


NGU Report 96.142
Geochemistry of topsoil
in Vaggatem - Skogfoss

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Title: Geochemistry of topsoil in Vaggatem - Skogfoss				
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<p>Summary:</p> <p>The total area of Kenor's claim (approximately 200 km²) is mapped by sampling mineral topsoil (1,000mx1,000m grid) and the determination of hot aqua regia extracts of 31 elements, as well as cold aqua regia extracts of Au, Bi, Sb, Se and Te, as well as Au determined by cyanidation. In addition, an area surrounding the drill site at Pike Lake (Gjeddevann) is sampled in a much denser grid. Results are displayed in maps at scale 1:100,000 and 1:50,000 and interpreted along with modern bedrock maps, Em maps and Quaternary deposits map.</p> <p>A number of areas are outlined and evaluated for future prospecting, and parts of the claim is suggested to be abandoned.</p>				
Keywords: geochemistry		gold		topsoil
arsenic		antimony		bismuth

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Appendix 6	Transparent topographical map for overlay on point maps

INTRODUCTION

A claim of approximately 200 km² is held by Kenor a.s. in Pasvik. The claim was based on the discovery of gold in bedrock and on the extent of the Petsamo supergroup, which is known for hosting gold mineralisations both in Russia and Finland. In order to reduce the area of the claim in time for the next claimholder's fee, a very strict time limit was the major obstacle when the Geological Survey of Norway was asked to perform a geochemical assessment of the area. At the time plans and budgets were approved, arrival of the winter season with its implications on field work efficiency was the critical factor.

A strategy of detailed sampling around the drilling site was adopted, but the initial idea of a long profile across the entire Petsamo supergroup passing the occurrence, was abandoned in favour of the idea of a quick and immediate mapping of the entire area prior to the winter season. The occurrence of elevated gold values in the C-horizon (9 and 12 pbb) also in the southern end of the claim, found during the Nordkalott project by NGU in 1986, supported this strategy. Financial restrictions limited the number of samples to be taken and analyzed to a maximum of 300.

METHODS

Choice of sample site.

When prospecting for low grade/expectedly small area outcrop ores, the representativity of the samples collected is more important than ever. Generally, when sampling Quaternary deposits in a glaciated terrain, the closer to the bedrock surface the samples are taken, the denser they need to be taken in order to pick up the geochemical signatures of the bedrock. Hence, with an area of approximately 200 km² to investigate, and with a maximum of 300 samples for analysis, the samples had to be collected high up in the profile. A regular 1,000x1,000 m grid coinciding with the UTM (WGS84) grid on the map sheets of scale 1:50,000 was used as the initial sampling site grid. Areas of other Quaternary deposits than till were not sampled. The Quaternary deposits map of Carlson et al (1983) was used for planning, the exact nature of the surficial deposit being checked in field. To improve on the sample medium's chance of containing gold or its pathfinder elements, the final sample site was positioned down a local slope rather than on local tops.

Sampling.

Furthermore, to improve on representativity of the sampling, a number of subsamples at each sampling site was considered necessary. To reduce on time spent for collecting samples, composite samples of minerogenic topsoil were collected at each site. Five subsamples were cut by a 10 cmØ steel cylinder. From the «core» extracted, the organic part of the profile was

discarded, and the topmost 5 cm collected. This 5 cm mostly consisted of the bleached layer of a podzol; the thickness of this horizon as well as of the organic horizon was recorded as an average over the 5 (or more) samples constituting the composite sample for one site. Pebbles and roots were removed from the sample as it was put in its wrapping - a white paper bag of approximately 2 l volume, tested for contaminants by the same laboratory that conducted the analysis.

Field notes.

Upon arrival at sample site, position was determined by use of a map in the scale 1:50,000, compass and/or GPS receiver. All coordinates were recorded on paper, with reference to UTM zone 35 and WGS84 datum (Illustrated on recent maps from Statens Kartverk with blue grid and coordinates along the map's edge). When sampling was completed, notes were taken on number of subsamples, depth of humus layer and depth of bleached layer, along with remarks as found necessary by the field crew. All observations were marked with the initials of the person sampling.

Logistics.

Given the shape of the area to be sampled, the road network and the low feasibility of using 4-wheel vehicles due to boulder fields and legal restrictions on their use, travelling on foot from the roads was chosen as the most cost effective means of transportation. A boat was hired for some long stretches on the lake st Spurvvatnet, and a 6-wheel drive vehicle was rented to bring the large volumes of samples from the detailed grid down to the road. The field work was carried out in the period 30.09.96 - 19.10.96 by Tor Erik Finne, NGU, (30.09- 06.10), Rolf Lynum, NGU, (30.09 - 13.10) and Harald Aasen, Geocare, (02.10 - 19.10).

Preparation and analysis.

At the end of the field campaign, all 244 samples previously wrapped in paper bags with additional individual plastic bag covers were wrapped in large fiberglass bags for protection and shipped in one lot to the laboratory of the Finnish Geological Survey's (GTK) regional office in Rovaniemi. This laboratory has on previous occasions proved to the Geological Survey of Norway that they are reliable with regards to quality and time, and are experienced in handling the type of samples used in this campaign. The Finnish lab is accredited according to EN standard 45001 and ISO Guide 25, and their analytical procedures reporting 31 elements after a digestion of the samples in hot aqua regia is certificated. The preparation and analytical procedures are described as follows:

1. Drying and sieving to < 0.063 mm.
2. Cold aqua regia digestion of 20 g subsample and determination of Au (det. limit 0,1 ppb) and Bi, Sb, Se and Te with GFAAS (GTK method 522U).
3. Hot aqua regia digestion and determination of 31 elements with ICP-AES (GTK method 511P).

Results were reported from the laboratory on Nov 21st, 1996, as Excel files with sample number and analytical data for 36 elements. Whenever a sample's concentration was recorded as less than the given detection limit for a certain element, this was included in the report.

Computing and mapping.

Analytical results and recorded coordinates were linked, and data reported less than detection limit were given new values equal to 0.5·detection limit (in order to distinguish them from the values that were reported equal to the detection limit), and to give more accurate estimates of population means. Samples were coded to create three subsets; (i) a regional subset consisting of all samples in the 1,000m x 1,000 m grid, (ii) a detail subset consisting of all samples from the detailed sample grid around the drill site at «Gjeddevann» (originally named «Pikes Lake» by gold discoverer Victor Melezhik, but named «Støvelvann» on the detailed orienteering map scale 1:15,000 issued by the local sports clubs) and (iii) a field duplicates subset from the entire area. A sample site number map is shown as Appendix 5.

A total of 21 field duplicate pairs were sampled and analyzed to allow for evaluation of data quality. The results were plotted in scatter plots (Appendix 1), and extreme outliers identified by site number in the scatter plot. The results are also reported as a table in Appendix 2. All other analytical results are shown in the tables of Appendix 3.

Maps were made employing robust statistics to distinguish between anomalies and background. For this purpose, all samples, both regional and detail, were used. An illustration explaining the rules for setting the variable's class limits is shown in Appendix 4. Hence, the maps presented in the scale 1:100,000 for the regional data, and in 1:50,000 for the detail area, both use the same symbol legend. For each element, these maps are plotted on one page, along with a cumulative frequency distribution diagram showing the regional (Reg) and the detail (Det) subsets with different line types. These maps are shown together with the sample site number map as Appendix 5. All maps have the bounding line of the claim included, as well as coarse representation of the major waterbodies of the area. The bounding line is also found on the included transparent copy of the topographical map 1:50,000 reduced to fit the 1:100,000 maps of this report.

RESULTS AND DISCUSSION

The chosen extraction method (aqua regia) is well suited to bring sulfides and gold into solution, but attacks rock-forming minerals with varying success. The analytical results of the major elements are more an indication of the sample's mineral composition than its total element content.

Some of the elements were ruled out before mapping due to their low levels compared to detection limit (Ag, Cd and Na), or due to solution equilibrium considerations in the analytical extract (Si). Furthermore, from the scatter plots of Appendix 1, it is clear that As, Au, B, Be and Mo all show poor or relatively poor reproducibility in the concentration area covered by the field duplicates. For gold, this problem is not caused by too high detection limit (0.1ppb - on the contrary), but most likely by the «nuggets effect» introduced at sampling or weighing. For As, the poor reproducibility in the low concentration range does not necessarily affect the anomaly picture in the map, as concentrations in the anomalous areas are at higher concentration levels. For B, Be and Mo, the poor reproducibility combined with the overall concentration range of the regional data set, suggests that single point anomalies of these elements should not be given excessive attention.

The anomaly pictures of a number of elements coincide to a great extent. Rather than describing the anomaly picture element by element, the anomalous areas will receive individual attention. But first of all, the results from the detail sampled area are discussed.

It appears quite clearly that Au is not «stable» in the sense that it does not have high reproducibility neither on 10 m distance level (field duplicates) nor on the 200 m level (the minimum distance between samples near the drillsite). The median value of the detail subset is even equal to that of the regional subset, but the 95 percentile of the detail subset is higher than for the regional. This suggests that pathfinder elements can be vital in the assessment of gold potential. From the detail study, Sb appears to be the best pathfinder, and not As as might be expected from observations from the drill cores. In cores, gold is hitherto only found on joints in arsenopyrite.

The question of transport distance of the Quaternary material is important when interpreting data like this. Judging from findings in area 3 and 7 (see below), it appears that transport distance is low; rarely more than 2000m, and most likely in the m and 10m range. This is in agreement with findings of the NGU project «Kola Ecogeochemistry» (Lars Olsen, NGU, personal communication). A number of areas of interest have been identified as illustrated in the figure:

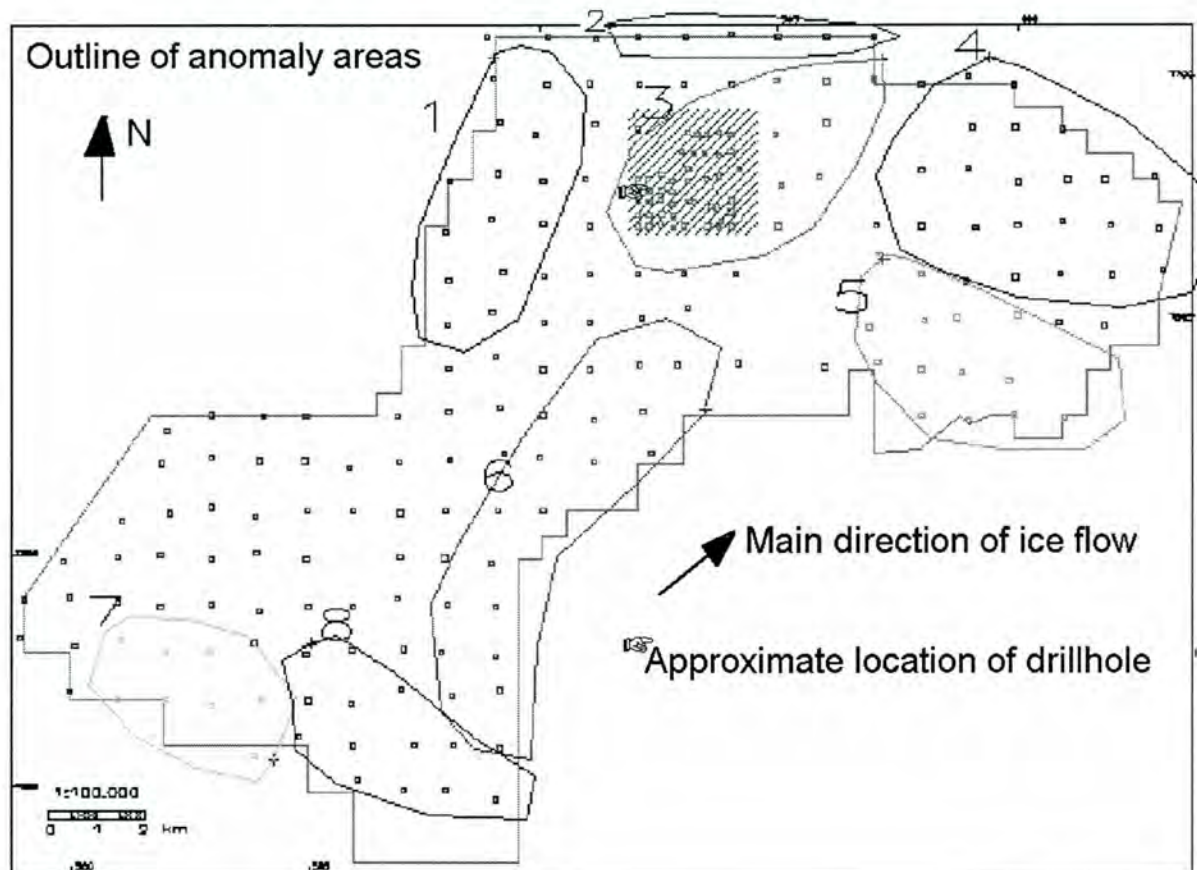


Figure 1
Approximate outline of anomaly areas.

Area 1

An area northwest of lake st Spurvatnet, particularly the samples from sites 1161 and 1368, has very high values for a number of elements, including As, Sb, Se, Te. According to the bedrock map Kirkenes scale 1:250,000, this area is located mainly on top of rocks belonging to the Skogfoss Formation or the Skjellvannet Formation. These units are, according to Siedlecka and Nordgulen (1996), composed of alkaline and subalkaline basalts locally with amygdaloid structures and breccia, and of basalts, in places with pillow structures, respectively. The unit dubbed «ore phyllite», containing graphitic phyllite, tuffs and tuffites, is always more than one km upstream along the main ice movement from the sites defining this anomaly.

Area 2

Oksfjellet in the northernmost part of the claim, is another multielement anomaly. In contrast to area 1, there is also Ni in area 2, but neither Au nor its pathfinders are present to any extent. This area is situated on the same lithological units as area 1, but considering the ice movement, it is likely that these samples also contain material of the «ore phyllite» as well as from the small pyroxenites, peridotites and gabbros found within the area.

Area 3

This includes the area sampled in detail at Pike Lake and continues in a northeasterly direction to the west of Triangelen. Together with Au, Sb and Te, this area is enriched in Sc, Co and B. The area falls almost completely within the andesitic volcanoclastic sandstone of the Kobbfoss Group. As is the case of the highest Au anomaly, the proximity of these samples to (inferred) faults or joints is a prominent feature of the area.

Area 4

A large part of the easternmost areas of the claim show elevated values of almost all the elements investigated (except for K, La, P, Pb, and Bi), even if adjusted for content of Mn in the samples. Although the content of Au in the samples from this area is only moderately anomalous, this area should be considered for further investigations. The results from the detail area indicate that pathfinder elements are of great importance in this terrain/medium, and Sb has its most pronounced anomaly right here. The lithology of the area is the same as for area 3; the andesitic volcanoclastic sandstone of the Kobbfoss Group. The area is cut by two faults that cross each other almost perpendicularly in the area's center.

Area 5

Immediately SW of area 4 is an area that contains approximately the same low values of Se and Te as in area 4, but with virtually no Sb. The numerous elements that showed high values in area 4 also have lower values in area 5, but As has its highest values in area 5, even when high Mn-values are taken into consideration. The bedrock of this area consists of units of sandstone with thin layers of phyllite in the Kobbfoss Group. A thrust fault borders the area to the SW.

Area 6

The mica schists and gneisses of the Revsaksfjellet Group are clearly shown by anomalous values of Al, Ca, Mg, K, Li, and Sr along the western and northwestern shores of the Vaggatem Lake of the Pasvik River. Au shows a line of N-S anomalous values along UTM grid line 591 E, and there are some Se anomalies. The Se values occur 1-2 km «ice downstream» of the Au anomaly at 591 E, and at a similar distance from a Au anomaly at the southwestern end of this area. The prospecting potential of this area, judging from the geochemical data alone, is quite good.

Area 7

Along the SW border of the claim is a small area showing high levels of Ba, Cr, Cu, Mo, Pb and Zn; even when adjusted for Mn content. Amphibolite with beds of graphite-mica schists of the Revsaksfjellet Group, together with the mentioned schists of area 6, as well as the tonalitic gneisses of the same stratigraphic group comprise the bedrock of this area, (in order of increasing subcrop area). The area contains no important Au-values, and the pathfinder elements are also low. If the metal content of the topsoil is reflecting that of the underlying

amphibolites and graphite mica schists, then this area indicates the influence distance from the glacial movement in this part of Pasvik.

Area 8

Directly ESE of area 7 is an area that contains two (small) Au-anomalies as well as high Bi, Se and P values. This area covers the border zone between the tonalitic gneisses of the Revsaksfjellet Group and the sandstones with thin layers of phyllite in the Kobbfoss Group. A thrust fault constitutes the border between these two rock types.

By creating a hybrid variable of Au and Sb, the map of figure 2 is created as the Au-Sb factor draped on a surface of Au concentration. This illustrates an alternative way of selecting areas for further prospecting, given that Au and Sb are the best indicators.

(10xAu)+Sb grid draped on Au surface

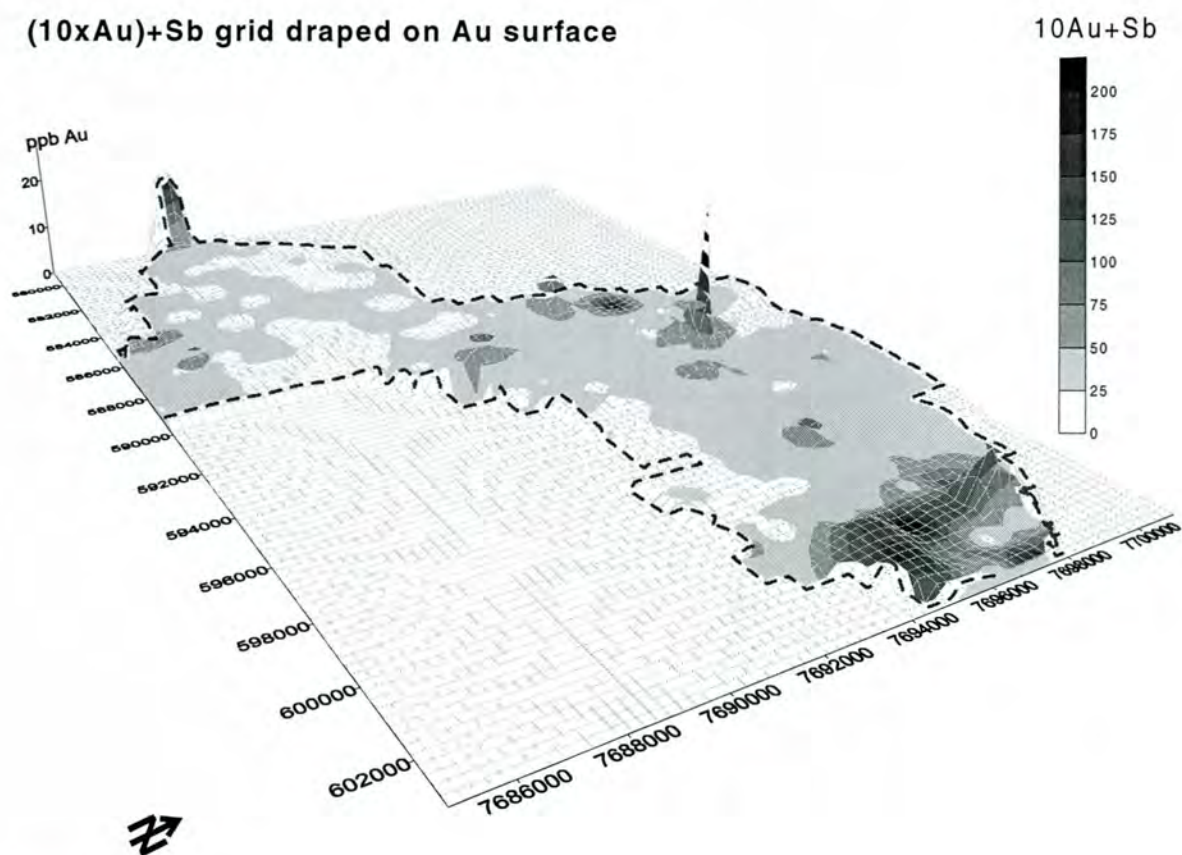


Figure 2
(10xAu)+Sb draped on ppb Au surface.

A second set of gold analysis.

Following the first version of this report, it was decided to obtain repeated gold analysis by using the remainder of the material of all samples, applying a cyanidation technique. The same laboratory that conducted the other analysis conducted this second gold analyses, but not quite without difficulties. The technique of cyanidation (of maximum 100g sample weight) was originally adapted for coarser till material, and during the preparation of this batch of <0.06mm material, a score of difficulties was encountered. For a number of samples, flocculation or gel-formation occurred, and there is a possibility that Au may have been held back from the analytical solution in a «random» fashion. According to the laboratory's manager Heikki Niskavaara, the difficulties may relate to the high proportion of fines in the samples, or even a small content of organic material. However, gold figures given in the report from the lab are in the worst case conservative in the way that some gold values may have been reported lower than the correct values.

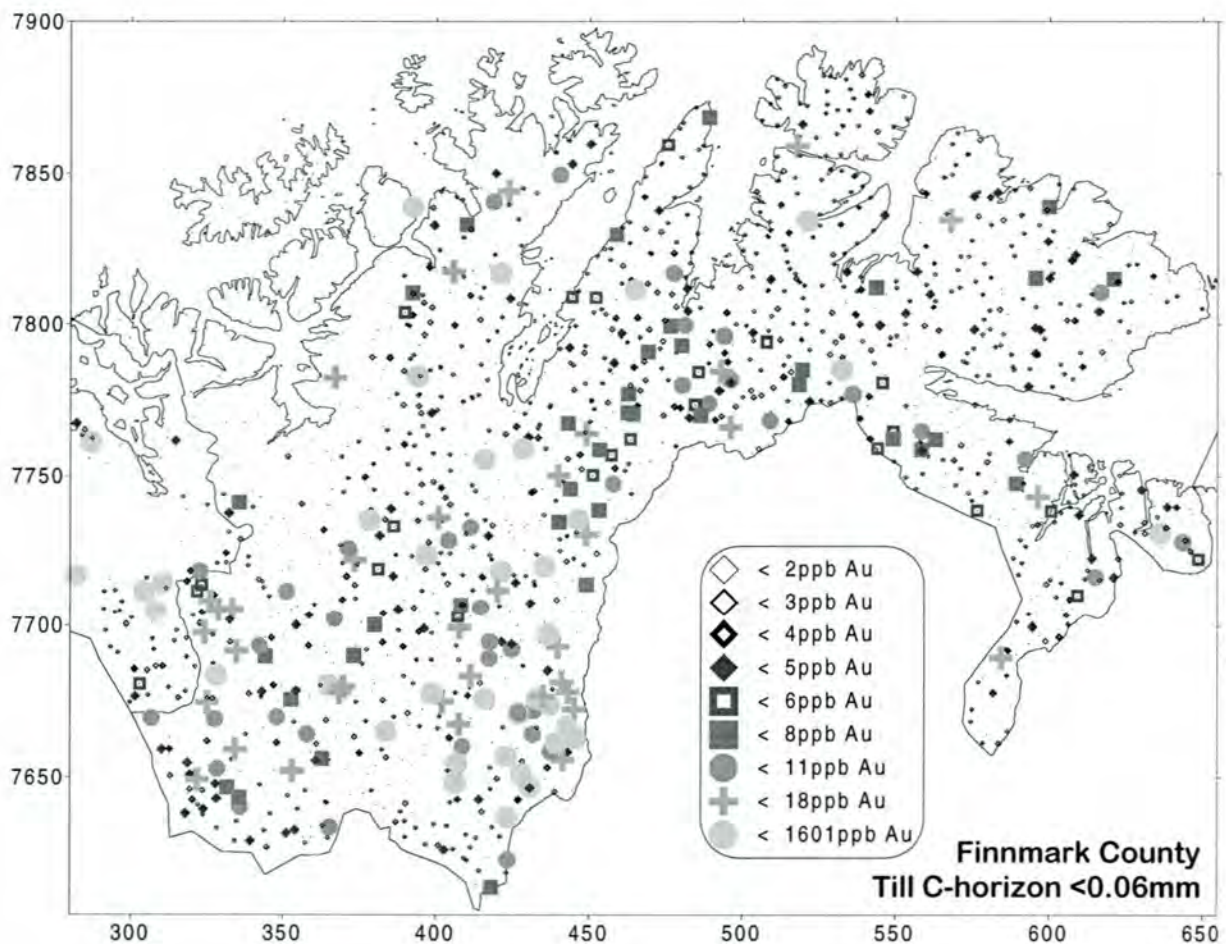


Figure 3.

Concentration of gold in 1056 till samples collected from 60cm depth (C-horizon) during Nordkalottprosjektet 1980-83. Analysis done by Fire Assay at ACME Lab. Inc. in Canada.

Gold value levels relative to other regional surveys.

Neither of the sets of gold analyses show exciting maximum values of Au (36 and 11 ppb Au for the Aqua regia and the Cyanidation method, respectively). The all county survey mentioned in the introduction had as its maximum value 1600 ppb Au, whereas a 1000m x 1000m survey carried out upstreams of the Sargejok alluvial gold works, found only 91 ppb as its richest sample. These two mentioned surveys were done by sampling C-horizon of till material, and applying fire assay or Meyer's method (H-Br solution and MIBK extraction). Figure 3 shows the results of the all county survey based on 1056 samples of C-horizon of till. According to this figure, the area of the Pasvik claim does not belong to a region of anomalous values of Au in the till. This should be interpreted as an indication that in Pasvik, the regional background is not as elevated as in the Karasjok greenstone. However, the occurrence of Au values above 10ppb does indicate that sufficient gold was present in bedrock outcrops at time of glaciation that its traces are found in the till.

If gold in the Petsamo supergroup of Pasvik is associated with both major and minor shear zones, a number of small mineralisations may be present. These are likely to express themselves in the till as gold anomalies downwards the ice flow direction.

CONCLUSION

The following areas are considered of little or no interest for further Au prospecting:

Area 2 - It contains no interesting associations of Au or pathfinders.

Area 7 - Even if there are some weak As-anomalies in this area, they are not supported by accompanying Au-values or any of the other pathfinders.

The entire area to the north of area 7 and west of 587 km E (South of area 1), is also considered of little value, judging from the obtained data.

Areas 1, 3, 4, 5, 6 & 8 are considered of interest for future prospecting work. The geochemical data themselves do not allow for prioritizing between these areas.

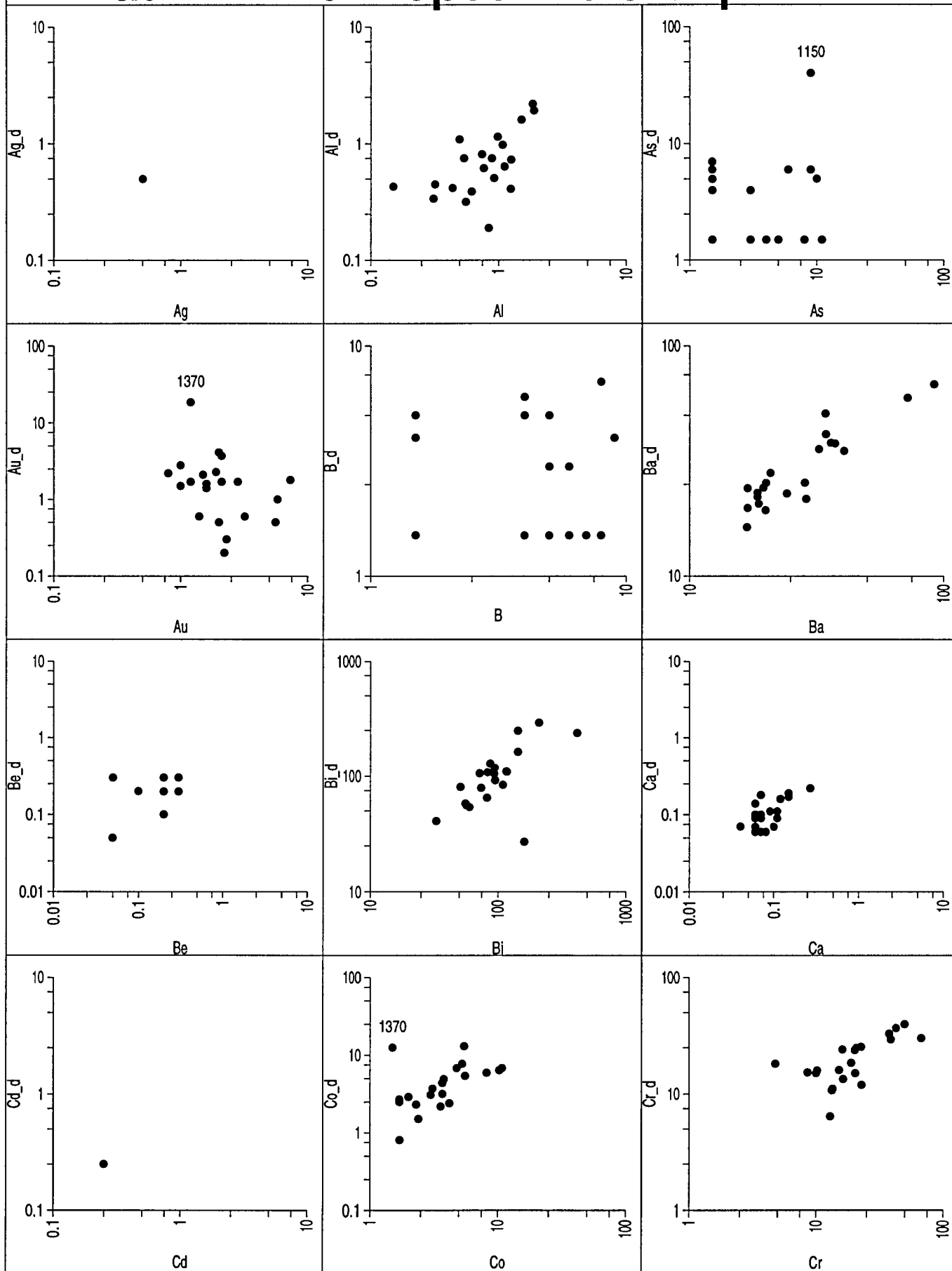
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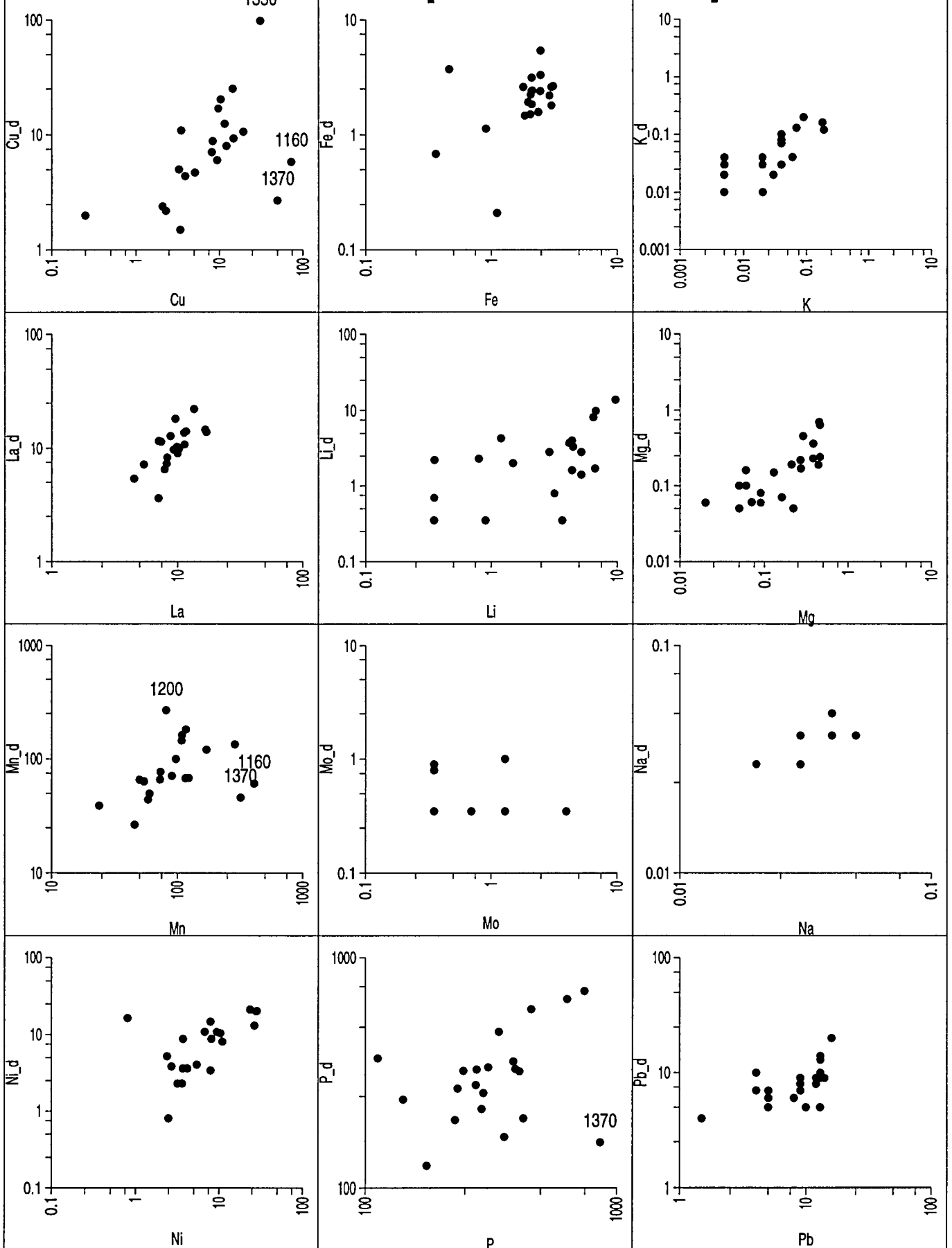
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Siedlecka, A. and Nordgulen, Ø. 1996. Geologisk kart over Norge, berggrunnskart KIRKENES M 1:250,000. NGU.

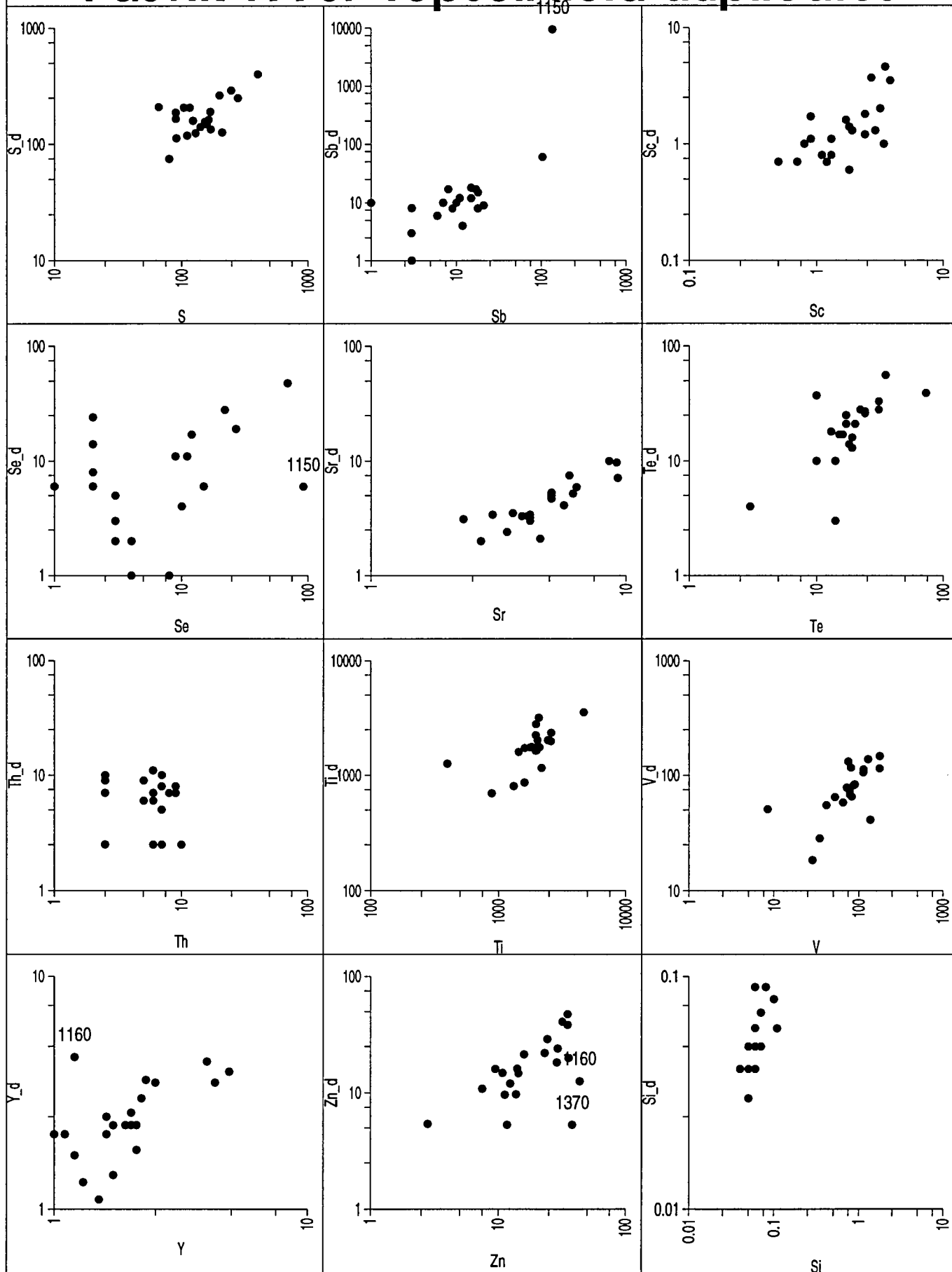
Pasvik 1996. Topsoil field duplicates



Pasvik 1996. Topsoil field duplicates



Pasvik 1996. Topsoil field duplicates



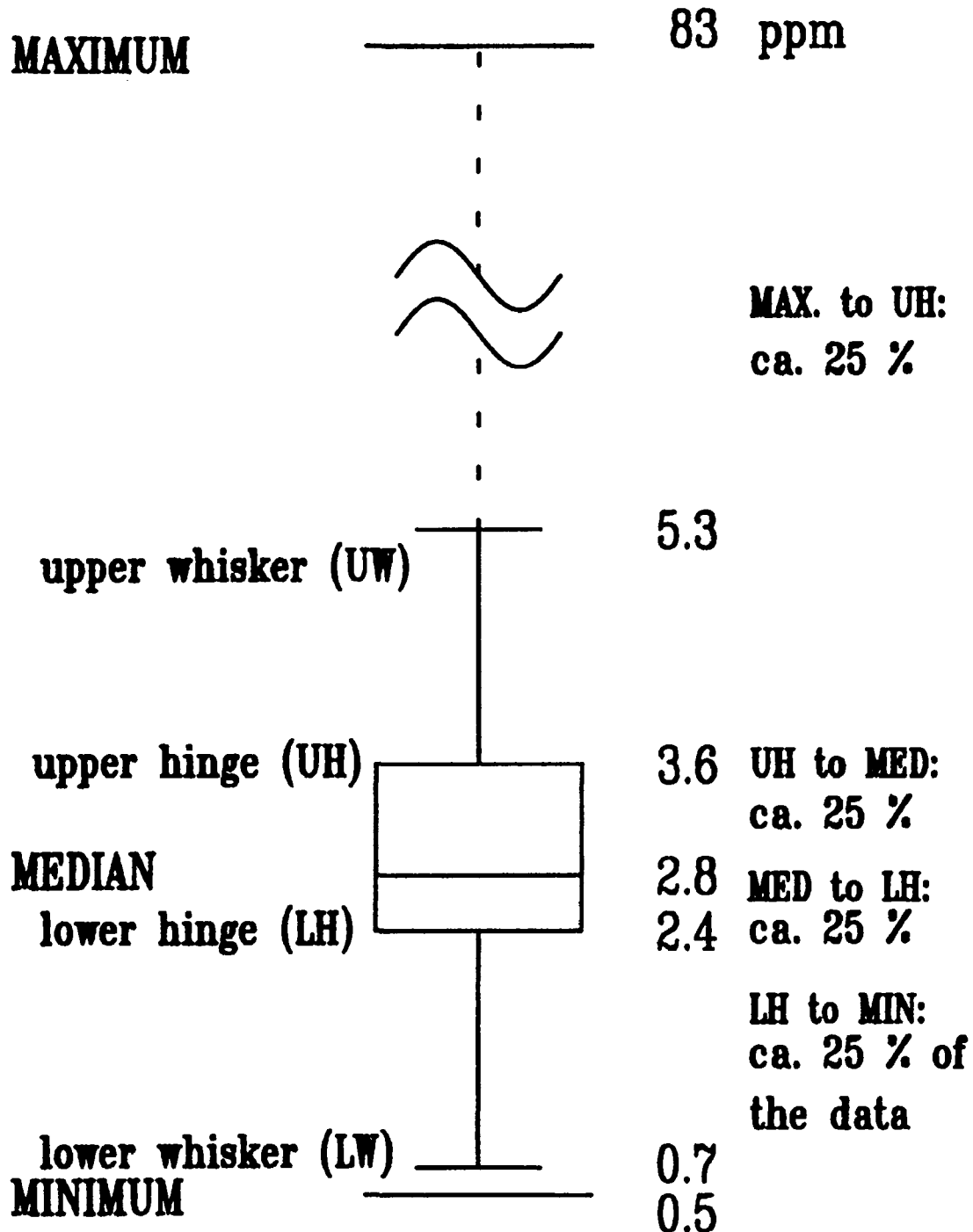
Pasvik Claim
Mineral topsoil <0.063mm

Hot aqua regia/ICP-AES (Ag-Zn)
Cold aqua regia/GF-AAS (Au-Te)

REGIONAL AND DETAIL SUBSETS

*Site	mEast	mNorth	ppm Ag	% Al	ppm As	ppm B	ppm Ba	ppm Be	% Ca	ppm Cd	ppm Co	ppm Cr	ppm Cu	% Fe	% K	ppm La	ppm Li	% Mg	ppm Mn	ppm Mo	% Na	ppm Ni	% P	ppm Pb	ppm S	ppm Sc	ppm Si	ppm Sr	ppm Th	ppm Ti	ppm V	ppm Y	ppm Zn	ppb Au	ppb Bi	ppb Sb	ppb Se	ppb Te
1367	596020	7700050	1	1.05	1.5	4.0	28.8	0.20	0.10	0.25	9.7	27.5	33.0	4.12	0.08	8.7	5.3	0.44	246.0	0.8	0.03	18.1	322	13	196	2.6	0.06	3.6	10.0	3130	149.0	3.0	70.0	1.3	124	37	8	77
1368	588920	7697150	0.5	0.66	18.0	4.0	22.7	0.40	0.04	0.25	3.1	90.2	42.8	14.20	0.03	3.4	0.4	0.12	141.0	31.1	0.03	12.0	983	13	790	1.9	0.07	2.1	16.0	4650	340.0	1.5	60.2	0.6	242	175	66	332
1369	589150	7696050	0.5	0.49	6.0	1.5	20.4	0.30	0.08	0.25	4.8	23.2	16.3	3.31	0.03	5.5	1.0	0.15	109.0	1.1	0.03	8.0	325	9	188	1.3	0.05	2.9	5.0	2720	211.0	1.3	18.9	0.6	135	22	6	53
1370	588950	7695200	0.5	0.84	1.5	1.5	24.1	0.30	0.14	0.25	12.5	18.1	50.0	3.71	0.01	3.6	3.7	0.22	319.0	0.4	0.03	16.3	860	4	208	1.8	0.05	2.7	2.5	1600	137.0	2.1	38.2	18.6	106	18	24	37
1371	589000	7694280	0.5	0.22	3.0	7.0	17.4	0.05	0.04	0.25	1.0	5.8	1.2	0.42	0.03	11.4	0.4	0.02	34.0	0.4	0.03	2.2	182	8	76	0.5	0.04	2.6	2.5	716	20.2	1.4	4.9	2.2	116	6	8	10
1372	589080	7693200	0.5	0.34	1.5	3.0	19.3	0.05	0.03	0.25	1.3	10.0	1.3	0.90	0.04	8.7	0.4	0.06	24.1	0.4	0.03	2.9	115	7	75	0.6	0.04	2.1	2.5	1950	48.7	1.2	5.7	2.2	116	10	6	13
1373	589200	7692200	0.5	0.27	1.5	7.0	25.3	0.05	0.06	0.25	1.5	7.4	2.5	0.82	0.01	10.9	0.4	0.06	42.0	0.4	0.03	3.4	280	9	91	0.7	0.04	3.6	2.5	1560	37.5	1.7	6.7	1.8	175	15	4	17
1374	589050	7691000	0.5	0.24	1.5	4.0	17.5	0.05	0.04	0.25	1.6	10.1	3.6	1.01	0.02	9.4	0.4	0.04	30.2	0.4	0.03	3.1	200	5	98	0.6	0.04	2.9	2.5	1680	56.3	1.5	6.3	1.9	187	10	8	25
1375	596020	7701000	0.5	0.32	1.5	5.0	18.8	0.20	0.04	0.25	2.7	13.5	3.3	2.05	0.01	11.9	0.4	0.06	66.3	0.4	0.02	3.8	152	11	113	0.8	0.05	2.3	7.0	3530	155.0	1.3	8.6	2.6	78	16	5	19
1376	597000	7701000	0.5	1.10	6.0	6.0	21.2	0.20	0.10	0.25	10.5	20.3	13.2	4.58	0.03	4.3	2.7	0.38	212.0	0.4	0.02	10.5	246	7	181	1.9	0.10	3.6	8.0	7630	221.0	1.5	22.6	2.1	97	28	11	25
1377	597000	7700100	0.5	0.40	4.0	6.0	18.3	0.05	0.06	0.25	1.7	10.1	5.1	1.78	0.01	9.9	0.4	0.06	53.1	0.4	0.03	2.7	472	7	118	0.9	0.04	2.8	2.5	1340	63.8	1.4	10.7	1.5	51	13	18	16
1378	598000	7699980	0.5	0.72	1.5	1.5	26.9	0.20	0.10	0.25	3.6	17.7	8.8	1.95	0.02	9.1	1.8	0.21	68.9	0.4	0.03	7.1	274	5	221	2.0	0.05	4.0	2.5	1950	91.6	2.2	15.3	2.4	48	15	14	11
1379	599000	7700150	0.5	0.47	17.0	4.0	21.4	0.20	0.06	0.25	3.8	19.1	4.5	2.89	0.01	10.0	0.4	0.14	116.0	0.4	0.03	6.3	338	5	150	1.3	0.05	3.0	7.0	3310	170.0	1.5	15.3	0.9	56	26	6	25

Explanation of the BOXPLOT

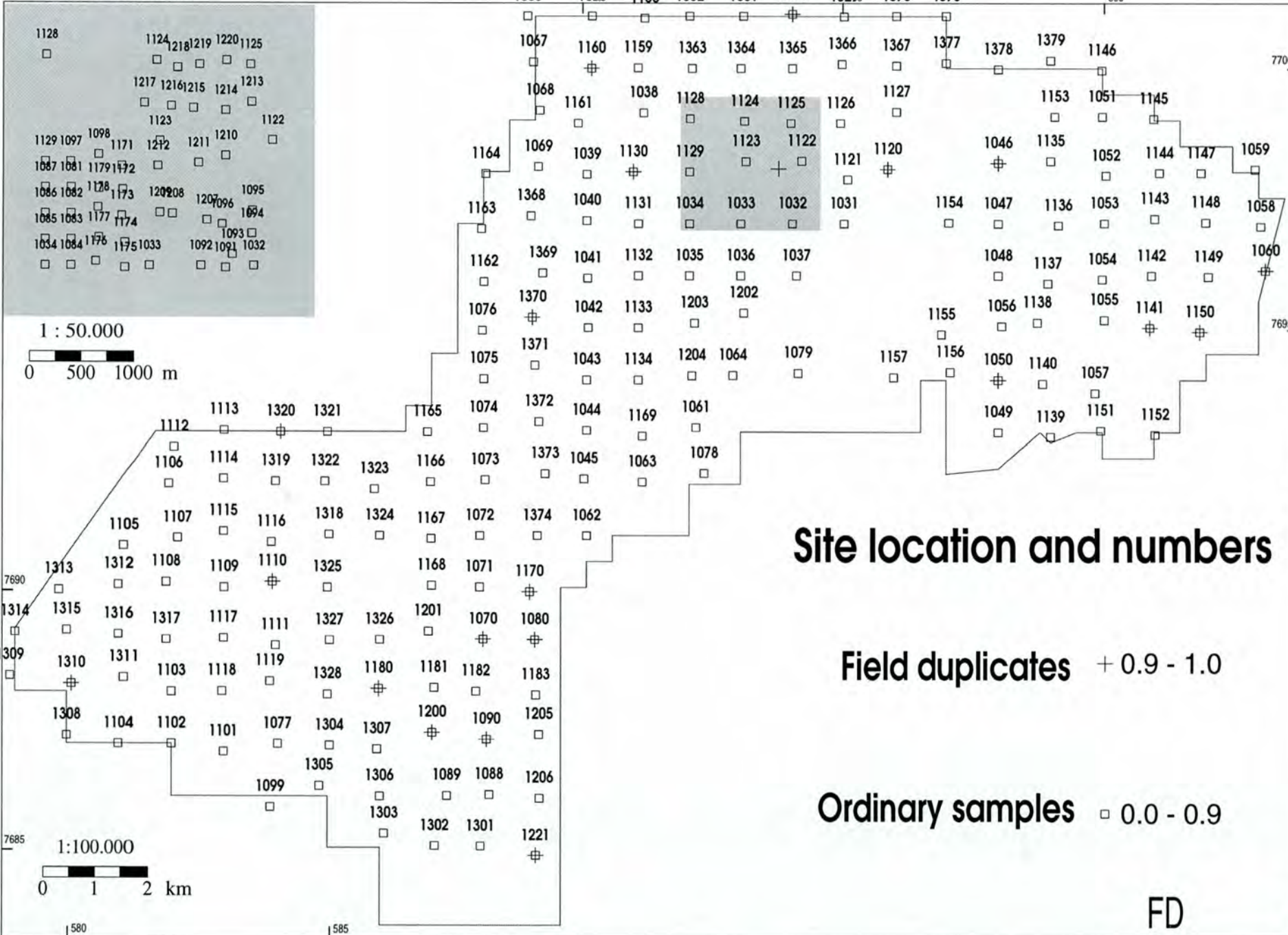


AS (N=316)

Definitions: hinge spread (HS) = UH - LH
 upper whisker = UH + 1.5 x HS
 lower whisker = LH - 1.5 x HS

the whiskers are drawn at the last actual data point

Coordinates are UTM zone 35, WGS84 datum



KENOR Pasvik 1996

Topsoil
<0.06mm

Aqua Regia
ICP-AES
GF-AAS

Site location and numbers

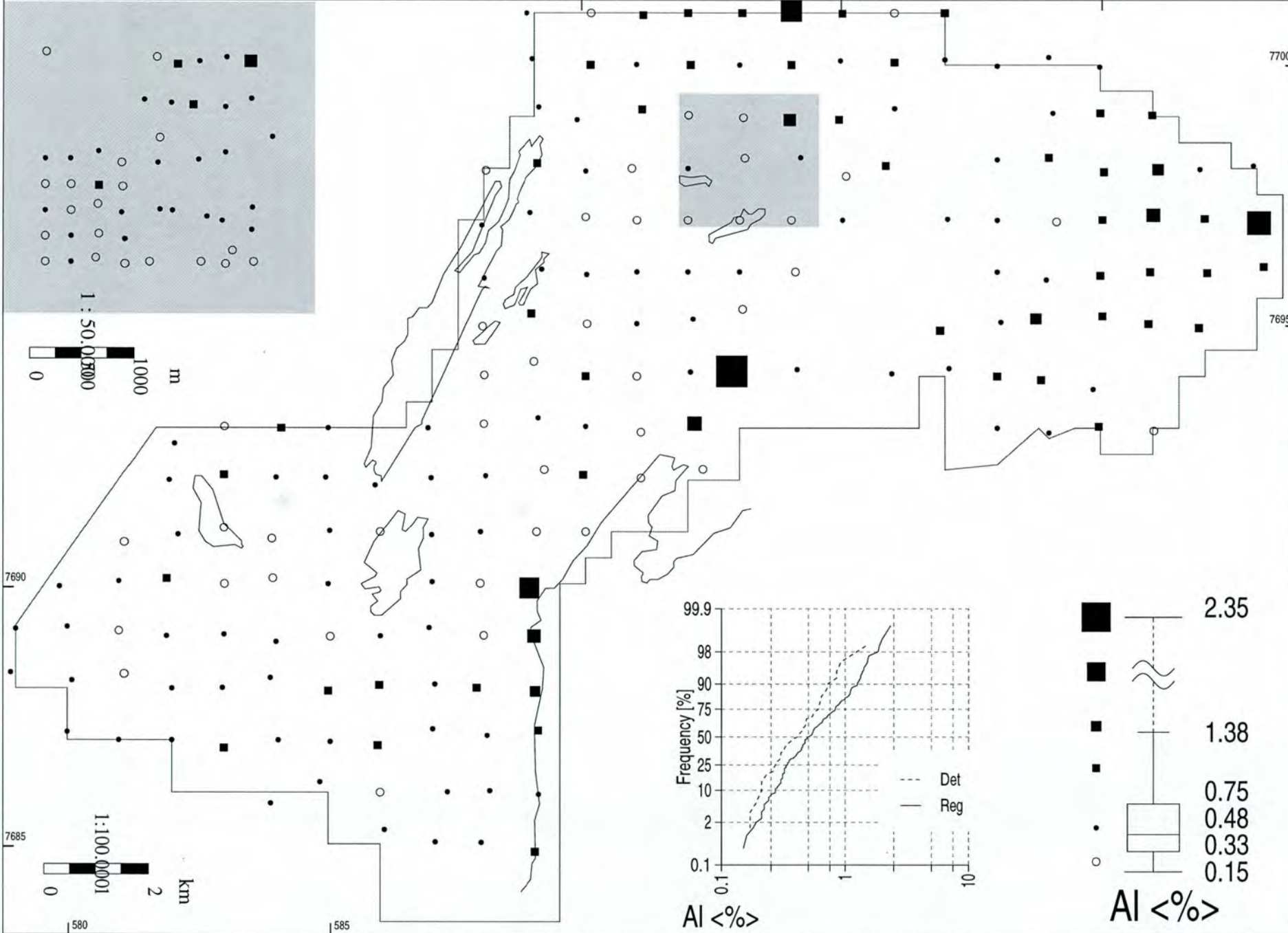
Field duplicates ⊕ 0.9 - 1.0

Ordinary samples □ 0.0 - 0.9

FD

nov'96
NGU

Coordinates are UTM zone 35, WGS84 datum

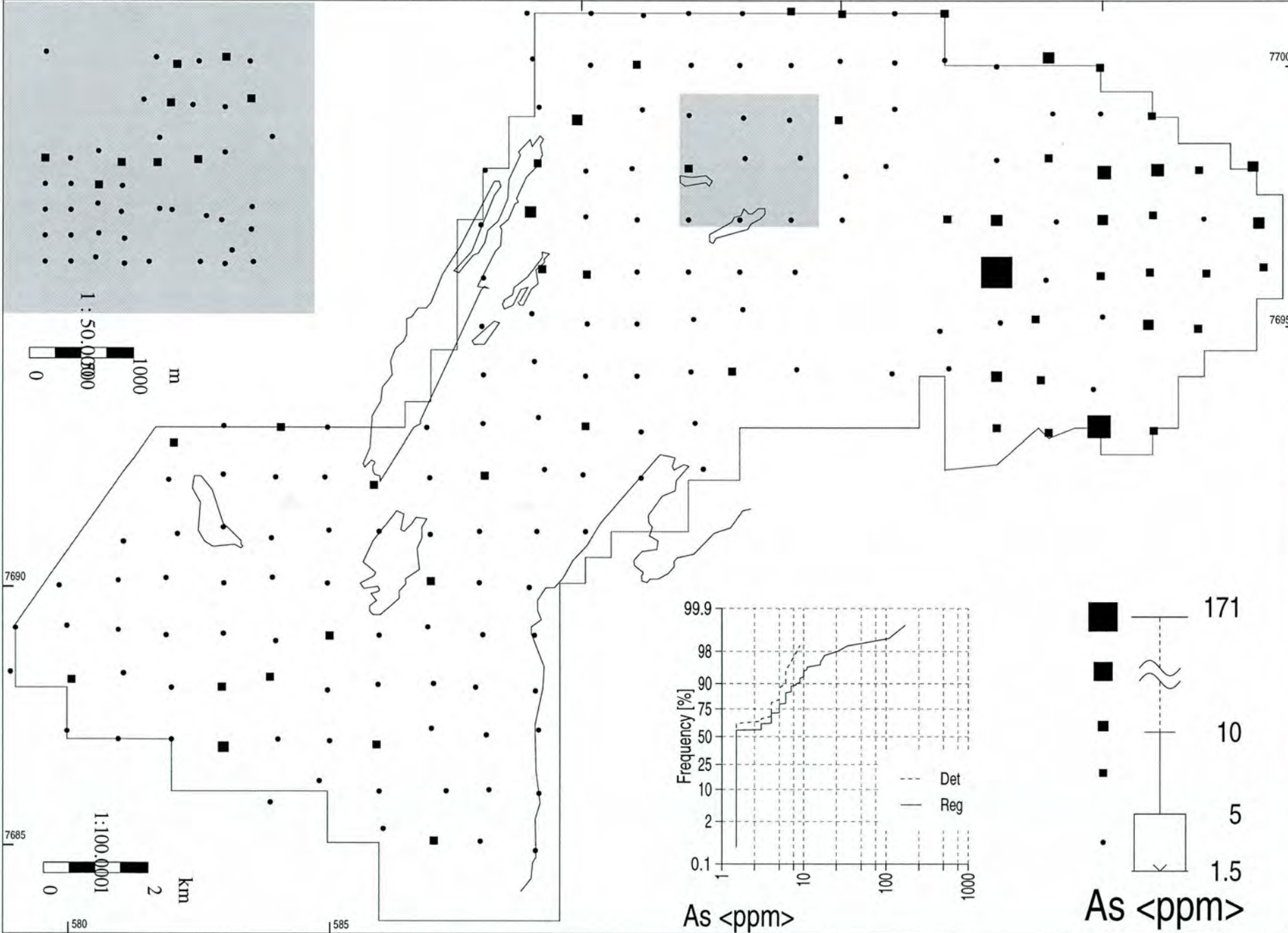


KENOR Pasvik 1996

Topsoil
<math><0.06\text{mm}</math>

Aqua Regia
ICP-AES
GF-AAS

Coordinates are UTM zone 35, WGS84 datum

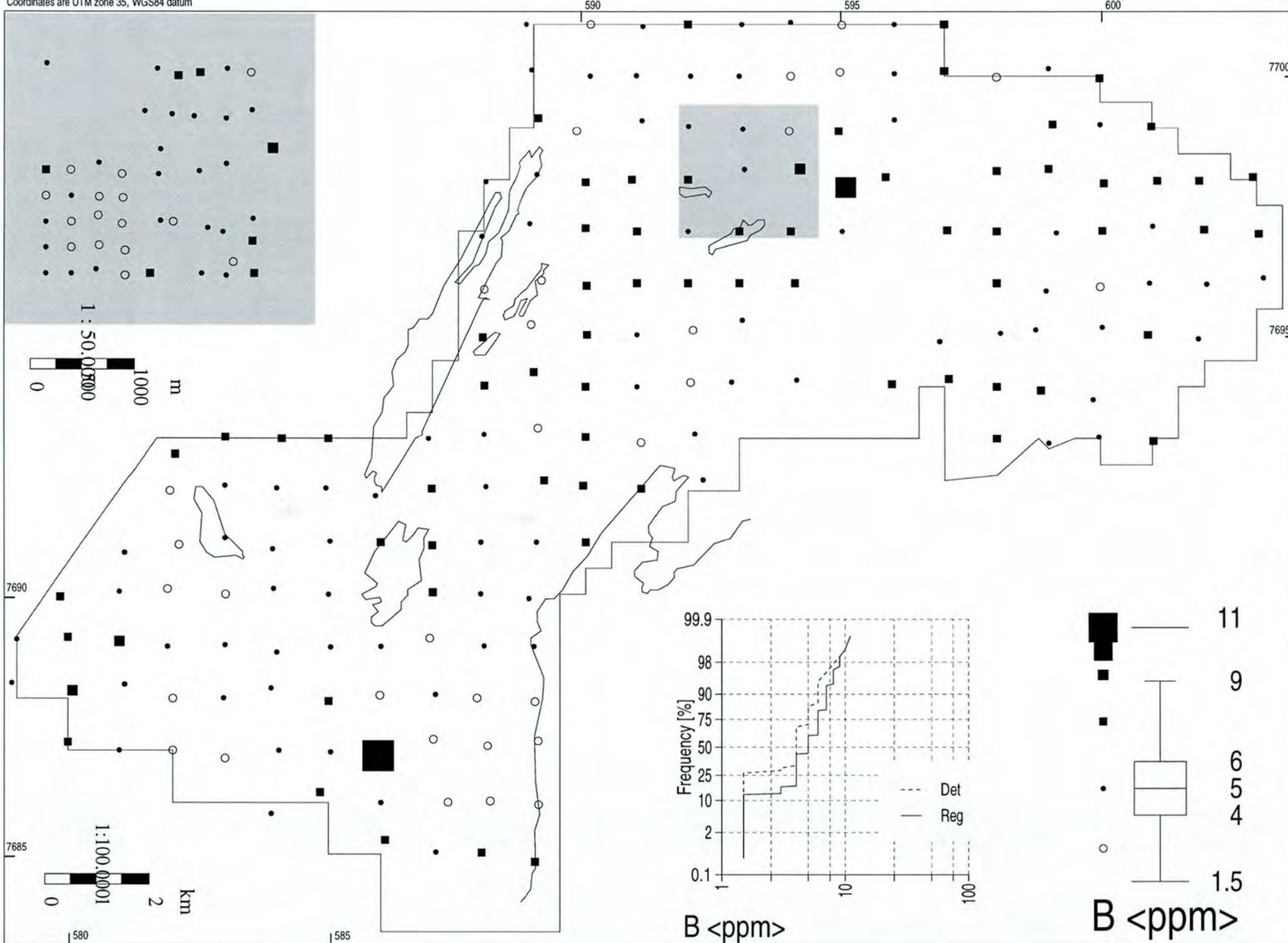


KENOR Pasvik 1996

Topsoil
<0.06mm

Aqua Regia
ICP-AES
GF-AAS

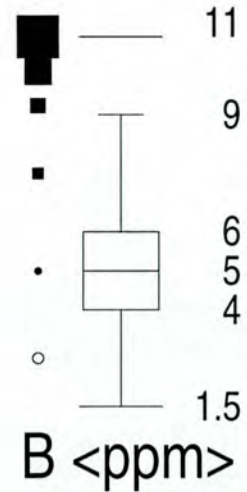
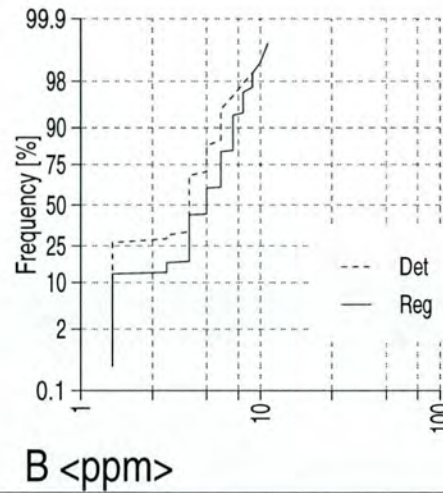
Coordinates are UTM zone 35, WGS84 datum



KENOR Pasvik 1996

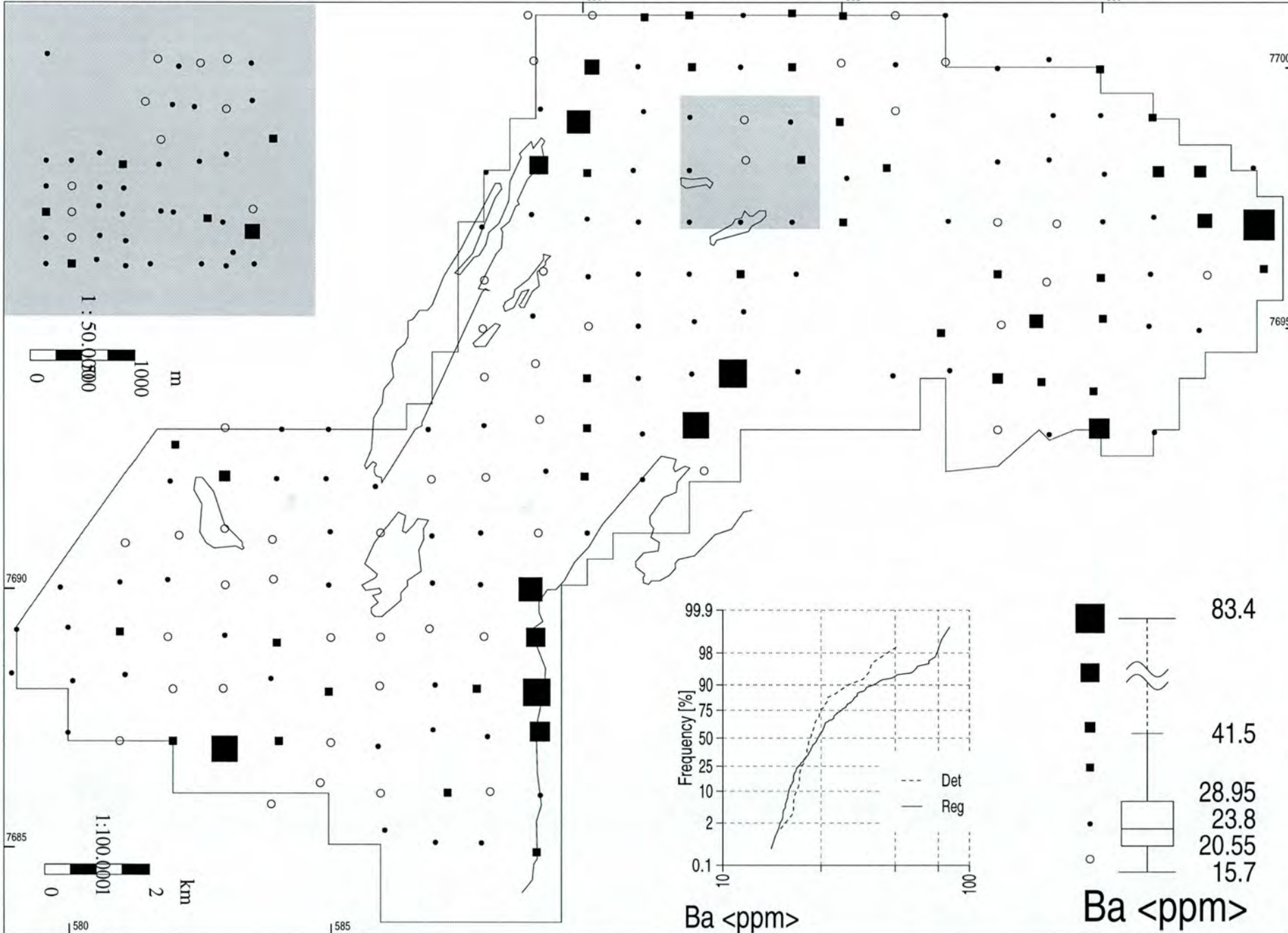
Topsoil
<0.06mm

Aqua Regia
ICP-AES
GF-AAS



apr 97
NGU

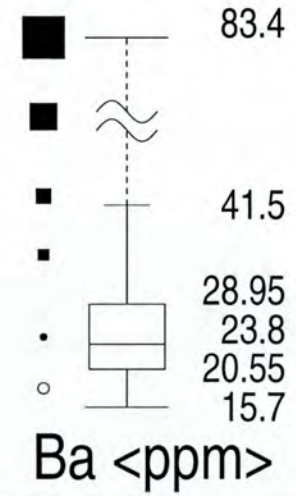
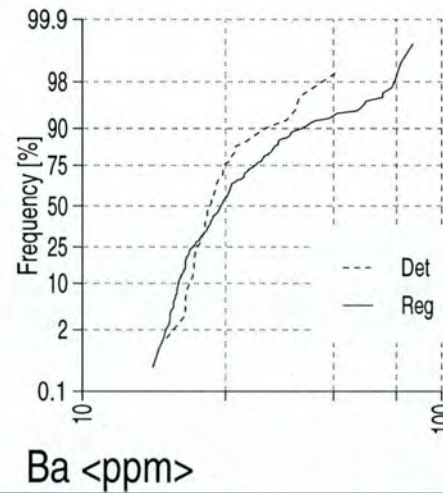
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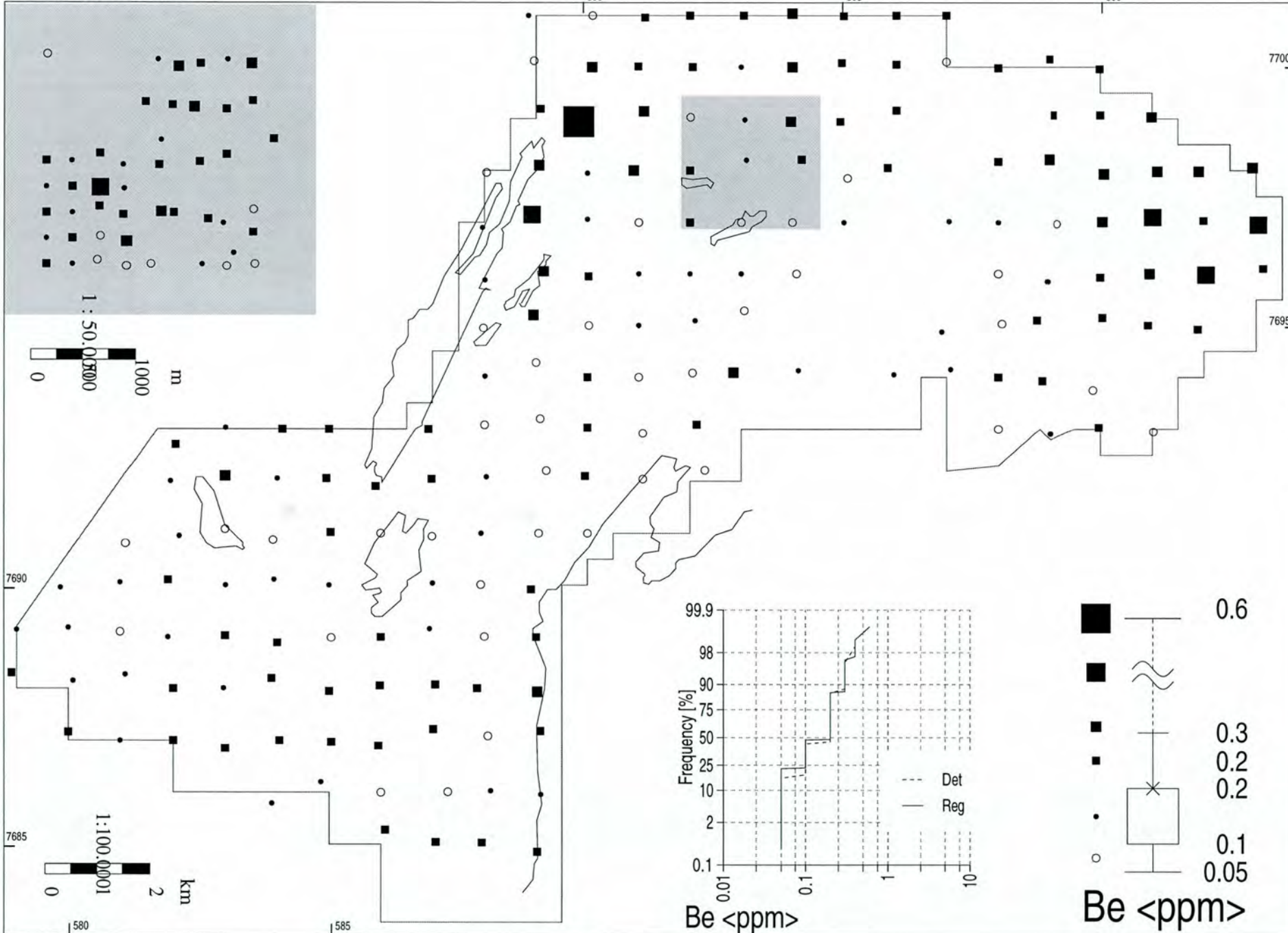
KENOR Pasvik 1996

Topsoil
<0.06mm

Aqua Regia
ICP-AES
GF-AAS



Coordinates are UTM zone 35, WGS84 datum



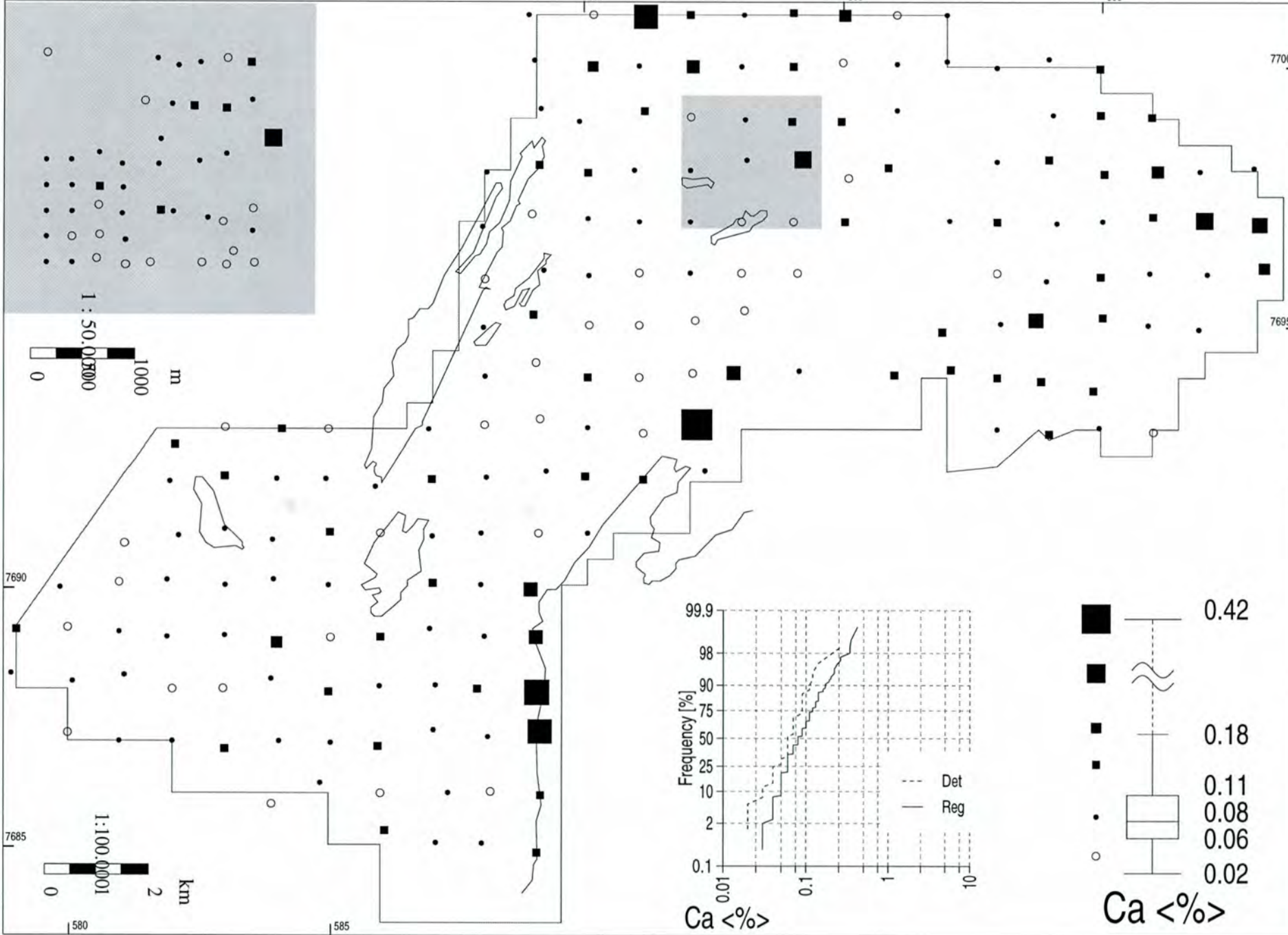
KENOR Pasvik 1996

Topsoil
<0.06mm

Aqua Regia
ICP-AES
GF-AAS

apr 97
NGU

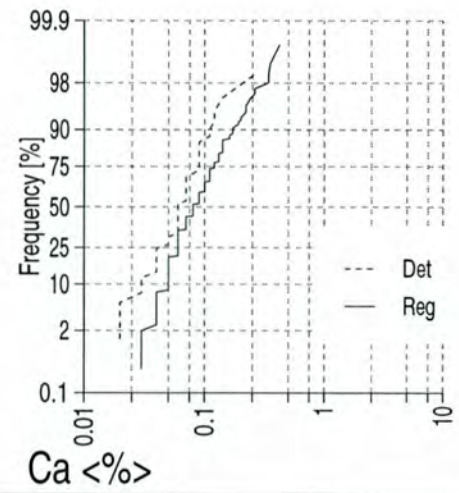
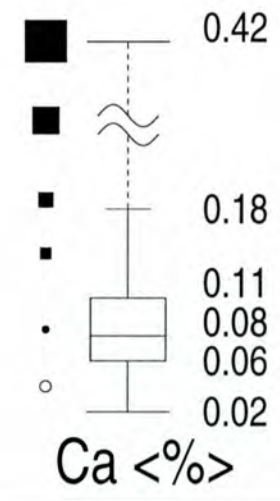
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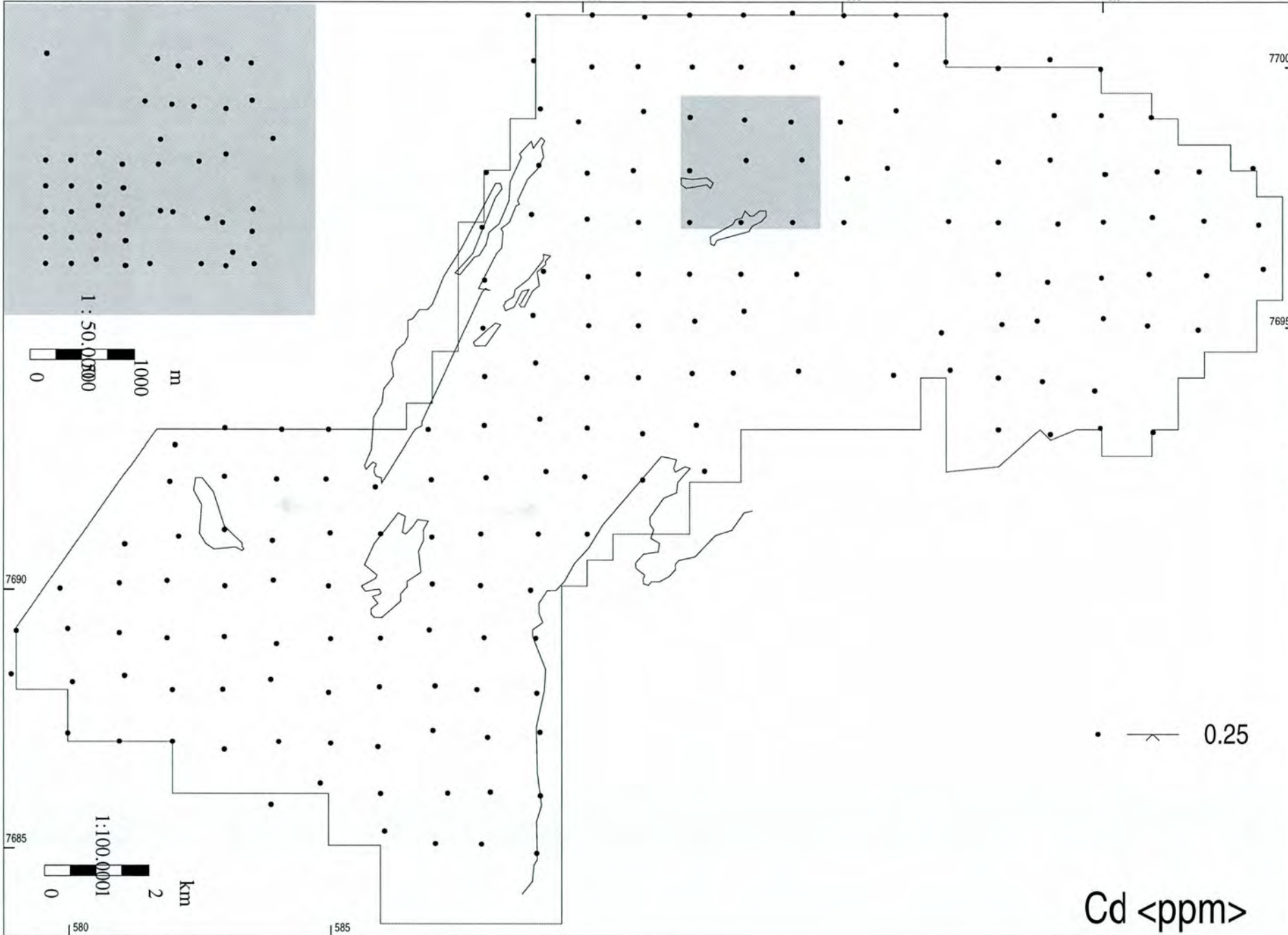
KENOR Pasvik 1996

Topsoil
<0.06mm

Aqua Regia
ICP-AES
GF-AAS



Coordinates are UTM zone 35, WGS84 datum



KENOR Pasvik 1996

Topsoil
<0.06mm

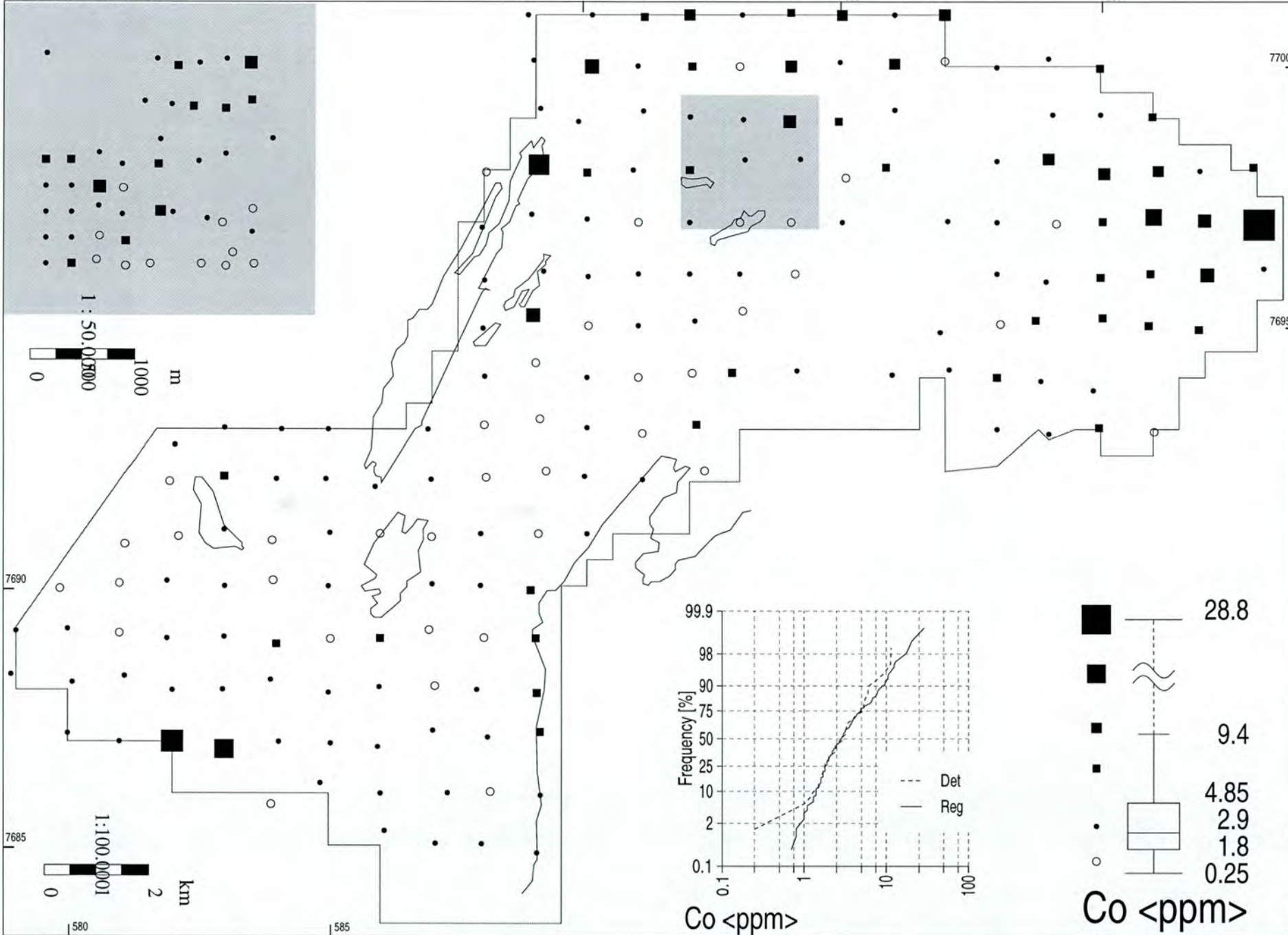
Aqua Regia
ICP-AES
GF-AAS

• — 0.25

Cd <ppm>

apr 97
NGU

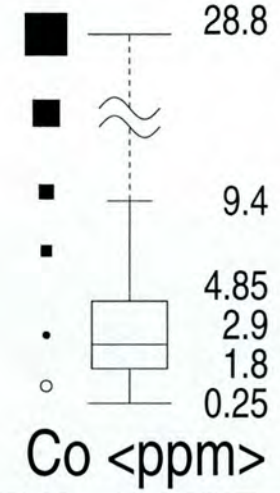
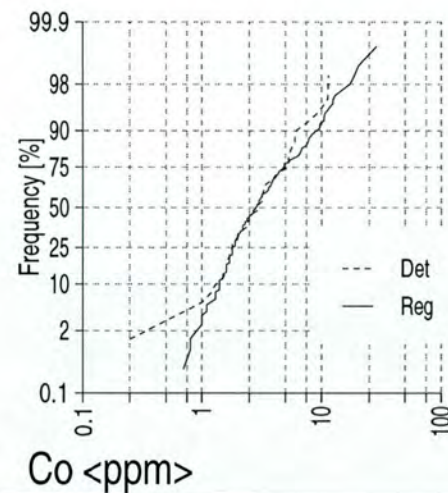
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KENOR Pasvik 1996

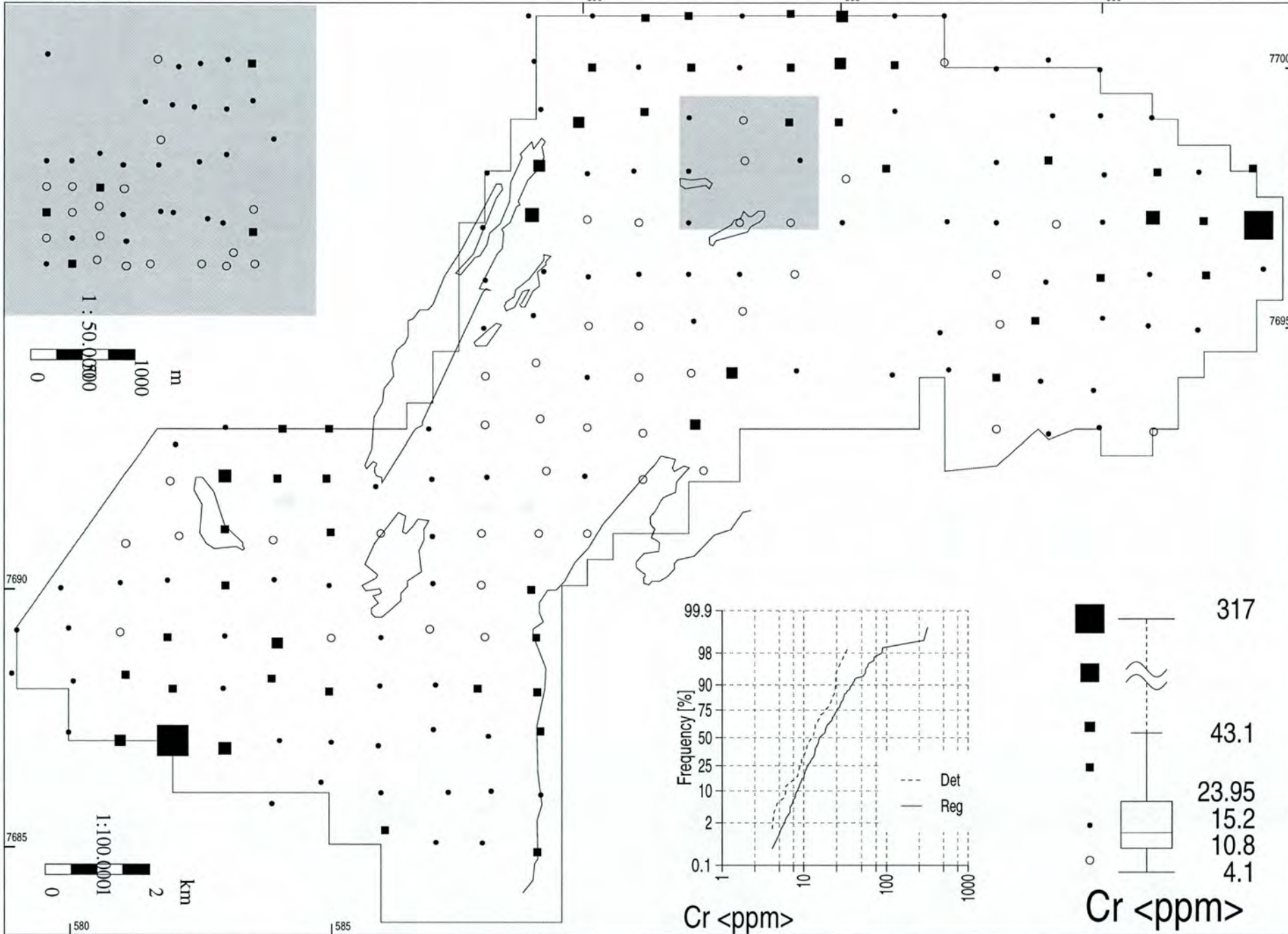
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<0.06mm

Aqua Regia
ICP-AES
GF-AAS



apr 97
NGU

Coordinates are UTM zone 35, WGS84 datum

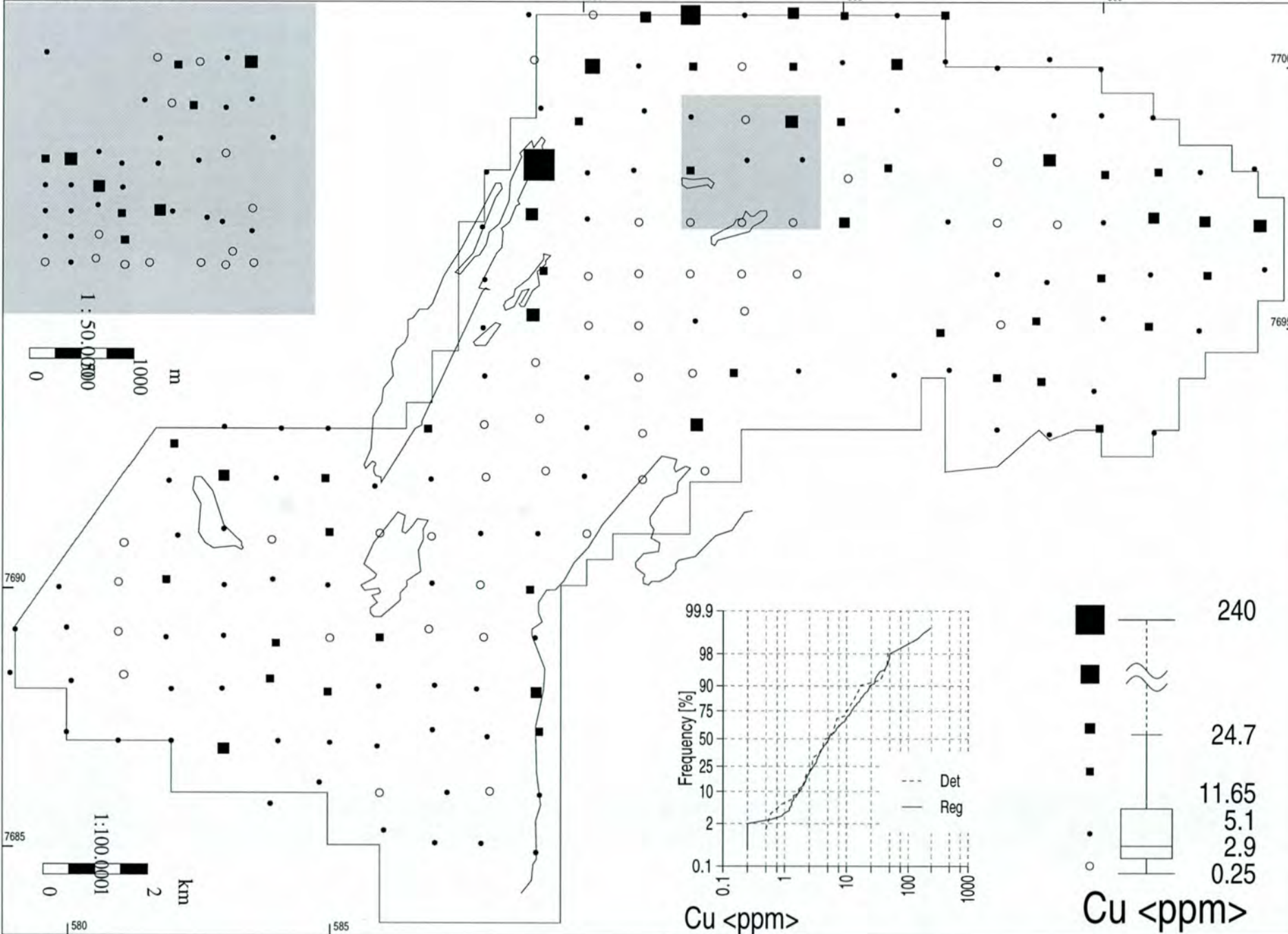


KENOR Pasvik 1996

Topsoil
<0.06mm

Aqua Regia
ICP-AES
GF-AAS

Coordinates are UTM zone 35, WGS84 datum



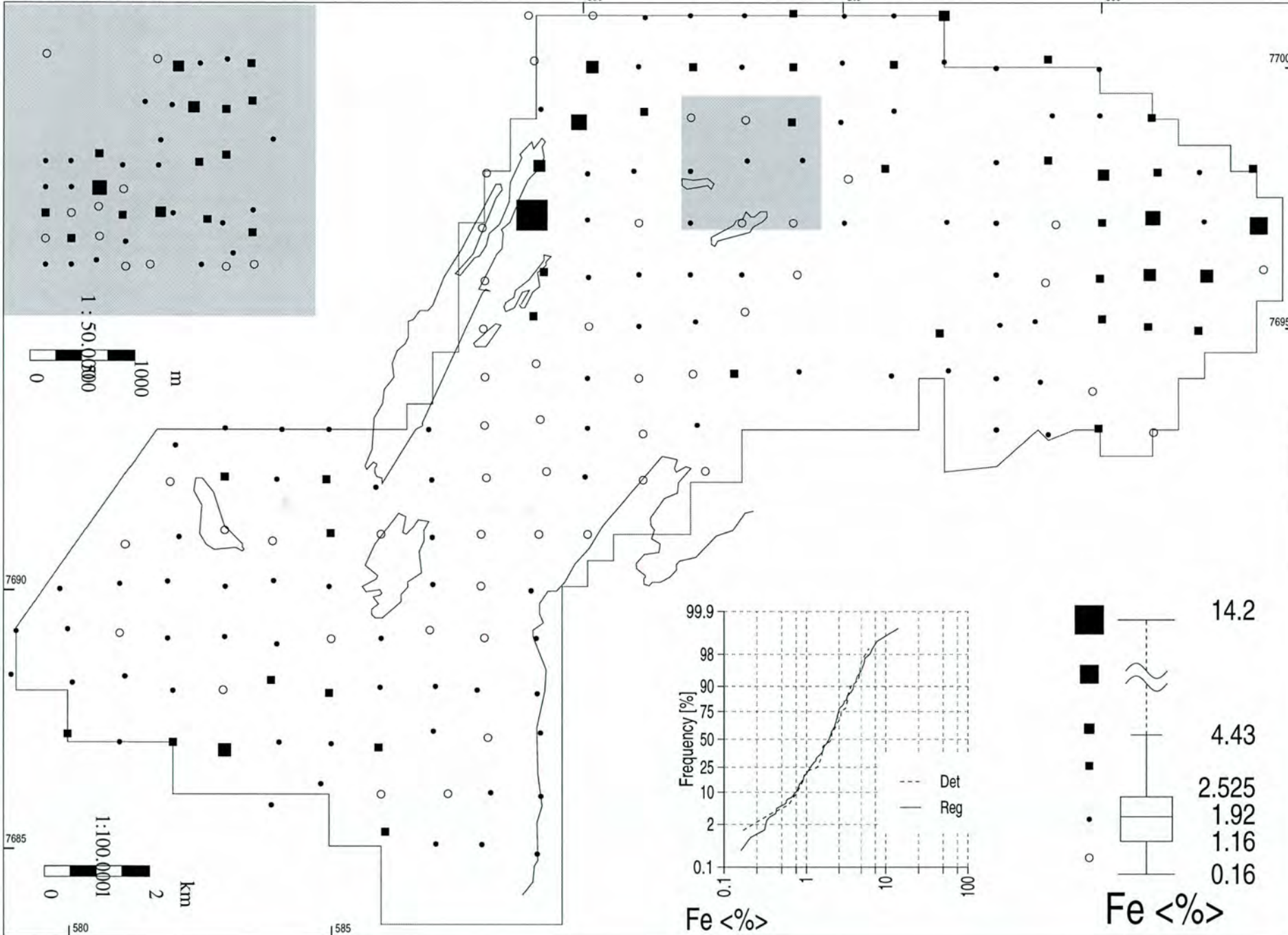
KENOR Pasvik 1996

Topsoil
<0.06mm

Aqua Regia
ICP-AES
GF-AAS

apr 97
NGU

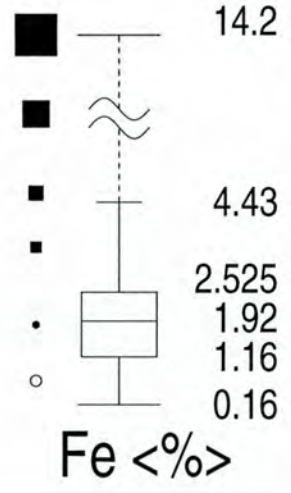
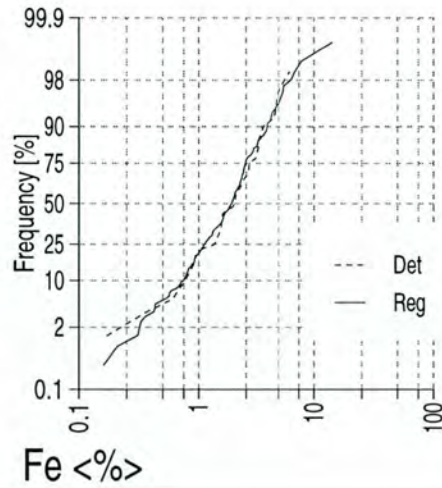
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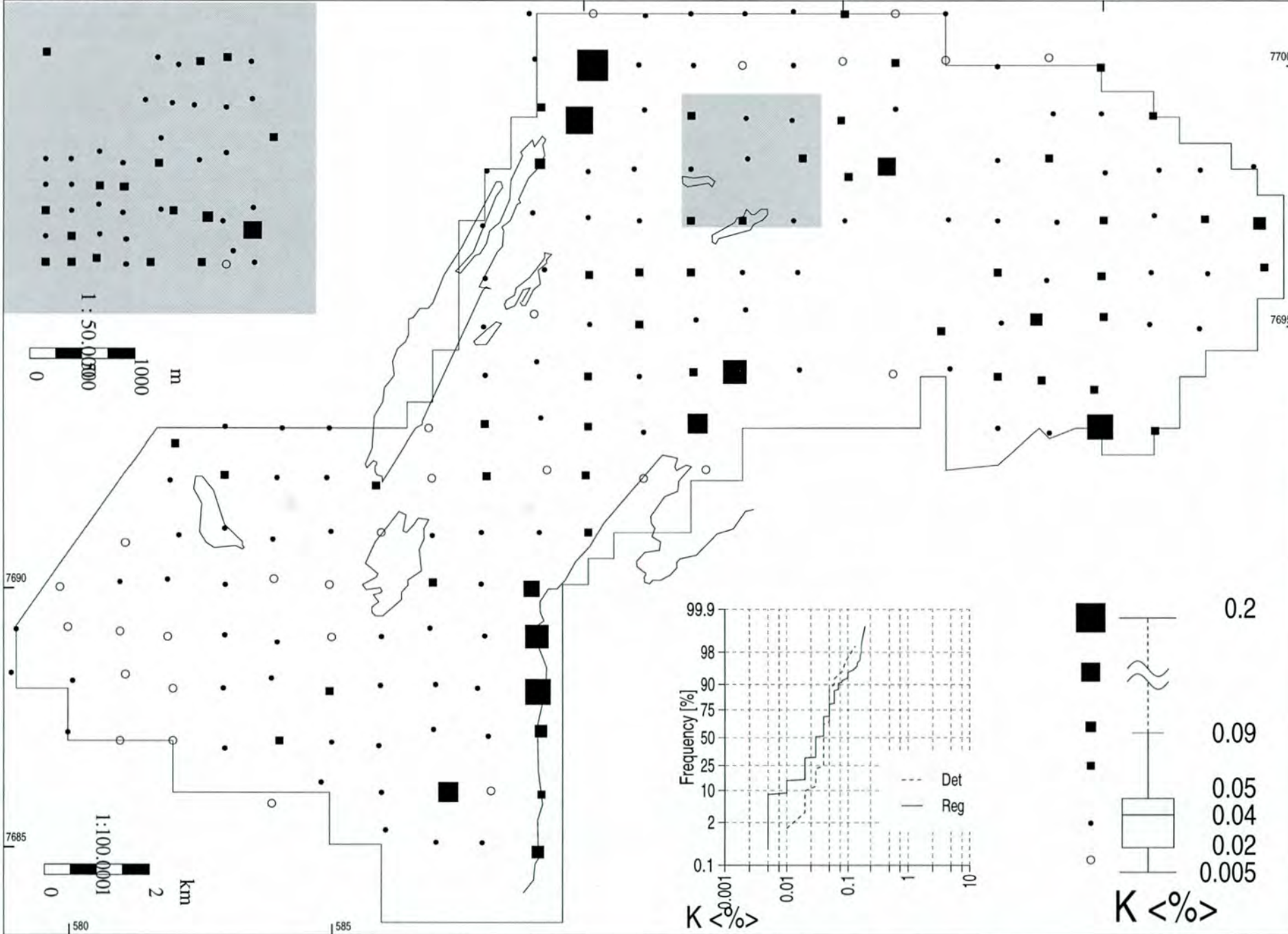
KENOR Pasvik 1996

Topsoil
<0.06mm

Aqua Regia
ICP-AES
GF-AAS



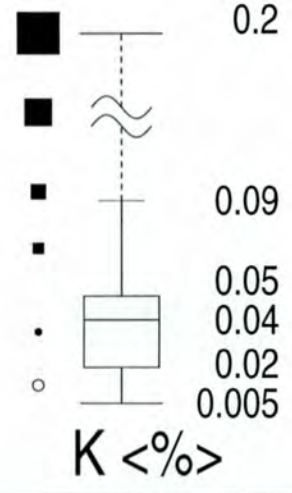
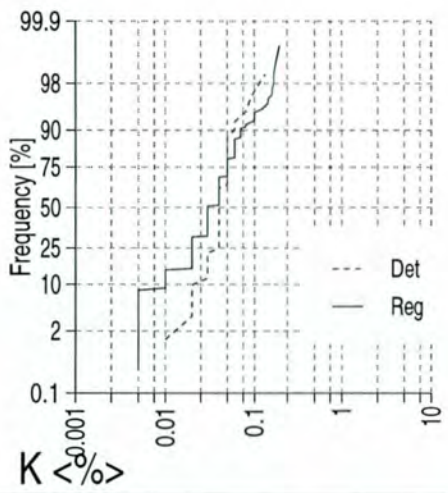
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KENOR Pasvik 1996

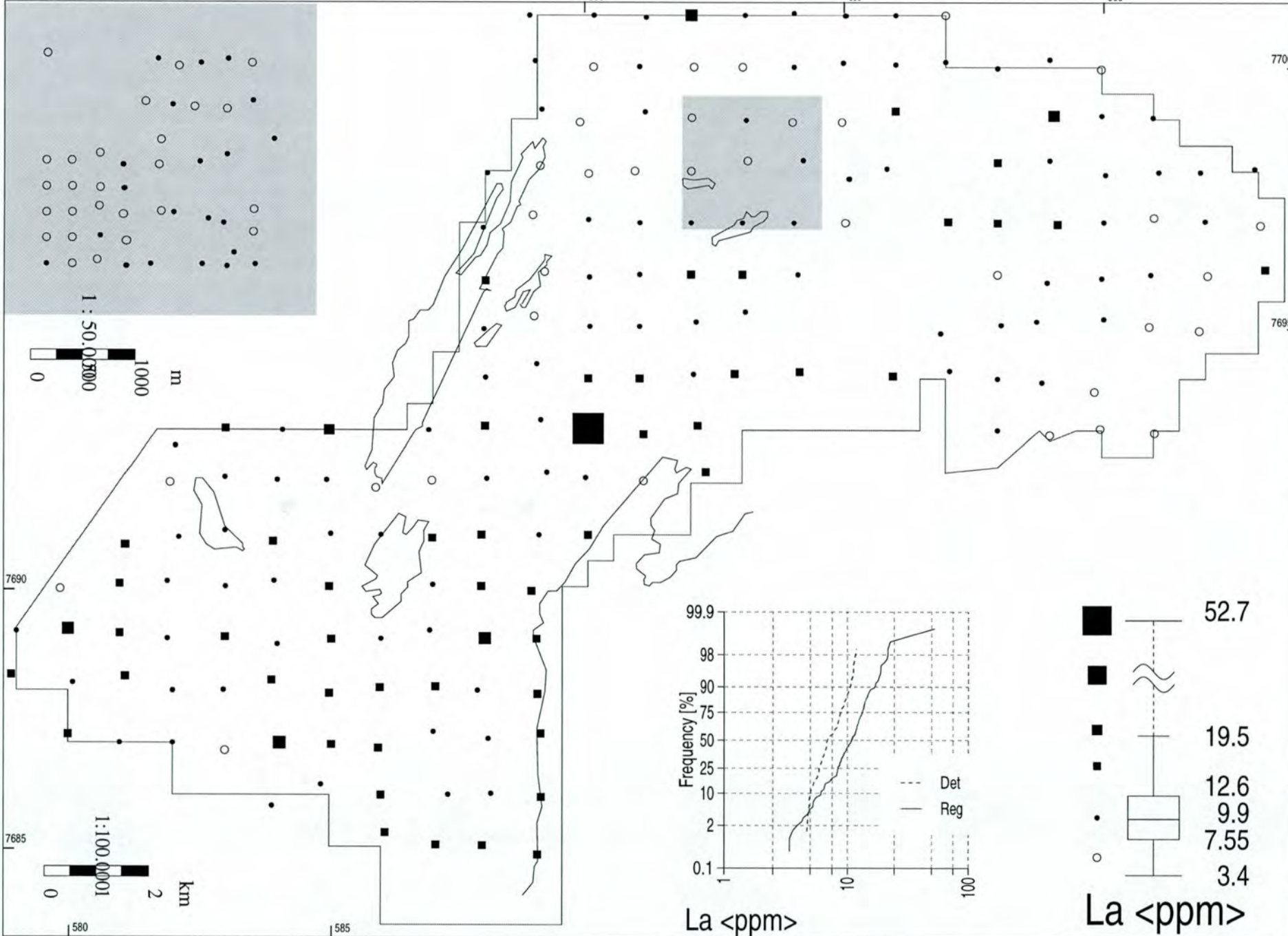
Topsoil
<math>< 0.06\text{mm}</math>

Aqua Regia
ICP-AES
GF-AAS



apr 97
NGU

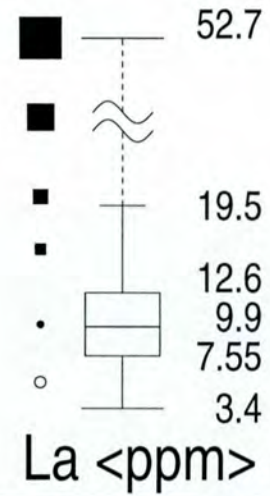
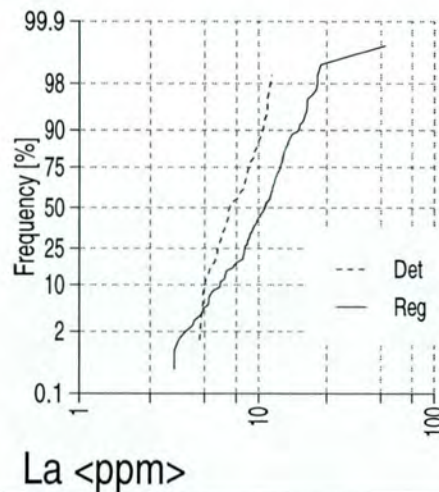
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KENOR Pasvik 1996

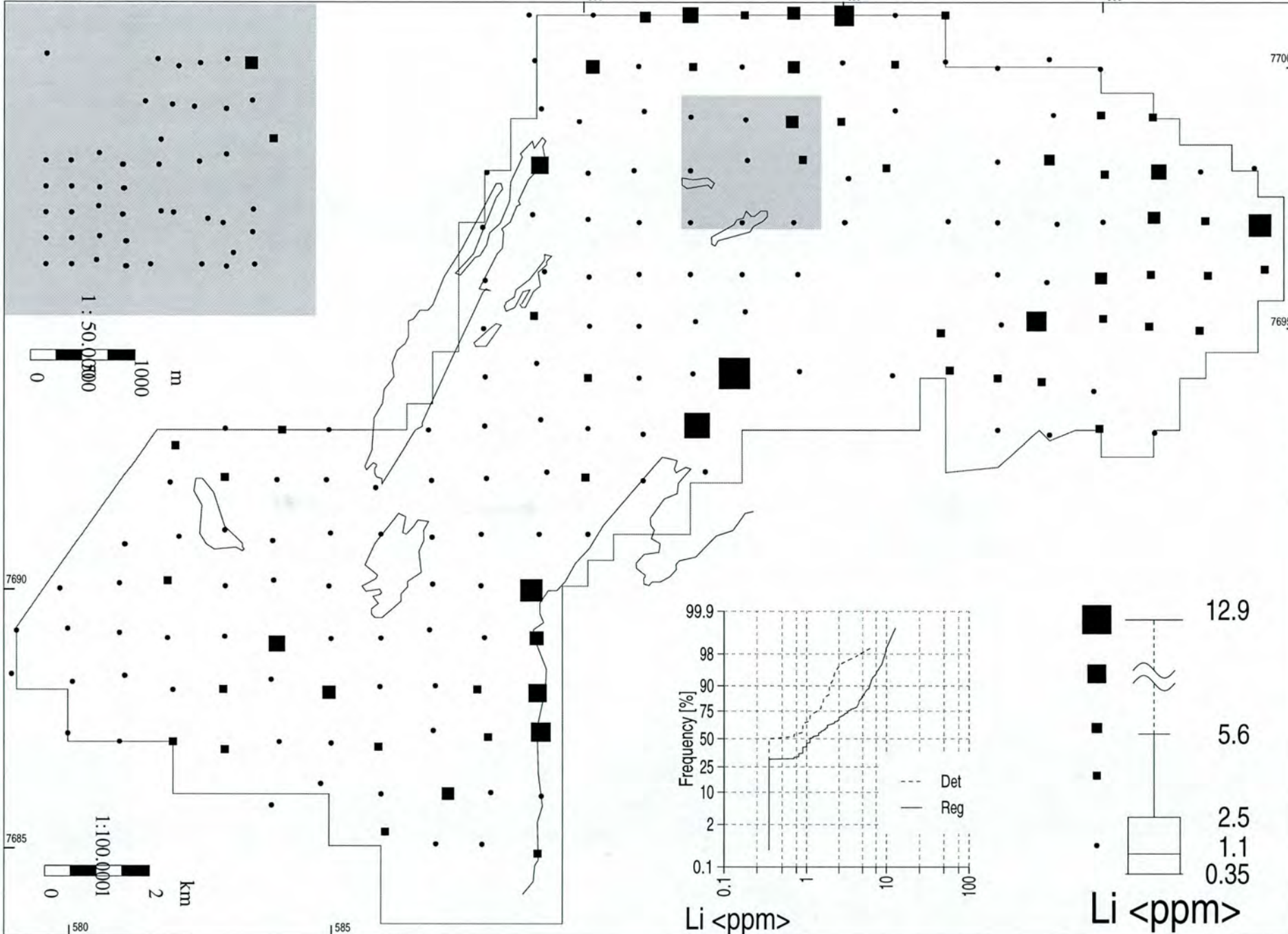
Topsoil
<0.06mm

Aqua Regia
ICP-AES
GF-AAS



apr 97
NGU

Coordinates are UTM zone 35, WGS84 datum



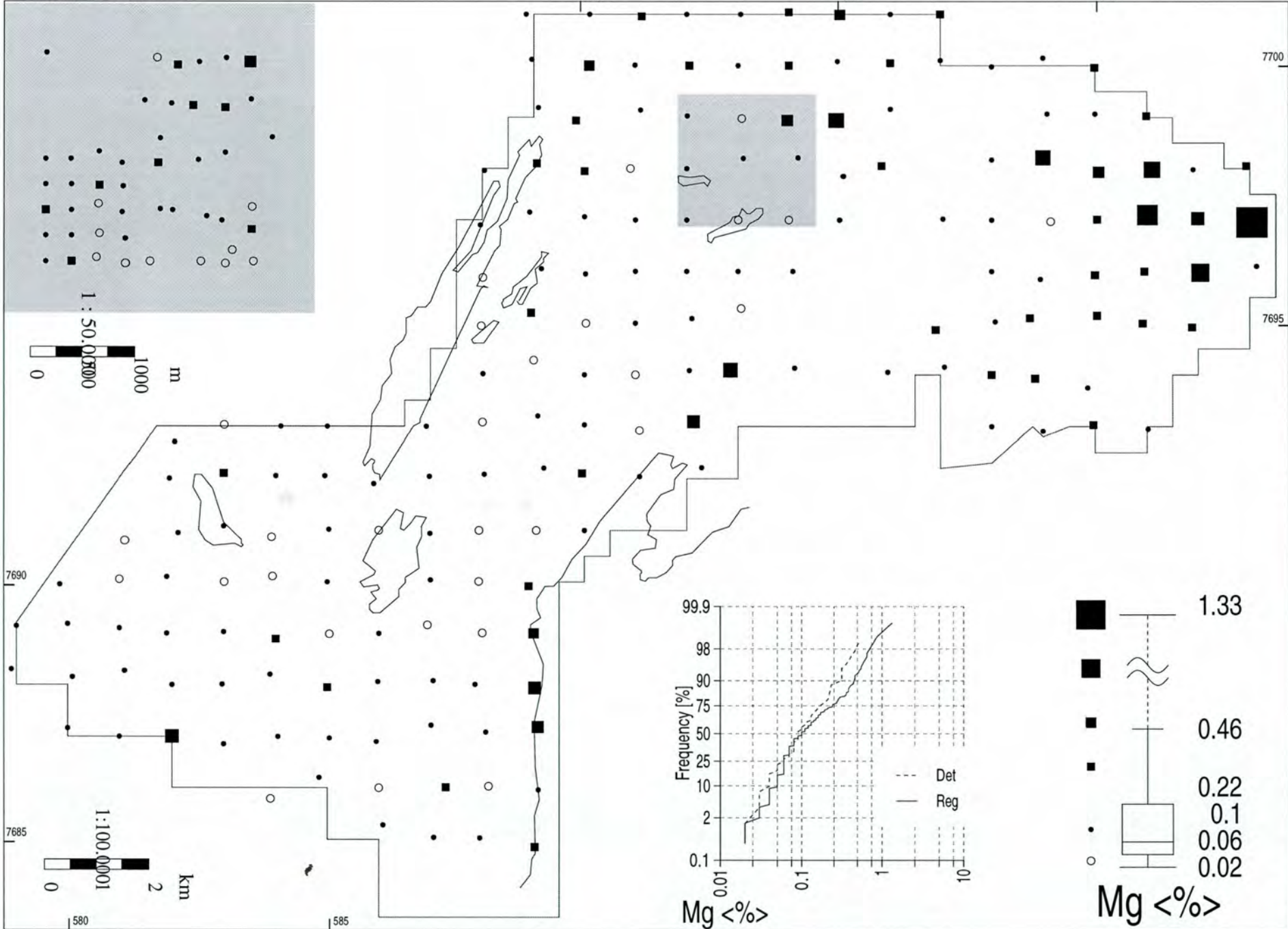
KENOR Pasvik 1996

Topsoil
<0.06mm

Aqua Regia
ICP-AES
GF-AAS

apr 97
NGU

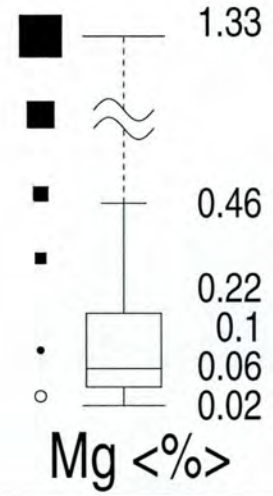
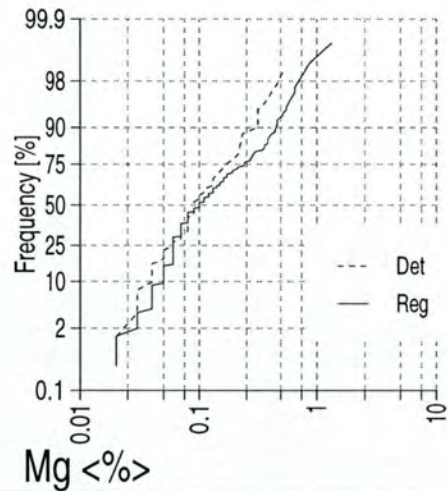
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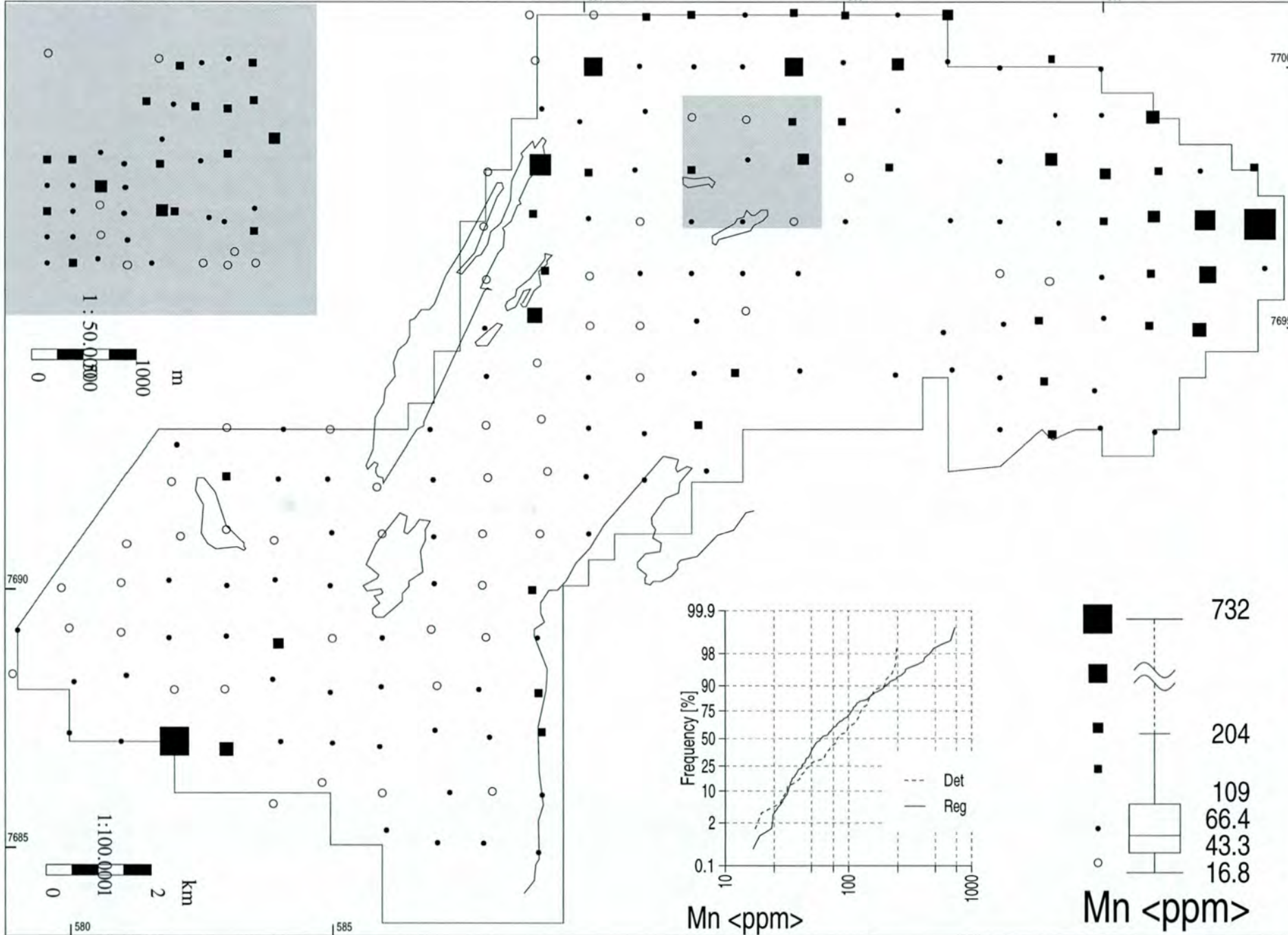
KENOR Pasvik 1996

Topsoil
<0.06mm

Aqua Regia
ICP-AES
GF-AAS



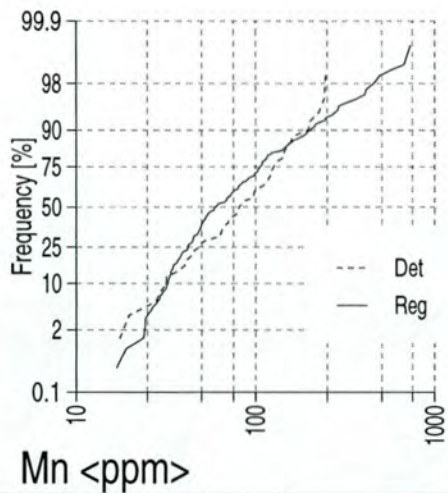
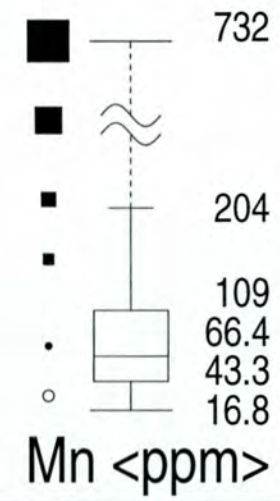
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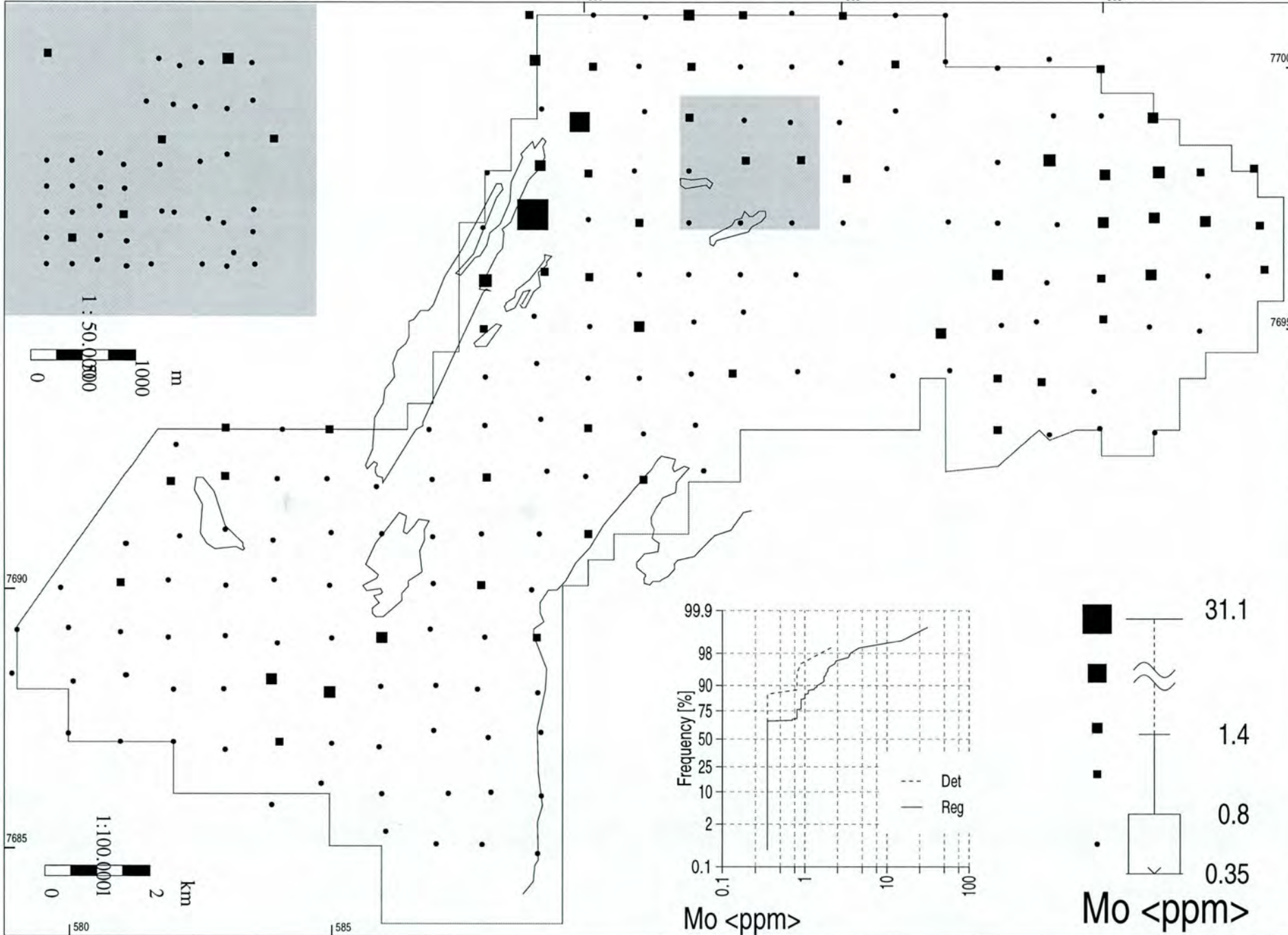
KENOR Pasvik 1996

Topsoil
<0.06mm

Aqua Regia
ICP-AES
GF-AAS



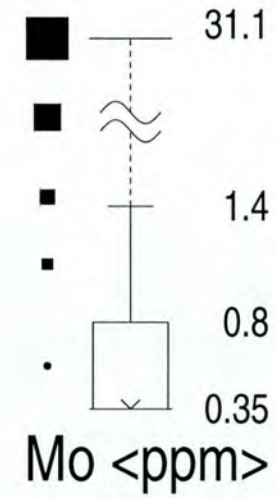
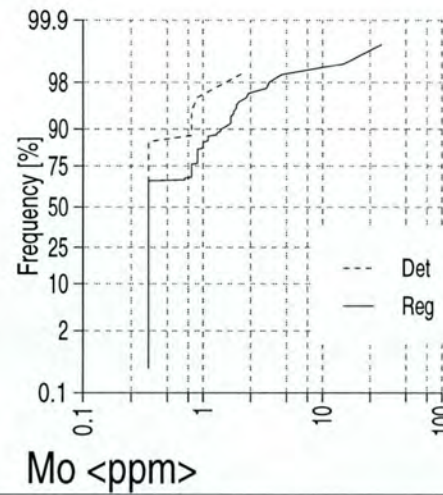
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KENOR Pasvik 1996

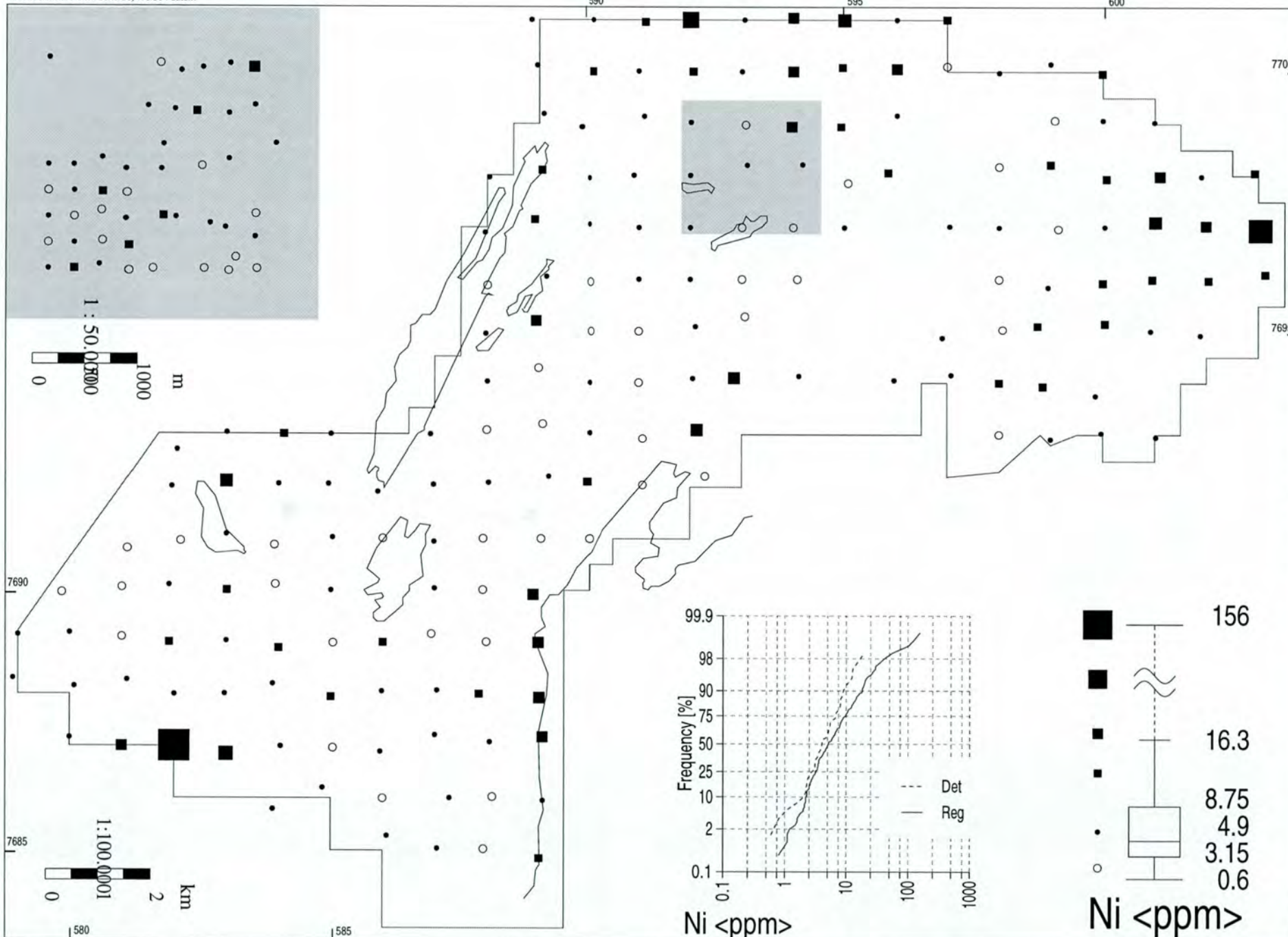
Topsoil
<0.06mm

Aqua Regia
ICP-AES
GF-AAS



apr 97
NGU

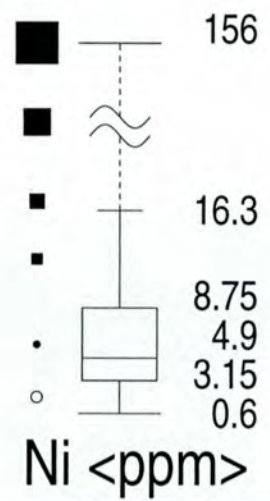
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KENOR Pasvik 1996

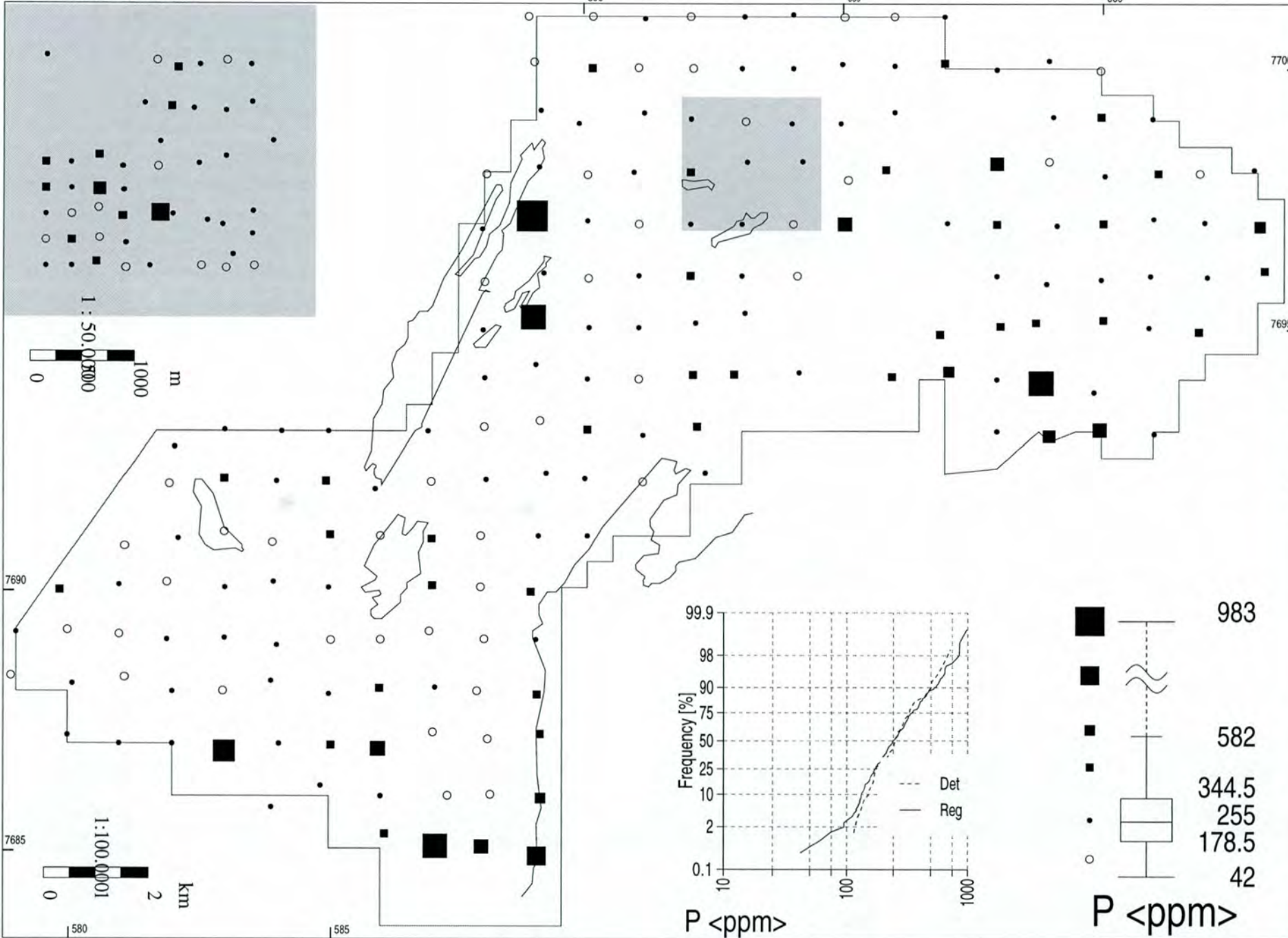
Topsoil
<0.06mm

Aqua Regia
ICP-AES
GF-AAS



apr 97
NGU

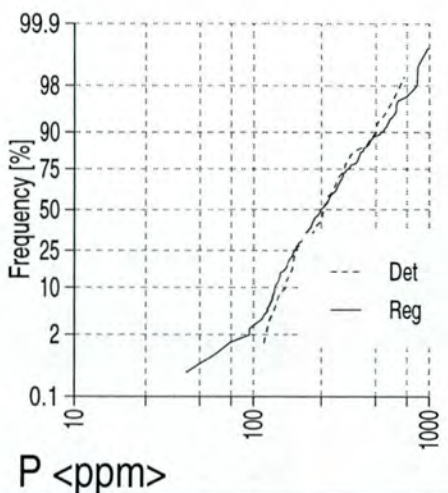
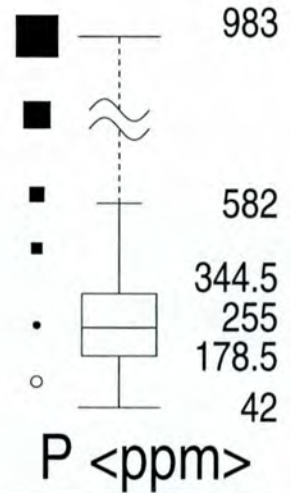
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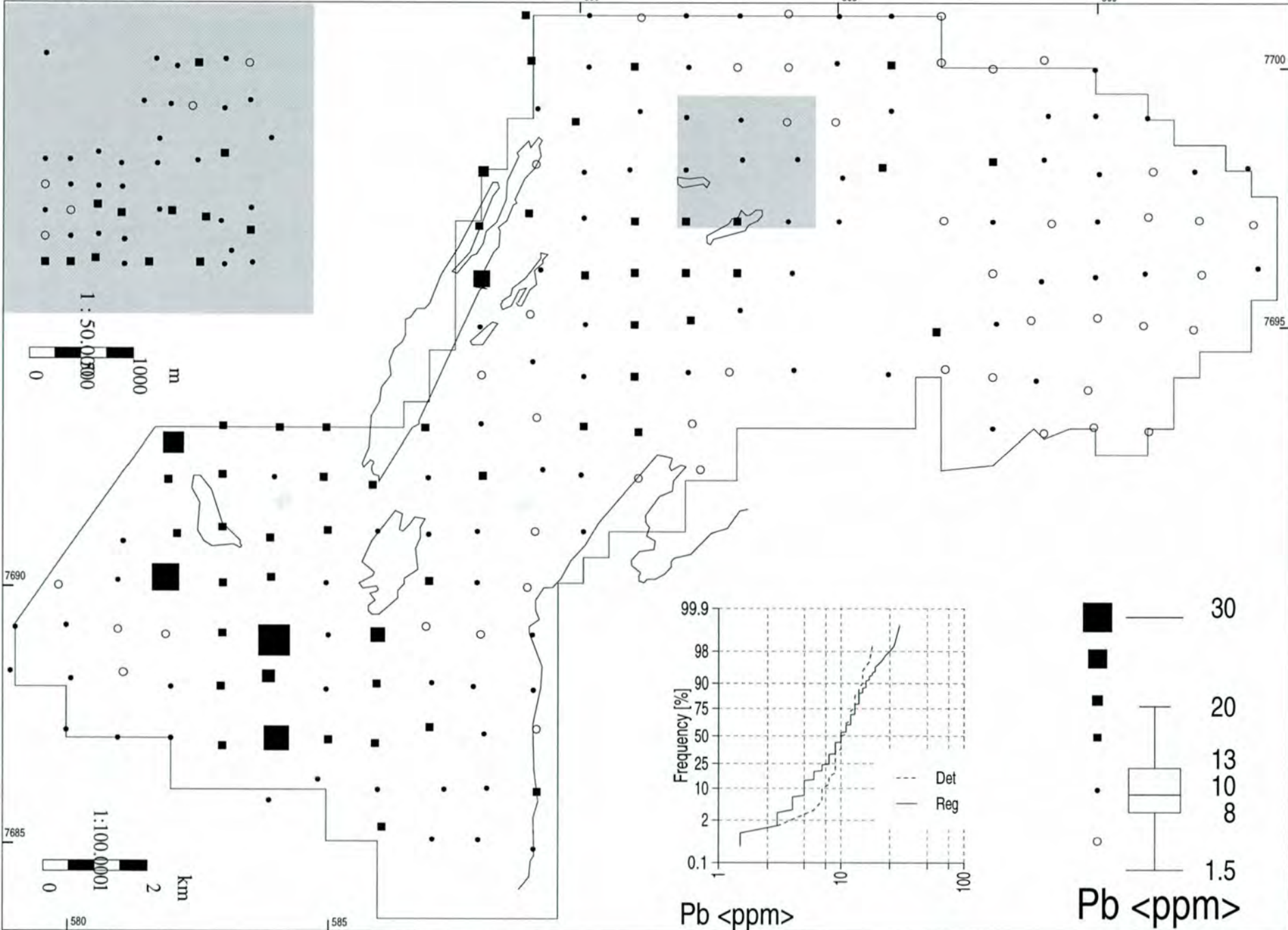
KENOR Pasvik 1996

Topsoil
<0.06mm

Aqua Regia
ICP-AES
GF-AAS



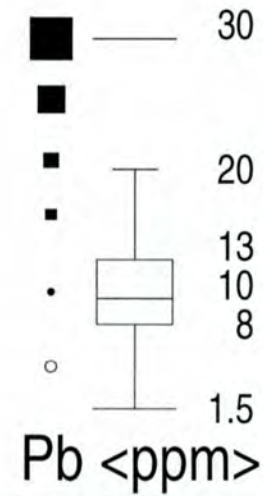
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KENOR Pasvik 1996

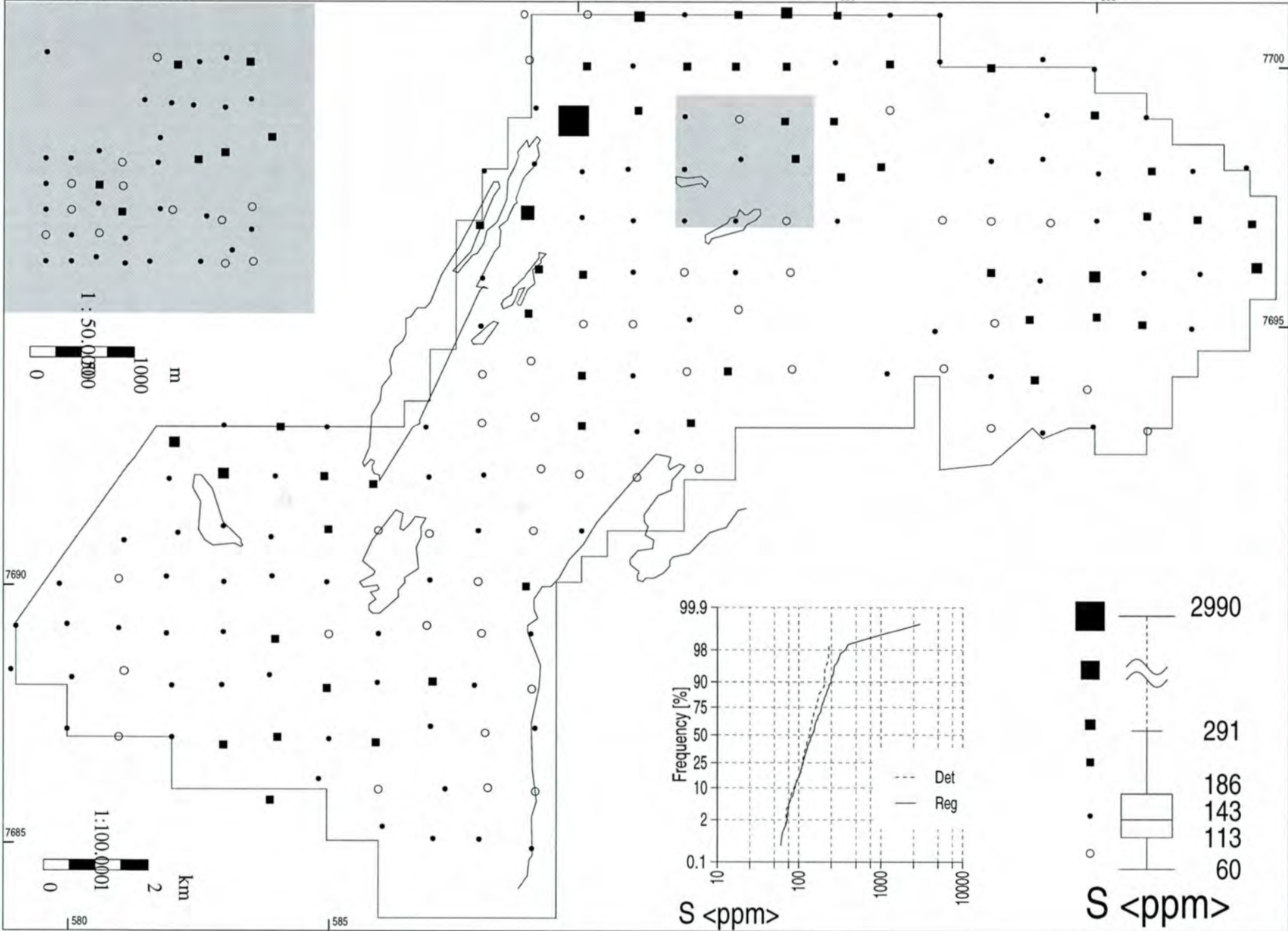
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Aqua Regia
ICP-AES
GF-AAS



apr 97
NGU

Coordinates are UTM zone 35, WGS84 datum



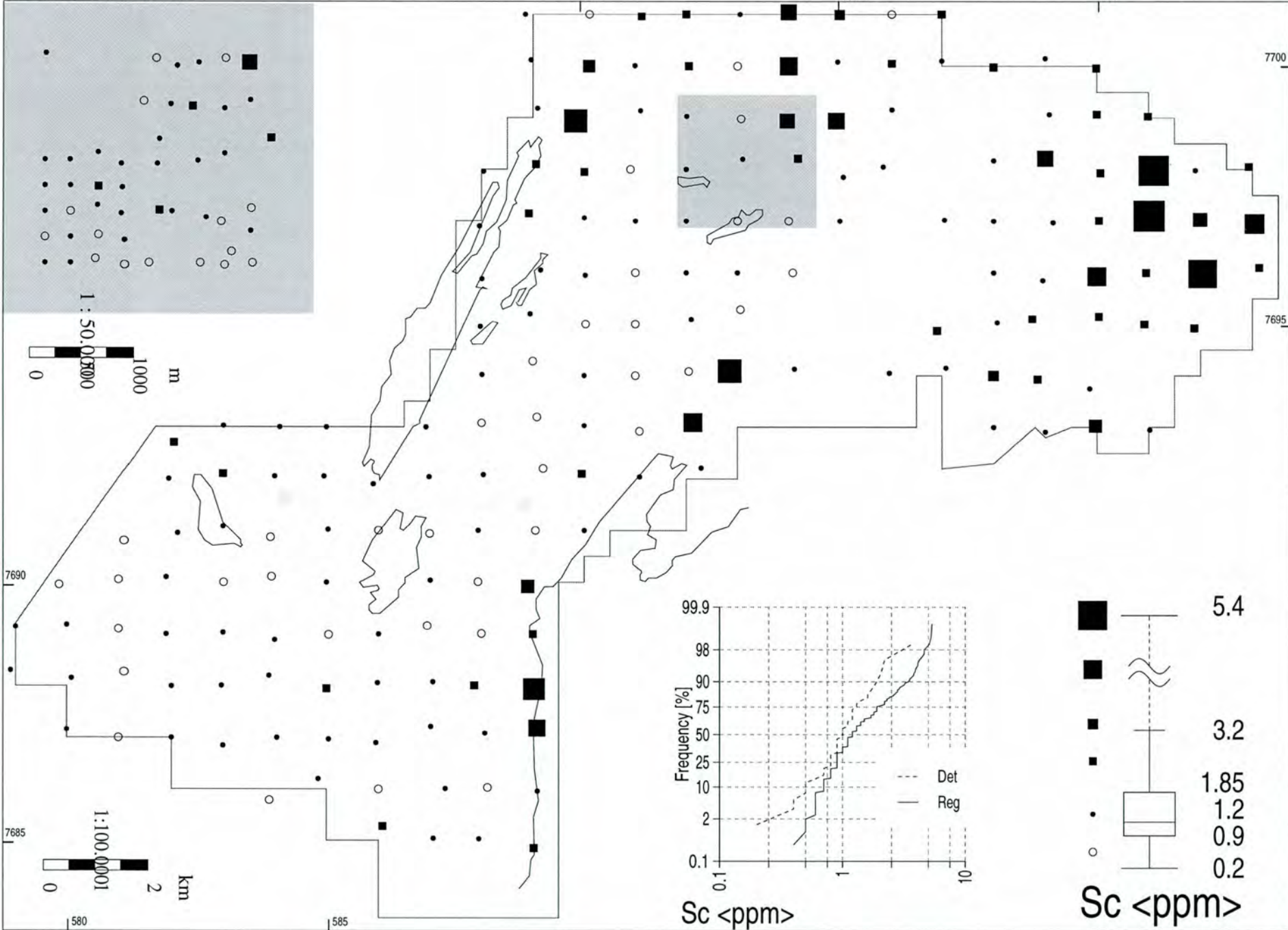
KENOR Pasvik 1996

Topsoil
<0.06mm

Aqua Regia
ICP-AES
GF-AAS

apr 97
NGU

Coordinates are UTM zone 35, WGS84 datum

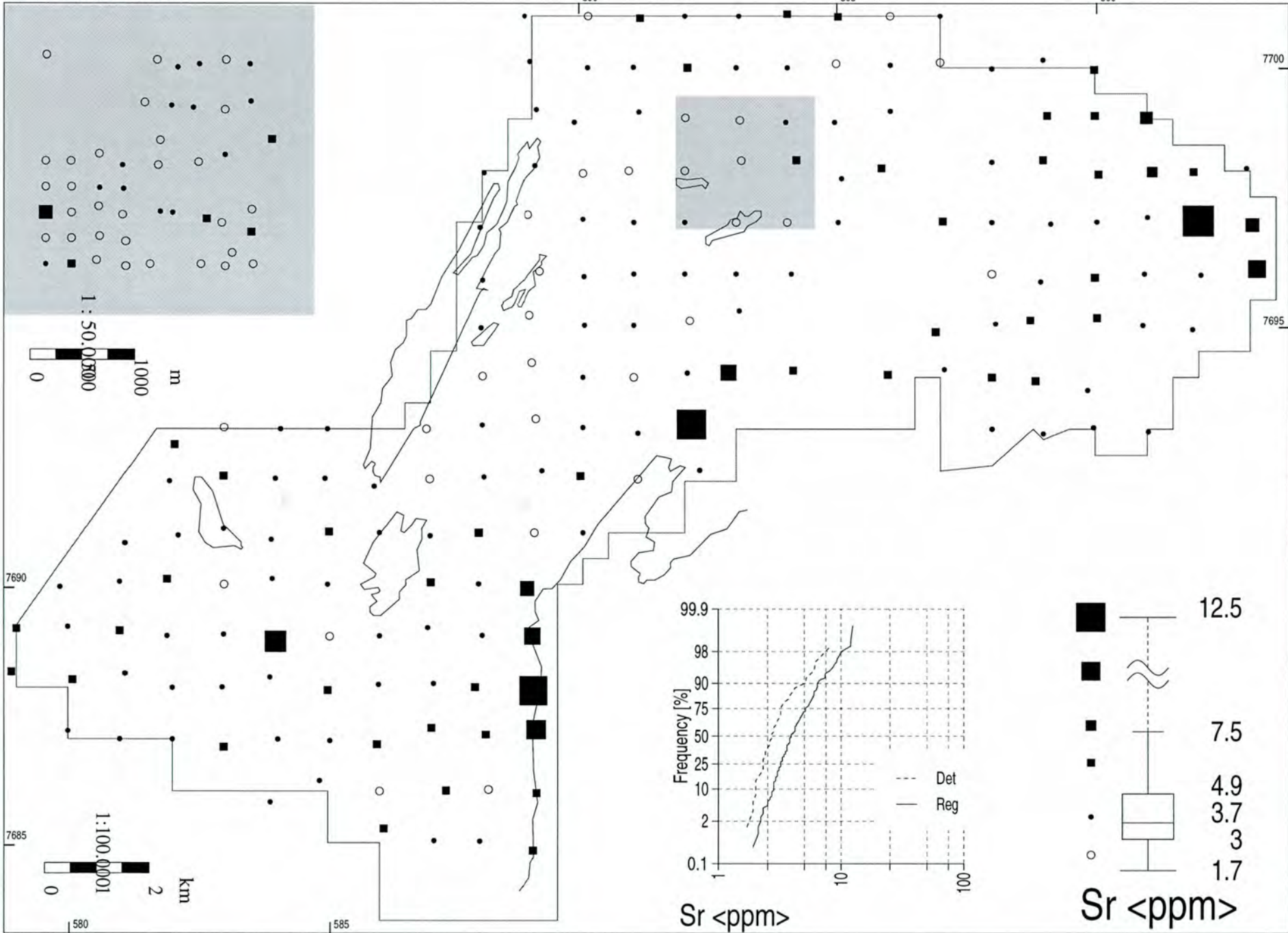


KENOR Pasvik 1996

Topsoil
<0.06mm

Aqua Regia
ICP-AES
GF-AAS

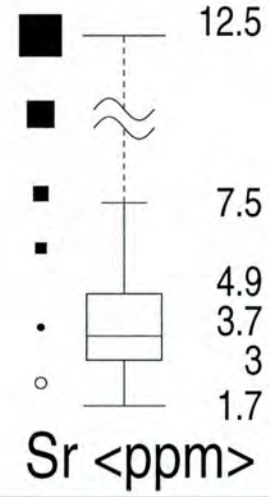
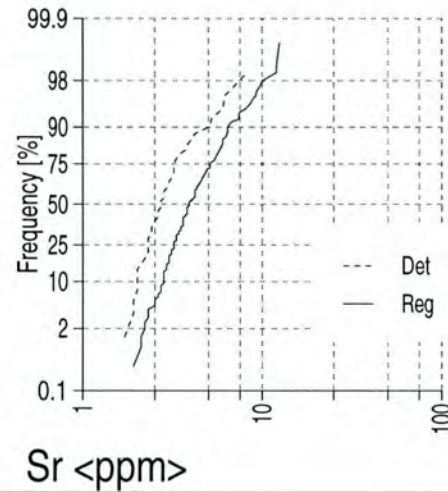
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KENOR Pasvik 1996

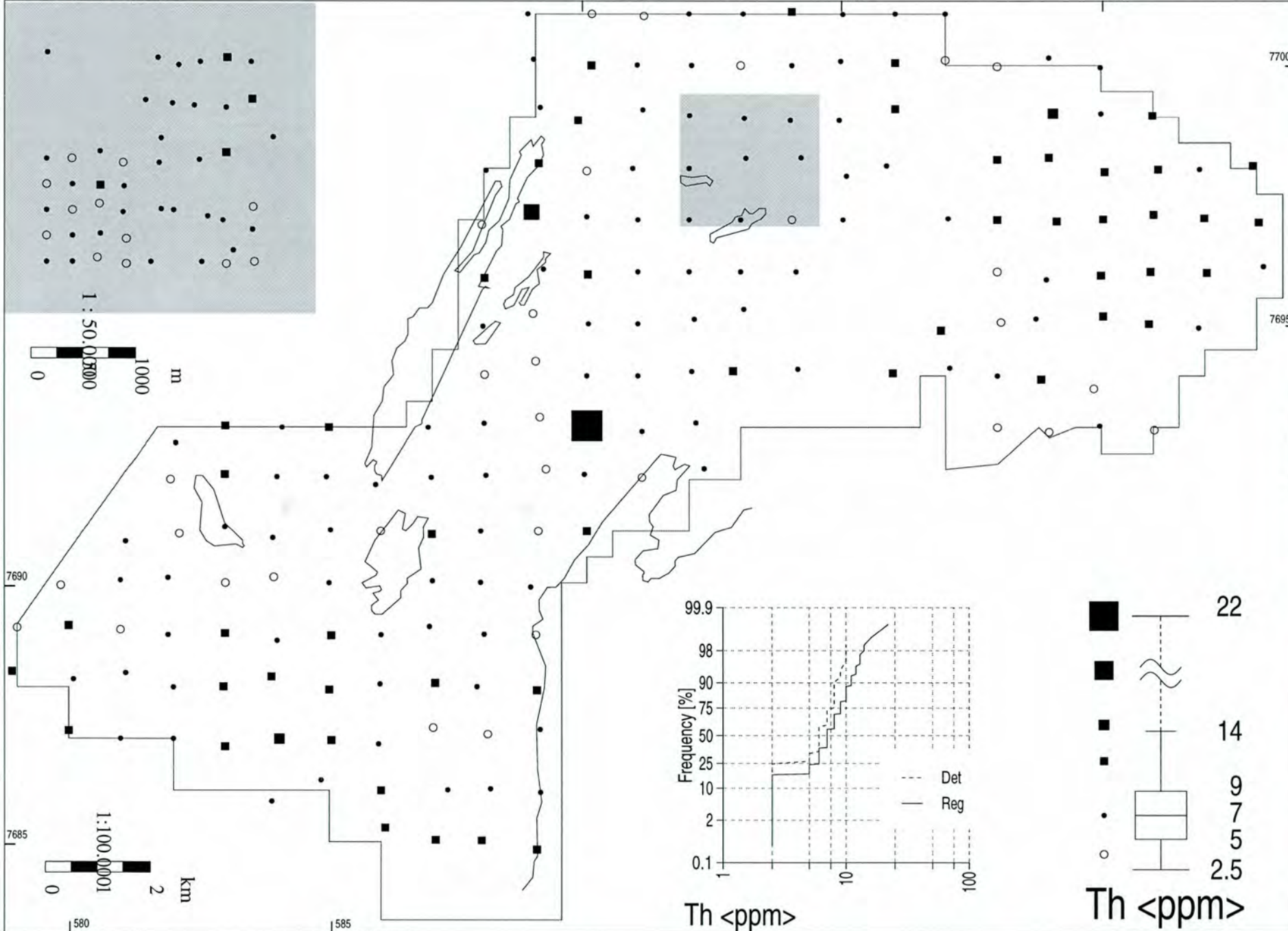
Topsoil
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Aqua Regia
ICP-AES
GF-AAS



apr 97
NGU

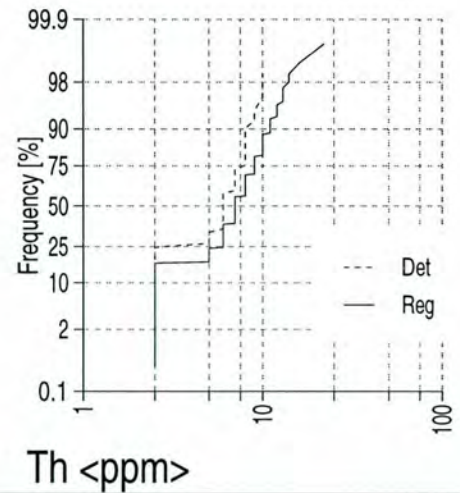
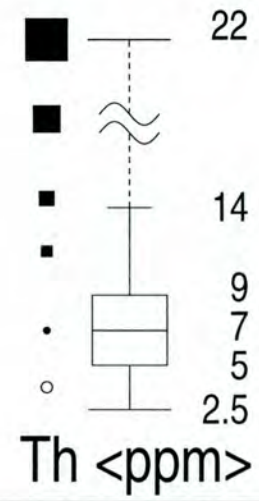
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KENOR Pasvik 1996

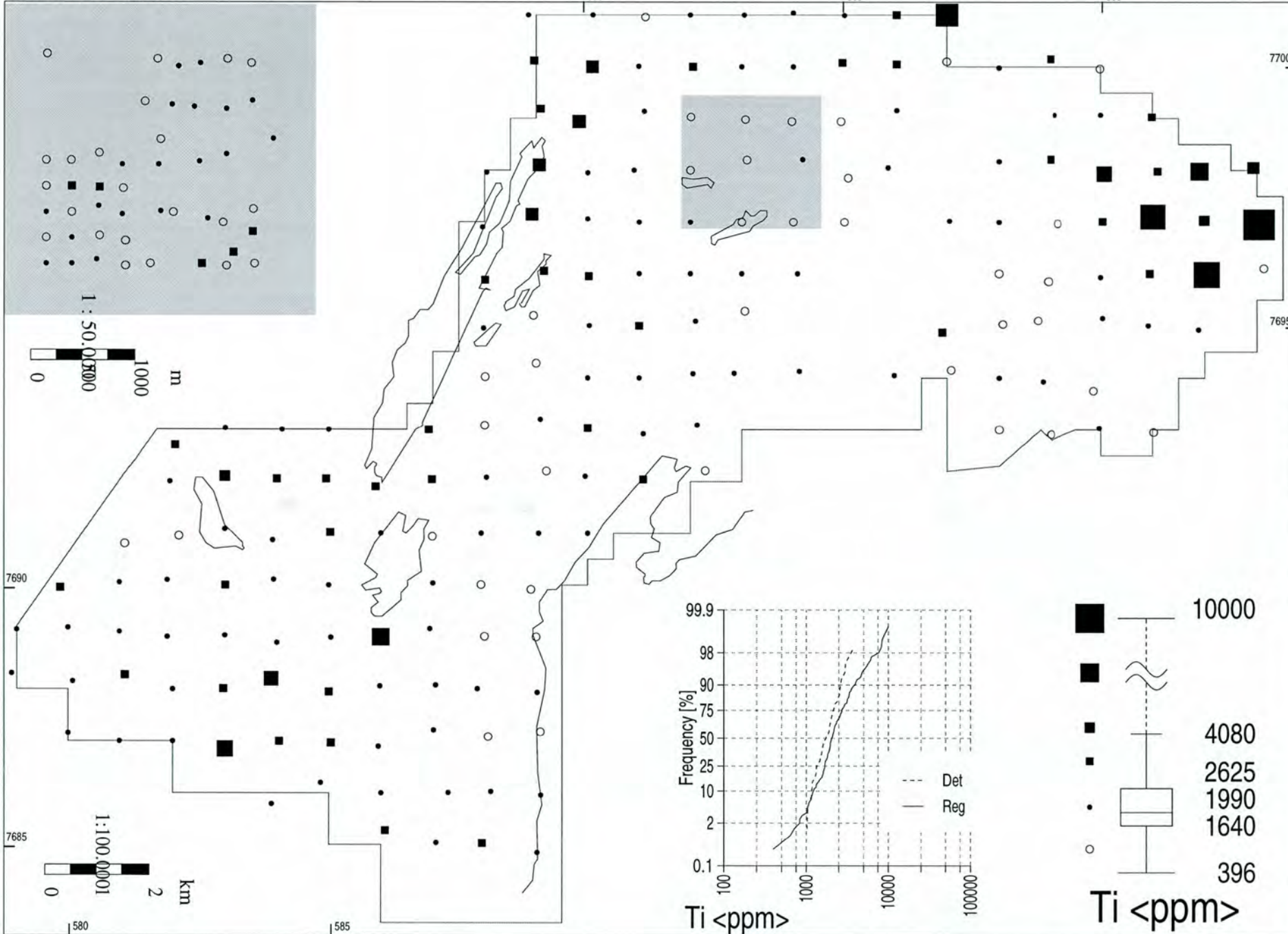
Topsoil
<0.06mm

Aqua Regia
ICP-AES
GF-AAS



apr 97
NGU

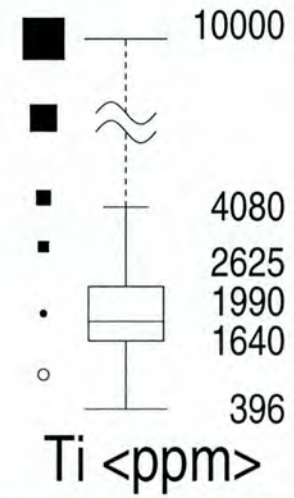
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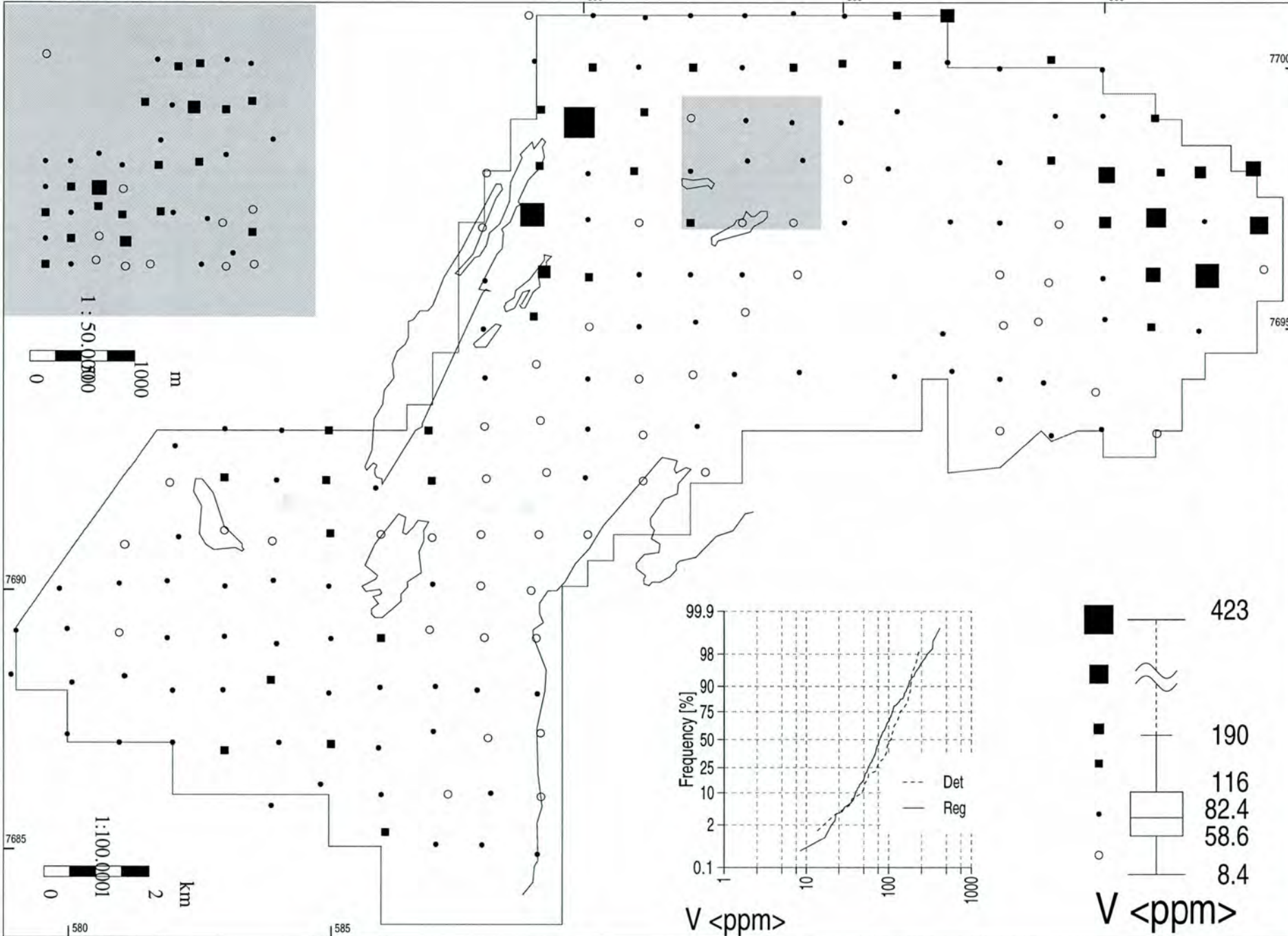
KENOR Pasvik 1996

Topsoil
<0.06mm

Aqua Regia
ICP-AES
GF-AAS



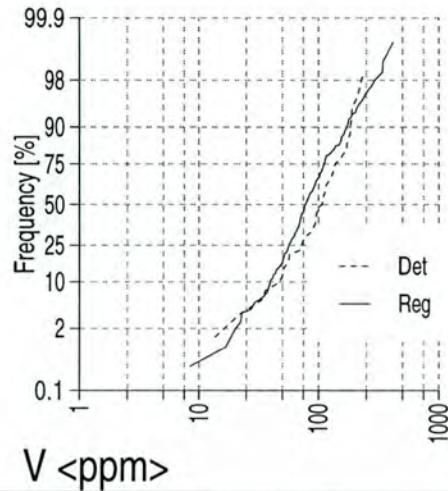
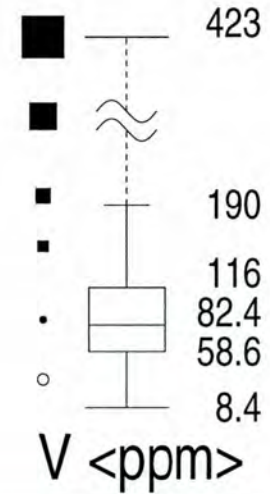
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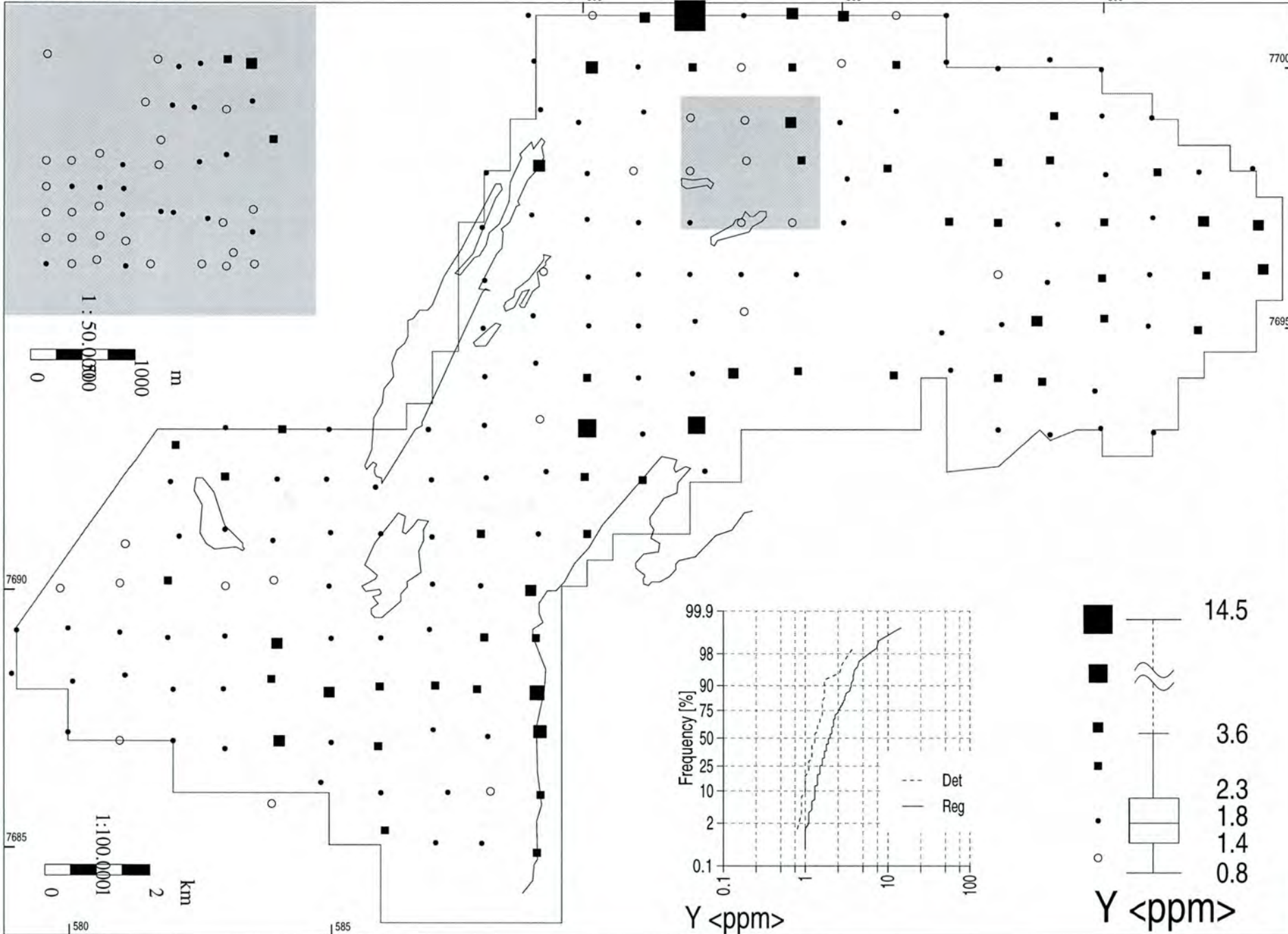
KENOR Pasvik 1996

Topsoil
<0.06mm

Aqua Regia
ICP-AES
GF-AAS



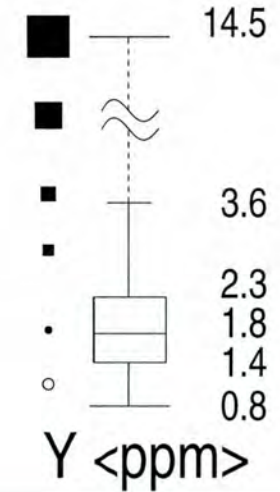
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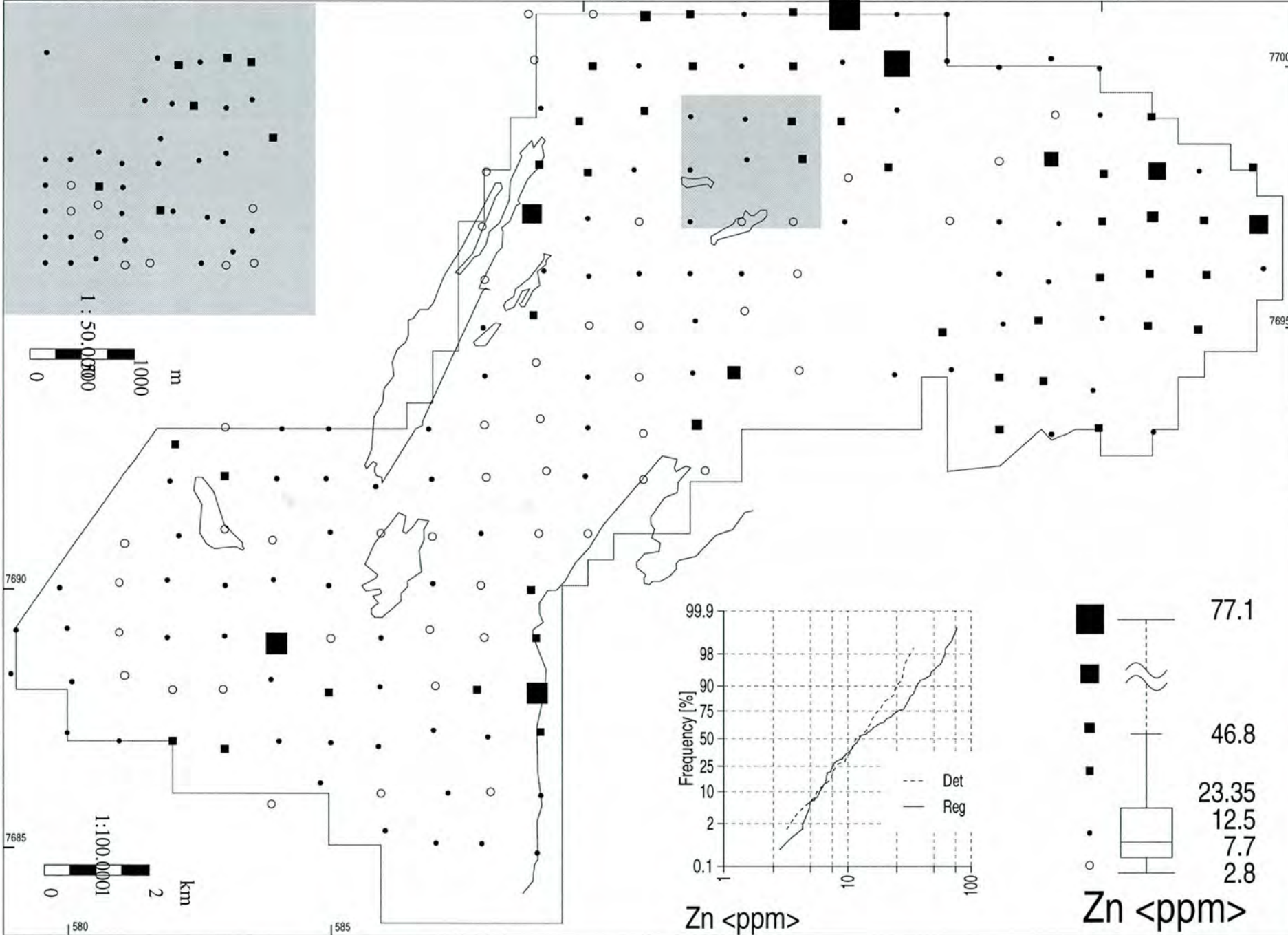
KENOR Pasvik 1996

Topsoil
<0.06mm

Aqua Regia
ICP-AES
GF-AAS



Coordinates are UTM zone 35, WGS84 datum



KENOR Pasvik 1996

Topsoil
<0.06mm

Aqua Regia
ICP-AES
GF-AAS

77.1

46.8

23.35

12.5

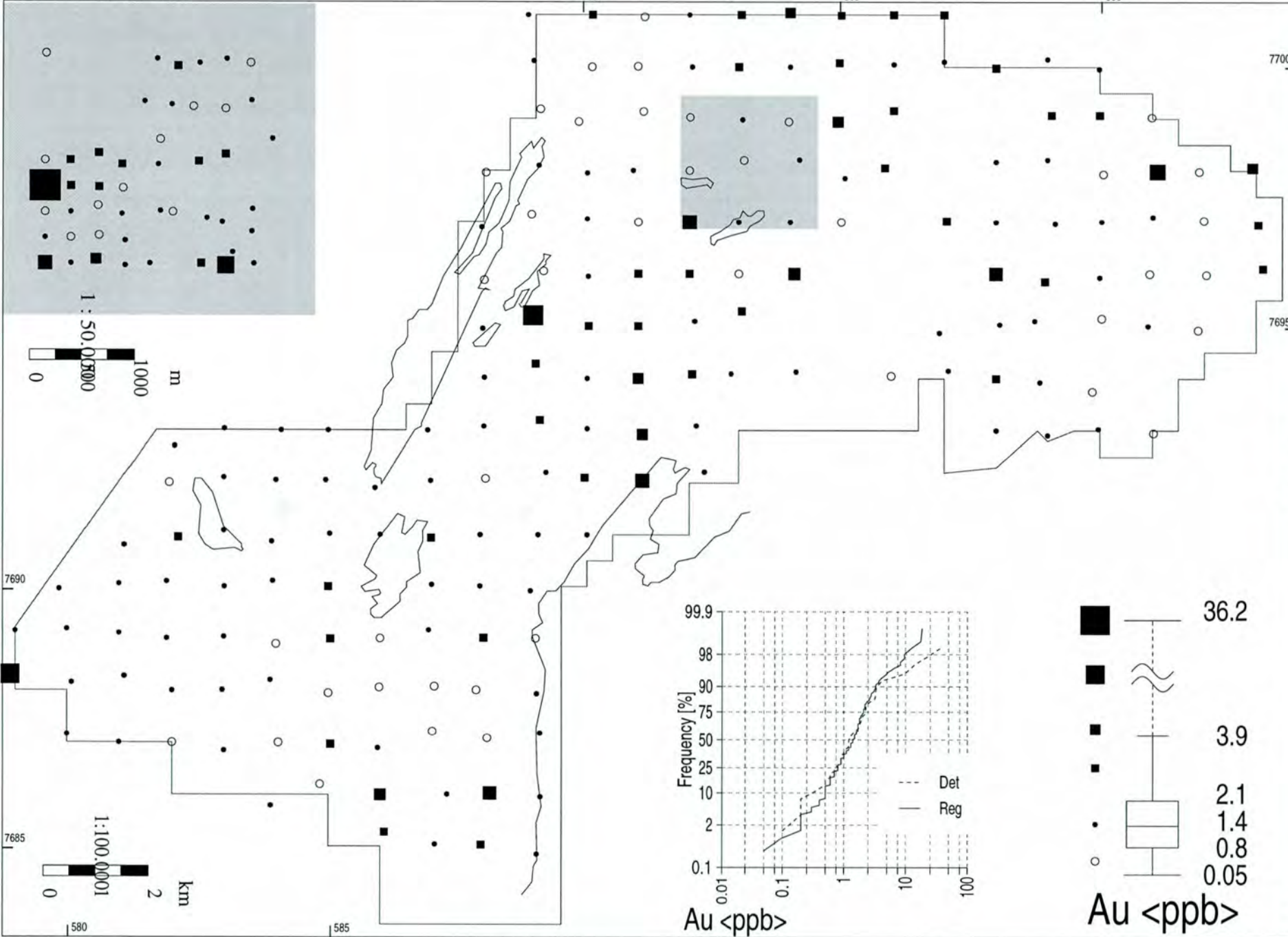
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Zn <ppm>

apr 97
NGU

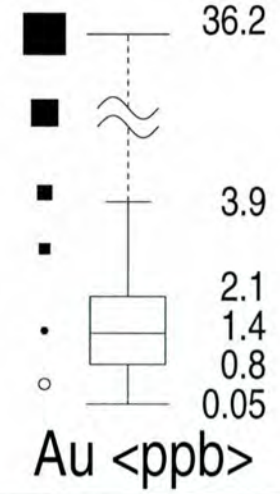
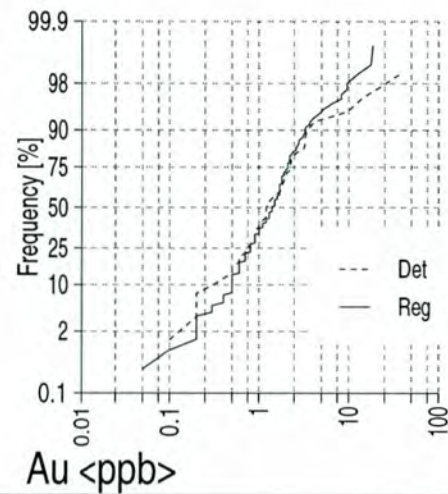
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KENOR Pasvik 1996

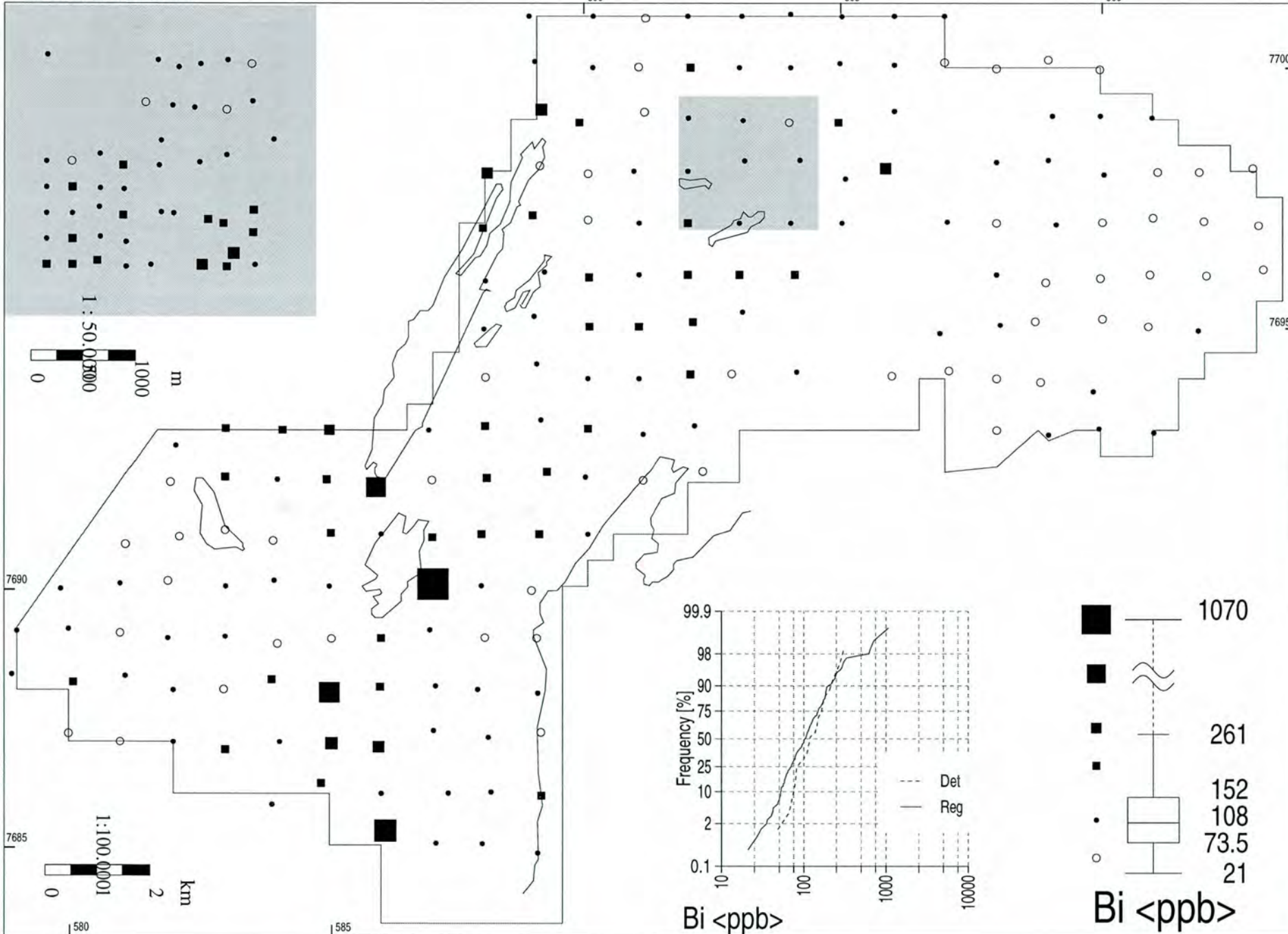
Topsoil
<0.06mm

Aqua Regia
ICP-AES
GF-AAS



apr 97
NGU

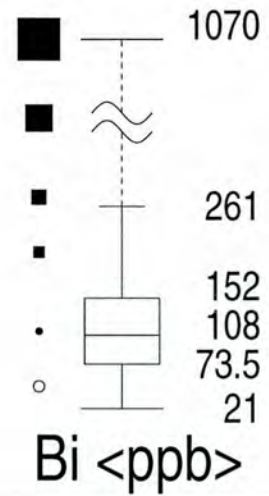
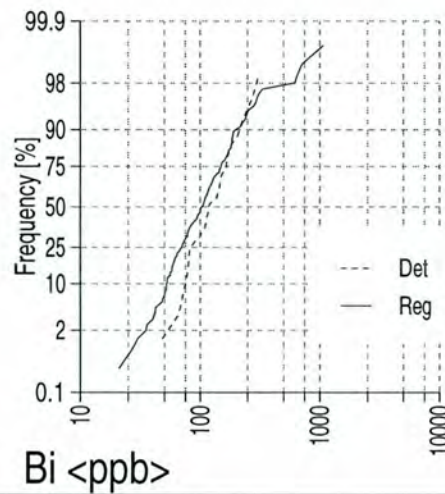
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KENOR Pasvik 1996

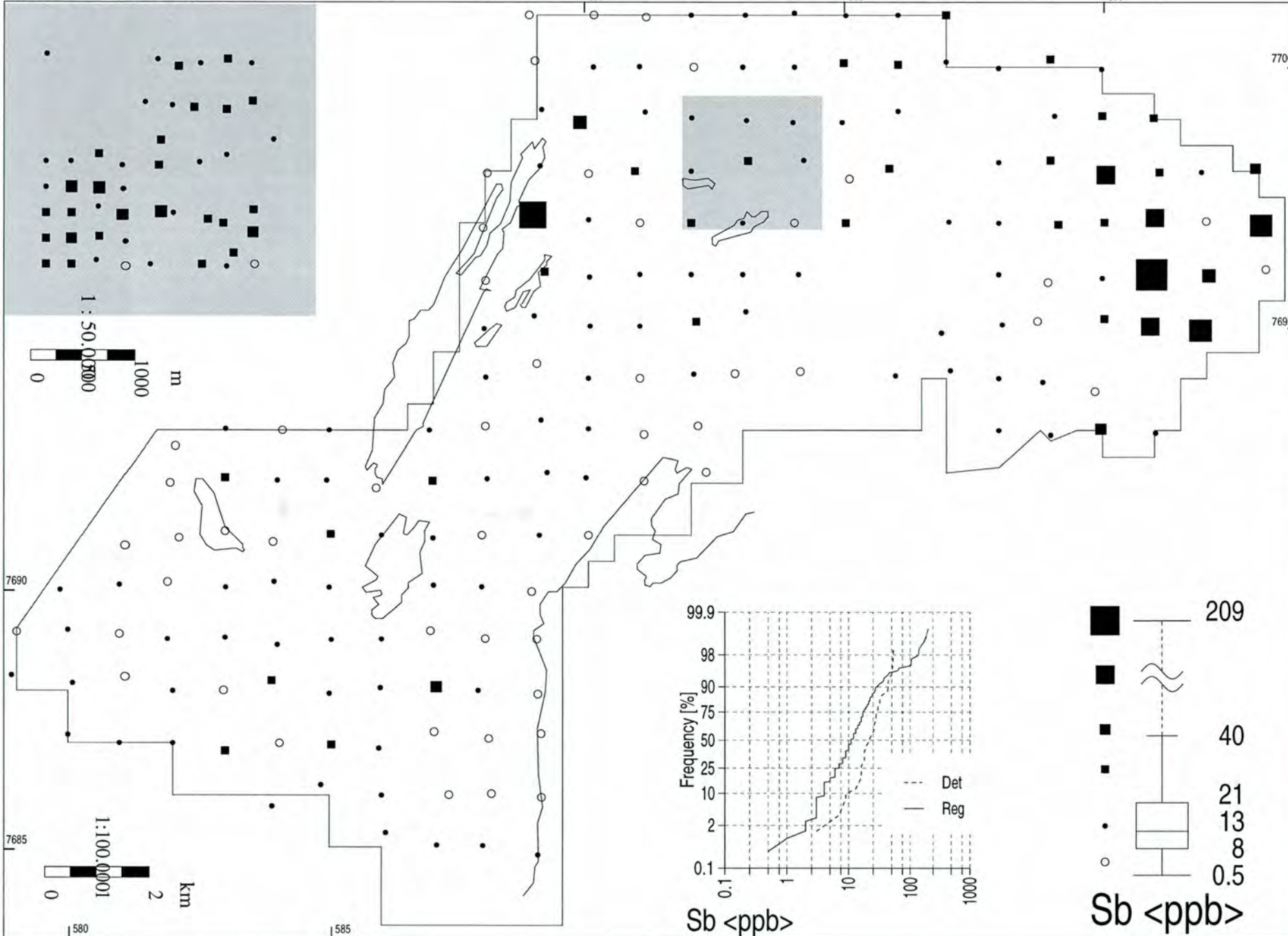
Topsoil
<0.06mm

Aqua Regia
ICP-AES
GF-AAS



apr 97
NGU

Coordinates are UTM zone 35, WGS84 datum

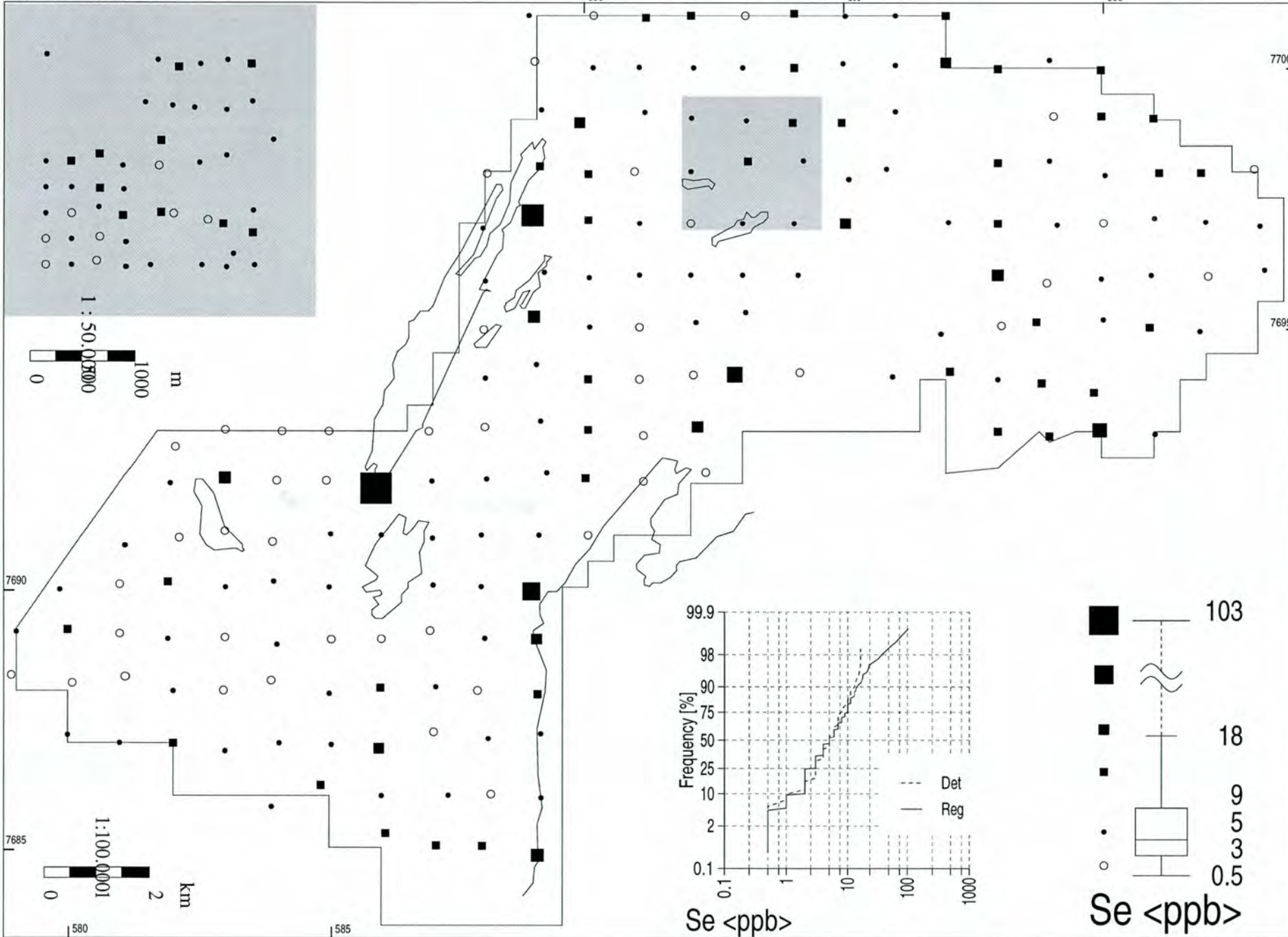


KENOR Pasvik 1996

Topsoil
<0.06mm

Aqua Regia
ICP-AES
GF-AAS

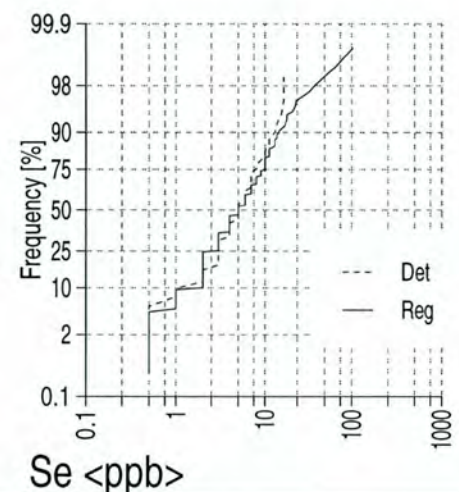
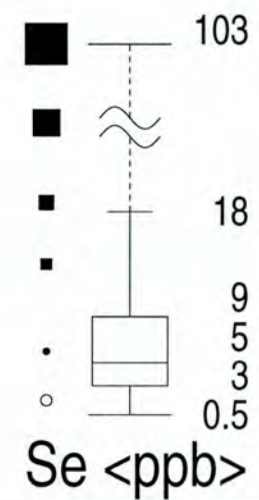
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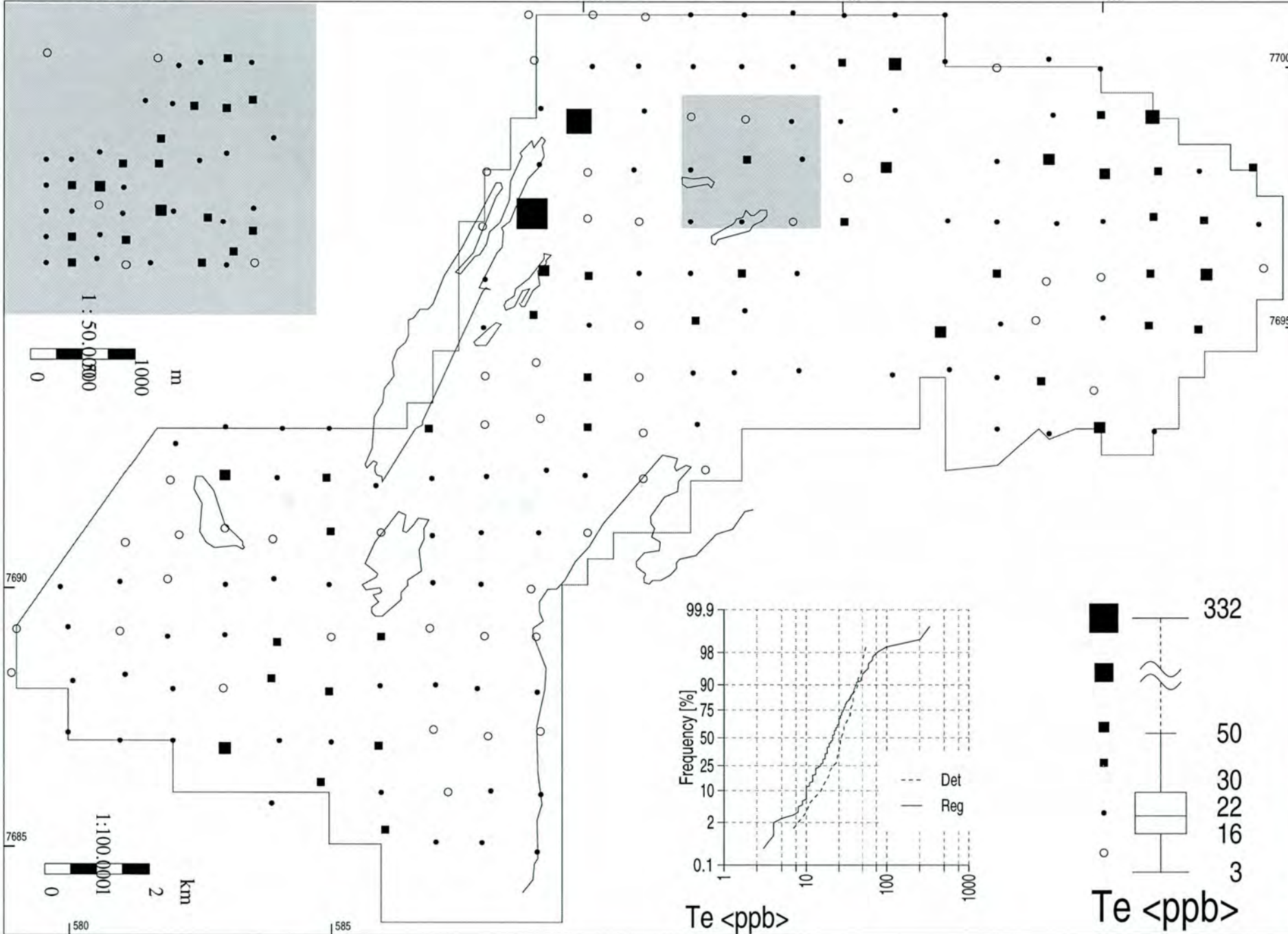
KENOR Pasvik 1996

Topsoil
<0.06mm

Aqua Regia
ICP-AES
GF-AAS



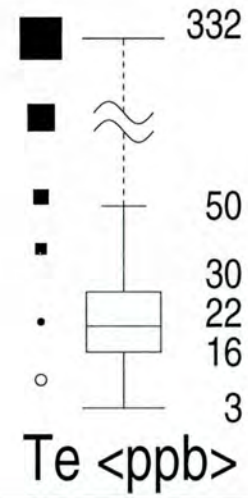
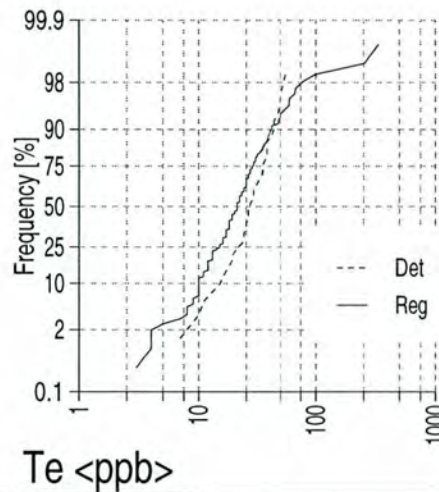
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KENOR Pasvik 1996

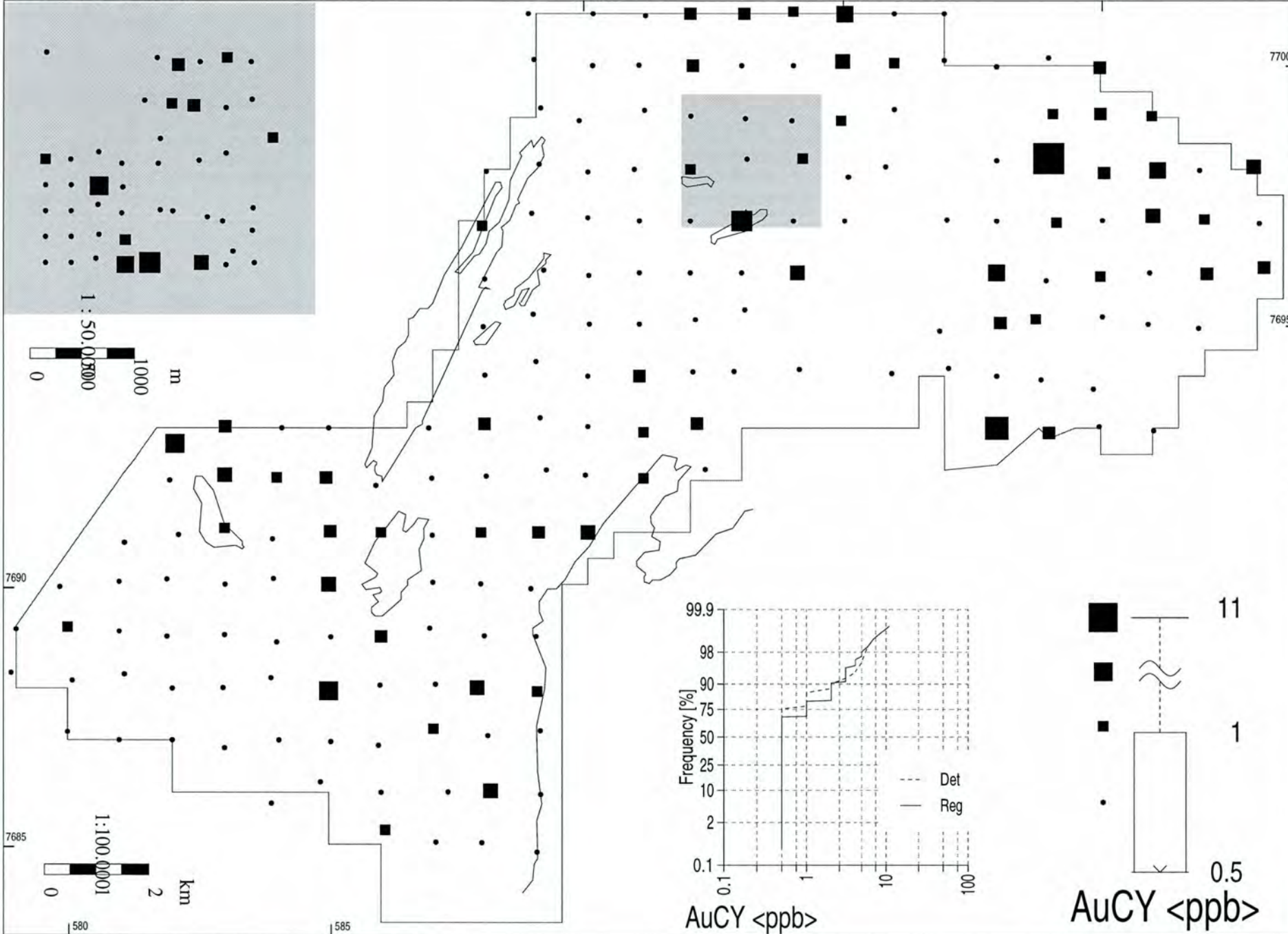
Topsoil
<0.06mm

Aqua Regia
ICP-AES
GF-AAS



apr 97
NGU

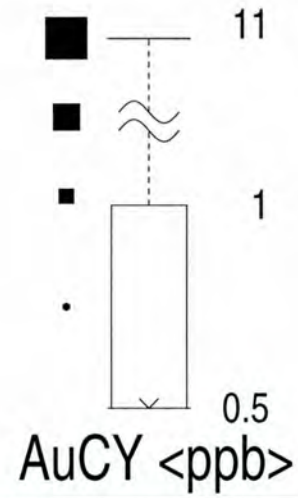
Coordinates are UTM zone 35, WGS84 datum



KENOR Pasvik 1996

Topsoil
<0.06mm

Aqua Regia
ICP-AES
GF-AAS



apr 97
NGU

