.233 - 0.833
N
0
50
100 km
Till samples, <2 mm
aqua regia extraction

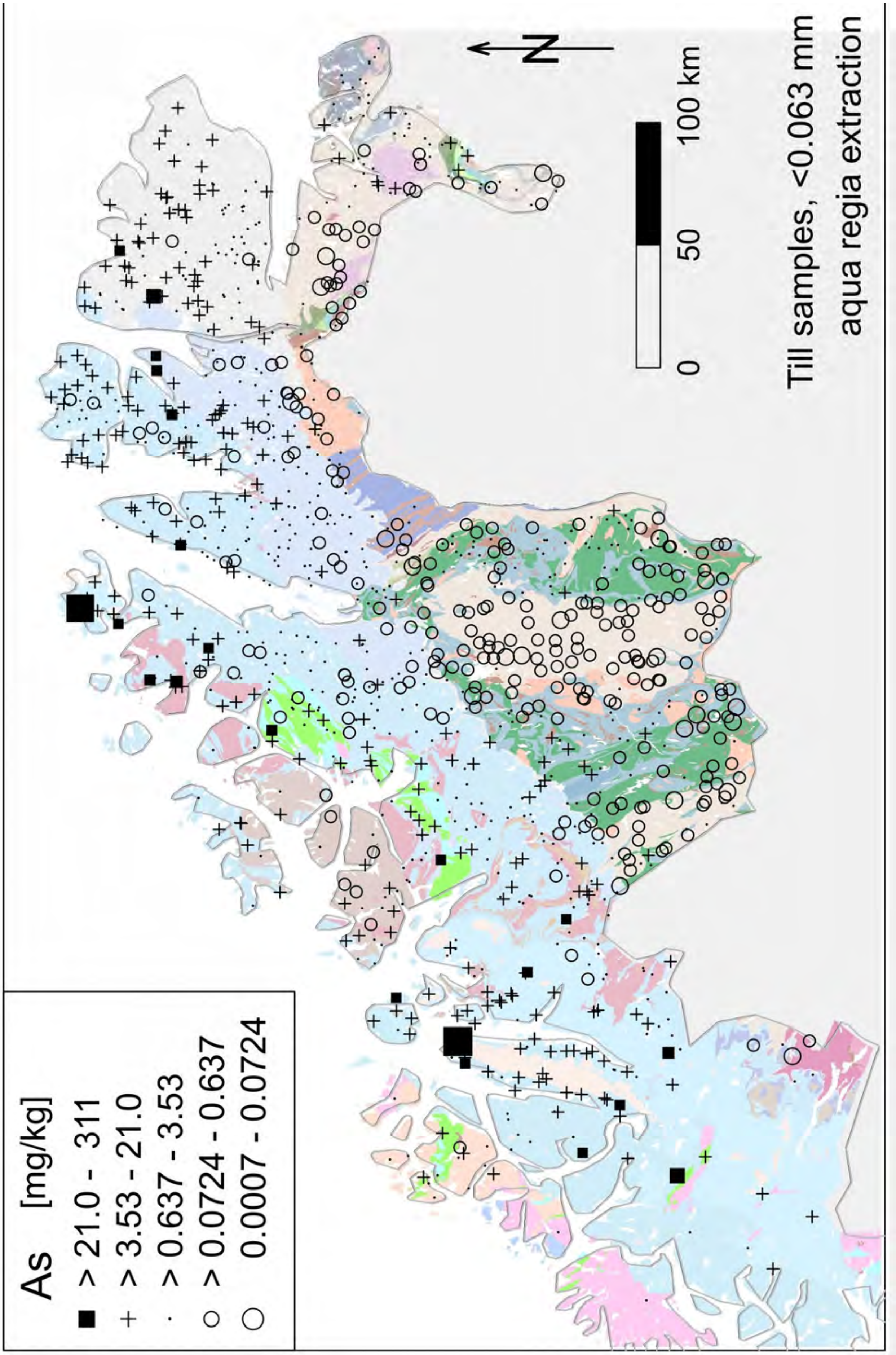

Yb [mg/kg]
> 1.85 - 7.74
> 0.692 - 1.85
> 0.280 - 0.692
> 0.0617 - 0.280
0.0122 - 0.0617
N
0 50 100 km
Till samples, <2 mm
aqua regia extraction

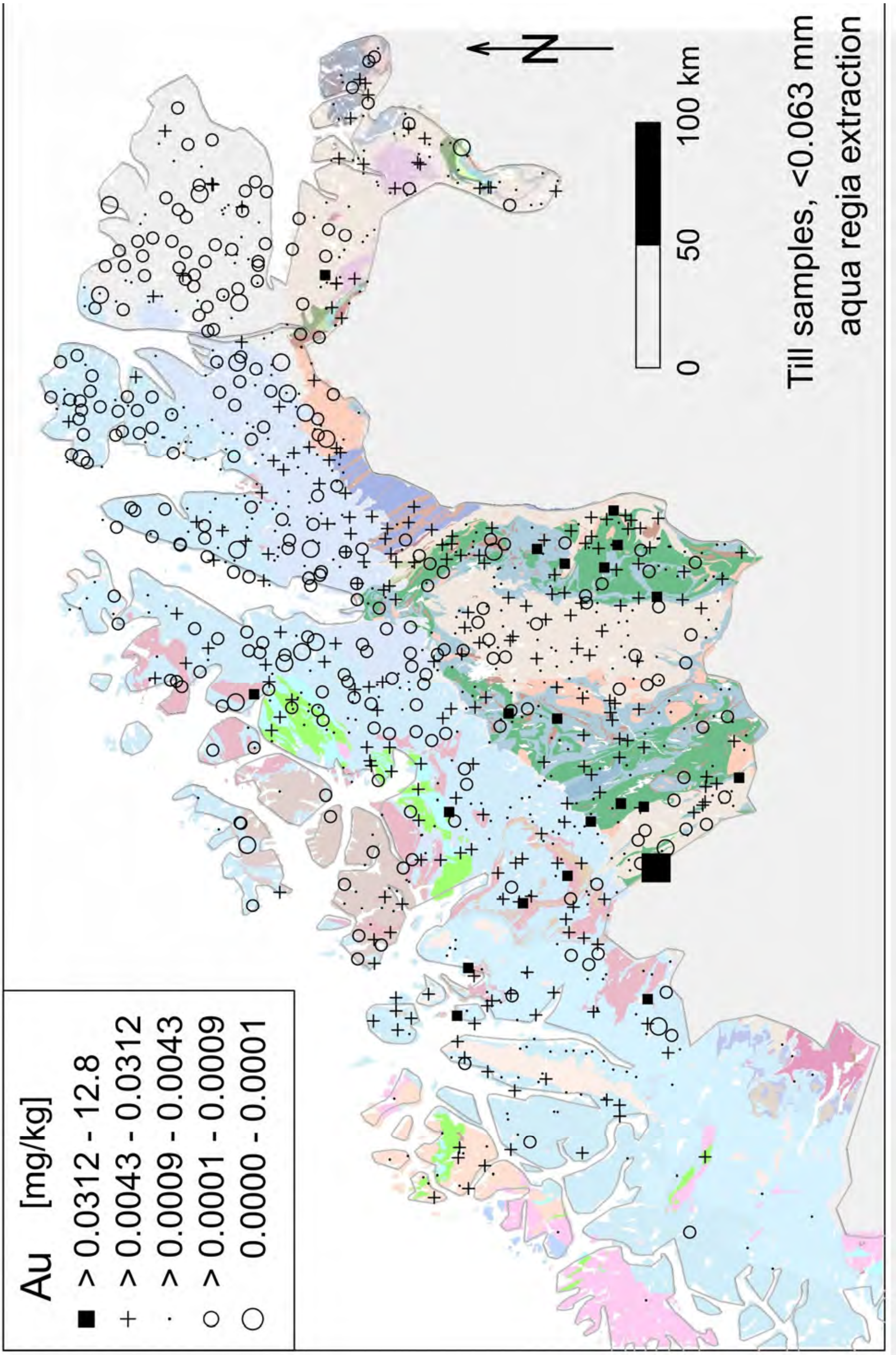

Zn [mg/kg]
> 107 - 230
> 47.8 - 107
> 20.7 - 47.8
> 3.43 - 20.7
0.417 - 3.43
N
0 50 100 km
Till samples, <2 mm
aqua regia extraction

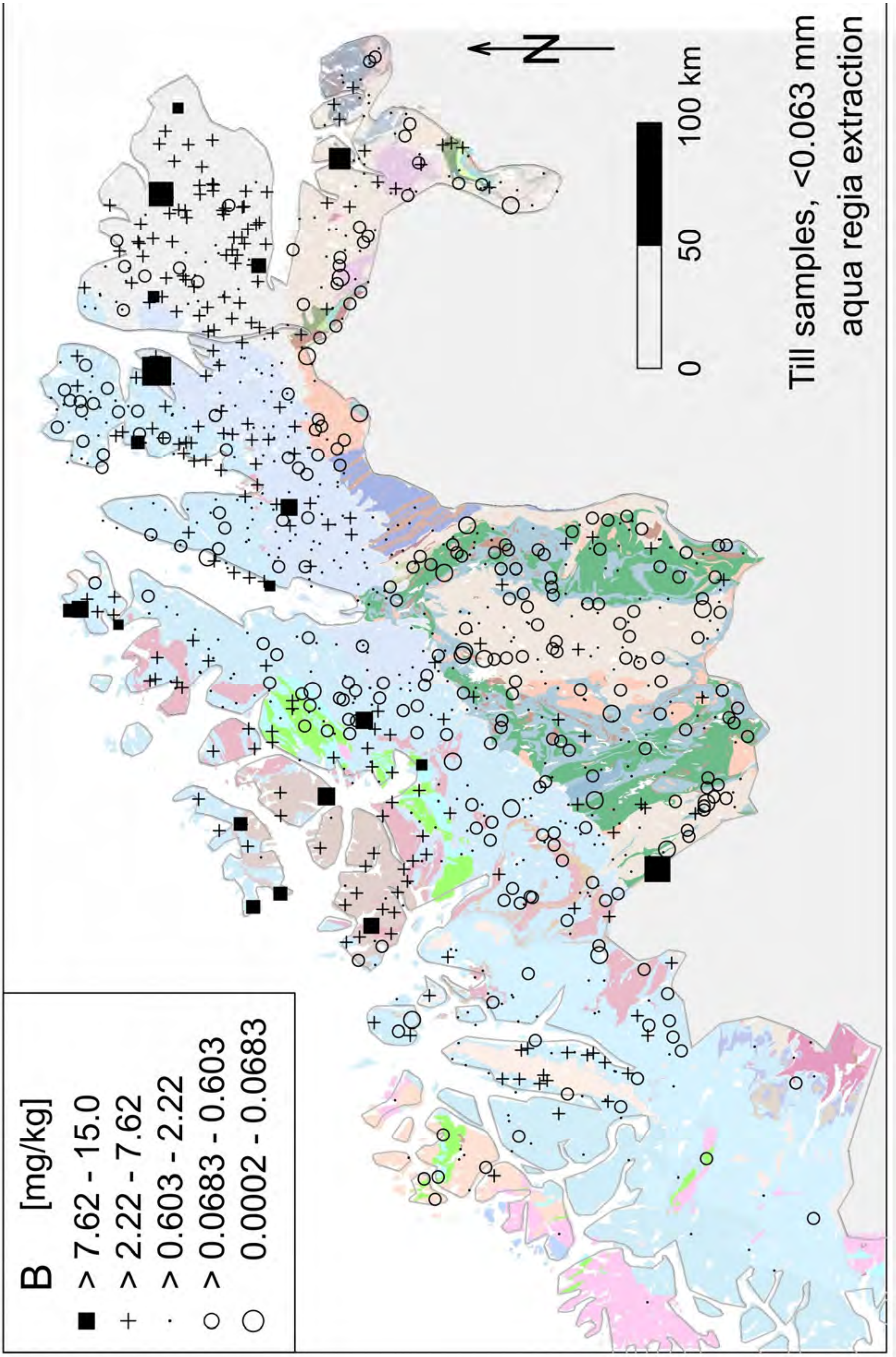

Zr [mg/kg]
> 9.84 - 15.7
> 2.82 - 9.84
> 0.594 - 2.82
> 0.142 - 0.594
0.0265 - 0.142
N
0 50 100 km
Till samples, <2 mm
aqua regia extraction

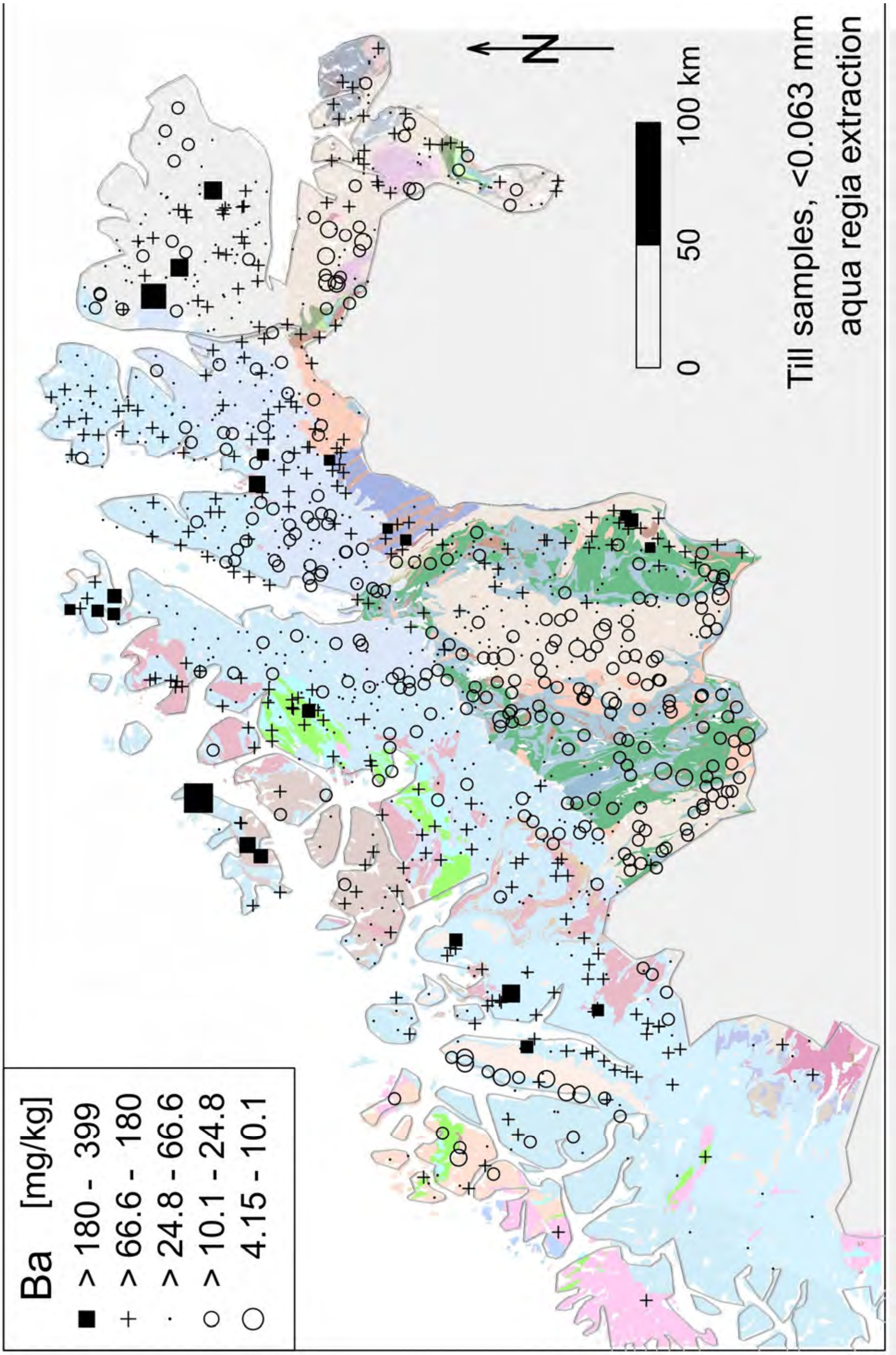

Ag [mg/kg]
> 0.124 - 0.758
> 0.0366 - 0.124
> 0.0098 - 0.0366
> 0.0019 - 0.0098
0.0001 - 0.0019
N
0 50 100 km
Till samples, <0.063 mm
aqua regia extraction

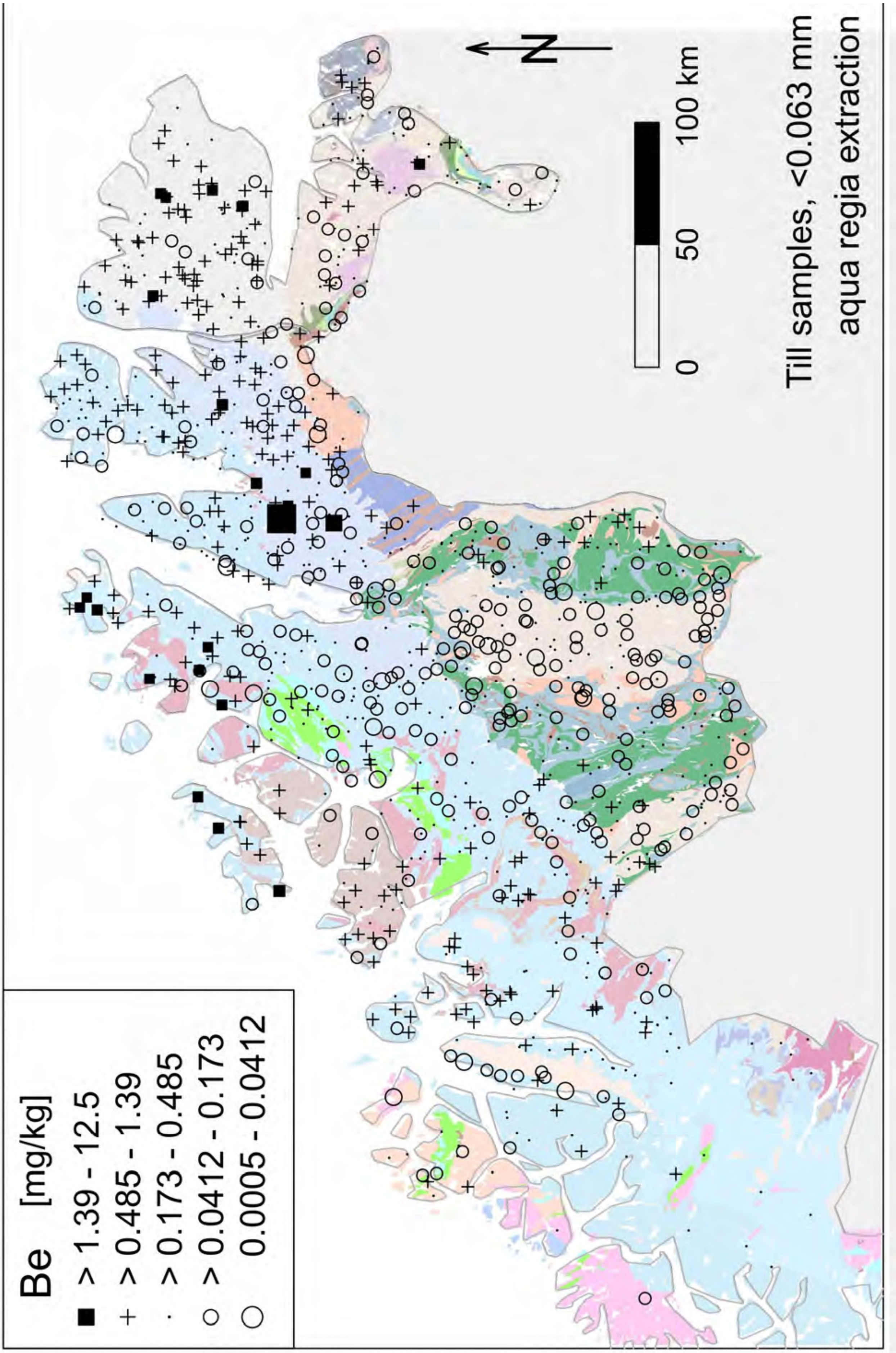

Al [mg/kg]
> 39743 - 93061
> 18575 - 39743
> 8549 - 18575
> 3963 - 8549
1253 - 3963
N
0
50
100 km
Till samples, <0.063 mm
aqua regia extraction

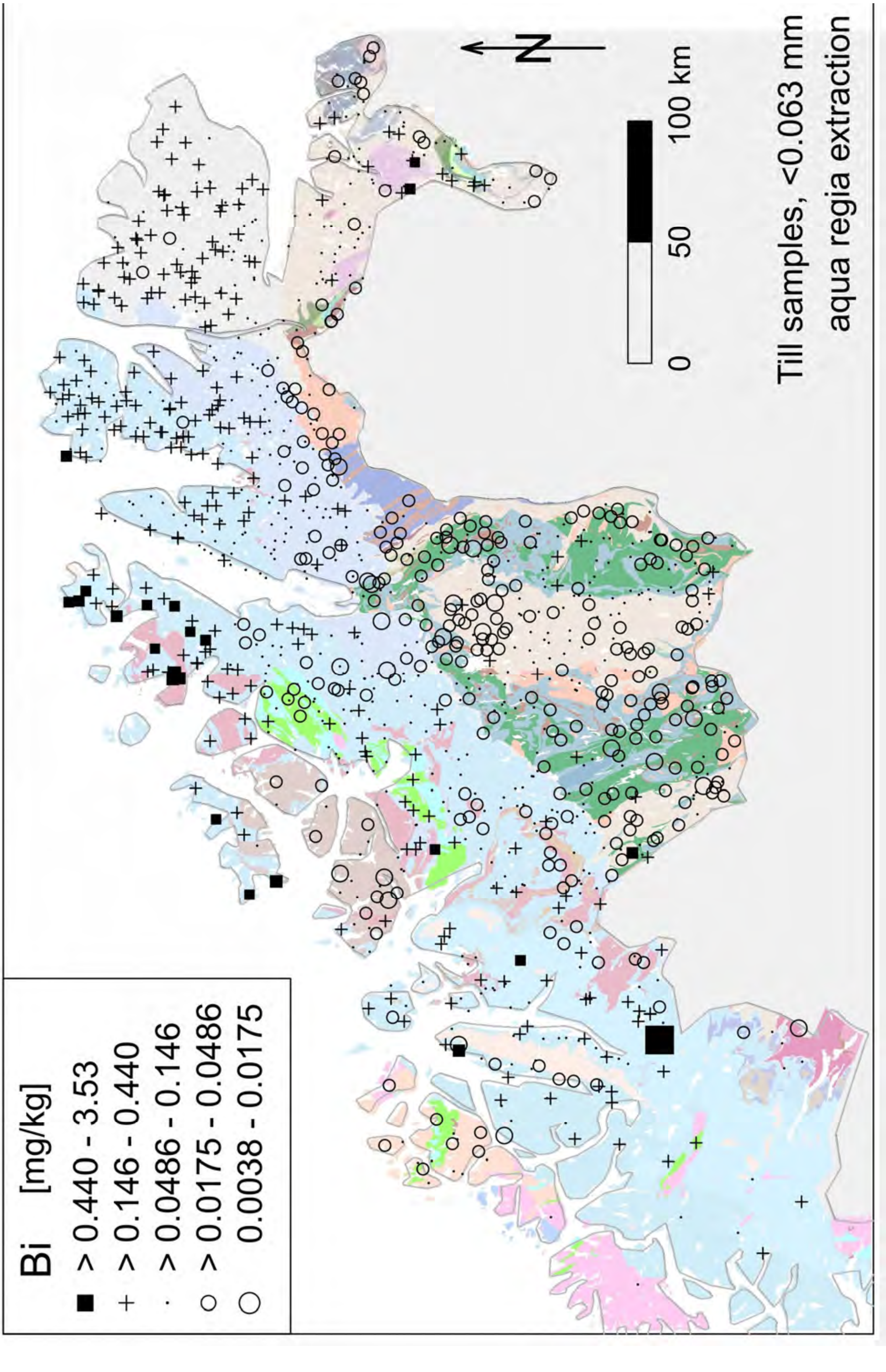

As [mg/kg]
> 21.0 - 311
> 3.53 - 21.0
> 0.637 - 3.53
> 0.0724 - 0.637
0.0007 - 0.0724
N
0
50
100 km
Till samples, <0.063 mm
aqua regia extraction

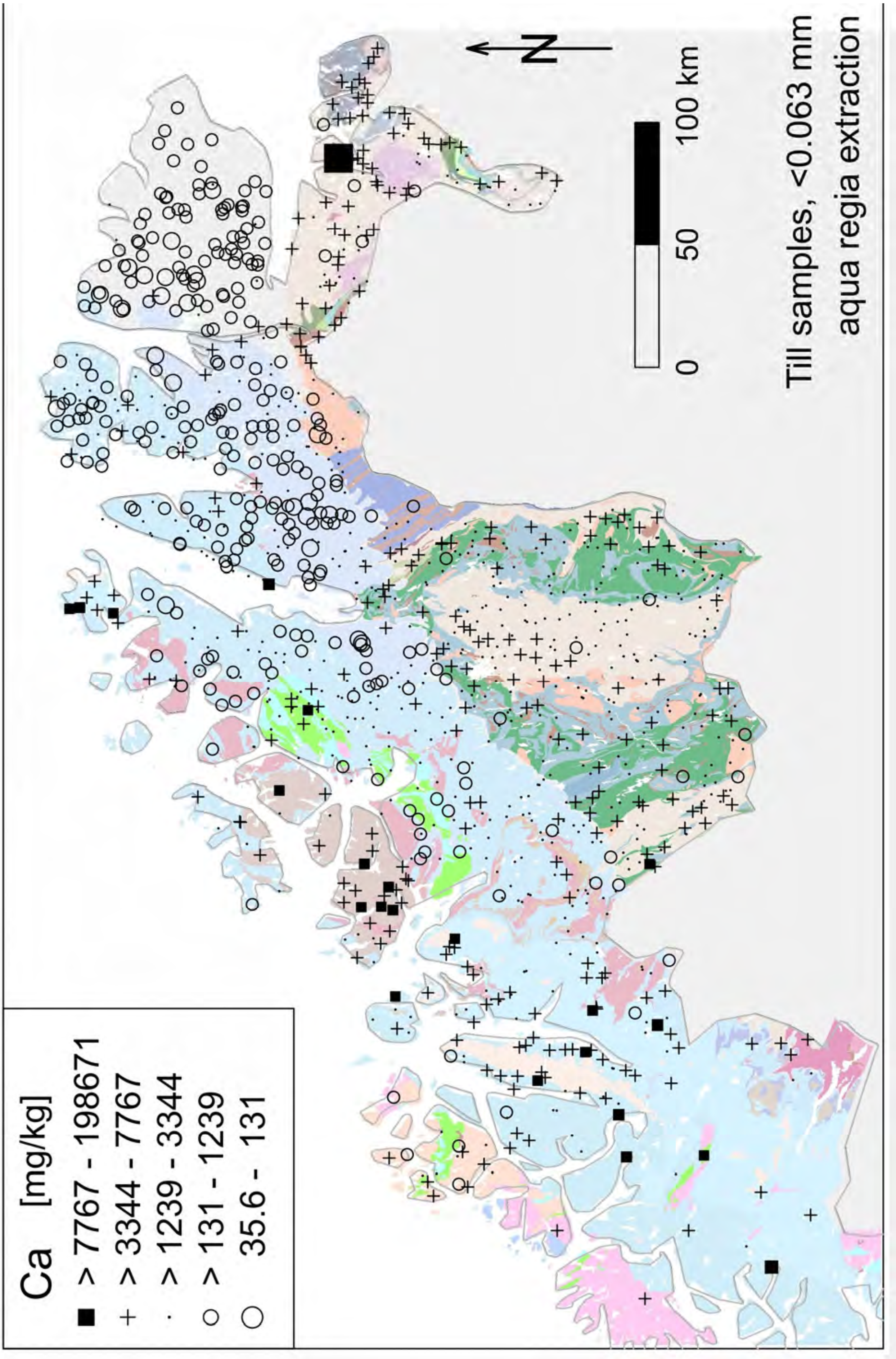

Au [mg/kg]
> 0.0312 - 12.8
> 0.0043 - 0.0312
> 0.0009 - 0.0043
> 0.0001 - 0.0009
0.0000 - 0.0001
N
0 50 100 km
Till samples, <0.063 mm
aqua regia extraction

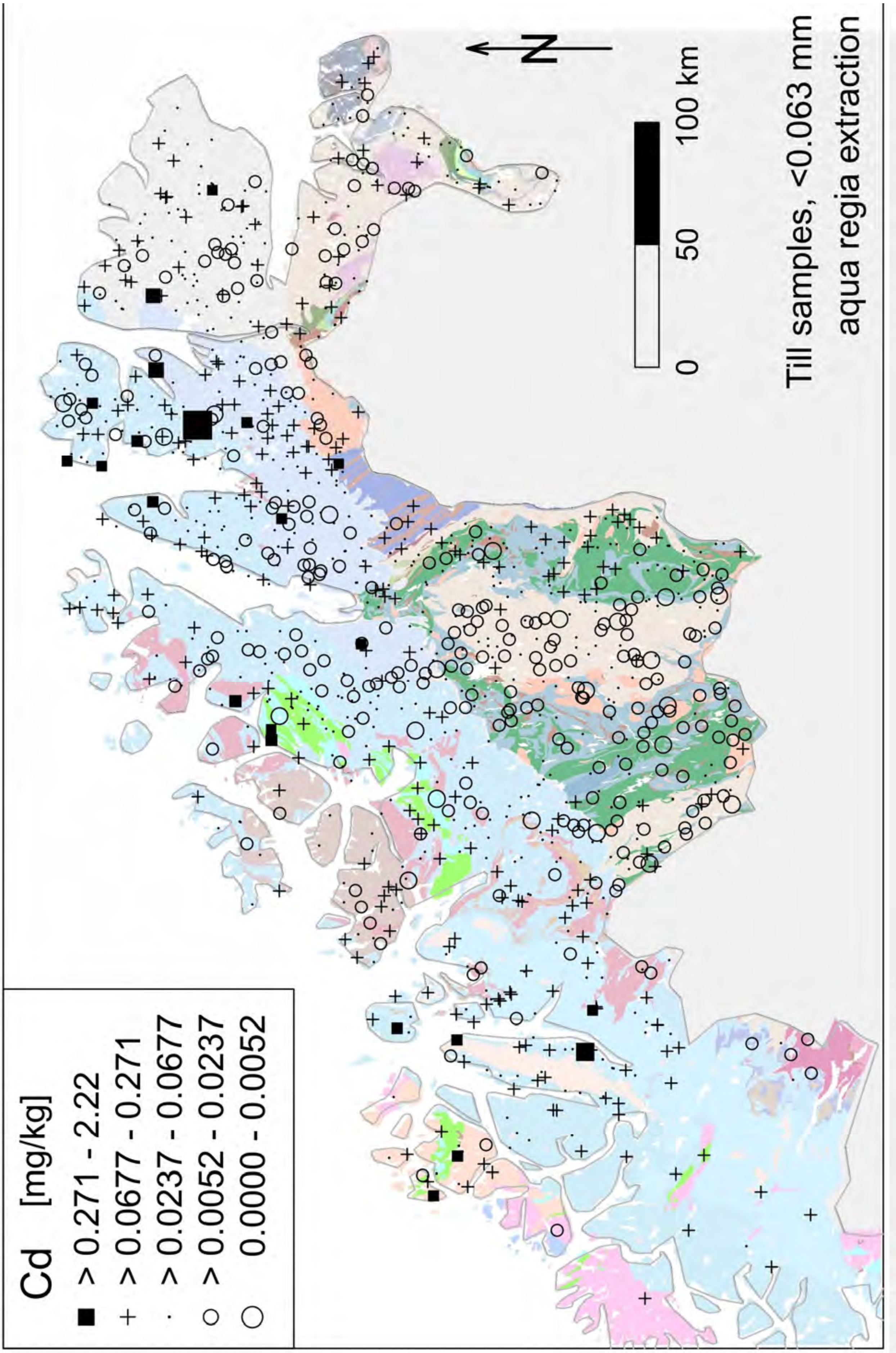

B [mg/kg]
> 7.62 - 15.0
> 2.22 - 7.62
> 0.603 - 2.22
> 0.0683 - 0.603
0.0002 - 0.0683
N
0 50 100 km
Till samples, <0.063 mm
aqua regia extraction

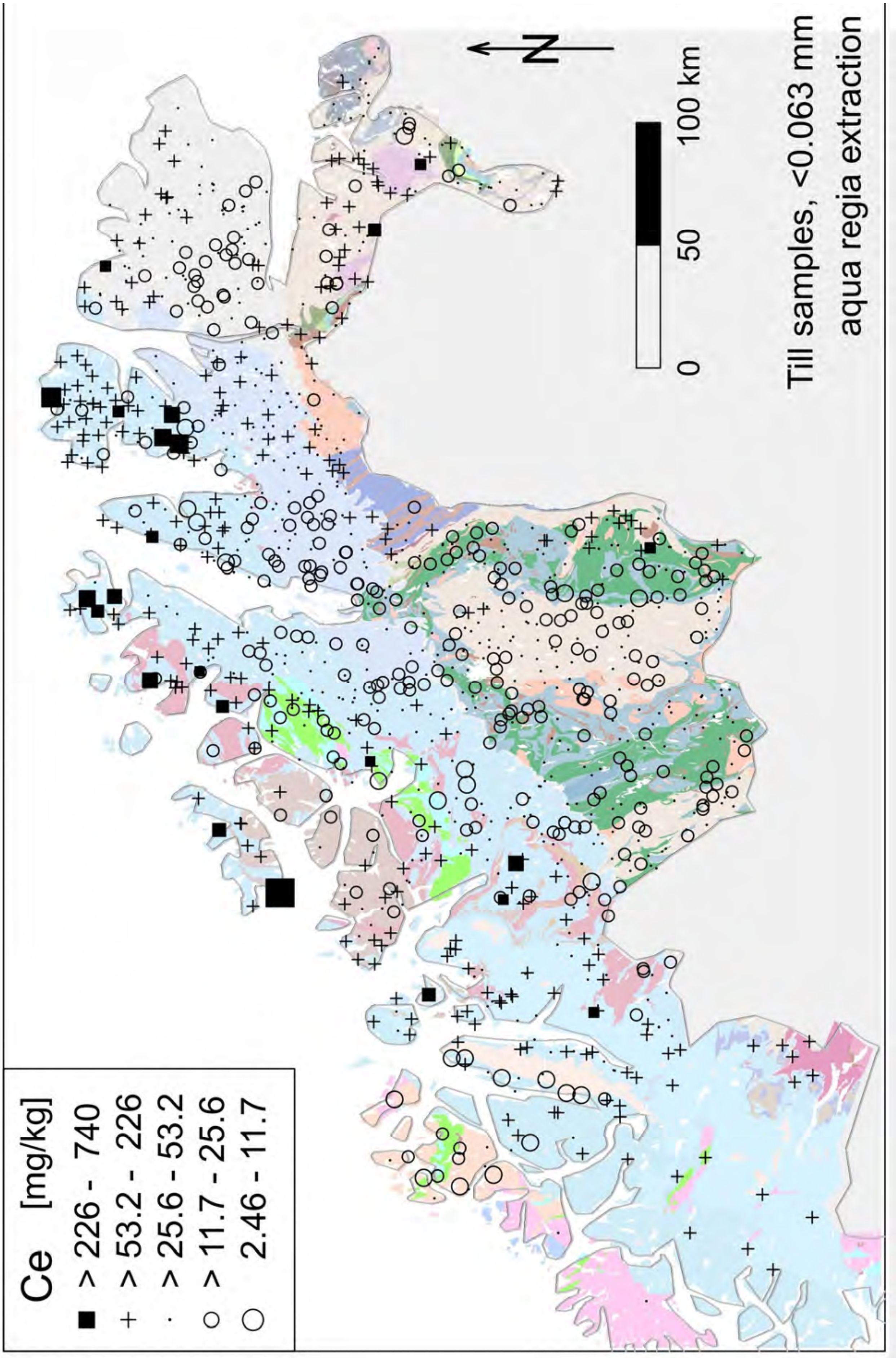

Ba [mg/kg]
> 180 - 399
> 66.6 - 180
> 24.8 - 66.6
> 10.1 - 24.8
4.15 - 10.1
N
0 50 100 km
Till samples, <0.063 mm
aqua regia extraction

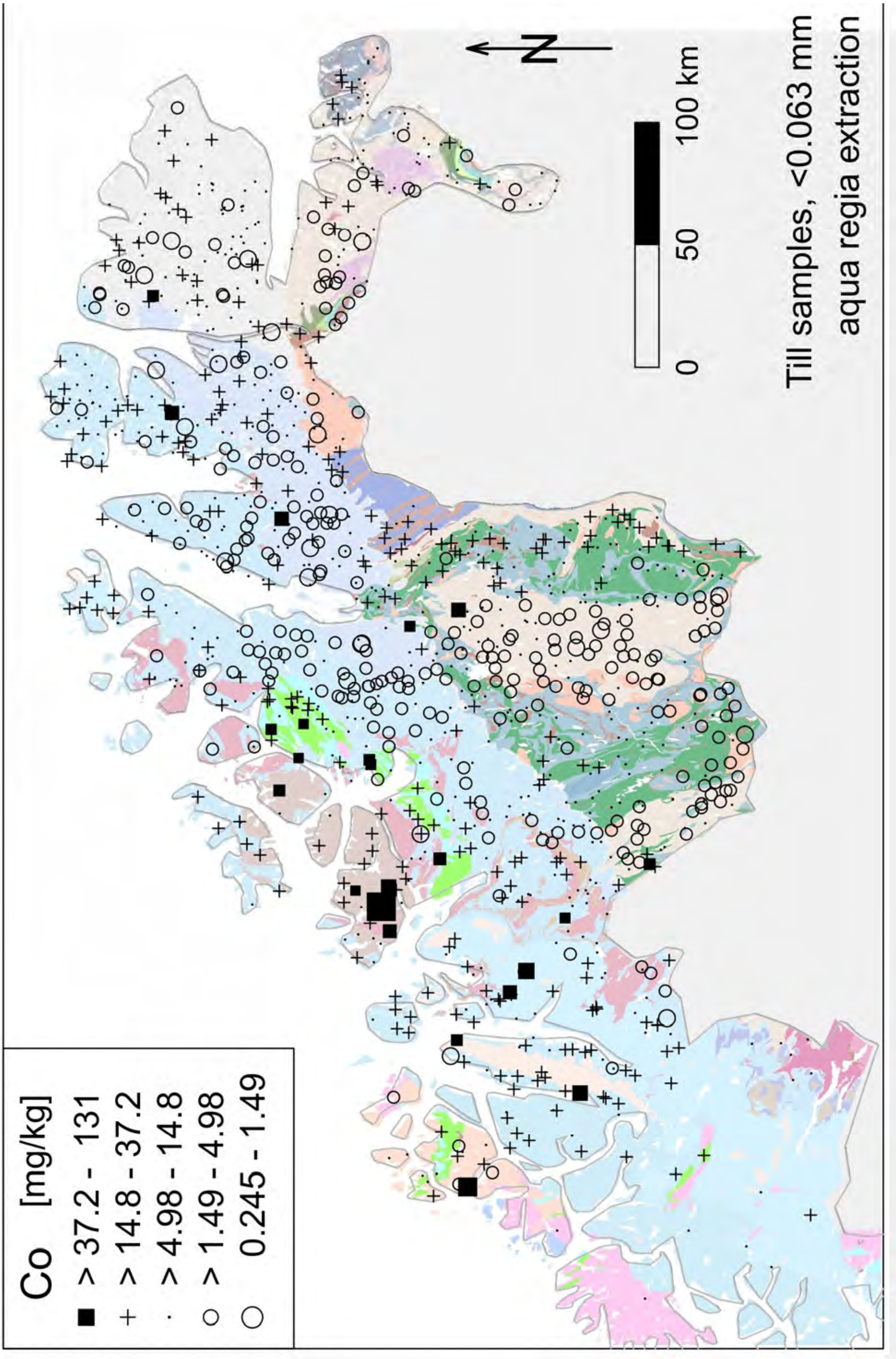

Be [mg/kg]
> 1.39 - 12.5
> 0.485 - 1.39
> 0.173 - 0.485
> 0.0412 - 0.173
0.0005 - 0.0412
N
0
50
100 km
Till samples, <0.063 mm
aqua regia extraction

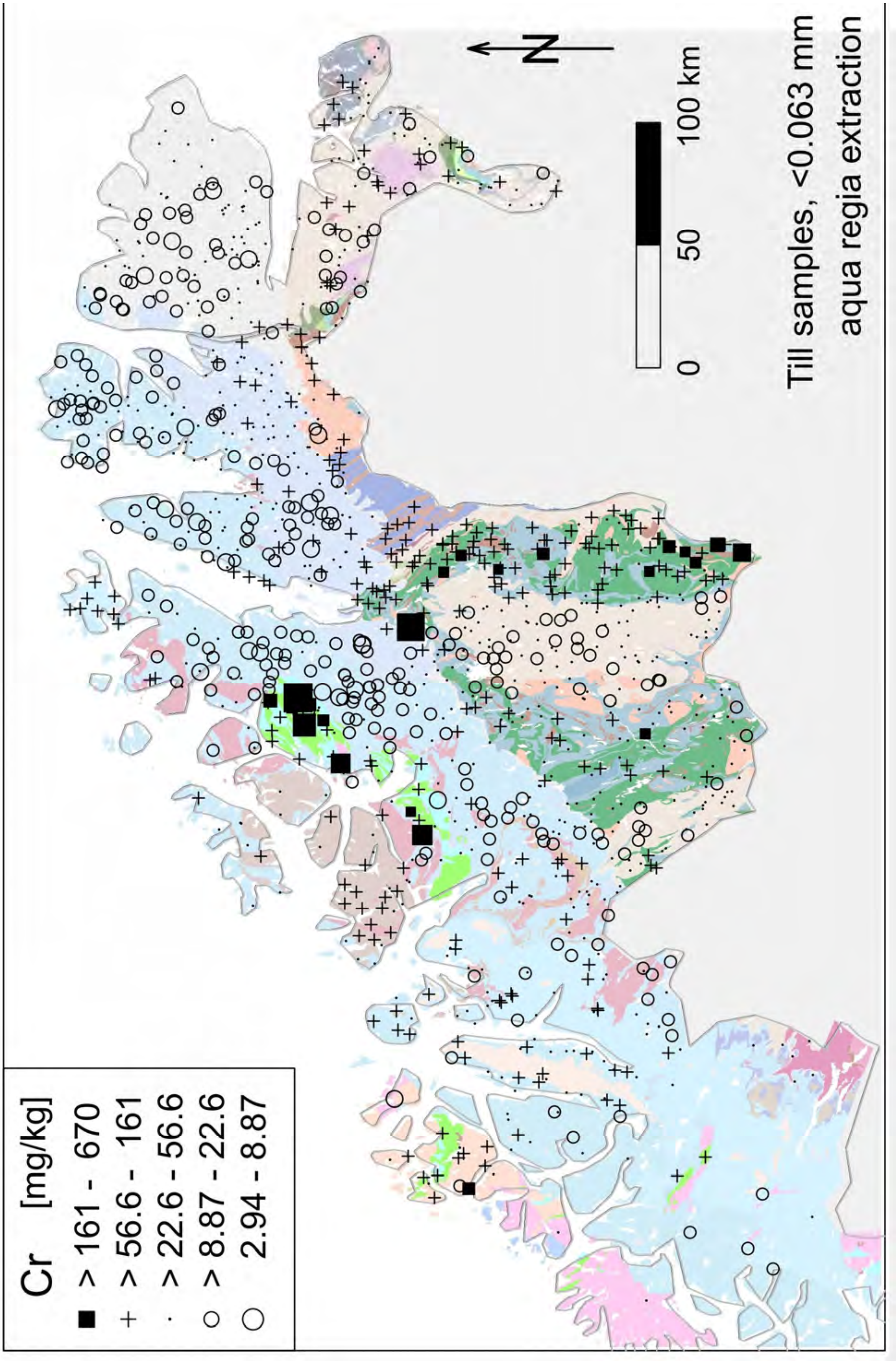

Bi [mg/kg]
> 0.440 - 3.53
> 0.146 - 0.440
> 0.0486 - 0.146
> 0.0175 - 0.0486
0.0038 - 0.0175
N
0
50
100 km
Till samples, <0.063 mm
aqua regia extraction

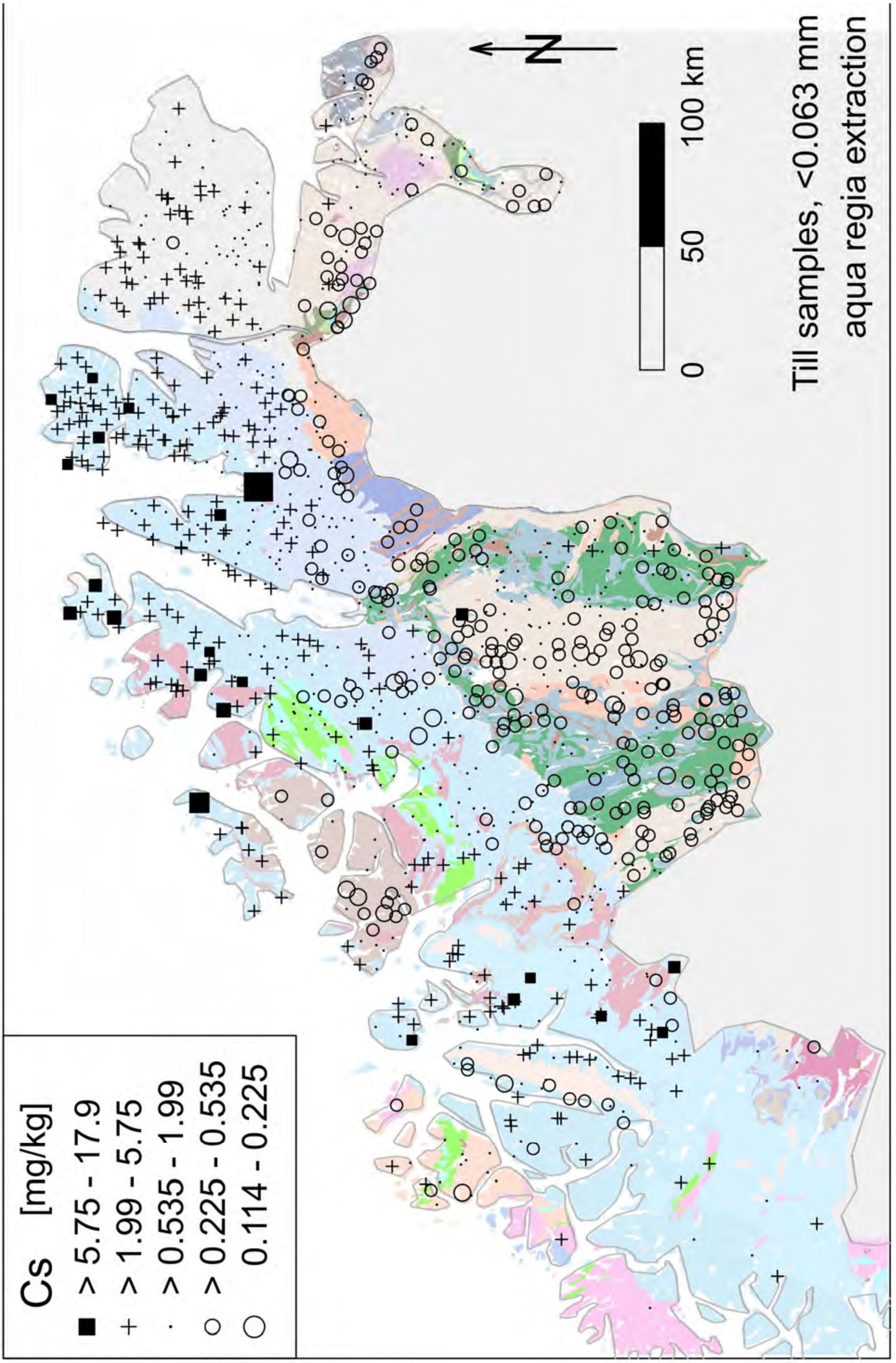

Ca [mg/kg]
> 7767 - 198671
> 3344 - 7767
> 1239 - 3344
> 131 - 1239
35.6 - 131
N
0 50 100 km
Till samples, <0.063 mm
aqua regia extraction

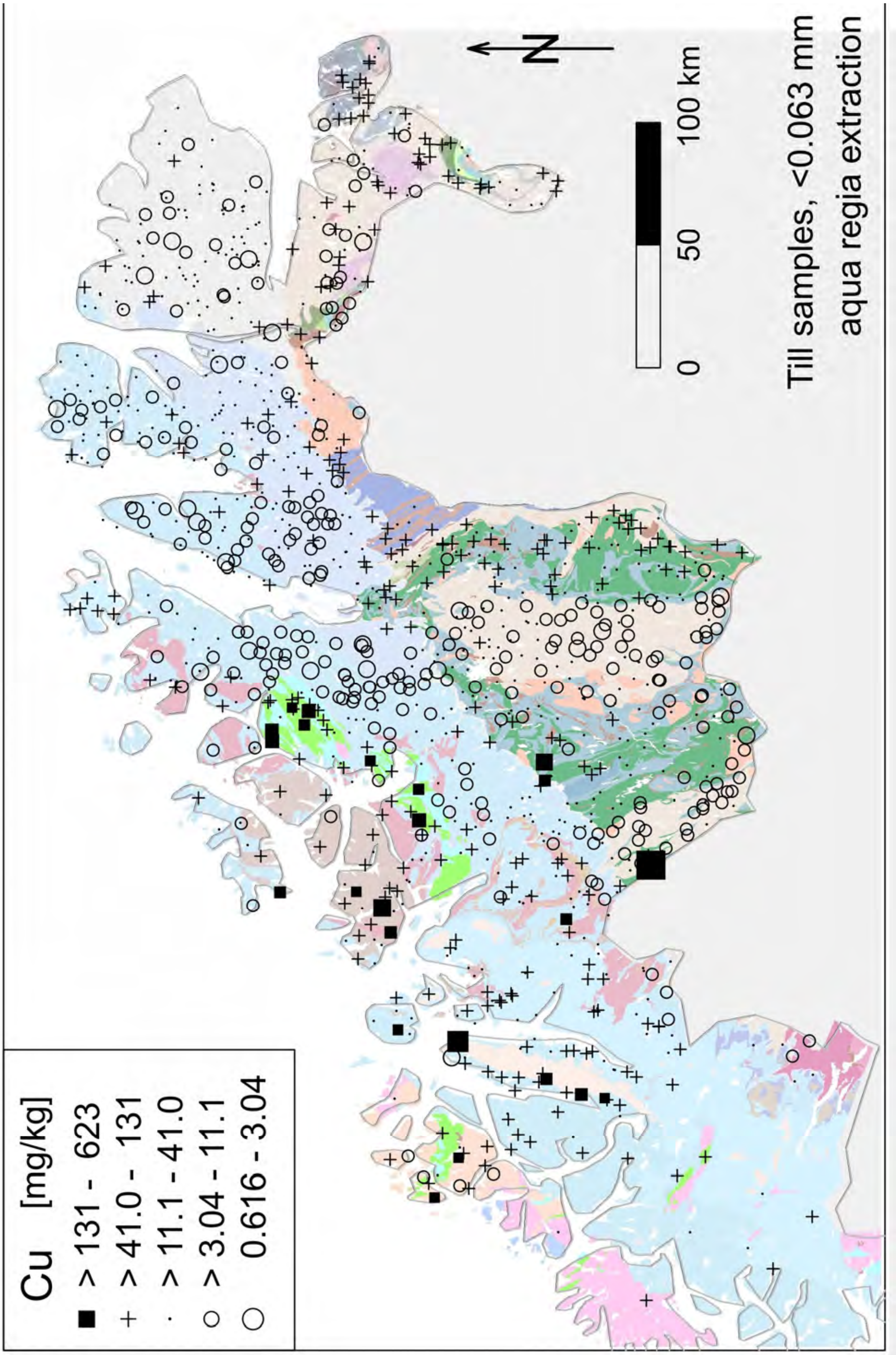

Cd [mg/kg]
> 0.271 - 2.22
> 0.0677 - 0.271
> 0.0237 - 0.0677
> 0.0052 - 0.0237
0.0000 - 0.0052
N
0
50
100 km
Till samples, <0.063 mm
aqua regia extraction

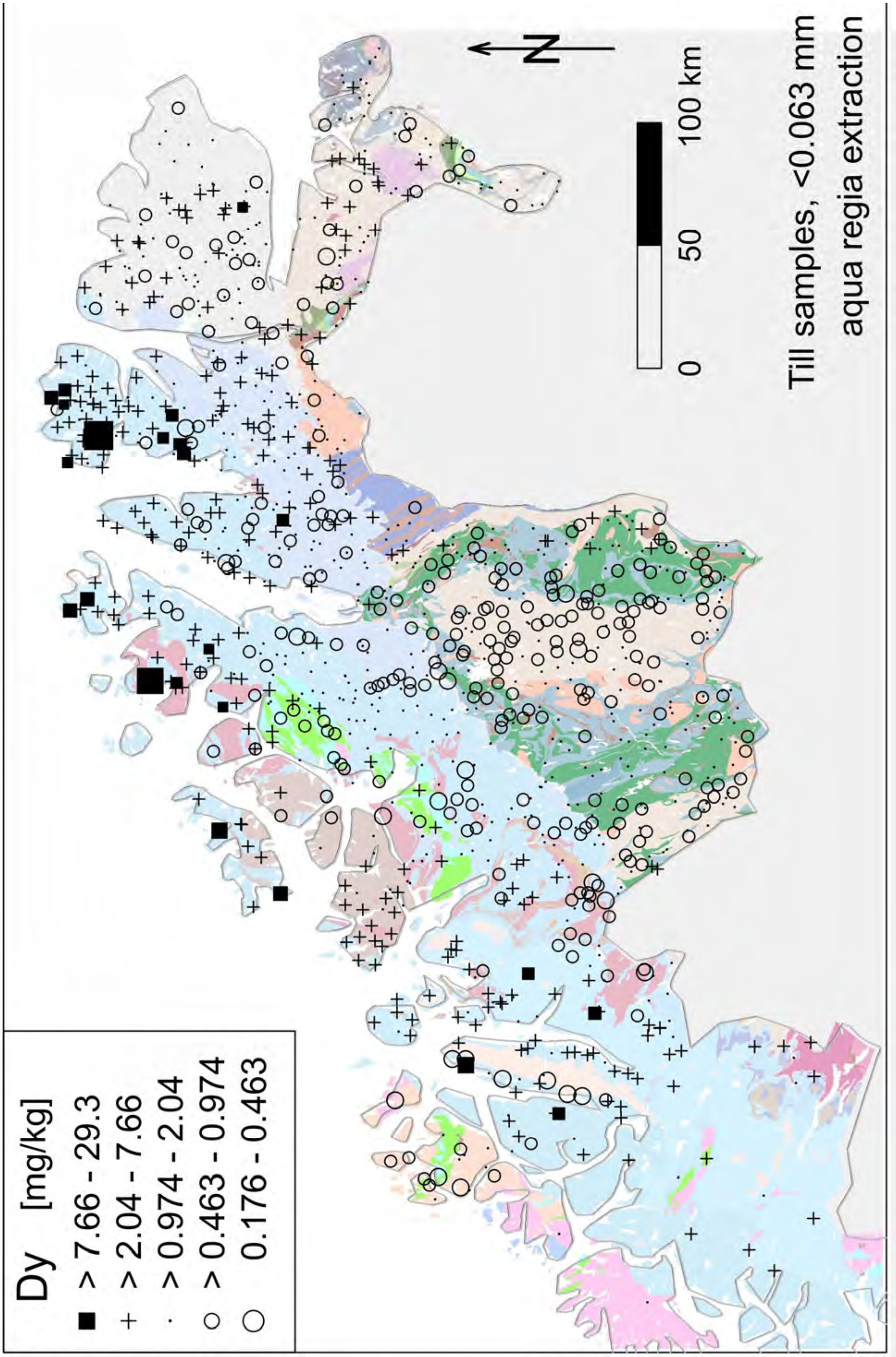

Ce [mg/kg]
> 226 - 740
> 53.2 - 226
> 25.6 - 53.2
> 11.7 - 25.6
2.46 - 11.7
N
0 50 100 km
Till samples, <0.063 mm
aqua regia extraction

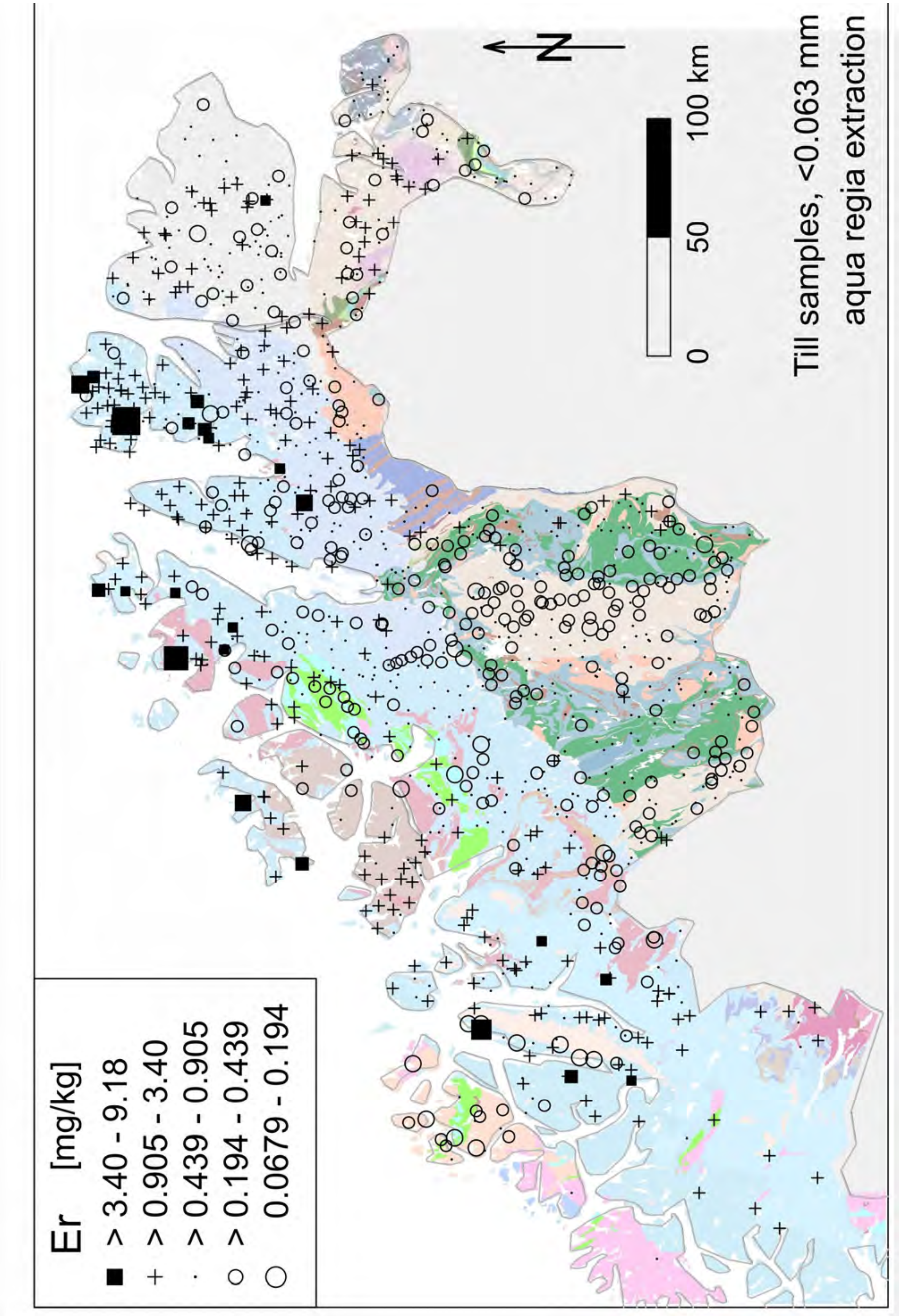

Co [mg/kg]
> 37.2 - 131
> 14.8 - 37.2
> 4.98 - 14.8
> 1.49 - 4.98
0.245 - 1.49
N
0 50 100 km
Till samples, <0.063 mm
aqua regia extraction

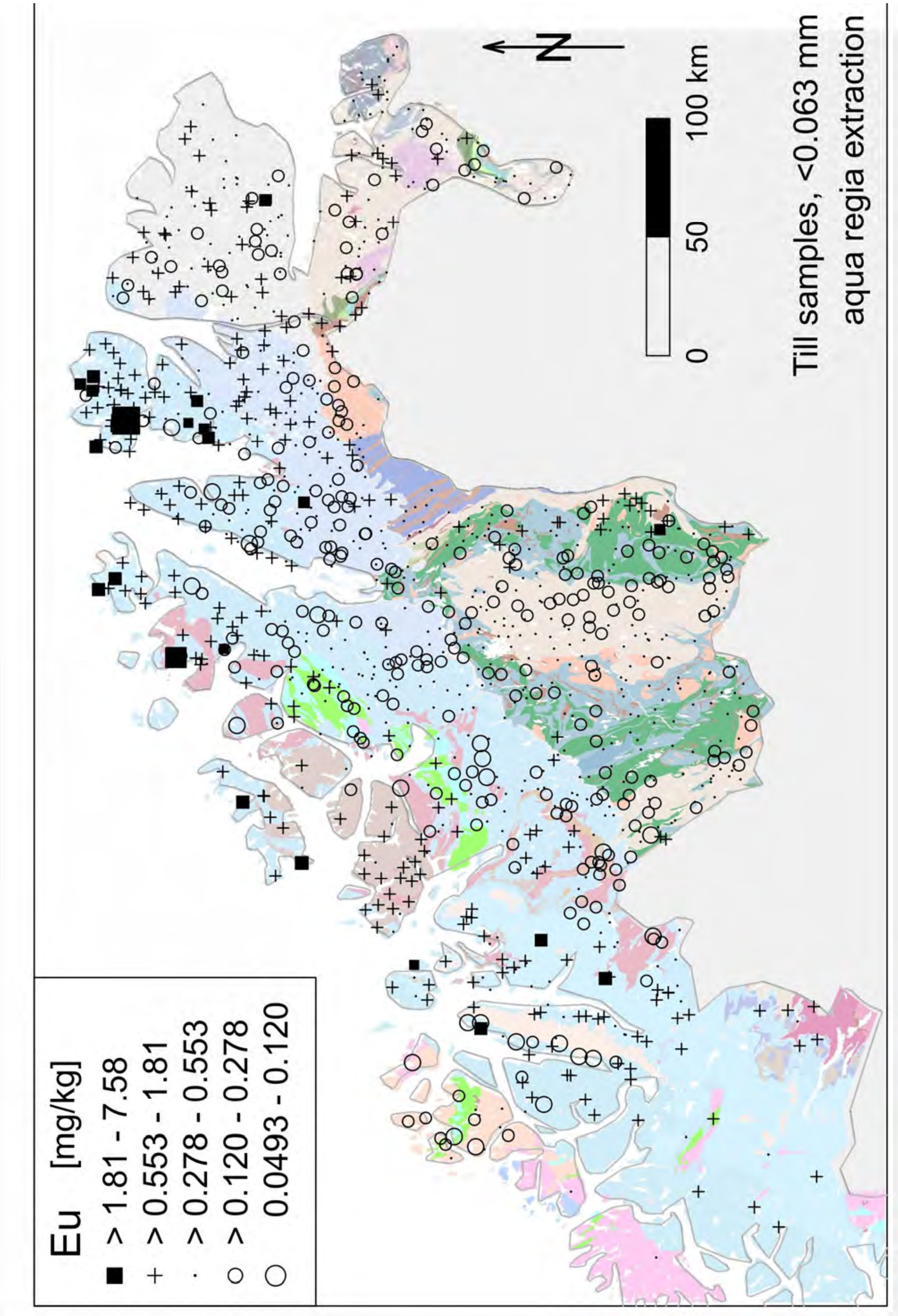

N
0 50 100 km
Till samples, <0.063 mm
aqua regia extraction
Cr [mg/kg]
> 161 - 670
> 56.6 - 161
> 22.6 - 56.6
> 8.87 - 22.6
2.94 - 8.87

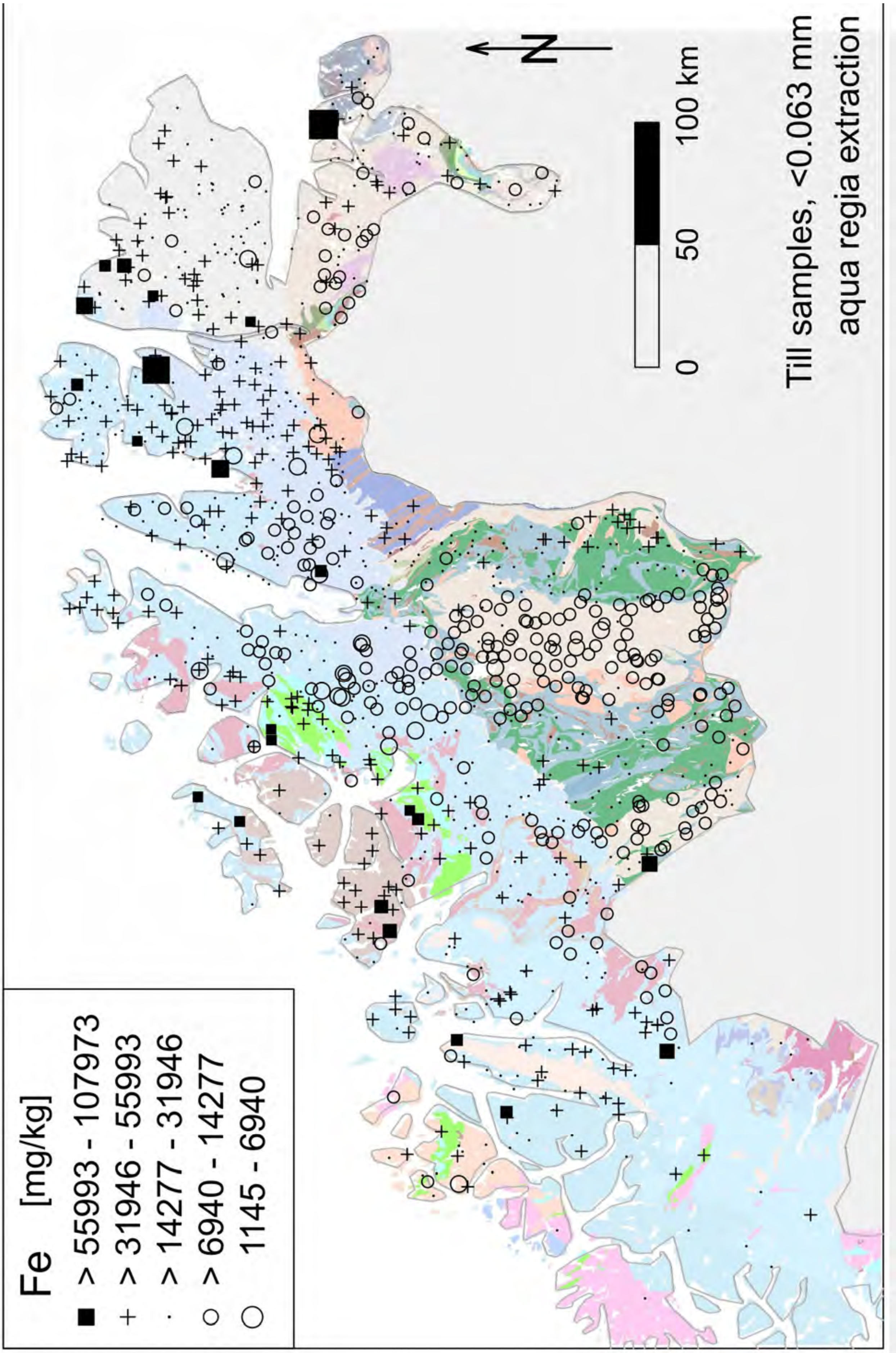

N
0 50 100 km
Till samples, <0.063 mm
aqua regia extraction
Cs [mg/kg]
> 5.75 - 17.9
> 1.99 - 5.75
> 0.535 - 1.99
> 0.225 - 0.535
0.114 - 0.225

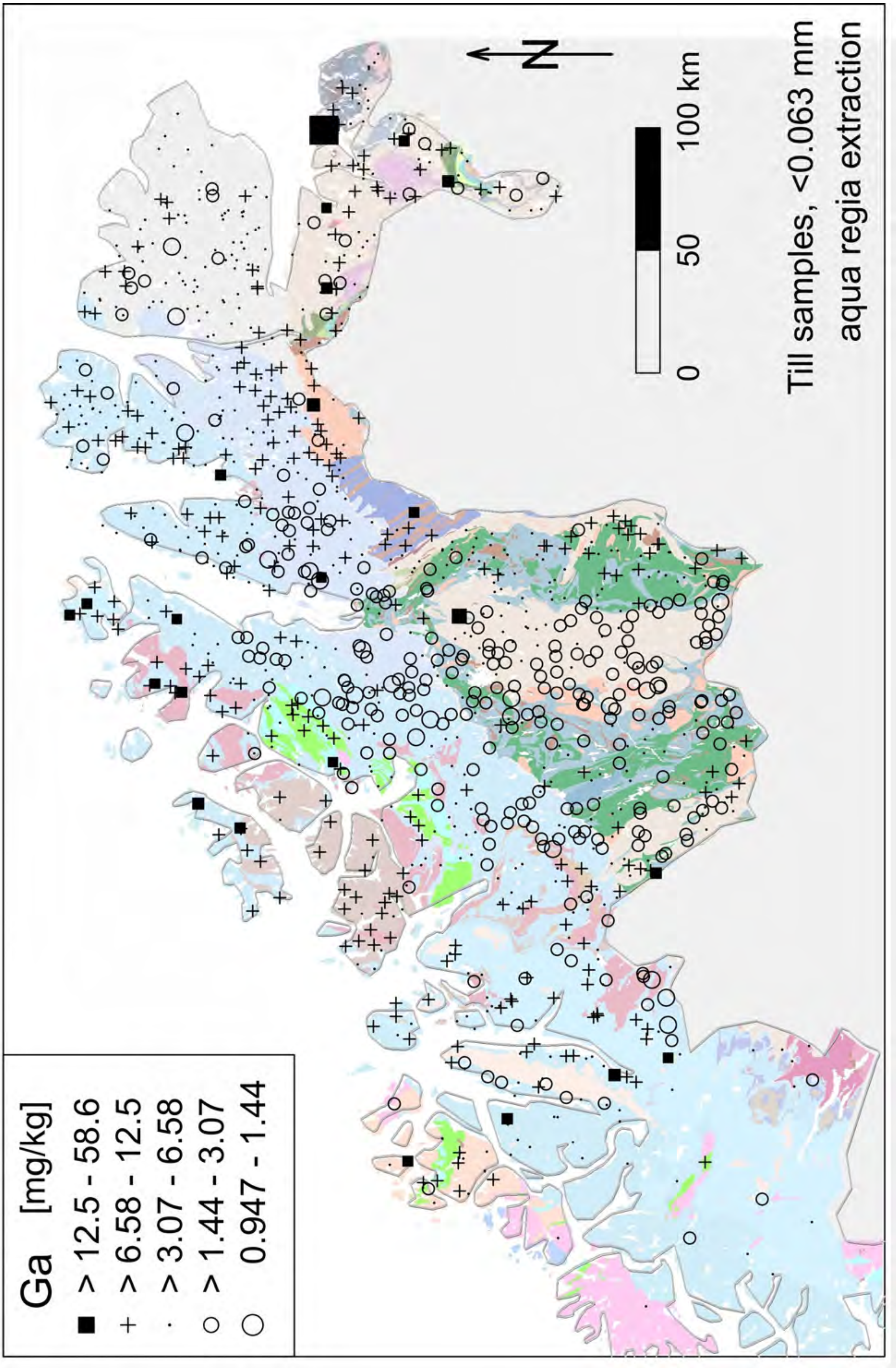

N
0
50
100 km
Till samples, <0.063 mm
aqua regia extraction
Cu [mg/kg]
> 131 - 623
> 41.0 - 131
> 11.1 - 41.0
> 3.04 - 11.1
0.616 - 3.04

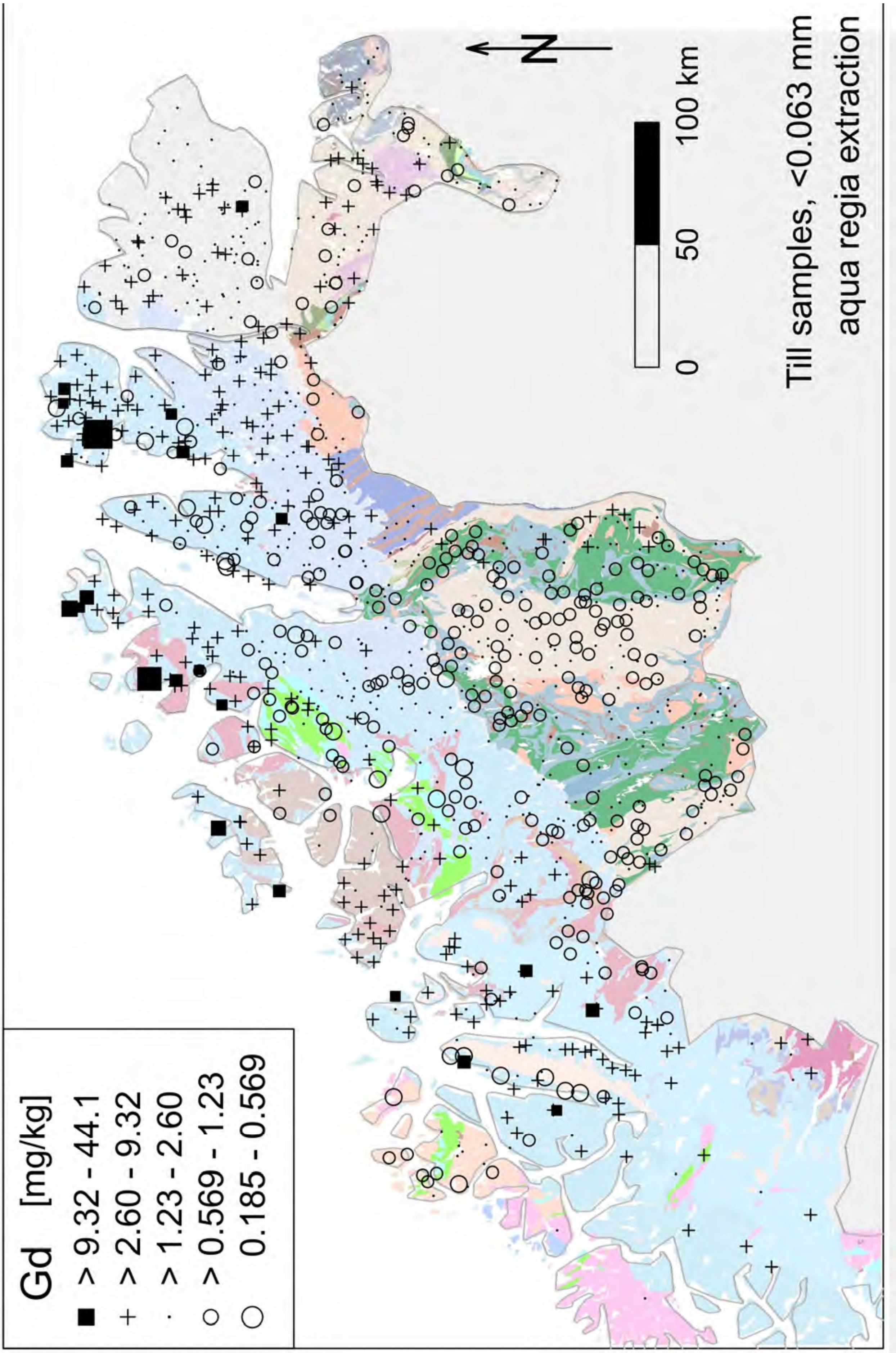

Dy [mg/kg]
> 7.66 - 29.3
> 2.04 - 7.66
> 0.974 - 2.04
> 0.463 - 0.974
0.176 - 0.463
N
0
50
100 km
Till samples, <0.063 mm
aqua regia extraction

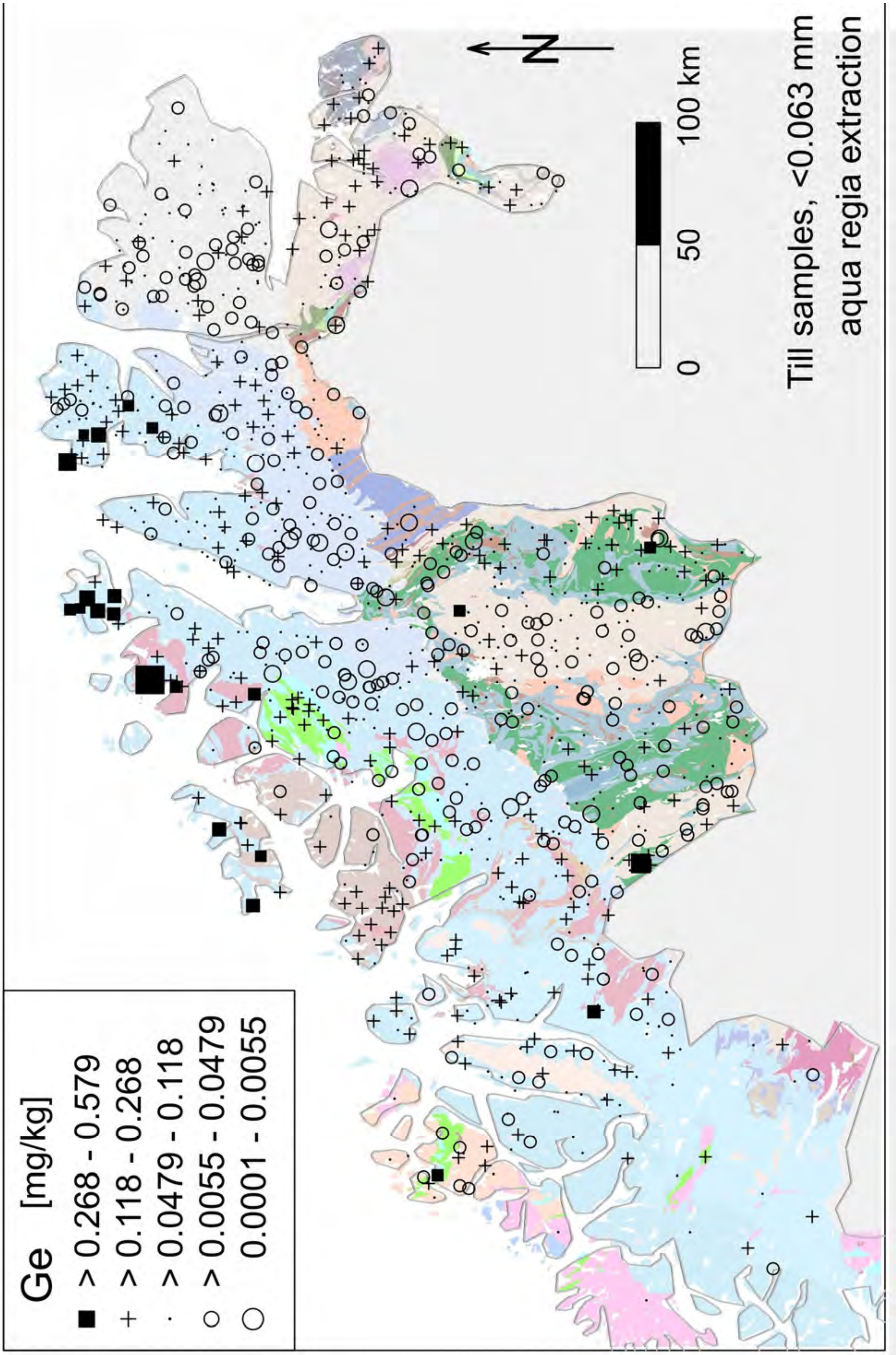

Er [mg/kg]
> 3.40 - 9.18
> 0.905 - 3.40
> 0.439 - 0.905
> 0.194 - 0.439
0.0679 - 0.194
N
0
50
100 km
Till samples, <0.063 mm
aqua regia extraction

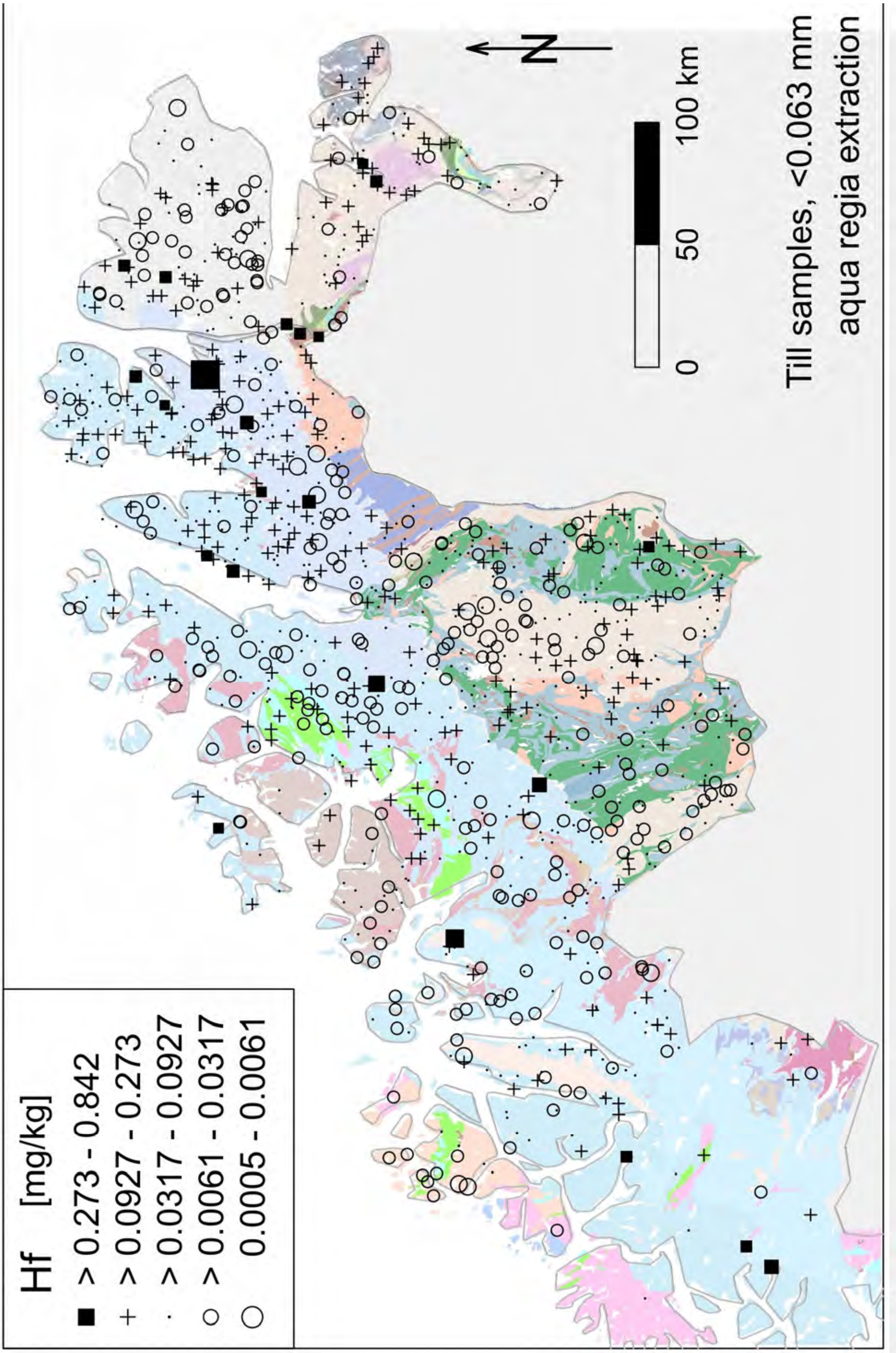

N
0 50 100 km
Till samples, <0.063 mm
aqua regia extraction
Eu [mg/kg]
> 1.81 - 7.58
> 0.553 - 1.81
> 0.278 - 0.553
> 0.120 - 0.278
0.0493 - 0.120

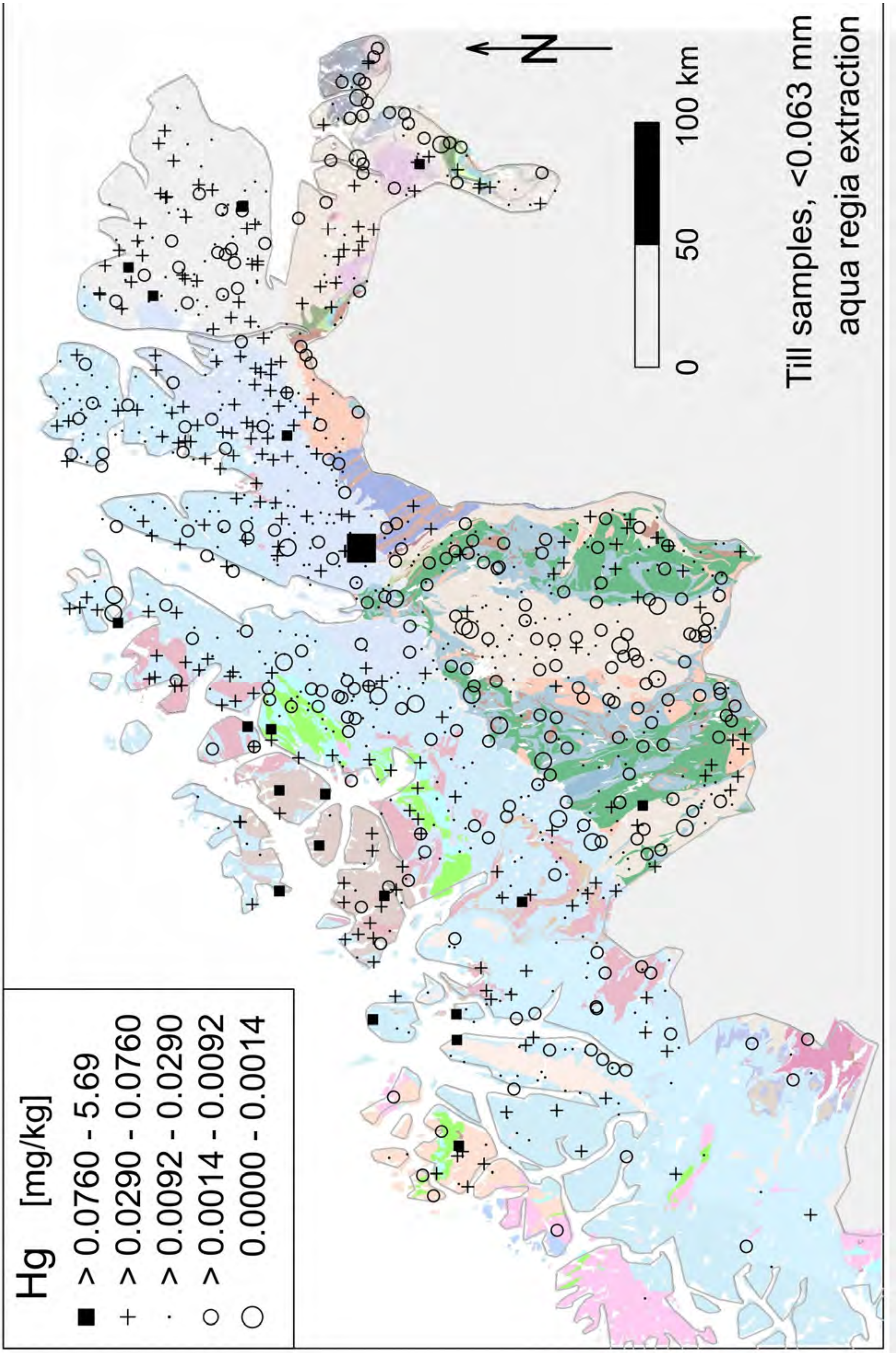

Fe [mg/kg]
> 55993 - 107973
> 31946 - 55993
> 14277 - 31946
> 6940 - 14277
1145 - 6940
N
0 50 100 km
Till samples, <0.063 mm
aqua regia extraction

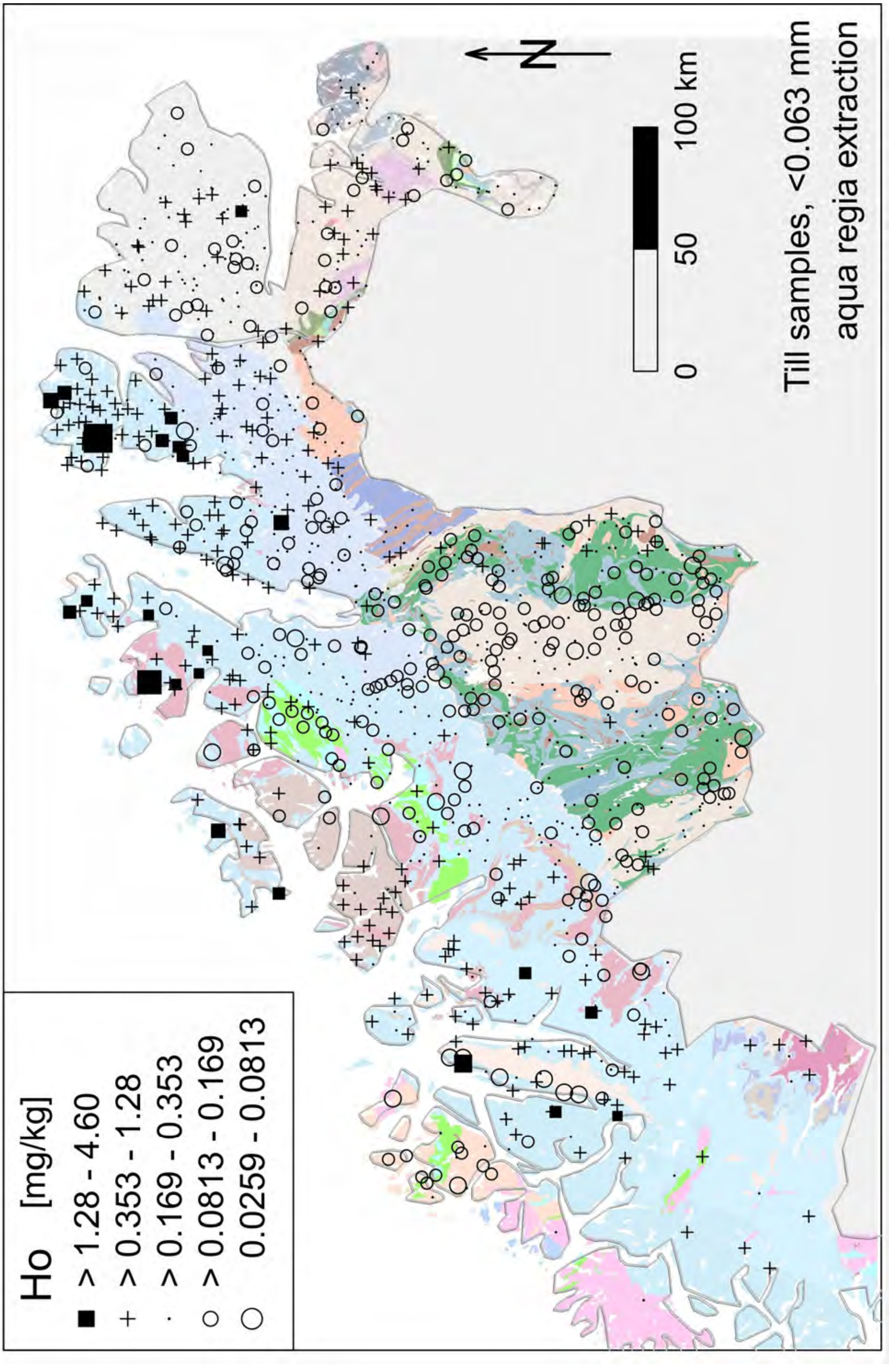

Ga [mg/kg]
> 12.5 - 58.6
> 6.58 - 12.5
> 3.07 - 6.58
> 1.44 - 3.07
0.947 - 1.44
N
0
50
100 km
Till samples, <0.063 mm
aqua regia extraction

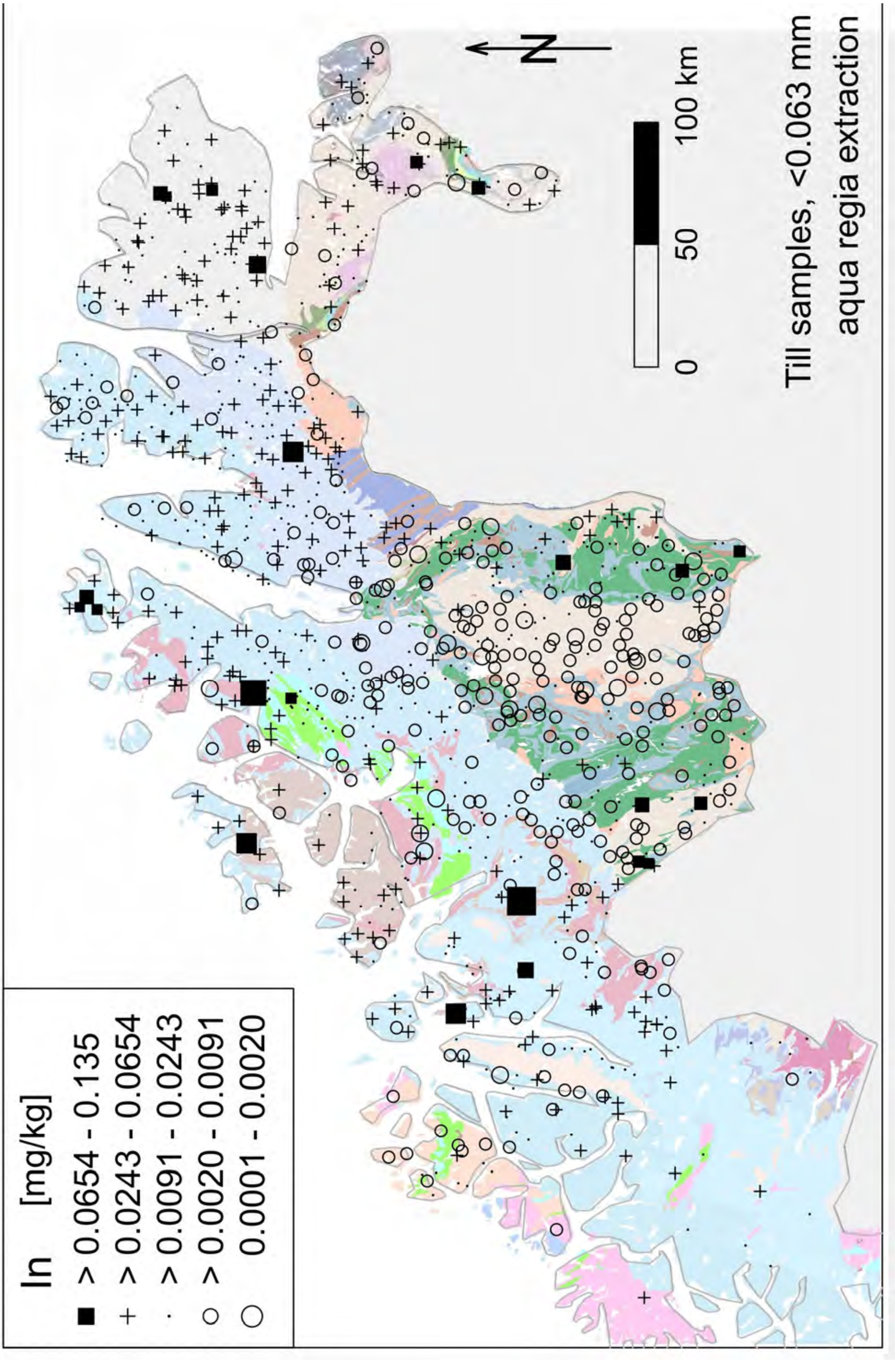

Gd [mg/kg]
> 9.32 - 44.1
> 2.60 - 9.32
> 1.23 - 2.60
> 0.569 - 1.23
0.185 - 0.569
N
0
50
100 km
Till samples, <0.063 mm
aqua regia extraction

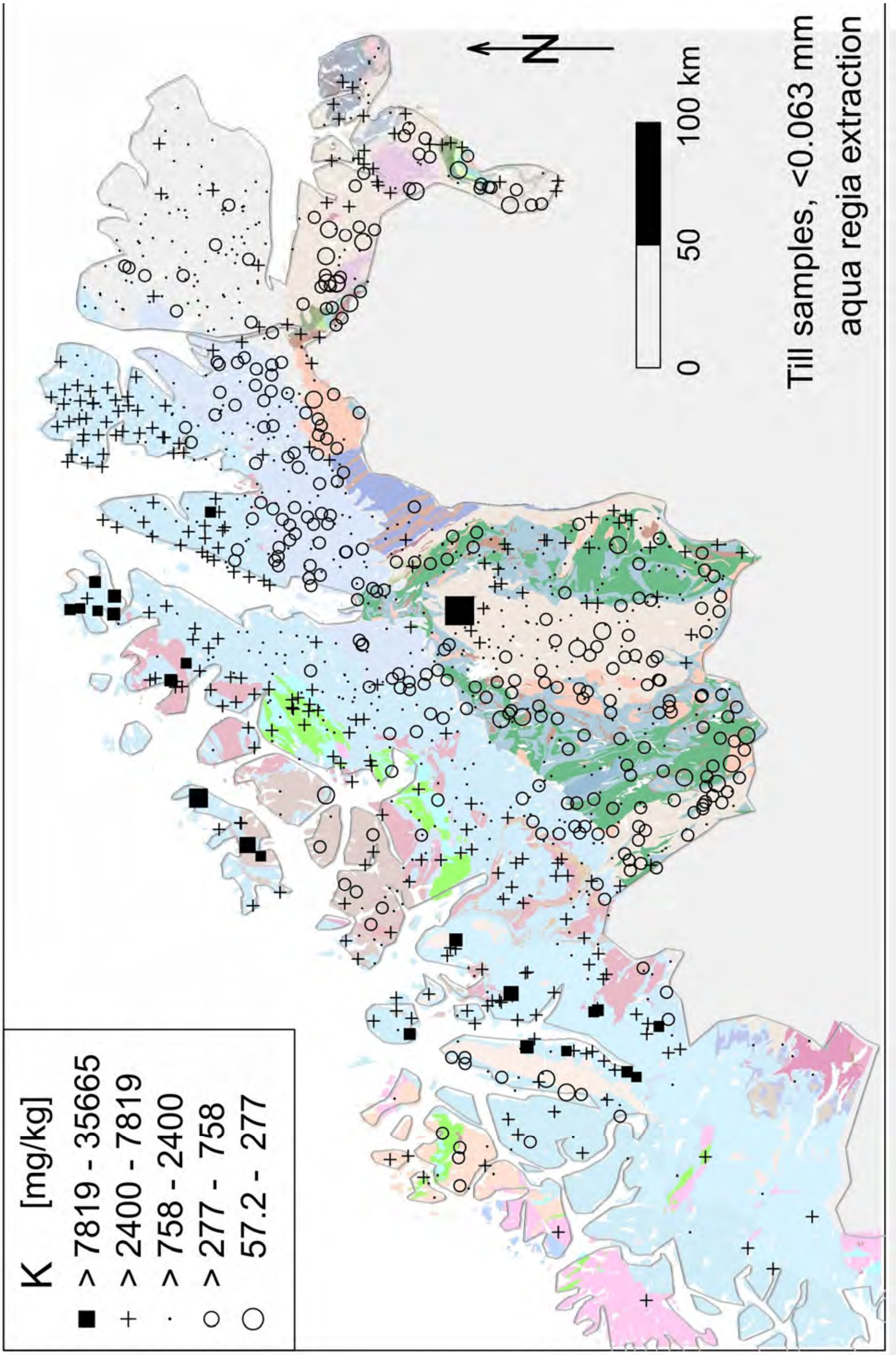

Ge [mg/kg]
> 0.268 - 0.579
> 0.118 - 0.268
> 0.0479 - 0.118
> 0.0055 - 0.0479
0.0001 - 0.0055
N
0 50 100 km
Till samples, <0.063 mm
aqua regia extraction

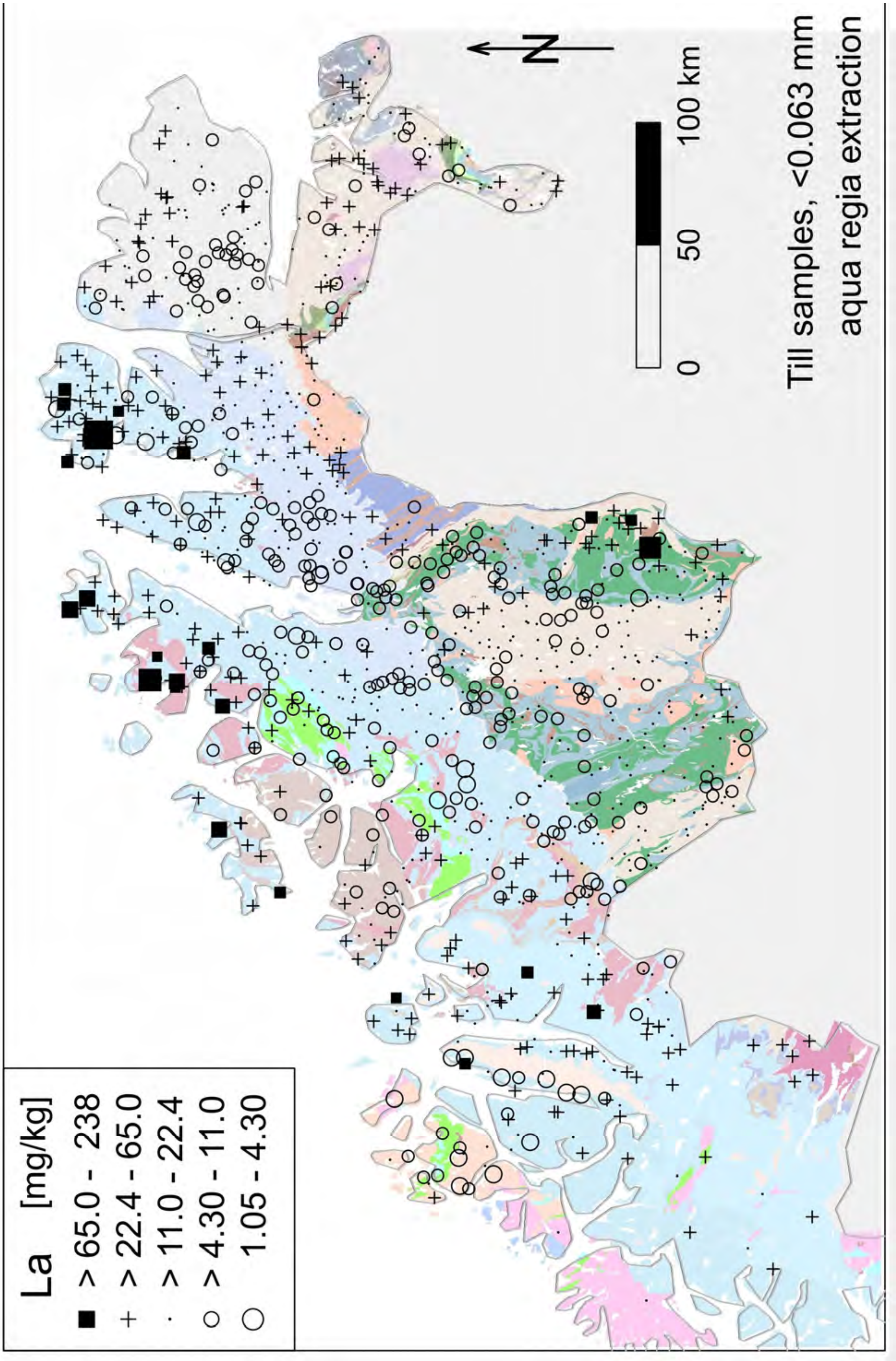

Hf [mg/kg]
> 0.273 - 0.842
> 0.0927 - 0.273
> 0.0317 - 0.0927
> 0.0061 - 0.0317
0.0005 - 0.0061
N
0
50
100 km
Till samples, <0.063 mm
aqua regia extraction

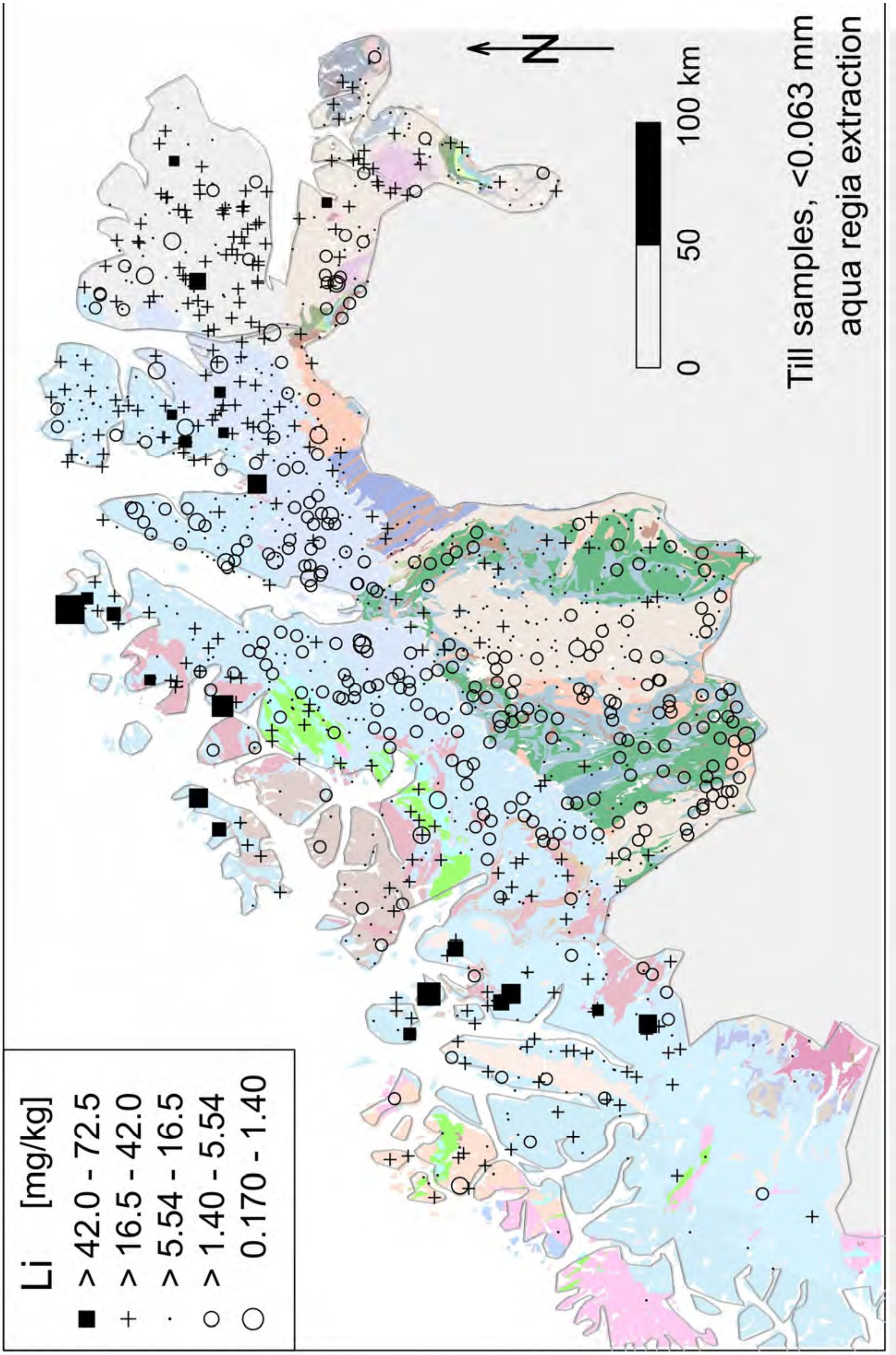

Hg [mg/kg]
> 0.0760 - 5.69
> 0.0290 - 0.0760
> 0.0092 - 0.0290
> 0.0014 - 0.0092
0.0000 - 0.0014
N
0 50 100 km
Till samples, <0.063 mm
aqua regia extraction

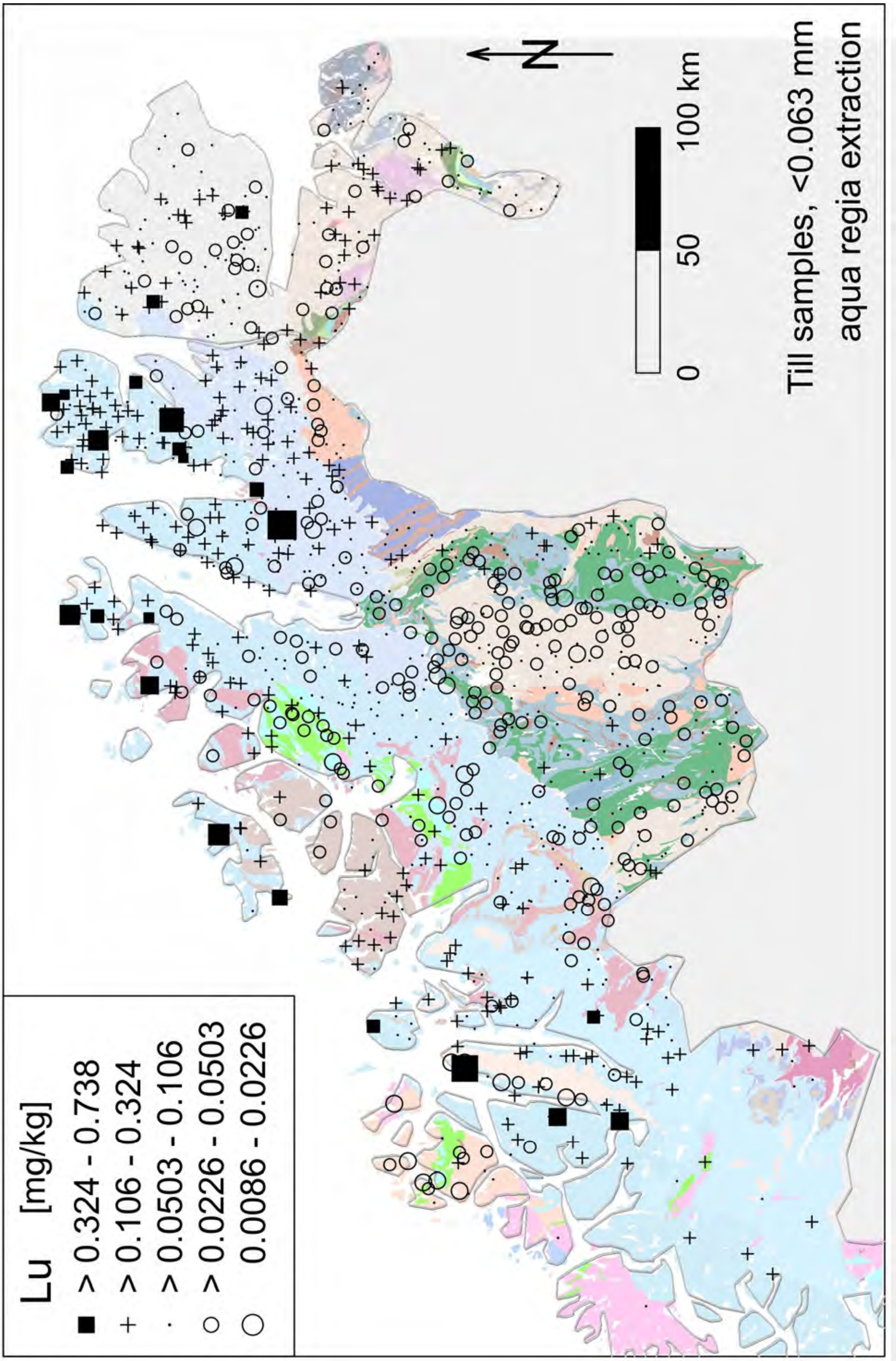

Ho [mg/kg]
> 1.28 - 4.60
> 0.353 - 1.28
> 0.169 - 0.353
> 0.0813 - 0.169
0.0259 - 0.0813
N
0
50
100 km
Till samples, <0.063 mm
aqua regia extraction

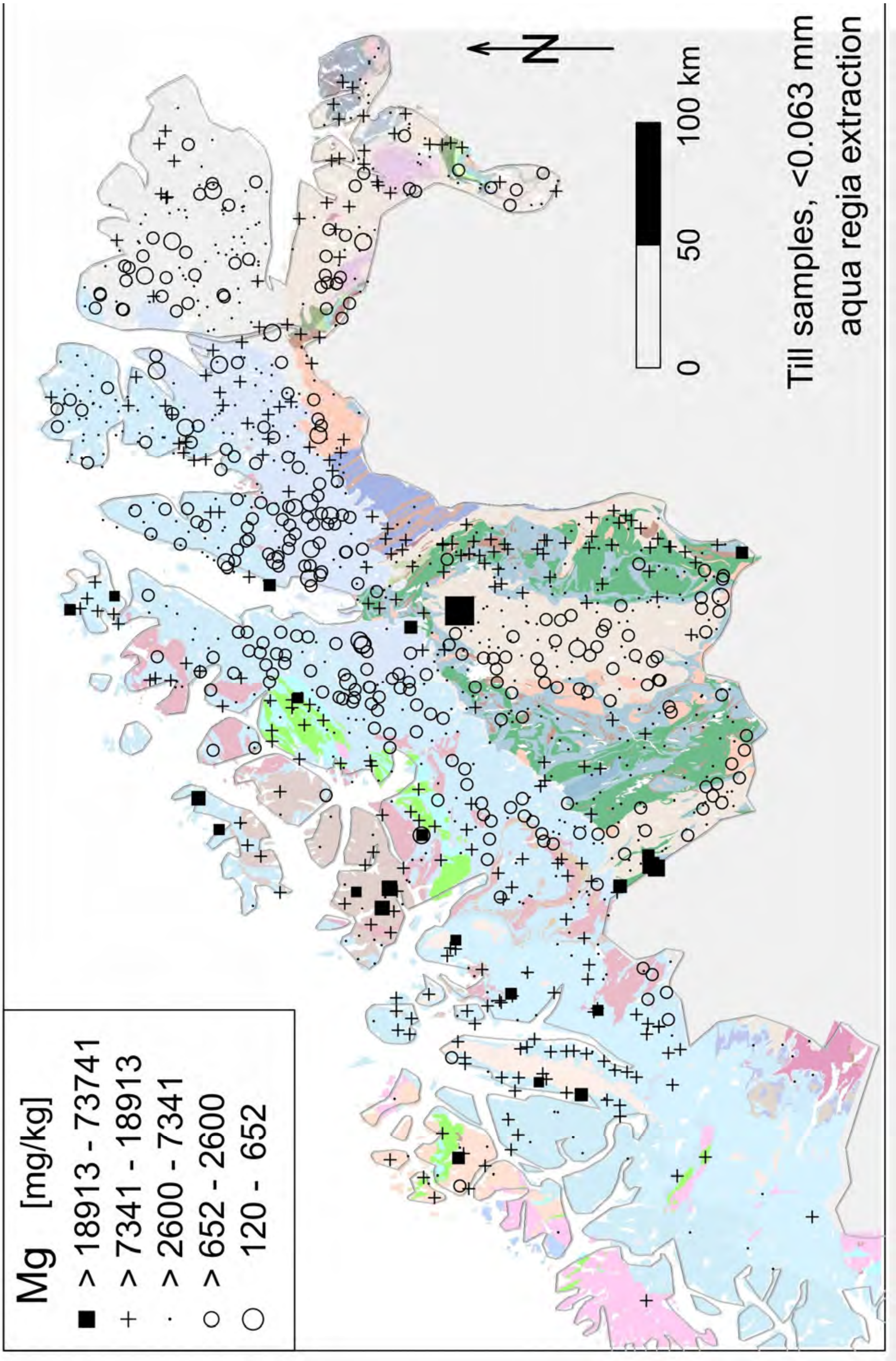

In [mg/kg]
> 0.0654 - 0.135
> 0.0243 - 0.0654
> 0.0091 - 0.0243
> 0.0020 - 0.0091
0.0001 - 0.0020
N
0 50 100 km
Till samples, <0.063 mm
aqua regia extraction

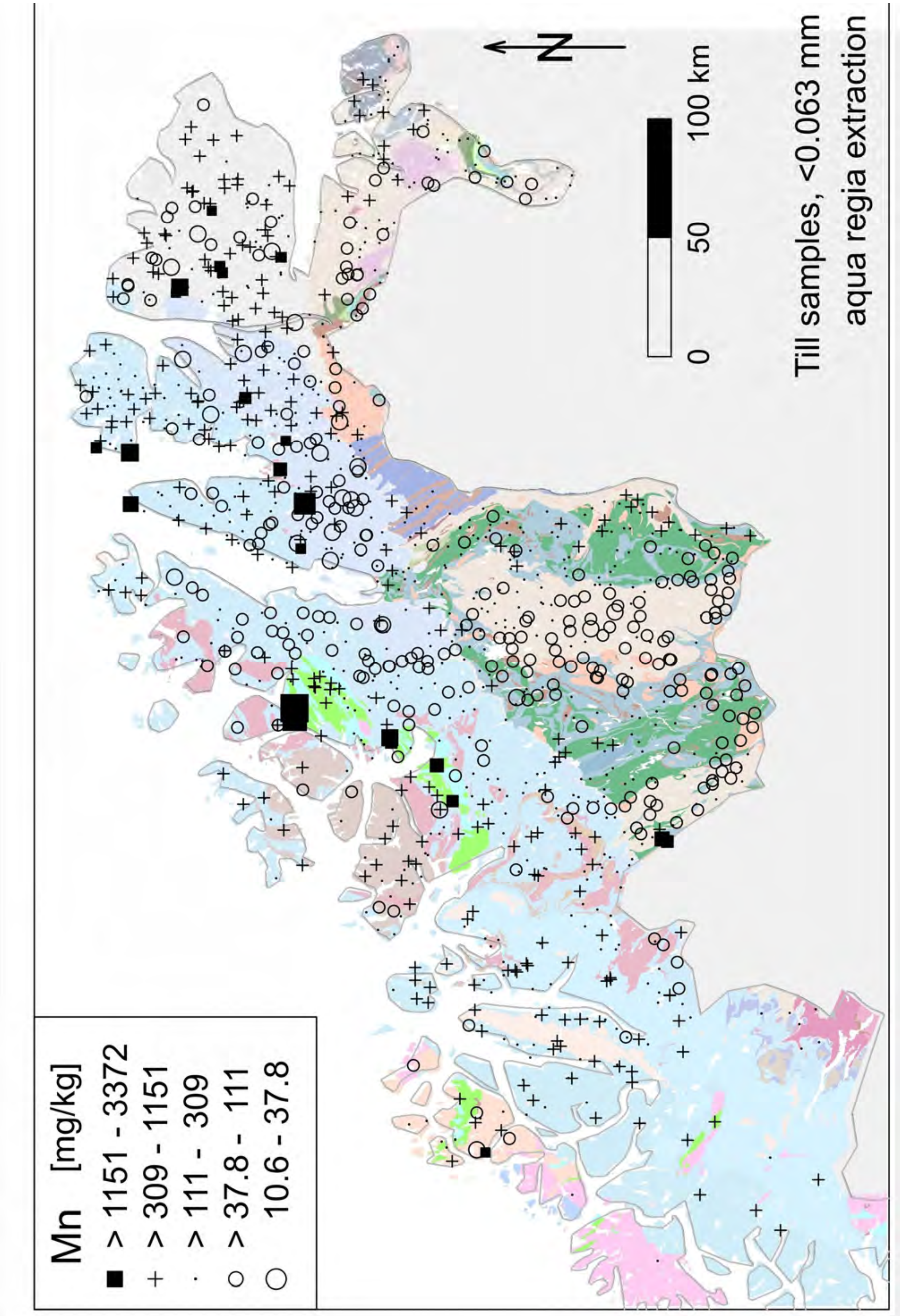

K [mg/kg]
> 7819 - 35665
> 2400 - 7819
> 758 - 2400
> 277 - 758
57.2 - 277
N
0 50 100 km
Till samples, <0.063 mm
aqua regia extraction

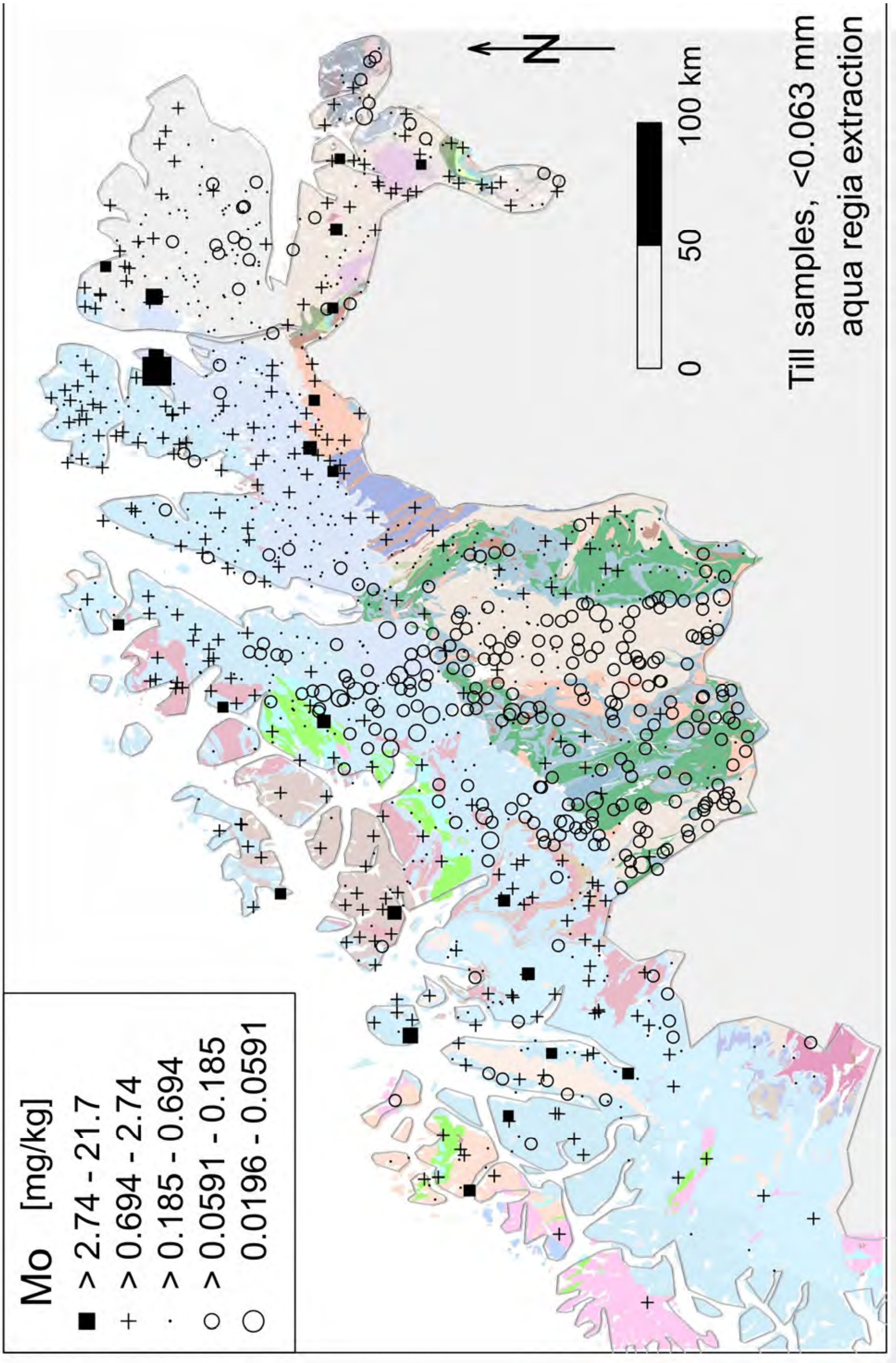

La [mg/kg]
> 65.0 - 238
> 22.4 - 65.0
> 11.0 - 22.4
> 4.30 - 11.0
1.05 - 4.30
N
0
50
100 km
Till samples, <0.063 mm
aqua regia extraction

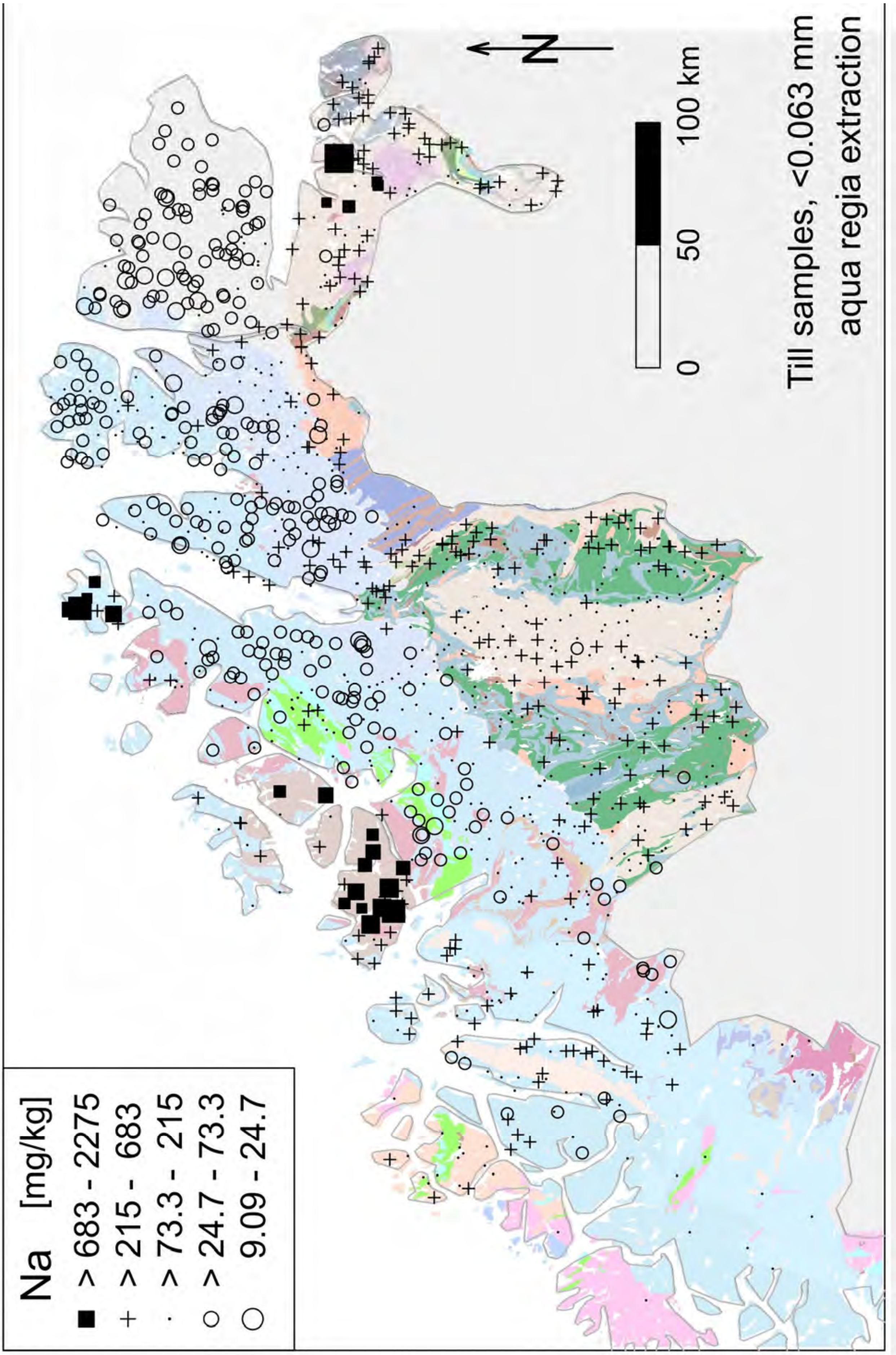

Li [mg/kg]
> 42.0 - 72.5
> 16.5 - 42.0
> 5.54 - 16.5
> 1.40 - 5.54
0.170 - 1.40
N
0
50
100 km
Till samples, <0.063 mm
aqua regia extraction

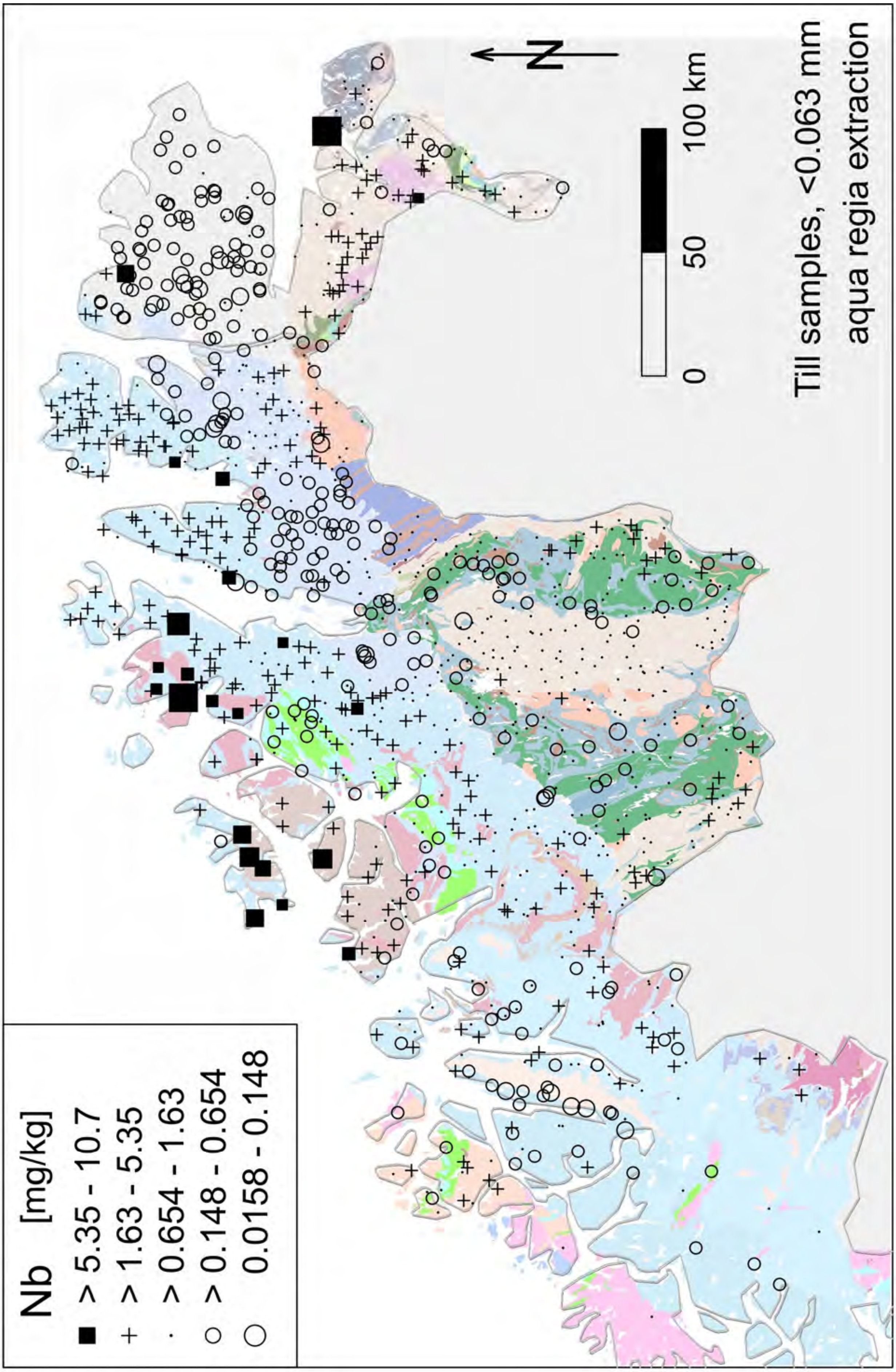

Lu [mg/kg]
> 0.324 - 0.738
> 0.106 - 0.324
> 0.0503 - 0.106
> 0.0226 - 0.0503
0.0086 - 0.0226
N
0
50
100 km
Till samples, <0.063 mm
aqua regia extraction

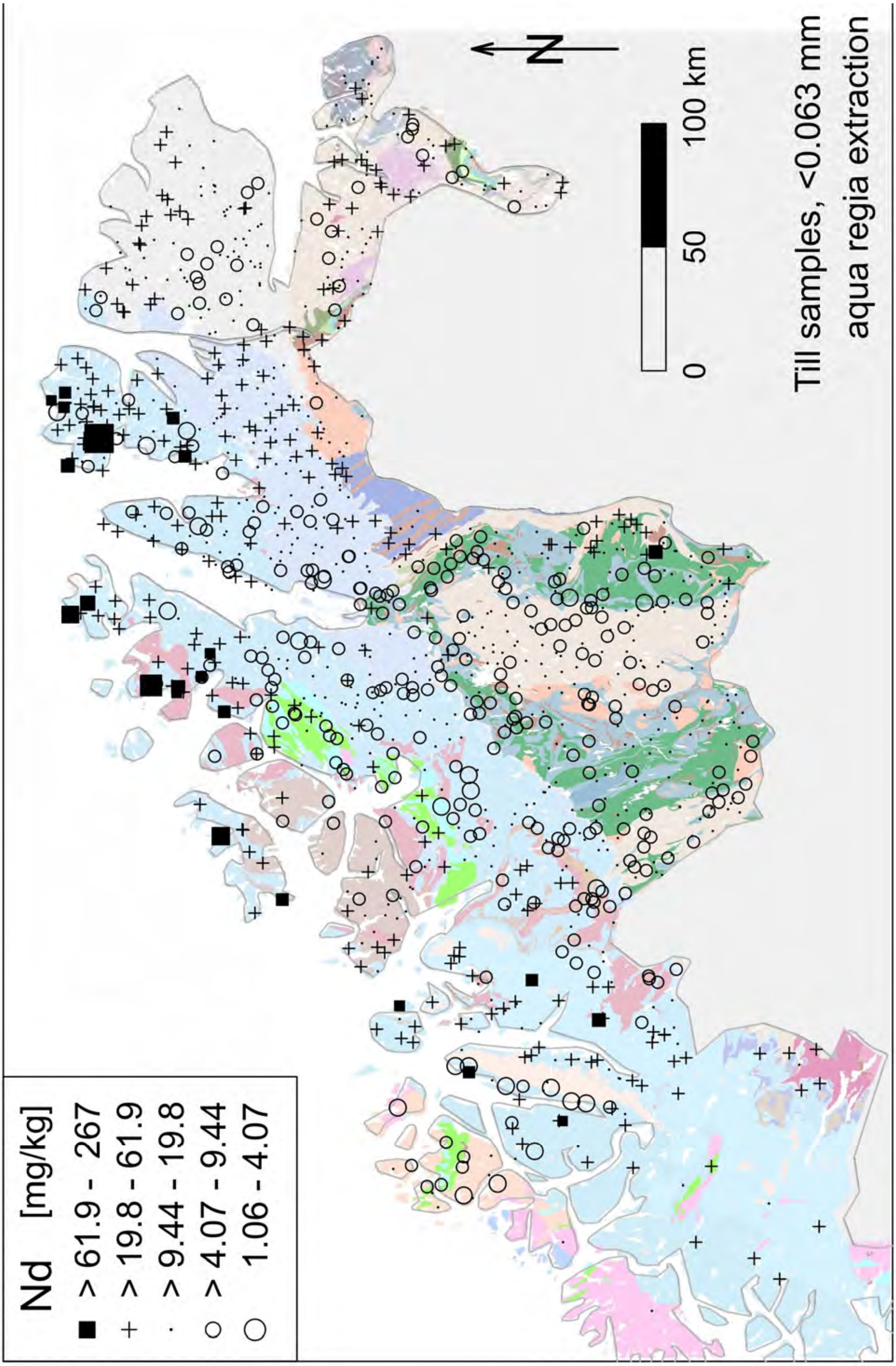

Mg [mg/kg]
> 18913 - 73741
> 7341 - 18913
> 2600 - 7341
> 652 - 2600
120 - 652
N
0 50 100 km
Till samples, <0.063 mm
aqua regia extraction

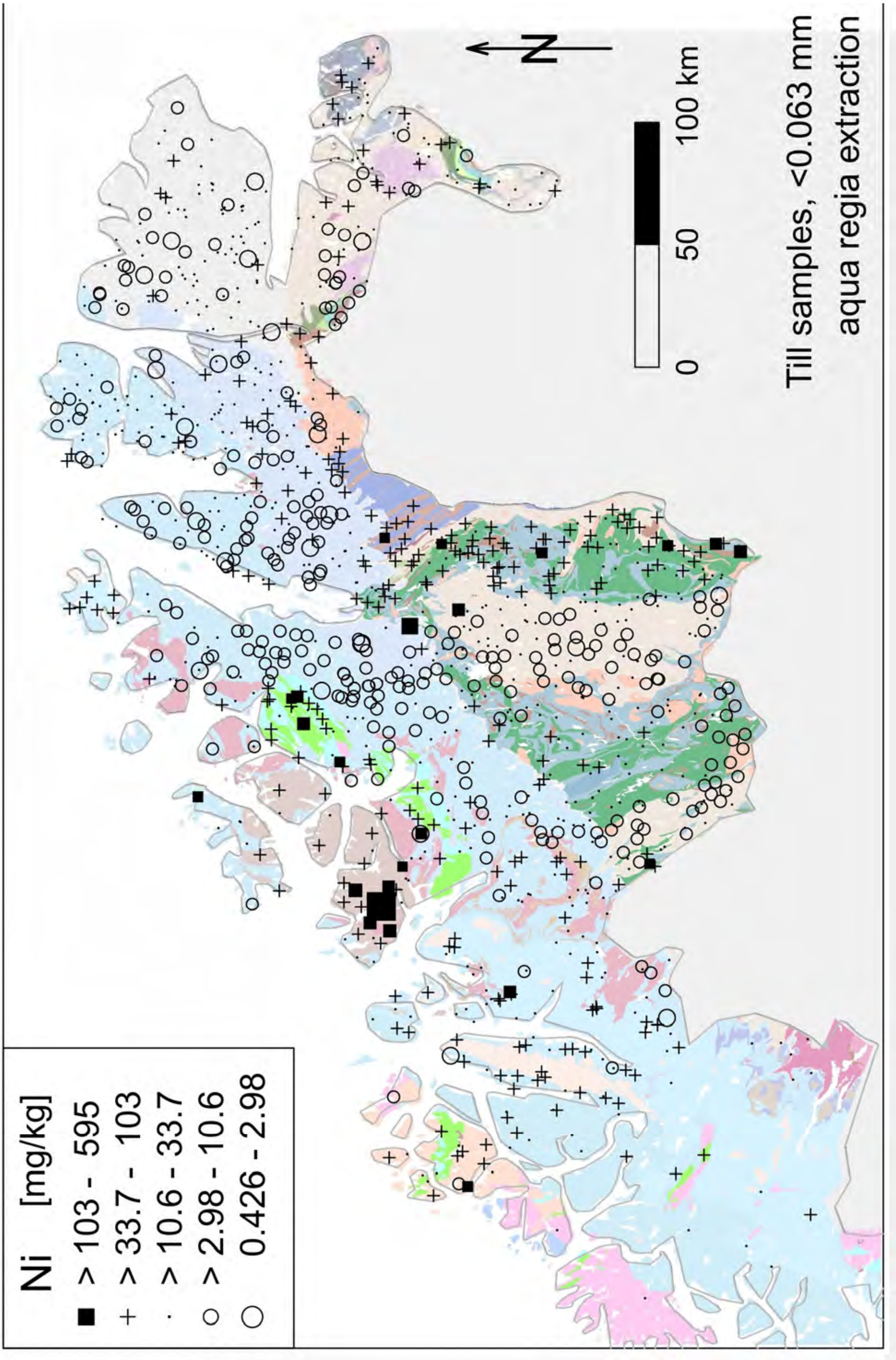

N
0
50
100 km
Till samples, <0.063 mm
aqua regia extraction
Mn [mg/kg]
> 1151 - 3372
> 309 - 1151
> 111 - 309
> 37.8 - 111
10.6 - 37.8

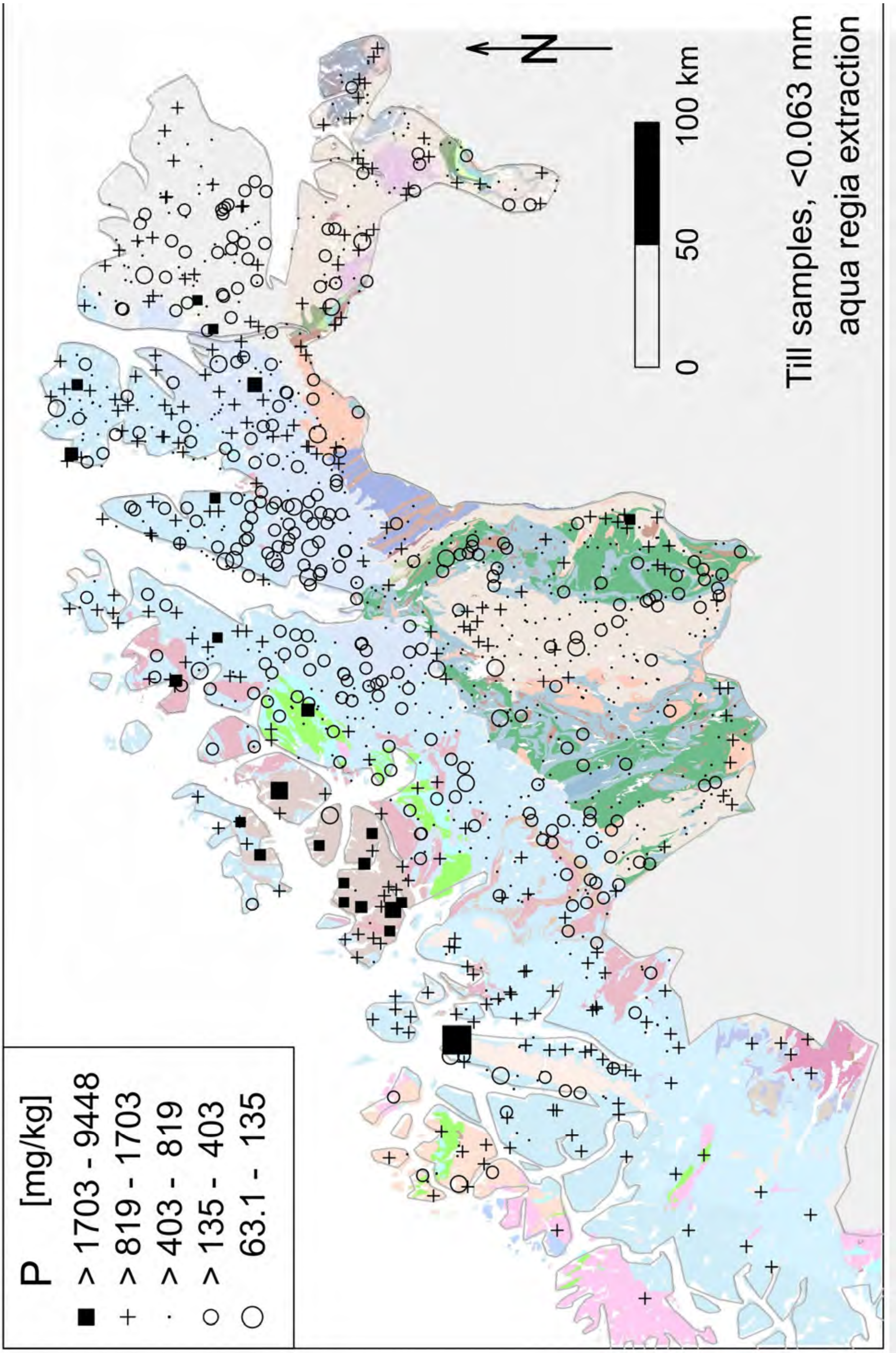

Mo [mg/kg]
> 2.74 - 21.7
> 0.694 - 2.74
> 0.185 - 0.694
> 0.0591 - 0.185
0.0196 - 0.0591
N
0
50
100 km
Till samples, <0.063 mm
aqua regia extraction

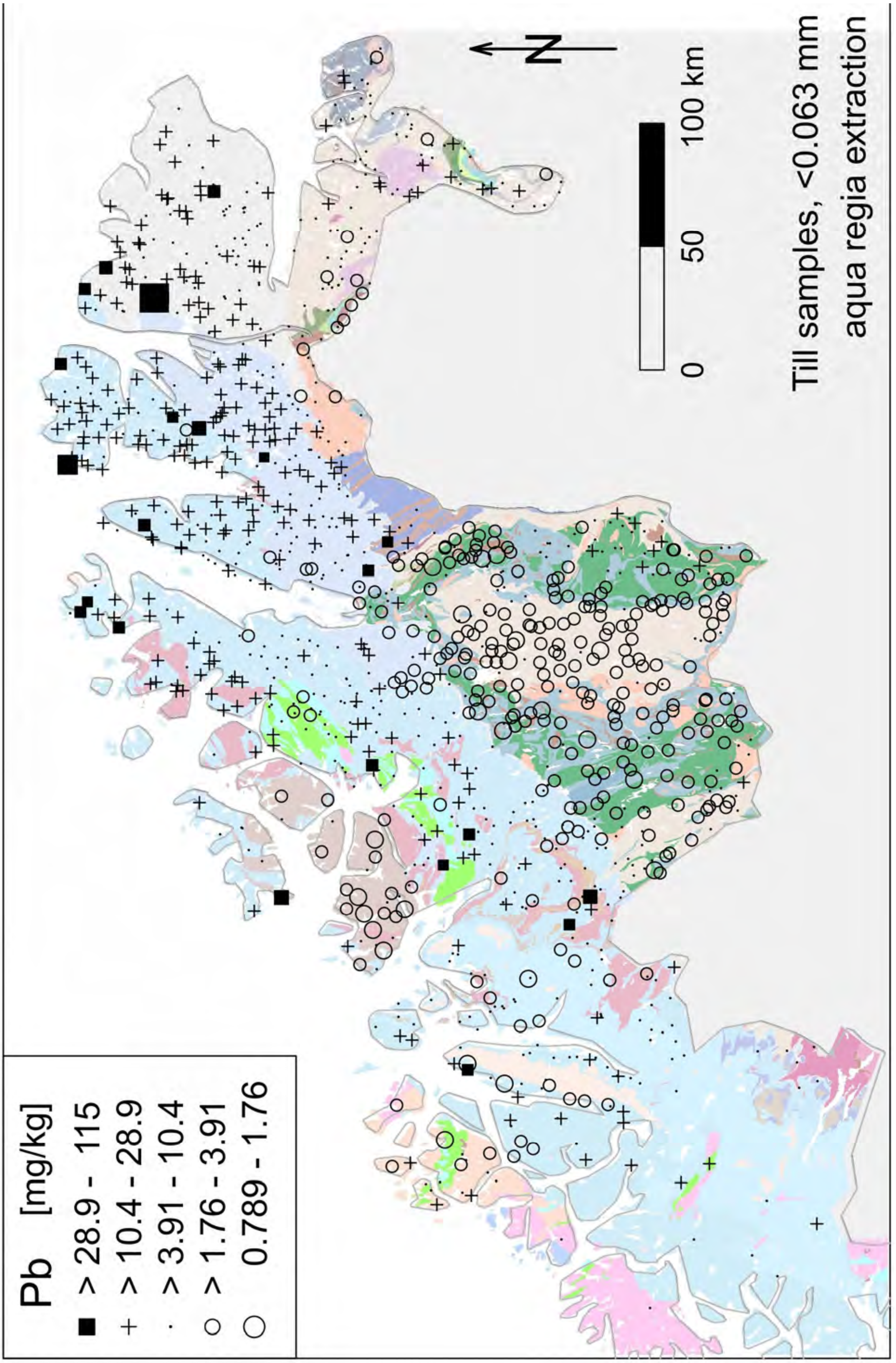

Na [mg/kg]
> 683 - 2275
> 215 - 683
> 73.3 - 215
> 24.7 - 73.3
9.09 - 24.7
N
0 50 100 km
Till samples, <0.063 mm
aqua regia extraction

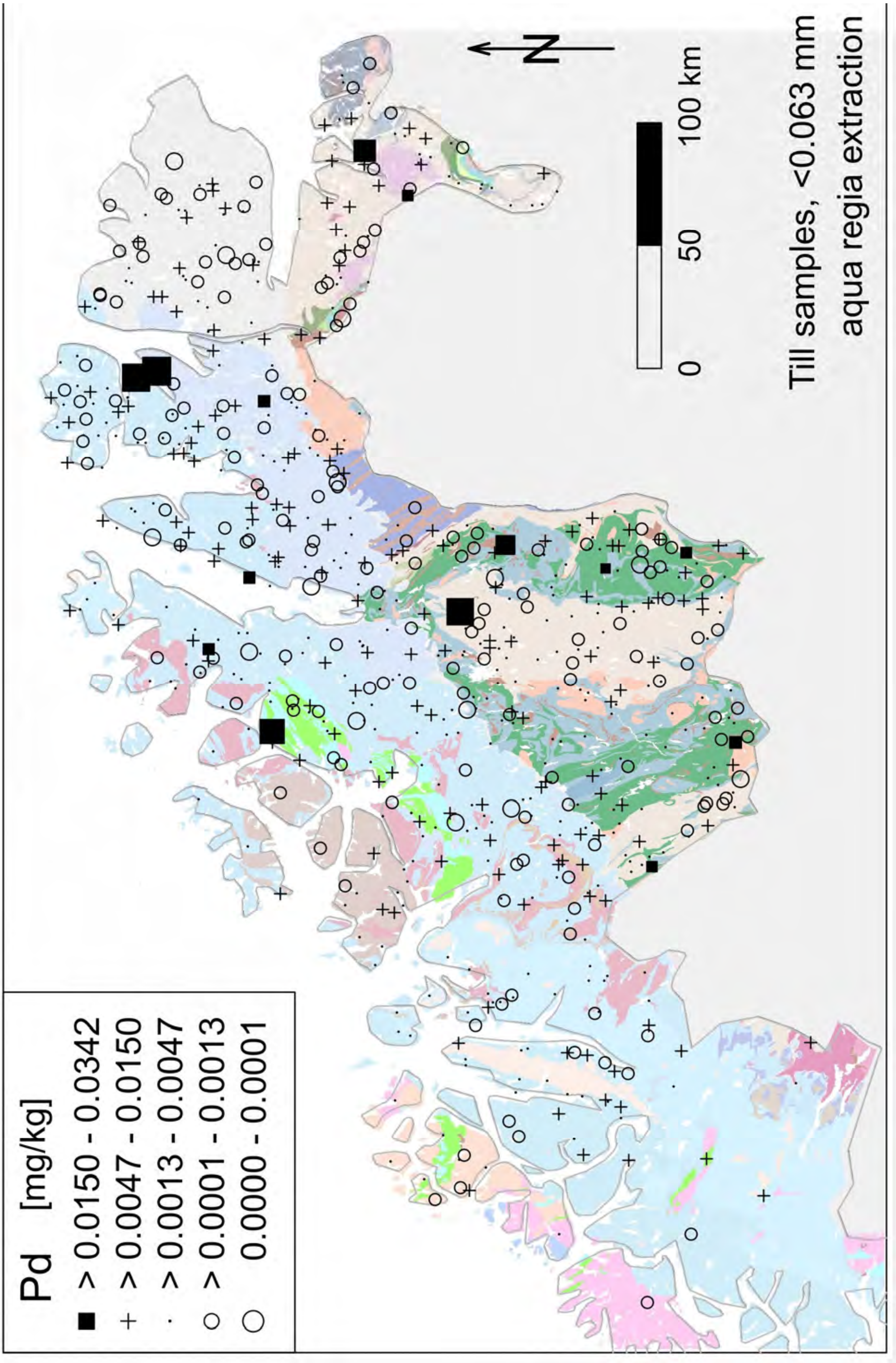

Nb [mg/kg]
> 5.35 - 10.7
> 1.63 - 5.35
> 0.654 - 1.63
> 0.148 - 0.654
0.0158 - 0.148
N
0
50
100 km
Till samples, <0.063 mm
aqua regia extraction

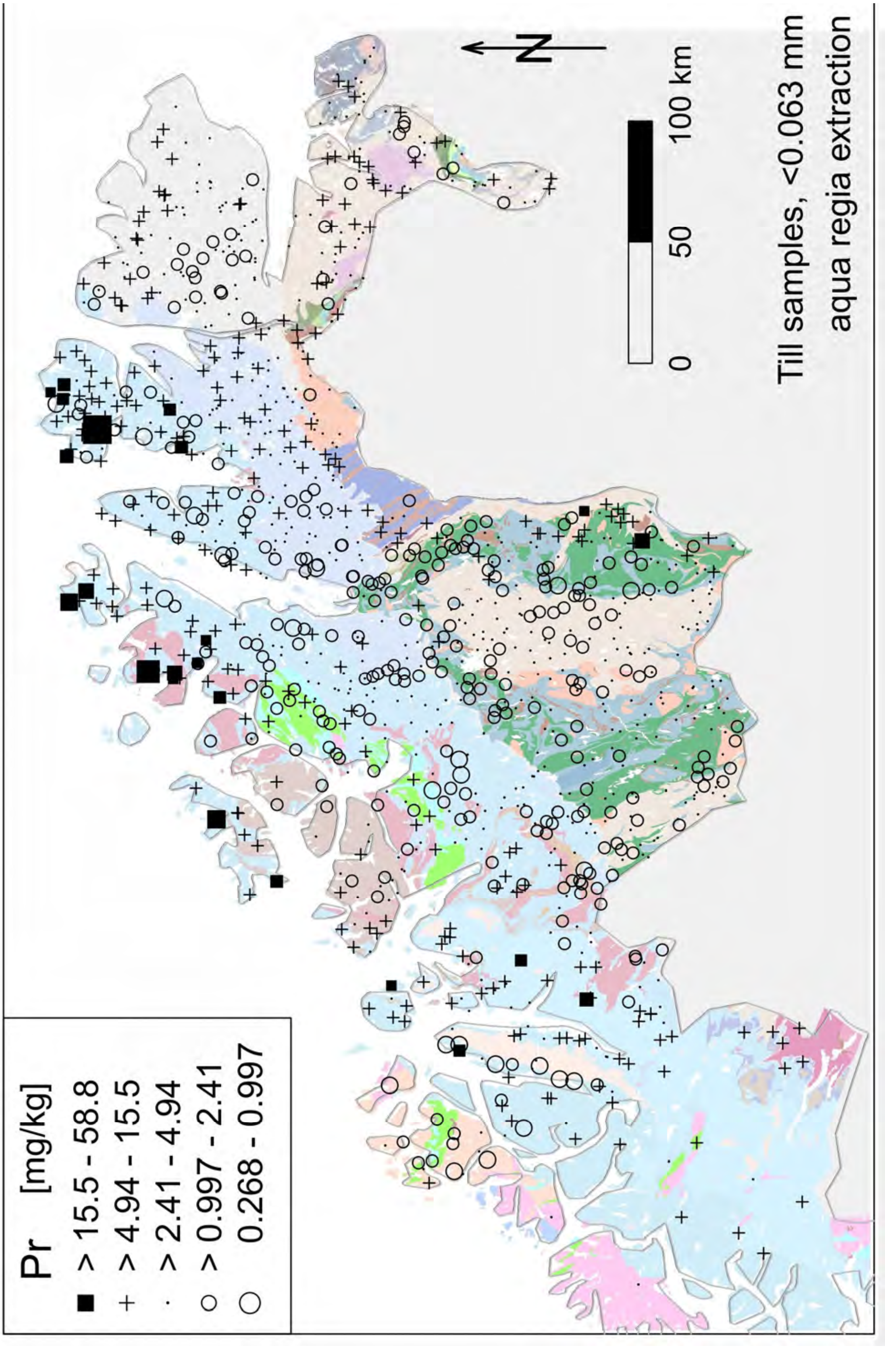

Nd [mg/kg]
> 61.9 - 267
> 19.8 - 61.9
> 9.44 - 19.8
> 4.07 - 9.44
1.06 - 4.07
N
0
50
100 km
Till samples, <0.063 mm
aqua regia extraction

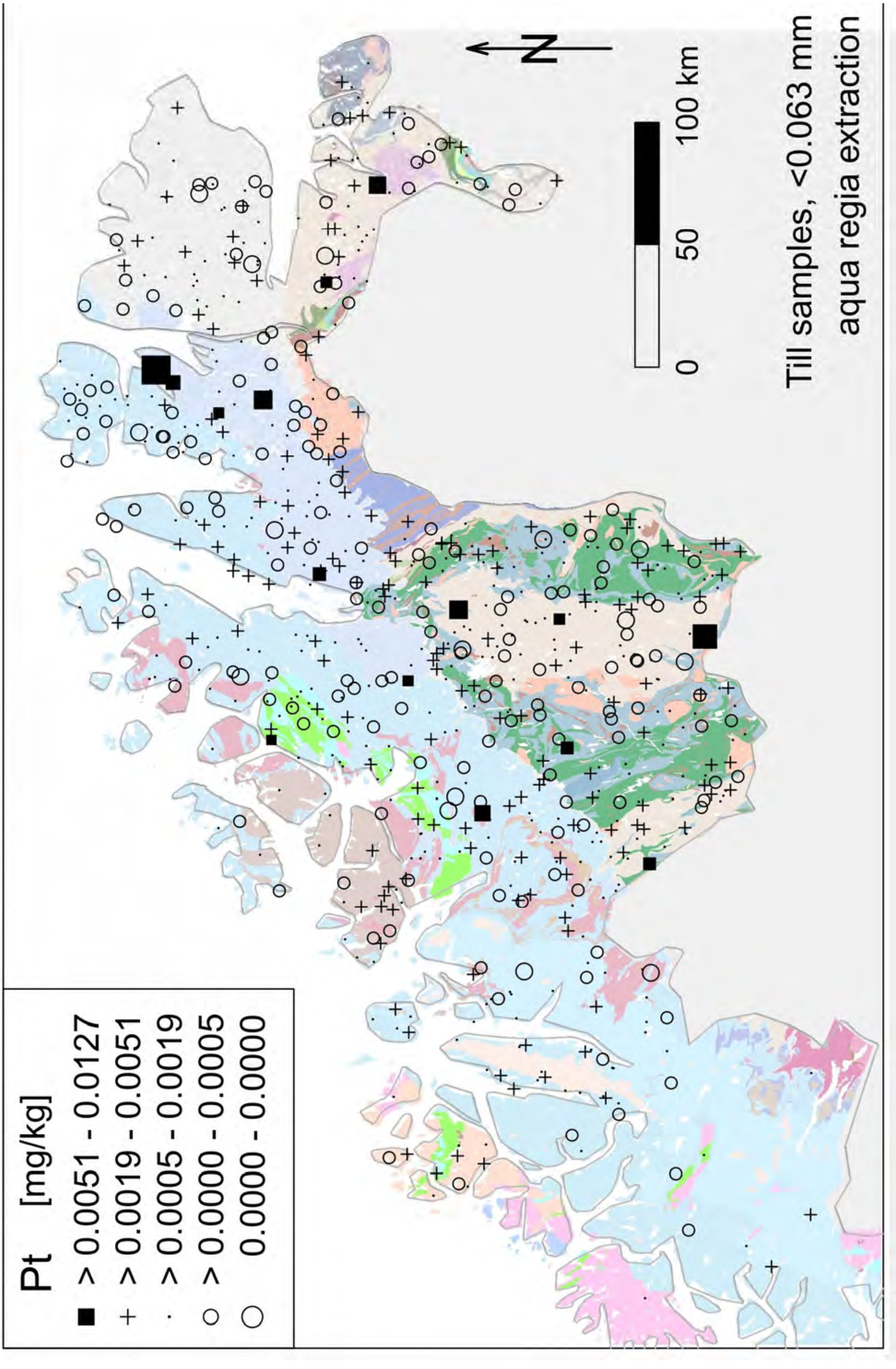

Ni [mg/kg]
> 103 - 595
> 33.7 - 103
> 10.6 - 33.7
> 2.98 - 10.6
0.426 - 2.98
N
0
50
100 km
Till samples, <0.063 mm
aqua regia extraction

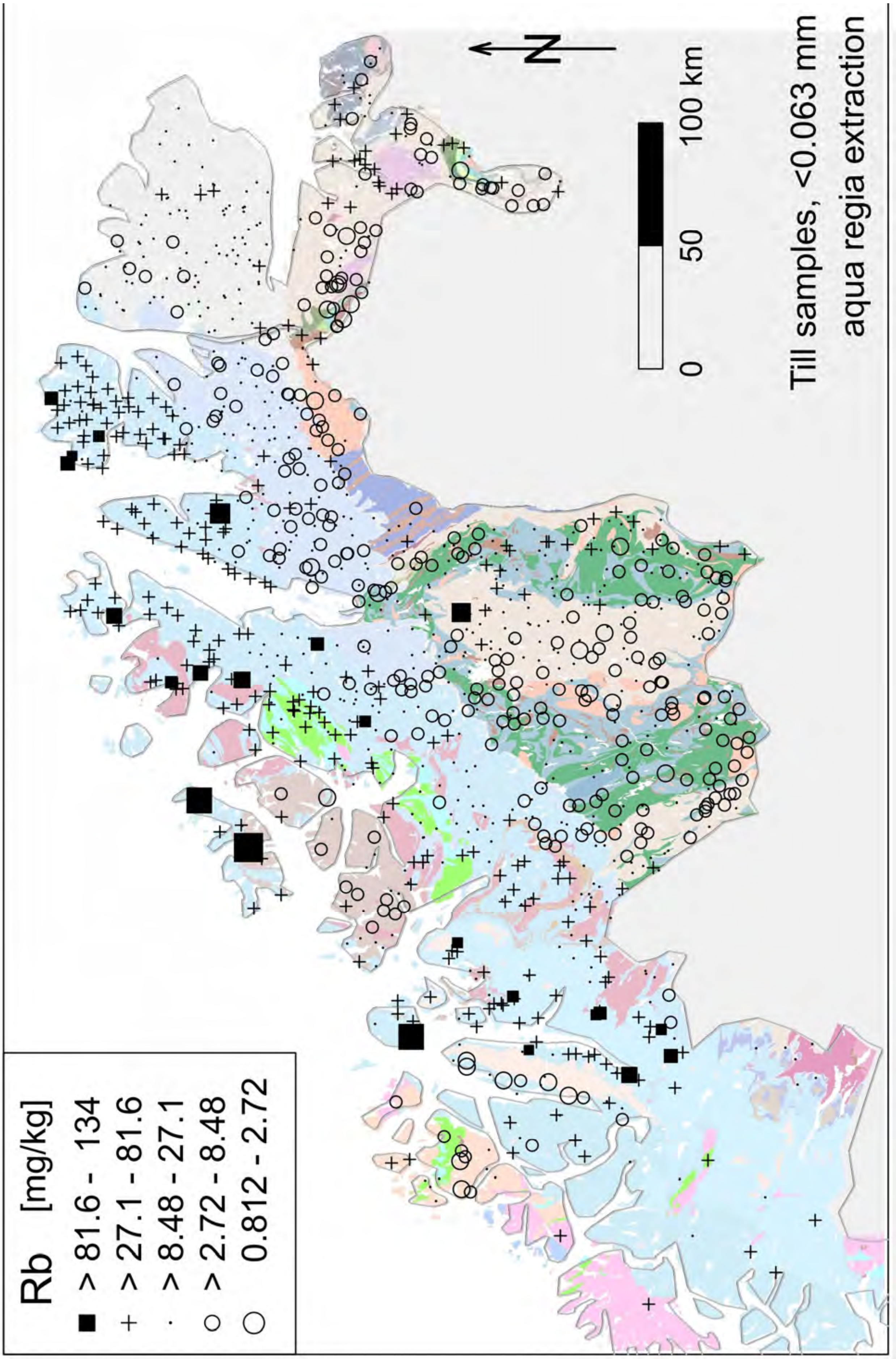

P [mg/kg]
> 1703 - 9448
> 819 - 1703
> 403 - 819
> 135 - 403
63.1 - 135
N
0
50
100 km
Till samples, <0.063 mm
aqua regia extraction

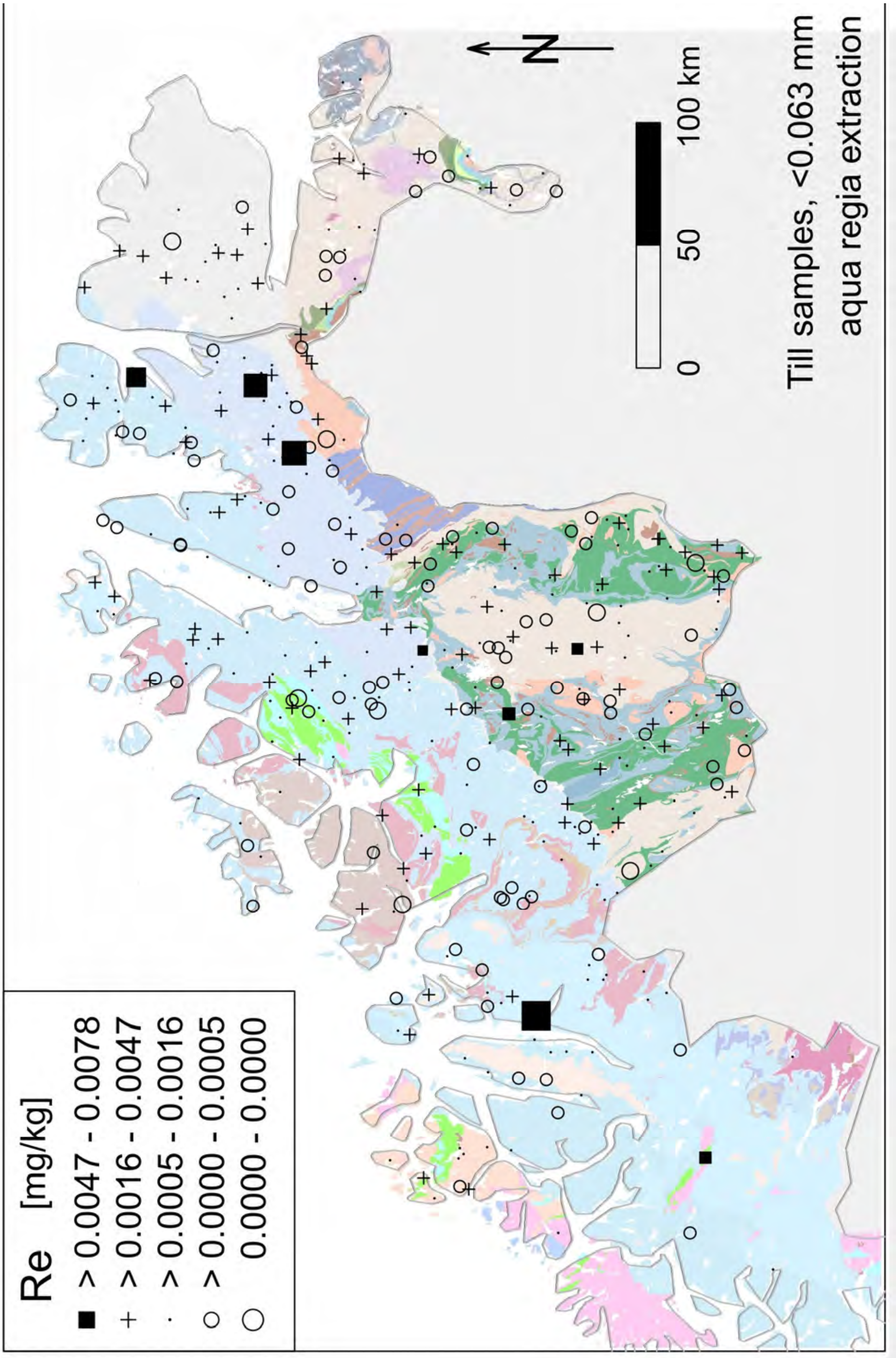

Pb [mg/kg]
> 28.9 - 115
> 10.4 - 28.9
> 3.91 - 10.4
> 1.76 - 3.91
0.789 - 1.76
N
0
50
100 km
Till samples, <0.063 mm
aqua regia extraction

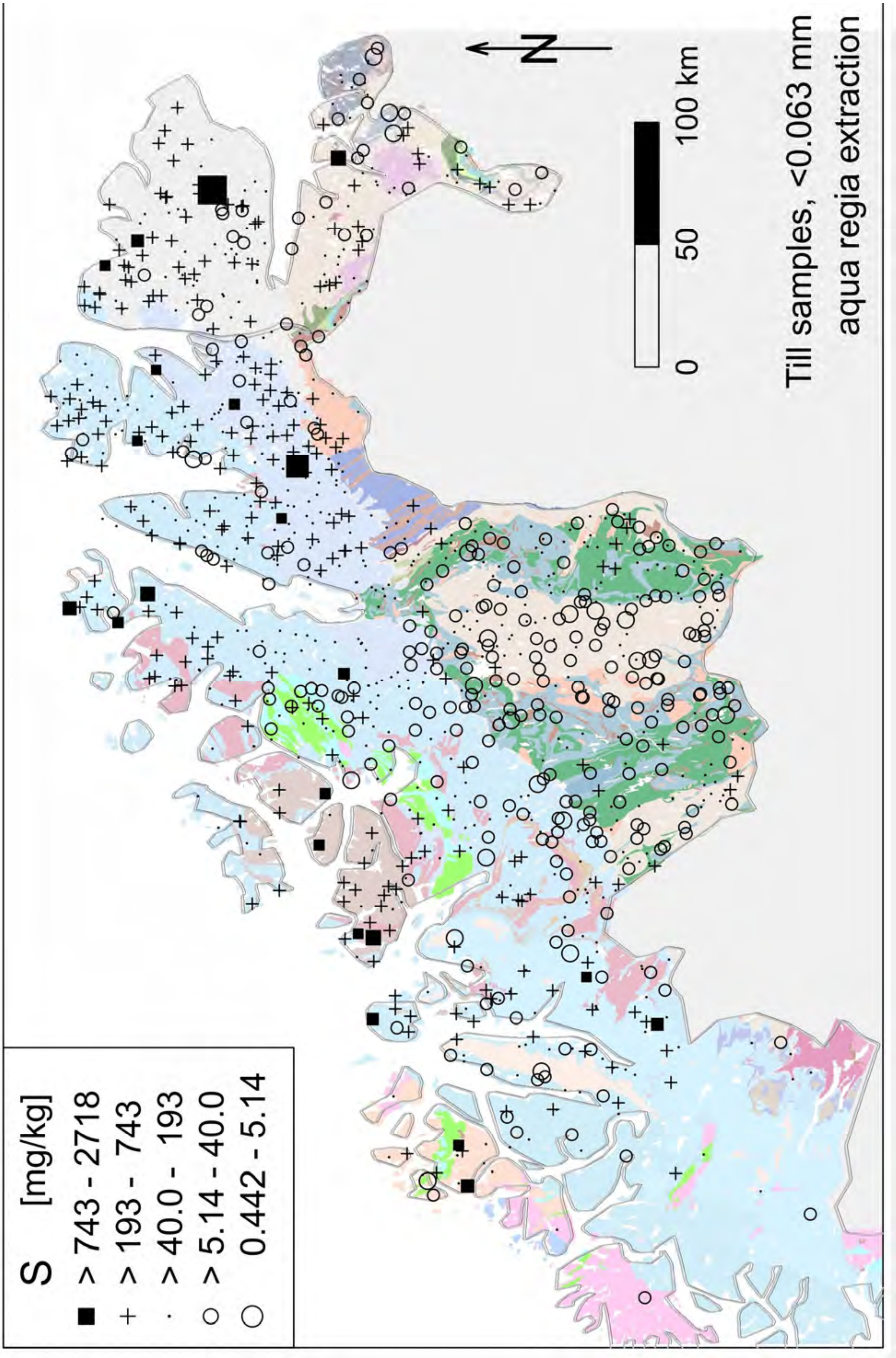

Pd [mg/kg]
> 0.0150 - 0.0342
> 0.0047 - 0.0150
> 0.0013 - 0.0047
> 0.0001 - 0.0013
0.0000 - 0.0001
N
0
50
100 km
Till samples, <0.063 mm
aqua regia extraction

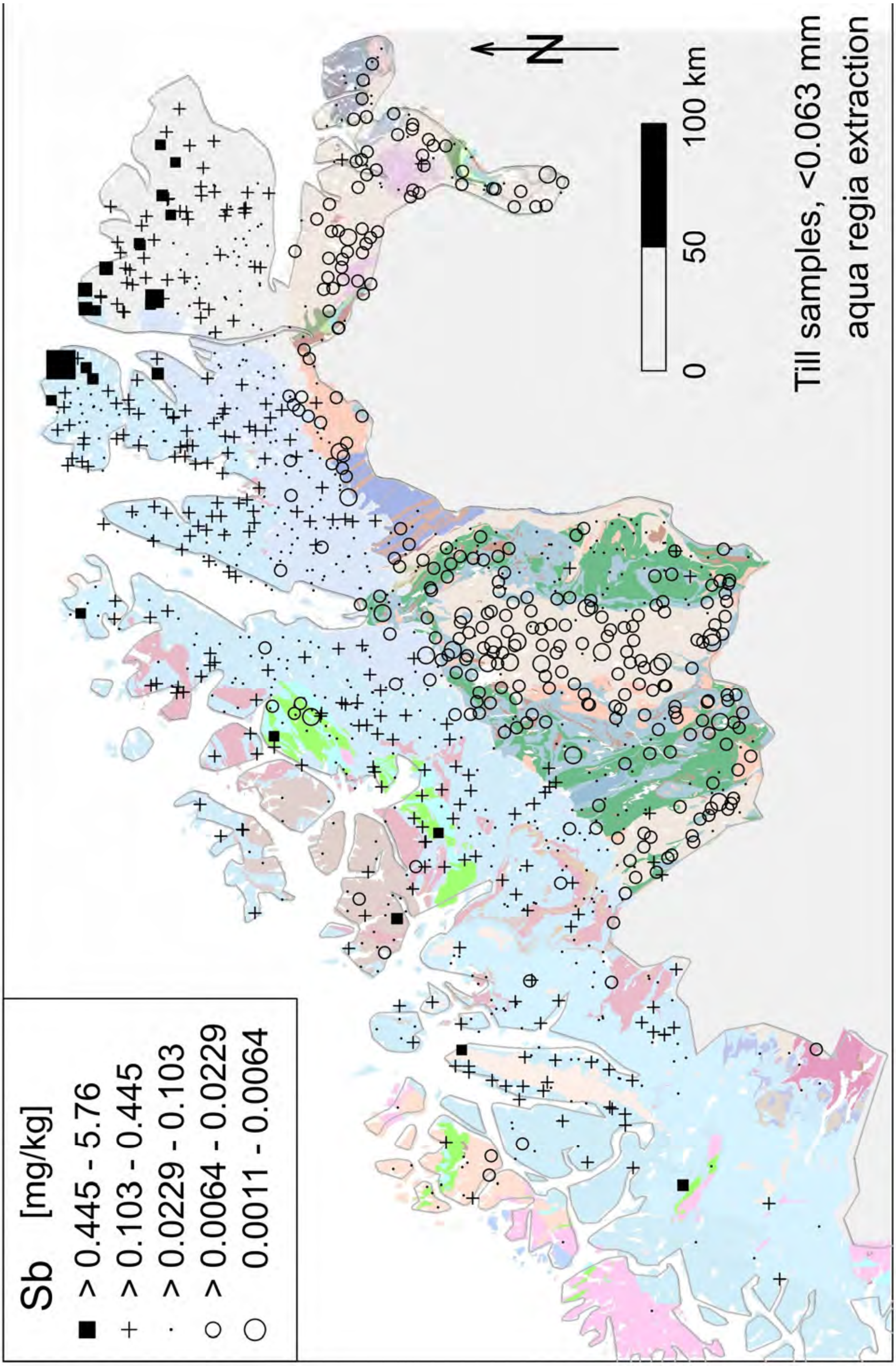

N
0
50
100 km
Till samples, <0.063 mm
aqua regia extraction
Pr [mg/kg]
> 15.5 - 58.8
> 4.94 - 15.5
> 2.41 - 4.94
> 0.997 - 2.41
0.268 - 0.997

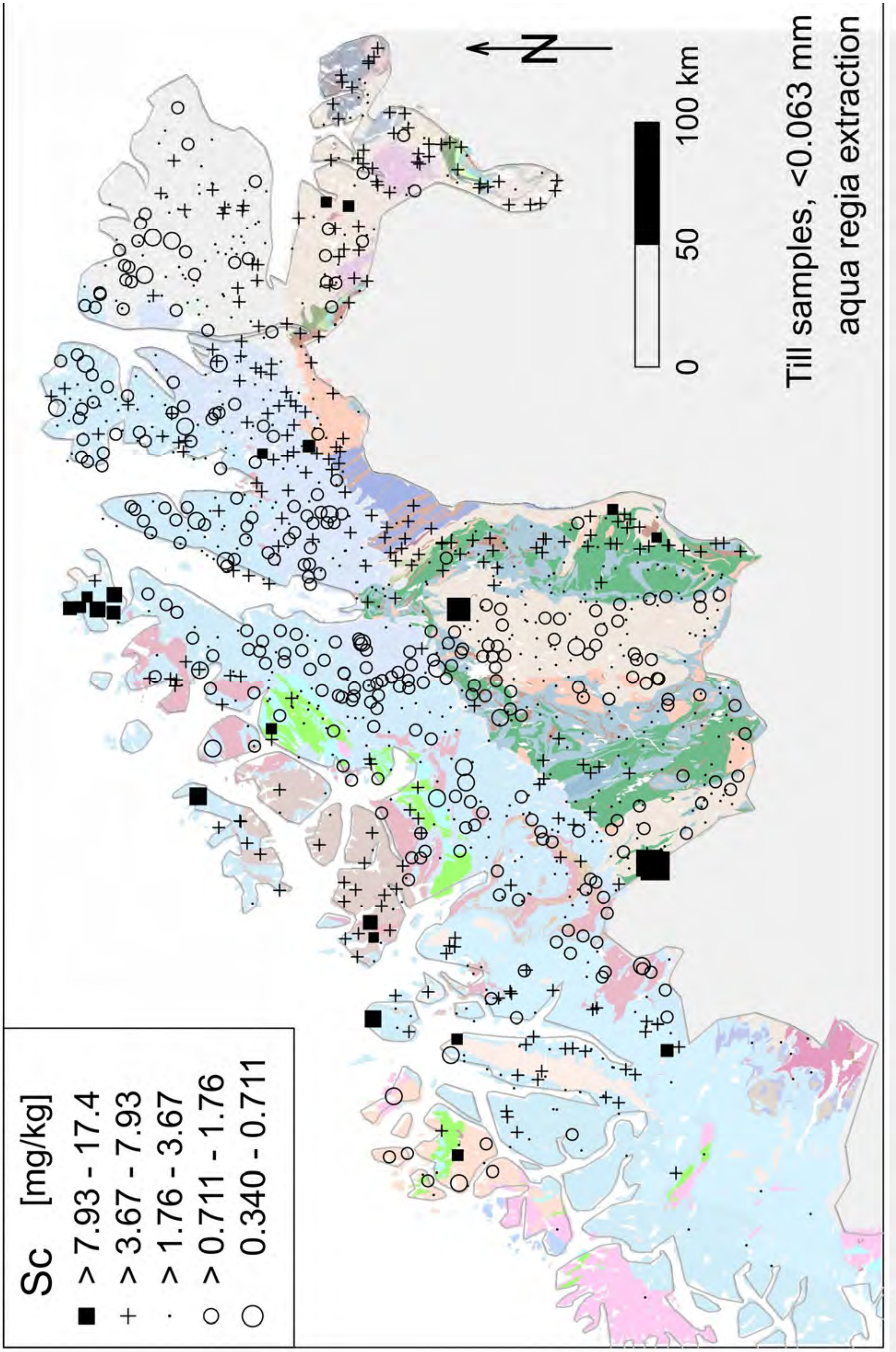

Pt [mg/kg]
> 0.0051 - 0.0127
> 0.0019 - 0.0051
> 0.0005 - 0.0019
> 0.0000 - 0.0005
0.0000 - 0.0000
N
0
50
100 km
Till samples, <0.063 mm
aqua regia extraction

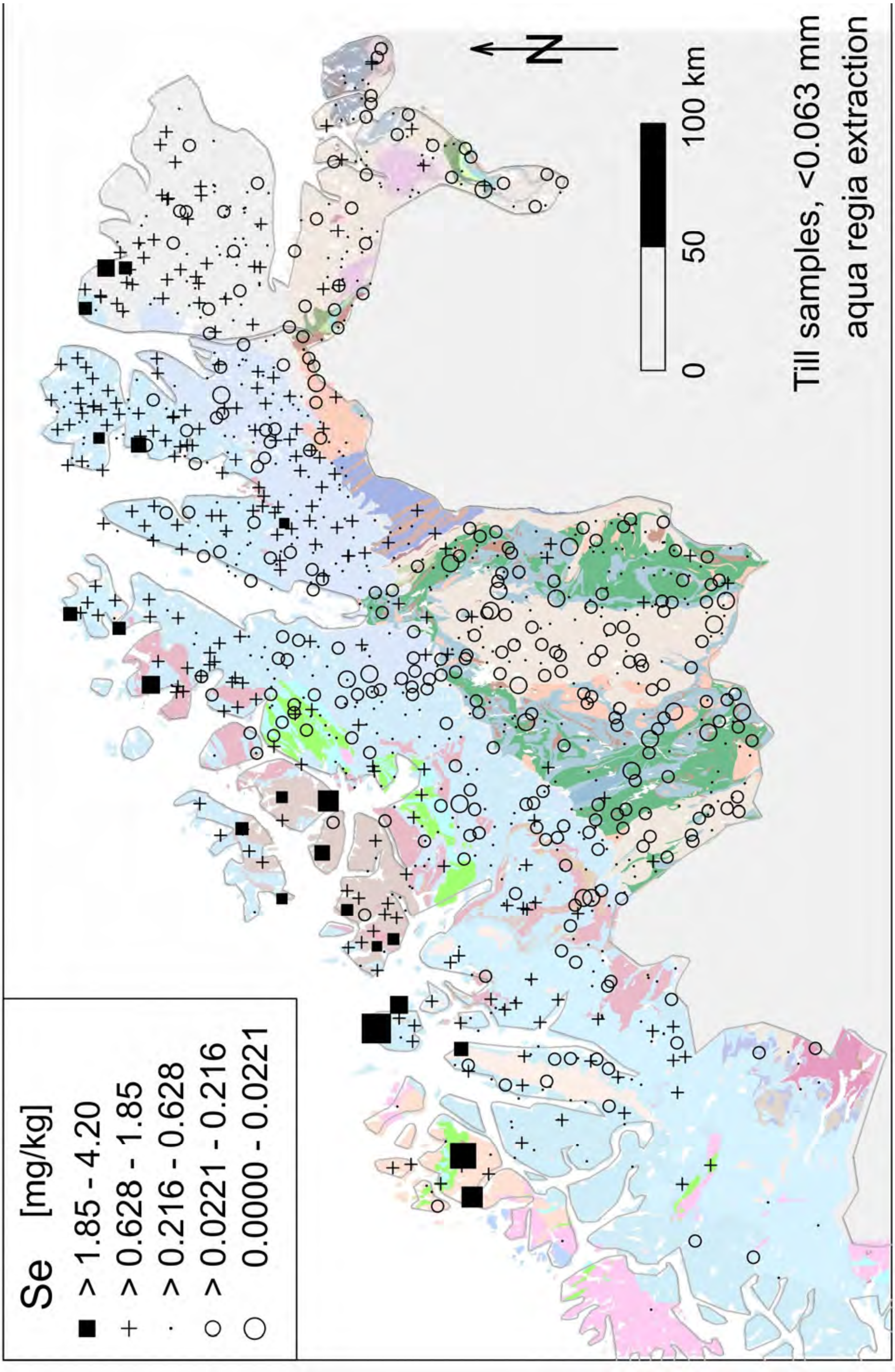

Rb [mg/kg]
> 81.6 - 134
> 27.1 - 81.6
> 8.48 - 27.1
> 2.72 - 8.48
0.812 - 2.72
N
0
50
100 km
Till samples, <0.063 mm
aqua regia extraction

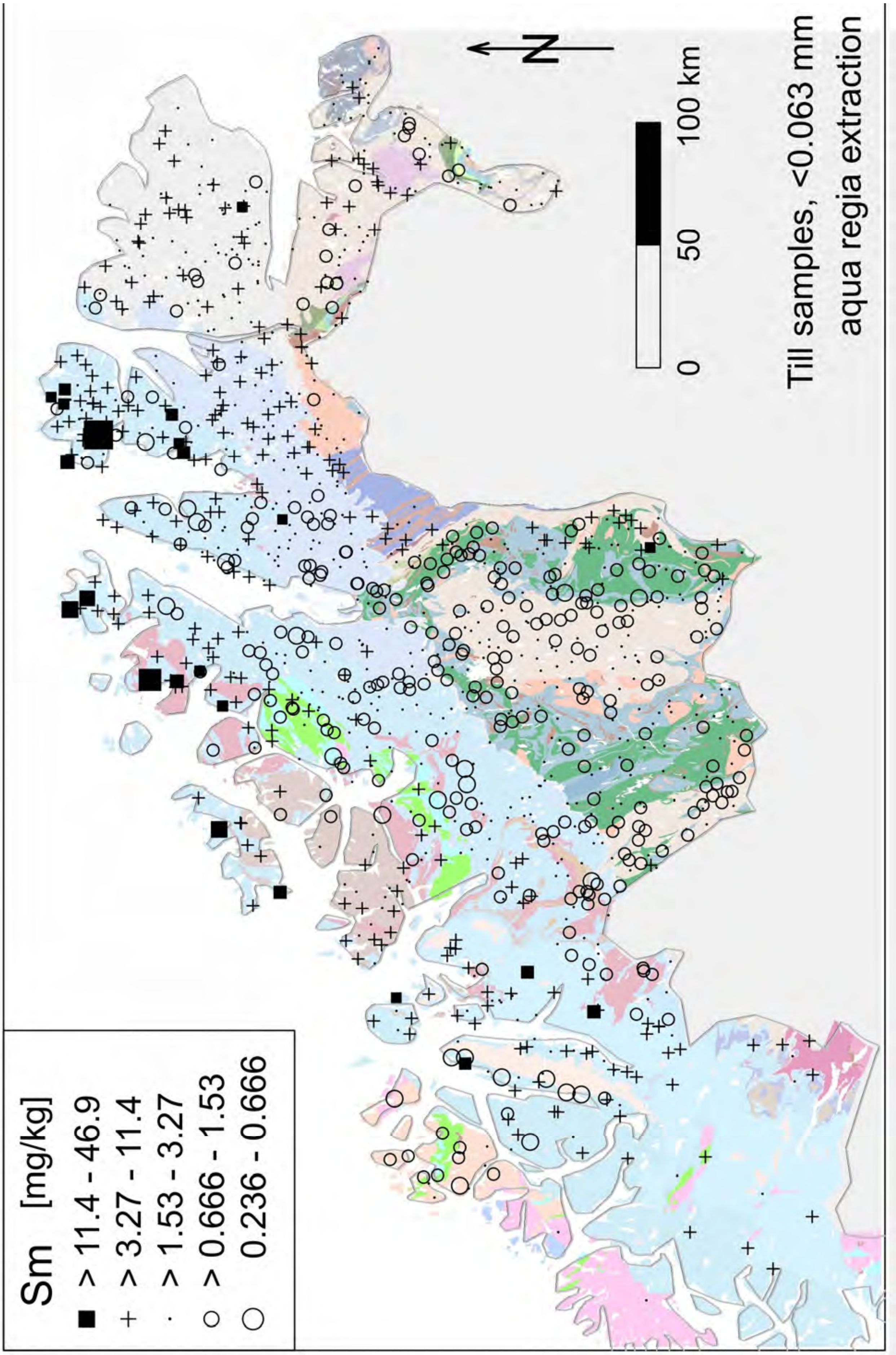

Re [mg/kg]
> 0.0047 - 0.0078
> 0.0016 - 0.0047
> 0.0005 - 0.0016
> 0.0000 - 0.0005
0.0000 - 0.0000
N
0
50
100 km
Till samples, <0.063 mm
aqua regia extraction

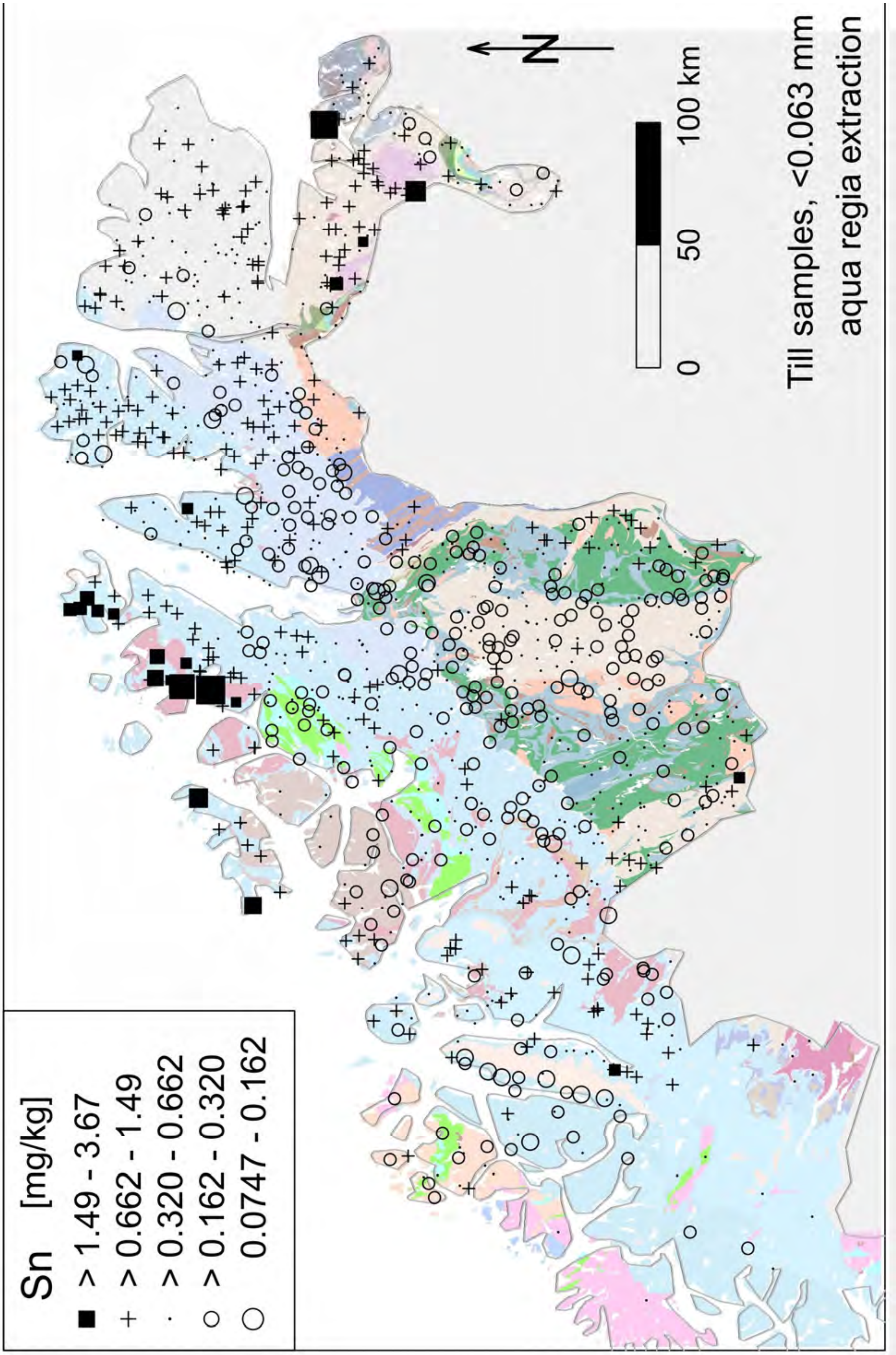

N
0 50 100 km
Till samples, <0.063 mm
aqua regia extraction
S [mg/kg]
> 743 - 2718
> 193 - 743
> 40.0 - 193
> 5.14 - 40.0
0.442 - 5.14

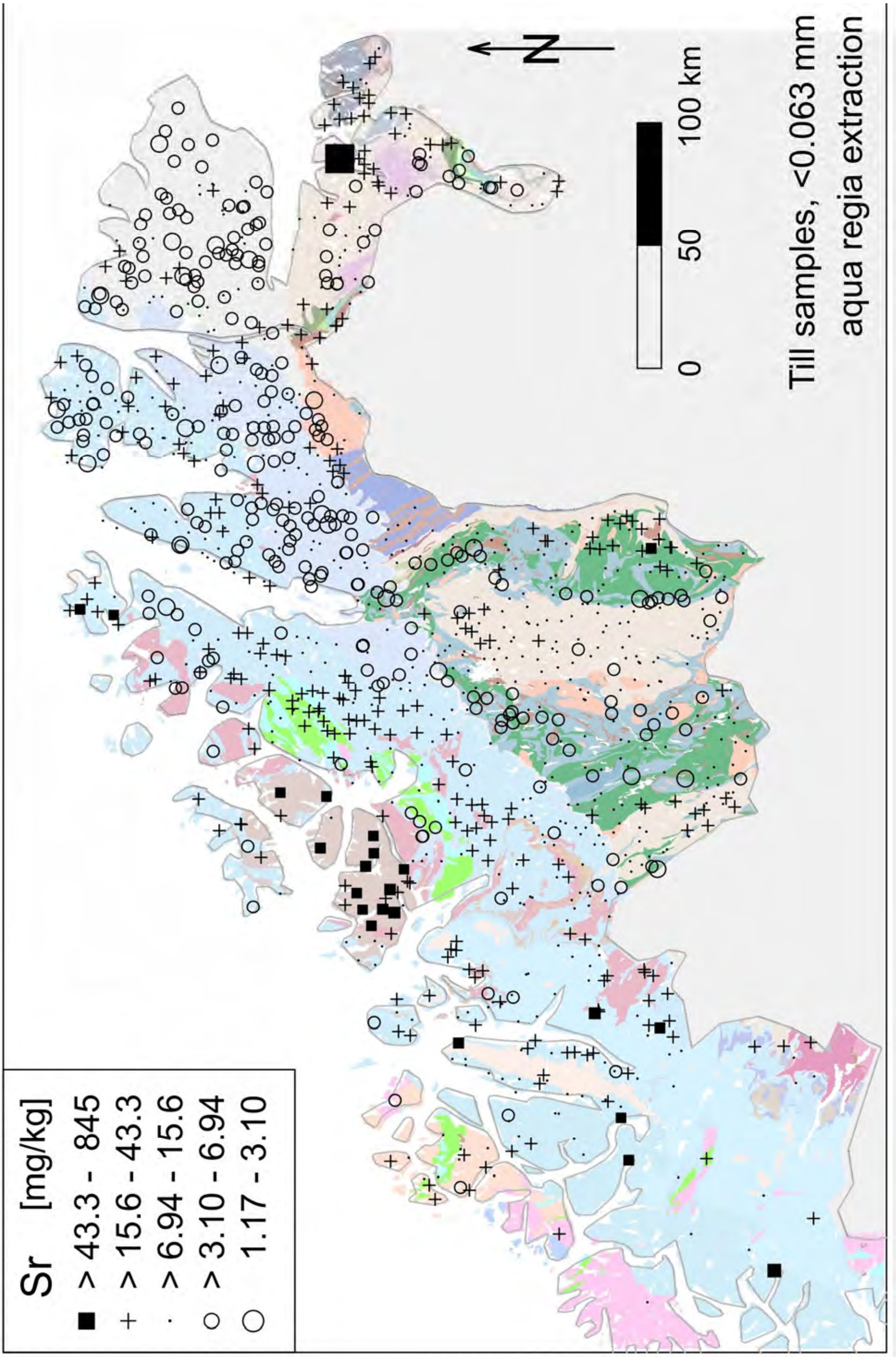

Sb [mg/kg]
> 0.445 - 5.76
> 0.103 - 0.445
> 0.0229 - 0.103
> 0.0064 - 0.0229
0.0011 - 0.0064
N
0 50 100 km
Till samples, <0.063 mm
aqua regia extraction

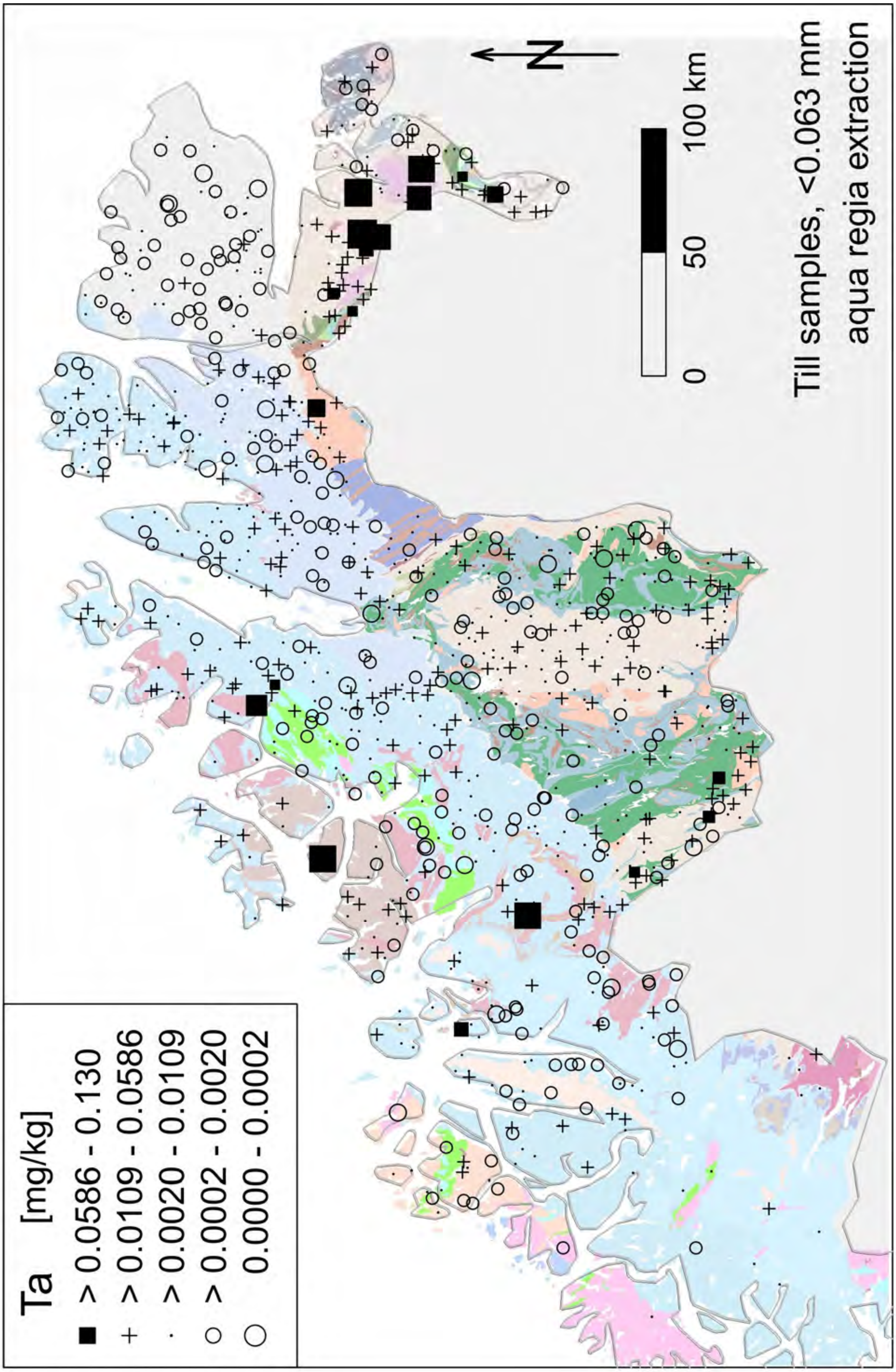

Sc [mg/kg]
> 7.93 - 17.4
> 3.67 - 7.93
> 1.76 - 3.67
> 0.711 - 1.76
0.340 - 0.711
N
0 50 100 km
Till samples, <0.063 mm
aqua regia extraction

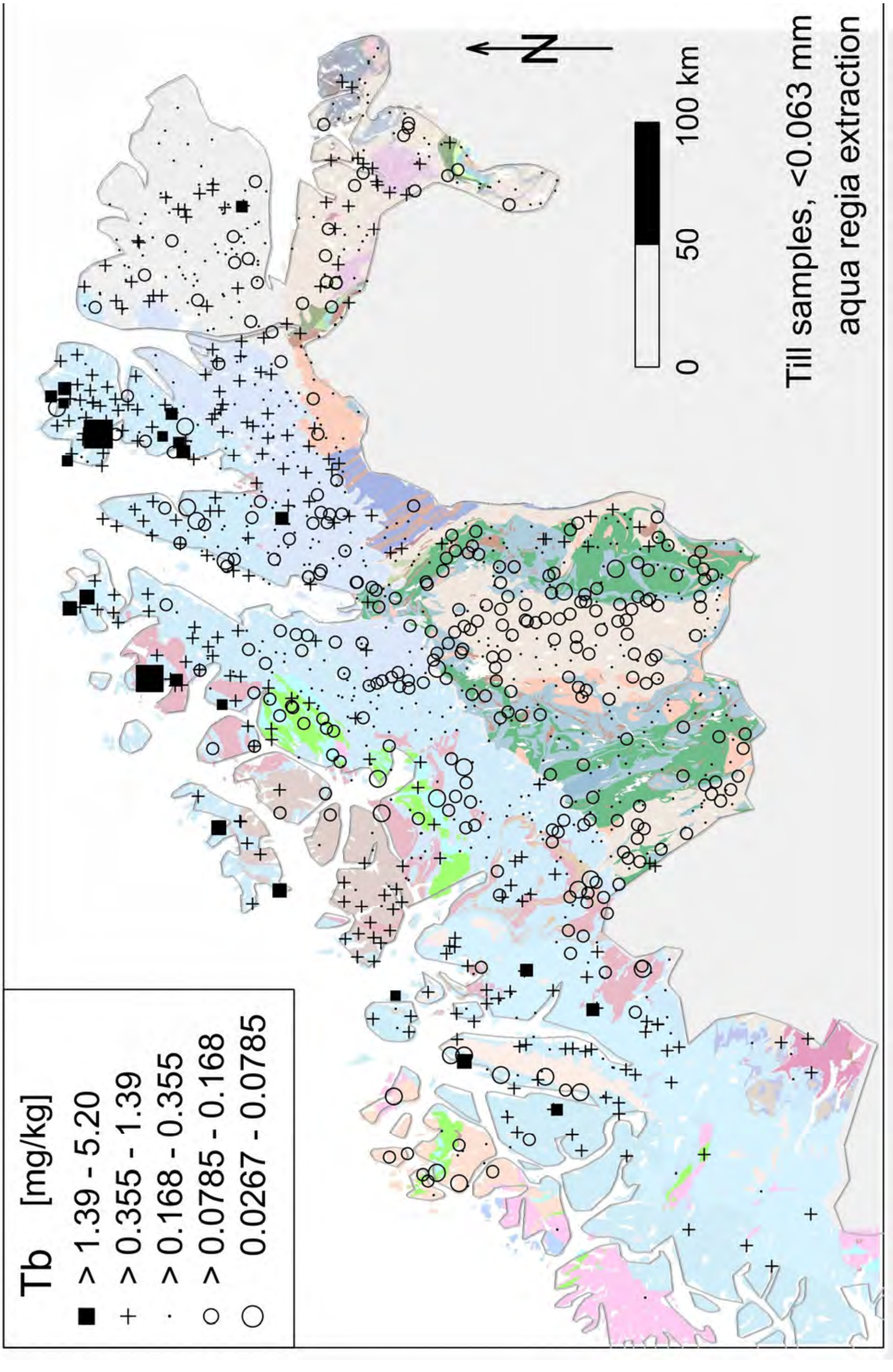

Se [mg/kg]
> 1.85 - 4.20
> 0.628 - 1.85
> 0.216 - 0.628
> 0.0221 - 0.216
0.0000 - 0.0221
N
0 50 100 km
Till samples, <0.063 mm
aqua regia extraction

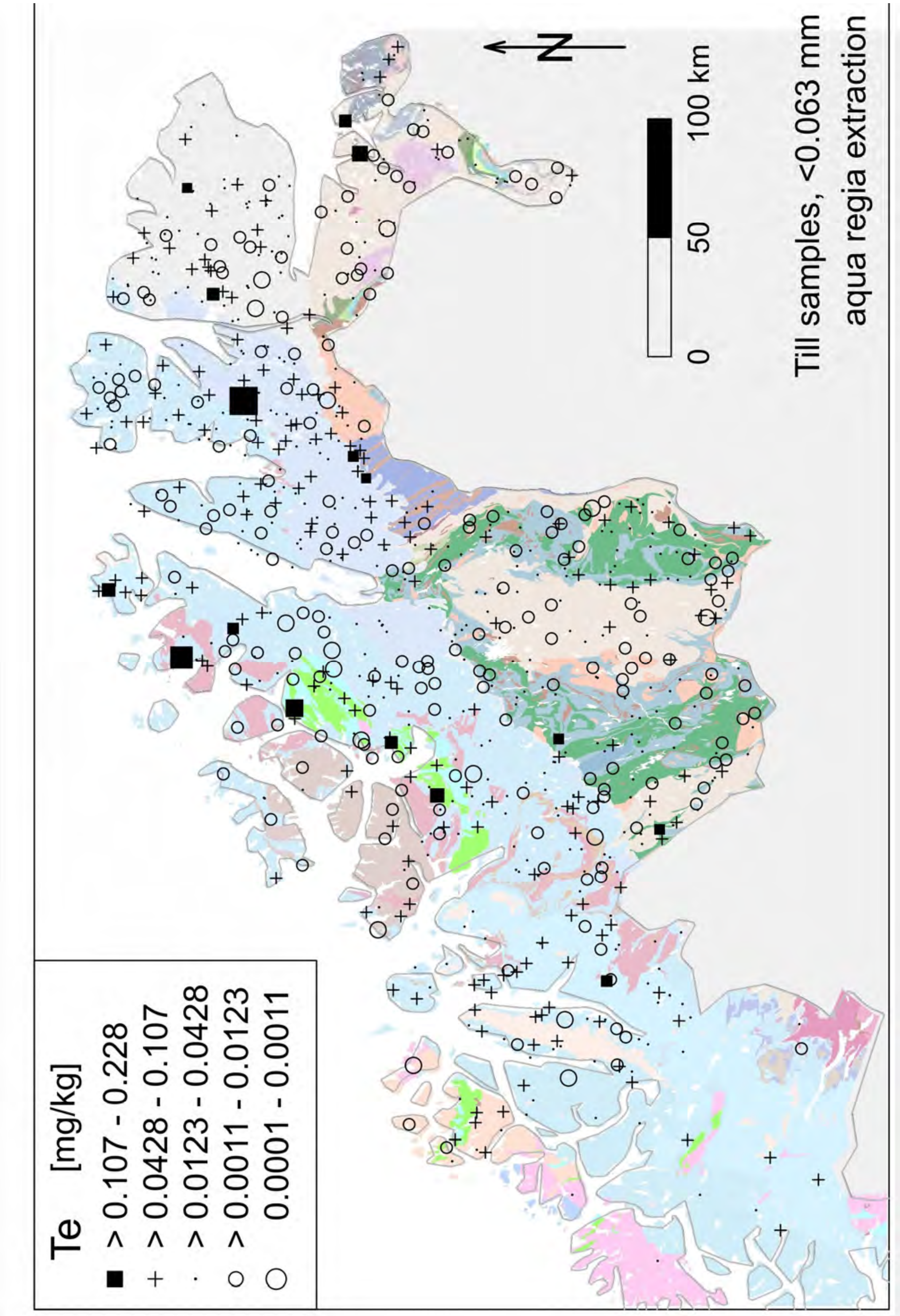

Sm [mg/kg]
> 11.4 - 46.9
> 3.27 - 11.4
> 1.53 - 3.27
> 0.666 - 1.53
0.236 - 0.666
N
0
50
100 km
Till samples, <0.063 mm
aqua regia extraction

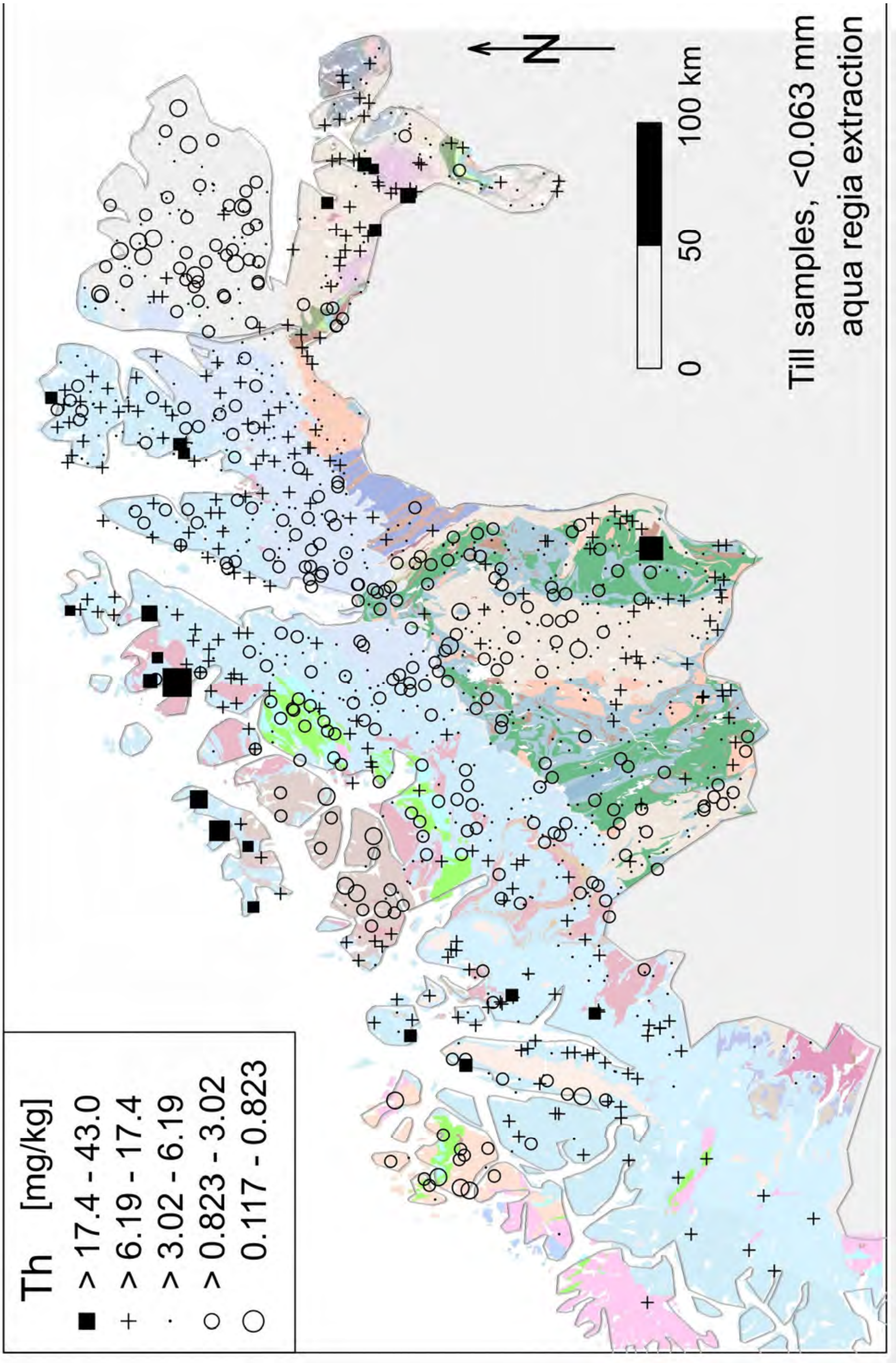

Sn [mg/kg]
> 1.49 - 3.67
> 0.662 - 1.49
> 0.320 - 0.662
> 0.162 - 0.320
0.0747 - 0.162
N
0
50
100 km
Till samples, <0.063 mm
aqua regia extraction

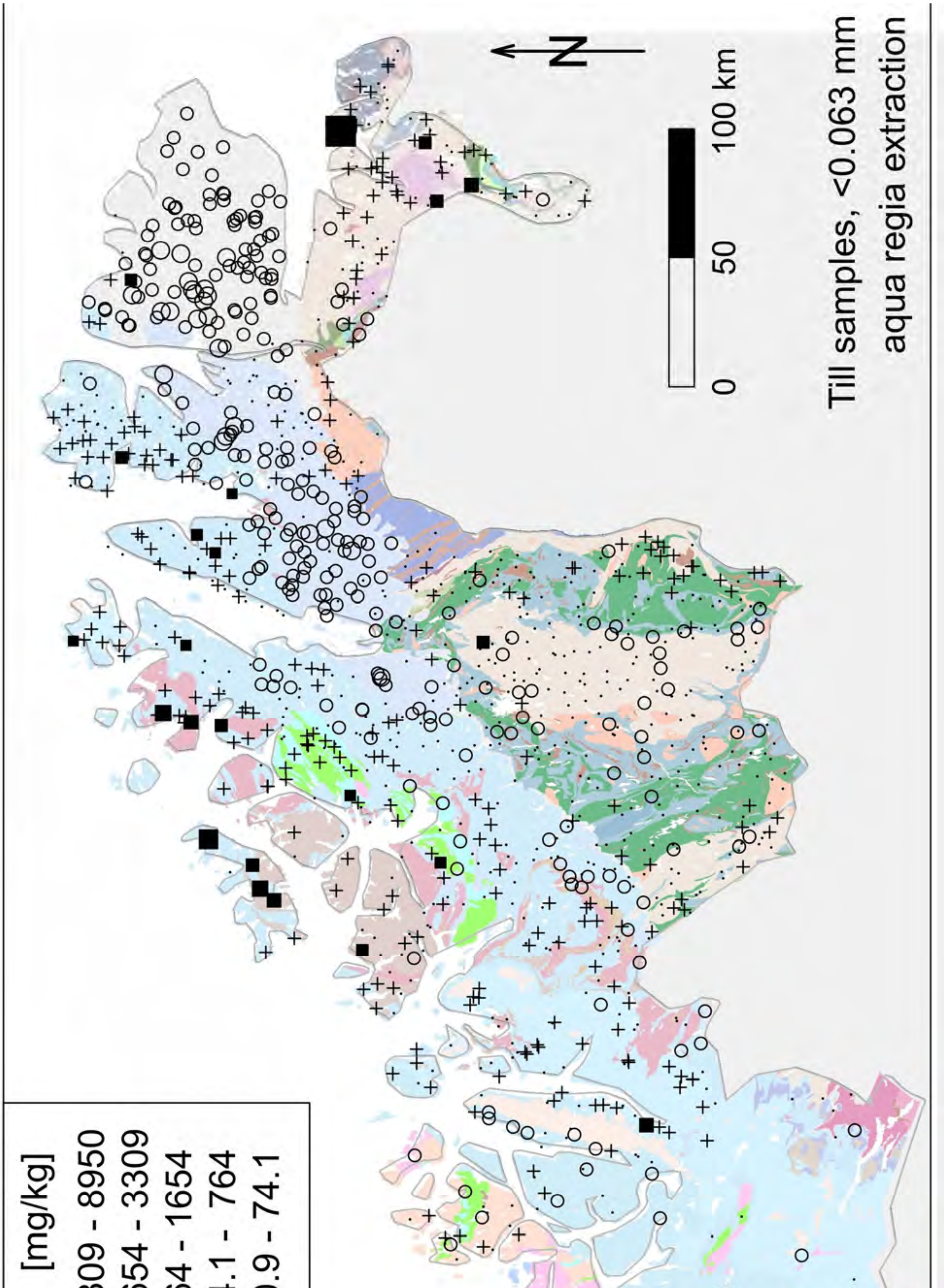

N
0
50
100 km
Till samples, <0.063 mm
aqua regia extraction
Sr [mg/kg]
> 43.3 - 845
> 15.6 - 43.3
> 6.94 - 15.6
> 3.10 - 6.94
1.17 - 3.10

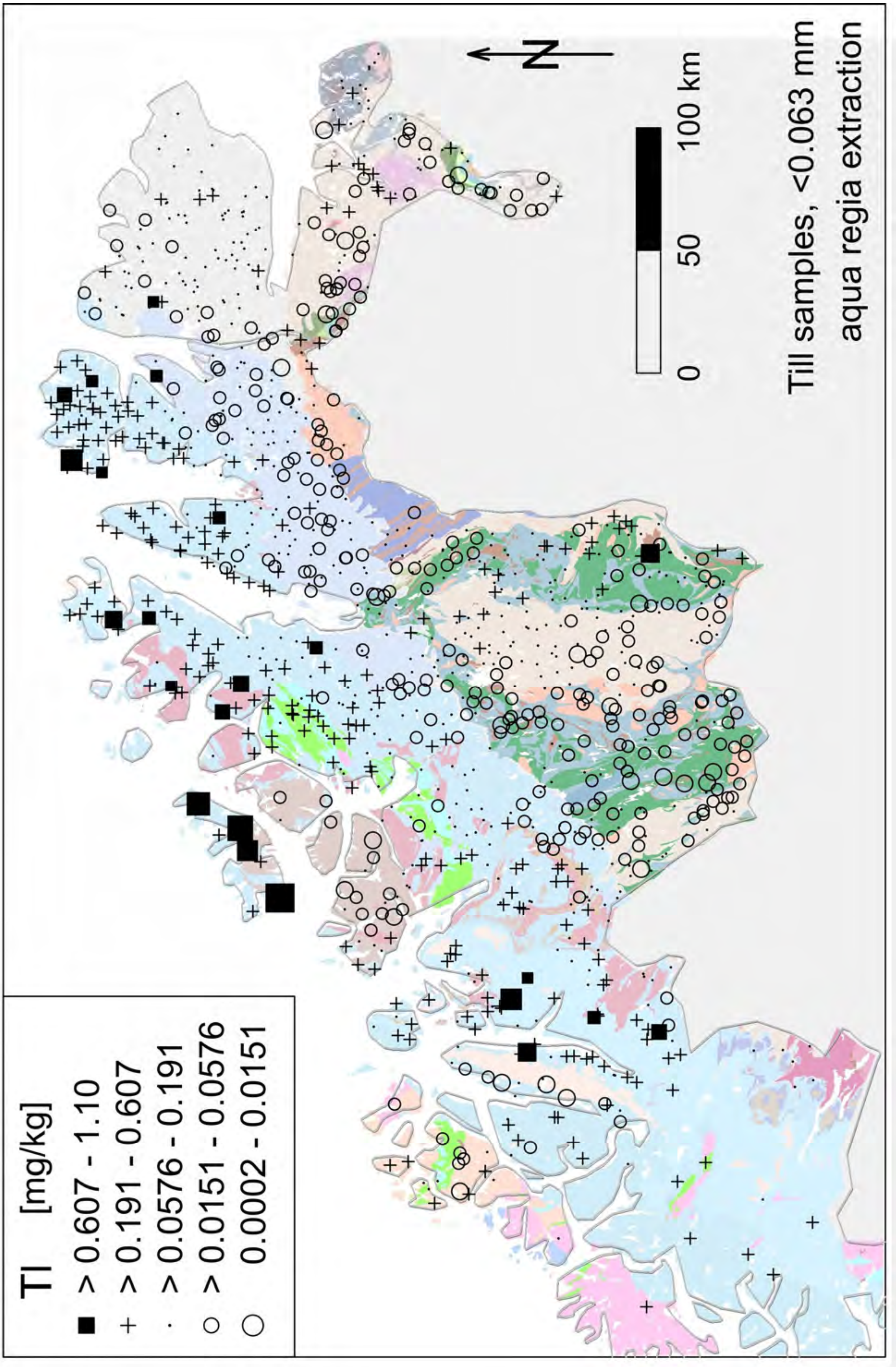

Ta [mg/kg]
> 0.0586 - 0.130
> 0.0109 - 0.0586
> 0.0020 - 0.0109
> 0.0002 - 0.0020
0.0000 - 0.0002
N
0
50
100 km
Till samples, <0.063 mm
aqua regia extraction

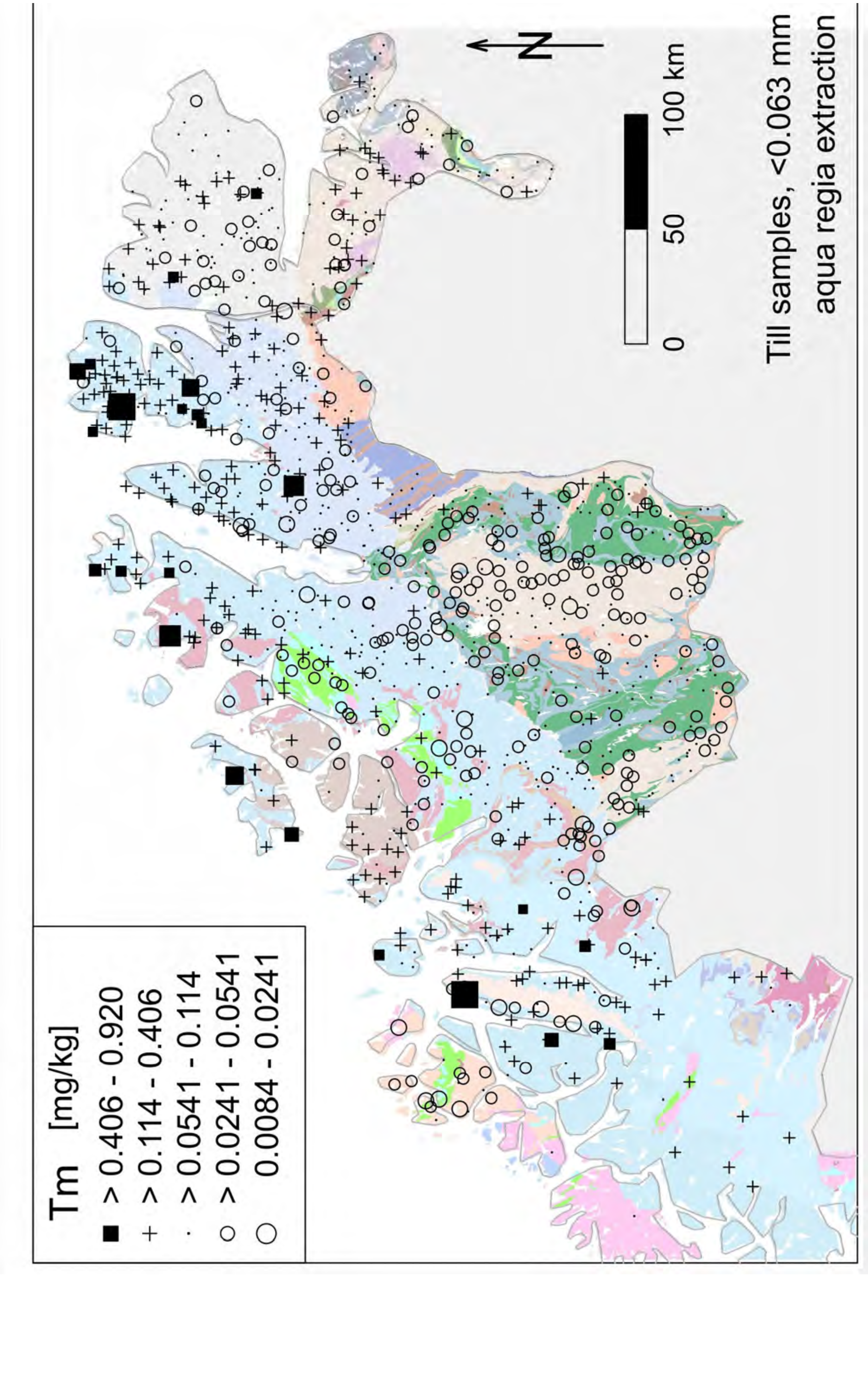

Tb [mg/kg]
> 1.39 - 5.20
> 0.355 - 1.39
> 0.168 - 0.355
> 0.0785 - 0.168
0.0267 - 0.0785
N
0
50
100 km
Till samples, <0.063 mm
aqua regia extraction

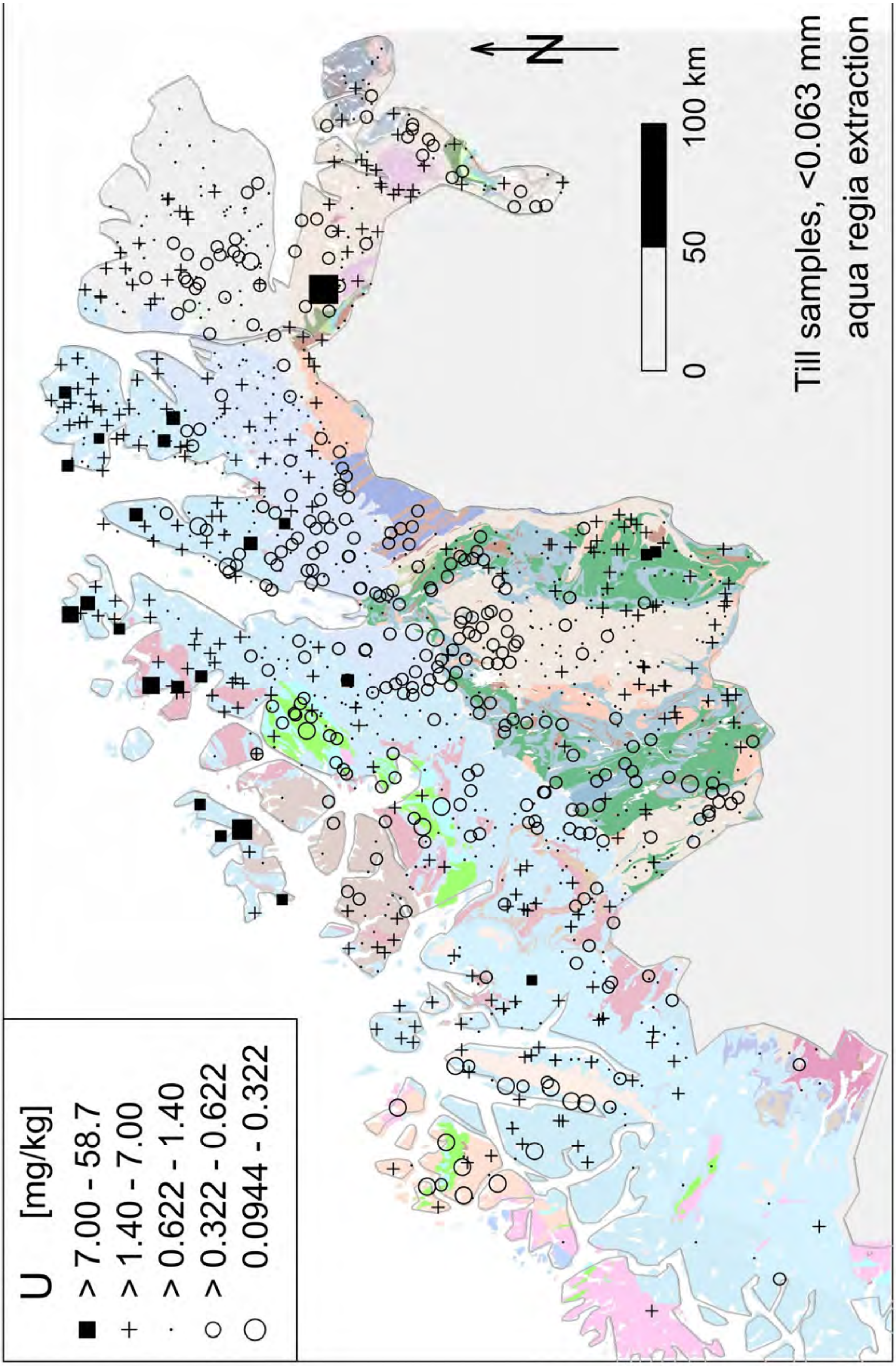

Te [mg/kg]
> 0.107 - 0.228
> 0.0428 - 0.107
> 0.0123 - 0.0428
> 0.0011 - 0.0123
0.0001 - 0.0011
N
0 50 100 km
Till samples, <0.063 mm
aqua regia extraction

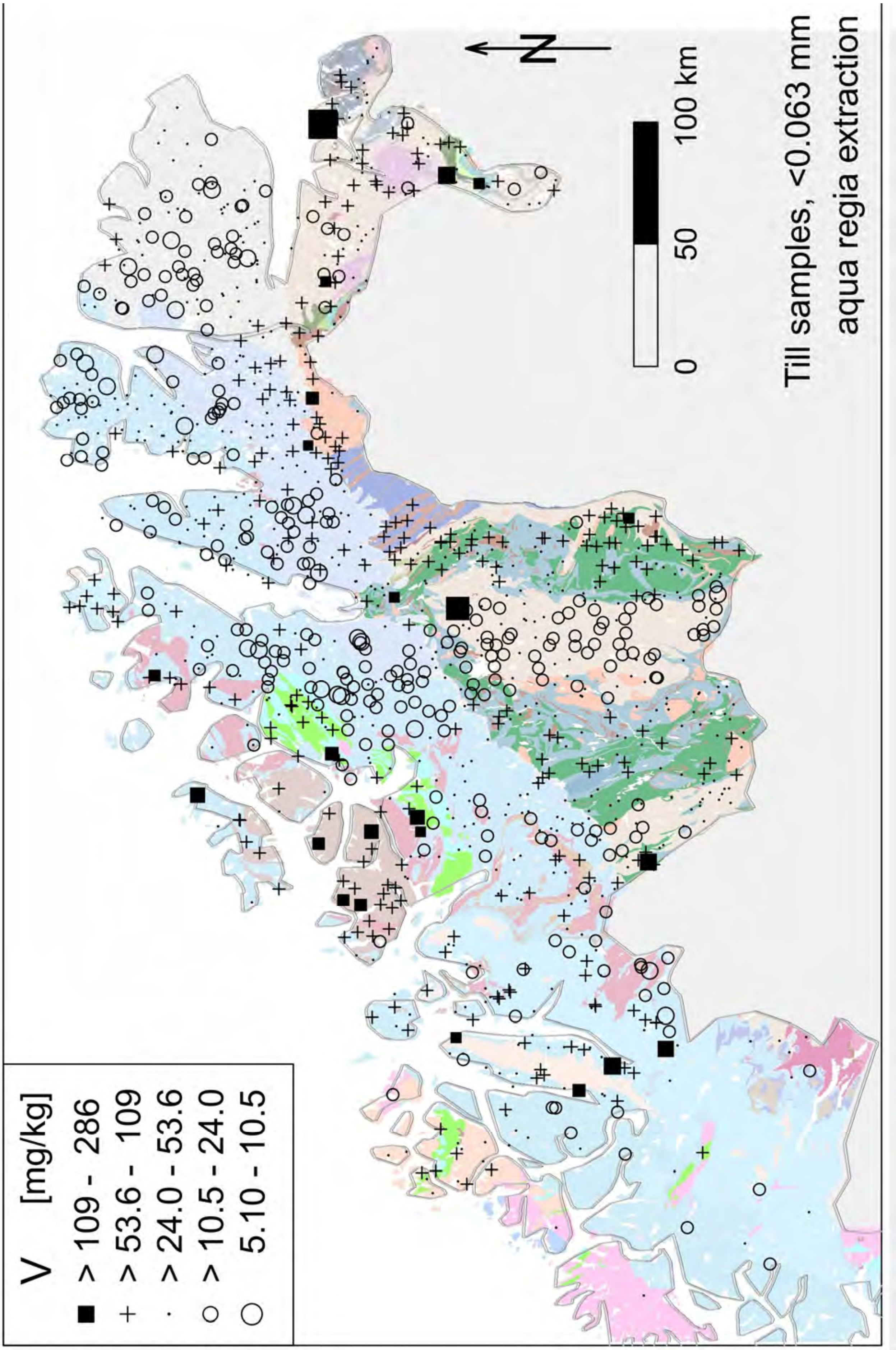

Th [mg/kg]
> 17.4 - 43.0
> 6.19 - 17.4
> 3.02 - 6.19
> 0.823 - 3.02
0.117 - 0.823
N
0 50 100 km
Till samples, <0.063 mm
aqua regia extraction

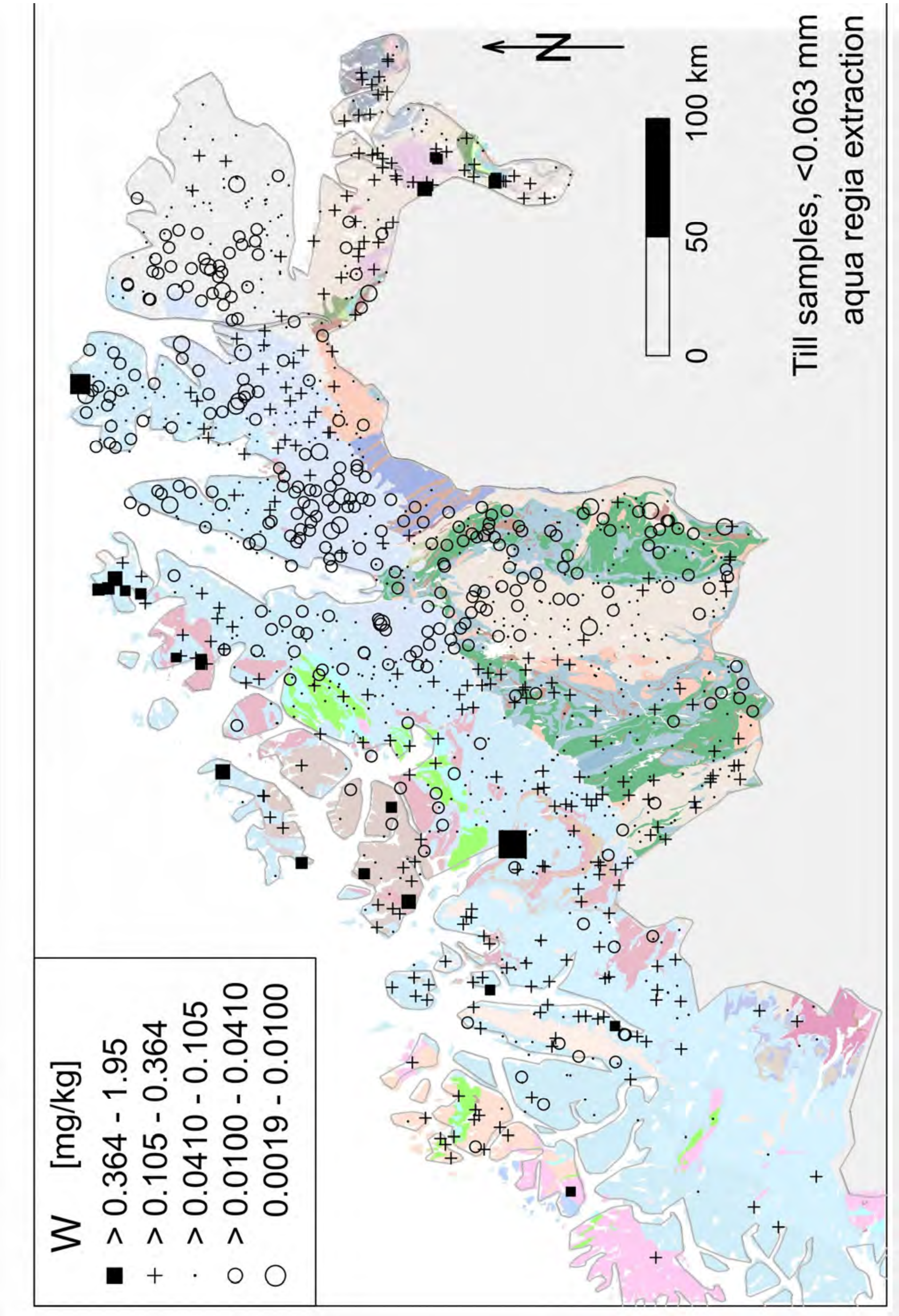

Ti [mg/kg]
> 3309 - 8950
> 1654 - 3309
> 764 - 1654
> 74.1 - 764
20.9 - 74.1
N
0 50 100 km
Till samples, <0.063 mm
aqua regia extraction

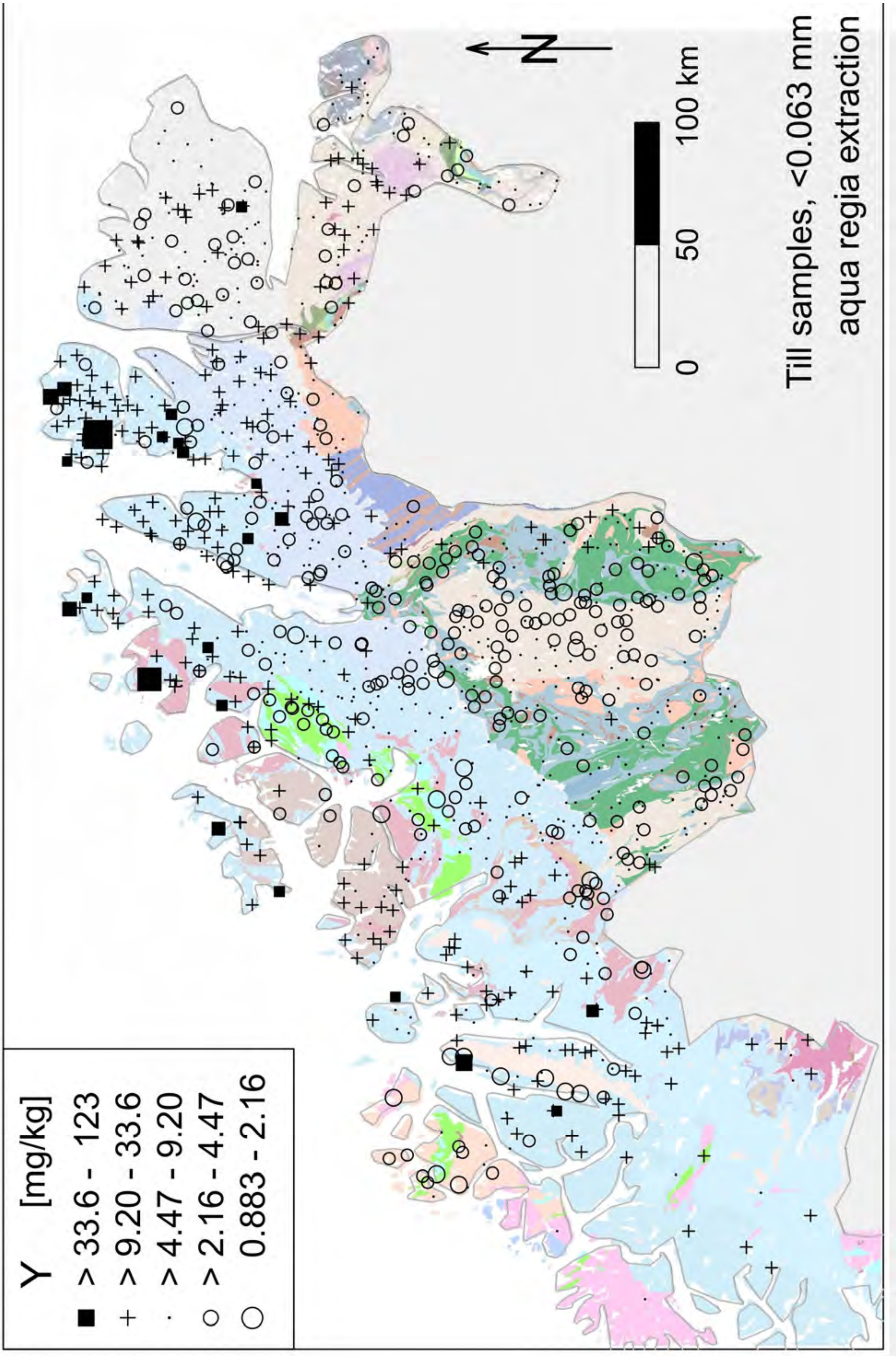

Tl [mg/kg]
> 0.607 - 1.10
> 0.191 - 0.607
> 0.0576 - 0.191
> 0.0151 - 0.0576
0.0002 - 0.0151
N
0
50
100 km
Till samples, <0.063 mm
aqua regia extraction

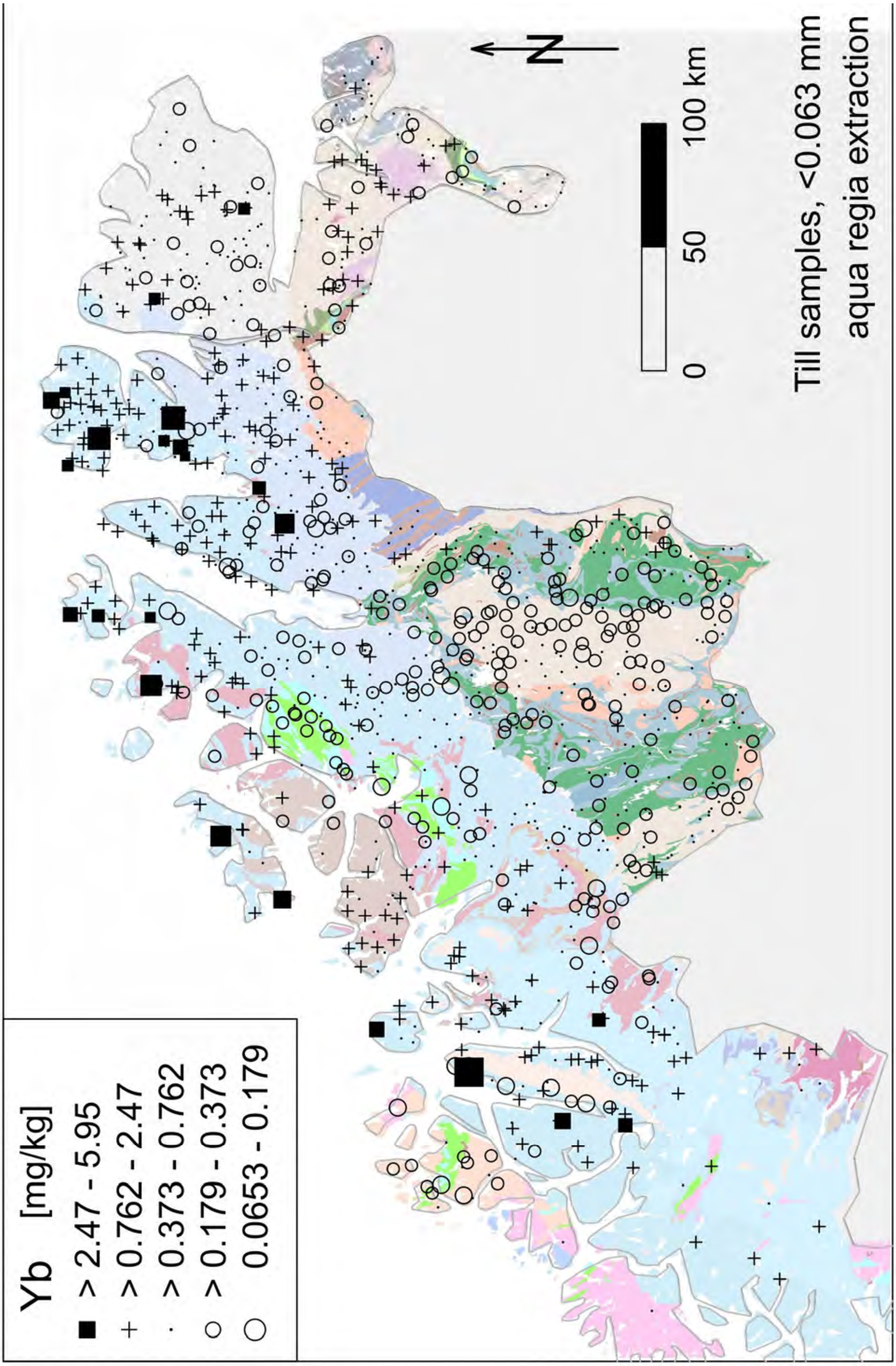

Tm [mg/kg]
> 0.406 - 0.920
> 0.114 - 0.406
> 0.0541 - 0.114
> 0.0241 - 0.0541
0.0084 - 0.0241
N
0 50 100 km
Till samples, <0.063 mm
aqua regia extraction

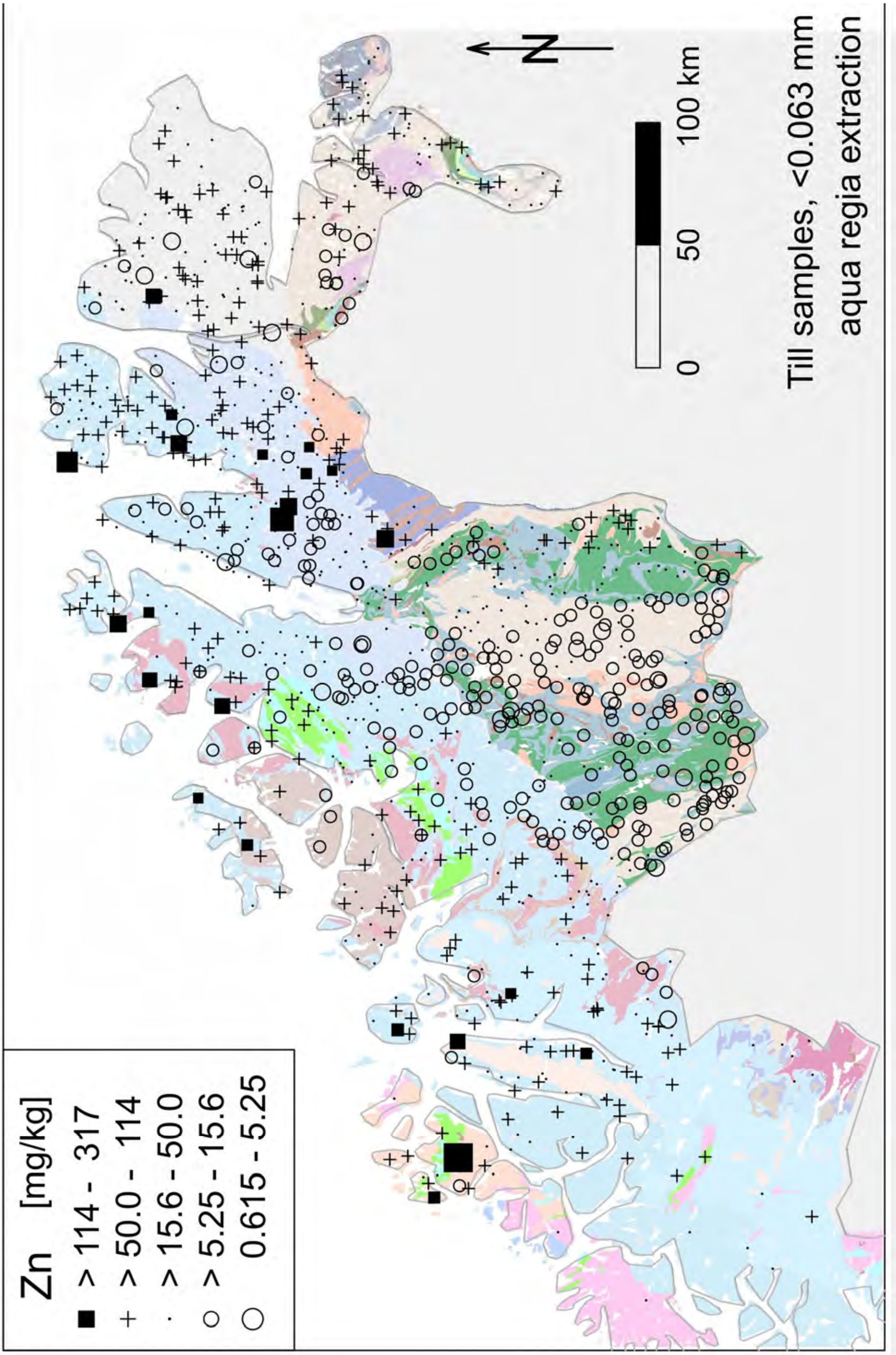

N
0 50 100 km
Till samples, <0.063 mm
aqua regia extraction
U [mg/kg]
> 7.00 - 58.7
> 1.40 - 7.00
> 0.622 - 1.40
> 0.322 - 0.622
0.0944 - 0.322

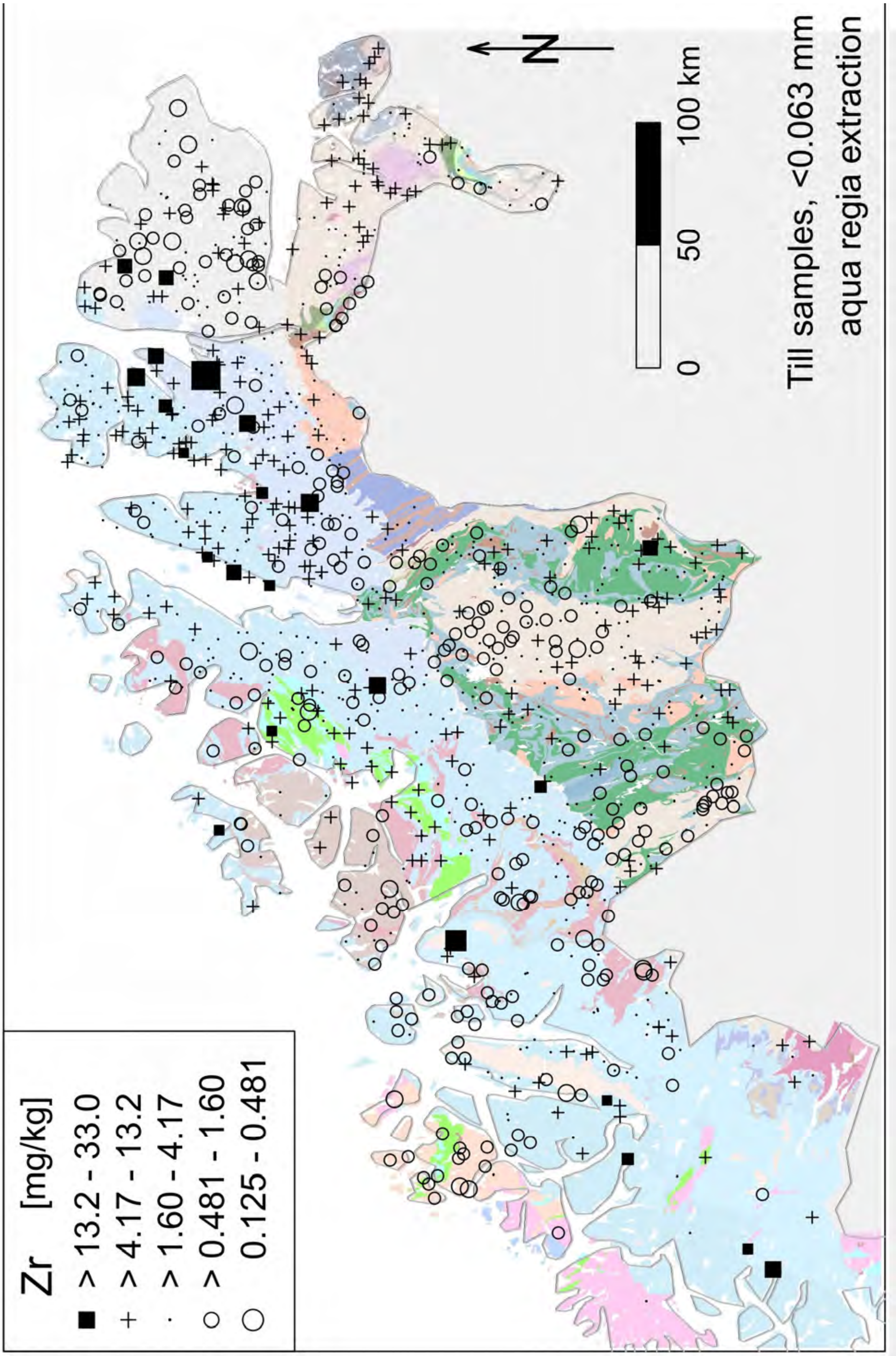

V [mg/kg]
> 109 - 286
> 53.6 - 109
> 24.0 - 53.6
> 10.5 - 24.0
5.10 - 10.5
N
0
50
100 km
Till samples, <0.063 mm
aqua regia extraction


W [mg/kg]
> 0.364 - 1.95
> 0.105 - 0.364
> 0.0410 - 0.105
> 0.0100 - 0.0410
0.0019 - 0.0100
N
0 50 100 km
Till samples, <0.063 mm
aqua regia extraction


N
0 50 100 km
Till samples, <0.063 mm
aqua regia extraction
Y [mg/kg]
> 33.6 - 123
> 9.20 - 33.6
> 4.47 - 9.20
> 2.16 - 4.47
0.883 - 2.16


N
0 50 100 km
Till samples, <0.063 mm
aqua regia extraction
Yb [mg/kg]
> 2.47 - 5.95
> 0.762 - 2.47
> 0.373 - 0.762
> 0.179 - 0.373
0.0653 - 0.179


N
0
50
100 km
Till samples, <0.063 mm
aqua regia extraction
Zn [mg/kg]
> 114 - 317
> 50.0 - 114
> 15.6 - 50.0
> 5.25 - 15.6
0.615 - 5.25


N
0
50
100 km
Till samples, <0.063 mm
aqua regia extraction
Zr [mg/kg]
> 13.2 - 33.0
> 4.17 - 13.2
> 1.60 - 4.17
> 0.481 - 1.60
0.125 - 0.481