NGU Report 97.172

Evaluation of detailed C-horizon sampling as prospecting method at Gjedde Lake gold mineralisation.

NGU
Norges geologiske undersøkelse
Geological Survey of Norway

Geological Survey of Norway
P.O.Box 3006 - Lade
N-7002 Trondheim, Norway
Tel.: 47 73 90 40 11
Telefax 47 73 92 16 20

REPORT

Report no.: 97.172 | ISSN 0800-3416 | Grading: Open

Title:
Evaluation of detailed C-horizon sampling as prospecting method at Gjedde Lake gold mineralisation.

Authors:
Tor Erik Finne

Client:
Kenor ASA

County:
Finnmark

Commune:
Sør-Varanger

Map-sheet name (M=1:250.000)
Kirkenes

Map-sheet no. and -name (M=1:50.000)
2333-1 Vaggatem

Deposit name and grid-reference:
Gjeddevann

Number of pages: 52 Price (NOK): 100,-
Map enclosures: 0

Fieldwork carried out:	Date of report:	Project no.:	Person responsible:
30.06-04.07.1997	20.11.1997	2706.00	D. B

Summary:

In order to evaluate sampling of C-horizon as a method for prospecting for mineralisation of the type found at Gjedde Lake, samples were collected at 25 m spacing along profiles crossing the discovery site and drill sites. Three profiles, 200 m apart, were sampled for about 600 m, and a high number of field duplicates were included in the sampling program (25 duplicates, equivalent to 30 %).

Samples were sieved to -0.06 mm and digested in aqua regia prior to analysis of 36 elements, including As, Au, Bi, Sb, Se, and Te. The method shows a good reproducibility with regards to gold, and As seems to be the best pathfinder.

It is recommended to continue using the employed techniques for future prospecting in the area, with some adjustments regarding the analytical program.

Keywords: Geochemistry	Gold	C-horizon

CONTENTS

1 INTRODUCTION 4
2 METHODS 4
2.1 Field work. 4
2.2 Preparation and analysis. 5
2.3 Computing and mapping. 5
3 RESULTS AND DISCUSSION 6
4 RECOMMENDATIONS 7
5 REFERENCE 7

APPENDIX (no. of pages)

Appendix 1 (3) Scatterplots of field duplicates
Appendix 2 (4) Analytical tables of field duplicates
Appendix 3 (4) Analytical tables and coordinates of samples
Appendix 4 (1) Sample number map
Appendix 5 (1) Scatterplots of Au and pathfinder elements
Appendix 6 (31) Point maps showing analytical results of hot aqua regia extracts of Al, As, Ba, Be, Ca, Co, Cr, Cu, Fe, K, La, Li, Mg, Mn, Mo, Ni, P, Pb, S, Sc, Sr, Th, Ti, V, Y, Zn, cold aqua regia extracts of Au, Bi, Sb, Se, Te.

1 INTRODUCTION

Following the topsoil geochemical survey of late fall 1996 (Finne 1996), a detailed study of the area around the drill site by Gjedde Lake was conducted in early summer 1997. This study was carried out to evaluate shallow sampling of C-horizon (at depths immediately below the precipitation of the B-horizon) and analysis as a method to uncover the known deposit as well as possible other deposits in the vicinity.

2 METHODS

2.1 Field work.

Field work was carried out in the period June 30th - July 4th 1997, by Øystein Jæger, NGU, and Tor Erik Finne, NGU. Transport in the field was solely on foot, and navigation was done by ordinary compass, precision range finder compass and steel tape measure. As the topography of the area investigated is very calm, no special equipment for slope compensation was employed. A wooden stick (.75x3x60 cm) was marked with the coordinates of the local grid and placed in the ground at every sample site.

Samples were collected in three profiles extending North-South from a base line approximately 75m S of drill site 1. The grid created during the field geophysical campaign of 1995 (Lauritsen 1995) was used, and extended to the North. Profiles at 800E, 1000E and 1200E were chosen to allow sampling immediately across the drill site and discovery point, to allow for some distance between the profiles, as well as minimize the interruption of sampling along the profile due to the lake. Samples were taken 25m apart along the profile, and at every third sample, a field duplicate was collected between one and three meters away from the ordinary sample.

Sampling was done using ordinary steel spades as well as small steel throwels to excavate the required sample mass at proper depth. Samples were collected well below the precipitation (B) horizon typical of the podzol profile predominant in these parts of the world (i.e.at about 20-40cm below the humus layer). A few sites did not show a well developed podzol profile. In these cases, samples were taken from depths that were deeper than the typical depth of the B - C interface of this area. A minimum of 1kg of sample was collected (pebbles removed by hand).

All coordinates of the sample sites were recorded on paper, with reference to the local grid. When sampling was completed, notes were taken on depth of humus layer and depth of

bleached layer, as well as depth of sampling and remarks as found necessary by the field crew. All observations were marked with the initials of the person sampling.

2.2 Preparation and analysis.

All 100 samples were wrapped in paper bags with additional individual plastic bag covers. The samples were wrapped in large fiberglass bags for protection and at the end of the field work 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 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 by GTK 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 July 24th 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 flagged in the analytical report.

2.3 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.

A total of 25 field duplicate pairs were sampled and analyzed to allow for evaluation of data quality. The results were plotted in scatter plots. The analytical results of the duplicates are also reported as a separate table, whereas all other analytical results are given in the tables of Appendix 3.

Maps were made employing robust statistics to distinguish between anomalies and background. For this purpose, all analytical results of this campaign were used as population. Maps were made as dot maps, with a combination of changing symbols and size to distinguish between the various categories of analytical values obtained, according to the robust statistics employed. For each element, the point map of the three profiles was superimposed on a map of the surrounding samples from the detailed part of the 1996 topsoil survey. Co-registration of the two maps was done by eye only, as they were reported in two different coordinate systems. As upper limits of the symbol classes for the 1996 data, the robust statistics of that data set was used. The regional map of the topsoil survey was included as a small illustration as well.

3 RESULTS AND DISCUSSION

The results of the analysis of field duplicates (FD) are illustrated in the scatterplots of Appendix 1, as well as in the tables of Appendix 2. All other analytical results are given in the tables of Appendix 3.

It appears that most elements follow a 1:1 line in the plots, although there are three duplicates in which the deviation from the 1:1 line is particularly high; namely the pairs of site 1527, 1563 and 1577. When sorting the data for the FD evaluation, the sample of the pair that was taken furthest to the north was always plotted along the Y-axis, to increase chances to detect any bias with regards to closeness to source. For gold, such bias does not appear to be the case.

Appendix 4 shows a sample number map. As it appears, samples were taken along a profile regularly by a distance of 50m by each of the two members of the field team, with an offset of 25m between the two. Only very few samples were not taken at the regular positions of the grid. These samples' locations were moved due to the presence of Gjedde Lake and marshland. Difficulties with boulders/rock rarely caused sampling more than 5m away from the preplanned locations.

Appendix 5 shows five scatterplots intended to illustrate to what extent As and «pathfinders» correlate with Au. It appears that As is the real pathfinder in this material, partly in contradiction to the results from the topsoil survey of late fall 1996. Since gold is associated with arsenopyrite in the drill cores, this illustrates that the samples of C-horizon resemble bedrock to a greater extent than the more weathered bleached layer of the topsoil.

Appendix 6 shows the geochemical maps of 31 of the elements analyzed, as the results of Ag, B, Cd, Na, and Si were not considered interesting enough to justify a map (no variation, or analytical results of no meaning due to precipitation problems in the analytical solute).

The most anomalous area of Au is clearly along profile 800E. The site immediately near the outcrop of the mineralized zone along profile 1000E shows only a moderate Au value. This is believed to be due to an effect of local topography, which partly forms a lee side downstream the ice movement, thereby decreasing the glaciers' ability to erode and deposit material from the mineralized zone. Considering the major ice movement direction, it appears that the anomalous part of profile 800E is an indication that there was more available gold further to the West of 800E. This is in accordance with the topsoil survey, which shows an anomaly of a rather large area, but only moderate gold values SW of Gjedde Lake. The tails of this anomaly can be seen in profile 1000E at 1150-1225N and at 1375-1425N. Weak traces of the same anomaly can also be observed at 1200E at 1300-1325N and 1425-1475N.

4 RECOMMENDATIONS

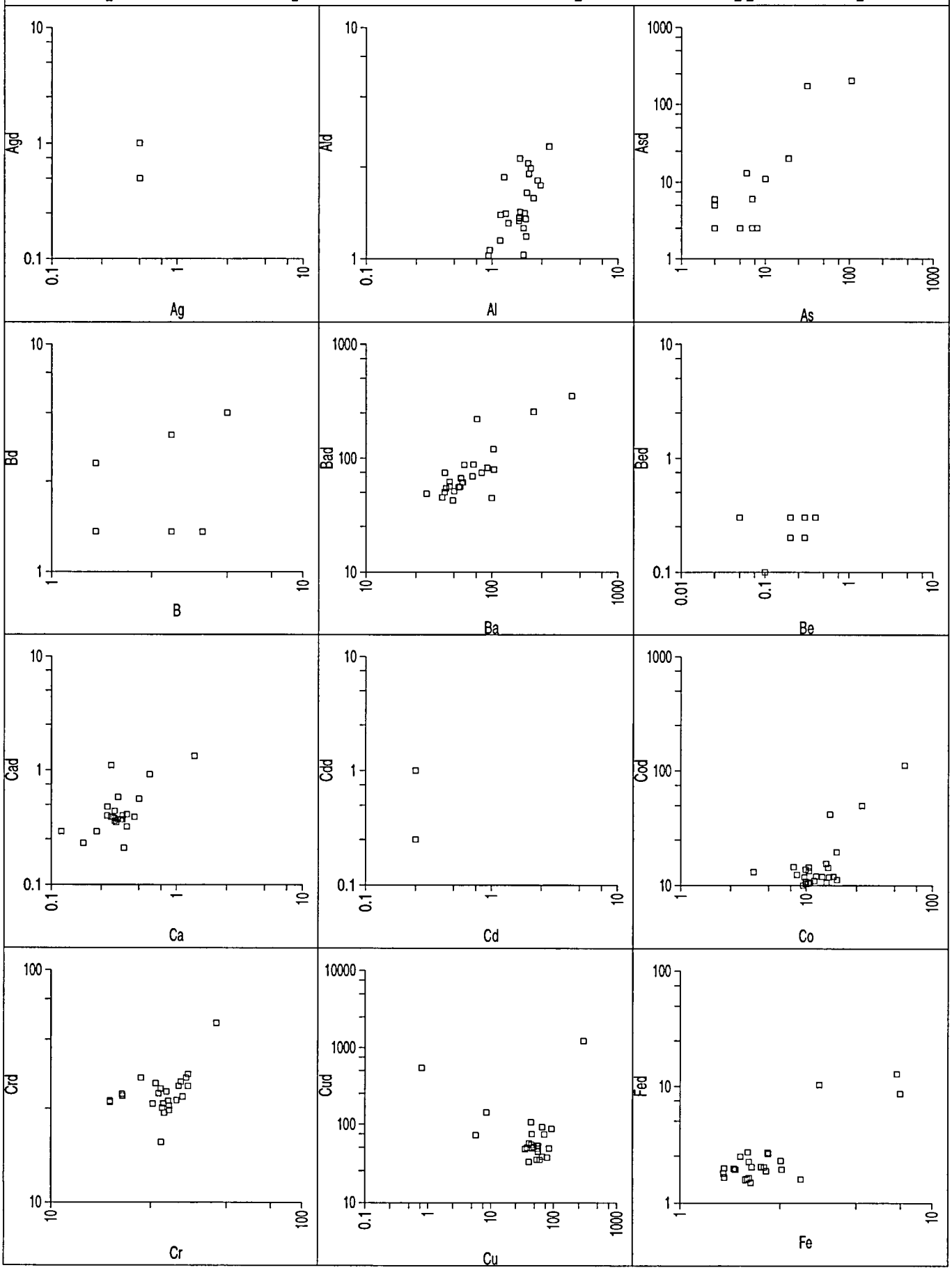
It appears that the results of Au in the C-horizon are of quite high quality with regards to reproducibility of the field duplicates. They are well matched by the association of As values, although an analytical method with a greater sensitivity for As should be applied. Continued application of the strategy of sampling C-horizon along profiles 200 - 250m apart, and with 25m sampling distance along the profile can be considered a reliable technique. Cost minimizing can be obtained by negotiating an analytical scheme containing only Au (a detection limit of 1ppb should also be considered) and As (detection limit should be lower than 1ppm; the present method yield only 5ppm detection limit). A minimum sample mass of 20g <0.06mm is considered to be crucial for maintaining high quality results.

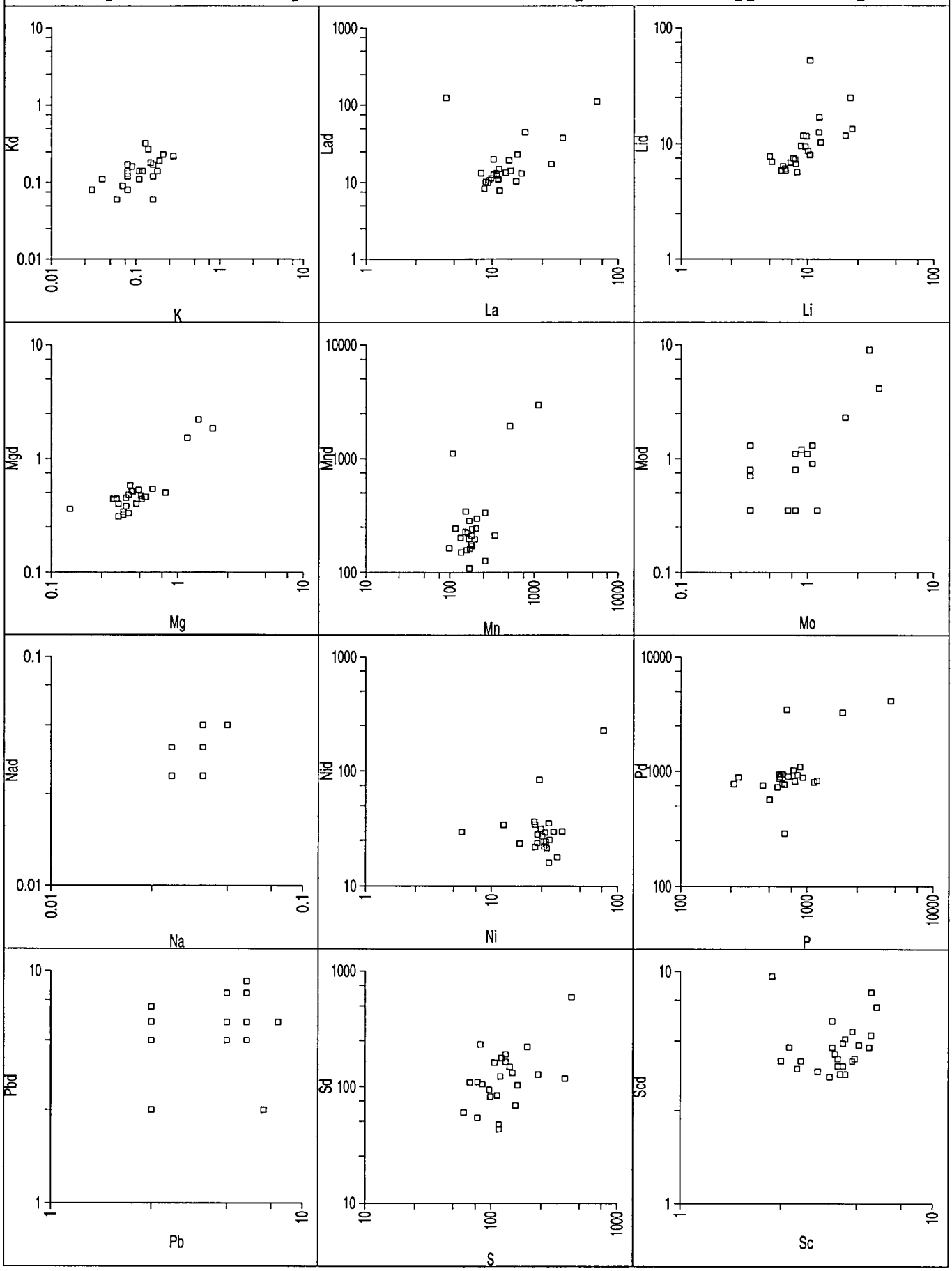
A high production of about 13 samples/man-day could be maintained for an extended period, by introducing support of motorized transport of samples at the end of the day/week, and by substituting traditional navigation by compass and steel tape measure with real time DGPS.

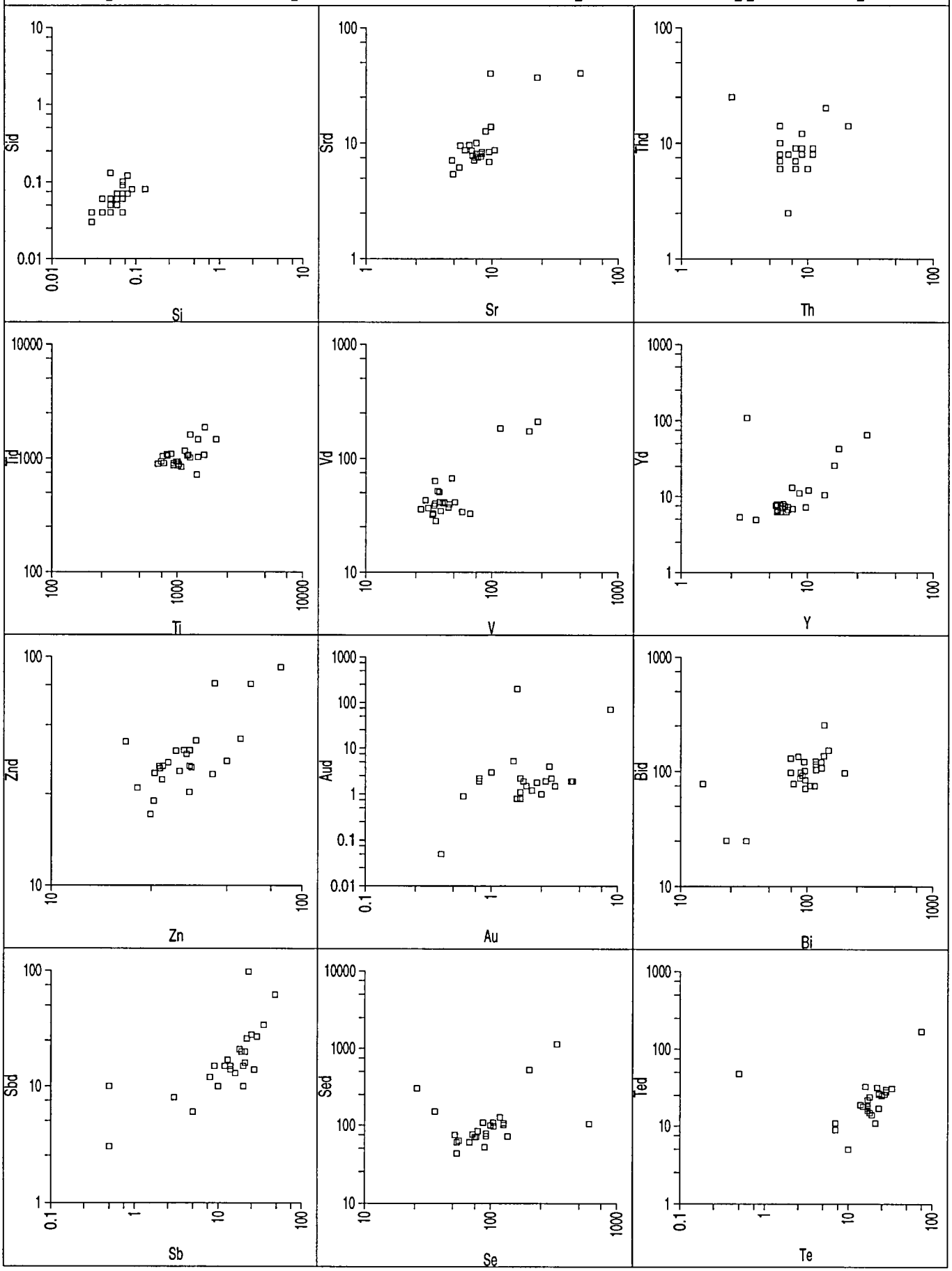
5 REFERENCES

Finne, T. E. 1996. Geochemistry of topsoil in Vaggatem - Skogfoss. NGU Report 96.142.

Lauritsen, T. 1995. Geofysiske bakkemålinger ved Gjeddevann i Pasvik, Sør-Varanger kommune, Finnmark. NGU Report 95.119.


Agd
Ag
Ald
Al
Asd
As
Bd
B
Bad
Ba
Bed
Be
Cad
Ca
Cdd
Cd
Cod
Co
Crd
Cr
Cud
Cu
Fed
Fe


Kd
K
Lad
La
Lid
Li
Mgd
Mg
Mnd
Mn
Mod
Mo
Nad
Na
Nid
Ni
Pd
P
Pbd
Pb
Sd
S
Scd
Sc


Sid
Si
Srd
Sr
Thd
Th
Tid
Ti
Vd
V
Yd
Y
Znd
Zn
Aud
Au
Bid
Bi
Sbd
Sb
Sed
Se
Ted
Te

*Site	East	North	East d	North d	Humus thickness		Bleached layer thickness		Sample depth		Ag	Ag-d	Al	Al-d	As	As-d	Au	Au-d	B	B-d
	m	m	m	m	cm	d	cm	d	cm	d	ppm	ppm	%	%	ppm	ppm	ppb	ppb	ppm	ppm
1504	800	1026	800	1029	3	1	4	5	33	50	0.5	0.5	1.17	1.55	2.5	2.5	0.8	2.2	1.5	1.5
1506	795	1125	795	1128	15	7	6	3	40	55	0.5	0.5	1.16	1.20	32.0	172.0	1.6	199.5	1.5	1.5
1509	800	1276	800	1277	1	7	4	3	32	55	0.5	0.5	1.78	1.36	107.0	201.0	8.8	69.5	1.5	1.5
1512	810	1425	810	1428	35	20	0	0	35	30	0.5	0.5	0.96	1.09	2.5	5.0	2.9	4.0	1.5	1.5
1515	800	1575	800	1576	11	5	4	2	38	34	0.5	0.5	1.29	1.57	2.5	2.5	1.5	5.2	1.5	1.5
1518	1000	1326	1000	1329	4	2	7	0	35	50	0.5	0.5	1.78	1.04	2.5	2.5	1.9	1.5	1.5	1.5
1521	1001	1474	1004	1476	5	5	10	5	30	32	0.5	0.5	1.25	2.26	7.0	2.5	1.0	3.0	1.5	1.5
1524	1000	1024	1001	1026	3	2	4	4	38	35	0.5	0.5	1.86	1.49	2.5	2.5	2.1	1.2	5.0	5.0
1527	1200	1627	1200	1629	3	5	7	0	50	40	0.5	0.5	2.86	3.06	2.5	2.5	0.6	0.9	4.0	1.5
1530	1199	1476	1200	1479	4	6	4	7	30	40	0.5	0.5	1.87	1.25	7.0	6.0	3.0	2.2	1.5	1.5
1533	1201	1323	1201	1326	2	2	4	4	48	48	0.5	0.5	1.35	1.43	2.5	2.5	4.4	1.9	1.5	1.5
1536	1200	1100	1200	1100	2	4	3	6	29	25	0.5	0.5	2.31	2.19	2.5	2.5	1.6	0.8	1.5	1.5
1539	1200	1001	1200	1002	1	3	4	2	34	30	0.5	0.5	2.04	2.47	2.5	2.5	1.7	0.8	3.0	1.5
1553	800	1104	801	1107	20	20	0	0	25	25	0.5	0.5	0.94	1.03	19.0	20.0	2.3	1.8	1.5	1.5
1556	798	1250	799	1253	5	2	2	4	30	50	0.5	0.5	1.68	1.60	6.0	13.0	1.7	2.2	1.5	1.5
1559	800	1400	800	1401	1	4	4	10	40	35	0.5	0.5	1.82	1.58	2.5	6.0	0.8	1.9	1.5	1.5
1562	800	1547	800	1549	8	6	1	1	55	50	0.5	1.0	1.94	2.59	2.5	5.0	0.6	0.9	1.5	1.5
1565	1000	1300	1000	1301	3	4	3	2	40	43	0.5	0.5	1.64	1.46	2.5	2.5	1.8	1.9	1.5	1.5
1568	1000	1451	1000	1453	3	2	4	4	40	45	0.5	0.5	1.64	1.51	8.0	2.5	2.5	1.0	1.5	1.5
1571	1000	1601	1000	1607	2	3	1	4	30	30	0.5	0.5	1.97	2.34	2.5	2.5	1.7	1.1	3.0	1.5
1574	1195	1215	1193	1218	10	13	0	0	30	30	0.5	0.5	1.65	1.50	10.0	11.0	4.3	1.9	3.0	4.0
1577	1198	1603	1199	1604	2	2	0	0	38	45	0.5	0.5	1.67	2.72	2.5	5.0	0.4	0.1	1.5	1.5
1580	1200	1447	1200	1448	2	3	2	3	20	35	0.5	0.5	1.89	1.94	5.0	2.5	3.2	1.5	1.5	1.5
1583	1200	1299	1200	1301	5	3	4	5	45	48	0.5	0.5	2.14	1.84	5.0	2.5	2.7	1.9	1.5	3.0
1586	1202	1074	1200	1075	3	2	5	2	38	40	0.5	0.5	2.44	2.09	2.5	2.5	1.5	5.2	1.5	1.5

*Site	Ba	Ba-d	Be	Be-d	Bi	Bi-d	Ca	Ca-d	Cd	Cd-d	Co	Co-d	Cr	Cr-d	Cu	Cu-d	Fe	Fe-d	K	K-d	La	La-d	Li	Li-d	Mg
	ppm	ppm	ppm	ppm	ppb	ppb	%	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	%	%	%	ppm	ppm	ppm	ppm	%
1504	54.5	55.5	0.2	0.2	74	98	0.40	0.32	0.25	0.25	12.0	12.0	19.2	28.9	35.6	48.0	1.50	1.65	0.11	0.14	11.3	11.1	5.2	7.0	0.34
1506	82.6	74.5	0.2	0.2	199	97	0.46	0.39	0.25	0.25	9.7	11.8	29.6	24.6	85.6	48.8	1.86	2.69	0.19	0.19	15.5	10.4	20.0	11.7	0.49
1509	60.3	87.1	0.3	0.2	118	103	0.32	0.38	0.25	0.25	17.5	11.2	28.1	26.3	66.4	38.3	2.10	2.02	0.12	0.14	11.4	14.9	7.7	7.5	0.39
1512	103.0	120.0	0.2	0.2	130	120	0.50	0.56	0.25	0.25	8.4	12.4	27.4	30.5	66.6	92.9	1.50	1.96	0.21	0.23	36.3	37.4	12.4	16.9	0.44
1515	56.8	66.5	0.2	0.2	137	253	0.32	0.44	0.25	0.25	14.4	15.5	22.9	34.1	48.9	51.1	1.64	1.95	0.16	0.17	13.7	19.3	6.4	6.4	0.33
1518	42.4	74.5	0.3	0.2	85	134	0.28	0.48	0.25	0.25	7.9	14.5	25.5	26.3	44.2	107.0	1.49	1.78	0.08	0.17	10.3	19.9	6.6	6.1	0.31
1521	30.3	48.8	0.2	0.3	96	101	0.12	0.29	0.25	0.25	3.8	13.1	17.2	27.0	5.8	72.2	1.93	2.01	0.03	0.08	11.5	7.8	5.0	7.8	0.14
1524	69.8	69.0	0.3	0.3	106	75	0.33	0.35	0.25	0.25	13.4	11.9	35.3	31.3	54.7	34.9	2.16	2.00	0.12	0.14	9.9	11.3	10.4	8.0	0.56
1527	215.0	255.0	0.2	0.2	15	78	1.39	1.33	0.25	0.25	27.6	50.0	27.6	17.9	0.8	545.0	7.46	8.64	0.13	0.32	68.4	111.0	21.9	24.8	1.90
1530	45.9	56.4	0.3	0.2	78	78	0.30	0.39	0.25	0.25	10.5	13.4	29.6	25.8	44.7	54.4	1.88	1.63	0.08	0.13	8.2	13.2	8.3	5.7	0.39
1533	58.6	61.1	0.2	0.2	92	92	0.32	0.36	0.25	0.25	10.4	10.4	29.4	27.0	56.9	44.3	1.82	1.58	0.11	0.11	12.9	13.4	7.3	6.9	0.47
1536	58.2	61.1	0.3	0.3	97	84	0.37	0.37	0.25	0.25	17.4	19.6	35.3	35.3	93.7	87.5	2.24	2.65	0.16	0.12	9.5	10.7	10.1	8.7	0.52
1539	55.7	56.0	0.3	0.3	117	122	0.34	0.37	0.25	0.25	10.7	10.6	34.7	34.1	55.7	48.5	2.23	2.67	0.08	0.14	11.2	10.8	9.6	9.5	0.51
1553	71.0	87.9	0.2	0.2	95	121	0.34	0.58	0.25	0.25	10.0	10.8	26.9	29.1	79.5	37.2	1.66	1.91	0.14	0.27	15.9	23.0	22.6	13.4	0.43
1556	99.9	44.6	0.3	0.2	115	75	0.38	0.21	0.25	0.25	14.5	10.6	32.4	31.4	61.0	34.7	2.24	2.61	0.16	0.06	14.1	14.2	9.8	11.6	0.55
1559	40.2	45.0	0.3	0.3	136	136	0.18	0.23	0.25	0.25	15.2	11.8	31.7	27.2	55.5	53.1	2.54	1.92	0.06	0.06	8.9	10.2	8.1	6.7	0.34
1562	431.0	351.0	0.1	0.1	23	25	0.61	0.92	0.25	0.25	60.2	112.0	45.7	59.0	297.0	1240.0	7.24	12.90	0.28	0.22	18.2	44.7	12.3	12.5	1.46
1565	48.8	42.5	0.2	0.2	88	87	0.36	0.37	0.25	0.25	9.4	10.0	27.8	25.2	41.2	56.7	1.85	1.60	0.11	0.11	9.3	9.9	6.7	5.9	0.37
1568	50.2	51.2	0.3	0.3	131	107	0.31	0.39	0.25	0.25	11.6	11.0	28.3	24.0	41.0	32.9	1.91	1.50	0.08	0.12	11.0	12.2	6.2	5.9	0.41
1571	43.2	54.3	0.3	0.3	97	71	0.32	0.36	0.25	0.25	10.5	14.4	26.2	32.2	45.6	74.7	1.74	2.47	0.08	0.08	10.9	13.2	9.3	11.7	0.42
1574	92.0	82.1	0.3	0.2	148	152	0.37	0.40	0.25	0.25	14.9	14.3	33.6	28.2	71.6	73.8	2.20	1.86	0.15	0.18	29.5	17.3	12.7	10.3	0.63
1577	76.0	221.0	0.1	0.3	33	25	0.30	1.10	0.25	1.00	15.4	41.9	17.2	26.6	8.5	143.0	3.58	10.30	0.04	0.11	4.3	124.0	10.5	51.9	1.19
1580	42.1	50.0	0.3	0.3	89	98	0.23	0.29	0.25	0.25	9.9	10.3	28.9	29.6	45.9	49.3	1.88	2.23	0.07	0.09	8.7	8.3	8.0	7.3	0.37
1583	104.0	79.4	0.2	0.2	74	130	0.40	0.41	0.25	0.25	16.4	11.9	19.3	28.4	38.2	49.8	3.02	1.59	0.18	0.14	17.1	13.1	10.5	8.1	0.80
1586	46.1	61.9	0.4	0.3	117	115	0.28	0.40	0.25	0.25	9.9	13.8	33.1	32.7	57.3	52.8	2.51	2.28	0.09	0.16	10.3	12.6	8.9	9.6	0.41

*Site	Mg-d	Mn	Mn-d	Mo	Mo-d	Na	Na-d	Ni	Ni-d	P	P-d	Pb	Pb-d	S	S-d	Sb	Sb-d	Sc	Sc-d	Se	Se-d	Si	Si-d	Sr	Sr-d
	%	ppm	ppm	ppm	ppm	%	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb	ppb	ppm	ppm	ppb	ppb	%	%	ppm	ppm
1504	0.40	178.0	176.0	0.4	0.4	0.04	0.04	16.7	23.4	1200	827	2.5	5.0	68	109	14	14	2.9	3.8	72	76	0.05	0.06	7.7	7.5
1506	0.53	170.0	283.0	0.4	0.4	0.04	0.04	28.6	16.0	608	899	5.0	6.0	157	69	23	98	4.0	6.1	137	72	0.03	0.03	10.5	8.7
1509	0.45	346.0	211.0	0.4	0.4	0.03	0.04	27.4	21.4	926	879	8.0	6.0	119	123	48	62	3.9	3.5	127	101	0.05	0.04	6.6	9.6
1512	0.51	162.0	223.0	0.8	1.1	0.05	0.05	24.0	84.1	841	926	6.0	5.0	107	162	21	20	4.1	4.4	602	105	0.04	0.04	9.8	13.8
1515	0.44	208.0	297.0	0.4	0.4	0.04	0.04	24.6	31.3	882	1090	6.0	9.0	97	94	13	17	4.4	4.9	100	100	0.05	0.05	6.1	8.7
1518	0.44	117.0	243.0	0.4	0.4	0.04	0.05	21.8	36.2	708	899	6.0	5.0	116	43	22	26	4.5	5.1	79	84	0.07	0.04	5.6	9.5
1521	0.36	97.7	163.0	0.4	0.8	0.03	0.04	5.8	29.5	263	774	6.0	8.0	122	176	21	16	2.5	4.1	36	151	0.08	0.12	4.8	7.1
1524	0.46	184.0	239.0	0.4	0.4	0.05	0.05	28.8	25.2	581	727	2.5	7.0	112	84	20	10	4.5	3.6	54	43	0.06	0.06	8.3	8.4
1527	1.83	517.0	1930.0	3.7	4.1	0.04	0.03	26.7	29.3	4620	4130	2.5	2.5	384	118	1	10	6.0	7.0	203	531	0.07	0.10	50.0	40.1
1530	0.38	154.0	344.0	0.8	0.4	0.05	0.05	25.2	27.1	597	934	2.5	2.5	116	47	12	15	4.4	3.9	75	70	0.09	0.08	7.0	7.8
1533	0.40	173.0	162.0	0.8	0.8	0.05	0.05	26.9	22.9	445	751	2.5	2.5	61	60	16	13	4.8	4.1	56	63	0.06	0.07	8.0	8.1
1536	0.44	263.0	334.0	0.7	0.4	0.05	0.05	36.1	29.8	800	816	2.5	6.0	131	191	35	34	5.6	4.7	127	107	0.13	0.08	7.2	7.1
1539	0.47	197.0	196.0	0.9	1.2	0.05	0.05	26.2	24.3	643	936	5.0	8.0	120	178	25	28	4.8	5.5	87	108	0.07	0.09	8.2	7.7
1553	0.52	134.0	201.0	0.4	0.4	0.04	0.05	31.1	29.7	285	884	2.5	6.0	78	54	19	20	3.0	4.1	77	71	0.03	0.04	8.9	12.6
1556	0.46	262.0	126.0	0.4	1.3	0.05	0.05	33.2	17.9	661	287	5.0	5.0	85	105	10	10	4.2	4.2	68	60	0.06	0.06	9.5	6.9
1559	0.31	170.0	109.0	1.2	0.4	0.04	0.04	26.1	22.1	503	567	5.0	6.0	148	132	14	15	4.9	4.2	90	52	0.07	0.06	4.9	5.4
1562	2.20	1130.0	2950.0	2.0	2.3	0.04	0.03	77.1	226.0	1910	3260	2.5	2.5	82	232	3	8	5.7	8.1	335	1140	0.05	0.13	22.8	36.9
1565	0.34	158.0	157.0	0.4	0.4	0.05	0.05	23.1	23.7	660	761	6.0	6.0	99	82	18	21	4.2	3.9	92	72	0.08	0.07	7.4	7.5
1568	0.33	169.0	197.0	0.4	0.4	0.05	0.05	27.0	24.3	625	944	6.0	6.0	163	103	20	15	4.3	3.6	92	78	0.06	0.06	7.5	8.1
1571	0.58	180.0	210.0	1.0	1.1	0.05	0.05	24.6	31.4	778	1020	7.0	2.5	194	222	5	6	2.7	4.7	119	127	0.08	0.07	7.5	10.0
1574	0.54	183.0	171.0	1.1	0.9	0.05	0.05	28.4	35.1	662	768	6.0	8.0	131	164	27	14	5.7	5.3	52	75	0.04	0.04	8.3	8.1
1577	1.52	108.0	1110.0	3.1	9.0	0.03	0.03	12.5	34.0	689	3470	2.5	2.5	432	596	1	3	2.3	9.5	26	303	0.06	0.05	9.7	40.0
1580	0.32	204.0	244.0	1.1	1.3	0.04	0.04	22.2	21.9	637	782	2.5	7.0	141	149	8	12	3.5	3.7	106	97	0.07	0.07	5.5	6.2
1583	0.50	136.0	150.0	0.4	0.7	0.05	0.05	22.1	34.3	1140	802	2.5	5.0	78	110	9	15	4.0	4.7	54	60	0.04	0.06	9.5	8.4
1586	0.48	153.0	228.0	0.4	0.7	0.05	0.05	23.2	28.1	602	858	6.0	6.0	237	128	29	27	5.1	4.8	105	108	0.13	0.08	6.9	8.6

*Site	Te	Te-d	Th	Th-d	Ti	Ti-d	V	V-d	Y	Y-d	Zn	Zn-d
	ppb	ppb	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
1504	17	16	8.0	7.0	699	893	33.7	31.8	5.8	6.5	26.9	33.0
1506	19	14	6.0	7.0	895	1090	35.3	63.4	9.7	7.1	27.6	28.9
1509	27	26	9.0	8.0	782	906	40.6	40.2	6.4	7.9	35.6	33.1
1512	28	28	10.0	6.0	1030	890	35.4	40.1	16.4	25.5	27.1	32.3
1515	23	26	9.0	12.0	742	936	29.7	42.7	10.2	12.0	22.0	26.6
1518	22	32	6.0	14.0	763	1040	27.3	35.6	7.5	13.0	25.6	23.3
1521	16	33	8.0	6.0	1430	717	67.3	32.5	2.9	5.3	19.8	42.3
1524	21	11	6.0	7.0	1230	1070	38.7	41.2	6.1	6.2	32.5	31.4
1527	1	48	21.0	14.0	1650	1860	199.0	173.0	29.8	64.5	82.1	89.9
1530	14	19	6.0	8.0	936	868	34.1	32.7	5.6	7.5	34.6	37.4
1533	18	15	11.0	9.0	1270	1010	39.2	34.4	7.6	6.8	27.8	33.1
1536	33	31	9.0	8.0	1020	862	41.8	41.1	7.0	6.6	35.6	38.7
1539	28	30	7.0	8.0	1150	1160	38.2	50.6	7.0	7.2	37.7	42.7
1553	17	22	6.0	14.0	839	1050	31.2	36.5	8.6	11.0	25.8	30.8
1556	17	17	11.0	8.0	1270	1610	48.1	67.0	6.8	6.2	35.5	25.5
1559	18	24	6.0	7.0	1010	929	45.2	36.9	6.8	6.2	24.8	20.4
1562	75	171	14.0	20.0	2030	1460	232.0	210.0	17.8	42.3	44.7	76.1
1565	15	18	6.0	6.0	982	932	33.7	32.0	5.7	6.2	36.2	32.6
1568	23	17	6.0	10.0	1080	839	35.8	28.1	6.3	7.0	33.8	38.8
1571	10	5	6.0	7.0	821	1080	37.0	51.6	5.7	7.8	29.2	34.3
1574	23	27	9.0	9.0	1460	1020	51.0	41.1	13.7	10.4	49.9	34.8
1577	7	11	2.5	25.0	1460	1460	117.0	183.0	3.3	108.0	62.2	75.9
1580	17	18	6.0	6.0	939	906	34.8	38.3	3.9	4.9	31.4	38.5
1583	7	9	7.0	2.5	1630	1070	58.2	33.7	6.6	7.4	43.8	30.5
1586	25	25	8.0	9.0	1200	1050	46.1	39.4	6.1	7.6	56.6	43.5

*Site number	East m	North m	Sample depth cm	Humus thickness cm	Bleached layer thickness cm	Ag ppm	Al %	As ppm	B ppm	Ba ppm	Be ppm	Ca ppm	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	K %	La ppm
1501	1001	1150	60	10	0	0.5	1.96	14.0	1.5	71.1	0.4	0.46	0.25	27.8	45.4	68.8	4.20	0.09	34.6
1502	1000	1123	30	4	6	0.5	0.64	15.0	1.5	20.7	0.1	0.25	0.25	3.5	14.7	20.9	0.72	0.04	11.8
1503	1000	1105	35	5	0	0.5	1.54	14.0	1.5	71.7	0.2	0.31	0.25	9.2	31.5	48.9	1.63	0.21	16.1
1504	800	1026	33	3	4	0.5	1.17	2.5	1.5	54.5	0.2	0.40	0.25	12.0	19.2	35.6	1.50	0.11	11.3
1505	800	1073	32	7	3	0.5	0.42	2.5	1.5	26.2	0.1	0.10	0.25	2.0	9.7	3.9	0.43	0.03	8.7
1506	795	1125	40	15	6	0.5	1.16	32.0	1.5	82.6	0.2	0.46	0.25	9.7	29.6	85.6	1.86	0.19	15.5
1507	800	1172	38	3	6	0.5	1.17	66.0	1.5	81.3	0.2	0.37	0.25	10.4	31.0	33.5	2.01	0.16	12.3
1508	800	1224	60	5	3	0.5	1.60	53.0	1.5	57.3	0.2	0.26	0.25	18.1	25.2	79.1	2.12	0.08	14.7
1509	800	1276	32	1	4	0.5	1.78	107.0	1.5	60.3	0.3	0.32	0.25	17.5	28.1	66.4	2.10	0.12	11.4
1510	800	1326	40	5	5	0.5	2.31	2.5	1.5	227.0	0.1	0.62	0.25	39.7	33.0	302.0	5.19	0.28	32.2
1511	800	1377	35	1	6	0.5	1.43	2.5	1.5	42.2	0.2	0.22	0.25	8.3	27.9	66.7	1.54	0.07	11.0
1512	810	1425	35	35	0	0.5	0.96	2.5	1.5	103.0	0.2	0.50	0.25	8.4	27.4	66.6	1.50	0.21	36.3
1513	800	1475	48	7	9	0.5	1.09	2.5	1.5	74.4	0.2	0.40	0.25	8.8	25.9	71.3	1.51	0.17	17.7
1514	800	1525	40	9	4	0.5	1.27	2.5	1.5	87.0	0.2	0.43	0.25	11.1	36.3	64.5	2.09	0.16	12.2
1515	800	1575	38	11	4	0.5	1.29	2.5	1.5	56.8	0.2	0.32	0.25	14.4	22.9	48.9	1.64	0.16	13.7
1516	1000	1225	40	3	4	0.5	1.22	12.0	1.5	60.0	0.3	0.37	0.25	13.4	25.7	63.5	2.00	0.13	17.2
1517	1000	1275	32	5	3	0.5	1.29	6.0	1.5	43.9	0.2	0.36	0.25	10.0	23.5	26.6	1.41	0.11	9.9
1518	1000	1326	35	4	7	0.5	1.78	2.5	1.5	42.4	0.3	0.28	0.25	7.9	25.5	44.2	1.49	0.08	10.3
1519	1003	1374	35	4	3	0.5	1.29	8.0	1.5	111.0	0.2	0.54	0.25	11.5	31.7	72.0	1.94	0.21	24.5
1520	1000	1427	35	2	8	0.5	1.64	1080.0	1.5	51.7	0.2	0.39	0.25	11.3	26.4	37.4	2.03	0.12	14.4
1521	1001	1474	30	5	10	0.5	1.25	7.0	1.5	30.3	0.2	0.12	0.25	3.8	17.2	5.8	1.93	0.03	11.5
1522	1000	1525	31	4	7	0.5	1.42	7.0	6.0	48.4	0.2	0.35	0.25	12.1	21.7	56.2	1.48	0.09	10.9
1523	1000	1576	44	7	4	0.5	1.62	2.5	1.5	61.5	0.3	0.30	0.25	11.9	32.2	47.7	1.90	0.10	14.3
1524	1000	1024	38	3	4	0.5	1.86	2.5	5.0	69.8	0.3	0.33	0.25	13.4	35.3	54.7	2.16	0.12	9.9
1525	1200	1173	45	3	9	0.5	1.52	782.0	4.0	159.0	0.1	0.60	0.25	32.6	56.6	181.0	4.52	0.23	15.8
1526	1200	1675	40	4	5	0.5	1.19	6.0	1.5	56.7	0.2	0.43	0.25	11.9	23.6	38.9	1.64	0.11	13.3
1527	1200	1627	50	3	7	0.5	2.86	2.5	4.0	215.0	0.2	1.39	0.25	27.6	27.6	0.8	7.46	0.13	68.4
1528	1200	1575	55	3	8	0.5	1.55	6.0	5.0	48.6	0.3	0.38	0.25	12.5	22.8	38.9	1.64	0.08	14.7
1529	1200	1525	35	4	5	0.5	1.50	2.5	7.0	38.4	0.2	0.36	0.25	10.7	25.3	71.5	1.45	0.10	10.1
1530	1199	1476	30	4	4	0.5	1.87	7.0	1.5	45.9	0.3	0.30	0.25	10.5	29.6	44.7	1.88	0.08	8.2
1531	1200	1428	39	6	3	0.5	1.53	2.5	4.0	55.6	0.4	0.37	0.25	18.6	27.9	118.0	2.57	0.08	28.8
1532	1192	1363	45	10	8	0.5	2.27	9.0	3.0	204.0	0.2	1.00	0.25	50.9	32.2	283.0	7.21	0.32	53.1

*Site number	East m	North m	Sample depth cm	Humus thickness cm	Bleached layer thickness cm	Ag ppm	Al %	As ppm	B ppm	Ba ppm	Be ppm	Ca ppm	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	K %	La ppm
1533	1201	1323	48	2	4	0.5	1.35	2.5	1.5	58.6	0.2	0.32	0.25	10.4	29.4	56.9	1.82	0.11	12.9
1534	1201	1273	30	4	6	0.5	1.59	2.5	1.5	45.2	0.3	0.19	0.25	9.1	28.0	69.3	1.71	0.08	11.5
1535	1200	1148	30	2	4	0.5	2.31	2.5	1.5	42.8	0.3	0.20	0.25	10.5	33.5	71.1	1.78	0.08	8.6
1536	1200	1100	29	2	3	0.5	2.31	2.5	1.5	58.2	0.3	0.37	0.25	17.4	35.3	93.7	2.24	0.16	9.5
1537	1200	1049	33	3	5	0.5	2.03	2.5	1.5	60.7	0.3	0.35	0.25	12.5	32.7	52.0	1.96	0.21	10.9
1538	1200	1026	35	3	4	0.5	3.01	2.5	1.5	66.0	0.5	0.35	0.25	19.2	44.1	79.5	3.64	0.11	10.1
1539	1200	1001	34	1	4	0.5	2.04	2.5	3.0	55.7	0.3	0.34	0.25	10.7	34.7	55.7	2.23	0.08	11.2
1551	800	1000	35	3	3	0.5	1.51	2.5	1.5	45.0	0.2	0.19	0.25	11.1	38.1	58.5	2.29	0.08	7.9
1552	800	1050	35	3	5	0.5	2.17	2.5	3.0	64.1	0.3	0.26	0.25	13.2	33.3	60.3	2.08	0.18	11.3
1553	800	1104	25	20	0	0.5	0.94	19.0	1.5	71.0	0.2	0.34	0.25	10.0	26.9	79.5	1.66	0.14	15.9
1554	802	1148	35	4	3	0.5	1.56	44.0	1.5	82.8	0.3	0.55	0.25	28.1	30.7	137.0	3.48	0.16	19.7
1555	795	1208	45	4	3	0.5	1.99	2.5	1.5	69.4	0.3	0.38	0.25	11.1	33.5	50.7	1.91	0.23	14.6
1556	798	1250	30	5	2	0.5	1.68	6.0	1.5	99.9	0.3	0.38	0.25	14.5	32.4	61.0	2.24	0.16	14.1
1557	800	1308	45	3	10	0.5	1.73	10.0	3.0	110.0	0.3	0.57	0.25	16.6	35.7	85.8	2.55	0.14	18.4
1558	800	1350	40	3	1	0.5	2.00	2.5	1.5	79.8	0.3	0.39	0.25	15.8	39.7	63.0	2.35	0.18	13.1
1559	800	1400	40	1	4	0.5	1.82	2.5	1.5	40.2	0.3	0.18	0.25	15.2	31.7	55.5	2.54	0.06	8.9
1560	800	1452	20	16	0	0.5	1.22	8.0	5.0	130.0	0.2	0.72	0.25	21.3	36.1	65.9	3.27	0.17	29.1
1561	800	1500	25	13	0	0.5	1.51	2.5	3.0	87.3	0.3	0.42	0.25	16.3	38.8	112.0	2.73	0.15	42.1
1562	800	1549	50	6	1	1.0	2.59	5.0	1.5	351.0	0.1	0.92	0.25	112.0	59.0	1240.0	12.90	0.22	44.7
1563	800	1598	20	15	0	0.5	1.22	25.0	1.5	101.0	0.2	0.61	0.25	11.8	41.0	45.3	2.61	0.16	13.1
1564	1000	1250	55	2	5	0.5	2.43	13.0	3.0	49.8	0.3	0.25	0.25	9.3	33.9	43.3	1.94	0.07	11.1
1565	1000	1300	40	3	3	0.5	1.64	2.5	1.5	48.8	0.2	0.36	0.25	9.4	27.8	41.2	1.85	0.11	9.3
1566	992	1350	40	2	4	0.5	1.73	2.5	1.5	59.3	0.2	0.37	0.25	15.3	62.2	30.0	2.86	0.13	7.1
1567	1000	1400	30	3	1	0.5	1.32	5.0	1.5	134.0	0.2	0.54	0.25	12.5	30.0	75.9	2.16	0.23	39.5
1568	1000	1451	40	3	4	0.5	1.64	8.0	1.5	50.2	0.3	0.31	0.25	11.6	28.3	41.0	1.91	0.08	11.0
1569	1000	1496	35	2	3	0.5	1.81	2.5	1.5	43.6	0.3	0.35	0.25	12.0	22.6	47.2	2.19	0.07	11.1
1570	1000	1559	30	3	3	0.5	1.77	2.5	1.5	46.1	0.2	0.38	0.25	13.9	32.1	59.0	2.14	0.11	12.2
1571	1000	1601	30	2	1	0.5	1.97	2.5	3.0	43.2	0.3	0.32	0.25	10.5	26.2	45.6	1.74	0.08	10.9
1572	1000	1001	35	3	6	0.5	2.16	2.5	1.5	60.8	0.3	0.38	0.25	17.5	34.4	66.6	2.62	0.18	10.4
1573	1005	1045	30	10	0	0.5	1.40	247.0	1.5	97.1	0.1	1.30	0.25	16.8	20.7	419.0	2.30	0.20	46.9
1574	1193	1218	30	13	0	0.5	1.50	11.0	4.0	82.1	0.2	0.40	0.25	14.3	28.2	73.8	1.86	0.18	17.3
1575	1201	1700	30	4	3	0.5	1.70	7.0	1.5	57.7	0.2	0.33	0.25	9.2	31.8	54.9	2.09	0.07	9.9

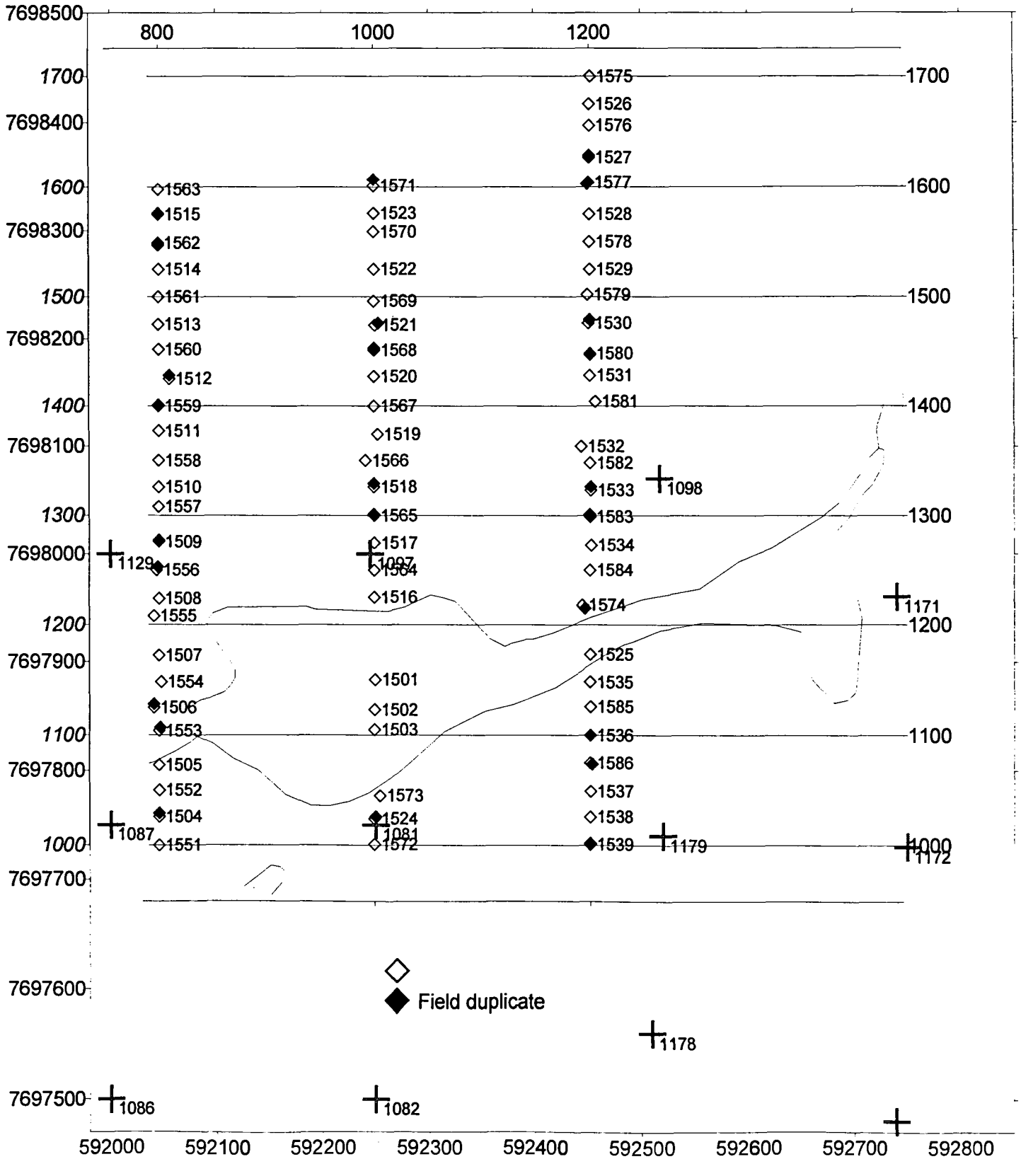
*Site number	East m	North m	Sample depth cm	Humus thickness cm	Bleached layer thickness cm	Ag ppm	Al %	As ppm	B ppm	Ba ppm	Be ppm	Ca ppm	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	K %	La ppm
1576	1200	1656	45	4	0.5	0.5	2.31	2.5	1.5	116.0	0.2	1.10	0.25	34.7	28.2	255.0	7.09	0.10	55.6
1577	1199	1604	45	2	0	0.5	2.72	5.0	1.5	221.0	0.3	1.10	1.00	41.9	26.6	143.0	10.30	0.11	124.0
1578	1200	1550	40	2	2	0.5	1.03	2.5	1.5	31.6	0.2	0.35	0.25	6.6	17.7	17.3	1.08	0.07	12.4
1579	1198	1502	30	1	4	0.5	2.27	2.5	1.5	41.7	0.3	0.32	0.25	8.9	31.4	45.1	1.74	0.07	10.1
1580	1200	1448	35	3	3	0.5	1.94	2.5	1.5	50.0	0.3	0.29	0.25	10.3	29.6	49.3	2.23	0.09	8.3
1581	1205	1404	37	3	3	0.5	2.14	6.0	3.0	56.6	0.3	0.20	0.25	30.1	37.9	154.0	3.94	0.06	23.2
1582	1200	1348	40	4	4	0.5	3.08	2.5	3.0	48.7	0.5	0.22	0.25	10.0	34.7	41.5	2.39	0.06	9.9
1583	1200	1299	45	5	4	0.5	2.14	5.0	1.5	104.0	0.2	0.40	0.25	16.4	19.3	38.2	3.02	0.18	17.1
1584	1200	1250	35	3	2	0.5	2.34	6.0	1.5	46.1	0.4	0.20	0.25	14.0	37.9	60.4	3.21	0.07	10.5
1585	1200	1126	30	3	3	0.5	2.13	2.5	1.5	49.1	0.3	0.37	0.25	17.5	30.4	47.3	2.28	0.13	9.9
1586	1200	1075	40	2	2	0.5	2.09	2.5	1.5	61.9	0.3	0.40	0.25	13.8	32.7	52.8	2.28	0.16	12.6

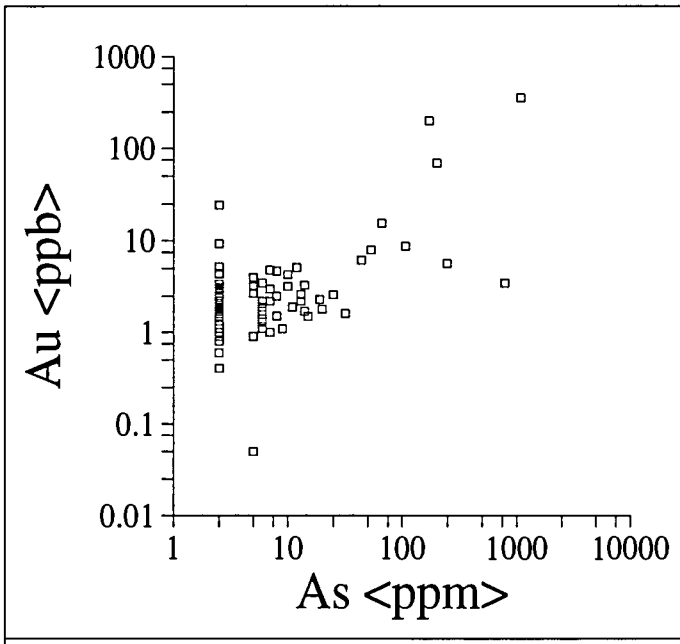
*Site number	Li ppm	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P ppm	Pb ppm	S ppm	Sc ppm	Si %	Sr ppm	Th ppm	Ti ppm	V ppm	Y ppm	Zn ppm	Au ppb	Bi ppb	Sb ppb	Se ppb	Te ppb
1501	24.0	0.88	217.0	2.0	0.04	59.4	1250	2.5	142	8.8	0.06	9.5	8.0	852	118.0	17.3	63.1	3.3	48	53	262	24
1502	2.3	0.13	68.3	0.4	0.03	8.6	673	6.0	28	2.1	0.06	5.4	9.0	479	16.9	5.6	8.8	1.5	71	5	39	9
1503	9.3	0.53	150.0	0.4	0.04	25.9	647	8.0	153	4.3	0.05	7.5	7.0	1140	34.6	8.6	29.3	1.7	142	21	48	23
1504	5.2	0.34	178.0	0.4	0.04	16.7	1200	2.5	68	2.9	0.05	7.7	8.0	699	33.7	5.8	26.9	0.8	74	14	72	17
1505	2.5	0.08	32.0	0.4	0.03	3.0	134	15.0	96	1.1	0.04	3.3	2.5	1150	23.8	2.6	9.6	1.6	46	4	2	6
1506	20.0	0.49	170.0	0.4	0.04	28.6	608	5.0	157	4.0	0.03	10.5	6.0	895	35.3	9.7	27.6	1.6	199	23	137	19
1507	15.9	0.47	167.0	0.4	0.04	27.7	349	7.0	158	4.4	0.03	8.9	5.0	988	39.7	7.4	37.4	15.5	111	20	114	18
1508	9.1	0.42	213.0	0.4	0.03	32.6	981	5.0	144	3.7	0.06	7.1	18.0	828	41.8	8.5	24.8	8.0	91	17	84	14
1509	7.7	0.39	346.0	0.4	0.03	27.4	926	8.0	119	3.9	0.05	6.6	9.0	782	40.6	6.4	35.6	8.8	118	48	127	27
1510	13.2	1.48	402.0	1.7	0.04	54.2	2220	2.5	52	3.0	0.05	12.5	10.0	1760	108.0	7.8	53.6	1.1	12	4	194	34
1511	6.2	0.33	132.0	0.4	0.04	25.5	427	7.0	176	4.8	0.06	5.5	6.0	934	29.3	7.0	24.4	2.1	133	17	66	24
1512	12.4	0.44	162.0	0.8	0.05	24.0	841	6.0	107	4.1	0.04	9.8	10.0	1030	35.4	16.4	27.1	2.9	130	21	602	28
1513	8.3	0.38	182.0	0.4	0.04	31.2	907	7.0	82	3.8	0.03	7.9	11.0	790	31.1	9.5	24.4	3.4	134	12	63	21
1514	8.2	0.50	225.0	0.4	0.03	36.6	1080	8.0	124	3.3	0.04	9.7	7.0	817	53.0	7.3	38.0	24.5	318	13	122	27
1515	6.4	0.33	208.0	0.4	0.04	24.6	882	6.0	97	4.4	0.05	6.1	9.0	742	29.7	10.2	22.0	1.5	137	13	100	23
1516	5.5	0.43	233.0	0.4	0.05	27.0	774	7.0	57	4.0	0.05	8.4	14.0	944	42.0	7.7	34.5	5.1	126	22	170	32
1517	5.7	0.30	185.0	0.4	0.04	19.8	844	8.0	78	3.3	0.06	7.4	6.0	741	28.8	5.9	35.4	1.4	99	20	80	21
1518	6.6	0.31	117.0	0.4	0.04	21.8	708	6.0	116	4.5	0.07	5.6	6.0	763	27.3	7.5	25.6	1.9	85	22	79	22
1519	10.2	0.58	240.0	0.4	0.05	25.9	757	7.0	42	5.0	0.04	13.2	12.0	1280	47.5	11.3	30.8	4.7	111	15	42	16
1520	5.5	0.34	272.0	0.4	0.05	21.0	892	2.5	126	4.6	0.07	8.5	9.0	734	34.6	7.9	32.4	354.8	89	726	135	36
1521	5.0	0.14	97.7	0.4	0.03	5.8	263	6.0	122	2.5	0.08	4.8	8.0	1430	67.3	2.9	19.8	1.0	96	21	36	16
1522	5.2	0.28	223.0	0.4	0.04	25.7	868	2.5	100	3.2	0.10	7.5	6.0	711	28.2	6.3	41.4	2.2	88	12	104	17
1523	7.3	0.50	174.0	0.9	0.05	30.5	602	2.5	98	4.9	0.06	7.7	8.0	1140	38.5	9.2	27.5	2.7	102	7	71	14
1524	10.4	0.56	184.0	0.4	0.05	28.8	581	2.5	112	4.5	0.06	8.3	6.0	1230	38.7	6.1	32.5	2.1	106	20	54	21
1525	28.1	0.94	859.0	1.9	0.05	66.2	1120	2.5	100	8.0	0.06	12.0	7.0	1130	85.8	24.7	51.6	3.5	28	247	144	19
1526	5.0	0.34	198.0	0.4	0.05	23.3	894	2.5	66	3.5	0.07	9.1	8.0	852	32.2	7.1	34.3	3.5	104	15	75	11
1527	21.9	1.90	517.0	3.7	0.04	26.7	4620	2.5	384	6.0	0.07	50.0	21.0	1650	199.0	29.8	82.1	0.6	15	1	203	1
1528	5.4	0.29	144.0	1.0	0.04	20.7	1050	2.5	129	3.4	0.07	9.2	7.0	667	28.5	9.1	27.4	1.3	94	12	100	12
1529	6.0	0.34	205.0	0.9	0.05	23.1	800	6.0	89	4.0	0.07	7.3	9.0	798	27.6	6.2	29.0	2.1	92	16	66	16
1530	8.3	0.39	154.0	0.8	0.05	25.2	597	2.5	116	4.4	0.09	7.0	6.0	936	34.1	5.6	34.6	3.0	78	12	75	14
1531	7.9	0.63	389.0	1.0	0.05	38.2	843	2.5	61	6.1	0.06	9.2	11.0	973	70.4	16.3	32.9	2.1	96	16	100	18
1532	19.7	1.50	666.0	3.4	0.04	70.6	3230	2.5	59	4.7	0.05	30.0	10.0	1650	131.0	26.2	81.8	1.1	38	14	152	18

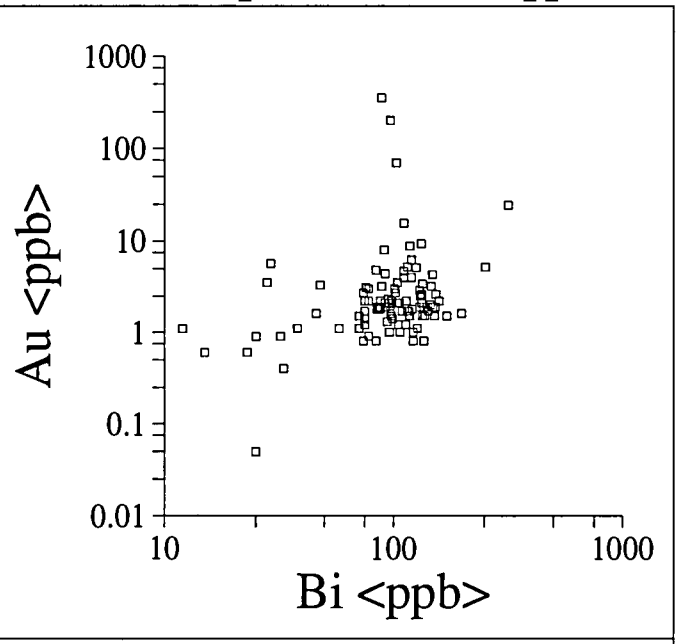
*Site number	Li ppm	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P ppm	Pb ppm	S ppm	Sc ppm	Si %	Sr ppm	Th ppm	Ti ppm	V ppm	Y ppm	Zn ppm	Au ppb	Bi ppb	Sb ppb	Se ppb	Te ppb
1533	7.3	0.47	173.0	0.8	0.05	26.9	445	2.5	61	4.8	0.06	8.0	11.0	1270	39.2	7.6	27.8	4.4	92	16	56	18
1534	7.7	0.38	143.0	0.4	0.04	23.9	494	2.5	160	4.4	0.07	5.1	10.0	897	29.9	7.0	26.4	1.8	86	18	99	22
1535	9.3	0.40	124.0	0.4	0.04	27.8	460	2.5	145	5.0	0.11	5.0	6.0	893	30.3	5.3	25.2	2.2	158	17	96	16
1536	10.1	0.52	263.0	0.7	0.05	36.1	800	2.5	131	5.6	0.13	7.2	9.0	1020	41.8	7.0	35.6	1.6	97	35	127	33
1537	7.8	0.48	220.0	0.4	0.05	28.4	946	2.5	184	5.3	0.08	7.5	11.0	1020	37.8	6.8	35.3	1.7	109	37	87	31
1538	11.6	0.51	349.0	1.2	0.05	35.6	941	7.0	241	6.6	0.12	7.7	9.0	1070	64.1	7.7	61.4	2.2	114	31	124	32
1539	9.6	0.51	197.0	0.9	0.05	26.2	643	5.0	120	4.8	0.07	8.2	7.0	1150	38.2	7.0	37.7	1.7	117	25	87	28
1551	8.0	0.44	184.0	0.9	0.04	23.9	332	2.5	154	3.8	0.06	5.6	6.0	1320	40.3	4.7	36.7	2.0	145	17	74	23
1552	10.1	0.42	196.0	0.7	0.04	26.3	810	5.0	136	4.6	0.10	6.2	9.0	1030	35.9	6.8	41.7	1.0	122	23	85	28
1553	22.6	0.43	134.0	0.4	0.04	31.1	285	2.5	78	3.0	0.03	8.9	6.0	839	31.2	8.6	25.8	2.3	95	19	77	17
1554	8.7	0.56	584.0	2.2	0.04	33.7	1440	2.5	130	3.8	0.05	13.4	14.0	1050	57.6	10.1	35.8	6.2	120	28	208	40
1555	7.8	0.43	150.0	0.4	0.05	28.1	856	6.0	118	4.6	0.07	8.1	11.0	1000	33.4	9.2	31.1	1.5	151	22	96	26
1556	9.8	0.55	262.0	0.4	0.05	33.2	661	5.0	85	4.2	0.06	9.5	11.0	1270	48.1	6.8	35.5	1.7	115	10	68	17
1557	8.4	0.58	323.0	0.9	0.06	41.0	854	7.0	119	5.2	0.06	12.7	13.0	1260	47.8	10.8	32.3	3.2	146	13	147	31
1558	10.5	0.58	201.0	0.4	0.06	44.2	645	10.0	104	5.3	0.06	9.3	9.0	1390	47.9	7.7	39.5	9.3	132	15	76	24
1559	8.1	0.34	170.0	1.2	0.04	26.1	503	5.0	148	4.9	0.07	4.9	6.0	1010	45.2	6.8	24.8	0.8	136	14	90	18
1560	17.0	0.55	429.0	1.9	0.05	57.8	1190	10.0	332	4.0	0.04	15.9	7.0	744	62.1	15.1	48.0	1.5	171	19	200	45
1561	35.9	0.66	212.0	1.0	0.05	49.2	540	6.0	185	5.6	0.03	11.2	8.0	1190	58.0	21.9	38.9	1.9	149	20	116	28
1562	12.5	2.20	2950.0	2.3	0.03	226.0	3260	2.5	232	8.1	0.13	36.9	20.0	1460	210.0	42.3	76.1	0.9	25	8	1140	171
1563	17.5	0.66	192.0	1.4	0.05	61.9	793	6.0	291	5.5	0.04	15.3	6.0	1070	74.7	8.4	35.8	2.6	133	16	197	14
1564	7.0	0.42	154.0	0.4	0.05	23.5	533	7.0	329	6.9	0.10	6.8	8.0	1420	41.2	7.0	29.9	2.6	153	23	71	20
1565	6.7	0.37	158.0	0.4	0.05	23.1	660	6.0	99	4.2	0.08	7.4	6.0	982	33.7	5.7	36.2	1.8	88	18	92	15
1566	23.0	0.82	233.0	0.9	0.04	26.4	811	2.5	99	3.9	0.03	8.7	2.5	1430	64.5	4.9	38.7	3.1	76	9	52	10
1567	12.5	0.59	499.0	0.9	0.06	29.6	961	2.5	76	5.7	0.03	11.8	9.0	1150	44.5	19.3	34.0	4.0	111	14	63	17
1568	6.2	0.41	169.0	0.4	0.05	27.0	625	6.0	163	4.3	0.06	7.5	6.0	1080	35.8	6.3	33.8	2.5	131	20	92	23
1569	8.9	0.48	165.0	1.1	0.04	20.4	864	6.0	109	3.9	0.08	7.1	8.0	839	41.8	5.5	30.7	1.8	85	11	118	14
1570	8.6	0.53	242.0	0.4	0.05	32.1	976	5.0	139	3.8	0.08	8.0	11.0	1010	46.4	5.9	30.5	1.2	105	14	95	17
1571	9.3	0.42	180.0	1.0	0.05	24.6	778	7.0	194	2.7	0.08	7.5	6.0	821	37.0	5.7	29.2	1.7	97	5	119	10
1572	10.2	0.49	308.0	0.7	0.05	33.1	954	8.0	160	5.9	0.08	7.7	11.0	1160	42.2	8.4	47.1	1.5	118	39	140	48
1573	31.3	0.83	87.9	0.4	0.03	19.2	2940	2.5	956	6.9	0.03	21.4	2.5	1010	81.9	72.2	82.5	5.7	29	37	2090	11
1574	10.3	0.54	171.0	0.9	0.05	35.1	768	8.0	164	5.3	0.04	8.1	9.0	1020	41.1	10.4	34.8	1.9	152	14	75	27
1575	6.2	0.41	139.0	1.5	0.05	33.0	801	6.0	184	4.2	0.06	7.6	8.0	865	37.8	6.0	27.4	4.8	84	8	115	13

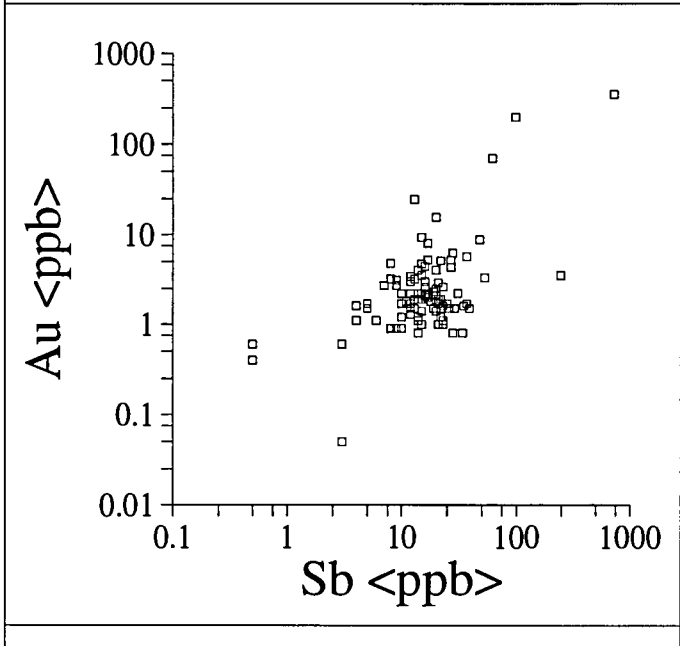
*Site number	Li ppm	Mg %	Mn ppm	Mo ppm	Na %	Ni ppm	P ppm	Pb ppm	S ppm	Sc ppm	Si %	Sr ppm	Th ppm	Ti ppm	V ppm	Y ppm	Zn ppm	Au ppb	Bi ppb	Sb ppb	Se ppb	Te ppb
1576	14.8	1.63	1400.0	2.6	0.03	33.0	3840	2.5	141	8.5	0.07	35.9	14.0	1290	199.0	51.1	62.8	0.9	32	9	236	24
1577	51.9	1.52	1110.0	9.0	0.03	34.0	3470	2.5	596	9.5	0.05	40.0	25.0	1460	183.0	108.0	75.9	0.1	25	3	303	11
1578	3.7	0.24	132.0	0.4	0.04	14.1	925	2.5	60	2.6	0.06	7.3	7.0	678	22.9	6.2	17.5	1.1	58	6	56	11
1579	7.2	0.35	189.0	0.4	0.05	21.5	795	2.5	143	4.7	0.09	6.8	7.0	872	30.9	6.1	32.6	1.7	75	12	86	18
1580	7.3	0.32	244.0	1.3	0.04	21.9	782	7.0	149	3.7	0.07	6.2	6.0	906	38.3	4.9	38.5	1.5	98	12	97	18
1581	12.3	0.83	301.0	1.5	0.04	47.9	513	2.5	124	8.1	0.04	6.5	16.0	1360	106.0	9.2	39.7	1.4	75	15	132	16
1582	9.0	0.35	148.0	1.1	0.04	20.7	561	2.5	262	6.1	0.16	5.9	10.0	1060	35.0	7.9	33.8	2.1	104	17	105	21
1583	10.5	0.80	136.0	0.4	0.05	22.1	1140	2.5	78	4.0	0.04	9.5	7.0	1630	58.2	6.6	43.8	2.7	74	9	54	7
1584	10.2	0.40	179.0	1.3	0.04	23.8	427	6.0	227	7.1	0.11	5.9	8.0	1330	46.6	8.1	33.6	1.1	127	23	118	25
1585	8.4	0.43	279.0	0.8	0.05	23.2	775	6.0	165	4.8	0.07	8.1	7.0	1000	40.3	6.8	39.7	1.2	113	22	99	22
1586	9.6	0.48	228.0	0.7	0.05	28.1	858	6.0	128	4.8	0.08	8.6	9.0	1050	39.4	7.6	43.5	5.2	115	27	108	25

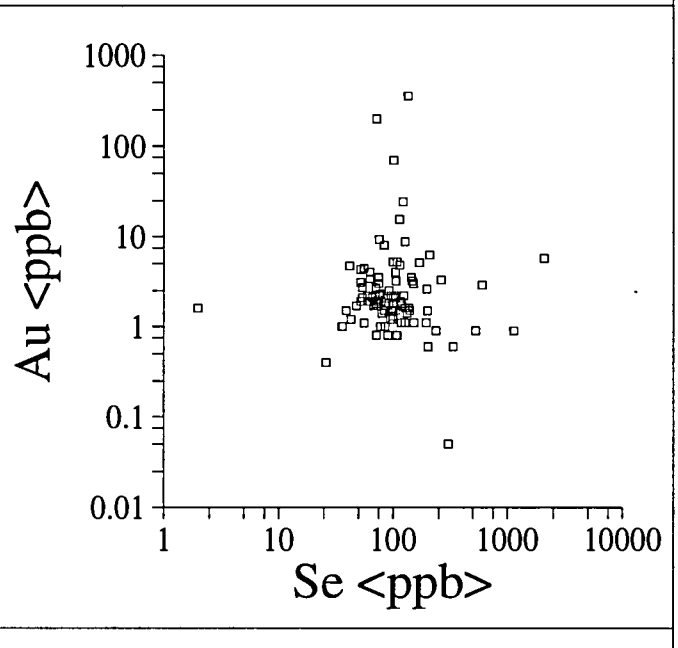
Sample location map.
Location of Field duplicates enhanced. Local grid aligned with magnetic North (same as geophysics 1995, extended to the North)
Alignment of local grid with UTM grid WGS84 approximated

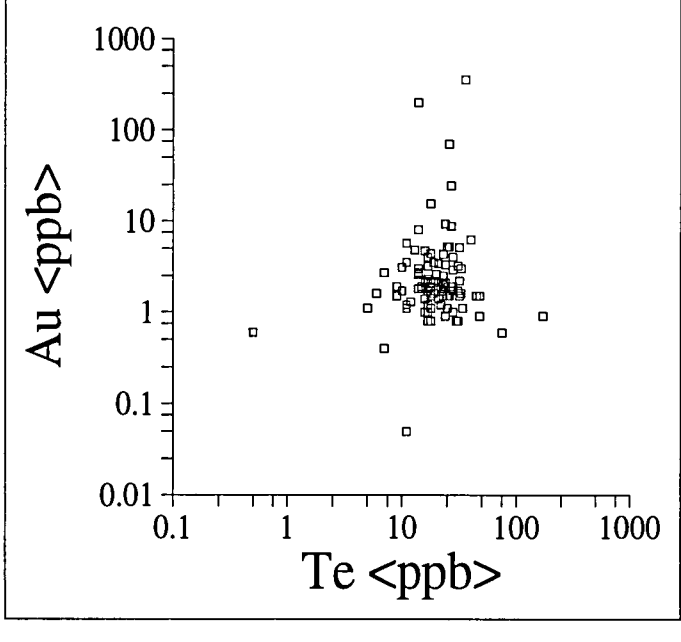












Scatterplots of Au as function of pathfinder elements

Appendix 6 31p Point maps showing analytical results of hot aqua regia extracts of Al, As, Ba, Be, Ca, Co, Cr, Cu, Fe, K, La, Li, Mg, Mn, Mo, Ni, P, Pb, S, Sc, Sr, Th, Ti, V, Y, Zn, cold aqua regia extracts of Au, Bi, Sb, Se, Te.

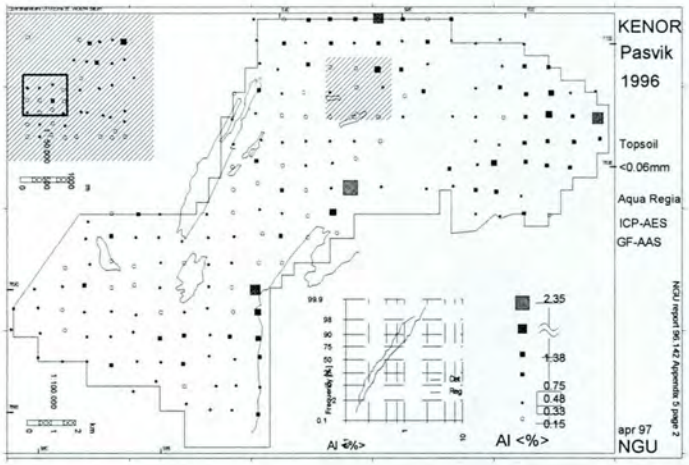
% Al

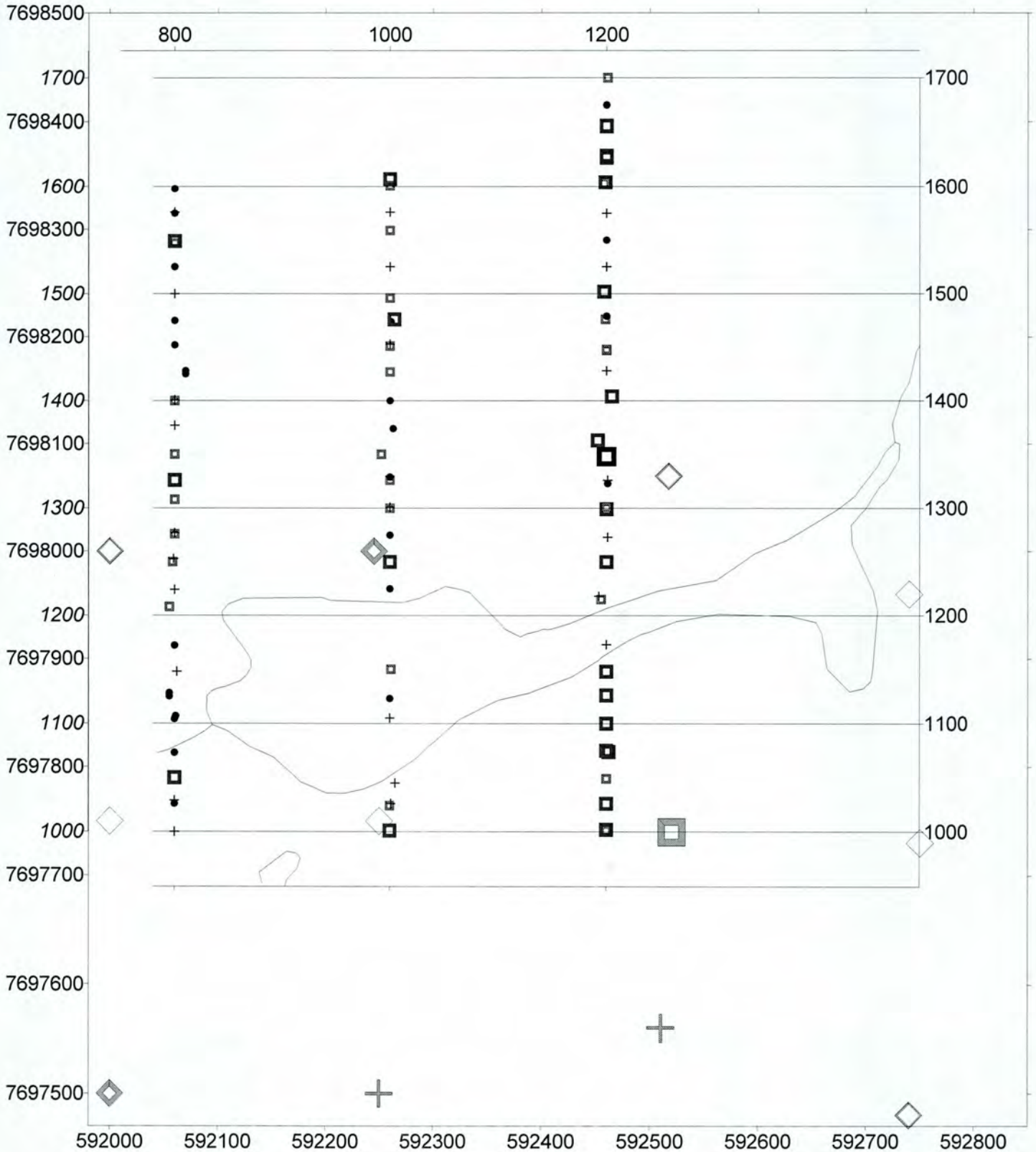
Topsoil '96

- 0.2 to 0.3
- 0.3 to 0.3
- 0.3 to 0.5
- 0.5 to 0.6
- 0.6 to 1.5

C-horizon '97

- < 0.4
- < 0.4
- < 1.4
- < 1.6
- < 2.1
- < 3.1
- < 3.1





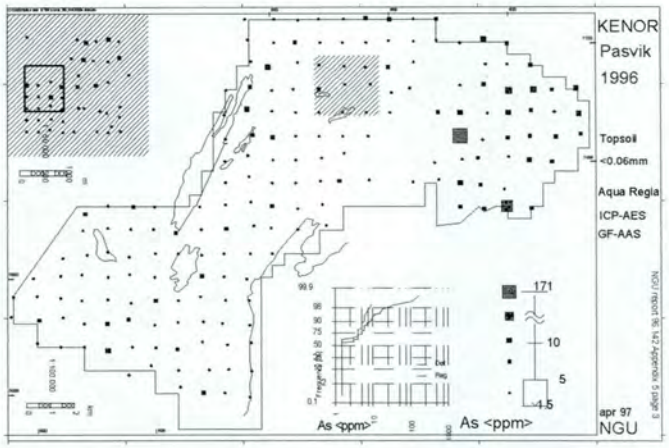
ppm As

Topsoil '96

- 2 to 3
- 3 to 4
- 4 to 5
- 5 to 6
- 6 to 9

C-horizon '97

- < 2.5
- < 2.5
- < 2.5
- < 2.5
- < 8.0
- < 15.0
- < 1080.0



7698500
800
1000
1200
1700
7698400
1600
7698300
1500
7698200
1400
7698100
1300
7698000
1200
7697900
1100
7697800
1000
7697700
7697600
7697500
592000
592100
592200
592300
592400
592500
592600
592700
592800

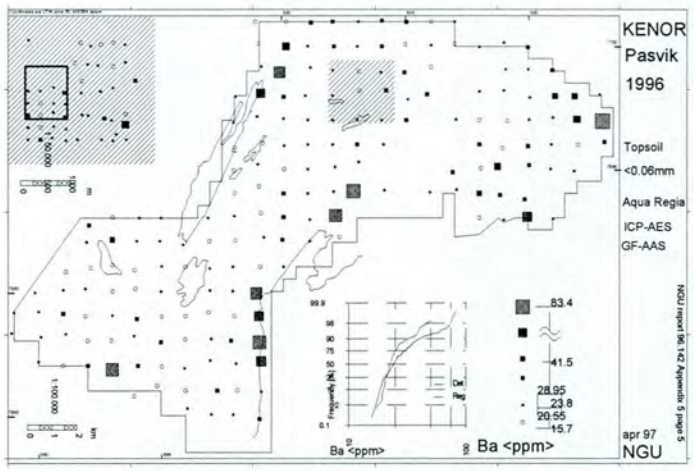
ppm Ba

Topsoil '96

- 17.1 to 23.8
- 23.8 to 30.5
- 30.5 to 37.1
- 37.1 to 43.8
- 43.8 to 50.5

C-horizon '97

- < 20.7
- < 20.7
- < 48.7
- < 60.2
- < 82.7
- < 130.0
- < 431.0



7698500
800
1000
1200
1700
7698400
1600
7698300
1500
7698200
1400
7698100
1300
7698000
1200
7697900
1100
7697800
1000
7697700
7697600
7697500
592000
592100
592200
592300
592400
592500
592600
592700
592800

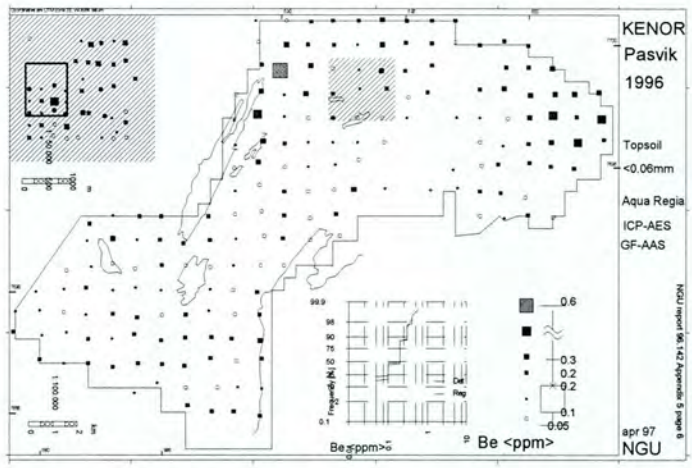
ppm Be

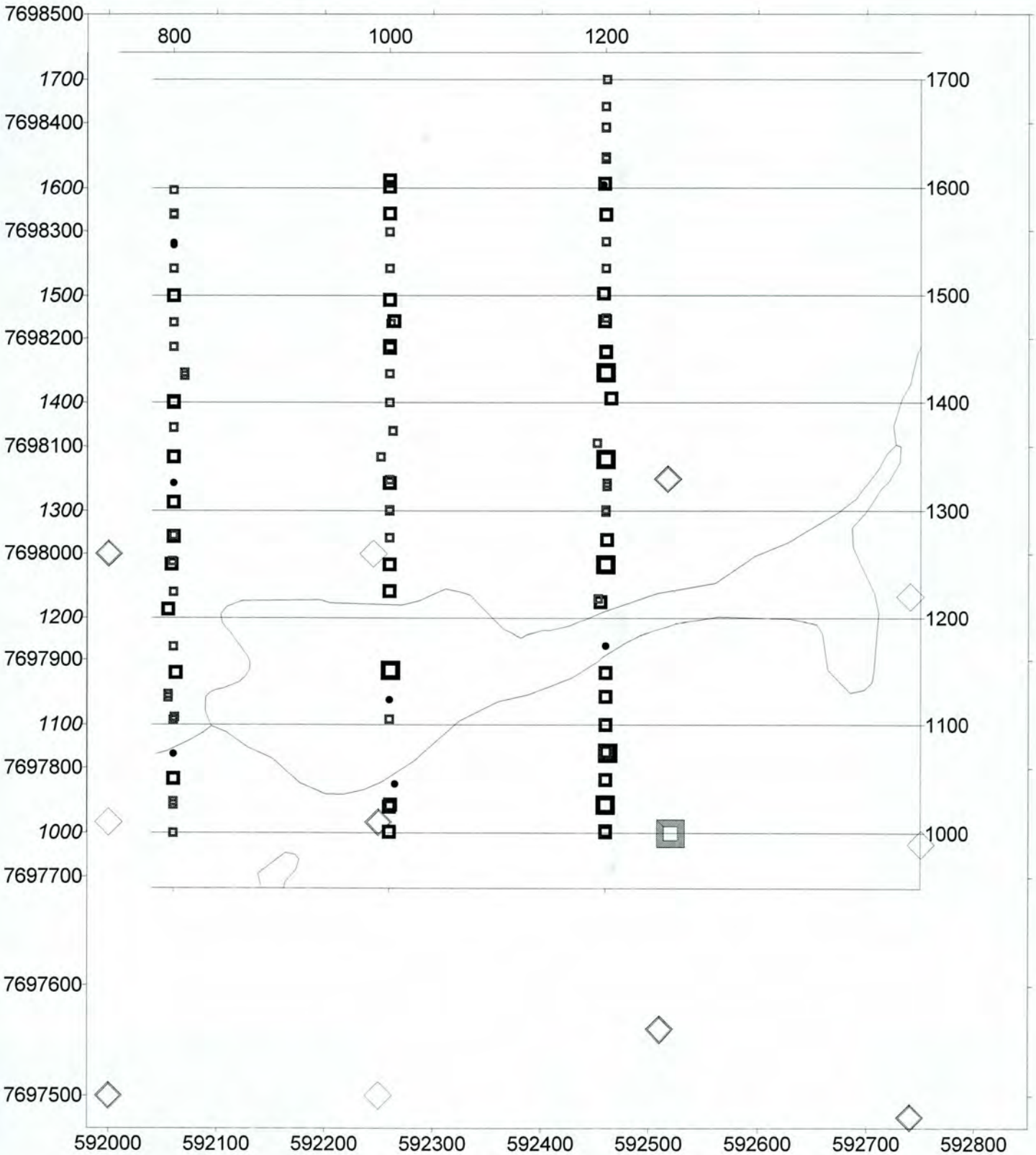
Topsoil '96

+	0.1 to 0.1
◇	0.1 to 0.2
◇	0.2 to 0.3
◇	0.3 to 0.4
□	0.4 to 0.4

C-horizon '97

○	< 0.1
○	< 0.1
●	< 0.2
+	< 0.2
□	< 0.3
□	< 0.4
□	< 0.5





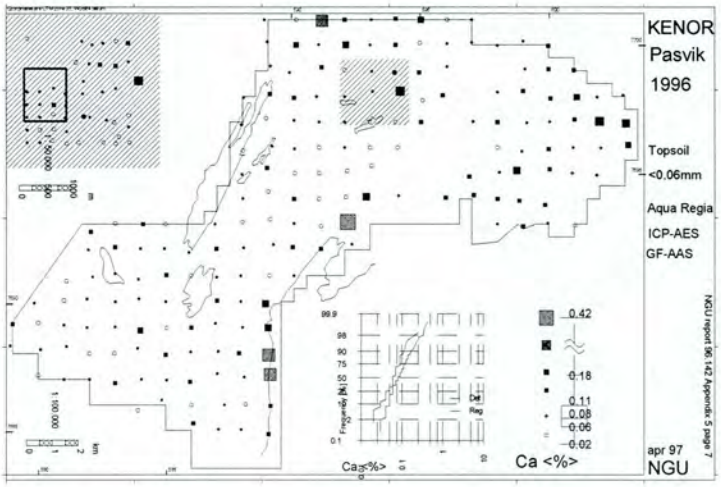
% Ca

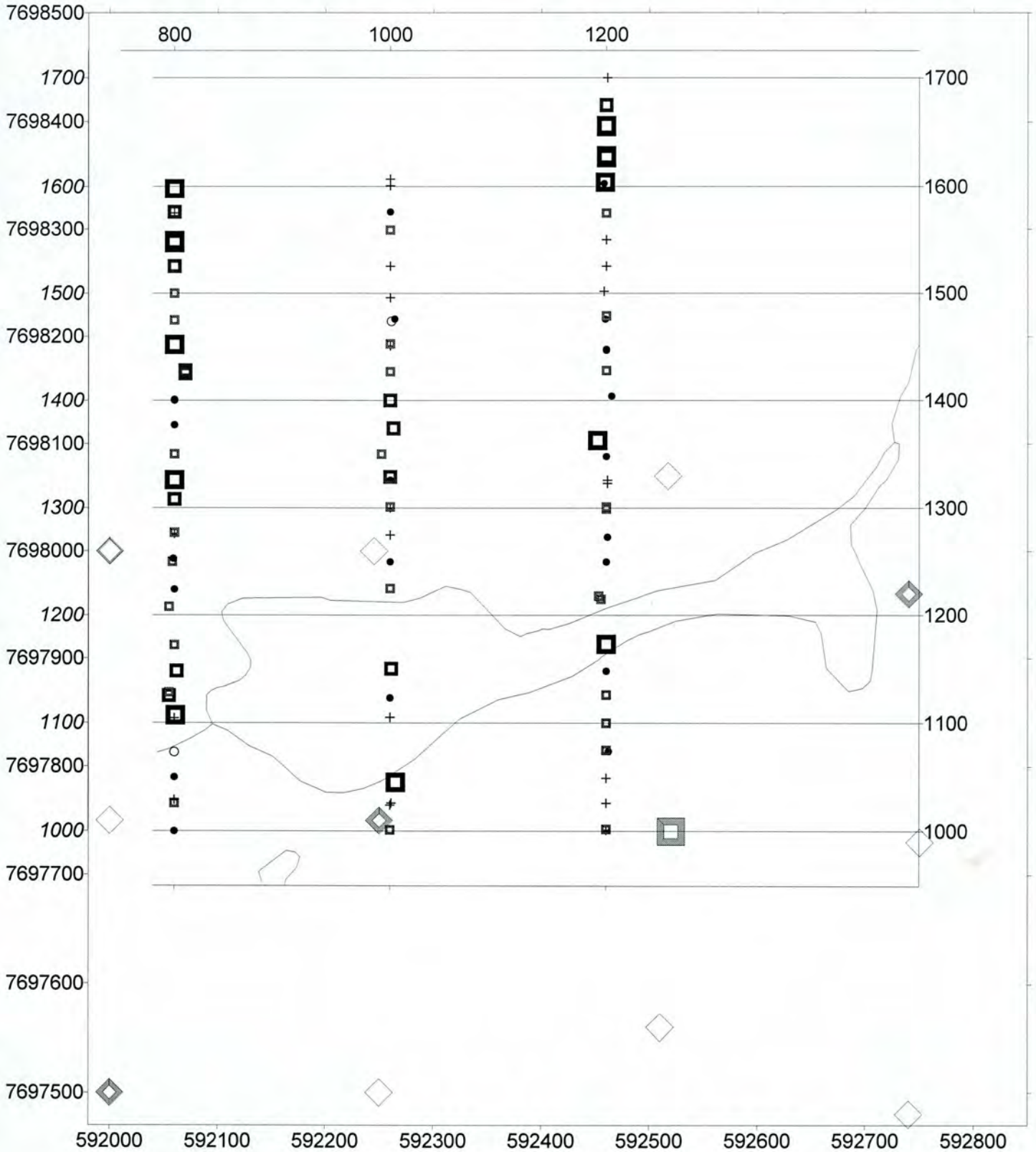
Topsoil '96

- 0.02 to 0.05
- 0.05 to 0.07
- 0.07 to 0.08
- 0.08 to 0.11
- 0.11 to 0.26

C-horizon '97

- < 0.1
- < 0.2
- < 0.3
- < 0.4
- < 0.4
- < 0.6
- < 1.4





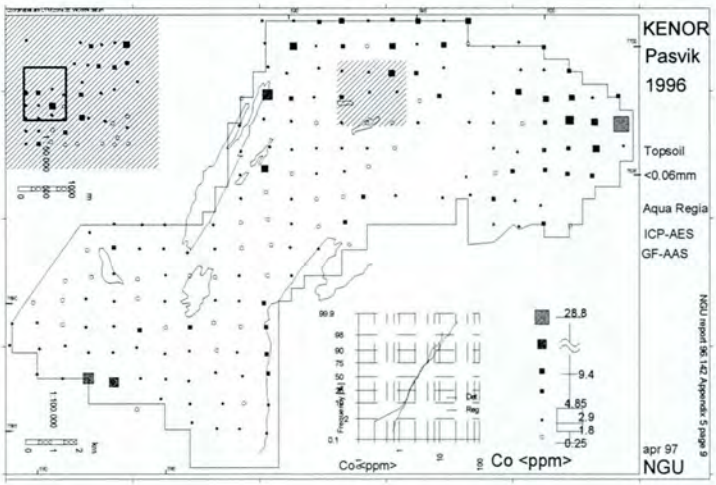
ppm Co

Topsoil '96

- 0.3 to 1.7
- 1.7 to 2.5
- 2.5 to 3.3
- 3.3 to 5.4
- 5.4 to 11.5

C-horizon '97

- < 2.0
- < 3.5
- < 10.4
- < 12.0
- < 16.0
- < 21.3
- < 112.0



7698500
800
1000
1200
1700
7698400
1600
7698300
1500
7698200
1400
7698100
1300
7698000
1200
7697900
1100
7697800
1000
7697700
7697600
7697500
592000
592100
592200
592300
592400
592500
592600
592700
592800

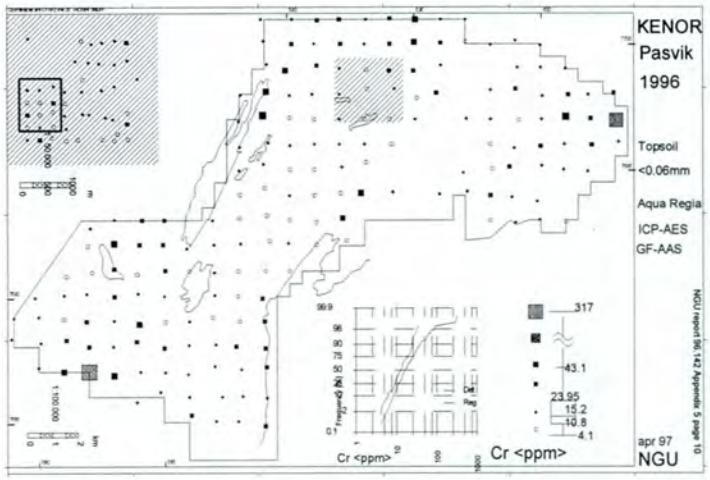
ppm Cr

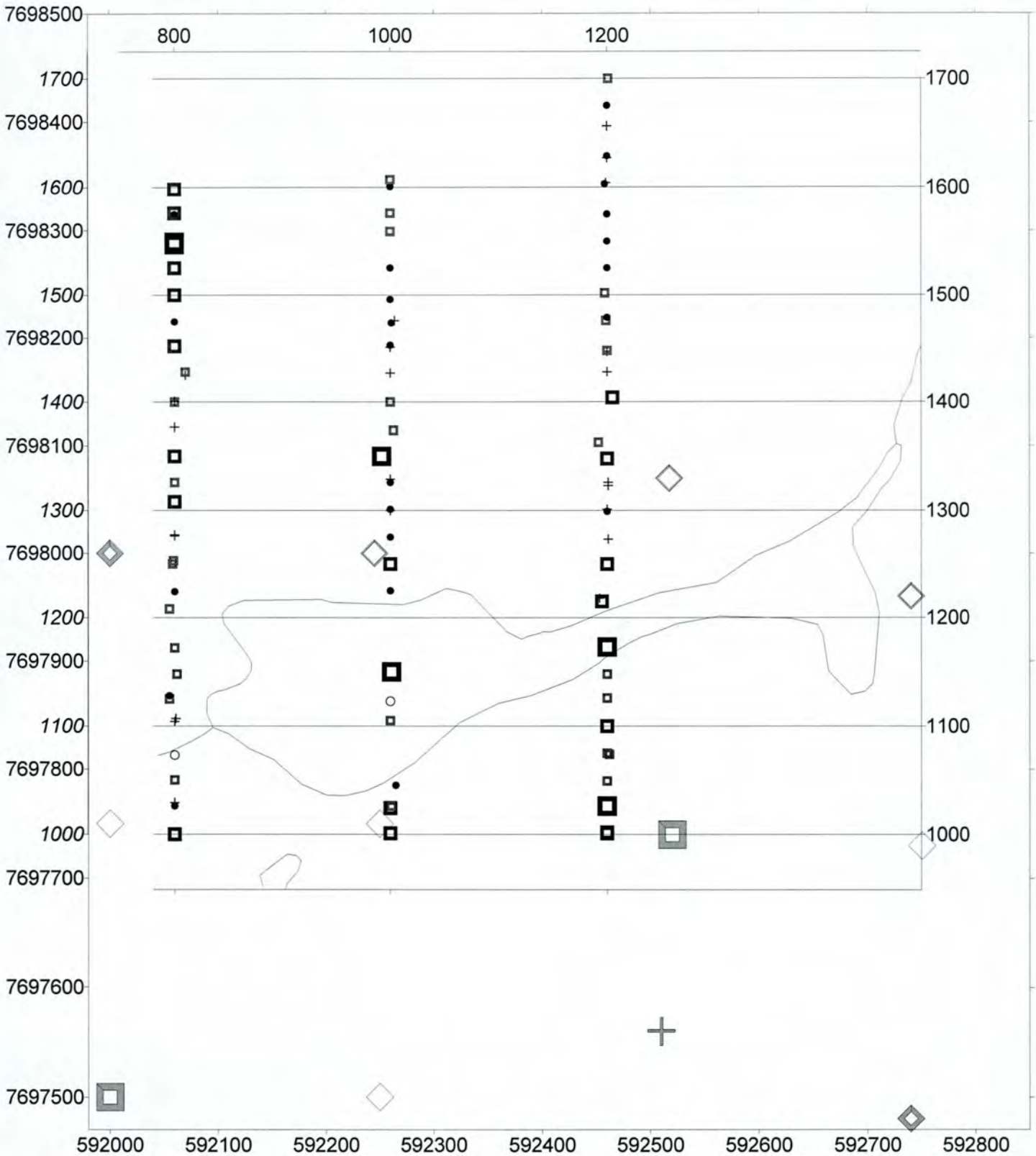
Topsoil '96

- 4.1 to 8.8
- 8.8 to 10.9
- 10.9 to 13.8
- 13.8 to 20.8
- 20.8 to 34.6

C-horizon '97

- < 9.7
- < 17.2
- < 26.3
- < 29.6
- < 33.5
- < 44.1
- < 62.2





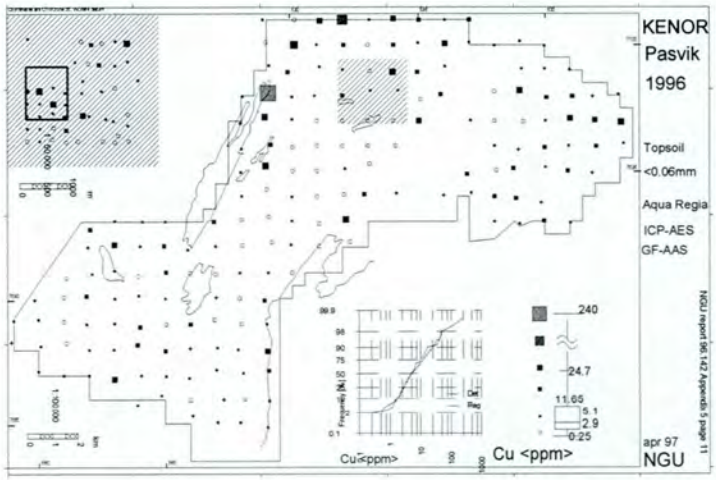
ppm Cu

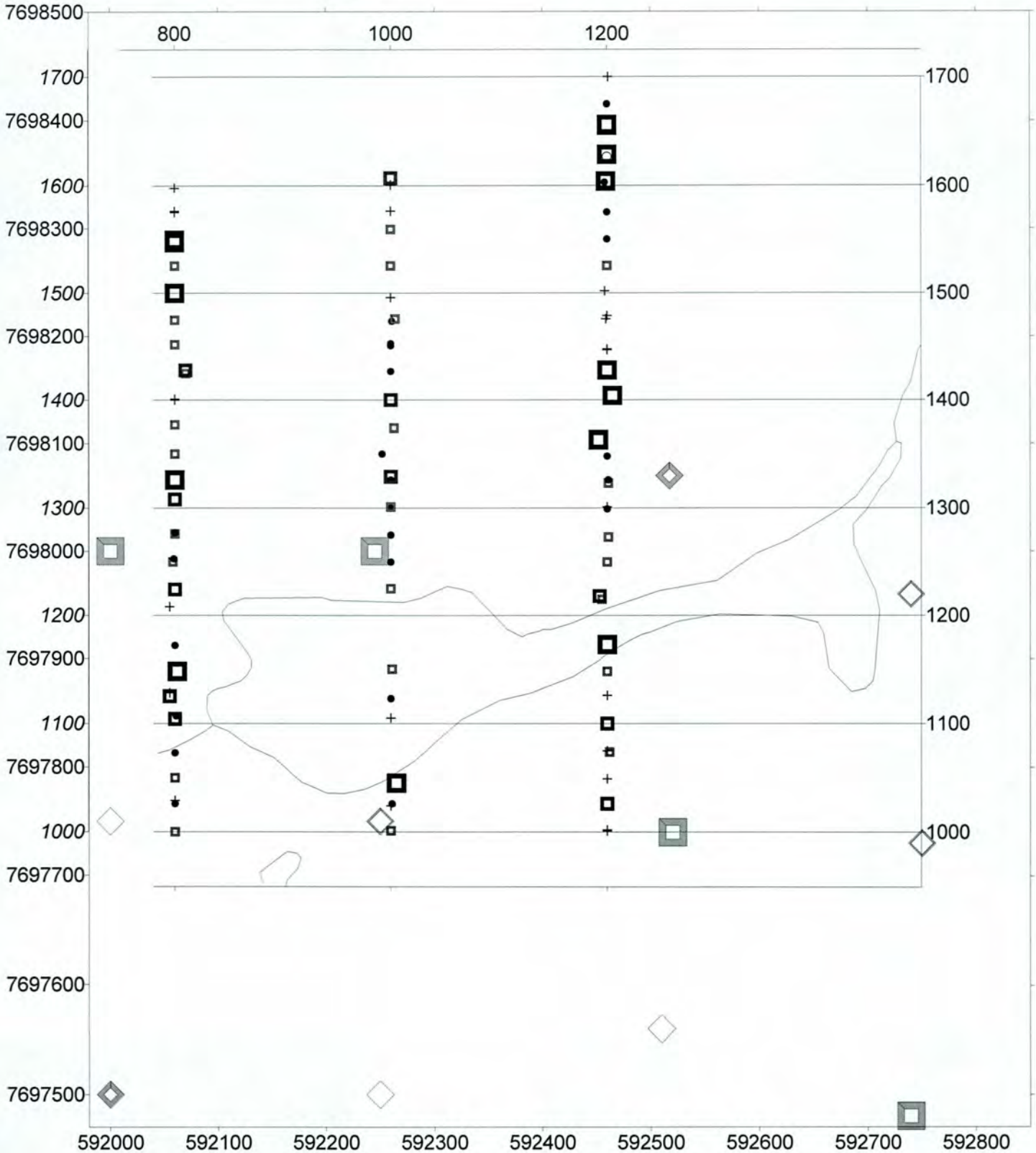
Topsoil '96

- 0.5 to 2.3
- 2.3 to 3.9
- 3.9 to 6.5
- 6.5 to 12.7
- 12.7 to 47.8

C-horizon '97

- < 0.8
- < 3.9
- < 44.5
- < 56.0
- < 73.0
- < 112.0
- < 1240.0





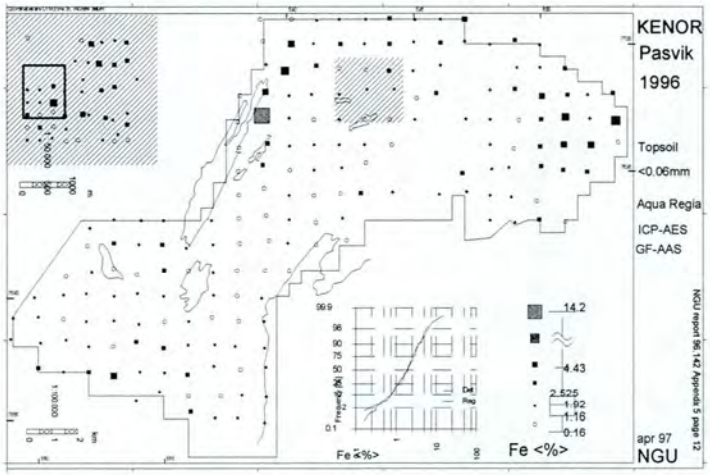
% Fe

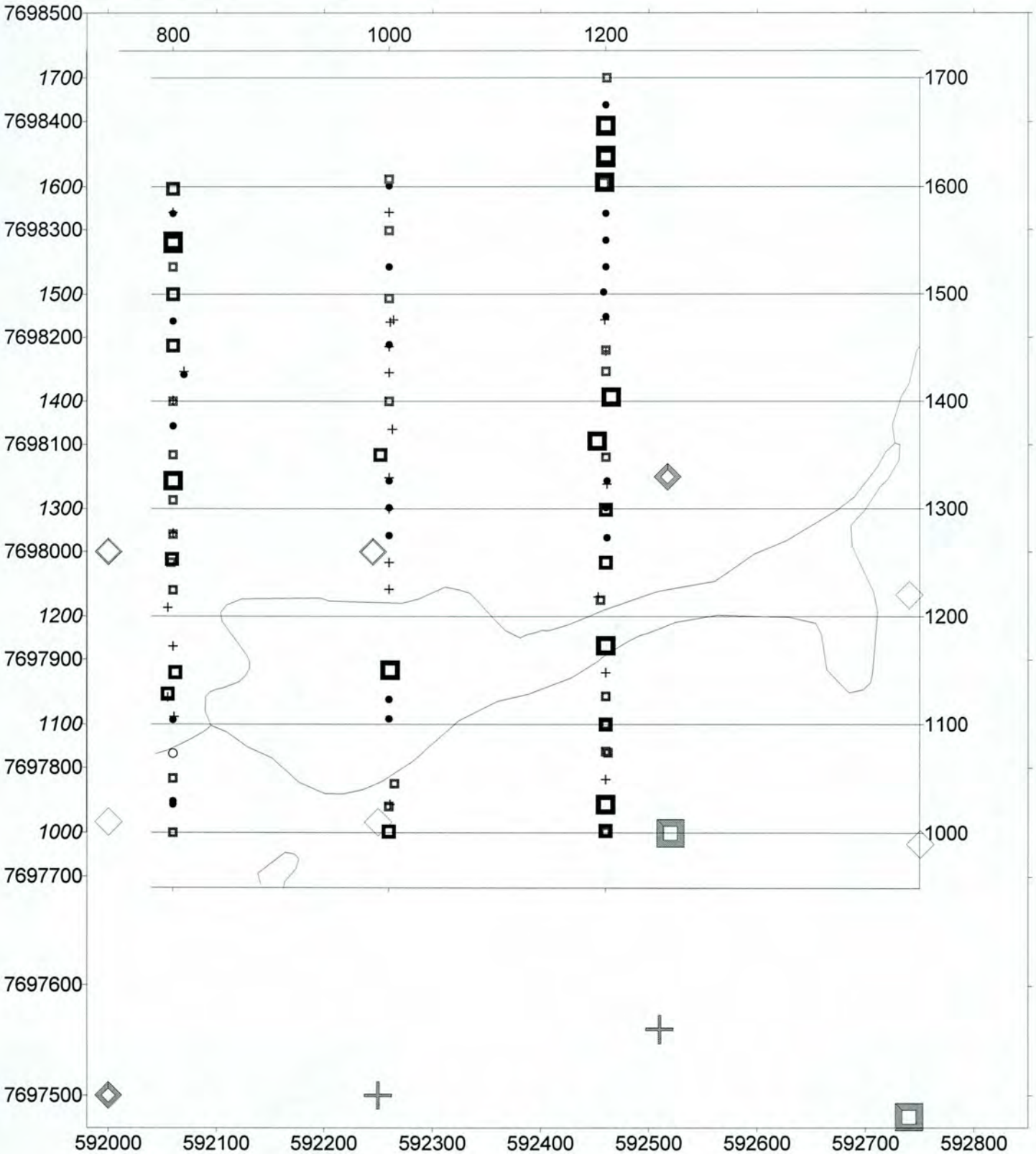
Topsoil '96

- 0.2 to 1.0
- 1.0 to 1.6
- 1.6 to 2.2
- 2.2 to 3.1
- 3.1 to 6.3

C-horizon '97

- < 0.4
- < 0.7
- < 1.8
- < 2.1
- < 2.6
- < 3.6
- < 12.9





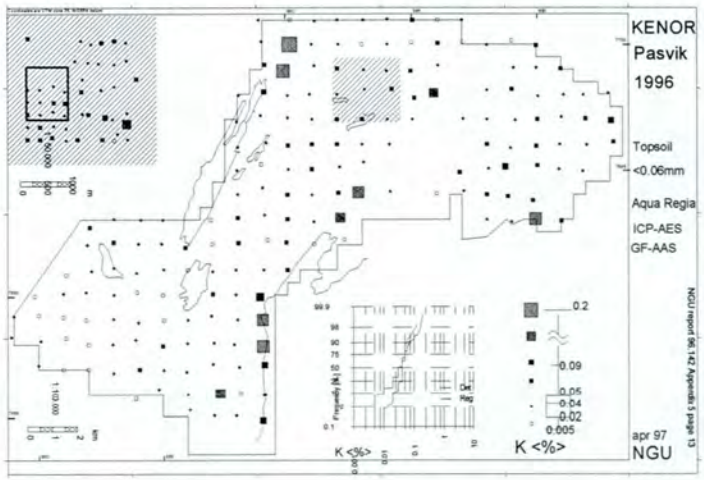
% K

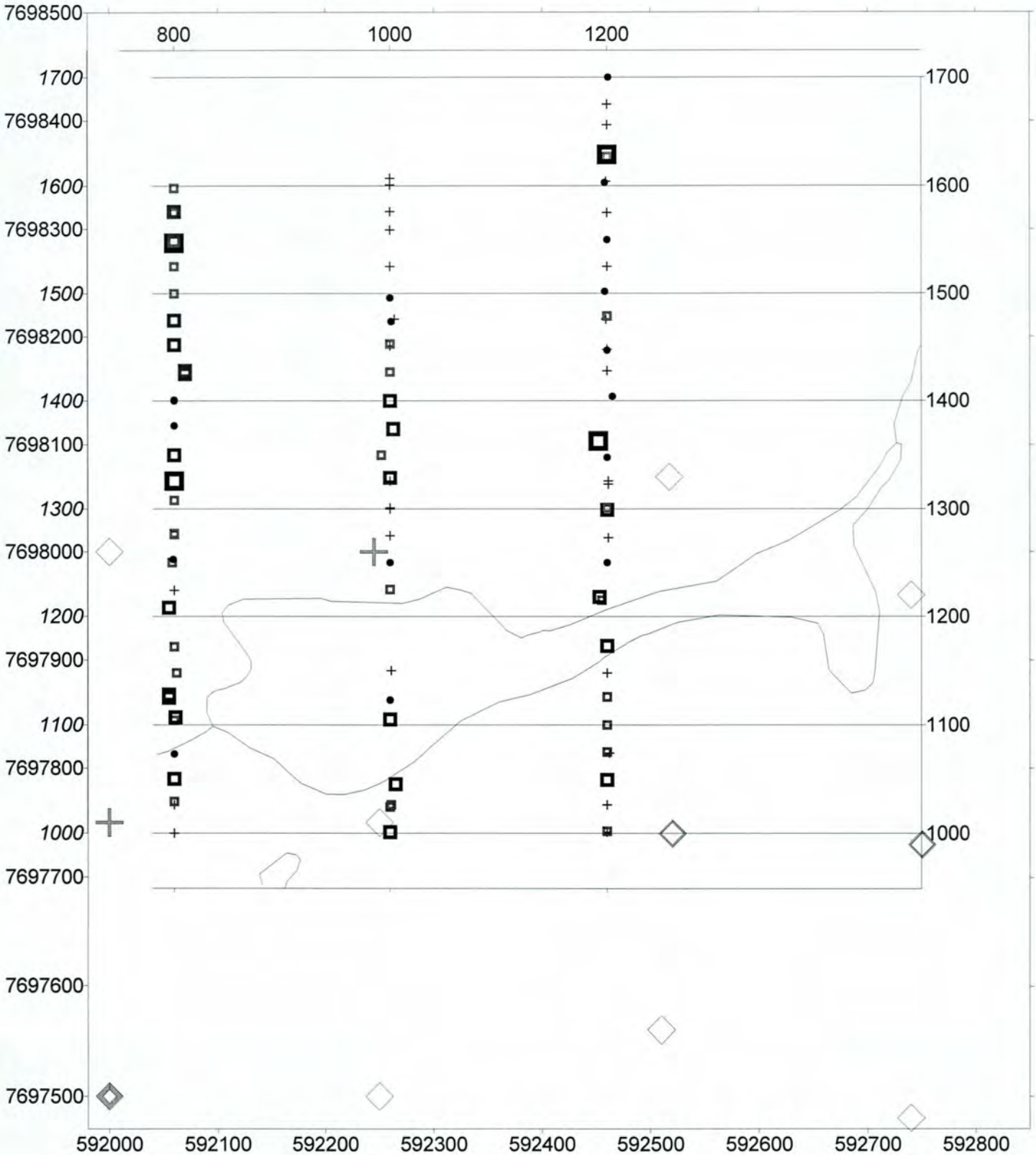
Topsoil '96

- 0.01 to 0.04
- 0.04 to 0.05
- 0.05 to 0.06
- 0.06 to 0.08
- 0.08 to 0.13

C-horizon '97

- < 0.03
- < 0.03
- < 0.08
- < 0.12
- < 0.17
- < 0.28
- < 0.32





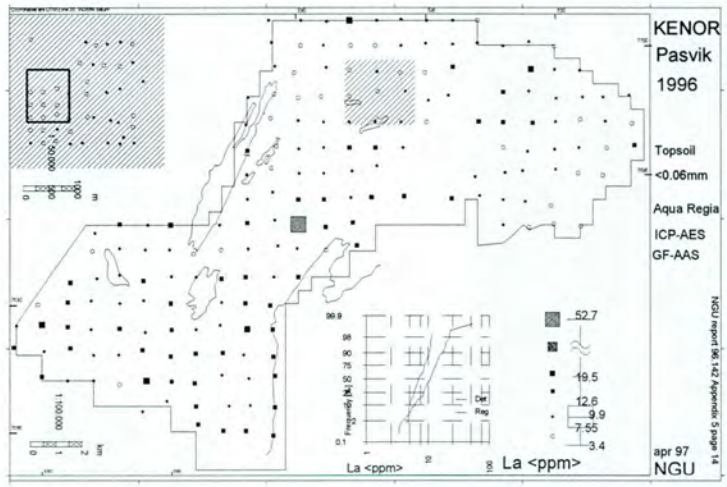
ppm La

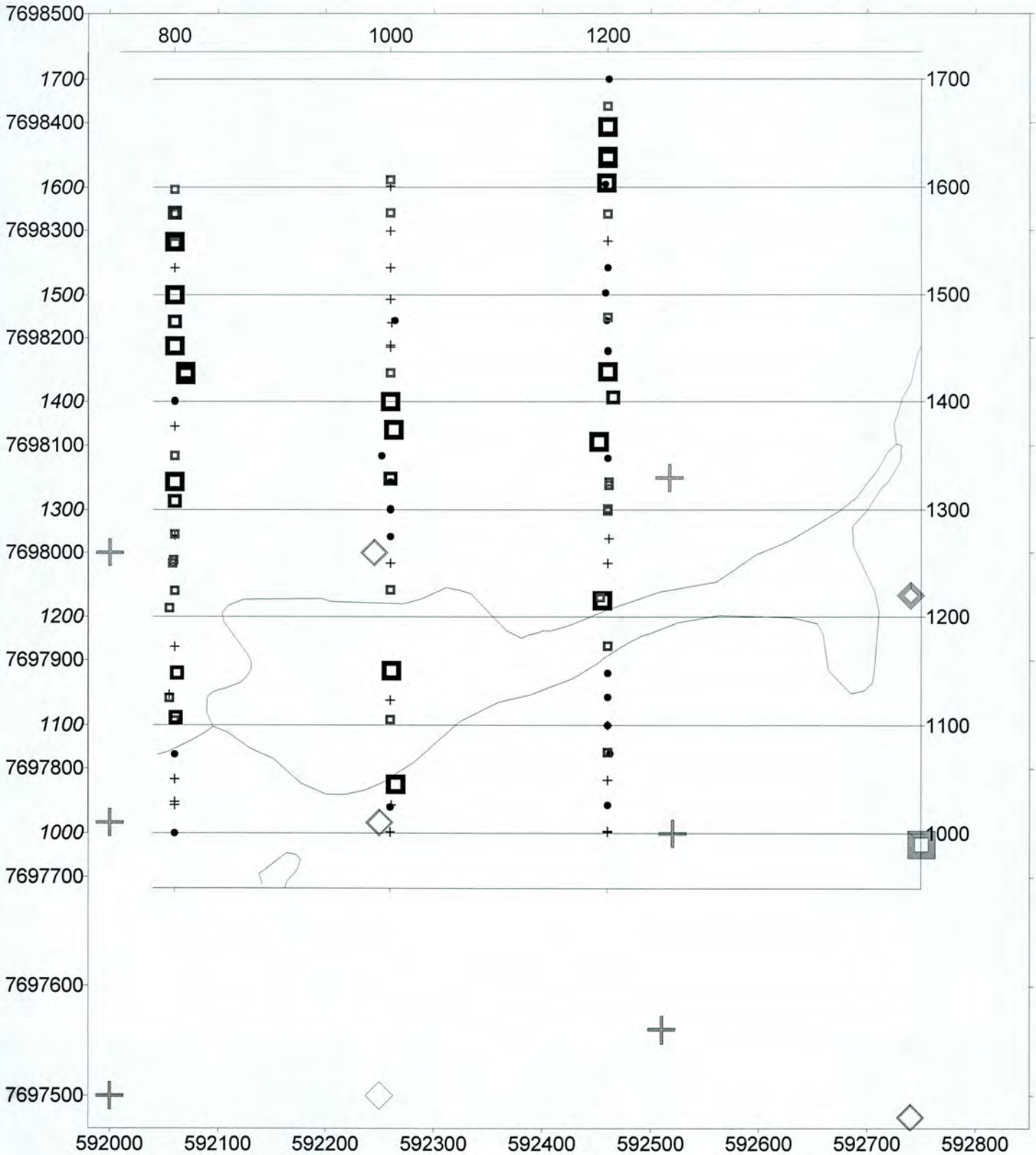
Topsoil '96

- 4.7 to 5.8
- 5.8 to 6.5
- 6.5 to 7.8
- 7.8 to 9.3
- 9.3 to 11.7

C-horizon '97

- < 4.3
- < 4.3
- < 10.4
- < 12.5
- < 17.5
- < 24.5
- < 124.0





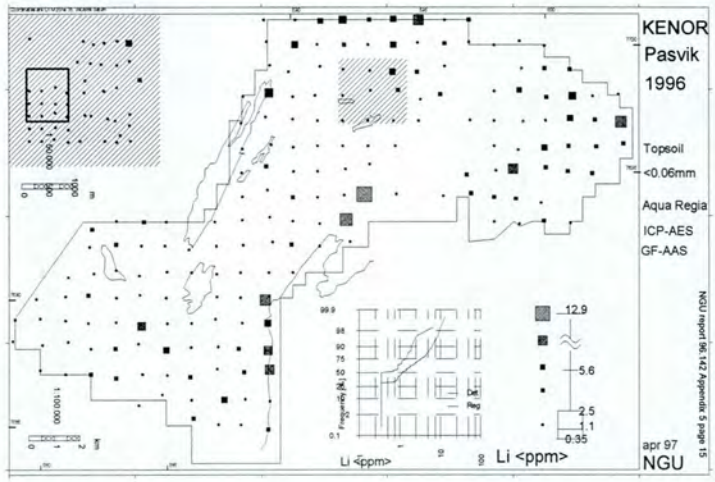
ppm Li

Topsoil '96

- 0.3 to 0.7
- 0.7 to 1.0
- 1.0 to 1.4
- 1.4 to 1.9
- 1.9 to 6.4

C-horizon '97

- < 2.3
- < 2.3
- < 6.9
- < 8.7
- < 11.7
- < 17.5
- < 51.9



7698500
800
1000
1200
1700
7698400
1600
7698300
1500
7698200
1400
7698100
1300
7698000
1200
7697900
1100
7697800
1000
7697700
7697600
7697500
592000
592100
592200
592300
592400
592500
592600
592700
592800

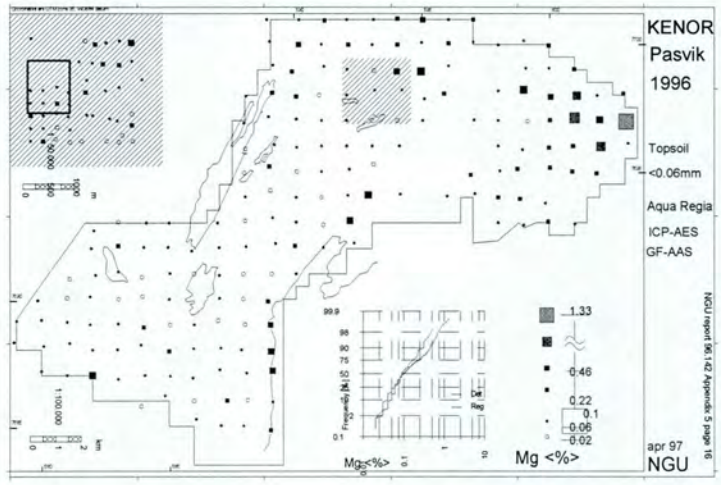
% Mg

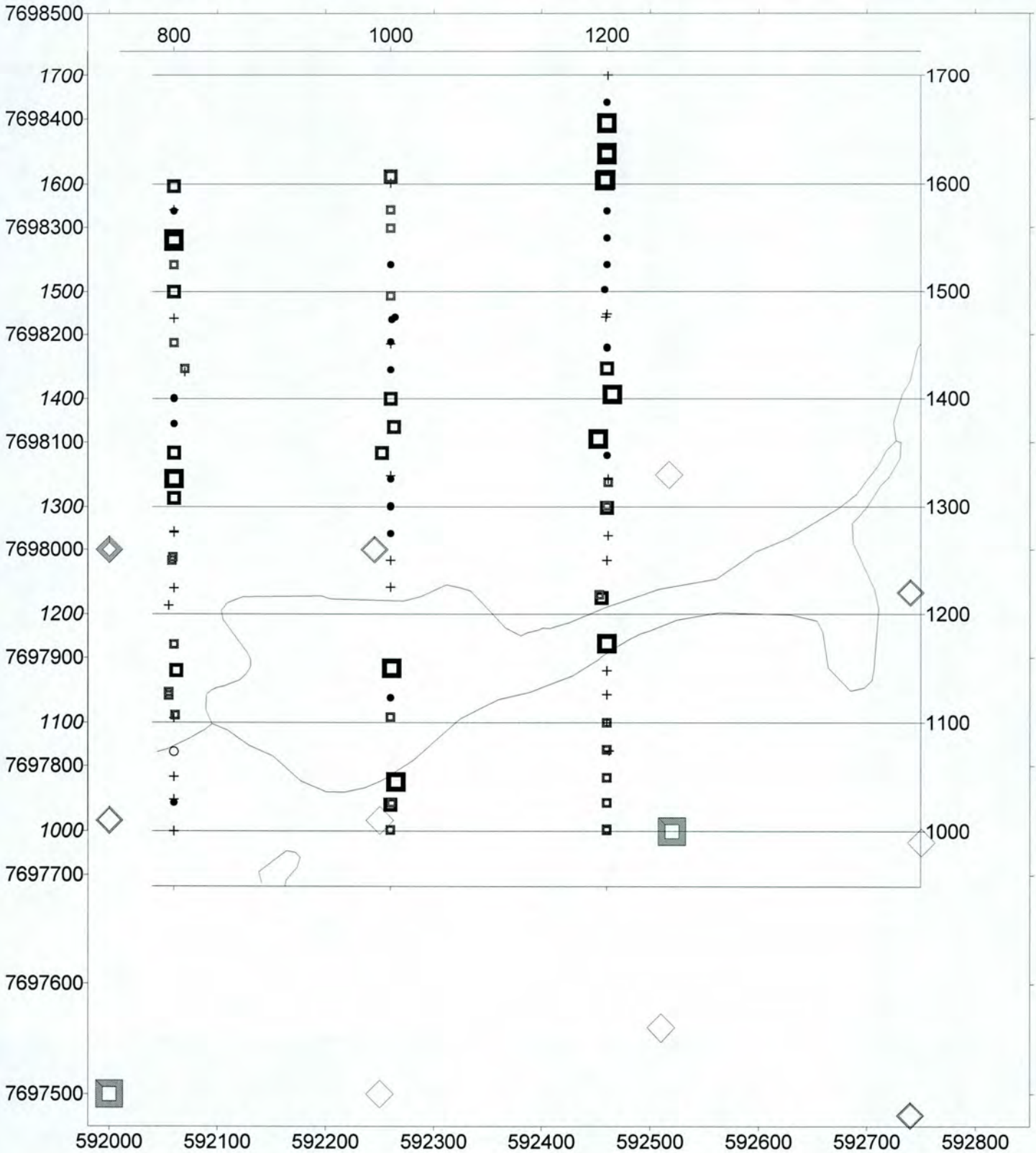
Topsoil '96

- 0.02 to 0.05
- 0.05 to 0.09
- 0.09 to 0.13
- 0.13 to 0.22
- 0.22 to 0.52

C-horizon '97

- < 0.1
- < 0.1
- < 0.4
- < 0.5
- < 0.6
- < 0.8
- < 2.2





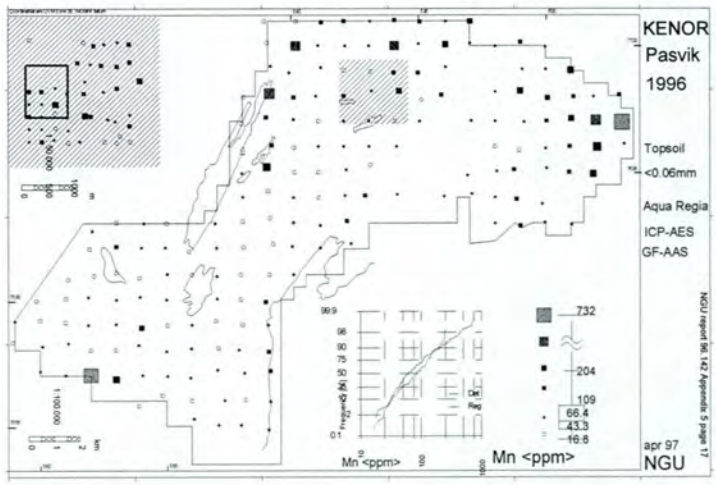
ppm Mn

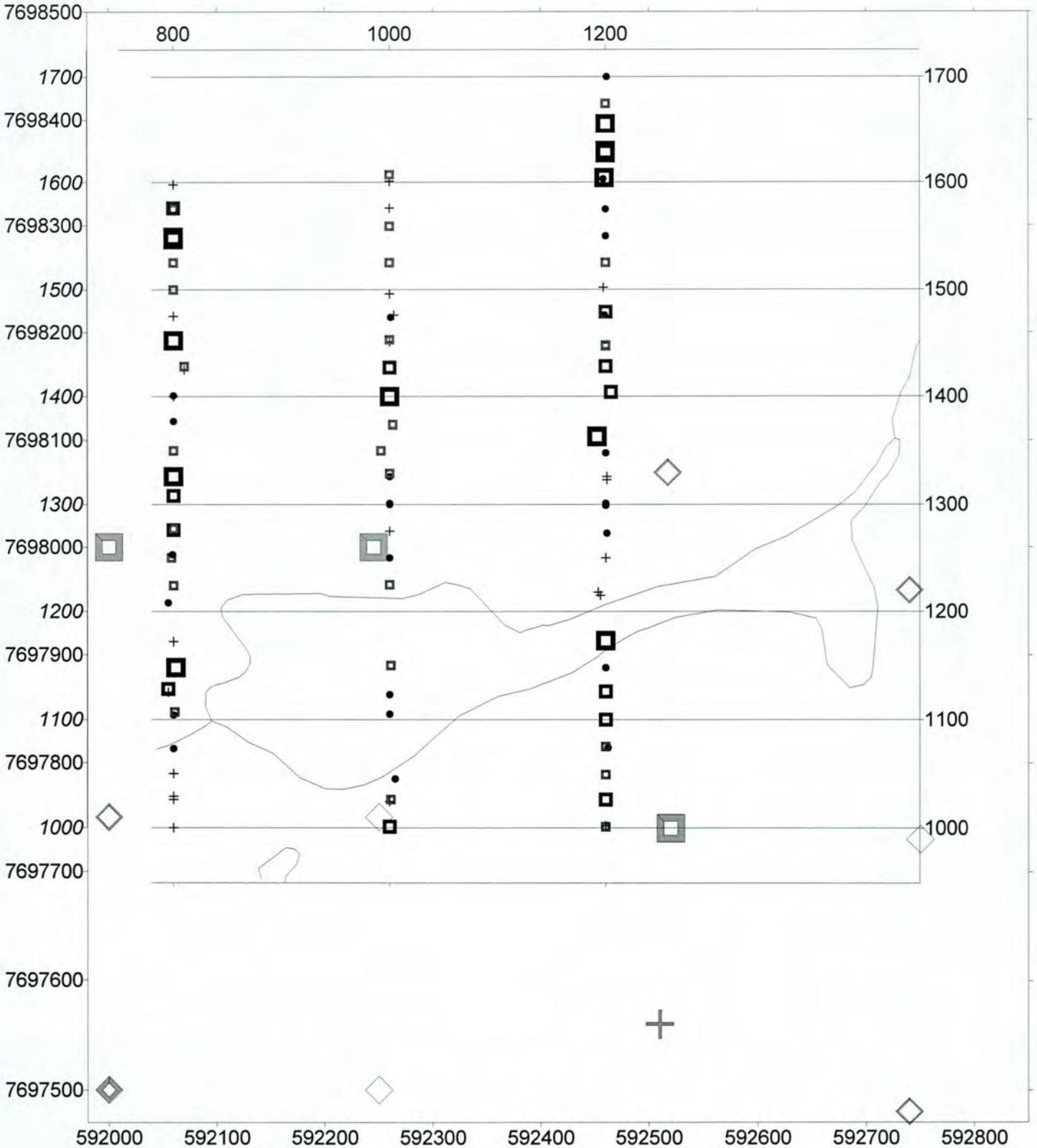
Topsoil '96

- 18 to 44
- 44 to 70
- 70 to 99
- 99 to 142
- 142 to 245

C-horizon '97

- < 32
- < 32
- < 160
- < 197
- < 263
- < 402
- < 2950





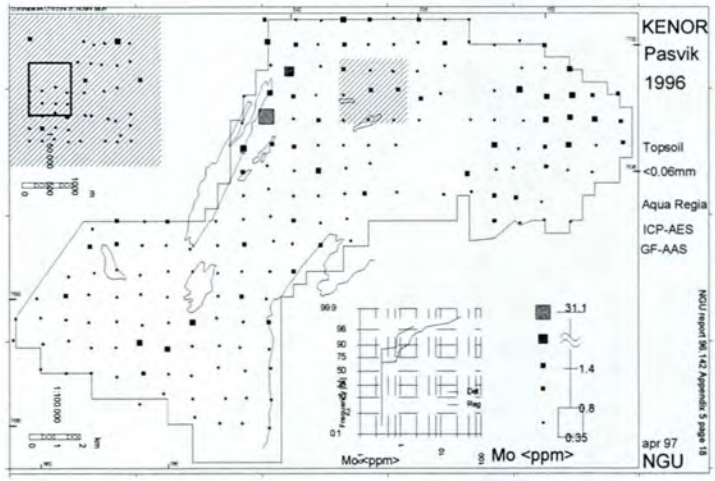
ppm Mo

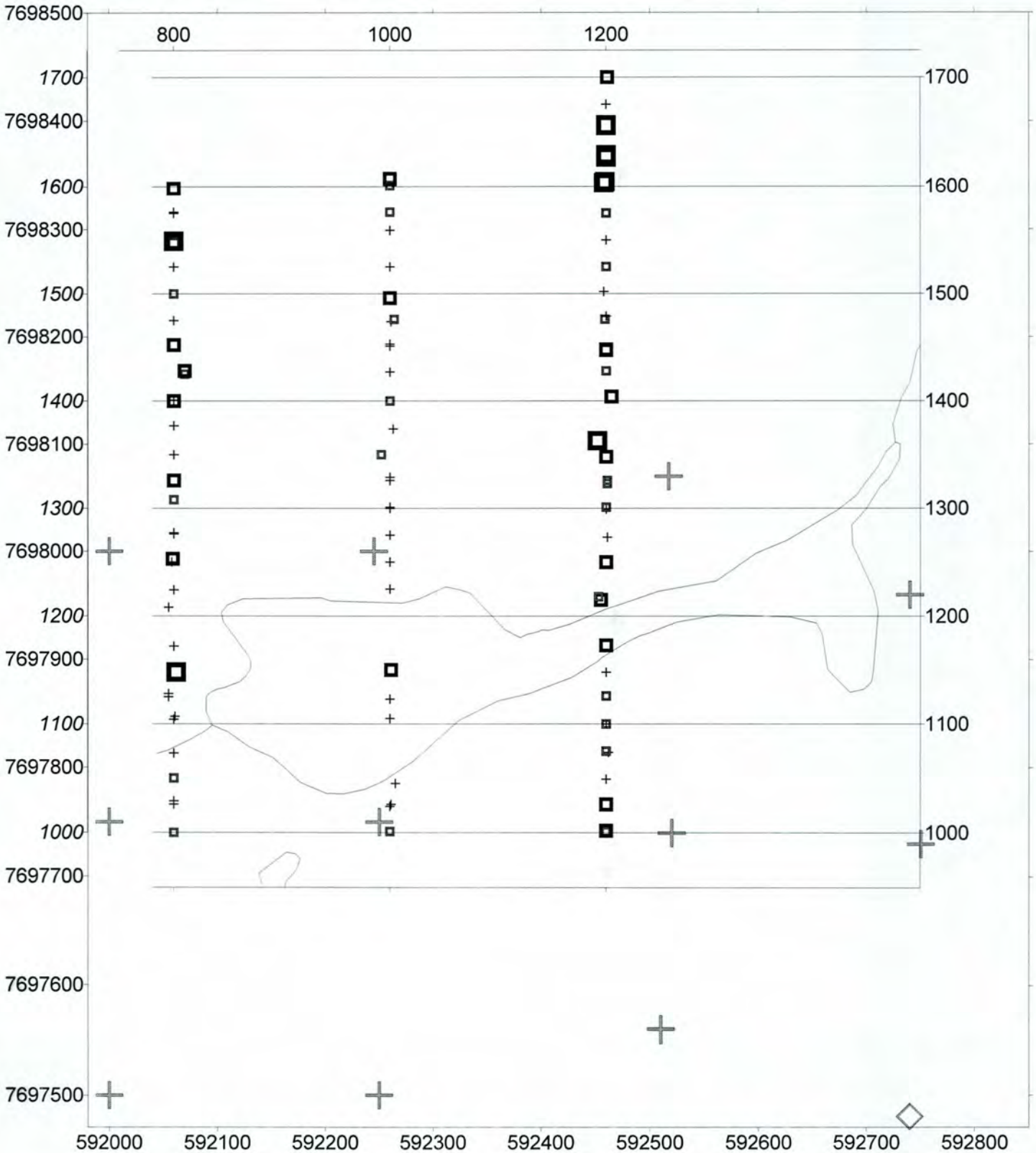
Topsoil '96

+	0.3 to 0.8
◇	0.8 to 0.9
◇	0.9 to 2.1
◇	2.1 to 2.1
□	2.1 to 2.1

C-horizon '97

○	< 0.3
○	< 0.3
●	< 0.3
+	< 0.7
□	< 1.1
□	< 2.2
□	< 9.0





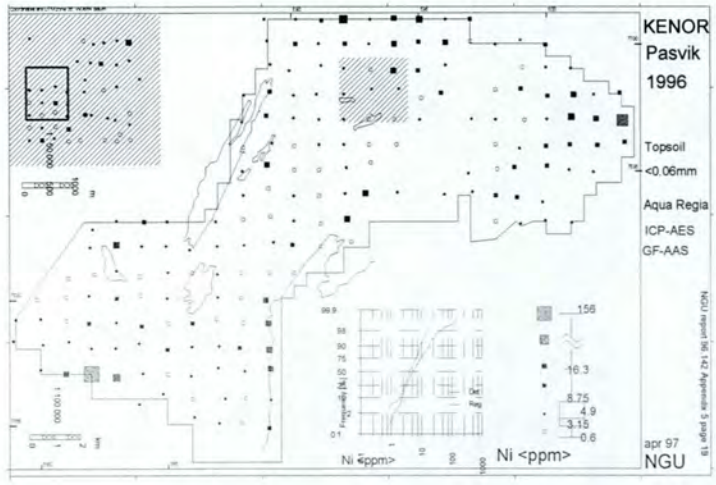
ppm Ni

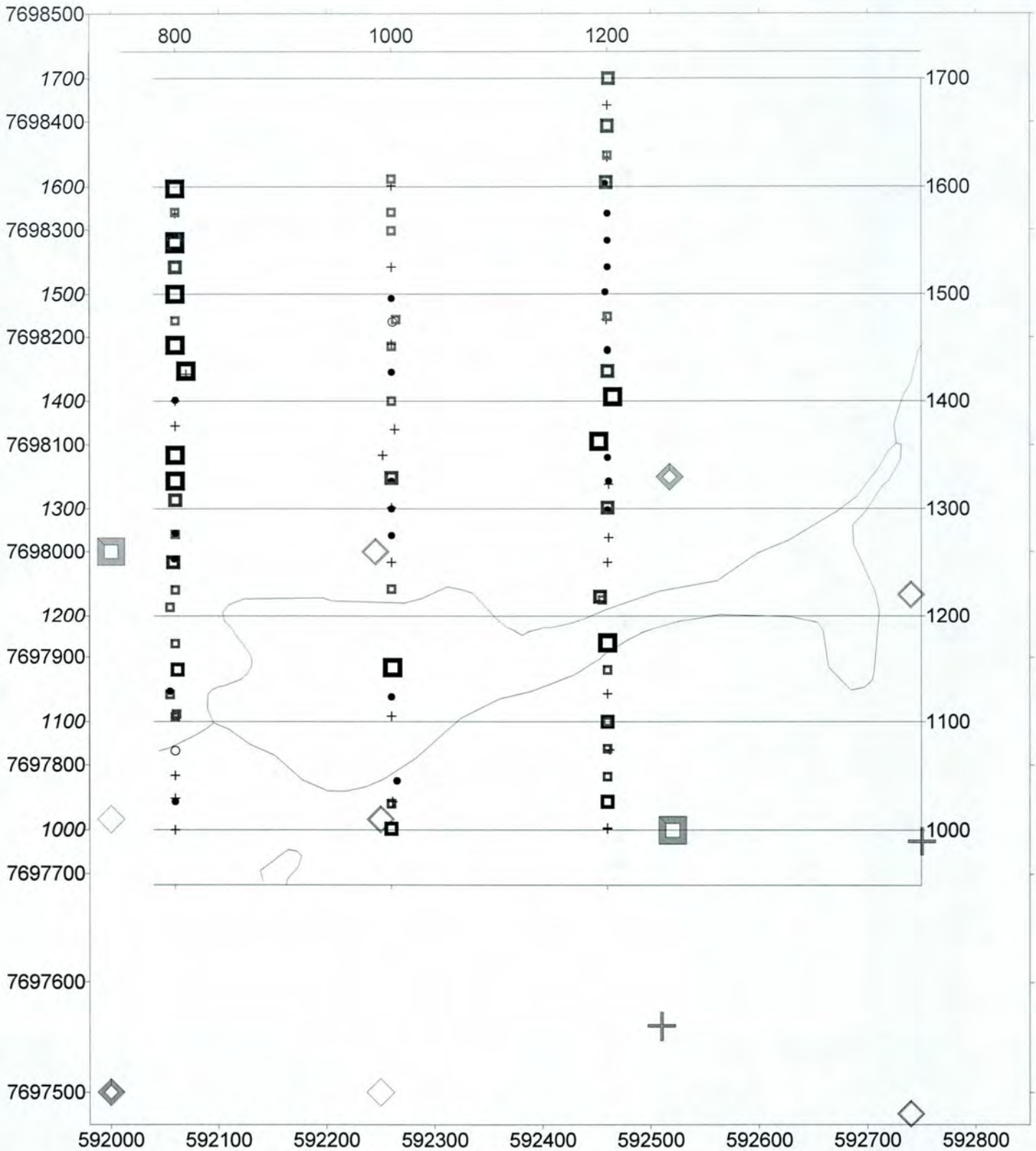
Topsoil '96

- 0.6 to 2.4
- 2.4 to 3.6
- 3.6 to 5.1
- 5.1 to 7.5
- 7.5 to 19.7

C-horizon '97

- < 3.0
- < 8.6
- < 23.2
- < 27.0
- < 33.0
- < 44.2
- < 226.0





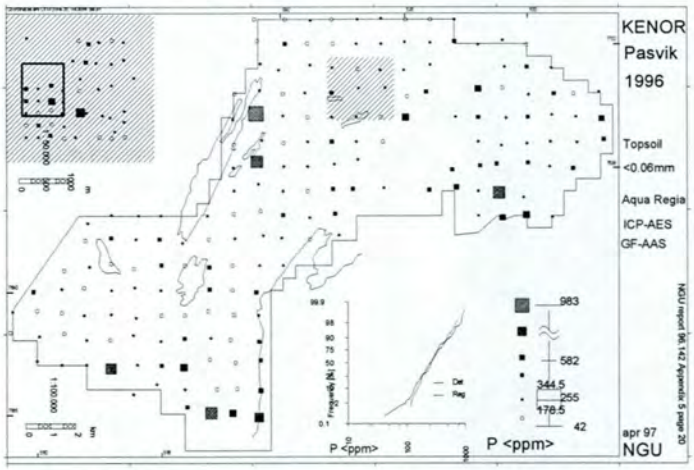
ppm P

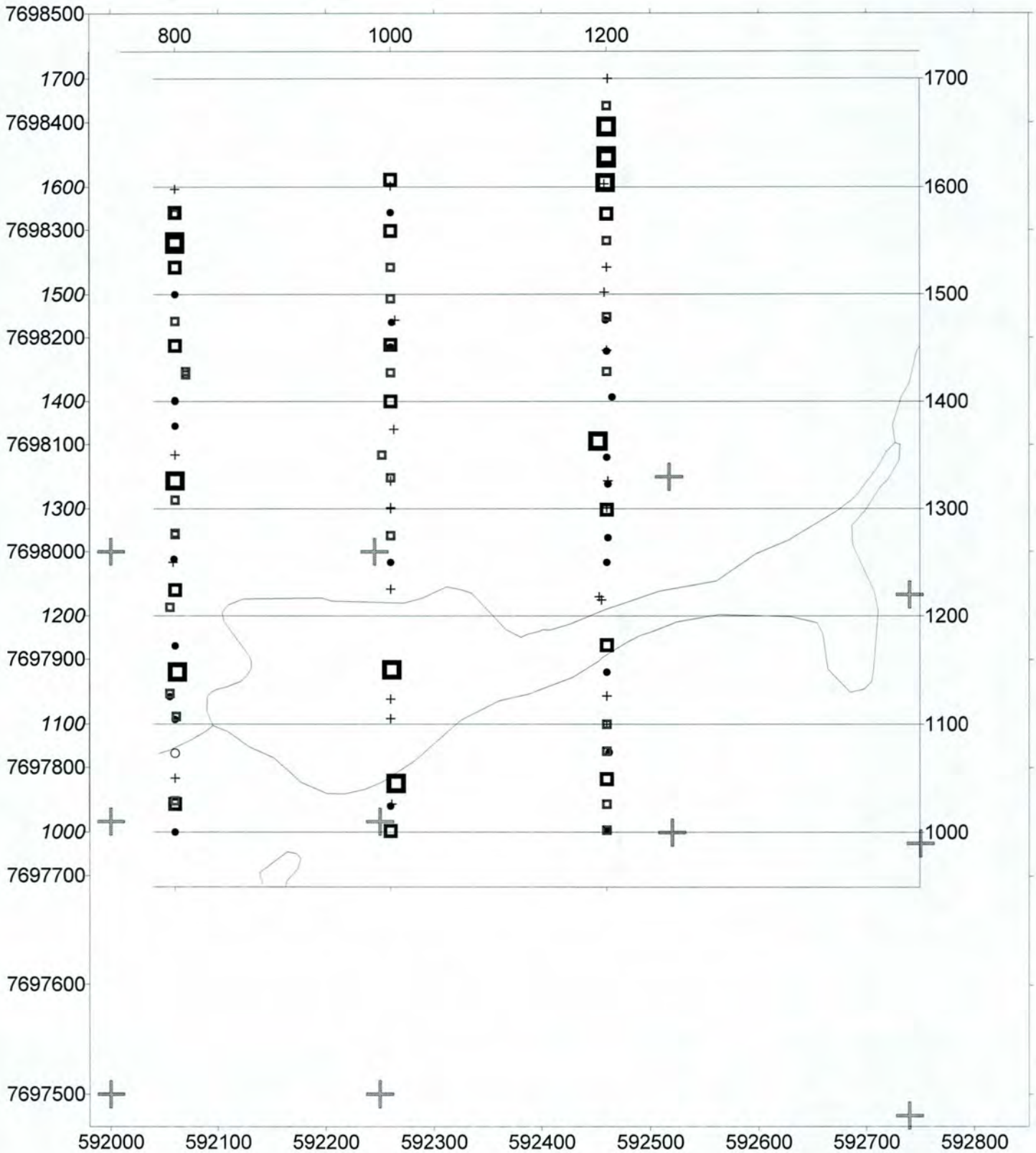
Topsoil '96

- 134 to 644
- 644 to 810
- 810 to 943
- 943 to 1250
- 1250 to 4620

C-horizon '97

- < 134
- < 263
- < 644
- < 811
- < 943
- < 1250
- < 4620





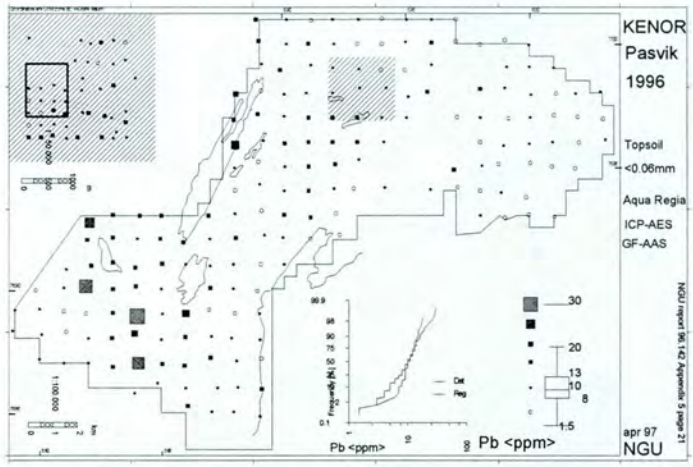
ppm Pb

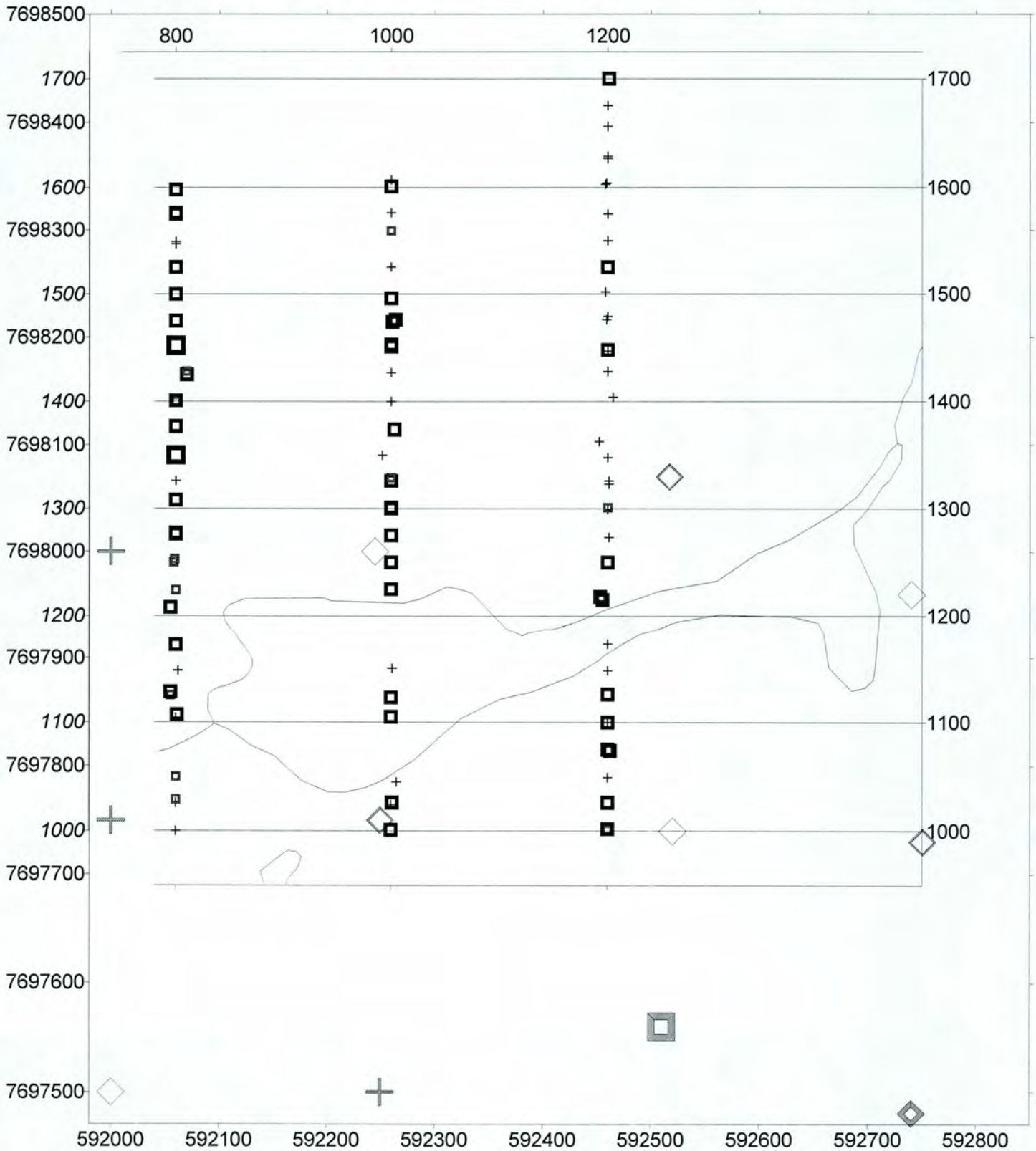
Topsoil '96

- 3.0 to 9.0
- 9.0 to 10.0
- 10.0 to 12.5
- 12.5 to 17.0
- 17.0 to 18.0

C-horizon '97

- < 2.5
- < 2.5
- < 2.5
- < 5.0
- < 6.0
- < 10.0
- < 15.0





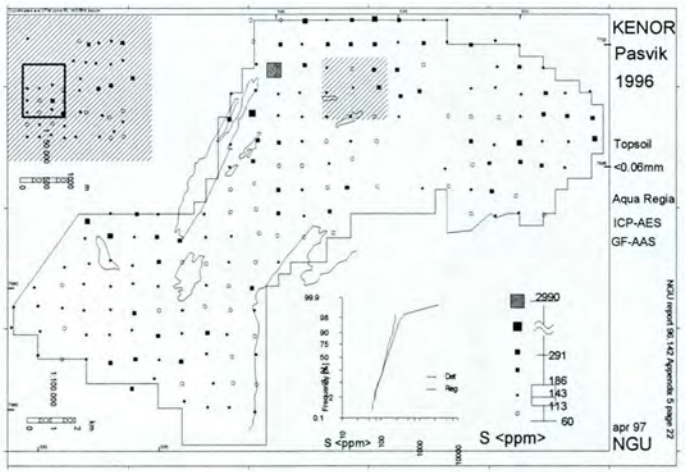
ppm S

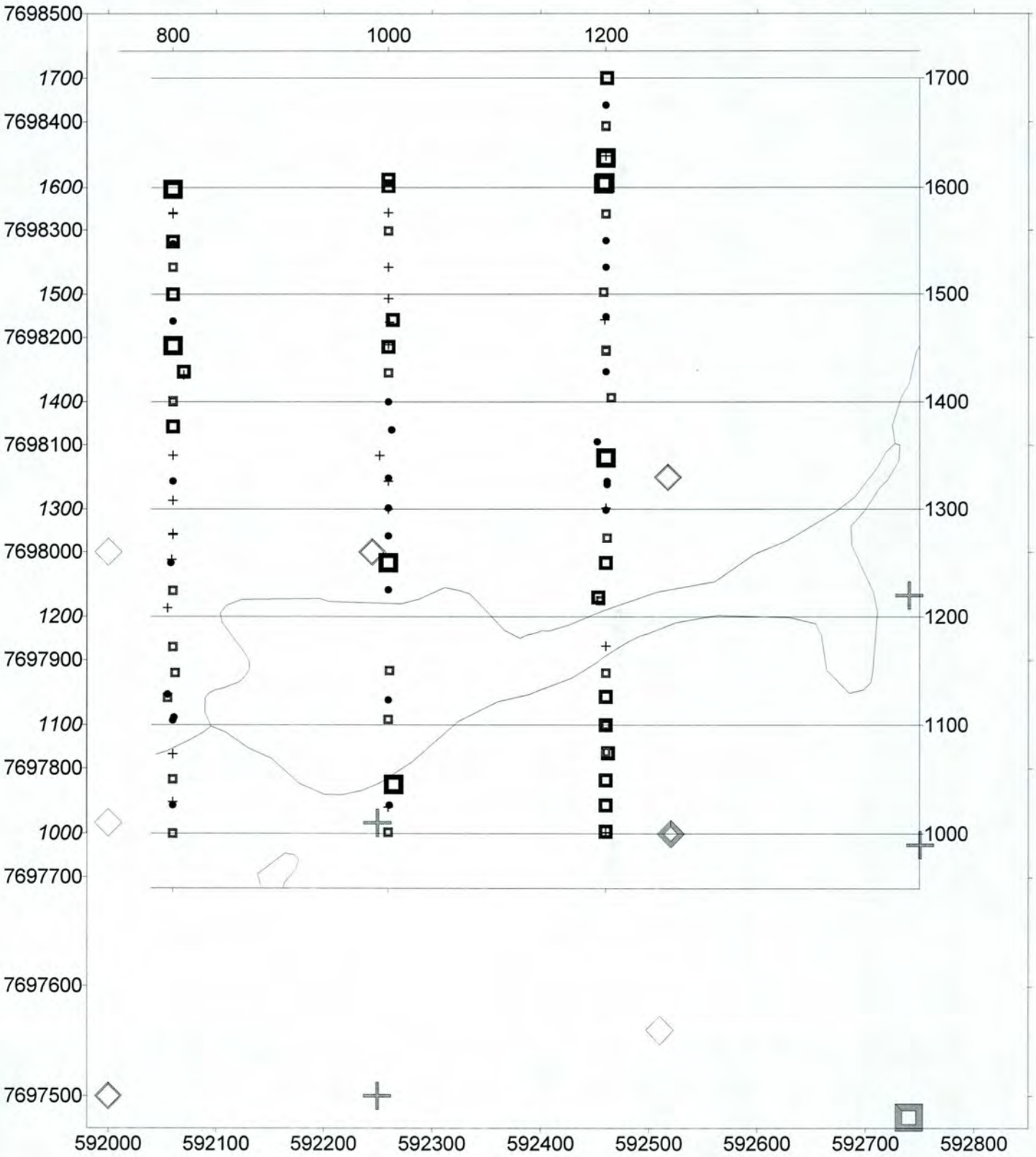
Topsoil '96

- 69 to 113
- 113 to 135
- 135 to 161
- 161 to 230
- 230 to 234

C-horizon '97

- < 28.0
- < 28.0
- < 91.5
- < 123.5
- < 161.0
- < 262.0
- < 956.0





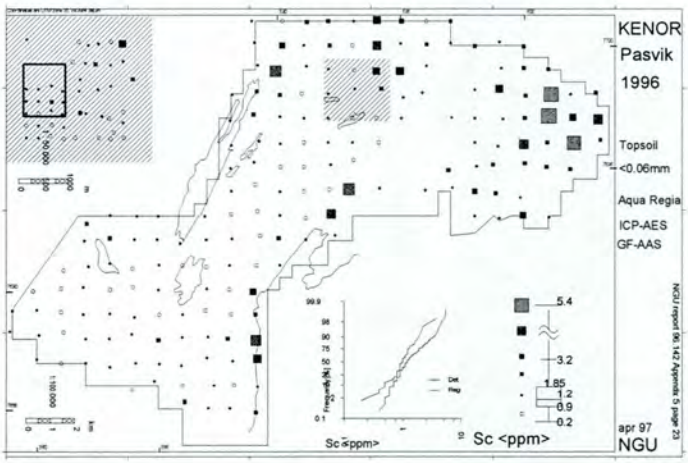
ppm Sc

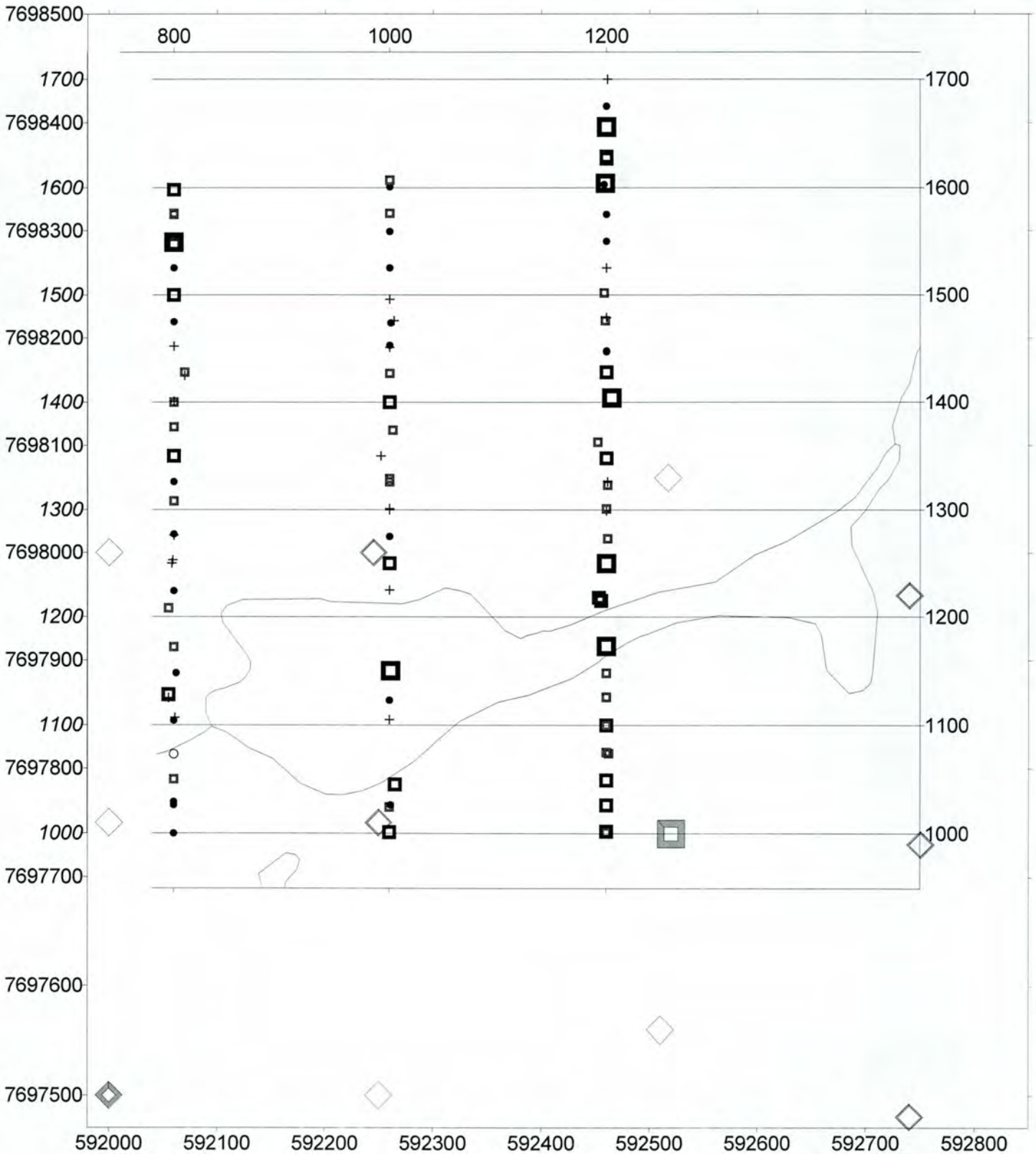
Topsoil '96

+	0.2 to 0.8
◇	0.8 to 1.0
◇	1.0 to 1.3
◇	1.3 to 1.9
□	1.9 to 3.7

C-horizon '97

○	< 1.1
○	< 2.1
●	< 3.8
+	< 4.4
□	< 5.3
□	< 7.1
□	< 9.5





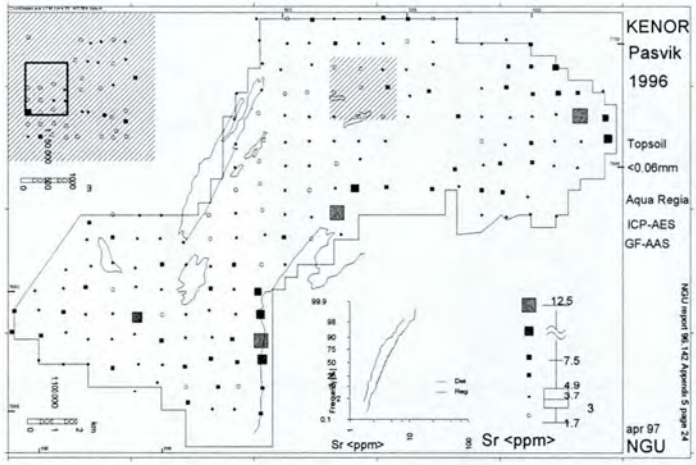
ppm Sr

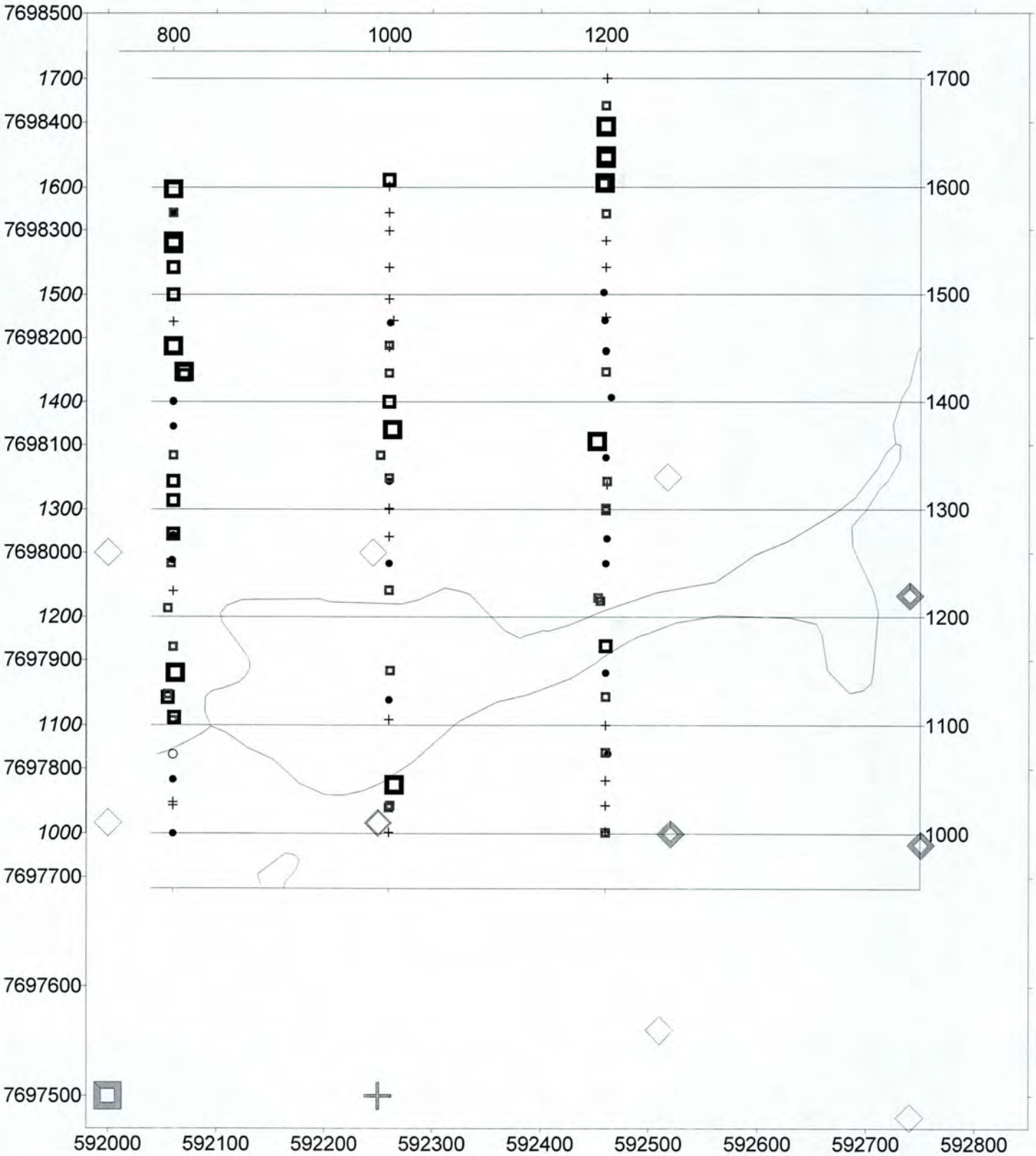
Topsoil '96

- 1.7 to 2.3
- 2.3 to 2.7
- 2.7 to 3.2
- 3.2 to 4.2
- 4.2 to 8.3

C-horizon '97

- < 3.3
- < 4.8
- < 7.1
- < 8.1
- < 9.6
- < 13.2
- < 50.0





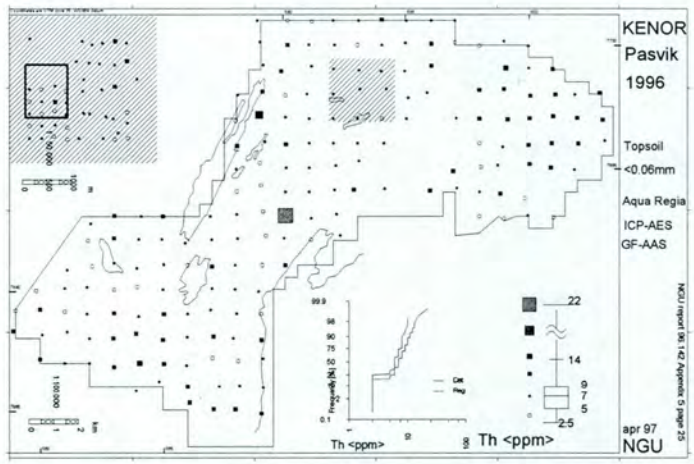
ppm Th

Topsoil '96

- 2.5 to 3.8
- 3.8 to 6.0
- 6.0 to 7.5
- 7.5 to 10.0
- 10.0 to 10.0

C-horizon '97

- < 2.5
- < 2.5
- < 6.0
- < 8.0
- < 10.0
- < 16.0
- < 25.0



7698500
7698400
7698300
7698200
7698100
7698000
7697900
7697800
7697700
7697600
7697500

800 1000 1200

1700 1600 1500 1400 1300 1200 1100 1000

592000 592100 592200 592300 592400 592500 592600 592700 592800

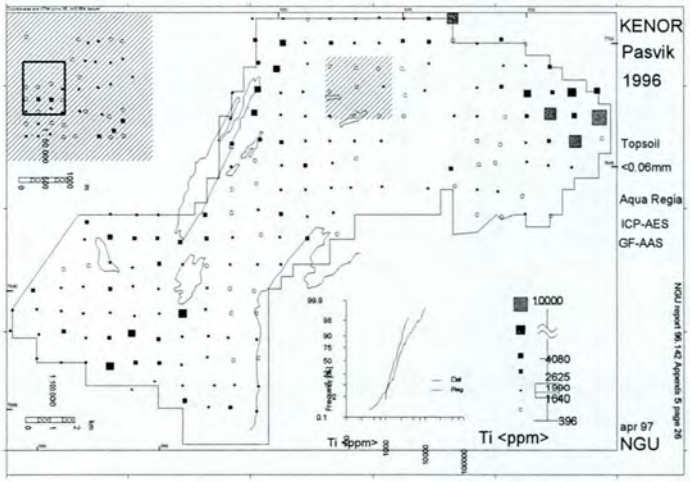
ppm Ti

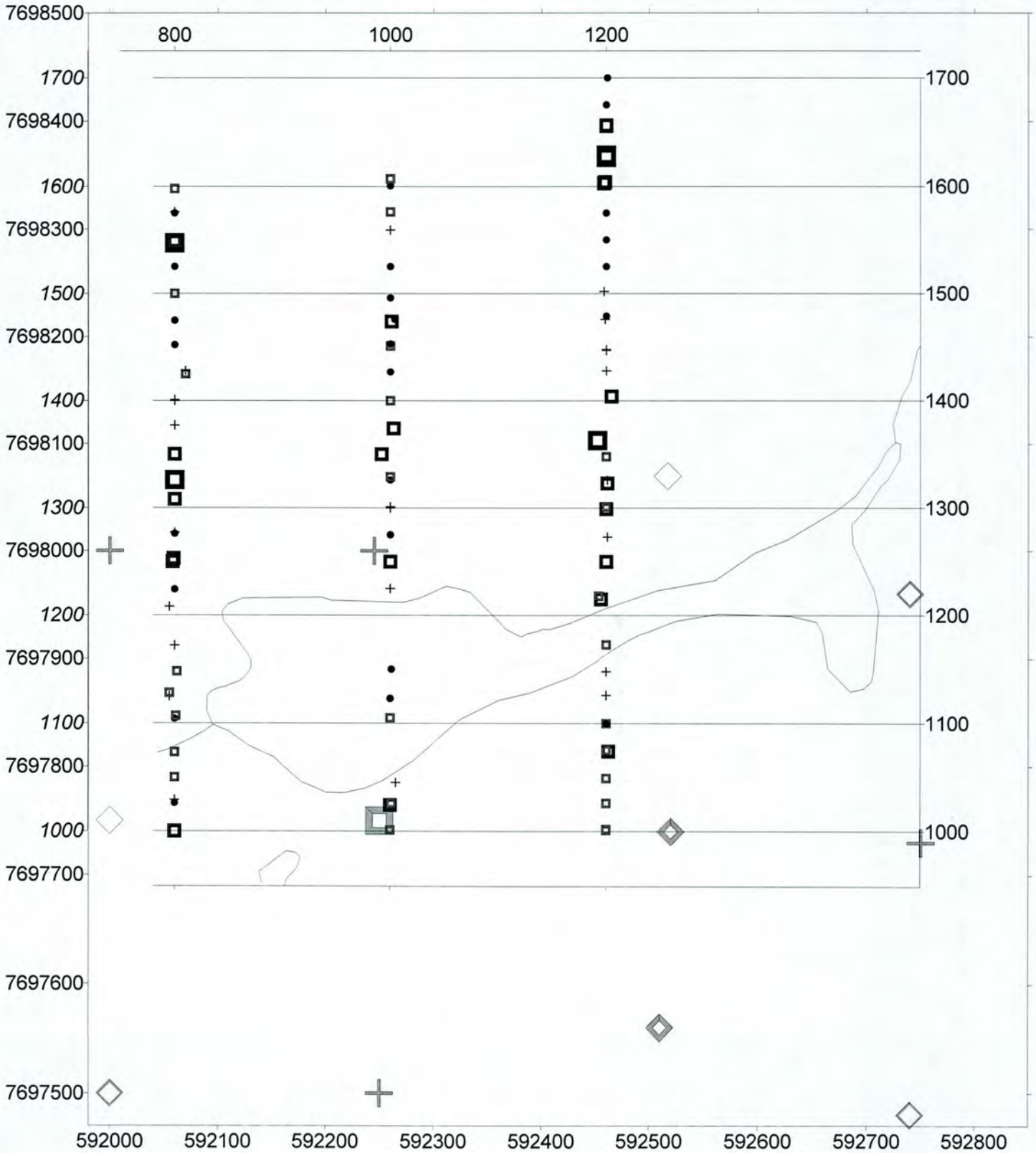
Topsoil '96

- 1020 to 1350
- 1350 to 1730
- 1730 to 2115
- 2115 to 3010
- 3010 to 3840

C-horizon '97

- < 479
- < 479
- < 870
- < 1020
- < 1195
- < 1650
- < 2030





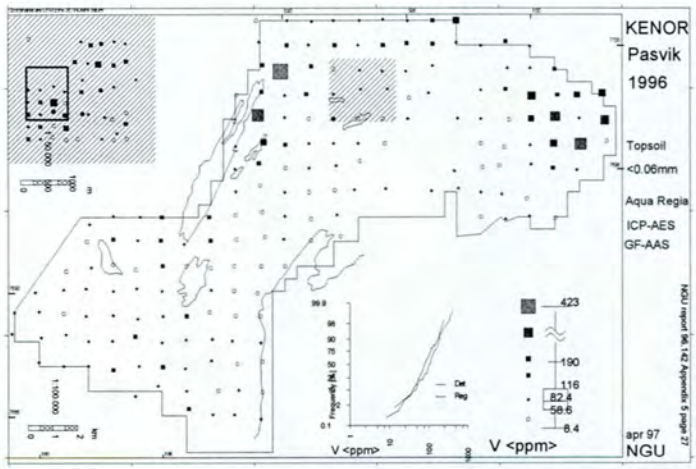
ppm V

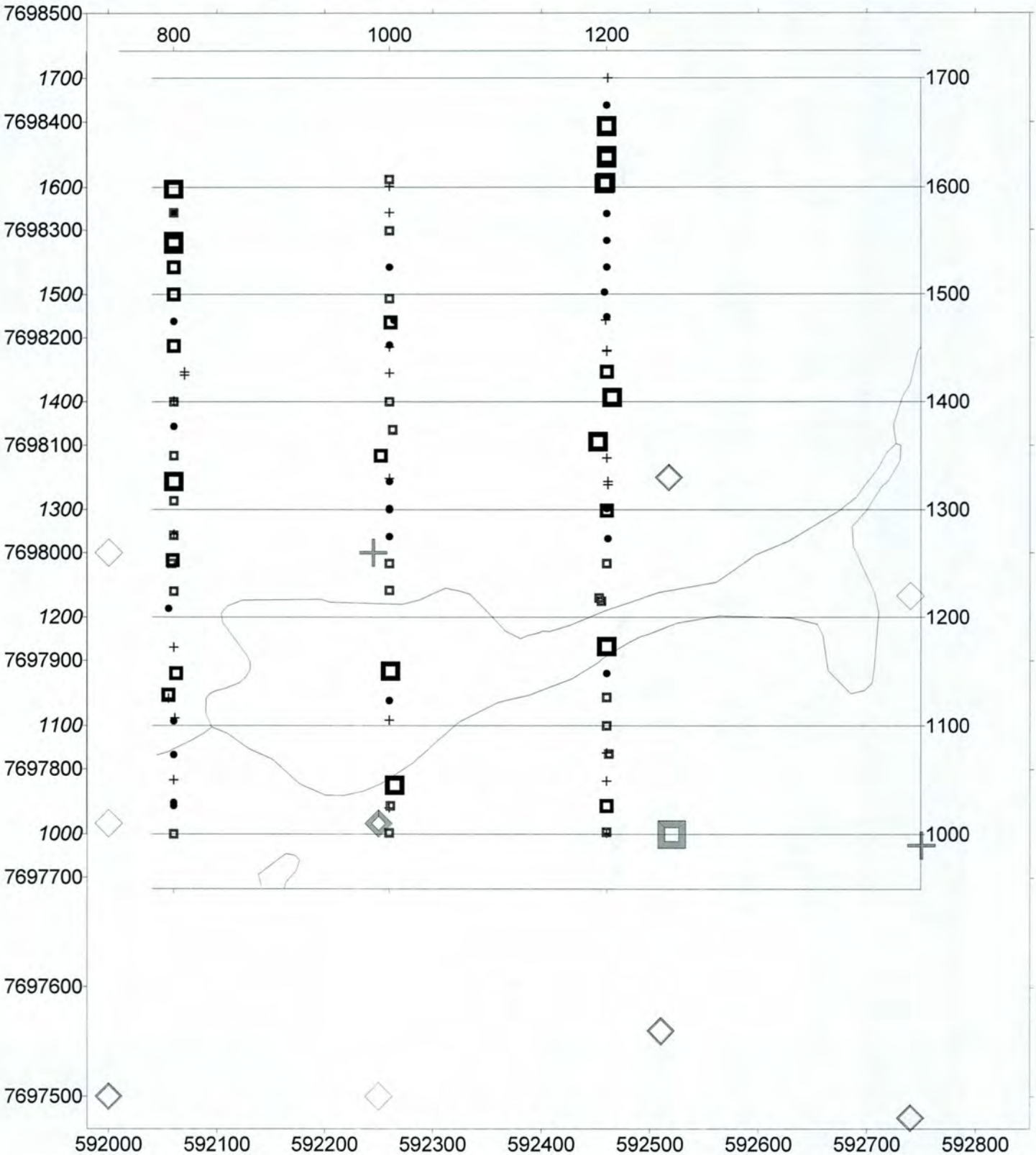
Topsoil '96

- 14 to 73
- 73 to 107
- 107 to 136
- 136 to 212
- 212 to 238

C-horizon '97

- < 16.9
- < 16.9
- < 33.9
- < 40.3
- < 52.3
- < 74.7
- < 232.0





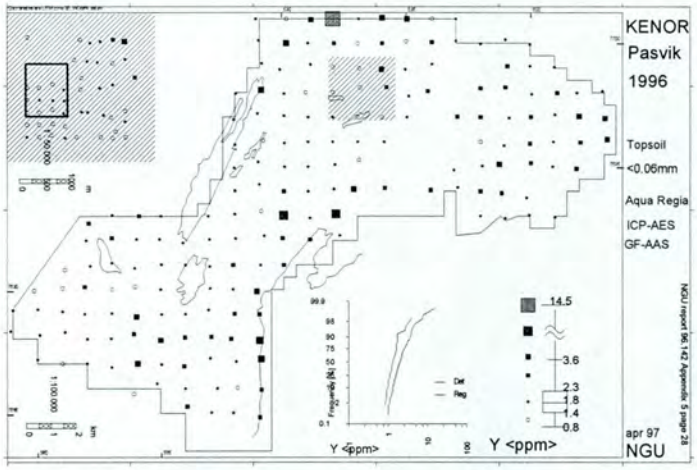
ppm Y

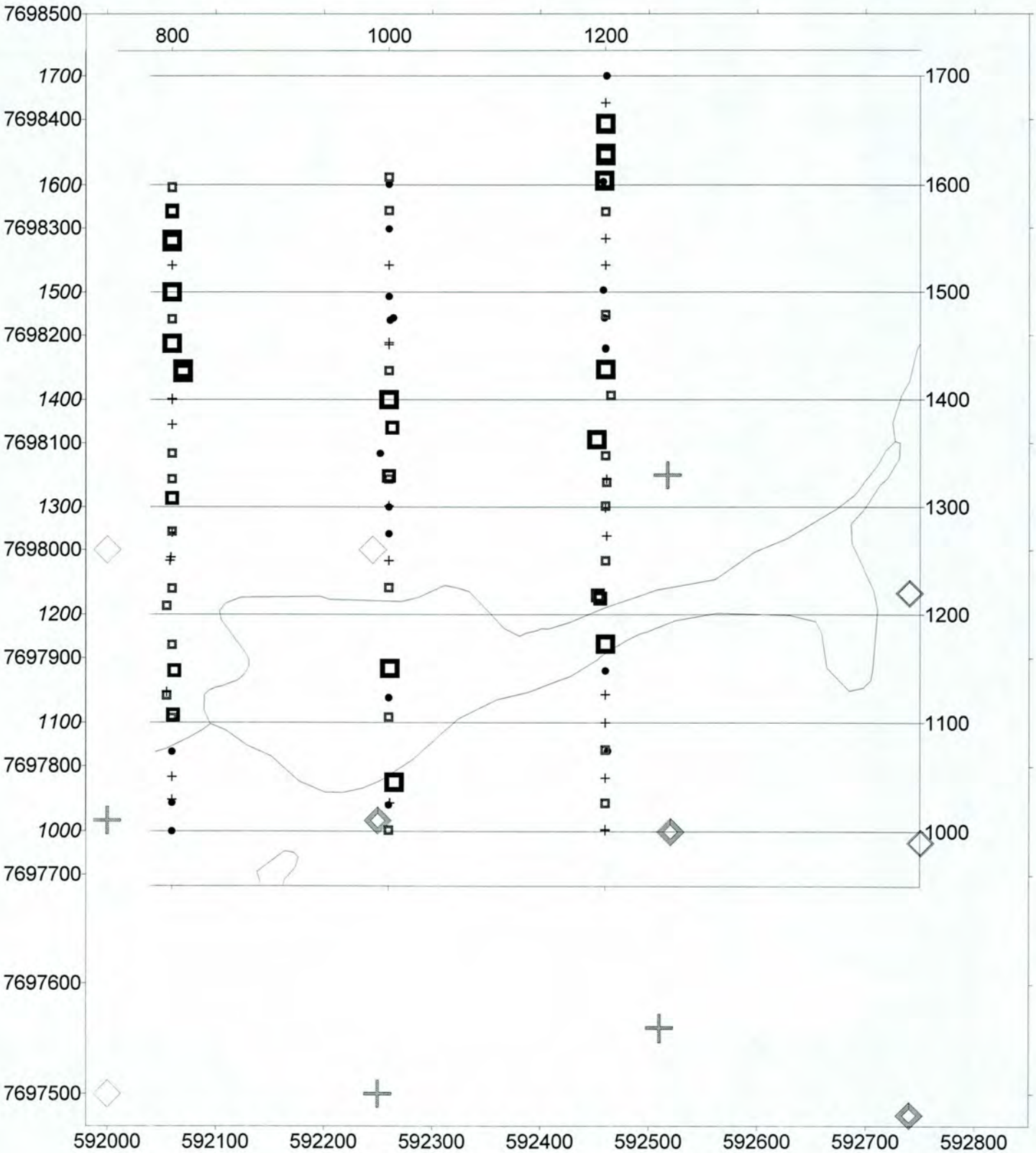
Topsoil '96

- 0.8 to 1.1
- 1.1 to 1.3
- 1.3 to 1.6
- 1.6 to 1.7
- 1.7 to 3.8

C-horizon '97

- < 2.6
- < 2.6
- < 6.2
- < 7.4
- < 9.9
- < 15.1
- < 108.0





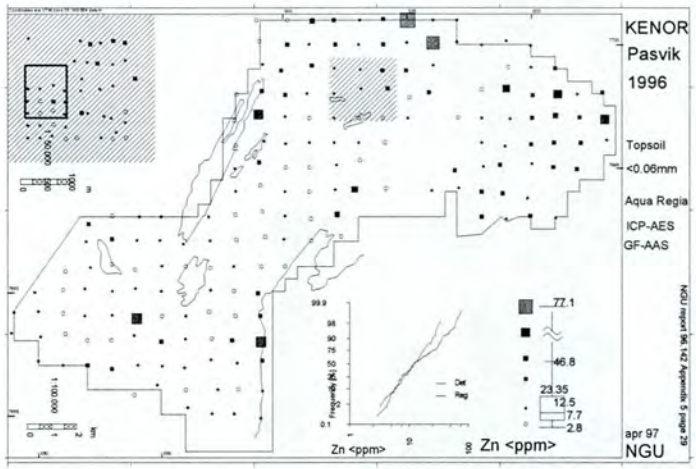
ppm Zn

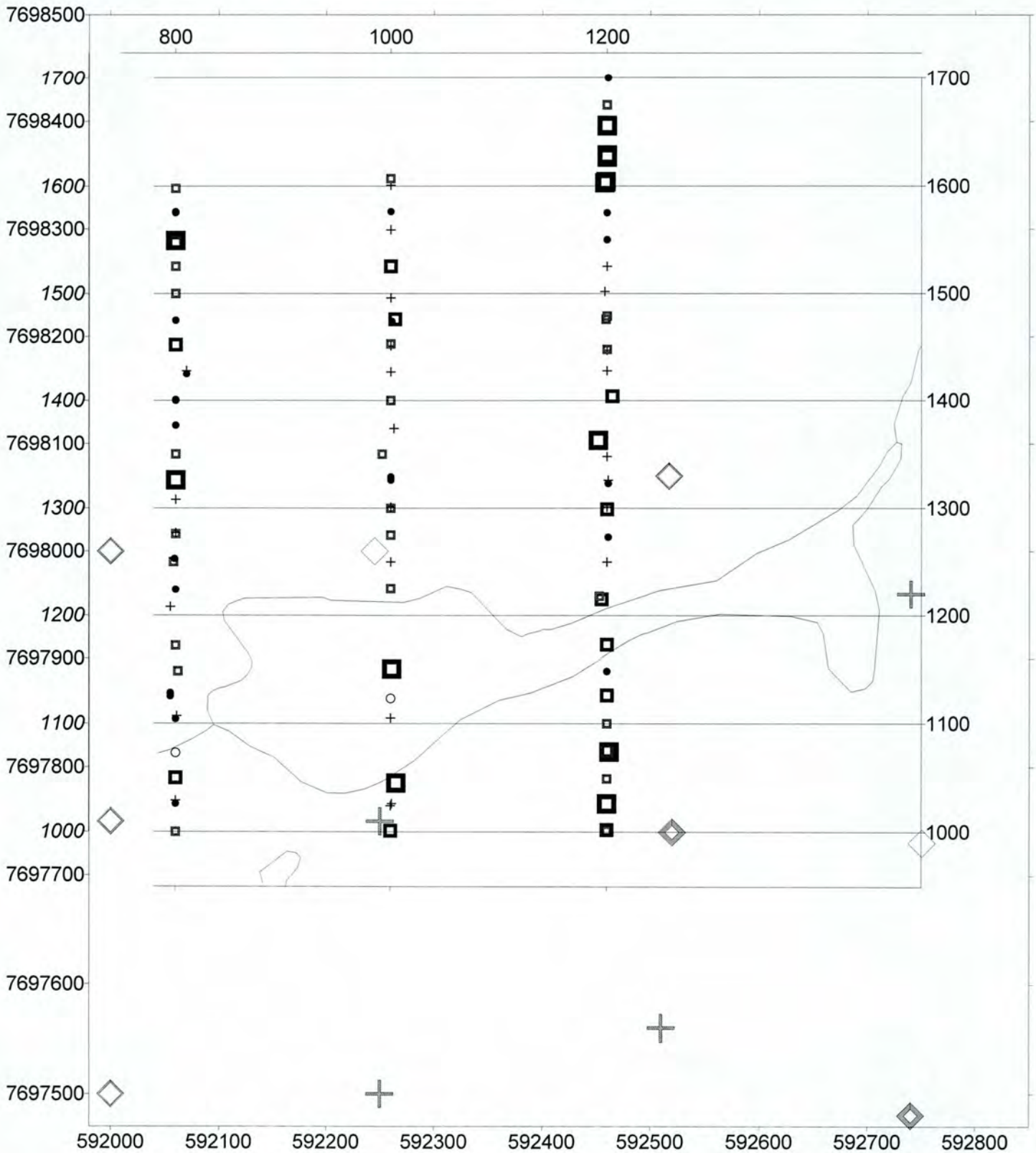
Topsoil '96

- 3.2 to 8.2
- 8.2 to 11.7
- 11.7 to 17.4
- 17.4 to 29.0
- 29.0 to 34.2

C-horizon '97

- < 8.8
- < 17.5
- < 29.0
- < 33.9
- < 39.6
- < 53.6
- < 89.9





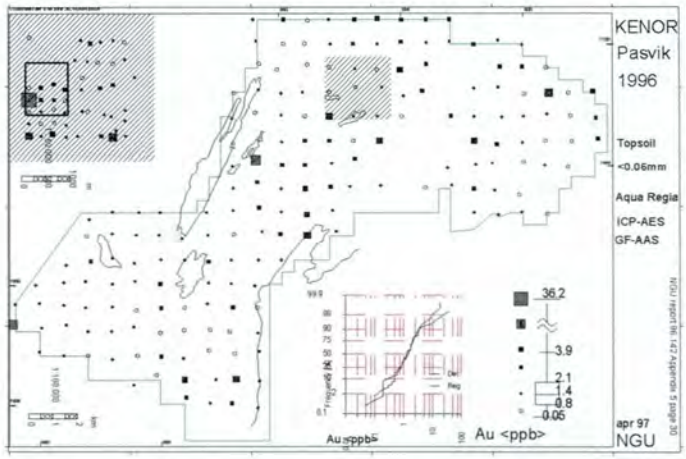
ppb Au

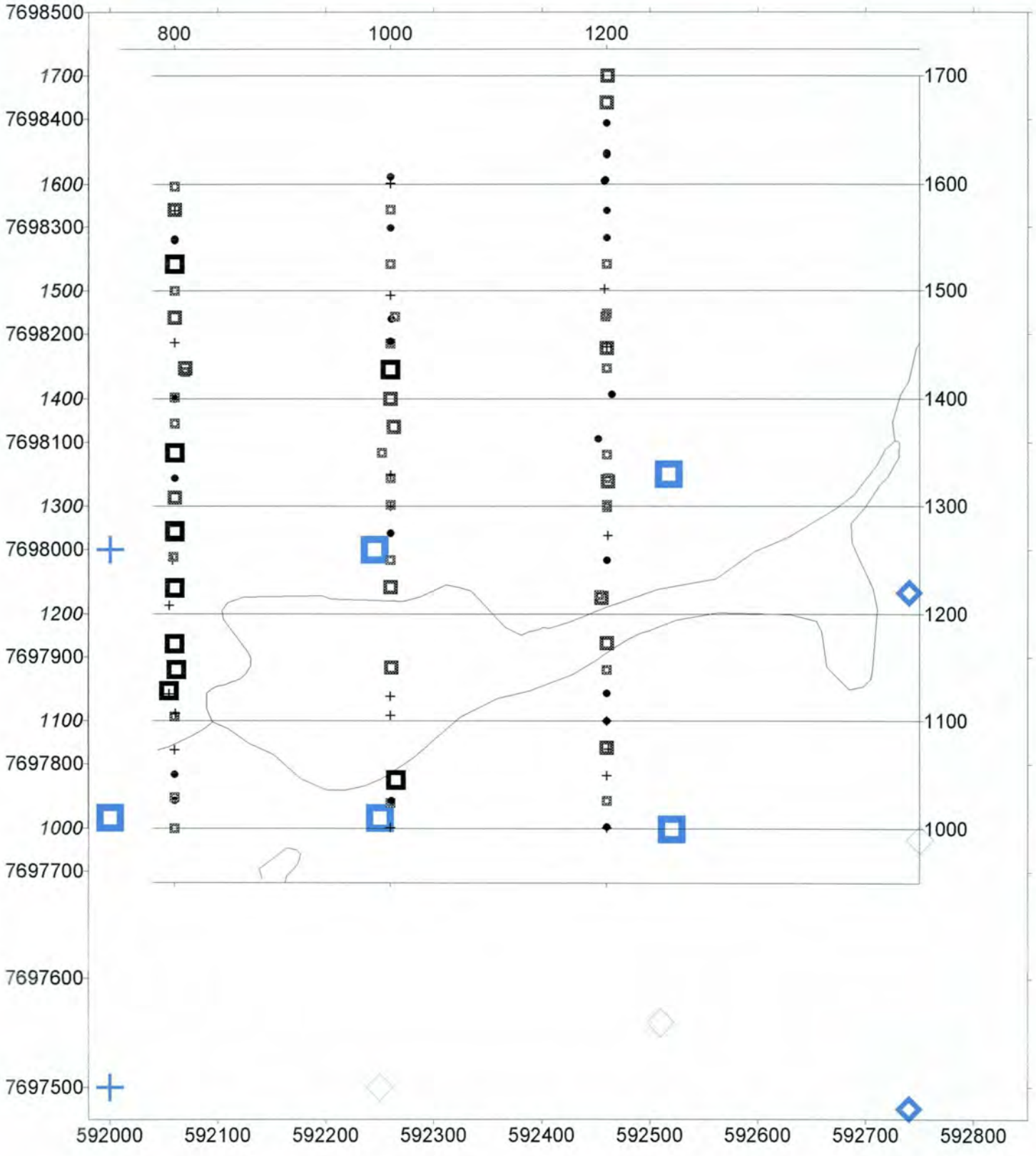
Topsoil '96

+	0.1 to 0.6
◇	0.6 to 1.0
◇	1.0 to 1.5
◆	1.5 to 2.6
□	2.6 to 36.2

C-horizon '97

○	< 0.1
○	< 0.1
●	< 1.5
+	< 1.9
▣	< 3.2
▣	< 5.7
■	< 355.0





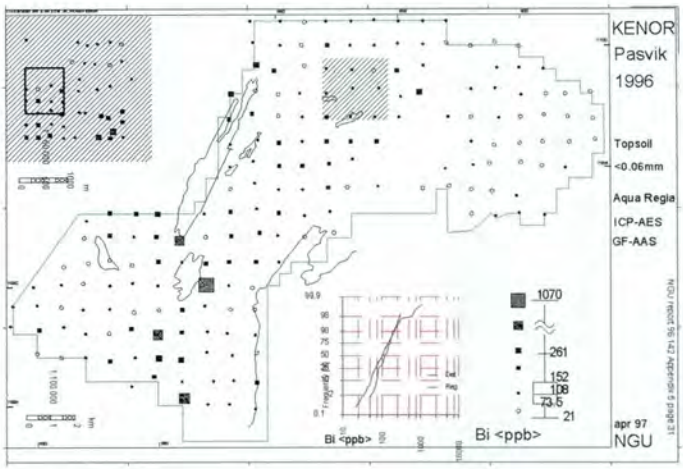
ppb Bi

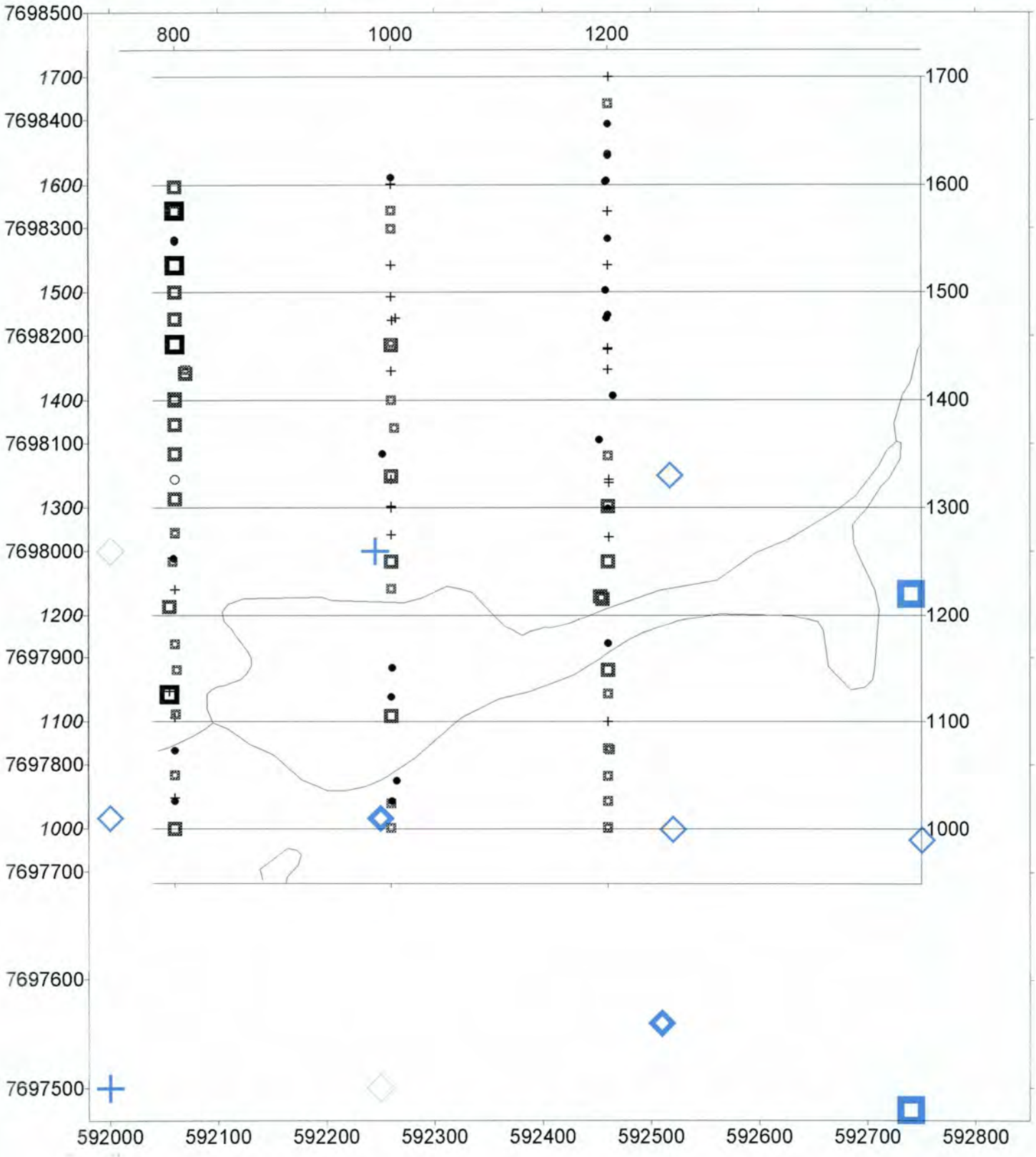
Topsoil '96

- 48 to 80
- 80 to 110
- 110 to 139
- 139 to 170
- 170 to 311

C-horizon '97

- < 12.0
- < 15.0
- < 81.0
- < 101.5
- < 126.5
- < 171.0
- < 318.0





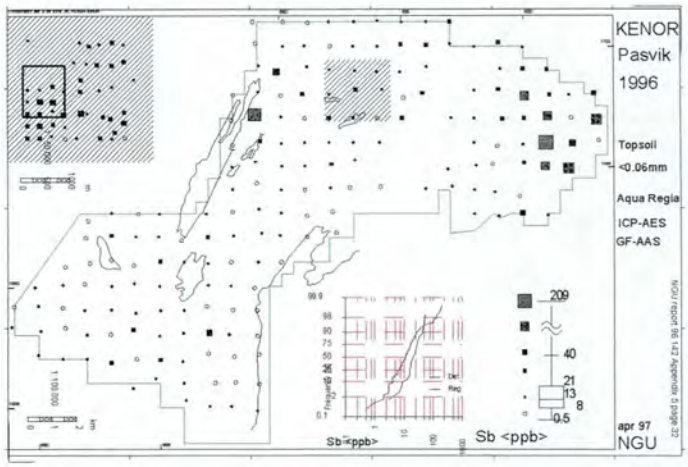
ppb Sb

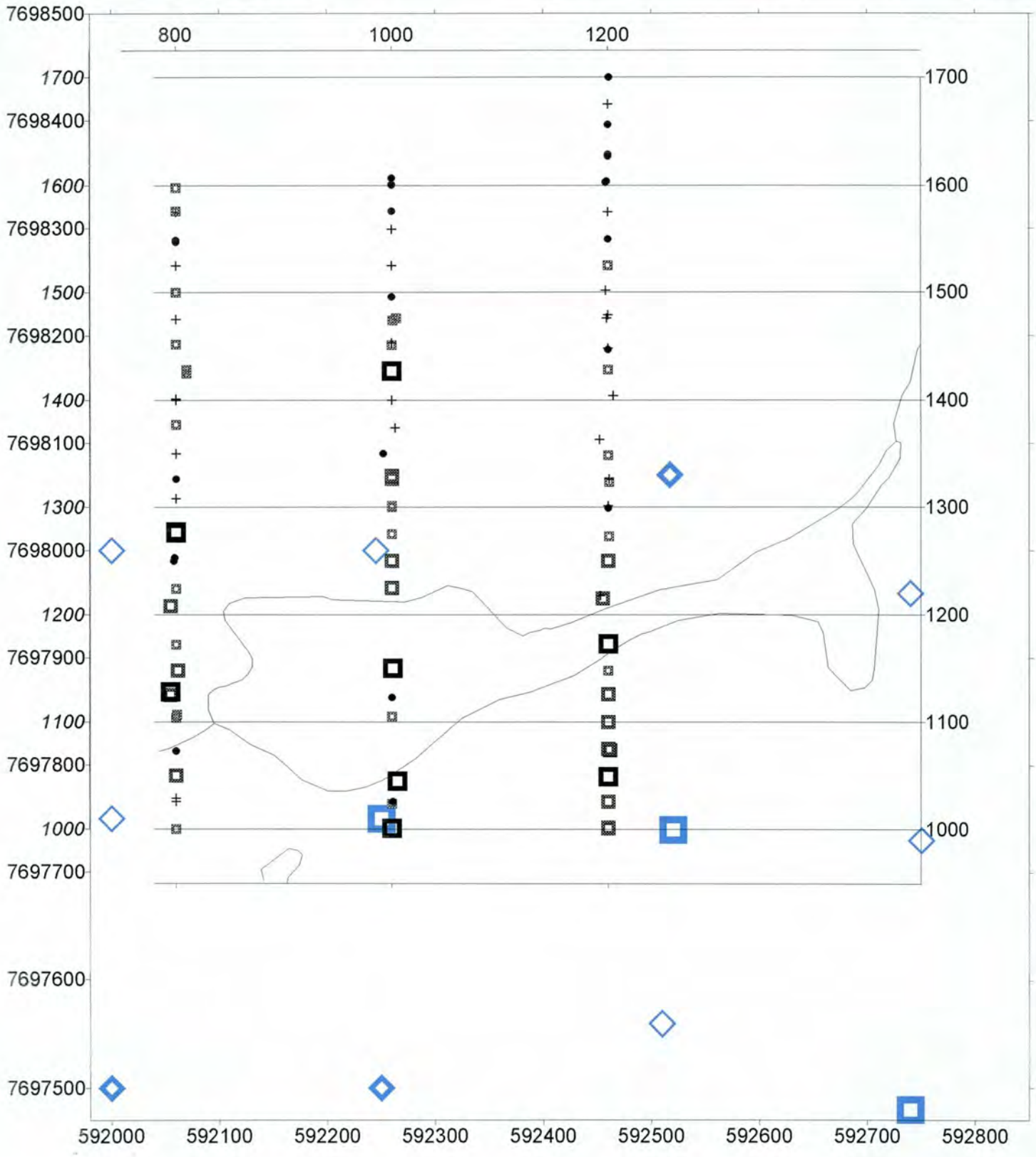
Topsoil '96

- 3 to 8
- 8 to 13
- 13 to 21
- 21 to 40
- 40 to 209

C-horizon '97

- < 0.5
- < 0.5
- < 12.0
- < 16.0
- < 22.0
- < 37.0
- < 726.0





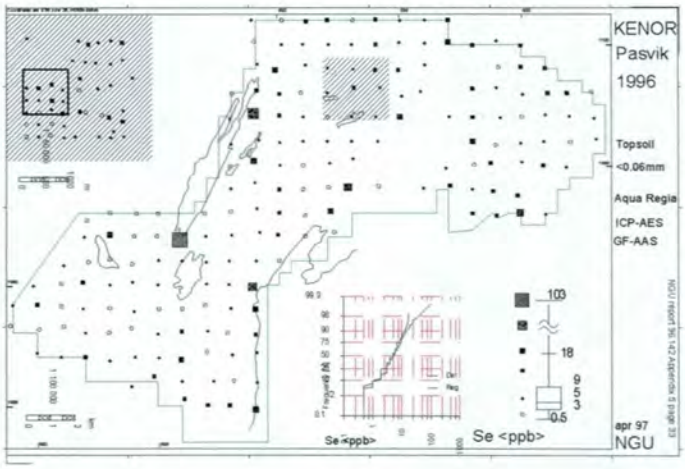
ppb Se

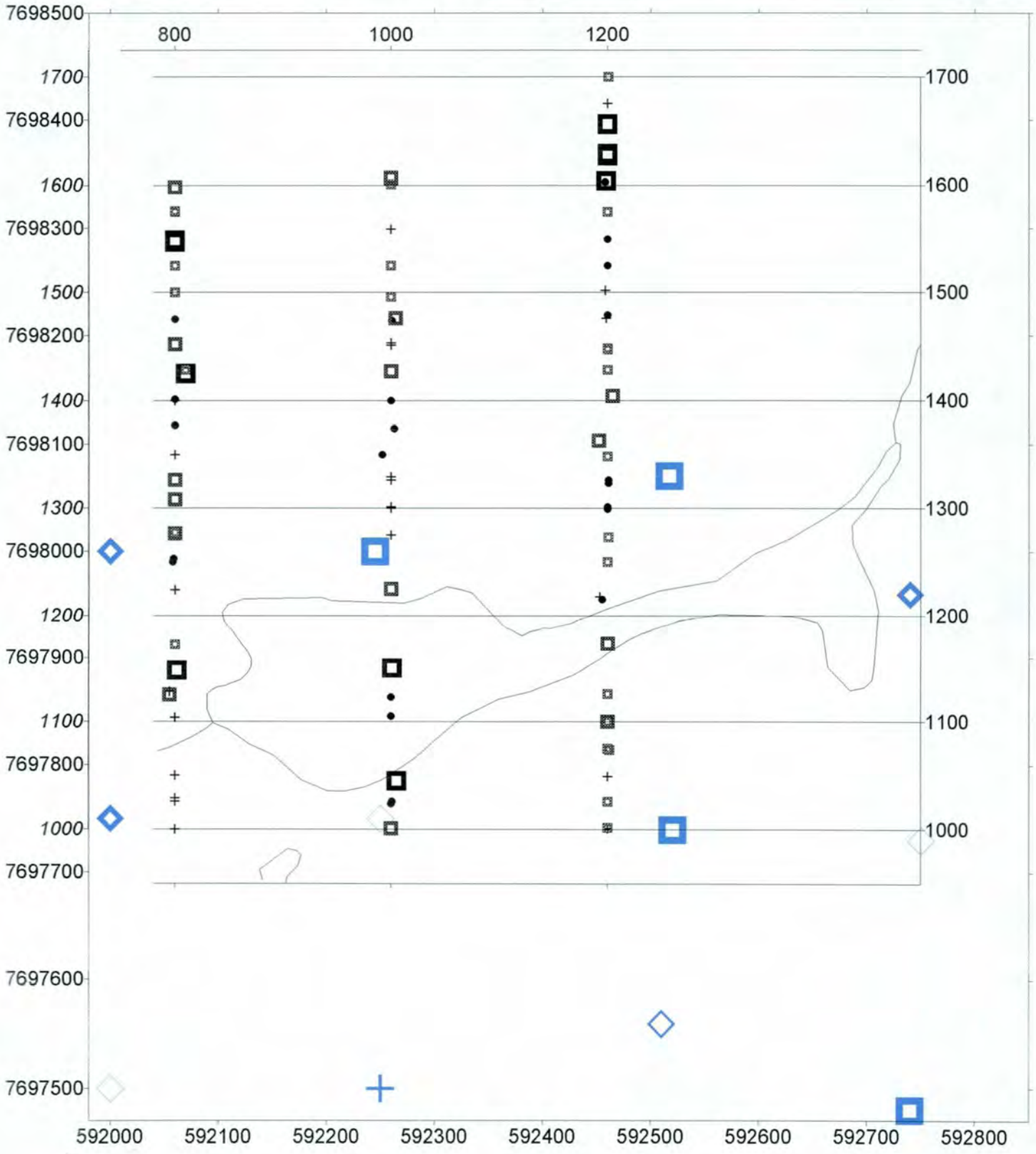
Topsoil '96

- 1 to 3
- 3 to 5
- 5 to 7
- 7 to 11
- 11 to 19

C-horizon '97

- < 2.0
- < 2.0
- < 71.0
- < 96.0
- < 125.5
- < 203.0
- < 2090.0





ppb Te

Topsoil '96

- 0 to 3
- 3 to 16
- 16 to 22
- 22 to 50
- 50 to 332

C-horizon '97

- < 0.5
- < 12.0
- < 16.0
- < 19.5
- < 26.5
- < 40.0
- < 171.0