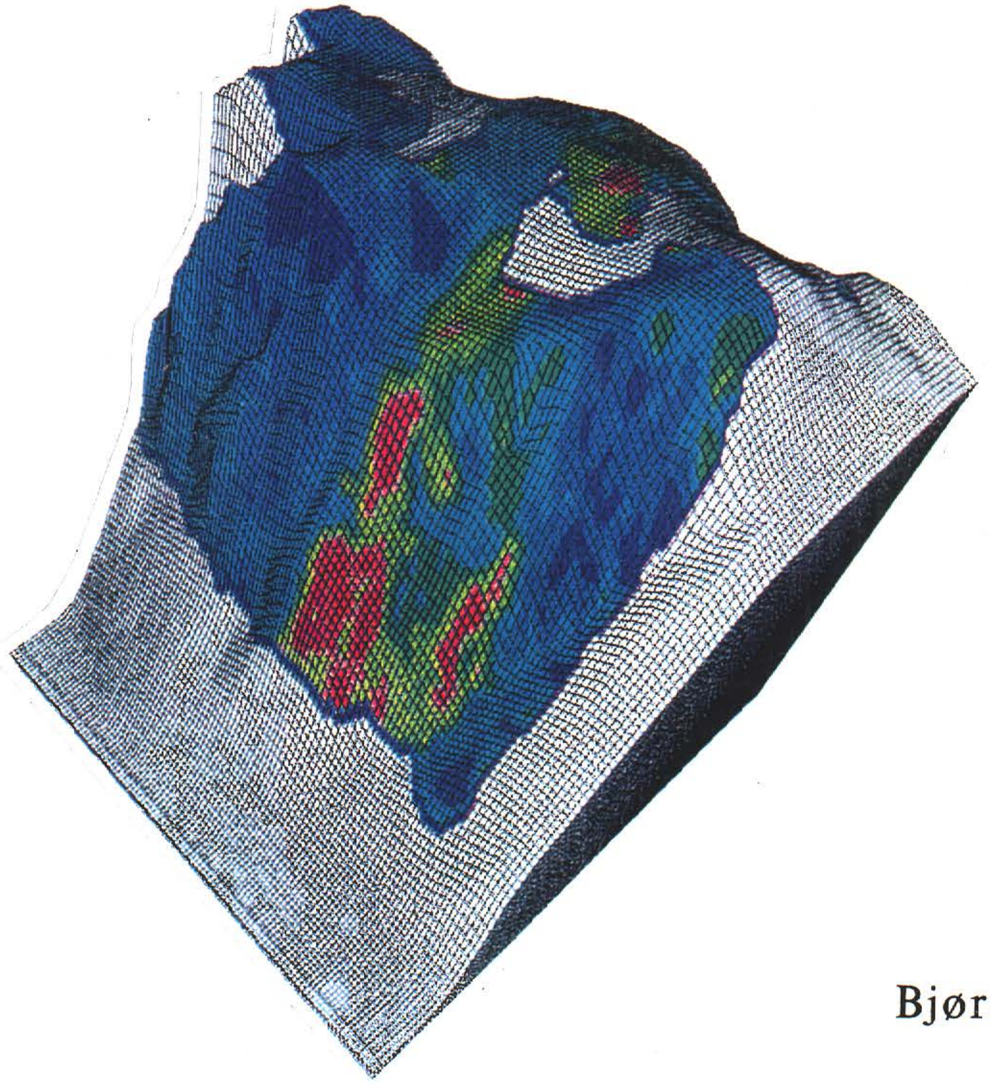
Open File Series No. 88/1

The Motzfeldt 87 Project

Final Report



Bjørn Thomassen

April 1988

GRØNLANDS GEOLOGISKE UNDERSØGELSE
The Geological Survey of Greenland
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THE GEOLOGICAL SURVEY OF GREENLAND

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THE MOTZFELDT 87 PROJECT

FINAL REPORT

Bjørn Thomassen

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SUMMARY

The Motzfeldt 87 Project comprises a detailed investigation of the niobium-tantalum-uranium-bearing pyrochlore mineralisation at Motzfeldt Sø, South Greenland. The aim of the project is to gain a general impression of the metal distribution in the mineralised zones and to delineate areas with high metal concentrations. The project had a duration of one year covering a field season and subsequent laboratory work, compilation and evaluation of results.

The mineralisation is hosted in the Motzfeldt Centre which belongs to the Proterozoic Gardar alkaline province. The centre is build up of several intrusive phases of syenite and nepheline syenite. Pyrochlore is concentrated in a 200-300 m wide zone along the outher margin of the intrusion. The mineral is hosted in both peralkaline microsyenite and altered syenite, with tantalum content (Nb/Ta = 11) highest in the latter. A vertical zonation of the Nb/Ta ratio exists with the highest tantalum contents at lower levels.

The field work carried out in July and August 1987 involved twenty persons and comprised an airborne gamma-spectrometric survey, a major chip sampling programme and minor reconnaissance.

Five areas were flown in detail with a helicopter borne, multi-channel gamma-spectrometer. A total of 454 line km were flown and 63 443 measurements were recorded over a total area of 18 km^2. The aeroradiometric results were used to guide the chip sampling programme. The data have been compiled into 12 contoured anomaly maps for uranium, thorium and U/Th ratio (appendices 8-19).

Systematic chip sampling of four main localities situated on steep mountain sides were carried out by a team of six mountaineers. The 928 samples collected have been assayed for Nb, Ta, U and Th, and analysed for Be, Ce, La, Li, Mo, Sn, Y and Zr. The geochemical data have been treated statistically, and based on kriging estimates 20 contoured anomaly maps for niobium, tantalum, Nb/Ta ratio, uranium and thorium have been prepared (appendices 21-30). Areas and average metal contents have been calculated for various cut-off values of tantalum and niobium (table 9). The most favourable area contains c. 3770 ppm Nb, 430 ppm Ta, 180 ppm U and 120 ppm Th over 1260 m^2.

Aeroradiometric and geochemical data have been correlated, whereby it has been possible to prepare 12 extrapolated geochemical maps of niobium, tantalum and uranium (appendices 31-42).

The tantalum potential of the investigated localities have been evaluated on the base of the processed data and geological modelling. As a result two localities are given a high priority for tantalum exploration, one locality a medium potential, and three localities a low potential.

It is concluded, that the mineralised zone of the Motzfeldt Centre has a potential of more than 500 x 10^6 tons rock with average contents of 1400 ppm Nb, 120 ppm Ta, 60 ppm U and 90 ppm Th. The potential for mineralisation with more than 250 ppm Ta (305 ppm Ta_2O_5) is at least 30 x 10^6 tons.

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1. INTRODUCTION

The Motzfeldt 87 Project comprises a detailed investigation of selected parts of the niobium-tantalum-uranium-bearing pyrochlore mineralisation at Motzfeldt Sø, South Greenland. The purpose is to gain a general impression of the metal distribution in the mineralised zones and to delineate areas with high metal contents with a view to possible exploitation. The project was carried out as a joint programme between the Geological Survey of Greenland (GGU) and Nunaoil A/S under supervision of GGU, and a major part of the funding was granted by the Mineral Resources Administration for Greenland. The project period was June 1. 1987 to May 31. 1988. During this time, the following has been accomplished:

Summer 1987. Two months of field work comprising an airborne gamma-spectrometric survey and a chip sampling programme as reported by Thomassen and Tukiainen (1987) and Thomassen et al. (in press).

Autumn 1987. Delivery of corrected gamma-spectrometric data from the contractor, completion of the bulk of the chemical analyses, and lithological logging of reference samples. Storage of all data in a data base at GGU and presentation of these data in a Preliminary Report (Thomassen, 1987).

Winter/spring 1988. Re-analysis of erroneous analytical results and statistical analysis of the completed data set. Drawing up of the present report.

The detailed geophysical and geochemical investigations were carried out at five localities east of Motzfeldt Sø (fig. 1, appendix 1). A sixth locality west of Motzfeldt Sø was covered by gamma-spectrometry only, and subordinate reconnaissance was carried out in the general area (locality 7).

For the full account of the field work and the complete presentation of the geological, geophysical and geochemical data, the reader is referred to the above reports. Unfortunately, the Preliminary Report contains serious analytical errors from locality 4. All analytical results, including the corrected values from locality 4, are therefore enclosed in this report, together with revised geochemical plots from the said locality (appendices 3-7).

The project was staffed by a project leader (K. Secher) and a project geologist (B. Thomassen) with informal consulting support from J. Pedersen (Nunaoil A/S) and T. Tukiainen (GGU). During the field season a total of 20 people were employed (table 1 in the Field Report).

During the project the following contractors have been used: Greenlandair Charter A/S (helicopter support), Global Earth Sciences Ltd., England (airborne gamma-spectrometric survey), Garaventa AG., Switzerland (mountaineering team), Bondar-Clegg and Co. Ltd. - Chemex Labs Ltd., Canada (chemical analyses), and IMSOR Image Processing Group, Technical University of Denmark (statistical analysis).

The Motzfeldt Sø area has an alpine topography with peaks up to 1900 m a.s.l. and steep sided, often glacier filled valleys. The climate is sub-arctic with occasional strong fohn winds. The investigated localities are situated some 15 km from a navigable fjord and 25 km from Narsarsuaq, the main airport for South Greenland.

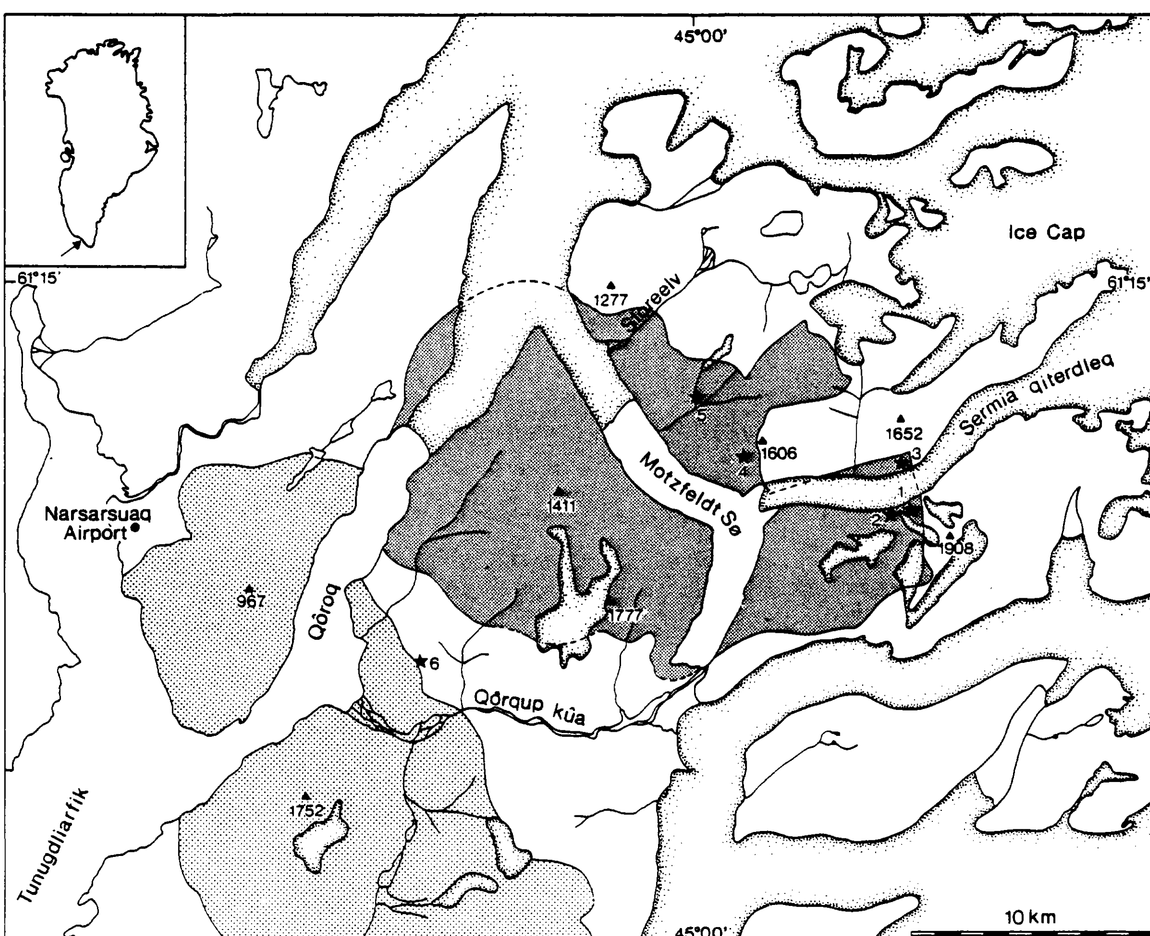

Fig. 1. The Motzfeldt Sø - Narsarsuaq area. The Motzfeldt Centre (dark grey) and other Gardar alkaline intrusions (light grey) are outlined. The investigated localities (1-6) are indicated with stars.

2. GEOLOGY AND MINERALISATION

The investigated pyrochlore mineralisation occurs in the c. 300 km^2 large Motzfeldt Centre, which belongs to the Proterozoic alkaline Gardar province in South Greenland (appendix 2). The centre was mapped geologically 1961-1970 by GGU geologists (Emeleus and Harry, 1970), and in the period 1979-1985 the survey, partly funded by the European Economic Community, discovered and investigated widespread pyrochlore mineralisation (Armour-Brown et al., 1980; Armour-Brown et al., 1983; Tukiainen et al., 1984; Tukiainen, 1986).

The geological investigations in the present project have been restricted to a general observation of the mineralised localities from a distance, and lithological logging of reference samples collected during the chip sampling programme. The log is enclosed in the Preliminary Report. The following outlines of the geology and mineralisation of the Motzfeldt Centre are based on Tukiainen (1986).

Geology

The c. 1310 Ma old Motzfeldt Centre was intruded into the Proterozoic Julianehåb granite and younger Gardar supracrustal rocks. The centre is built up of several intrusive phases of syenite and nepheline syenite. The main igneous phase (the Motzfeldt Ring Series) consists of a number of largely concentric, steep-sided, outward dipping units of predominantly peralkaline syenite and nepheline syenite which young inwards. The outermost of these units, the Motzfeldt Sø Formation, hosts the mineralisation. Post-dating the intrusion, the centre was dissected by a number of faults with displacements up to 6 km horizontally and 600 m vertically.

Large quantities of roofing sandstones and volcanics have been incorporated in the Motzfeldt Sø Formation. The volcanics are preserved as rafts, but the sandstones have largely been assimilated and caused an outer zone of the Motzfeldt Sø Formation with a silica saturated composition. The formation underwent an extreme differentation, which resulted in the formation of a peralkaline residuum rich in volatile and incompatible elements. The peralkaline residuum gave rise to a complex of late peralkaline sheets of microsyenite and pegmatite, and to hydrothermal alteration with associated mineralisation.

Host rocks for the mineralisation are altered syenite and peralkaline microsyenite. Both rocks are strongly altered (albitized, hematised and silicified). The altered syenite is a coarse-grained, often pegmatic rock with albite, orthoclase, arfvedsonite, fluorite, quartz, zircon and hematite as main minerals, and magnetite, thorite, pyrochlore, bastnaesite and mica as accessories. The peralkaline microsyenite is fine-to medium-grained, often porphyritic, and exhibits various aplitic and pegmatitic phases. Main minerals are albite, orthoclase, arfvedsonite, aenigmatite, quartz, zircon, eudialyte and fluorite; accessory minerals are nepheline, aegirine, analcime, hematite, magnetite, pyrochlore, låvenite, bastnaesite, thorite, monazite, columbite, bertrandite, astrophyllite, pyrite, sphalerite and mica.

Mineralisation

Niobium, tantalum, uranium, thorium, zirconium, cerium and lanthanum mineralisation occurs in the Motzfeldt Sø Formation. The metals occur mainly in the following minerals: Pyrochlore (Nb, Ta, U, REE), thorite (Th), zircon (Zr) and bastnaesite (REE, Th). Minor pyrite-dominated sulphide mineralisation is associated some fault zones.

The pyrochlore content increases outwards, especially towards the roof of the intrusion. The mineral has the following general composition: $(Ca,Na,LREE,U)_2(Nb,Ti,Ta)_2(OH,F,Cl)_7$. Its tantalum content and Nb/Ta ratio vary from 1.3 to 8.3% and from 8 to more than 50, respectively. In general tantalum contents are higher in pyrochlore from altered syenite than in pyrochlore from peralkaline microsyenite. The mineral shows also a marked compositional variation depending on its relative depth in the Motzfeldt Sø Formation. At the deeper levels it is enriched in tantalum and calcium, whereas at the higher levels of the igneous column it is more enriched in niobium, uranium and light rare earth elements.

Investigated localities

The dominant rock type is altered syenite at localities 2-5 and peralkaline microsyenite at locality 1. The unvisited locality 6 is underlain by Julianehåb Granite and younger Gardar nepheline syenites.

At locality 1 altered syenite is restricted to the lowermost part of the cliff, probably because the locality has been downfaulted some 500 m on the north side of an E-W striking fault system ("Qiterdleq fault", appendix 2). The fault system has been intruded by numerous trachyte dykes and by a number of quartz-fluorite veins. At locality 2 the altered syenite contains many basaltic rafts and sheets of peralkaline microsyenite. The altered syenite of locality 3 hosts a few basalt rafts whereas the altered syenite of localities 4 and 5 contain no significant amounts of other rock types.

3. AIRBORNE GAMMA-SPECTROMETRIC SURVEY

An airborne gamma-spectrometric survey of the whole Motzfeldt Sø area in 1982 (Tukiainen et al., 1984) and subsequent research (Tukiainen, 1986) has shown that pyrochlore mineralisation is efficiently pin-pointed by gamma-spectrometry. As the pyrochlore contains uranium, but only little thorium, the mineralised zones are registered as areas with high count rates in the uranium channel and high U/Th ratios. The purpose of the 1987 survey was thus to outline anomalies in detail and to facilitate the extrapolation of geochemical results beyond the sampled areas.

Activities

Five prospective areas defined from previous work were flown with a gamma-spectrometer mounted in a helicopter in the first two weeks of the field season (appendix 1). The airborne system recorded and stripped values for uranium, thorium, potassium and total gamma radiation. The survey was mainly carried out by contour flying with a contour spacing of 30 m and a ground clearance of 30 m. A total of 454 line km were flown, and 63 443 measurements with an average point separation of c. 7 m were recorded over an area of c. 18 km^2. Technical details of the survey can be found in the Field Report and in the contractors report (Anonymous, 1987).

Results

Preliminary results as anomaly maps of raw data were availabe immediately after the completion of the survey and were used to guide the chip sampling programme. The gamma-spectrometric data were corrected by the contractor and are now stored on magnetic tapes at GGU. Flight path maps and selected gamma-spectrometric profiles were presented in the Preliminary Report.

Contoured anomaly maps of cps uranium, thorium and U/Th ratios for localities 1-5 accompany the present report (appendices 8-19). They were prepared by minimum curvature interpolation techniques (Briggs, 1974). The U/Th ratios at locality 4 are also illustrated on a perspective plot (appendix 20). Contour intervals on the maps were chosen arbitrarily after the study of histograms of the data. At locality 6 anomalous high U/Th ratios do occur, but the overall level of radiation is so low (max. 140 cps U and 240 cps Th) that the area does not contain anomalies as defined in the present project. Consequently, no gamma-spectrometric maps have been prepared from this area.

4. CHIP SAMPLING PROGRAMME

As the outcropping pyrochlore mineralisation is mainly situated on 700-1200 m high, steep mountain cliffs, previous assessments of metal contents have been based on evidence from scree boulders and from traverses along the foot and top of the cliffs. A major purpose of the present project is to gain reliable information on the metal contents in the outcrops with the highest pyrochlore contents. To fulfil this purpose, the most promising of the gamma anomalies outlined by the airborne survey were systematically chip sampled at five localities (appendix 1). For practical reasons, the sampling was carried out by professional mountaineers.

Sampling procedures

The chip sampling team comprised six mountaineers under the direction of the project geologist. The group was lodged in a mobile field camp consisting of three caravans and the sampling was supported as far as possible by helicopter. For the full details, see the Field Report.

The mineralised localities were sampled on a grid with the grid lines perpendicular to the contours. The spacing between grid lines was originally 50 m with a vertical distance of 50 m between sample points in the lines. After the aeroradiometric survey had localized the anomalies, infilling sampling on a 25 x 25 m grid was performed at locality 1, and a 25 x 25 m grid was used from the beginning at localities 3 to 5. At each sample site, a chip sample was collected over an area of 4 m^2 together with two small reference samples, and thereafter a scintillometer reading was recorded.

A total of 928 chip samples were collected over approximately 1.8 km^2 of slope areas. The sample weights ranged from 1.0 kg to 2.5 kg with an average of 1.8 kg.

Analytical procedures

In a temporary laboratory established in Narsarsuaq, the chip samples were run through a jaw crusher and a dish mill, after which the grain size had been reduced to <1 mm. 100 g large splits from these powders were shipped directly to two commercial chemical laboratories in Canada.

The main laboratory was Bondar-Clegg and Co. Ltd., Ottawa. As a control on analytical accuracy, duplicates of every tenth sample were analysed by Chemex

Labs Ltd., Vancouver. The chip samples were assayed for Nb, Ta, U and Th, and analysed for Zr, Ce, La, Y, Be, Li, Sn and Mo. Nb was assayed by X-ray fluorescence and Ta, U and Th by instrumental neutron activation. All analytical methods and results are listed in the enclosed Final List of Analytical Results. To monitor the analytical precision, a total of 100 internal standards were prepared from four bulk samples of mineralised/unmineralised altered syenite and peralkaline microsyenite and included in the sample batches. Whole rock analysis was performed on 25 of the chip samples.

Quality of analytical data

The quality of the Bondar-Clegg analyses was monitored by means of the four groups of internal standards, which were duplicated 23 times each by the laboratory. The repeatability (the closeness of agreement between successive results obtained with the same method on identical material) can be estimated by means of the standard deviations of the logaritmic values for each element (table 1). It appears, that results are best for Zr, Ce, La, Nb and Th, intermediate for Y, Ta, U and Sn, and poor for Li, Be and Mo.

Comparisons of the results from 92 samples analysed by both Bondar-Clegg and Chemex are shown in table 1 and fig. 2. The reproducibility (the closeness of agreement between successive results on identical test material obtained under different conditions) as determined by the "between labs" variance (here given as a coefficient of variation) is best for Y, Ce, Zr, Th, La and U, and poorest for Nb, Li, Be, Ta, Mo and Sn. The relations between the results from the two laboratories are also illustrated by the squared coefficients of correlation and the factors of conversion, and by the plots on fig. 2. It appears that, apart from Be and Y, the Chemex values are lower than the Bondar-Clegg values, especially for Li, Sn and Ta. For Ta the squared coefficient of correlation is high, indicating that the deviation is due to poor calibration at one or both laboratories. For Sn the two laboratories have used different methods of analysis, and for Li they have used different extraction methods.

As mentioned above, the poor repeatability and reproducibility of the tantalum assays are probably due to calibration problems. The Chemex set-up has only included one tantalum standard on 41 ppm run with the analytical batches (Don Morse, pers. comm., 1988). Bondar-Clegg's system was calibrated by use of two atomic absorption standard solutions in the absence of appropriate certified reference material for tantalum. A calibration factor was calculated on theoretical grounds. Their standards run with sample batches did not include tantalum, but results from other elements in the standards were used to ascertain the overall data set quality of the multielement analyses. The resulting precision is +/- 5% at the 5 ppm level and +/- 3% at the 500 ppm level (Russ Calow, pers. comm., 1988).

A serious problem arose when Bondar-Clegg reported erroneously high Ta, U, Th, Ce and La values for a row of 26 samples (334031-42, 350041-55). The error arose during neutron activation analysis, because a sub-batch of 26 samples were irradiated at the inner site of the reactor unlike the other samples which were irradiated at the outside - and then all samples were calculated as outside irradiated (Russ Calow, pers. comm., 1988). The mistake was not cleared up before the erroneous values had been reported in the Preliminary Report, where the samples 350041-55 from locality 4 defined the highest tantalum concentration in the investigated areas.

As a consequence of the said error and of the dubious repeatability and reproducibility of some elements, the following steps have been taken to further check the quality of the Bondar-Clegg data:

-The original splits of the samples 334025-42, 350041-60 have been re-analysed by Bondar-Clegg. The new results, which are used in the Final List of Analytical Results, are in good agreement with the Chemex values (using the conversion factors) and with the general level for Nb/Ta ratios.

-Splits of 30 "blind" samples selected from all batches have been re-submitted to Bondar-Clegg and re-analysed. The results, which are enclosed as duplicates, show excellent agreement with earlier results from the laboratory, except for tantalum which displays a systematic deviation with in average 21% less tantalum in the new values (calibration error ?).

-Splits from all samples with >400 ppm Ta (36) were submitted to Chemex and assayed for Nb and Ta. The results, which are enclosed, are in good agreement with the Bondar-Clegg values, apart from a lower level of tantalum. However, six samples assayed twice by Chemex show a systematic deviation with in average 31% higher tantalum values in the new results (calibration error ?).

The re-analyses indicate that the true tantalum values are higher than those originally reported by Chemex and somewhat lower than the Bondar-Clegg figures. An improvement in the reliability of the tantalum assays, including the determination of analytical accuracy, will require circulation of standards between various laboratories, a procedure which is not feasible within the time limits of the present project.

Table 1. Assessment of analytical quality: Repeatability and reproducibility of analytical values.

Repeatability:	Standard deviation in % Average in ppm				92 samples analysed by two labs		
	332501-332524	332201-332224	332101-332124	332601-332624	Coeff. of var. betw. labs in %	Factor of conversion betw. labs	Squared coeff. of correlation
Nb	3.6 164	2.3 505	2.6 4236	3.7 25308	15.3	0.8008	99.3
Ta	13.7 11	14.8 36	12.0 204	12.9 2403	21.7	0.6782	95.2
U	17.3 6	13.0 13	7.4 1950	22.5 1990	8.0	0.8573	96.7
Th	9.9 9	6.0 46	5.3 1430	9.7 214	7.0	0.8726	96.9
Zr	2.8 630	2.3 2717	3.9 14375	13.9 3430	5.2	0.8118	99.0
Ce	4.6 115	5.1 730	5.1 2255	9.8 2360	3.8	0.8881	98.6
La	5.7 59	4.9 390	5.4 1352	13.3 1173	7.1	0.9219	98.7
Y	7.4 31	3.4 161	10.7 343	17.3 127	3.2	1.1188	94.7
Be	56.9 5	36.4 14	26.2 429	27.7 34	18.4	1.1772	61.0
Li	7.9 70	10.6 29	29.3 7	80.7 4	17.9	0.2792	61.1
Sn	76.2 6	18.9 21	2.3 495	6.6 65	131.1	0.3575	51.1
Mo	46.8 3	46.5 8	44.2 6	75.9 2	25.7	0.9005	61.5

Internal standards from the Motzfeldt Sø Formation:

332101-24: Mineralised peralkaline microsyenite.

332201-24: Unmineralised peralkaline microsyenite.

332501-24: Unmineralised nepheline syenite.

332601-24: Mineralised altered syenite.

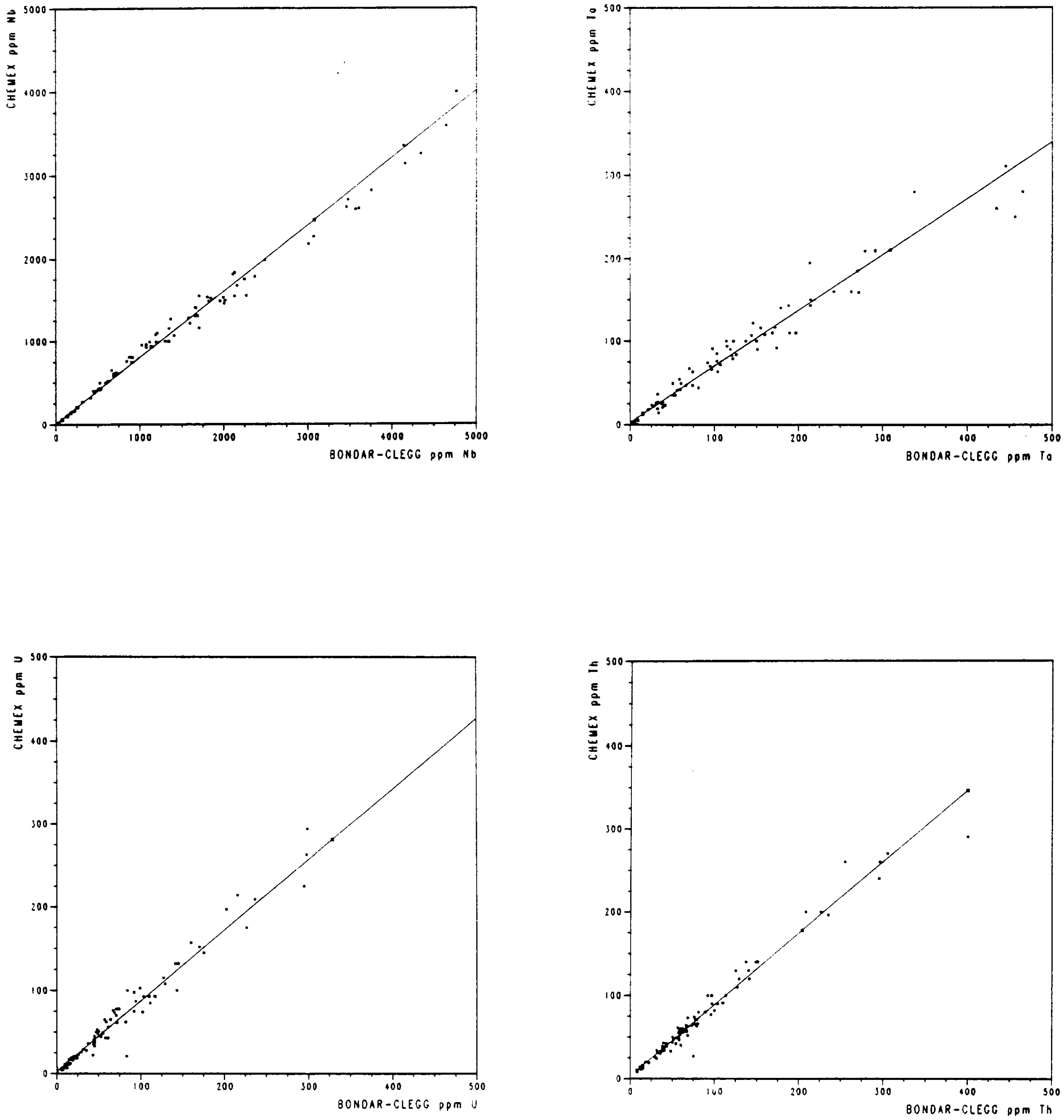

Fig. 2. Scatter plots of assay values from 92 chip samples analysed by two laboratories. The regression lines are calculated by the reduced major axis method.

5. RECONNAISSANCE PROGRAMME

With a view to possible placer formation, the local streams and alluvial plains were sampled on a reconnaissance base. A couple of sulphide-bearing quartz veins were also sampled, mainly to test for gold.

Alluvial samples

The sample material consists of 29 heavy mineral concentrates from the main drainage systems in the Motzfeldt Sø area, and 4 sand samples from the alluvial plains south and northeast of the lake, cf. appendix 1 in the Field Report. The heavy mineral concentrates were produced by panning of the -1 mm fraction of 15-20 kg large stream sediment samples. The sand samples originate from well sorted deposits, which only in one case (334080) contained appreciable amounts of black sand. The samples have been analysed for the usual 12 elements and additionally for Cu, Pb, Zn, Ag, Au, W, Mn, Ti and Fe. The analytical results together with a list of source areas are enclosed (List 1. C.).

Not surprisingly, the concentrates originating from the Motzfeldt Centre are enriched in most elements compared to samples derived from the basement. Only Fe, Ti, Cu and W are enriched in the latter. The maximum values for the target elements are 3390 ppm Nb, 466 ppm Ta, 318 ppm U and 1600 ppm Th. Sample no. 334068 shows maximum values for ten elements (U, Th, Zr, Ce, Be, Pb, Zn, Au, Sn and Mn). It represents an area with abundant sheets of mineralised peralkaline microsyenite and a sulphide-bearing fault zone (Tukiainen, 1986). It is noteworthy that the maximum tantalum value occurs in a sample collected above the chip sampled part of locality 5, indicating that this mineralisation continues towards the east. Gold is only registered in four samples (max. 45 ppb), whereas relatively much tungsten (330 and 225 ppm) appears in two samples collected below a sulphide-bearing quartz vein. As only minor scheelite occurs in these samples, they probably contain wolframite.

The sand samples collected south of Motzfeldt Sø show no significant metal enrichment, whereas the black sand from the NE coast is enriched in most elements (e.g. 540 ppm Nb, 40 ppm Ta, 19 ppm U, 64 ppm Th, 3100 ppm Zr). A part of this sand originates from locality 4.

Sulphide mineralisation

Sulphide minerals are mainly associated with fault systems where they occur disseminated in the country rocks or are hosted in quartz-fluorite veins. Two vein systems were cursorily investigated and a number of local, sulphide-bearing boulders were collected. Some of these samples have been analysed for Cu, Pb, Zn, Ag and Au (List 1. B).

The vein zones are several tenths of metres wide, brecciated, strongly altered and invaded by quartz-fluorite stringes of cm-dm thickness. The sulphides occur finely disseminated, as cm-large blebs and in semi-massive lenses, but the general sulphide content rarely exceeds a few per cent. Pyrite is the dominant sulphide mineral, and only traces of chalcopyrite, sphalerite, galena and molybdenite have been observed.

Analysis of chip samples from outcrops shows only slightly raised metal contents; the best grab sample gave 1% Cu and 75 ppb Au. Among the boulder finds the most promising analysis (>2% Cu, 0.5% Zn, >100 ppm Ag and 619 ppb Au) stems from a small chalcopyrite-rich sample of unknown origin.

6. STATISTICAL ANALYSIS

The purpose of the statistical analysis of the Motzfeldt 87 data is to reveal element distribution patterns in rock types and between localities, and to enable the preparation of contour maps delineating the highest concentrations of niobium, tantalum, uranium and thorium. The investigation comprises the revised Bondar-Clegg analyses, and lithological and radiometric data presented in the Preliminary Report. Standard SAS and BMDP software has been used in the routine calculations.

Basic statistics

The general metal contents in the various sampled rock types are indicated by the median and average (arithmetic mean) values listed in table 2. The table should be used with caution, as the lithological classification of the samples is based on reference samples, which may not in all cases represent the bulk of the samples. It is nevertheless evident that pegmatite (probably belonging to the altered syenite) and altered syenite are richest in all analysed elements except lithium, which is enriched in aplite, and molybdenum which is highest in basalt. Not surprisingly, trachyte and basalt are lowest in nearly all elements. It is characteristic that the peralkaline microsyenite is drastically lower in tantalum than the altered syenite, a relationship already described by Tukiainen (1986).

A summary of metal concentrations at the individual chip sampled localities is shown in table 3.

The frequency distributions of the individual elements were analysed by means of histograms. Examples of niobium, tantalum, Nb/Ta ratio, uranium and thorium distributions at the five localities are shown on figs 3-6. It appears that the elements mainly display a skew or log-normal distribution.

Correlation and factor analysis

By means of factor analysis it was attempted to separate the elements into groups which account for the variability of the analyses. As element distributions are assumed to be log-normal, the data were first transformed by the natural logarithm.

The correlations between the 12 elements for all chip samples classified as either altered syenite or pegmatite are shown in table 4. In a factor analysis of the elements five factors explain 78% of the total variation after varimax rotation. The correlations between the factors and the individual elements are illustrated in table 5. It appears that factor 1 is highly correlated with La-Ce-Y-Zr. These elements may occur in zircon rich in bastnaesite inclusions, or in eudialyte. The U-Ta-Nb association of factor 2 is readily explained by the existence of pyrochlore. In factor 3 the association Sn-Be, probably hosted in mica, is negatively correlated with Mo, and factor 4 displays a negative correlation between Th and Li.

Similar factor analyses have been performed for all chip samples on each of the investigated localities. The results are summarized in table 6, which shows the elements highly correlated with a factor. For locality 1 the separating of elements is minimal, but for the other localities the pattern from table 5 can be recognized. Again the grouping of U-Nb-Ta is explained by the occurrence of pyrochlore, whereas the La-Ce-Y-Zr might be due to zircon or eudialyte. The negative correlation of the pair Sn-Be with Mo is also repeated. It might be due to a large-scale zonation of these elements. The Ce-La-Th association of locality 5 indicates the existence of independent REE minerals as bastnaesite or monazite here.

The correlations between field scintillometry, ground gamma-spectrometry and analytical values are illustrated in table 7. It is noted that correlations between scintillometer measurements and analytical values for uranium and thorium are reasonably good. The good correlations between gamma-spectrometric uranium values, and analytical uranium, tantalum and niobium values support the philosophy of the airborne gamma-spectrometric survey, i.e that pyrochlore is detectable by this method.

Interpolated geochemical maps

The topographic base for the geochemical maps is digital terrain models (DTM) with 50 x 50 m grids prepared by GGU in a previous project (Tukiainen and Carlé, 1984). The maps were produced by two dimensional panel kriging (Journel and Huijbregts, 1978) in a surface approximating plane (SAP) and subsequent projection to the x-y plane of the DTM. Maps of niobium, tantalum, Nb/Ta ratios, uranium and thorium at localities 1-4 are enclosed as appendices 21-30. Contour intervals on the maps were chosen arbitrarily after the study of frequency distributions. At locality 5 the sample amount is too small to justify the preparation of contoured geochemical maps.

The kriging was performed in 25 x 25 m grids in the SAP. The range of influence was used as search radius, but only the three samples nearest to each kriging point were used in the calculations. The ranges of influence were determined by means of semi-variograms describing the spatial variability of the samples (table 8), (Conradsen et al., 1987). The semi-variograms all show relatively large nugget-effect (random variance), causing considerable smoothing on the geochemical maps.

Areas and metal contents were calculated in the DTM and SAP respectively for various tantalum and niobium cut-off values (table 9). As could be expected, the values in the table deviate from the values presented in the Preliminary Report. The latter were obtained by manual contouring in the x-y plane. The kriged values represent a statistical estimate only, but a comparison with the relative uranium levels on the aeroradiometric maps, which are based on a very large, unkriged data set, indicates that the values are quite realistic. The figures presented in table 9 represent the essence of the results of the Motzfeldt 87 Project. They will be commented on in chapter 7.

Extrapolated geochemical maps

The correlations between aeroradiometric and geochemical data were established by regression analysis of log-transformed chip sample values and untransformed gamma-spectrometric values. On this basis contour maps of niobium, tantalum and uranium have been prepared for localities 1+2, 3, 4, and 5 by extrapolation in the x-y plane (appendices 31-42).

At the preparation of the extrapolated maps, the following equations were used:

$$\mathrm{Ln}\ (\mathrm{Ta}) = -0.29892301-(0.006283591\ \mathrm{gU})+(0.005978323\ \mathrm{gTh})+(4.16615222\ \mathrm{gU/Th}).$$
$$\mathrm{Ln}\ (\mathrm{Nb}) = 2.66448830-(0.006706612\ \mathrm{gU})+(0.006591351\ \mathrm{gTh})+(3.84389543\ \mathrm{gU/Th}).$$
$$\mathrm{Ln}\ (\mathrm{U}) = 0.65247968-(0.004753569\ \mathrm{gU})+(0.004884906\ \mathrm{gTh})+(2.81088326\ \mathrm{gU/Th}).$$

The numbers in the brackets are prediction coefficients, the g-figures are gamma-spectrometric values. The prediction coefficients are based on the regression analysis between the kriged geochemical values and the gamma-spectrometric measurements over the localities where kriged data are available. The same coefficients have been used in the preparation of the maps of locality 5.

The regression analysis included the kriged areas as a whole. This gives meaningful overall predictors if the radiometric response of the rock types in all the investigated localities is uniform. It can be assumed that this is the case for localities 3, 4 and 5, and to a certain extent also for locality 2, whereas locality 1 is very heterogeneous - both lithologically and radiometrically. The data from locality 1 comprise a third of the collected geochemical data, and if the radiometric response from this locality is very different from that of the other localities, the overall predictors are affected accordingly.

In general, it can be stated that the extrapolated geochemical maps are in good agreement with the kriged geochemical maps as far as the distribution and location of the anomalous values are concerned. The absolute values on the extrapolated maps are, however, so different from the kriged ones that they should not be used for cut-off estimations. The reliabilty of the extrapolated maps is strongly affected by the high nugget effect and the uncertainty on the radiometric response discussed above. To test the effect of the radiometic response between the localities, the prediction coefficients should be calculated for each locality.

Table 2. Overview of metal contents in various rock types.
Median/average in ppm. N=number of chip samples.

	MAS	MPE	MAP	MPM	TRA	BAS
N	501	26	39	263	49	40
Nb	1470/1746	1495/1782	1010/1461	440/801	40/212	120/289
Ta	128/159	123/161	47/81	16/41	2/14	6/18
Nb/Ta*	11/13	12/14	17/20	21/24	18/19	18/19
U	61/83	57/78	52/70	21/43	7/12	7/20
Th	72/86	67/83	66/134	55/112	17/31	24/47
U/Th**	0.9/1.2	0.9/1.3	0.7/1.0	0.4/0.6	0.4/0.5	0.3/0.5
Zr	3303/4845	6633/7087	5547/6181	1786/4688	367/1540	356/1058
Ce	958/1140	1069/1396	961/1091	475/860	134/299	241/499
La	532/630	597/810	550/639	290/482	68/159	130/283
Y	194/276	295/345	146/249	91/176	35/82	61/96
Be	18/22	20/25	19/31	14/25	7/13	16/37
Li	22/32	33/59	120/149	42/81	22/28	59/79
Sn	38/48	77/119	65/84	34/66	7/17	12/36
Mo	6/8	6/9	6/8	4/9	2/4	8/13

* Only calculated if Ta>4 ppm.
** Only calculated if U>4 ppm.

MAS = Altered syenite
MPE = Pegmatite
MAP = Aplite
MPM = Peralkaline microsyenite
TRA = Trachyte
BAS = Basalt

Table 3. Summary of metal contents at the chip sampled localities. Range and median/average in ppm. N=number of chip samples.

	Loc. 1	Loc. 2	Loc. 3	Loc. 4	Loc. 5	Locs 1-5
N	329	119	286	145	49	928
Nb	10-8030 260/820	20-4290 900/1070	120-7520 1600/1757	240-11500 1100/1638	310-6390 1170/1666	10-11500 1010/1313
Ta	<1-378 9/38	1-385 66/83	8-693 138/161	8-1110 101/156	16-748 141/189	<1-1110 77/108
Nb/Ta*	6-75 21/24	2-54 13/14	5-25 11/12	6-162 12/14	7-19 9/10	2-162 13/16
U	<1-656 15/46	2-254 32/46	5-544 64/79	9-723 45/77	10-376 65/96	<1-723 45/64
Th	1-1960 46/102	1-1070 53/69	8-310 65/74	19-1110 97/118	19-228 76/81	1-1960 64/91
U/Th**	<0.1-10.6 0.4/0.7	<0.1-5.3 0.7/1.1	0.1-6.5 1.0/1.3	<0.1-7.1 0.5/0.8	0.2-4.1 1.0/1.3	<0.1-10.6 0.6/1.0
Zr	20-49684 1106/4532	144-19062 2693/4050	286-17241 3160/4684	71-36433 4056/5489	407-10271 2033/2735	20-49684 2676/4572
Ce	1-7870 367/831	52-4260 773/968	176-4330 933/1131	219-4570 847/1089	137-2730 934/1022	1-7870 767/991
La	1->2000 218/466	32->2000 456/565	88->2000 529/622	117->2000 476/612	75-1350 467/529	1->2000 429/553
Y	14-1245 76/164	28-982 180/240	28-1274 204/292	53-1206 200/280	50-424 136/155	14-1274 158/231
Be	1-797 13/26	1-102 11/15	2-95 18/20	7-287 27/33	5-45 13/15	1-797 16/23
Li	1-1810 42/86	1-402 35/53	<1-236 31/41	<1-57 4/13	<1-132 11/22	<1-1810 27/53
Sn	<1-678 26/69	1-472 24/45	6-372 41/49	6-195 47/51	4-51 15/17	<1-678 36/54
Mo	<1-202 4/8	1-84 10/13	<1-60 5/6	<1-142 5/8	3-39 10/12	<1-202 5/8

* Only calculated if Ta > 4 ppm.
** Only calculated if U > 4 ppm.

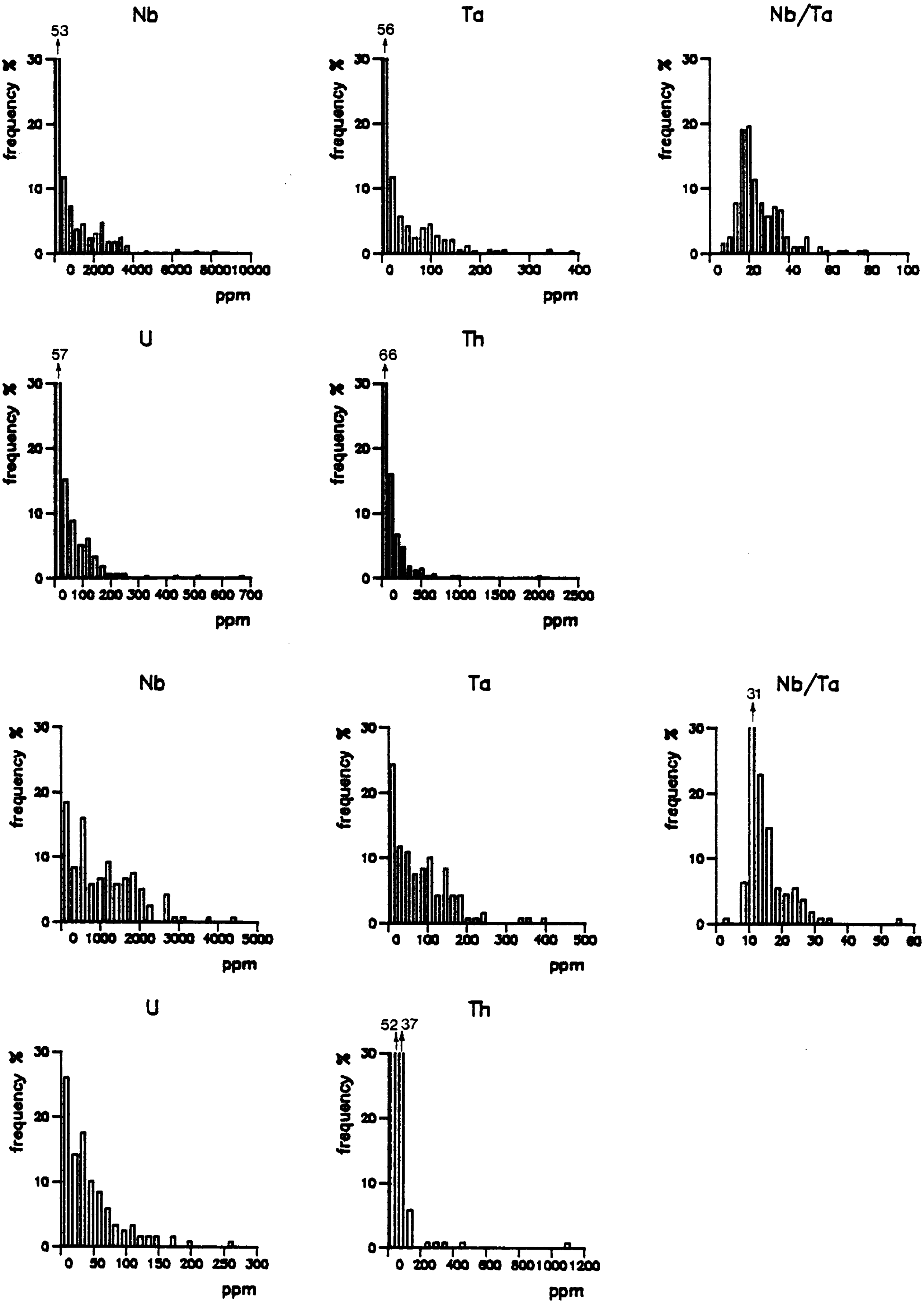

Fig. 3. Histograms of chip sample values from locality 1 (329 samples, top) and locality 2 (119 samples, bottom).

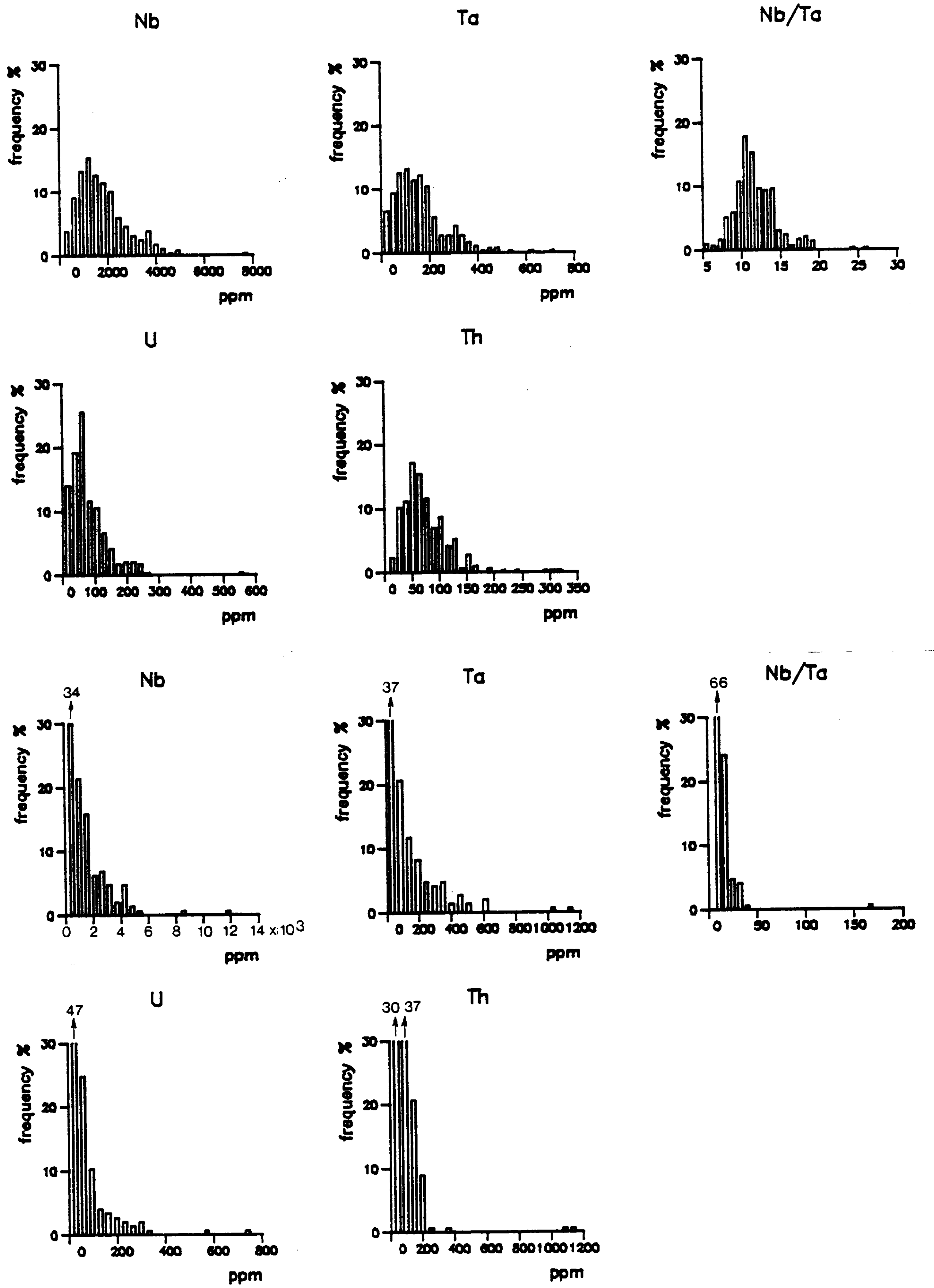

Fig. 4. Histograms of chip sample values from locality 3 (286 samples, top) and locality 4 (145 samples, bottom).

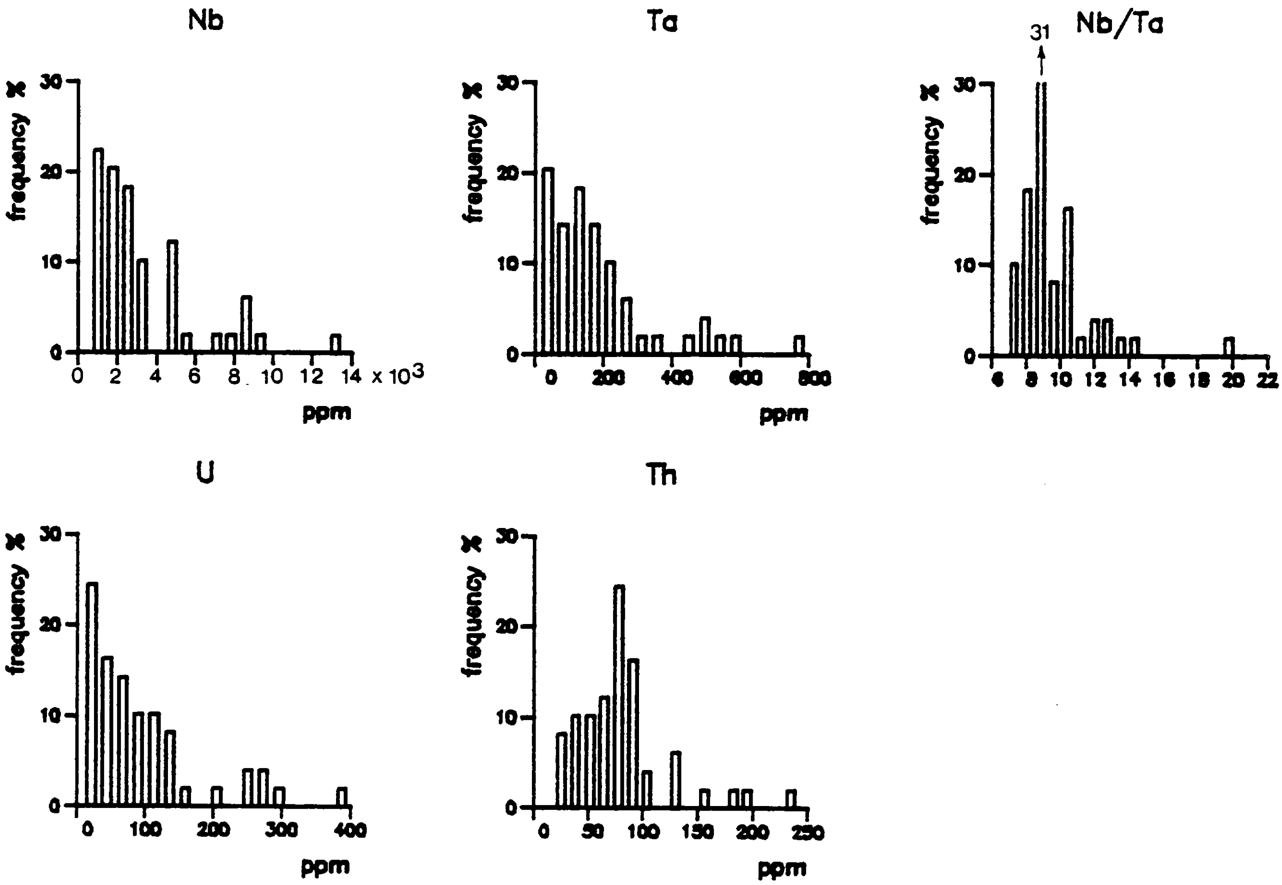

Fig. 5. Histograms of chip sample values from locality 5 (49 samples).

	Nb	Ta	U	Th	Zr	Ce	La	Y	Be	Li	Sn	Mo	
Nb	1.00000												Nb
Ta	0.90902	1.00000											Ta
U	0.80704	0.74902	1.00000										U
Th	0.26405	0.19288	0.27956	1.00000									Th
Zr	0.40677	0.32488	0.02847	0.35607	1.00000								Zr
Ce	0.47398	0.47985	0.21169	0.54087	0.68551	1.00000							Ce
La	0.46053	0.45795	0.18647	0.53109	0.69931	0.99336	1.00000						La
Y	0.37259	0.37072	-0.02510	0.33484	0.82236	0.82842	0.84076	1.00000					Y
Be	0.11110	0.06907	0.06481	0.47249	0.24121	0.24291	0.25671	0.29510	1.00000				Be
Li	0.01404	0.02414	0.05578	-0.21688	-0.16142	0.03118	0.02809	-0.08517	-0.07653	1.00000			Li
Sn	0.24011	0.08421	0.11420	0.28449	0.58166	0.32424	0.34425	0.44284	0.40628	-0.00643	1.00000		Sn
Mo	-0.13647	-0.05247	-0.00085	-0.07641	-0.22385	-0.08458	-0.09722	-0.21001	-0.27098	0.07161	-0.29870	1.00000	Mo
	Nb	Ta	U	Th	Zr	Ce	La	Y	Be	Li	Sn	Mo	

Table 4. Correlation matrix for logarithmic values of the 527 chip samples classified as altered syenite or pegmatite.

Table 5. Varimax rotated factor loadings (correlations between factors and elements) for the data presented in table 4.

	Factor 1	Factor 2	Factor 3	Factor 4	
La	0.93	0.23	0.04	0.11	La
Ce	0.92	0.26	0.02	0.12	Ce
Y	0.92	0.05	0.21	0.04	Y
Zr	0.81	0.08	0.32	0.08	Zr
U	-0.06	0.95	0.03	0.09	U
Nb	0.30	0.91	0.12	-0.01	Nb
Ta	0.31	0.89	-0.02	-0.04	Ta
Sn	0.37	0.05	0.70	0.04	Sn
Be	0.15	0.03	0.61	0.46	Be
Mo	-0.01	-0.03	-0.79	0.07	Mo
Th	0.39	0.21	0.14	0.70	Th
Li	0.04	0.08	0.03	-0.75	Li

Table 6. Summary of factor analysis of individual localities. Elements highly correlated with varimax rotated factors are shown.

	Loc. 1	Loc. 2	Loc. 3	Loc. 4	Loc. 5
F1	Ta-Nb-Ce-U-La-Zr-Y-Sn-Th	La-Ce-Y-(Th-Zr)	Y-La-Ce-Zr-(Th)	Y-Ce-La-Zr	La-Ce-Th-(Y-Sn)
F2	Li-Mo-Be	U-Nb-Ta	U-Nb-Ta	U-Nb-Ta	Nb-Ta-U
F3		Sn-Be	Mo/-Sn	Be-Th-Sn	Zr-Y
F4		Li	Li-Be	Mo-Li	Be/-Mo
F5		Mo			Li

Table 7. Correlation matrix of logarithmic values of scintillometer measurements (Scint), unstripped ground gamma-spectrometric measurements (Gtot, GU, GTh, GK), and chemical analyses for all chip samples.

	Scint cps	Gtot cps	GU cps	GTh cps	GK cps	U ppm	Th ppm	Nb ppm	Ta ppm	
Scint cps	1.00									Scint cps
Gtot cps	0.61	1.00								Gtot cps
GU cps	0.55	0.92	1.00							GU cps
GTh cps	0.50	0.66	0.45	1.00						GTh cps
GK cps	0.51	0.87	0.86	0.47	1.00					GK cps
U ppm	0.55	0.75	0.78	0.34	0.70	1.00				U ppm
Th ppm	0.52	0.59	0.45	0.70	0.44	0.59	1.00			Th ppm
Nb ppm	0.48	0.65	0.66	0.26	0.62	0.89	0.60	1.00		Nb ppm
Ta ppm	0.43	0.62	0.65	0.34	0.61	0.87	0.50	0.96	1.00	Ta ppm

Table 8. Ranges of influence and nugget effects determined from semi-variograms.

	Range of influence (m)		Nugget effect (%)	
Element	Loc. 1	Locs 2-4	Loc. 1	Locs 2-4
Nb	478	326	65	59
Ta	1092	247	64	67
Nb/Ta	82	86	35	74
U	426	266	82	67
Th	88	599	61	65

Table 9. Metal contents of chip sampled localities. Areas in m^2 from digital terrain models. Average metal contents in ppm are calculated by kriging in the surface approximating planes. L.c. area = Largest coherent area.

Case		Loc. 1	Loc. 2	Loc. 3	Loc. 4
Total area		609 631	630 442	344 650	175 549
Nb-Ta-U-Th		551-29-29-53	922-67-38-52	1475-130-63-66	1324-110-54-101
A	Total area	-	7 412 (1.2%)	44 061 (12.8%)	20 770 (11.8%)
	Nb-Ta-U-Th		2251-221-110-55	2493-240-95-73	2482-262-106-119
	L.c. area	-	5 602 (0.9%)	7 549 (2.2%)	7 574 (4.3%)
	Nb-Ta-U-Th		2243-221-106-59	3233-258-93-77	2694-255-102-157
B	Total area	-	-	12 046 (3.5%)	11 950 (6.8%)
	Nb-Ta-U-Th			2892-302-107-75	2677-295-120-102
	L.c. area	-	-	3 908 (1.1%)	3136 (1.8%)
	Nb-Ta-U-Th			2406-301-74-95	2315-274-95-88
C	Total area	-	-	7 236 (2.1%)	3 151 (1.8%)
	Nb-Ta-U-Th			3328-322-111-70	3474-364-174-117
	L.c. area	-	-	3 067 (0.9%)	1 892 (1.1%)
	Nb-Ta-U-Th			3835-312-105-79	3782-354-164-129
D	Total area	-	-	922 (0.3%)	1 261 (0.7%)
	Nb-Ta-U-Th			2948-353-73-90	3770-426-181-123
	L.c. area	-	-	922 (0.3%)	631 (0.4%)
	Nb-Ta-U-Th			2948-353-73-90	4272-414-170-121
E	Total area	-	-	-	1 261 (0.7%)
	Nb-Ta-U-Th				3770-426-181-123
	L.c. area	-	-	-	631 (0.4%)
	Nb-Ta-U-Th				4272-414-170-121
F	Total area	956 (0.2%)	-	3 067 (0.9%)	3 143 (1.8%)
	Nb-Ta-U-Th	4684-168-276-213		3835-312-105-79	3780-252-116-113
	L.c. area	956 (0.2%)	-	3 0673 (0.9%)	1 260 (0.7%)
	Nb-Ta-U-Th	4684-168-276-213		3835-312-105-79	3940-375-185-135

Case A: Ta > 200 ppm (244 ppm Ta_2O_5)
Case B: Ta > 250 ppm (305 ppm Ta_2O_5)
Case C: Ta > 300 ppm (366 ppm Ta_2O_5)
Case D: Ta > 350 ppm (427 ppm Ta_2O_5)
Case E: Ta > 400 ppm (488 ppm Ta_2O_5)
Case F: Nb >3500 ppm (5007 ppm Nb_2O_5)

7. GEOLOGICAL EVALUATION OF RESULTS

The conceptual model for the tantalum-enriched pyrochlore mineralisation at Motzfeldt Sø proposed by Tukiainen (1986) states, that mineralisation occurs in a belt characterized by late-magmatic alteration along the outer margin of an alkaline intrusion. This model has on the whole been confirmed by the present study.

The systematic geochemical and geophysical data acquired during the Motzfeldt 87 Project enable a quantification of the metal contents in the mineralisation. This will be attempted below in connection with a general evaluation of the individual investigated localities. The evaluation is based on the assumptions that tantalum is the main target element, and that tantalum contents below 250 ppm (305 ppm Ta_2O_5) are not economically attractive.

Locality 1

The geological setting is characterized by two large fault blocks separated by the Qiterdleq fault zone and each dominated by peralkaline microsyenite. This pattern is clearly reflected on the radiometric maps as is the intrusion/basement contact to the east. The northern fault block is well covered by chip samples, whereas the southern block remains virtually unsampled.

Geochemically the area is characterized by a combination of low average metal contents and unfavourable Nb/Ta and U/Th ratios (table 3). On the geochemical maps niobium, tantalum and uranium outline a NNE-SSW striking, c. 300 m wide mineralised belt in the central and western part of the northern fault block. A c. 200 m long, elongated anomaly in the central part of this belt represents the best part of the mineralisation. Weaker anomalies associated with altered syenite occur along the northern rim of the area. Very low values to the east represent an unmineralised zone adjacent to the basement contact. Thorium displays a deviating pattern with a large, dominating anomaly in the central part of the area. Absolute thorium values are also relatively high, corresponding to the prevailing peralkaline microsyenite.

The extrapolated geochemical maps show no new targets, but nicely outline the known anomalies. The large anomalies in the southern part of the maps are caused by thorium-rich microsyenite.

The sampled part of the mountain side covers c. 610 000 m^2 with an average content of c. 550 ppm Nb, 30 ppm Ta, 30 ppm U and 50 ppm Th. All kriged tantalum values are below 200 ppm, and only 0.2% of the area hosts more than 3500 ppm niobium (table 9). Consequently, the locality is regarded as a low priority target for further tantalum exploration.

Locality 2

A c. 400 m wide, north-south striking anomalous zone is evident on the U/Th ratio radiometric map. The northern part of this zone, corresponding to the sampled part of the locality, is underlain by slightly altered syenite containing large basalt rafts and quite a few sheets of peralkaline microsyenite. The original distance to the basement contact is obscured by fault tectonics. The southern part of the area is dominated by peralkaline microsyenite as evidenced by the thorium radiometric map.

Geochemically the area is characterized by modest metal contents (table 3). On the geochemical maps niobium, tantalum, Nb/Ta ratio and uranium outline a main 100 m by 200 m anomaly at the centre of the sampled area. Thorium deviates from this picture, but apart from a small peak to the SW, neither distinct patterns nor enriched areas exist for this element. A barren area to the SE on the maps represents a large basalt raft.

The extrapolated geochemical maps outline the known anomalies, but they do not reveal any obvious new targets. The large anomalies in the southern part of the maps are caused by thorium-rich microsyenite.

The sampled part of the mountain side covers c. 630 000 m^2 with average contents of c. 920 ppm Nb, 70 ppm Ta, 40 ppm U and 50 ppm Th. The main anomaly covering 1.2% of this area contains c. 220 pmm Ta (table 9). Due to these metal contents, the locality is regarded as a low priority target for further tantalum exploration.

Locality 3

This locality is wholly dominated by strongly altered syenite. The radiometric maps all show a large, 200-300 m wide, north-south orientated anomaly with a satellite anomaly some 100 m to the SE. The anomalies are located c. 200 m west of the NNW-SSE orientated basement contact. The main anomaly shows very high cps values for uranium, much lower thorium cps values, and consequently high U/Th ratios.

The geochemistry is characterized by high contents of most metals including niobium, tantalum and uranium, and a favourable Nb/Ta ratio (table 3). On the geochemical maps the niobium, tantalum and uranium anomalies, which occupy most of the area, seem to define a c. 300 m wide, NNE-SSW striking zone. The highly enriched areas inside this zone are irregularly distributed. The Nb/Ta ratio displays a distinct vertical zonation with the highest relative tantalum contents at the base of the cliff.

The extrapolated maps reflect the known anomalies and show no new ones.

The sampled mountain surface covers c. 345 000 m^2 with an average content of 1480 ppm Nb, 130 ppm Ta, 60 ppm U and 70 ppm Th (table 9). Four major anomalies occupying 3.5% of the area contain more than 250 ppm Ta, 2.1% of the area contains more than 300 ppm Ta, and 0.3% of the area contains more than 350 ppm Ta (table 9).

The tonnage potential of locality 3 can be estimated by geological modelling which suggests that the mineralised zone continues 200-300 m further north until the fault contact towards the basement. As the mineralised zone is c. 500 m high and 300 m wide, the locality hosts a potential 250 x 500 x 300 x 2.5 = 94 x 10^6 tons mineralised rock. Provided that the metal distribution observed on the surface continues in the third dimension, this mineralised body would contain an average 130 ppm Ta. 3.5% of the body corresponding to 3.3 x 10^6 tons would contain an average of 300 ppm Ta, 2.1% of the body corresponding to 2 x 10^6 tons would contain an average of 320 ppm Ta, and 0.3% of the body corresponding to 0.3 x 10^6 tons would contain 350 ppm Ta (cf. table 9). It should be stressed that these smaller bodies with above average tantalum contents would be irregularily distributed inside the larger body.

These figures indicate, that locality 3 holds a potential for a small-medium sized, low-grade tantalum deposit, whereas the existence of important high-grade zones have not been indicated by the present study. As the locality occurs on a very steep mountain cliff above a crevassed glacier it is difficult from a logistical point of view, and on the whole the locality is regarded as a medium priority target.

Locality 4

The locality forms the upper part of a 1600 m high mountain overlooking Motzfeldt Sø. The geophysical maps cover both the upper part of the cliff and the regolith and snow or glacier covered plateau on the top. This plateau has been grab sampled during earlier projects (Tukiainen, 1986). The geology is wholly dominated by coarse-grained, often pegmatically and miarolitically developed altered syenite.

On the radiometric maps uranium and thorium outline a larger anomaly to the south and a smaller to the north. These anomalies are connected over the mainly snow covered plateau in a north-south direction by less distinct anomalies. On the U/Th ratio map a 200-300 m wide, continuous anomalous zone situated 300-400 m west of the basement contact is evident over 2 km in a north-south direction.

The geochemistry is characterized by high average metal contents and the locality hosts the maximum chip sample values for niobium (1.15%), tantalum (0.11%) and uranium (0.07%). The geochemical maps show two main anomalies for niobium, tantalum and uranium. The largest anomaly towards NE is extended in both SW-NE and east-west directions. The SW-NE direction is the most conspicuous trend at the locality, but a cross-cutting NW-SE direction is also evident. The Nb/Ta ratio map indicates a vertical zonation of these two metals with most tantalum at lower levels. Thorium displays a distinct distribution pattern with the highest values towards NE and the lowest towards SW.

The extrapolated geochemical maps indicate that the most promising anomaly on the cliff remains unsampled.

The sampled mountain surface covers c. 175 000 m^2 with average contents of 1320 ppm Nb, 110 ppm Ta, 50 ppm U and 100 ppm Th (table 9). Two major and three minor anomalies covering 6.8% of the area contain more than 250 ppm Ta, two anomalies covering 1.8% of the area contain more than 300 ppm Ta, and two anomalies covering 0.7 % of the area contain more than 400 ppm Ta (table 9).

Geological modelling suggests, that a more than 400 m high and 300 m wide mineralised zone stretches over at least 1.5 km in a north-south direction across the plateau of locality 4. This corresponds to 400 x 300 x 1500 x 2.5 = 450 x 10^6 tons of potentially mineralised rock. Provided that the metal distribution observed on the surface continues in the third dimension, this mineralised body would contain an average of 110 ppm Ta. 6.8% of the body corresponding to c. 30 x 10^6 tons would contain an average of 300 ppm Ta, 1.8 % of the body corresponding to c. 8 x 10^6 tons would contain an average of 360 ppm Ta, and 0.7% of the body corresponding to 3 x 10^6 tons would contain an average of 430 ppm Ta. It must again be stressed that the smaller tonnages with above average tantalum contents will appear in several individual bodies irregularily distributed within the larger mineralised body.

The above figures indicate a good potential for tantalum although the existence of high-grade zones are only indicated by a few isolated chip samples. As the area has the best tantalum potential among the investigated localities and the logistic conditions for exploration work on the plateau are reasonably good, the locality is regarded as a high priority exploration target.

Locality 5

The aeroradiometric maps of uranium and thorium from locality 5 show large anomalous areas with the highest values to the north. Especially thorium anomalies are very prominent in the northern part of the map corresponding to the occurrence of strongly mineralised microsyenite. The contact towards the basement is evident in the NE corner of the anomaly maps. On the U/Th ratio map a 200-400 m wide, 1-1.5 km long and NNE-SSW orientated anomaly is evident in the southern half of the area. It is the southern snout of this anomaly, underlain by altered syenite, which has been chip sampled. Due to an extensive scree cover, the geology underlying the larger U/Th ratio anomaly is little known, but scattered outcrops indicate a dominance of altered syenite. The present location of the mineralised zone some 2 km away from the intrusive contact is inconsistent with the conceptual mineralisation model. The deviation might be due to tectonics involving tipped fault blocks.

The few chip samples (48) collected at locality 5 show high metal contents with maximum values for average tantalum (189 ppm) and uranium (96 ppm) and the most favourable average Nb/Ta ratio (10) among the sampled localities (table 3). The existence of an independent REE mineral has been indicated by factor analysis (table 6).

The extrapolated geochemical maps show strong anomalies to the north, which are due to thorium-rich microsyenite, but the southern anomaly mentioned above is also outlined.

Due to the small amount of chip sample information from this locality a quantitative estimate of the tantalum potential is not justified. However, the available data indicate a potential of the same order of size as the one at locality 4.

Based on the relatively high metal contents and the existence of a large, mostly unexplored aeroradiometric anomaly, this area is regarded as a high priority target for tantalum exploration. The logistic conditions for exploration work are relatively good as the area can be traversed by non-alpinists, and water for drilling operations is abundant. On the other hand the extensive scree cover hampers surface sampling over most of the area.

Locality 6

This area underlain by basement granites and Gardar alkaline rocks younger than the Motzfeldt Centre has not been visited. The aeroradiometric measurements show overall low uranium and thorium cps values, although a distinct U/Th ratio peak has been detected near the contact between basement and nepheline syenite. This anomaly ought to be checked, but on the whole the area seems to be of limited interest for further tantalum exploration.

Alluvial deposits

The mineralising elements are not highly enriched in the seven heavy mineral concentrates from streams draining Motzfeldt Centre rocks (List 1. C). As the sample sites are dominated by boulder filled stream beds with rapidly flowing streams, this is perhaps not surprising. The highest metal contents appear in samples from the Lejrelv drainage system, and the Lejrelv delta in Motzfeldt Sø is therefore an obvious target to test for placers, as is the beach below locality 4.

The 1.5 x 3.0 km^2 sized alluvial plan south of Motzfeldt Sø holds the major potential for placer deposits. As no major natural sections through the alluvium underlying the plain are exposed, investigations would involve mechanical pitting or scout borings.

Sulphide mineralisation

The encountered sulphide mineralisation is of vein or disseminated type and wholly dominated by pyrite with traces of copper, lead, zinc and molybdenum sulphides. The mineralisation seems to be of marginal interest.

8. CONCLUSIONS

The niobium-tantalum-uranium-bearing pyrochlore mineralisation in the Motzfeldt Centre occurs in a 200-300 m wide zone along the outer margin of the intrusion at a distance of some 200-400 m from the contact. At some localities the mineralised zone has been transposed by faults.

Pyrochlore is hosted in both altered syenite and in peralkaline microsyenite, but the Nb/Ta ratios are much more favourable in the altered syenite (Nb/Ta=11) than in the peralkaline microsyenite (Nb/Ta=21). A vertical zonation of the Nb/Ta ratio with the highest tantalum contents at lower levels is evident at some localities.

The mineralised zone has a potential of c. 500 x 10^6 tons rock with average contents of 1320-1480 ppm Nb, 110-130 ppm Ta, 50-60 ppm U and 70-100 ppm Th at the best investigated localities (locs 3 and 4). Inside the mineralised zone smaller areas with above average contents of these metals have been delineated. The distribution of such metal concentrations is irregular and without any distinct pattern.

Based on estimates of tantalum contents, potentially mineralised volume and logistic factors, the investigated localities have been given the following priority for further tantalum exploration:

High priority targets
Locality 4. Potential tonnage with >250 ppm Ta : 30 x 10^6 tons.
Locality 5. Estimated tonnage the same as for locality 4.

Medium priority target
Locality 3. Potential tonnage with >250 ppm Ta : 3 x 10^6 tons.

Low priority targets
Localities 1, 2 and 6. Potential tonnage with >250 ppm Ta : None.

The main purpose of the Motzfeldt 87 Project - to gain a general impression of the metal distribution in the mineralised zone and to delineate areas with high metal contents - has been fulfilled. The mineralised zone constitutes a very large tonnage with average tantalum contents in the order of 120 ppm. The most favourable area delineated inside the zone contains c. 430 ppm tantalum.

9. ACKNOWLEDGEMENTS

The author thanks J. Lau and O. Plesner for invaluable support from the base camp in Narsarsuaq; E. Dam and I. Rytved for their spirited contribution in the field laboratory; L. Thorning for assistance during the geophysical survey; J. Halskov for drafting of maps and figures; F. Schjøth for digitizing and data base work; L. Melchior Larsen for comments on the report; and finally the Swiss mountaineering team, the British geophysical staff and the IMSOR trio for enjoyable co-operation.

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Analytical procedures, Bondar-Clegg. Limits in ppm.

Element	Det. limit	Upper limit	Extraction	Method
Nb	10			X-ray fluorescence
Ta	1	90 000		Neutron activation
U	1	90 000		Neutron activation
Th	0.1	2 000		Neutron activation
Zr	1	20 000		X-ray fluorescence
Ce	1	20 000		Neutron activation
La	0.1	2 000		Neutron activation
Y	1	20 000		X-ray fluorescence
Be	0.5	2 000	$HF-H_2SO_4-HCl$	Atomic absorption
Li	1	20 000	$HF-HClO_4-HNO_3-HCl$	Atomic absorption
Sn	1	12 500		X-ray fluorescence
Mo	1	20 000	$HCl-HNO_3$, (1:3)	Atomic absorption
Cu	1	20 000	$HCl-HNO_3$, (1:3)	Atomic absorption
Pb	2		$HCl-HNO_3$, (1:3)	Atomic absorption
Zn	1		$HCl-HNO_3$, (1:3)	Atomic absorption
Ag	0.1	100	$HCl-HNO_3$, (1:3)	Atomic absorption
Au	1-5 ppb		Aqua regia	Fire assay/DC plasma
W	2		Carbonate sinter	Colourimetric
Mn	1		$HCl-HNO_3$, (1:3)	Atomic absorption
Ti	100			X-ray fluorescence
Fe	1000		$HCl-HNO_3$, (1:3)	Atomic absorption

Notes! 0 in the lists means: Below detection limit.
D in the lists means: Duplicated assay/analysis
Nb/Ta ratios are only calculated if Ta>4 ppm.
U/Th ratios are only calculated if U>4 ppm.

Sample types: A = Sand
C = Chips
H = Heavy mineral concentrate
R = Rock
S = Internal standard

Final List of Analytical Results.
1.A. Bondar-Clegg: 12 elements.

GGU no	Loc	Type	Nb ppm	Ta ppm	Nb/Ta	U ppm	Th ppm	U/Th	Zr ppm	Ce ppm	La ppm	Y ppm	Be ppm	Li ppm	Sn ppm	Mo ppm
333301	1	C	70	1		3	11		263	80	37	31	3	5	7	1
333302	1	C	390	13	30.0	22	76	0.3	1647	388	236	87	27	18	38	6
333303	1	C	50	1		5	13	0.4	20	89	42	31	10	26	18	1
333304	1	C	20	0		5	9	0.6	180	67	39	21	3	17	1	0
333305	1	C	220	13	16.9	5	16	0.3	788	243	125	64	3	4	9	18
333306	1	C	30	1		8	12	0.7	290	95	50	22	3	9	2	0
333307	1	C	90	6	15.0	13	45	0.3	549	215	99	54	9	10	14	0
333308	1	C	1330	50	26.6	78	242	0.3	6279	1130	759	238	63	27	129	8
333309	1	C	20	0		7	13	0.5	318	137	75	25	3	14	7	0
333310	1	C	70	2		12	75	0.2	445	151	77	31	5	8	2	0
333311	1	C	10	1		4	9		235	113	53	26	2	18	1	1
333312	1	C	10	1		4	7		142	77	37	21	1	30	2	3
333313	1	C	30	0		5	16	0.3	222	104	57	24	4	97	8	4
333314	1	C	1120	26	43.1	91	40	2.3	4082	508	338	127	14	168	45	10
333315	1	C	50	1		6	15	0.4	299	147	80	30	2	18	4	4
333316	1	C	30	1		6	15	0.4	306	114	61	23	2	23	0	2
333317	1	C	10	0		6	8	0.8	197	95	45	25	3	26	1	6
333318	1	C	20	0		4	23		190	124	67	27	7	26	2	3
333319	1	C	60	2		6	23	0.3	394	161	97	51	11	94	7	2
333320	1	C	140	8	17.5	15	60	0.3	365	1160	741	111	29	40	4	6
333321	1	C	1950	130	15.0	105	177	0.6	9455	2020	1190	452	75	128	174	0
333322	1	C	180	4		9	85	0.1	829	354	188	83	20	15	6	3
333323	1	C	130	7	18.6	6	65	0.1	323	240	108	105	56	37	5	2
333324	1	C	30	2		4	9		211	87	40	25	4	23	7	1
333325	1	C	10	0		4	9		180	81	38	22	2	17	3	2
333326	1	C	10	0		6	8	0.8	200	94	51	27	2	33	8	4
333327	1	C	10	0		3	46		181	93	41	97	32	24	2	1
333328	1	C	10	0		4	10		205	92	46	25	2	31	13	1
333329	1	C	80	4		7	24	0.3	293	296	170	40	11	16	1	3
333330	1	C	10	0		6	8	0.8	243	99	52	26	2	13	2	0
333331	1	C	140	3		5	19	0.3	298	352	214	48	8	20	6	3
333332	1	C	10	0		5	7	0.7	177	67	37	22	1	16	6	0
333333	1	C	10	0		5	10	0.5	194	101	49	19	2	17	4	3
333334	1	C	10	0		3	7		159	100	53	20	4	25	0	2
333335	1	C	20	0		5	13	0.4	217	100	49	25	3	29	9	1
333336	1	C	10	1		5	10	0.5	219	91	49	25	3	23	6	0

Final List of Analytical Results.
1.A. Bondar-Clegg: 12 elements.

GGU no	Loc	Type	Nb ppm	Ta ppm	Nb/Ta	U ppm	Th ppm	U/Th	Zr ppm	Ce ppm	La ppm	Y ppm	Be ppm	Li ppm	Sn ppm	Mo ppm
333337	1	C	80	6	13.3	9	25	0.4	413	144	82	32	4	19	9	0
333338	1	C	40	1		5	61	0.1	358	262	158	97	23	26	7	0
333339	1	C	70	2		6	34	0.2	420	196	94	42	8	23	9	0
333340	1	C	140	3		11	36	0.3	493	271	162	52	15	90	18	9
333341	1	C	110	4		5	13	0.4	270	277	205	37	8	35	7	3
333342	1	C	330	12	27.5	29	112	0.3	1760	632	495	77	12	60	44	0
333343	1	C	10	0		4	10		347	90	49	24	3	36	1	1
333344	1	C	60	2		7	36	0.2	408	209	122	46	22	152	18	9
333345	1	C	1050	77	13.6	29	482	0.1	12038	4270	1940	700	37	251	111	3
333346	1	C	20	0		5	11	0.5	315	98	49	28	3	19	2	1
333347	1	C	20	1		8	105	0.1	295	686	414	27	4	38	2	1
333348	1	C	20	0		7	14	0.5	289	118	66	28	7	26	4	2
333349	1	C	20	1		10	17	0.6	333	125	65	33	6	38	4	1
333350	1	C	660	53	12.5	61	110	0.6	2022	1030	617	250	49	48	69	73
333351	1	C	60	2		7	75	0.1	540	147	77	79	37	42	9	4
333352	1	C	430	15	28.7	39	97	0.4	1106	782	585	58	17	185	59	8
333353	1	C	520	16	32.5	36	61	0.6	1263	353	205	65	10	137	68	8
333354	1	C	10	0		8	13	0.6	224	96	54	31	9	19	2	6
333355	1	C	40	2		7	38	0.2	378	234	142	46	7	23	8	4
333356	1	C	2830	71	39.9	159	311	0.5	14870	7320	5970	309	8	4	170	3
333357	1	C	600	23	26.1	37	132	0.3	1860	680	459	112	10	27	39	4
333358	1	C	20	0		6	13	0.5	287	117	65	26	7	47	5	30
333359	1	C	520	22	23.6	30	27	1.1	1758	392	235	114	10	219	30	10
333360	1	C	6130	337	18.2	656	62	10.7	3239	836	456	104	14	119	159	8
333361	1	C	240	3		19	260	0.1	125	1480	975	283	797	258	132	12
333362	1	C	20	0		5	9	0.5	117	83	43	25	3	19	10	3
333363	1	C	30	2		7	13	0.6	235	116	55	33	4	13	12	1
333364	1	C	80	3		7	26	0.3	283	348	250	40	7	27	13	3
333365	1	C	3030	105	28.9	154	379	0.4	402	2400	1430	563	40	25	251	12
333366	1	C	440	8	55.0	40	225	0.2	14552	766	495	121	33	84	51	3
333367	1	C	460	7	65.7	31	291	0.1	1023	811	491	134	77	259	80	13
333368	1	C	1010	28	36.1	88	99	0.9	2354	791	470	136	29	1590	72	35
333369	1	C	3150	97	32.5	159	216	0.7	5691	3140	1750	654	14	16	307	10
333370	1	C	2360	115	20.5	102	226	0.5	16800	2670	1570	832	81	43	61	15
333371	1	C	1580	93	17.0	47	42	1.1	2094	2010	1160	575	19	147	121	10
333372	1	C	2500	151	16.6	81	42	1.9	11765	2240	1250	611	17	211	88	4

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GGU no	Loc	Type	Nb ppm	Ta ppm	Nb/Ta	U ppm	Th ppm	U/Th	Zr ppm	Ce ppm	La ppm	Y ppm	Be ppm	Li ppm	Sn ppm	Mo ppm
333373	1	C	20	2		6	7	0.8	12344	85	48	27	2	16	88	2
333374	1	C	3690	98	37.7	197	587	0.3	238	2710	1490	627	32	6	7	1
333375	1	C	270	15	18.0	0	14		11774	258	133	56	5	52	167	3
333376	1	C	1650	47	35.1	81	508	0.2	976	2970	2730	375	111	240	10	2
333377	1	C	730	21	34.8	62	683	0.1	10491	1320	809	352	217	61	475	19
333378	1	C	560	14	40.0	44	171	0.3	13692	1020	634	153	49	146	159	10
333379	1	C	890	52	17.1	107	159	0.7	13220	937	537	92	39	110	157	9
333380	1	C	680	30	22.7	53	39	1.4	3778	908	515	105	21	161	59	9
333381	1	C	740	37	20.0	52	35	1.5	7069	936	564	152	18	281	47	24
333382	1	C	110	3		7	44	0.2	561	207	108	40	9	150	5	8
333383	1	C	80	2		8	35	0.2	361	215	115	59	53	103	21	6
333384	1	C	20	1		7	13	0.5	229	96	45	23	4	19	6	3
333385	1	C	170	5	34.0	10	16	0.6	707	171	98	35	8	22	9	4
333386	1	C	6130	246	24.9	522	273	1.9	16283	4040	2730	777	73	12	225	2
333387	1	C	630	38	16.6	59	108	0.5	5897	577	413	82	32	53	154	3
333388	1	C	1990	105	19.0	116	300	0.4	15306	1580	941	663	59	112	239	2
333389	1	C	540	7	77.1	18	30	0.6	769	178	89	60	14	55	30	2
333390	1	C	30	1		7	15	0.5	405	133	74	34	5	14	14	3
333391	1	C	20	0		5	11	0.4	341	97	49	30	4	16	17	4
333392	1	C	50	2		6	20	0.3	531	381	256	65	54	24	24	9
333393	1	C	8030	378	21.2	333	62	5.4	2763	1300	732	129	15	120	56	9
333394	1	C	80	4		12	22	0.5	467	180	93	34	9	54	8	7
333395	1	C	1570	68	23.1	87	81	1.1	6916	990	595	248	15	57	95	3
333396	1	C	570	24	23.8	37	77	0.5	1786	1010	644	155	21	191	33	4
333397	1	C	2270	169	13.4	71	51	1.4	15512	2320	1430	758	19	122	120	6
333398	1	C	2000	102	19.6	92	56	1.7	9098	1520	821	451	15	20	57	12
333399	1	C	3260	236	13.8	77	79	1.0	20511	4310	3410	1136	45	60	154	19
333400	1	C	2120	179	11.8	83	129	0.6	13644	2790	1630	785	30	115	108	13
333901	1	C	220	9	24.4	12	35	0.3	688	181	100	93	23	34	8	6
333902	1	C	20	0		10	10	1.0	278	116	45	30	5	15	9	7
333903	1	C	490	28	17.5	43	49	0.9	4755	420	276	51	13	137	57	4
333904	1	C	30	2		6	13	0.5	242	125	55	31	8	20	8	7
333905	1	C	2380	113	21.1	112	374	0.3	10235	2010	1110	362	51	42	176	10
333906	1	C	30	1		8	13	0.6	275	113	56	30	7	18	3	8
333907	1	C	50	3		8	23	0.4	483	140	73	44	16	27	16	2
333908	1	C	50	2		7	17	0.4	371	117	67	33	10	19	6	3

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1.A. Bondar-Clegg: 12 elements.

GGU no	Loc	Type	Nb ppm	Ta ppm	Nb/Ta	U ppm	Th ppm	U/Th	Zr ppm	Ce ppm	La ppm	Y ppm	Be ppm	Li ppm	Sn ppm	Mo ppm
333909	1	C	20	1		7	17	0.4	389	134	67	37	10	33	9	3
333910	1	C	80	2		9	18	0.5	381	155	80	50	19	16	21	3
333911	1	C	20	0		6	9	0.7	243	101	46	24	8	9	6	7
333912	1	C	630	17	37.1	33	154	0.2	1340	619	391	163	47	2	46	28
333913	1	C	130	23	5.7	63	28	2.2	20541	147	87	35	12	101	89	28
333914	1	C	2760	132	20.9	131	149	0.9	7120	1610	1020	201	17	187	65	13
333915	1	C	160	3		7	31	0.2	543	108	50	83	207	331	49	1
333916	1	C	160	4		11	39	0.3	1015	306	187	83	31	109	18	0
344317	1	C	2800	177	15.8	73	66	1.1	41997	603	300	76	5	116	187	89
344318	1	C	800	46	17.4	37	24	1.6	11521	425	263	104	9	20	107	17
344319	1	C	870	28	31.1	39	80	0.5	2703	618	416	120	49	48	145	4
344320	1	C	1800	119	15.1	175	400	0.4	49684	6920	4720	632	188	52	272	0
344321	1	C	120	7	17.1	4	7		653	247	135	40	22	50	11	1
344322	1	C	2990	159	18.8	82	29	2.8	21228	557	299	66	4	82	163	2
344323	1	C	2390	148	16.1	119	81	1.5	22456	3280	1960	769	6	10	131	14
344324	1	C	1180	54	21.9	49	21	2.4	9828	677	384	165	7	208	109	2
344325	1	C	530	27	19.6	48	101	0.5	15147	333	217	80	57	177	219	1
344326	1	C	70	5	14.0	0	5		304	86	48	16	4	47	0	0
344327	1	C	2350	140	16.8	59	68	0.9	26301	4120	2660	1245	6	8	212	4
344328	1	C	1020	78	13.1	24	21	1.2	20368	2180	1220	647	6	5	121	2
344329	1	C	560	16	35.0	28	136	0.2	4341	543	368	135	48	356	62	19
344330	1	C	170	8	21.3	11	14	0.8	1893	289	215	101	25	1810	47	4
344331	1	C	110	5	22.0	5	19	0.3	307	234	126	38	61	148	38	1
344332	1	C	490	21	23.3	26	75	0.3	2058	432	255	90	30	29	45	3
344333	1	C	10	1		7	12	0.6	354	119	47	28	3	34	5	4
344334	1	C	3460	100	34.6	178	145	1.2	8426	667	408	163	16	1	301	3
344335	1	C	180	7	25.7	10	33	0.3	881	299	179	67	13	43	20	4
344336	1	C	1790	67	26.7	107	91	1.2	8079	915	545	230	12	1	180	8
344337	1	C	190	3		8	53	0.2	941	478	276	172	20	87	66	13
344338	1	C	1660	54	30.7	83	60	1.4	7615	1200	713	379	15	213	59	9
344339	1	C	20	1		6	13	0.5	335	106	56	25	3	18	3	7
344340	1	C	30	1		6	14	0.4	342	103	52	28	3	15	6	7
344341	1	C	20	0		4	22		304	147	84	46	15	22	2	6
344342	1	C	7160	338	21.2	441	279	1.6	14174	2290	1230	382	18	3	279	8
344343	1	C	110	2		7	224	0.0	548	1060	859	121	56	57	13	10
344344	1	C	810	18	45.0	51	94	0.5	3829	561	312	123	12	160	39	8

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GGU no	Loc	Type	Nb ppm	Ta ppm	Nb/Ta	U ppm	Th ppm	U/Th	Zr ppm	Ce ppm	La ppm	Y ppm	Be ppm	Li ppm	Sn ppm	Mo ppm
344345	1	C	50	1		5	19	0.3	354	237	128	42	6	72	9	6
344346	1	C	30	0		8	46	0.2	273	367	217	72	18	99	1	8
344347	1	C	540	25	21.6	51	79	0.6	3525	371	235	46	11	23	317	20
344348	1	C	2770	64	43.3	118	144	0.8	5447	998	510	109	17	237	130	8
344349	1	C	40	1		5	13	0.4	321	113	56	30	5	28	7	7
344350	1	C	20	1		5	11	0.4	312	106	54	25	2	28	0	3
344351	1	C	50	0		5	10	0.5	285	102	56	30	2	48	1	2
344352	1	C	490	15	32.7	47	57	0.8	1188	227	125	34	10	148	19	10
344353	1	C	2850	80	35.6	145	1000	0.1	1849	3250	2450	260	32	69	214	4
344354	1	C	10	0		5	57	0.1	218	245	121	65	10	29	2	3
344355	1	C	100	1		7	133	0.1	648	309	173	54	12	125	35	3
344356	1	C	10	0		4	29		276	186	119	39	6	21	15	2
344357	1	C	10	0		5	13	0.4	282	103	51	29	7	16	3	0
344358	1	C	2430	103	23.6	133	98	1.4	8169	1180	654	227	6	11	296	3
344359	1	C	1190	84	14.2	46	163	0.3	6725	1660	960	439	74	17	53	2
344360	1	C	440	21	21.0	31	38	0.8	2224	404	229	61	7	328	41	1
344361	1	C	560	22	25.5	48	103	0.5	2693	483	272	97	9	137	158	8
344362	1	C	1600	78	20.5	79	67	1.2	7645	1290	800	294	11	85	197	4
344363	1	C	620	30	20.7	41	28	1.5	1727	352	192	77	6	205	63	0
344364	1	C	160	5	32.0	10	99	0.1	684	1190	749	96	19	19	5	3
344365	1	C	3350	104	32.2	225	405	0.6	11940	961	549	90	17	10	250	6
344366	1	C	320	4		16	500	0.0	2696	978	618	130	40	255	93	1
344367	1	C	2470	33	74.8	137	221	0.6	17225	552	303	52	9	49	448	8
344368	1	C	2270	56	40.5	118	125	0.9	8576	1110	663	247	9	16	140	3
344369	1	C	50	2		6	21	0.3	504	160	100	14	4	57	11	1
344370	1	C	180	8	22.5	9	92	0.1	869	378	248	118	16	56	18	1
344371	1	C	100	2		11	61	0.2	423	540	329	56	8	99	4	11
344372	1	C	1940	97	20.0	43	106	0.4	13799	2600	1490	653	13	15	128	3
344373	1	C	190	3		15	104	0.1	1075	315	185	73	24	167	21	6
344374	1	C	1150	68	16.9	82	54	1.5	5826	610	358	63	13	215	123	17
344375	1	C	2550	82	31.1	156	21	7.6	3655	673	375	163	5	189	41	39
344376	1	C	800	44	18.2	19	32	0.6	6255	1240	690	276	7	164	49	13
344377	1	C	2320	128	18.1	28	49	0.6	13732	2920	1680	766	7	72	114	4
344378	1	C	3420	94	36.4	147	213	0.7	33891	2040	1140	322	21	4	537	7
344379	1	C	800	16	50.0	50	331	0.2	4052	1100	712	166	75	241	83	107
344380	1	C	1300	32	40.6	64	208	0.3	2253	2320	1620	133	41	258	83	29

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GGU no	Loc	Type	Nb ppm	Ta ppm	Nb/Ta	U ppm	Th ppm	U/Th	Zr ppm	Ce ppm	La ppm	Y ppm	Be ppm	Li ppm	Sn ppm	Mo ppm
344381	1	C	440	23	19.1	19	247	0.1	6454	1330	840	456	21	210	87	57
344382	1	C	60	2		3	44		365	176	92	46	2	14	7	7
344383	1	C	250	7	35.7	6	44	0.1	1603	387	229	86	14	168	23	12
344384	1	C	470	16	29.4	13	67	0.2	3241	804	482	172	15	184	55	8
344385	1	C	200	2		0	26		387	134	72	34	1	20	14	2
344386	1	C	540	16	33.8	39	245	0.2	2173	528	299	107	42	179	43	11
344387	1	C	250	5	50.0	13	157	0.1	1059	360	231	61	18	166	20	2
344388	1	C	1760	83	21.2	59	76	0.8	9970	2030	1160	390	9	40	114	15
351008	1	C	1010	35	28.9	51	229	0.2	6923	743	391	182	9	14	95	6
351009	1	C	30	0		6	41	0.1	248	354	208	71	9	42	5	1
351010	1	C	260	14	18.6	7	13	0.6	1057	238	139	58	2	24	8	0
351011	1	C	2900	90	32.2	110	109	1.0	13133	1410	778	207	48	5	197	2
351012	1	C	2400	40	60.0	112	493	0.2	7513	1890	1120	382	37	115	199	6
351013	1	C	3610	79	45.7	148	1960	0.1	6514	7870	5000	285	51	209	231	202
351014	1	C	1410	56	25.2	66	185	0.4	9082	1940	1490	145	43	262	130	21
351015	1	C	30	1		6	18	0.3	362	120	66	28	4	130	1	6
351016	1	C	40	1		7	17	0.4	314	131	66	31	31	90	26	4
351017	1	C	1650	94	17.6	36	52	0.7	9937	1940	1040	476	14	206	272	10
351018	1	C	230	14	16.4	10	23	0.4	1939	276	144	72	4	112	17	3
351019	1	C	40	2		7	16	0.4	384	158	80	31	4	57	7	6
351020	1	C	60	0		0	255		392	279	161	152	33	44	13	7
351021	1	C	880	36	24.4	33	235	0.1	9937	1410	908	312	19	84	91	13
351022	1	C	230	14	16.4	4	13		876	262	131	54	4	49	8	0
351023	1	C	3430	144	23.8	156	202	0.8	19000	3440	1910	701	59	6	275	3
351024	1	C	340	19	17.9	18	46	0.4	5130	589	428	49	10	227	26	103
351025	1	C	1110	45	24.7	51	484	0.1	6571	1840	1270	260	34	253	121	28
351026	1	C	680	12	56.7	14	323	0.0	3017	1130	745	394	140	97	325	8
351027	1	C	1570	32	49.1	57	706	0.1	9630	1970	1160	688	17	31	198	13
351028	1	C	50	2		4	46		401	156	81	79	32	49	12	11
351029	1	C	40	1		0	13		355	162	97	30	3	167	12	3
351030	1	C	470	25	18.8	17	42	0.4	3278	427	218	124	5	35	43	3
351031	1	C	270	14	19.3	7	16	0.4	1124	250	136	56	3	37	6	3
351032	1	C	3660	111	33.0	170	183	0.9	13061	2750	1510	616	10	8	189	9
351033	1	C	4640	176	26.4	240	203	1.2	15378	3310	1830	648	36	8	223	3
351034	1	C	30	1		0	14		321	115	57	39	15	49	14	0
351035	1	C	340	5	68.0	19	234	0.1	2631	436	225	205	105	252	73	7

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GGU no	Loc	Type	Nb ppm	Ta ppm	Nb/Ta	U ppm	Th ppm	U/Th	Zr ppm	Ce ppm	La ppm	Y ppm	Be ppm	Li ppm	Sn ppm	Mo ppm
351036	1	C	130	4		11	26	0.4	522	175	90	40	7	34	9	1
351037	1	C	340	9	37.8	21	72	0.3	1861	611	367	87	13	169	26	4
351038	1	C	170	4		15	62	0.2	1105	332	196	53	13	133	17	3
351039	1	C	30	1		5	19	0.3	384	122	63	39	7	46	5	6
351040	1	C	310	27	11.5	57	125	0.5	11589	452	254	208	62	10	195	53
351041	1	C	720	21	34.3	44	409	0.1	4996	713	412	167	51	13	46	4
351042	1	C	1560	63	24.8	86	47	1.8	3398	2540	1640	79	17	385	29	73
351043	1	C	100	4		16	35	0.5	549	286	137	84	5	53	15	2
351044	1	C	620	16	38.8	38	937	0.0	4251	815	460	289	52	145	80	19
351045	1	C	140	3		10	70	0.1	1128	174	102	62	5	135	22	15
351046	1	C	20	0		5	24	0.2	240	163	88	36	4	20	0	3
351047	1	C	400	8	50.0	22	125	0.2	2075	515	290	93	25	103	52	4
351048	1	C	220	6	36.7	9	46	0.2	880	232	126	58	15	140	30	10
351049	1	C	1190	87	13.7	54	328	0.2	11519	2280	1220	475	12	98	173	22
351050	1	C	520	50	10.4	84	56	1.5	27305	656	528	48	10	177	121	4
351051	1	C	920	46	20.0	76	80	1.0	1106	1230	966	71	12	159	65	10
351052	1	C	20	1		4	13		414	123	67	27	3	30	7	3
351053	1	C	30	2		6	15	0.4	392	139	82	34	4	25	6	7
351054	1	C	840	26	32.3	16	66	0.2	8419	1570	954	444	7	35	74	4
351055	1	C	1280	36	35.6	53	66	0.8	7066	1620	908	328	7	20	71	9
351056	1	C	2060	103	20.0	111	284	0.4	20902	2330	1310	605	50	8	259	3
351057	1	C	1410	94	15.0	70	138	0.5	13723	1440	860	254	13	10	137	7
351058	1	C	780	53	14.7	69	250	0.3	13176	1740	1290	149	30	348	189	2
351059	1	C	60	2		6	19	0.3	425	129	68	35	3	14	6	2
351060	1	C	1680	70	24.0	67	305	0.2	6694	2010	1220	377	23	141	184	3
351061	1	C	330	18	18.3	30	60	0.5	3455	434	301	55	13	73	29	1
351062	1	C	40	3		7	38	0.2	353	176	86	47	2	16	5	1
351063	1	C	820	34	24.1	62	254	0.2	6125	788	449	447	446	46	194	5
351064	1	C	2340	146	16.0	101	205	0.5	11430	2530	1440	544	32	173	102	5
351065	1	C	40	2		4	15		367	129	68	38	76	55	15	3
351066	1	C	2970	110	27.0	183	198	0.9	1877	1300	799	130	49	75	140	1
351067	1	C	30	1		8	17	0.5	354	190	93	38	26	16	9	3
351068	1	C	610	23	26.5	43	447	0.1	5337	1210	686	230	97	60	92	8
351069	1	C	30	1		5	19	0.3	368	193	115	41	14	15	6	4
351070	1	C	140	5	28.0	16	50	0.3	1122	386	236	56	20	31	27	3
351071	1	C	90	4		9	10	0.9	331	134	75	34	4	22	7	47

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GGU no	Loc	Type	Nb ppm	Ta ppm	Nb/Ta	U ppm	Th ppm	U/Th	Zr ppm	Ce ppm	La ppm	Y ppm	Be ppm	Li ppm	Sn ppm	Mo ppm
351072	1	C	840	47	17.9	53	102	0.5	7594	1100	671	331	52	259	113	6
351073	1	C	200	7	28.6	14	132	0.1	1513	278	131	88	51	48	17	6
351074	1	C	540	40	13.5	43	34	1.3	5547	517	368	48	19	163	28	8
351075	1	C	110	6	18.3	9	84	0.1	987	262	141	94	28	139	13	4
351076	1	C	10	1		5	13	0.4	325	109	57	26	3	17	0	0
351077	1	C	30	2		5	24	0.2	383	152	66	53	31	30	14	0
351078	1	C	190	14	13.6	4	23		904	311	171	78	4	2	7	4
351079	1	C	30	0		0	0		271	0		31	10	29	1	4
351080	1	C	1360	58	23.4	127	141	0.9	4319	2380	1770	85	19	11	167	22
351081	1	C	110	7	15.7	20	30	0.7	3411	238	165	31	13	26	52	4
351082	1	C	20	0		6	12	0.5	345	91	40	26	9	27	13	4
351083	1	C	2050	106	19.3	126	84	1.5	2972	1060	655	84	123	68	263	4
351084	1	C	10	0		5	11	0.4	254	100	49	25	3	6	1	2
351085	1	C	300	2		6	17	0.4	351	123	74	36	4	11	3	2
351086	1	C	1350	108	12.5	75	155	0.5	9251	1610	928	321	8	3	82	29
351087	1	C	2110	134	15.7	128	246	0.5	11374	1960	1240	418	34	119	106	4
351088	1	C	440	14	31.4	27	113	0.2	3369	1280	880	74	26	87	48	8
351089	1	C	350	16	21.9	28	106	0.3	1354	649	426	80	45	112	59	7
351090	1	C	20	1		5	15	0.3	327	122	61	30	8	27	6	2
351091	1	C	60	2		7	21	0.3	418	138	74	30	10	52	12	4
351092	1	C	100	5	20.0	7	20	0.3	483	85	41	40	28	10	12	12
351093	1	C	270	17	15.9	6	16	0.4	1054	262	140	52	7	46	7	9
351094	1	C	330	13	25.4	20	158	0.1	1608	329	161	147	73	60	18	11
351095	1	C	30	2		5	16	0.3	253	137	67	36	11	6	7	3
351096	1	C	150	7	21.4	12	37	0.3	465	170	92	40	16	27	13	2
351097	1	C	20	2		5	14	0.3	300	127	68	37	9	22	2	9
351098	1	C	20	1		4	13		328	108	73	23	3	28	1	3
351099	1	C	90	3		0	357		312	1590	1170	132	20	59	25	2
351100	1	C	20	0		6	15	0.4	293	115	64	25	4	21	1	2
351101	1	C	70	3		6	24	0.3	452	165	86	35	9	39	21	2
351102	1	C	20	0		6	13	0.5	305	102	57	23	2	13	5	0
351103	1	C	120	8	15.0	8	27	0.3	389	258	134	38	9	38	6	3
351104	1	C	280	17	16.5	20	55	0.4	1379	380	203	80	52	18	19	5
351105	1	C	30	2		5	18	0.3	314	127	80	30	5	85	0	12
351106	1	C	660	34	19.4	46	117	0.4	4934	464	267	147	33	2	48	15
351107	1	C	270	10	27.0	18	35	0.5	488	254	142	38	16	148	15	3

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GGU no	Loc	Type	Nb ppm	Ta ppm	Nb/Ta	U ppm	Th ppm	U/Th	Zr ppm	Ce ppm	La ppm	Y ppm	Be ppm	Li ppm	Sn ppm	Mo ppm
351108	1	C	20	0		6	22	0.3	293	155	82	32	12	66	1	2
351109	1	C	20	1		0	22		312	117	51	31	15	31	2	0
351110	1	C	10	1		5	13	0.4	286	115	57	22	2	21	0	1
351111	1	C	40	0		5	71	0.1	406	196	116	64	36	25	8	1
351112	1	C	630	33	19.1	53	224	0.2	6539	1130	679	101	40	21	93	5
351113	1	C	2370	119	19.9	120	49	2.5	11708	1370	764	266	19	16	241	6
351114	1	C	1430	69	20.7	124	113	1.1	12685	608	351	89	37	4	678	2
351115	1	C	3460	225	15.4	218	96	2.3	14538	2600	1480	680	56	7	266	2
351116	1	C	2480	127	19.5	105	67	1.6	10834	700	356	99	61	2	207	4
351117	1	C	30	1		7	15	0.5	397	110	53	23	4	42	5	2
351118	1	C	930	29	32.1	45	238	0.2	4544	1230	708	238	56	102	51	5
351119	1	C	3780	248	15.2	255	59	4.3	7307	1370	772	311	21	116	141	2
351120	1	C	180	4		12	76	0.2	959	410	239	71	17	126	18	7
351121	1	C	1460	148	9.9	27	40	0.7	12094	2290	1270	620	11	20	120	6
351122	1	C	2060	102	20.2	143	70	2.0	9144	1470	910	292	24	89	325	4
351123	1	C	520	31	16.8	43	69	0.6	1386	320	194	106	72	234	69	0
351124	1	C	350	16	21.9	24	30	0.8	1391	306	176	53	12	117	16	0
351125	1	C	740	15	49.3	67	49	1.4	1055	183	87	46	6	61	8	2
351126	1	C	20	0		5	14	0.4	300	112	67	26	6	36	4	2
351127	1	C	190	8	23.8	9	47	0.2	1136	551	299	132	15	6	14	5
351128	1	C	3050	196	15.6	128	109	1.2	12819	2040	1240	319	13	150	69	3
351129	1	C	1320	124	10.6	46	110	0.4	10230	1980	1120	541	12	105	60	3
351130	1	C	70	3		5	51	0.1	401	192	105	60	4	10	5	2
351131	1	C	40	3		4	29		278	143	76	36	8	21	5	2
351132	1	C	190	24	7.9	50	39	1.3	12992	109	73	27	20	28	88	19
351133	1	C	900	78	11.5	70	95	0.7	13370	1170	626	280	14	43	94	9
351134	1	C	1720	117	14.7	125	138	0.9	15212	1530	981	215	26	218	87	22
351135	1	C	690	43	16.0	60	110	0.5	12724	804	470	146	13	200	65	18
351136	1	C	1390	82	17.0	74	89	0.8	8997	1140	673	240	14	174	47	0
351137	1	C	3520	157	22.4	189	70	2.7	14268	1100	595	129	23	1	168	0
351138	1	C	2810	144	19.5	143	94	1.5	11470	2390	1260	479	21	27	121	0
351139	1	C	30	1		6	13	0.5	311	127	69	32	7	38	10	2
351140	1	C	3450	213	16.2	143	43	3.3	13423	3060	1680	816	13	43	100	8
351141	1	C	1990	123	16.2	80	60	1.3	11699	2290	1270	595	26	75	119	19
351142	1	C	2300	82	28.0	104	41	2.6	8883	1600	899	453	17	163	81	2
351143	1	C	70	0		7	41	0.2	558	236	127	56	11	107	16	3

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GGU no	Loc	Type	Nb ppm	Ta ppm	Nb/Ta	U ppm	Th ppm	U/Th	Zr ppm	Ce ppm	La ppm	Y ppm	Be ppm	Li ppm	Sn ppm	Mo ppm
351144	1	C	30	6	5.0	5	30	0.2	344	172	84	90	22	92	10	3
351145	1	C	1080	34	31.8	40	95	0.4	7530	1430	809	429	60	43	83	14
351146	1	C	540	21	25.7	40	45	0.9	1716	683	429	68	36	173	97	14
351147	1	C	60	0		8	17	0.5	337	188	92	49	14	126	12	12
351148	1	C	700	34	20.6	27	30	0.9	4406	979	554	234	29	173	62	21
333917	2	C	60	1		0	35		385	111	50	64	16	51	16	14
333918	2	C	40	2		7	16	0.4	228	70	39	42	9	61	1	23
333919	2	C	270	8	33.8	15	60	0.3	1340	167	103	84	25	117	10	6
333920	2	C	1400	98	14.3	23	38	0.6	9114	1130	768	603	4	10	17	84
333921	2	C	780	77	10.1	34	25	1.4	1373	310	181	87	24	42	35	13
333922	2	C	310	26	11.9	7	6	1.2	1930	286	173	148	1	30	9	0
333923	2	C	2150	171	12.6	82	57	1.4	9078	2090	1230	441	9	182	82	0
333924	2	C	80	3		2	24		252	104	66	57	6	48	10	0
333925	2	C	50	2		0	42		177	1840	714	123	37	59	13	73
333926	2	C	1090	54	20.2	73	53	1.4	4522	427	258	87	13	114	356	6
333927	2	C	1700	135	12.6	25	60	0.4	10091	1490	947	732	10	10	39	6
333928	2	C	1160	96	12.1	44	37	1.2	2693	985	589	143	7	4	23	2
333929	2	C	2170	172	12.6	49	15	3.2	12318	2110	1230	874	5	12	61	4
333930	2	C	1110	95	11.7	35	15	2.3	4427	1000	607	362	10	94	32	2
333931	2	C	30	1		0	24		287	150	143	115	17	52	11	0
333932	2	C	1550	145	10.7	36	76	0.5	7754	1570	961	449	33	42	43	1
333933	2	C	380	29	13.1	4	10		2064	526	334	203	7	3	10	0
333934	2	C	1290	98	13.2	30	76	0.4	5254	988	592	259	8	35	22	6
333935	2	C	1110	143	7.8	39	78	0.5	8212	2830	1810	750	4	17	34	0
333936	2	C	510	33	15.5	30	70	0.4	2758	1240	791	163	20	287	24	0
333937	2	C	320	10	32.0	10	80	0.1	466	406	260	183	35	58	31	0
333938	2	C	370	19	19.5	17	74	0.2	1216	521	353	192	42	40	22	41
333939	2	C	1270	121	10.5	40	52	0.8	3951	685	413	231	8	9	13	0
333940	2	C	1340	92	14.6	45	79	0.6	3082	720	423	193	15	47	30	0
333941	2	C	570	50	11.4	10	16	0.6	3379	547	329	294	5	13	23	0
333942	2	C	1820	123	14.8	46	79	0.6	8441	1370	790	563	6	9	43	0
333943	2	C	20	2		2	1		144	52	32	28	6	59	3	4
333944	2	C	40	2		0	8		159	415	224	36	12	64	7	29
333945	2	C	1730	141	12.3	61	60	1.0	5553	1630	1030	288	13	48	37	0

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GGU no	Loc	Type	Nb ppm	Ta ppm	Nb/Ta	U ppm	Th ppm	U/Th	Zr ppm	Ce ppm	La ppm	Y ppm	Be ppm	Li ppm	Sn ppm	Mo ppm
333946	2	C	2210	179	12.3	53	65	0.8	7413	1140	683	403	7	4	28	40
333947	2	C	1910	164	11.6	24	35	0.7	10700	2040	1240	982	9	20	45	3
333948	2	C	30	2		0	5		216	115	62	60	12	77	29	3
333949	2	C	510	27	18.9	22	43	0.5	2135	434	281	117	58	35	25	41
333950	2	C	1570	137	11.5	45	59	0.8	4917	1650	1010	279	15	29	9	35
333951	2	C	1790	151	11.9	32	59	0.5	7025	767	464	253	13	20	20	4
333952	2	C	1800	141	12.8	55	33	1.6	4230	564	358	249	4	13	12	4
333953	2	C	340	13	26.2	19	62	0.3	759	593	338	130	27	62	34	15
333954	2	C	630	55	11.5	31	36	0.9	1297	973	550	308	10	57	21	12
333955	2	C	2230	248	9.0	138	40	3.5	1235	412	219	299	11	23	18	11
333956	2	C	3090	334	9.3	105	128	0.8	10341	2220	1250	858	102	24	48	8
333957	2	C	2590	247	10.5	148	43	3.4	2591	1120	640	192	17	7	44	14
333958	2	C	800	85	9.4	52	59	0.9	1081	995	560	138	13	20	18	11
333959	2	C	100	7	14.3	0	10		340	178	116	45	15	43	18	18
333960	2	C	1990	214	9.3	117	22	5.3	909	314	164	68	9	25	26	14
333961	2	C	1670	136	12.3	90	29	3.1	1031	365	185	84	8	28	17	14
333962	2	C	1370	110	12.5	66	58	1.1	4809	1190	674	218	11	22	39	13
333963	2	C	1080	75	14.4	50	92	0.5	6940	1920	1210	472	21	10	60	11
333964	2	C	320	15	21.3	5	40	0.1	1203	475	262	81	15	22	10	8
333965	2	C	2650	49	54.1	38	62	0.6	3498	503	299	93	7	5	18	21
333966	2	C	150	6	25.0	3	17		562	156	96	52	21	104	19	13
333967	2	C	90	4		3	11		289	146	85	82	23	78	17	13
333968	2	C	2120	147	14.4	166	120	1.4	6845	1850	1020	451	33	38	40	9
333969	2	C	480	30	16.0	20	36	0.6	1318	400	230	98	9	26	13	17
333970	2	C	610	81	7.5	43	48	0.9	1520	812	474	121	9	19	13	21
333971	2	C	520	43	12.1	31	30	1.0	1239	337	186	117	7	3	20	23
333972	2	C	1670	108	15.5	61	88	0.7	2718	1300	774	253	11	68	23	12
333973	2	C	100	5	20.0	4	13		335	188	106	52	10	86	2	21
333974	2	C	110	5	22.0	3	28		361	255	151	67	10	67	11	12
333975	2	C	600	41	14.6	25	47	0.5	3552	1060	606	191	11	29	36	18
333976	2	C	450	27	16.7	20	21	1.0	968	266	163	79	7	28	14	18
333977	2	C	2040	189	10.8	145	58	2.5	1052	1010	547	125	11	30	13	12
333978	2	C	1080	114	9.5	75	71	1.1	1993	1050	553	180	10	6	39	13
333979	2	C	2870	185	15.5	111	63	1.8	8545	1180	715	237	12	27	34	13
333980	2	C	1180	59	20.0	58	296	0.2	4100	2710	2330	296	74	141	138	34
333981	2	C	200	12	16.7	10	17	0.6	665	136	82	52	9	12	12	15

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GGU no	Loc	Type	Nb ppm	Ta ppm	Nb/Ta	U ppm	Th ppm	U/Th	Zr ppm	Ce ppm	La ppm	Y ppm	Be ppm	Li ppm	Sn ppm	Mo ppm
333982	2	C	1150	101	11.4	77	26	3.0	1662	253	135	109	11	17	17	20
333983	2	C	510	52	9.8	42	119	0.4	3384	1710	962	201	15	20	16	15
333984	2	C	1340	112	12.0	104	62	1.7	2500	958	563	260	15	21	21	18
333985	2	C	2150	191	11.3	133	79	1.7	1174	897	484	196	5	3	16	15
333986	2	C	50	29	1.7	22	35	0.6	174	480	283	107	15	37	30	10
333987	2	C	1890	155	12.2	99	58	1.7	3097	790	429	126	10	27	24	26
333988	2	C	900	75	12.0	63	36	1.8	1607	656	383	98	9	38	23	44
333989	2	C	520	32	16.3	25	77	0.3	1215	524	280	164	12	40	15	15
333990	2	C	680	32	21.3	44	34	1.3	4351	967	614	169	7	9	34	4
333991	2	C	640	45	14.2	38	153	0.2	3462	2380	1340	320	20	24	36	13
333992	2	C	1780	141	12.6	69	59	1.2	8241	1250	695	233	16	65	23	6
333993	2	C	1170	68	17.2	31	39	0.8	4667	712	462	180	9	27	19	9
333994	2	C	2610	201	13.0	116	93	1.2	6789	2700	1620	384	12	72	16	14
333995	2	C	660	45	14.7	29	40	0.7	2078	402	232	122	13	51	51	13
333996	2	C	2650	187	14.2	67	88	0.8	9314	2030	1240	608	21	12	38	8
333997	2	C	190	9	21.1	3	70		574	302	176	106	58	44	26	7
333998	2	C	1310	116	11.3	23	53	0.4	7705	2040	1240	525	10	50	32	11
333999	2	C	460	19	24.2	23	20	1.2	1960	152	75	93	11	168	50	7
334000	2	C	240	8	30.0	8	113	0.1	1165	276	157	111	17	37	21	15
334010	2	R	910	38	23.9	30	488	0.1	8844	5020	2940	1474	>2000	17	461	105
334011	2	R	1340	93	14.4	97	37	2.6	15052	1970	1140	674	4	11	149	538
334012	2	R	960	99	9.7	6	14	0.4	13030	2330	1290	585	1	40	93	10
334013	2	R	40	2		0	3		412	649	362	290	5	564	16	15486
334015	2	R	440	20	22.0	0	645		3834	5510	2900	360	4	19	11	2220
334016	2	R	1740	116	15.0	65	142	0.5	8069	4730	3750	291	2	21	56	582
334017	2	R	3380	48	70.4	48	63	0.8	10272	3530	3550	1368	2000	2	219	10
334018	2	R	20	0		2	8		94	40	24	46	6	32	1	120
334019	2	R	760	58	13.1	28	35	0.8	7550	1250	784	311	9	9	125	8
334020	2	R	140	26	5.4	91	63	1.5	36745	18	12	126	6	5	144	8
334021	2	R	7310	214	34.2	161	666	0.2	12094	9280	7010	134	33	19	411	6
334022	2	R	350	17	20.6	17	24	0.7	1082	230	137	69	3	23	13	378
334023	2	R	1250	99	12.6	46	48	1.0	2851	400	219	152	3	10	25	74
344301	2	C	300	11	27.3	11	13	0.9	1285	142	81	72	8	23	18	8
344302	2	C	50	2		7	13	0.5	299	119	62	28	13	97	16	7
344303	2	C	230	10	23.0	14	18	0.8	785	200	106	52	3	22	7	8
344304	2	C	880	32	27.5	81	325	0.2	9438	730	432	218	34	14	135	29

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GGU no	Loc	Type	Nb ppm	Ta ppm	Nb/Ta	U ppm	Th ppm	U/Th	Zr ppm	Ce ppm	La ppm	Y ppm	Be ppm	Li ppm	Sn ppm	Mo ppm
344305	2	C	450	46	9.8	30	83	0.4	4181	953	517	301	11	18	60	8
344306	2	C	380	22	17.3	61	74	0.8	13145	299	182	91	16	6	83	12
344307	2	C	1230	52	23.7	106	1070	0.1	8533	1130	698	176	11	374	472	4
344308	2	C	120	5	24.0	9	23	0.4	318	159	95	37	16	60	11	11
344309	2	C	2120	76	27.9	254	142	1.8	10134	1580	1070	380	25	367	376	4
344310	2	C	1840	114	16.1	92	73	1.3	19062	2930	1810	744	5	9	174	29
344311	2	C	1630	90	18.1	90	30	3.0	14904	2540	1590	629	9	2	168	7
344312	2	C	1650	113	14.6	65	17	3.7	16700	2120	1250	740	2	1	159	7
344313	2	C	2780	113	24.6	176	72	2.4	5413	955	600	199	20	98	169	7
344314	2	C	790	41	19.3	35	24	1.4	5697	562	309	194	13	22	101	3
344315	2	C	960	66	14.5	39	8	4.8	6364	796	490	306	6	95	107	28
344316	2	C	1410	87	16.2	31	75	0.4	9598	1650	1040	642	22	143	65	3
344389	2	C	100	6	16.7	4	11		322	240	137	51	33	152	31	22
344390	2	C	1200	123	9.8	16	68	0.2	6902	1400	797	479	15	95	87	6
344391	2	C	1650	144	11.5	60	85	0.7	7411	1300	702	175	9	63	37	7
344392	2	C	3690	385	9.6	192	82	2.3	1855	1860	971	213	8	51	61	3
344393	2	C	910	61	14.9	32	436	0.1	5010	4260	3020	457	30	37	94	10
344394	2	C	150	5	30.0	0	10		296	201	119	61	18	83	7	12
344395	2	C	1000	84	11.9	58	93	0.6	1752	872	456	184	8	25	13	6
344396	2	C	690	61	11.3	29	33	0.9	2444	571	303	151	7	55	26	10
344397	2	C	580	53	10.9	19	27	0.7	1495	449	244	154	6	26	24	9
344398	2	C	1060	109	9.7	0	231		7244	1680	944	550	12	7	45	9
344399	2	C	870	80	10.9	36	22	1.6	1797	354	205	155	7	25	31	12
344400	2	C	220	15	14.7	6	29	0.2	1179	358	191	108	3	17	9	9
351001	2	C	860	78	11.0	32	54	0.6	3812	1060	615	138	7	39	18	11
351002	2	C	450	26	17.3	8	35	0.2	1380	693	357	115	8	61	38	7
351003	2	C	4290	357	12.0	102	92	1.1	6215	1830	991	212	6	55	32	3
351004	2	C	560	36	15.6	8	79	0.1	2268	625	349	125	3	402	11	23
351005	2	C	1330	117	11.4	52	78	0.7	4674	1430	755	207	13	53	61	10
351006	2	C	1740	162	10.7	59	114	0.5	9384	2250	1270	276	13	58	27	4
351007	2	C	550	36	15.3	25	90	0.3	6119	773	355	284	10	11	20	13
334027	3	R	10	0		10	5	2.0	198	89	42	35	1	6	0	4
351149	3	C	2070	195	10.6	156	101	1.5	1353	1820	985	274	22	25	42	5
351150	3	C	840	55	15.3	44	66	0.7	2301	962	506	156	16	0	35	6

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GGU no	Loc	Type	Nb ppm	Ta ppm	Nb/Ta	U ppm	Th ppm	U/Th	Zr ppm	Ce ppm	La ppm	Y ppm	Be ppm	Li ppm	Sn ppm	Mo ppm
351151	3	C	3860	314	12.3	245	69	3.6	3251	1410	811	274	17	41	40	5
351152	3	C	1090	77	14.2	80	131	0.6	2074	1850	1010	225	22	92	35	4
351153	3	C	990	76	13.0	62	64	1.0	1314	961	523	130	14	74	17	6
351154	3	C	1290	102	12.6	32	65	0.5	5536	763	410	213	12	38	17	8
351155	3	C	820	65	12.6	59	117	0.5	2669	1410	754	207	17	55	26	3
351156	3	C	1610	171	9.4	82	59	1.4	6495	1280	693	337	15	43	52	2
351157	3	C	3860	372	10.4	251	83	3.0	5332	1610	915	318	16	48	41	7
351158	3	C	1120	83	13.5	78	123	0.6	2666	1900	1050	248	19	56	33	11
351159	3	C	1760	126	14.0	126	103	1.2	1945	1700	912	186	20	49	42	4
351160	3	C	3470	291	11.9	226	40	5.7	1541	628	361	131	18	80	33	1
351161	3	C	1190	63	18.9	52	130	0.4	3552	1740	912	295	19	75	31	5
351162	3	C	1390	99	14.0	98	153	0.6	2758	2200	1200	278	19	73	32	6
351163	3	C	810	49	16.5	51	112	0.5	2269	1630	857	225	15	79	30	8
351164	3	C	2220	161	13.8	106	64	1.6	2493	857	464	178	26	86	25	5
351165	3	C	1190	108	11.0	95	105	0.9	2402	1600	840	183	18	40	32	3
351166	3	C	3010	220	13.7	165	72	2.3	3181	886	475	200	35	83	47	3
351167	3	C	2110	133	15.9	109	27	4.1	1485	478	241	120	15	36	46	0
351168	3	C	7520	693	10.9	544	84	6.5	3515	1150	624	222	14	11	50	1
351169	3	C	1870	153	12.2	133	72	1.8	1754	1020	531	132	19	75	28	5
351170	3	C	1650	144	11.5	111	32	3.4	1790	615	340	156	17	64	43	3
351171	3	C	3320	213	15.6	168	59	2.8	3176	1580	788	263	21	87	38	3
351172	3	C	2460	192	12.8	117	98	1.2	4188	1030	614	274	24	117	34	3
351173	3	C	1450	110	13.2	68	38	1.8	2138	640	325	216	17	55	19	10
351174	3	C	2150	174	12.4	118	58	2.0	1948	756	368	159	12	16	25	11
351175	3	C	2070	162	12.8	110	50	2.2	1639	615	314	109	20	76	26	4
351176	3	C	1670	329	5.1	221	195	1.1	2829	2350	1140	185	17	67	30	3
351177	3	C	1580	117	13.5	85	73	1.2	2036	1030	560	150	22	75	29	5
351178	3	C	670	60	11.2	40	18	2.2	6035	1090	568	410	15	79	44	0
351179	3	C	1200	76	15.8	47	149	0.3	8826	829	507	177	31	70	54	5
351180	3	C	530	28	18.9	19	39	0.5	2079	312	178	103	52	16	34	1
351181	3	C	1230	110	11.2	39	34	1.1	10393	2460	1250	647	30	29	71	2
351182	3	C	890	82	10.9	33	22	1.5	8405	1340	780	527	30	15	57	0
351183	3	C	1450	91	15.9	65	74	0.9	11037	1550	781	509	37	19	121	0
351184	3	C	1490	83	18.0	85	148	0.6	10606	1140	589	440	22	16	85	0
351185	3	C	770	56	13.8	40	48	0.8	6853	830	428	265	19	25	108	0
351186	3	C	770	67	11.5	31	82	0.4	6450	868	434	333	32	16	70	2

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351187	3	C	2190	86	25.5	145	155	0.9	14301	810	417	158	33	14	197	7
351188	3	C	2280	158	14.4	95	63	1.5	9194	1390	805	520	13	2	48	5
351189	3	C	2190	154	14.2	75	42	1.8	8988	1800	1040	627	19	70	51	1
351190	3	C	3600	279	12.9	82	39	2.1	12495	2520	1480	874	29	57	69	2
351191	3	C	3090	253	12.2	73	111	0.7	11097	2220	1160	657	27	92	63	2
351192	3	C	1090	80	13.6	33	33	1.0	6379	1120	583	403	21	50	68	3
351193	3	C	3760	342	11.0	66	49	1.3	14674	4330	3640	1113	13	84	86	4
351194	3	C	2770	193	14.4	77	84	0.9	11092	2060	1200	711	33	37	87	3
351195	3	C	3570	319	11.2	89	89	1.0	17241	3370	1880	967	28	16	124	2
351196	3	C	2170	182	11.9	56	57	1.0	8618	1710	936	582	17	86	53	1
351197	3	C	1280	89	14.4	55	127	0.4	8204	1040	588	370	45	107	81	1
351198	3	C	2190	161	13.6	41	58	0.7	10959	1790	967	630	19	101	59	1
351199	3	C	2960	200	14.8	123	62	2.0	5955	1120	599	346	18	62	88	0
351200	3	C	3750	270	13.9	110	59	1.9	12511	2640	1550	839	19	45	93	2
351201	3	C	4360	312	14.0	150	101	1.5	14693	2970	1710	957	30	24	100	0
351202	3	C	3640	332	11.0	93	73	1.3	15304	3670	2870	1077	31	22	84	0
351203	3	C	3380	302	11.2	98	98	1.0	11295	2550	1480	780	33	78	66	0
351204	3	C	1320	80	16.5	56	46	1.2	2541	586	326	149	18	98	47	4
351205	3	C	3710	286	13.0	210	70	3.0	2713	1050	574	177	14	50	43	4
351206	3	C	2220	160	13.9	102	54	1.9	4140	678	358	183	13	14	53	1
351207	3	C	2480	176	14.1	107	59	1.8	2668	637	356	231	22	52	50	0
351208	3	C	390	16	24.4	16	43	0.4	1577	315	153	126	18	32	51	0
351209	3	C	2480	171	14.5	114	59	1.9	1885	546	276	129	25	7	43	1
351210	3	C	2010	146	13.8	99	62	1.6	1756	483	279	130	19	25	37	1
351211	3	C	2780	217	12.8	139	80	1.7	3449	858	462	192	17	26	43	3
351212	3	C	1890	135	14.0	75	55	1.4	4229	743	427	221	13	7	39	3
351213	3	C	1160	101	11.5	61	47	1.3	3633	655	356	212	18	12	63	2
351214	3	C	860	74	11.6	42	42	1.0	3517	506	285	178	17	55	86	0
351215	3	C	3550	347	10.2	223	85	2.6	3255	1030	528	178	16	23	58	0
351216	3	C	1620	138	11.7	95	98	1.0	7324	553	289	151	14	10	70	2
351217	3	C	3160	302	10.5	163	80	2.0	4723	1190	610	251	17	27	66	0
351218	3	C	1130	109	10.4	55	51	1.1	2420	617	347	150	14	43	35	2
351219	3	C	1190	113	10.5	66	70	0.9	2066	846	452	150	10	7	35	0
351220	3	C	460	41	11.2	12	31	0.4	2426	427	206	91	5	19	18	0
351221	3	C	450	30	15.0	19	59	0.3	1694	509	268	240	17	90	38	3
351222	3	C	1160	123	9.4	57	98	0.6	4156	1380	749	213	13	22	53	6

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GGU no	Loc	Type	Nb ppm	Ta ppm	Nb/Ta	U ppm	Th ppm	U/Th	Zr ppm	Ce ppm	La ppm	Y ppm	Be ppm	Li ppm	Sn ppm	Mo ppm
351223	3	C	330	17	19.4	11	78	0.1	1100	282	161	150	12	0	24	2
351224	3	C	680	58	11.7	26	88	0.3	2573	743	416	178	17	32	30	3
351225	3	C	650	51	12.7	32	70	0.5	1219	1270	682	125	15	72	23	4
351226	3	C	1130	135	8.4	64	87	0.7	1477	1180	639	178	9	40	19	3
351227	3	C	740	41	18.0	33	88	0.4	2437	496	295	131	12	8	32	7
351228	3	C	4440	480	9.3	244	88	2.8	1644	719	399	132	23	39	39	2
351229	3	C	2910	286	10.2	46	95	0.5	15133	3410	1980	1024	23	11	94	5
351230	3	C	2100	169	12.4	71	58	1.2	8133	1790	1060	527	21	31	99	2
351231	3	C	1650	123	13.4	51	126	0.4	6868	1630	937	468	22	33	63	6
351232	3	C	2280	211	10.8	78	48	1.6	8849	1990	1120	617	11	51	91	2
351233	3	C	1470	108	13.6	47	307	0.2	11092	1390	801	492	15	44	114	0
351234	3	C	1850	174	10.6	27	118	0.2	13254	2910	1700	835	20	21	113	2
351235	3	C	2090	203	10.3	20	62	0.3	13039	2100	1210	803	12	12	70	3
351236	3	C	2590	203	12.8	70	103	0.7	10056	2010	1160	605	11	12	59	5
351237	3	C	1870	128	14.6	44	109	0.4	8418	1340	775	460	21	5	96	4
351238	3	C	480	34	14.1	12	29	0.4	2388	383	202	89	2	1	15	1
351239	3	C	850	59	14.4	23	72	0.3	5834	862	519	306	12	9	90	3
351240	3	C	1810	103	17.6	69	97	0.7	6083	969	633	327	13	4	63	5
351241	3	C	1740	126	13.8	89	78	1.1	2465	660	399	193	18	102	46	2
351242	3	C	2690	245	11.0	62	125	0.5	14107	3020	1700	944	29	6	93	4
351243	3	C	1780	98	18.2	70	107	0.7	5359	776	509	525	20	18	78	3
351244	3	C	1950	135	14.4	79	111	0.7	6875	1330	793	496	23	67	75	3
351245	3	C	1290	98	13.2	66	83	0.8	3599	978	561	283	14	0	43	3
351246	3	C	3370	305	11.0	195	53	3.7	1890	611	339	125	11	23	50	2
351247	3	C	2390	218	11.0	38	148	0.3	12481	1700	1090	650	10	0	79	5
351248	3	C	2150	185	11.6	50	221	0.2	10692	1720	1040	616	13	3	75	6
351249	3	C	650	47	13.8	15	54	0.3	3547	660	363	237	11	6	60	2
351250	3	C	2480	214	11.6	50	235	0.2	11890	2790	1490	846	20	12	81	2
351251	3	C	2560	183	14.0	118	92	1.3	5279	921	550	244	19	88	61	3
351252	3	C	1600	125	12.8	104	66	1.6	1968	648	359	136	13	61	56	3
351253	3	C	1880	165	11.4	36	80	0.4	9569	2000	1150	659	29	2	63	4
351254	3	C	2120	178	11.9	75	195	0.4	9841	1800	948	577	45	0	68	4
351255	3	C	1640	158	10.4	21	91	0.2	10295	2120	1110	691	52	9	72	2
351256	3	C	2560	217	11.8	152	63	2.4	3466	829	453	194	20	7	67	2
351257	3	C	1470	121	12.1	100	49	2.0	1839	513	301	136	17	6	36	2
351258	3	C	1750	114	15.4	78	72	1.1	5153	1010	529	336	27	53	67	2

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GGU no	Loc	Type	Nb ppm	Ta ppm	Nb/Ta	U ppm	Th ppm	U/Th	Zr ppm	Ce ppm	La ppm	Y ppm	Be ppm	Li ppm	Sn ppm	Mo ppm
351259	3	C	2690	258	10.4	106	72	1.5	6873	1190	629	331	17	4	43	4
351260	3	C	1700	160	10.6	55	77	0.7	7872	1780	1020	555	41	19	101	2
351261	3	C	2680	206	13.0	136	56	2.4	4711	1340	723	350	17	9	57	2
351262	3	C	1170	83	14.1	62	60	1.0	2518	596	338	160	16	7	53	3
351263	3	C	2390	246	9.7	145	98	1.5	8347	1620	886	563	37	6	113	3
351264	3	C	2540	210	12.1	145	50	2.9	2057	737	419	177	11	16	45	4
351265	3	C	1140	134	8.5	31	63	0.5	9387	1780	923	531	49	23	109	4
351266	3	C	1130	76	14.9	66	73	0.9	2857	557	306	143	20	11	44	4
351267	3	C	3980	379	10.5	191	109	1.8	1777	677	377	147	35	17	34	2
351268	3	C	1690	138	12.2	67	75	0.9	2761	1300	732	199	18	65	21	3
351269	3	C	1800	179	10.1	96	77	1.3	1825	916	524	155	28	57	18	3
351270	3	C	1070	74	14.5	47	50	0.9	1742	614	373	124	32	80	25	5
351271	3	C	2450	216	11.3	122	40	3.0	1030	556	329	104	17	59	32	4
351272	3	C	2020	161	12.5	86	53	1.6	1944	674	384	158	14	11	20	4
351273	3	C	1040	79	13.2	51	110	0.5	1527	492	285	111	51	33	23	4
351274	3	C	140	8	17.5	5	29	0.2	290	359	184	68	11	92	8	21
351275	3	C	470	35	13.4	10	29	0.3	2432	393	203	97	18	19	12	0
351276	3	C	3750	350	10.7	175	51	3.4	1851	700	369	125	22	80	30	9
351277	3	C	1920	200	9.6	106	26	4.1	1091	403	203	120	17	57	25	1
351278	3	C	460	27	17.0	19	35	0.5	1704	528	274	132	28	127	47	3
351279	3	C	4830	463	10.4	230	36	6.5	1787	553	292	138	12	3	35	0
351280	3	C	1130	97	11.6	48	66	0.7	5132	778	422	123	11	8	22	3
351281	3	C	1530	150	10.2	77	72	1.1	1818	850	465	149	20	44	24	7
351282	3	C	3310	389	8.5	202	100	2.0	6805	1400	717	198	12	49	30	4
351283	3	C	3660	378	9.7	225	94	2.4	3144	1090	604	192	19	40	45	4
351284	3	C	1480	124	11.9	47	107	0.4	5603	1960	1100	435	28	79	67	7
351285	3	C	1740	154	11.3	88	106	0.8	1737	1530	872	181	18	109	26	5
351286	3	C	550	42	13.1	27	31	0.9	2081	442	243	130	13	4	41	3
351287	3	C	930	87	10.7	45	40	1.1	1389	436	248	108	13	36	33	4
351288	3	C	3720	336	11.1	140	61	2.3	2681	790	408	234	26	4	35	4
351289	3	C	2760	241	11.5	128	24	5.3	1384	423	236	118	17	41	33	5
351290	3	C	2150	188	11.4	141	59	2.4	1660	694	434	168	18	34	45	11
351291	3	C	1900	164	11.6	47	110	0.4	7198	2350	1290	552	19	51	29	32
351292	3	C	1280	109	11.7	66	148	0.4	2889	2340	1260	255	24	82	34	11
351293	3	C	1410	125	11.3	65	113	0.6	3067	1690	936	246	26	72	34	11
351294	3	C	730	54	13.5	34	36	0.9	2532	433	244	170	18	9	25	9

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GGU no	Loc	Type	Nb ppm	Ta ppm	Nb/Ta	U ppm	Th ppm	U/Th	Zr ppm	Ce ppm	La ppm	Y ppm	Be ppm	Li ppm	Sn ppm	Mo ppm
351295	3	C	1490	135	11.0	69	32	2.1	1533	400	209	85	13	54	36	9
351296	3	C	2530	234	10.8	120	98	1.2	1658	1140	597	229	32	75	36	7
351297	3	C	1770	146	12.1	49	59	0.8	5116	1110	622	377	95	50	46	11
351298	3	C	1080	107	10.1	66	108	0.6	2070	1950	1040	209	29	98	35	13
351299	3	C	920	102	9.0	51	125	0.4	2831	2080	1160	314	22	77	24	5
351300	3	C	2000	172	11.6	92	66	1.4	1555	902	499	175	14	26	19	14
351301	3	C	780	72	10.8	39	27	1.5	1653	351	197	124	19	28	34	7
351302	3	C	910	118	7.7	50	20	2.5	1253	364	187	97	19	81	36	9
351303	3	C	2810	323	8.7	146	37	3.9	2470	685	351	176	24	77	49	7
351304	3	C	2110	228	9.3	89	36	2.5	2859	839	436	175	28	84	66	8
351305	3	C	700	54	13.0	29	78	0.4	1652	1120	642	163	24	70	34	14
351306	3	C	990	104	9.5	50	101	0.5	2398	1860	1020	217	6	17	16	7
351307	3	C	750	68	11.0	38	74	0.5	1759	1100	609	151	21	24	16	5
351308	3	C	660	78	8.5	43	59	0.7	1618	807	465	134	16	49	33	4
351309	3	C	450	35	12.9	17	14	1.2	1128	241	138	95	43	71	35	6
351310	3	C	1660	155	10.7	74	81	0.9	1978	592	304	261	44	46	67	7
351311	3	C	2230	204	10.9	158	74	2.1	5466	1270	683	244	45	49	79	9
351312	3	C	1690	300	5.6	27	92	0.3	9859	2080	1170	565	23	24	69	9
351313	3	C	1120	138	8.1	74	122	0.6	1853	1720	960	214	21	73	29	12
351314	3	C	860	87	9.9	57	140	0.4	3762	1930	1110	243	9	9	24	14
351315	3	C	660	49	13.5	29	46	0.6	1661	394	211	99	19	38	26	13
351316	3	C	1870	162	11.5	85	67	1.3	2365	991	552	169	29	200	28	8
351317	3	C	2880	312	9.2	128	104	1.2	2931	1580	823	194	27	97	32	5
351318	3	C	1340	119	11.3	67	54	1.2	1920	539	306	158	21	36	52	6
351319	3	C	1430	151	9.5	27	43	0.6	6166	1340	801	443	18	69	23	10
351320	3	C	3000	272	11.0	170	61	2.8	3247	801	422	202	18	16	50	7
351321	3	C	820	99	8.3	53	27	2.0	1422	344	180	90	23	120	54	5
351322	3	C	1250	125	10.0	60	62	1.0	2382	664	387	168	18	33	36	7
351323	3	C	3120	321	9.7	188	75	2.5	2341	925	500	183	19	26	46	8
351324	3	C	1330	133	10.0	62	79	0.8	2335	909	526	142	15	33	27	14
351325	3	C	900	138	6.5	67	43	1.6	1415	434	218	92	16	236	46	2
351326	3	C	600	41	14.6	30	48	0.6	2224	337	195	115	8	4	36	4
351327	3	C	2350	217	10.8	106	55	1.9	1628	375	200	98	13	52	28	8
351328	3	C	1410	131	10.8	39	34	1.2	5506	930	566	378	14	31	44	6
351329	3	C	1510	185	8.2	15	31	0.5	8445	1860	1120	585	11	161	41	6
351330	3	C	1190	122	9.8	20	35	0.6	5399	936	532	377	12	43	24	6

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351331	3	C	1820	246	7.4	62	126	0.5	7721	1900	989	546	15	11	61	34
351332	3	C	1660	138	12.0	55	68	0.8	3581	901	540	203	18	70	25	10
351333	3	C	2030	169	12.0	106	48	2.2	3139	816	454	230	23	16	48	4
351334	3	C	2300	190	12.1	120	95	1.3	7894	1200	663	326	22	4	60	6
351335	3	C	1350	106	12.7	64	52	1.2	3184	552	298	146	11	3	48	6
351336	3	C	1910	186	10.3	84	53	1.6	3983	1020	548	281	15	19	43	8
351337	3	C	1060	100	10.6	78	162	0.5	1809	605	299	164	13	10	69	2
351338	3	C	2250	181	12.4	121	83	1.5	5410	836	501	259	16	7	57	8
351339	3	C	670	62	10.8	37	46	0.8	1491	381	227	79	10	15	16	18
351340	3	C	1650	151	10.9	49	67	0.7	6031	1130	587	318	18	22	56	6
351341	3	C	2780	223	12.5	141	93	1.5	3367	1140	624	236	19	16	75	8
351342	3	C	1120	87	12.9	54	67	0.8	4175	697	403	166	18	21	50	6
351343	3	C	1010	96	10.5	50	40	1.3	2461	337	162	85	10	4	25	4
351344	3	C	1620	141	11.5	39	103	0.4	8627	1240	691	425	20	5	67	6
351345	3	C	670	64	10.5	42	65	0.6	2464	623	343	142	10	7	46	8
351346	3	C	2230	190	11.7	119	53	2.3	2098	733	384	183	20	22	57	6
351347	3	C	730	59	12.4	28	89	0.3	5893	1310	711	188	12	32	29	6
351348	3	C	3250	344	9.4	195	40	4.9	1408	588	276	110	16	64	39	0
351349	3	C	1820	210	8.7	124	152	0.8	4775	1790	964	275	13	17	31	6
351350	3	C	500	32	15.6	19	31	0.6	1910	319	194	95	13	9	19	2
351351	3	C	840	102	8.2	46	56	0.8	2820	625	319	185	19	16	41	2
351352	3	C	4790	465	10.3	274	50	5.5	2192	546	298	132	12	8	23	6
351352	3	C D	4950	367	13.5	271	53	5.1	2267	600	290	142	13	5	21	7
351353	3	C	4080	385	10.6	220	83	2.6	3079	755	421	245	19	13	41	4
351353	3	C D	4180	304	13.8	218	84	2.6	3083	710	380	245	19	11	38	1
351354	3	C	1780	153	11.6	65	104	0.6	4260	865	475	285	19	26	44	2
351354	3	C D	1870	116	16.1	72	103	0.7	4369	720	400	288	19	21	40	4
351355	3	C	740	65	11.4	18	58	0.3	7698	1380	704	447	16	9	104	2
351355	3	C D	760	51	14.9	24	61	0.4	7782	1420	686	454	16	6	103	5
351356	3	C	1290	70	18.4	72	170	0.4	9138	1570	776	699	22	11	111	4
351357	3	C	2380	246	9.7	110	51	2.2	1783	862	446	169	19	31	35	10
351358	3	C	1860	190	9.8	64	65	1.0	5705	972	539	270	10	25	12	10
351359	3	C	890	91	9.8	46	137	0.3	3814	1840	1010	245	18	23	29	14
351360	3	C	1340	107	12.5	59	67	0.9	2164	581	298	132	23	33	35	10
351361	3	C	1730	189	9.2	97	30	3.2	1842	446	237	117	18	47	58	8
351362	3	C	1960	172	11.4	102	133	0.8	2436	1060	570	291	17	8	32	8

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351363	3	C	1620	203	8.0	22	59	0.4	9000	1630	1000	496	64	26	57	16
351364	3	C	1790	160	11.2	94	63	1.5	2244	773	439	138	8	11	27	12
351365	3	C	840	81	10.4	43	46	0.9	1430	533	279	107	13	67	26	12
351366	3	C	840	85	9.9	42	31	1.3	1536	441	237	111	10	23	16	16
351367	3	C	880	87	10.1	42	37	1.2	1433	383	193	110	17	82	29	8
351368	3	C	620	43	14.4	24	24	1.0	3695	506	232	180	11	25	38	4
351369	3	C	2100	203	10.3	92	32	2.9	1983	500	260	129	12	16	29	6
351370	3	C	1950	174	11.2	94	65	1.4	3829	1030	526	187	7	4	32	8
351371	3	C	1220	158	7.7	47	48	1.0	5533	1020	583	294	20	31	50	10
351372	3	C	2080	202	10.3	94	127	0.7	3219	1450	752	273	9	11	60	10
351373	3	C	1420	127	11.2	71	34	2.1	2187	563	290	129	14	59	29	6
351374	3	C	1120	92	12.2	50	31	1.6	1496	377	190	85	18	36	17	2
351375	3	C	2090	186	11.2	95	26	3.7	1716	500	278	131	18	105	35	4
351376	3	C	2890	277	10.4	141	76	1.9	1974	1140	627	144	12	49	24	16
351377	3	C	1250	100	12.5	54	37	1.5	1720	385	211	151	12	5	31	6
351378	3	C	1080	105	10.3	55	26	2.1	1439	305	149	104	4	5	37	6
351379	3	C	540	31	17.4	27	102	0.3	2539	577	297	263	14	4	23	8
351380	3	C	1700	150	11.3	71	57	1.2	3742	780	375	147	7	12	34	6
351381	3	C	1500	204	7.4	105	53	2.0	3689	639	320	132	11	32	33	16
351381	3	C D	1910	145	13.2	109	49	2.2	3981	640	310	130	11	30	31	13
351382	3	C	370	27	13.7	13	23	0.6	1618	443	241	130	20	177	23	6
351382	3	C D	370	20	18.5	12	25	0.5	1561	450	230	126	19	184	21	3
351383	3	C	2430	256	9.5	109	34	3.2	4781	677	351	116	12	29	25	6
351383	3	C D	2190	174	12.6	104	32	3.3	4717	660	330	112	11	22	19	3
351384	3	C	1060	106	10.0	58	49	1.2	2388	647	353	140	13	18	31	10
351385	3	C	1120	114	9.8	56	27	2.1	2488	410	221	113	12	9	30	4
351386	3	C	1290	151	8.5	70	26	2.7	922	297	143	89	10	1	32	7
351387	3	C	910	101	9.0	51	46	1.1	2505	664	332	154	10	8	35	11
351388	3	C	860	79	10.9	49	111	0.4	3793	736	401	222	35	7	29	8
351389	3	C	1070	102	10.5	50	62	0.8	6057	994	541	300	12	2	41	20
351390	3	C	1590	189	8.4	103	58	1.8	3486	846	446	160	12	18	30	14
351391	3	C	760	81	9.4	34	26	1.3	2039	449	235	127	9	29	19	8
351392	3	C	4290	539	8.0	241	87	2.8	3602	1280	640	159	13	20	31	7
351393	3	C	840	66	12.7	29	42	0.7	2513	499	276	204	21	2	40	7
351394	3	C	1180	214	5.5	27	35	0.8	8085	1360	827	457	7	2	40	7
351395	3	C	1210	134	9.0	56	310	0.2	6544	1060	538	329	28	13	64	10

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GGU no	Loc	Type	Nb ppm	Ta ppm	Nb/Ta	U ppm	Th ppm	U/Th	Zr ppm	Ce ppm	La ppm	Y ppm	Be ppm	Li ppm	Sn ppm	Mo ppm
351396	3	C	730	73	10.0	38	103	0.4	3100	1420	723	218	9	5	28	9
351397	3	C	790	72	11.0	37	37	1.0	6511	761	443	201	14	36	37	11
351398	3	C	1510	185	8.2	94	92	1.0	2649	1720	895	189	18	49	18	9
351399	3	C	830	107	7.8	62	122	0.5	3292	1570	814	232	23	21	18	14
351400	3	C	3560	456	7.8	202	68	3.0	2722	1210	572	161	14	29	23	8
351401	3	C	800	77	10.4	34	45	0.8	1832	443	227	135	13	47	19	9
351402	3	C	3820	389	9.8	104	46	2.3	10058	2130	1170	665	17	66	53	7
351403	3	C	3380	356	9.5	55	47	1.2	13843	2500	1670	867	22	114	54	3
351404	3	C	1930	217	8.9	63	64	1.0	4674	1360	734	361	22	51	41	11
351405	3	C	2710	297	9.1	119	86	1.4	5094	1060	600	212	12	17	36	23
351406	3	C	2820	301	9.4	136	75	1.8	3890	1000	573	270	38	103	50	8
351407	3	C	3080	419	7.4	73	74	1.0	12294	2820	1550	778	29	124	67	5
351408	3	C	1840	197	9.3	58	97	0.6	9882	1570	968	543	40	83	77	8
351409	3	C	4130	633	6.5	126	162	0.8	15713	3910	2440	1274	11	20	53	60
351410	3	C	120	9	13.3	6	15	0.4	286	189	105	28	9	98	11	3
351411	3	C	2270	267	8.5	29	53	0.5	11444	2370	1360	758	22	78	82	3
351412	3	C	1370	137	10.0	60	108	0.6	4755	1090	603	324	41	43	49	13
351413	3	C	1600	181	8.8	56	123	0.5	8682	1710	969	508	16	8	49	4
351414	3	C	3010	371	8.1	54	49	1.1	11850	2420	1380	751	18	10	54	11
351415	3	C	280	16	17.5	13	84	0.2	2125	257	150	112	26	52	17	8
351416	3	C	2220	315	7.0	42	123	0.3	10383	1570	908	522	22	17	68	1
351417	3	C	680	55	12.4	20	34	0.6	2091	364	213	197	8	8	27	0
351418	3	C	120	10	12.0	5	14	0.4	416	176	88	29	8	59	6	3
351419	3	C	340	24	14.2	9	25	0.4	1294	872	503	150	22	25	18	4
351420	3	C	410	38	10.8	7	11	0.6	2150	491	270	209	18	1	25	3
351421	3	C	1590	172	9.2	24	45	0.5	11411	2070	1260	682	27	101	81	5
351422	3	C	1480	128	11.6	59	42	1.4	4700	941	550	305	15	19	45	4
351423	3	C	1380	118	11.7	47	114	0.4	9884	1840	979	497	42	9	177	9
351424	3	C	900	84	10.7	26	158	0.2	7694	1440	790	424	31	79	91	4
351425	3	C	810	59	13.7	25	55	0.5	5282	1060	574	286	24	45	55	2
351426	3	C	1140	157	7.3	36	51	0.7	9825	1640	916	604	22	21	91	2
351427	3	C	770	43	17.9	53	122	0.4	2923	878	540	191	36	85	49	5
351428	3	C	350	35	10.0	16	8	2.0	977	305	151	89	7	54	11	3
351429	3	C	240	23	10.4	10	21	0.5	1536	323	152	67	15	117	16	4
351430	3	C	2240	197	11.4	72	295	0.2	12725	3110	1690	760	22	42	113	6
351431	3	C	1650	122	13.5	122	50	2.5	5009	850	489	242	24	60	174	8

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351432	3	C	1560	129	12.1	72	65	1.1	7848	1240	671	356	23	89	85	3
351433	3	C	560	29	19.3	42	82	0.5	6367	427	214	116	34	53	372	5
351434	3	C	760	41	18.5	26	51	0.5	4173	744	411	218	34	81	126	2
350001	4	C	2550	276	9.2	56	110	0.5	13547	2450	1350	733	17	1	49	4
350002	4	C	4060	25	162.4	18	86	0.2	1692	384	207	109	21	4	29	5
350003	4	C	960	111	8.6	60	62	1.0	789	219	117	58	16	13	29	3
350004	4	C	3230	395	8.2	197	66	3.0	1091	803	387	74	17	57	37	10
350005	4	C	1090	113	9.6	23	54	0.4	8768	1450	806	548	15	26	33	11
350006	4	C	340	9	37.8	23	55	0.4	1023	237	126	53	14	2	34	4
350007	4	C	260	9	28.9	18	47	0.4	1246	238	133	81	10	0	27	8
350008	4	C	240	16	15.0	9	19	0.5	1025	290	163	81	7	46	6	4
350009	4	C	700	66	10.6	46	47	1.0	905	340	187	68	16	30	17	13
350010	4	C	700	66	10.6	44	137	0.3	1027	2150	1260	141	30	56	24	12
350011	4	C	980	102	9.6	28	73	0.4	6000	882	505	295	42	34	59	7
350012	4	C	4460	469	9.5	185	99	1.9	11560	2020	1090	647	24	5	60	3
350013	4	C	1340	120	11.2	24	93	0.3	8489	1420	899	445	38	4	44	3
350014	4	C	910	76	12.0	32	122	0.3	6417	1340	767	346	33	1	47	2
350015	4	C	1820	196	9.3	98	1080	0.1	11957	1950	786	483	21	4	67	7
350016	4	C	2800	290	9.7	111	187	0.6	13362	2640	1480	785	53	5	195	3
350017	4	C	430	19	22.6	18	149	0.1	1392	515	299	89	41	1	48	3
350018	4	C	850	38	22.4	33	145	0.2	2171	586	337	109	25	0	48	2
350019	4	C	1830	153	12.0	35	137	0.3	9865	1290	729	510	42	2	68	5
350020	4	C	4340	465	9.3	215	140	1.5	5437	1450	787	284	67	1	68	5
350020	4	C D	4140	322	12.9	233	135	1.7	4779	1250	843	267	45	3	64	3
350021	4	C	3500	396	8.8	147	216	0.7	13909	1840	939	483	62	2	117	6
350021	4	C D	3270	256	12.8	143	192	0.7	13078	1490	909	523	41	4	114	4
350022	4	C	3050	272	11.2	194	149	1.3	7582	1400	825	428	79	1	54	5
350022	4	C D	3070	194	15.8	196	145	1.4	7484	1290	853	413	53	3	52	5
350023	4	C	2480	253	9.8	92	102	0.9	11344	1470	810	422	22	3	98	4
350023	4	C D	2420	173	14.0	93	97	1.0	11278	1340	790	433	19	7	100	5
350024	4	C	670	56	12.0	28	72	0.4	2919	528	315	199	16	1	24	5
350024	4	C D	640	46	13.9	31	80	0.4	2818	570	330	195	14	2	22	6
350025	4	C	720	54	13.3	19	201	0.1	5149	1170	668	286	59	0	34	1
350026	4	C	1100	77	14.3	66	163	0.4	4988	1220	665	273	10	0	37	142

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350027	4	C	4510	608	7.4	86	167	0.5	36433	4570	3320	1206	39	3	89	7
350028	4	C	1470	109	13.5	48	146	0.3	10482	1230	790	248	57	0	14	4
350029	4	C	550	19	28.9	30	118	0.3	2468	575	324	134	30	0	60	3
350030	4	C	720	50	14.4	45	43	1.0	1332	386	215	86	19	24	38	14
350031	4	C	1800	150	12.0	88	72	1.2	3543	571	355	163	27	5	65	2
350032	4	C	2730	287	9.5	47	166	0.3	18918	2390	1380	797	58	1	85	8
350033	4	C	660	51	12.9	38	114	0.3	1598	468	277	100	37	12	44	5
350034	4	C	920	81	11.4	47	116	0.4	3454	719	354	176	43	23	56	3
350035	4	C	530	37	14.3	14	93	0.1	2000	648	359	160	27	1	29	16
350036	4	C	460	32	14.4	13	68	0.2	2849	514	258	160	26	0	20	4
350037	4	C	1530	107	14.3	67	133	0.5	9320	1510	811	302	40	1	100	9
350038	4	C	1540	97	15.9	51	166	0.3	7237	1060	562	336	31	1	72	1
350039	4	C	1650	164	10.1	81	88	0.9	4924	1050	513	245	27	13	46	11
350040	4	C	3060	291	10.5	160	54	3.0	2865	893	480	159	20	39	41	9
350041	4	C	2690	209	12.9	129	99	1.3	7135	605	383	202	24	1	60	2
350042	4	C	1510	124	12.2	58	68	0.9	6366	842	547	341	16	1	53	3
350043	4	C	2100	196	10.7	50	181	0.3	15153	2360	1530	944	23	2	69	1
350044	4	C	1290	96	13.5	39	77	0.5	71	1100	710	410	36	21	53	4
350045	4	C	1490	108	13.8	63	97	0.6	6376	1070	650	349	29	17	48	4
350046	4	C	850	60	14.2	42	115	0.4	6079	1090	696	268	32	16	64	7
350047	4	C	1210	118	10.3	30	83	0.4	7440	1300	846	410	74	2	45	3
350048	4	C	670	37	18.1	29	132	0.2	4827	778	510	246	44	0	46	6
350049	4	C	4130	334	12.4	251	69	3.6	3163	559	361	131	21	2	63	13
350049	4	C D	4170	342	12.2	265	72	3.7	3236	710	360	126	20	3	65	12
350050	4	C	1070	60	17.8	45	127	0.4	5374	647	454	173	48	2	135	2
350050	4	C D	1110	53	20.9	43	125	0.3	5108	770	490	169	35	3	140	3
350051	4	C	2940	242	12.1	141	254	0.6	7083	1330	914	789	144	25	73	16
350051	4	C D	3080	224	13.8	138	254	0.5	7042	1590	946	820	115	27	62	12
350052	4	C	11500	1040	11.1	723	102	7.1	1357	957	641	69	30	12	56	5
350052	4	C D	12000	955	12.6	713	98	7.3	1238	1050	585	67	25	14	56	4
350053	4	C	1710	151	11.3	52	89	0.6	8332	644	439	158	28	7	126	3
350054	4	C	1360	104	13.1	66	205	0.3	7375	1140	794	345	139	0	98	38
350055	4	C	720	58	12.5	38	158	0.2	5790	1200	829	194	30	26	20	7
350056	4	C	2130	162	13.1	56	73	0.8	9219	1180	811	397	33	17	48	16
350057	4	C	1350	69	19.5	55	195	0.3	9006	1650	1060	436	66	1	51	1
350058	4	C	630	23	27.4	50	1110	0.0	2976	2570	1420	420	287	9	46	0

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350059	4	C	1030	90	11.5	71	372	0.2	7414	1050	691	364	67	3	63	6
350060	4	C	4130	445	9.3	294	74	4.0	3115	961	590	180	16	42	31	9
350061	4	C	3940	365	10.8	197	171	1.2	9049	2500	1370	451	28	3	91	5
350062	4	C	1760	190	9.3	36	102	0.4	8373	1350	794	465	21	6	52	0
350063	4	C	810	42	19.3	31	153	0.2	6605	1220	706	272	40	2	81	0
350064	4	C	840	75	11.2	39	73	0.5	3805	847	461	167	21	33	26	3
350065	4	C	2490	196	12.7	111	113	1.0	9760	2150	1270	498	51	7	142	3
350066	4	C	1940	136	14.3	84	118	0.7	9695	2070	1150	520	37	6	105	1
350067	4	C	980	78	12.6	30	102	0.3	6123	1160	643	308	41	2	54	2
350068	4	C	1580	127	12.4	32	134	0.2	9043	1860	1120	540	35	3	59	3
350069	4	C	5080	505	10.1	324	178	1.8	4149	1180	686	277	62	3	56	4
350070	4	C	900	74	12.2	21	151	0.1	5493	1170	705	349	43	2	47	1
350071	4	C	1950	200	9.8	36	193	0.2	12386	2700	1610	774	49	4	66	0
350072	4	C	820	61	13.4	32	115	0.3	5791	1330	796	257	49	2	101	1
350073	4	C	880	101	8.7	17	36	0.5	5680	944	562	391	14	8	24	2
350074	4	C	710	61	11.6	30	64	0.5	4056	709	363	173	22	51	61	3
350075	4	C	1180	73	16.2	76	115	0.7	2175	472	266	129	22	4	28	1
350076	4	C	730	41	17.8	31	75	0.4	5579	882	453	309	25	3	42	4
350077	4	C	1990	200	9.9	103	49	2.1	3564	834	436	200	38	46	67	8
350078	4	C	1410	154	9.2	30	50	0.6	9113	1410	741	481	10	2	34	2
350079	4	C	780	48	16.3	52	75	0.7	3237	651	394	133	32	2	53	5
351435	4	C	4570	602	7.6	278	78	3.6	6949	1440	754	404	22	52	51	7
351436	4	C	2960	375	7.9	91	221	0.4	17405	2810	1640	820	65	3	57	1
351437	4	C	1500	192	7.8	33	86	0.4	8226	1550	901	557	60	3	43	7
351438	4	C	530	39	13.6	27	144	0.2	2734	871	514	211	56	0	33	3
351439	4	C	2270	258	8.8	129	67	1.9	1763	601	317	120	29	56	57	10
351440	4	C	4150	434	9.6	236	89	2.7	1924	934	492	138	30	6	39	17
351441	4	C	690	49	14.1	37	116	0.3	2552	548	299	182	59	8	47	0
351442	4	C	670	20	33.5	31	185	0.2	2555	924	600	134	45	1	67	0
351443	4	C	1030	100	10.3	54	96	0.6	4076	796	435	227	40	11	42	3
351444	4	C	560	36	15.6	18	102	0.2	2576	670	404	156	31	1	34	0
351445	4	C	2300	287	8.0	84	57	1.5	7968	1470	844	419	13	24	45	4
351446	4	C	460	14	32.9	32	131	0.2	2181	432	234	78	32	1	54	3
351447	4	C	510	33	15.5	16	46	0.4	2621	442	250	121	11	23	33	3
351448	4	C	780	37	21.1	54	102	0.5	4658	746	464	198	45	2	143	0
351449	4	C	710	51	13.9	35	132	0.3	4988	875	476	243	42	2	55	7

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351450	4	C	590	38	15.5	20	149	0.1	4214	816	425	260	37	0	34	4
351451	4	C	770	85	9.1	44	46	1.0	1948	640	343	128	15	51	45	13
351452	4	C	580	42	13.8	27	146	0.2	3409	745	412	211	50	1	36	6
351453	4	C	2830	234	12.1	92	194	0.5	19991	3770	1970	779	113	1	77	9
351454	4	C	520	15	34.7	28	129	0.2	1908	446	261	86	40	2	62	3
351455	4	C	2160	248	8.7	35	136	0.3	18401	3520	1830	829	29	4	72	2
351456	4	C	630	42	15.0	27	123	0.2	3485	604	362	171	32	0	41	7
351457	4	C	250	8	31.3	11	70	0.2	1526	294	180	66	13	0	26	7
351458	4	C	590	23	25.7	36	47	0.8	1647	358	190	72	12	5	26	9
351459	4	C	2430	364	6.7	45	105	0.4	19542	3440	1860	916	26	3	58	3
351460	4	C	2120	263	8.1	145	57	2.5	1119	344	171	70	13	29	36	13
351461	4	C	1520	137	11.1	73	56	1.3	4372	1110	650	272	16	39	33	7
351462	4	C	450	18	25.0	35	178	0.2	1345	611	370	136	42	5	36	3
351463	4	C	420	27	15.6	28	98	0.3	720	300	173	63	25	43	42	18
351464	4	C	1530	178	8.6	100	62	1.6	1055	431	236	87	22	29	53	18
351465	4	C	1270	132	9.6	62	51	1.2	2670	646	352	186	16	7	31	8
351466	4	C	730	43	17.0	32	74	0.4	2138	627	329	131	17	0	18	20
351467	4	C	2870	323	8.9	162	48	3.4	1378	546	278	108	14	28	42	20
351468	4	C	1290	107	12.1	83	84	1.0	3181	536	277	119	10	2	55	5
351469	4	C	530	29	18.3	26	66	0.4	3565	564	312	148	14	1	36	8
351470	4	C	530	33	16.1	29	54	0.5	2300	420	230	110	12	9	37	5
351471	4	C	690	38	18.2	36	51	0.7	4187	493	239	192	8	0	39	4
351472	4	C	300	18	16.7	21	62	0.3	949	219	123	70	12	0	26	2
351473	4	C	1010	116	8.7	65	44	1.5	1437	270	147	75	16	53	51	13
351474	4	C	3350	357	9.4	214	75	2.8	2227	700	379	108	16	29	45	20
351474	4	C D	3190	260	12.3	196	69	2.8	2245	690	360	116	17	25	42	19
351475	4	C	3980	489	8.1	291	85	3.4	4852	1730	906	151	9	26	18	14
351475	4	C D	4000	350	11.4	267	75	3.5	4942	1630	814	146	9	23	18	11
351476	4	C	8630	1110	7.8	574	203	2.8	3033	3310	1720	298	14	20	22	14
351476	4	C D	8550	777	11.0	524	171	3.1	3229	2910	1630	286	15	18	24	9
351477	4	C	1720	199	8.6	98	78	1.3	1335	550	288	99	25	56	37	15
351477	4	C D	1710	133	12.9	104	69	1.5	1328	520	270	94	22	46	37	9
351478	4	C	450	33	13.6	24	51	0.5	1265	301	159	95	13	2	22	8
351478	4	C D	460	26	17.7	27	53	0.5	1291	280	140	98	13	0	21	5
351479	4	C	490	39	12.6	28	54	0.5	1009	238	122	70	14	0	26	11
351480	4	C	520	37	14.1	14	40	0.4	3389	614	272	183	20	10	24	14

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GGU no	Loc	Type	Nb ppm	Ta ppm	Nb/Ta	U ppm	Th ppm	U/Th	Zr ppm	Ce ppm	La ppm	Y ppm	Be ppm	Li ppm	Sn ppm	Mo ppm
351481	4	C	1440	130	11.1	53	69	0.8	7512	1060	610	362	20	50	50	31
351482	4	C	550	20	27.5	26	131	0.2	3290	520	285	146	42	7	53	5
351483	4	C	720	54	13.3	31	147	0.2	5256	930	505	249	38	2	60	3
351484	4	C	1120	101	11.1	65	154	0.4	3426	714	363	179	27	36	48	4
351485	4	C	2410	260	9.3	156	48	3.2	1361	329	175	58	22	50	45	11
351486	4	C	660	47	14.0	24	54	0.4	8795	1350	742	241	12	38	22	15
351487	4	C	2960	357	8.3	116	120	1.0	14064	2850	1530	743	32	13	66	19
351488	4	C	480	19	25.3	26	90	0.3	2206	499	280	107	21	1	31	7
351489	4	C	900	105	8.6	43	61	0.7	3775	792	424	242	22	3	32	7
351490	4	C	1130	104	10.9	37	97	0.4	6759	970	532	322	37	4	72	4
351491	4	C	510	30	17.0	15	55	0.3	2594	433	254	160	14	6	23	6
351492	4	C	1700	178	9.6	56	71	0.8	10690	2220	1190	499	16	50	53	9
351493	4	C	1390	125	11.1	85	103	0.8	2193	595	324	115	26	29	57	10
351494	4	C	1480	169	8.8	91	41	2.2	1130	344	171	68	15	53	32	10
351495	4	C	350	17	20.6	16	48	0.3	1790	347	177	105	14	26	32	8
351496	4	C	900	90	10.0	62	114	0.5	1955	455	256	110	24	40	44	8
351497	4	C	690	36	19.2	46	58	0.8	3751	452	254	145	11	2	38	18
351498	4	C	790	74	10.7	30	38	0.8	4407	700	375	239	12	35	24	15
351499	4	C	720	48	15.0	38	96	0.4	4579	820	444	231	34	2	64	8
351500	4	C	4760	617	7.7	298	100	3.0	1228	1910	964	111	8	5	23	7
350080	5	C	1020	121	8.4	24	79	0.3	4788	1060	577	189	16	37	18	7
350081	5	C	1460	162	9.0	51	89	0.6	4028	1230	677	259	21	19	22	6
350082	5	C	590	53	11.1	24	34	0.7	3303	484	253	88	10	93	6	7
350083	5	C	350	28	12.5	10	27	0.4	1382	413	211	75	12	77	11	11
350084	5	C	580	72	8.1	22	67	0.3	2860	526	263	230	45	7	28	4
350085	5	C	460	35	13.1	23	88	0.3	407	1470	809	185	27	35	20	10
350086	5	C	1320	168	7.9	95	159	0.6	2033	2520	1330	226	16	33	18	10
350087	5	C	970	102	9.5	26	67	0.4	5150	816	454	180	15	81	15	4
350088	5	C	1310	169	7.8	52	43	1.2	3959	598	319	143	17	30	14	8
350089	5	C	830	106	7.8	41	25	1.6	2732	325	174	128	8	11	9	13
350090	5	C	870	126	6.9	26	76	0.3	5078	1000	559	266	29	10	33	8
350091	5	C	510	48	10.6	25	47	0.5	1172	595	323	72	9	132	5	5
350092	5	C	2580	293	8.8	134	75	1.8	1871	829	452	136	25	10	12	16
350093	5	C	1610	176	9.1	85	33	2.6	1256	501	238	75	9	122	9	7

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GGU no	Loc	Type	Nb ppm	Ta ppm	Nb/Ta	U ppm	Th ppm	U/Th	Zr ppm	Ce ppm	La ppm	Y ppm	Be ppm	Li ppm	Sn ppm	Mo ppm
350094	5	C	1630	183	8.9	105	43	2.5	925	554	293	94	9	17	11	3
350095	5	C	470	38	12.4	26	57	0.5	1161	718	343	85	15	19	31	16
350096	5	C	3750	381	9.8	203	53	3.8	1145	534	260	101	8	5	9	13
350097	5	C	870	124	7.0	67	57	1.2	1174	876	467	97	9	4	4	12
350098	5	C	1090	141	7.7	70	31	2.3	1494	571	290	120	11	18	15	15
350099	5	C	4300	531	8.1	247	60	4.1	1614	730	348	146	16	33	23	4
350100	5	C	4640	581	8.0	297	80	3.7	937	1160	574	138	13	37	17	10
350101	5	C	370	35	10.6	20	19	1.0	806	137	75	50	7	4	4	15
350102	5	C	1440	143	10.1	83	84	1.0	1231	1040	591	151	18	2	9	5
350103	5	C	1800	199	9.0	104	103	1.0	8906	1110	566	140	11	0	7	6
350104	5	C	1140	130	8.8	61	53	1.1	2445	532	308	180	18	4	24	13
350105	5	C	790	109	7.2	64	79	0.8	787	1190	613	109	15	34	16	15
350106	5	C	370	26	14.2	18	77	0.2	961	1110	559	122	19	14	10	14
350107	5	C	2320	265	8.8	133	68	1.9	2705	772	422	210	39	4	21	10
350108	5	C	2590	255	10.2	135	74	1.8	1865	857	462	183	17	5	16	18
350109	5	C	2470	232	10.6	115	88	1.3	1411	1070	544	127	28	1	8	6
350110	5	C	2260	242	9.3	129	104	1.2	4933	1450	742	185	8	1	8	11
350111	5	C	850	90	9.4	52	88	0.6	1737	894	438	129	17	10	25	6
350112	5	C	1150	113	10.2	41	131	0.3	5238	1870	970	424	23	8	22	8
350113	5	C	2240	244	9.2	124	89	1.4	2044	934	464	118	9	4	20	10
350114	5	C	3710	428	8.7	252	228	1.1	790	2730	1350	230	15	9	20	6
350114	5	C D	3750	330	11.4	239	204	1.2	782	2450	1290	217	17	11	22	3
350115	5	C	4280	504	8.5	267	186	1.4	10271	2160	1060	236	29	3	8	10
350115	5	C D	4400	412	10.7	266	183	1.5	10854	2110	1090	281	29	1	11	11
350116	5	C	4350	512	8.5	277	191	1.5	5131	2070	1030	190	23	2	12	9
350116	5	C D	4430	390	11.4	259	177	1.5	5148	1910	1000	205	25	2	19	10
350117	5	C	6390	748	8.5	376	95	3.9	4928	1080	508	128	5	1	12	13
350117	5	C D	6590	622	10.6	384	94	4.1	5043	1140	518	135	6	1	10	6
350118	5	C	540	50	10.8	30	72	0.4	1430	611	321	88	10	6	18	39
350119	5	C	750	74	10.1	44	60	0.7	2268	617	311	110	8	10	13	26
350120	5	C	910	103	8.8	61	96	0.6	2525	1340	646	125	5	13	13	12
350121	5	C	1610	202	8.0	104	82	1.3	2620	896	430	130	5	11	21	17
350122	5	C	2510	276	9.1	150	44	3.4	3432	441	211	80	6	2	11	10
350123	5	C	1300	185	7.0	101	97	1.0	1525	1220	633	132	6	3	11	19
350124	5	C	1310	174	7.5	95	67	1.4	5880	1140	574	189	5	21	15	13
350125	5	C	1170	129	9.1	65	72	0.9	4246	1160	607	255	7	13	29	28

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350126	5	C	310	16	19.4	35	132	0.3	821	1590	861	140	12	25	27	16
350127	5	C	800	69	11.6	63	124	0.5	3586	1310	734	262	27	17	51	15
350128	5	C	670	56	12.0	51	79	0.6	1023	1220	685	116	8	34	32	7
332101	7	S	4230	174	24.3	193	1370	0.1	14862	2230	1310	352	420	6	494	8
332102	7	S	4230	174	24.3	223	1390	0.2	14889	2190	1420	358	347	5	504	6
332103	7	S	4360	182	24.0	215	1400	0.2	15089	2200	1400	357	367	6	486	8
332104	7	S	4410	186	23.7	212	1470	0.1	13893	2290	1380	348	357	6	515	7
332105	7	S	4380	171	25.6	201	1380	0.1	15330	2170	1350	363	352	5	486	6
332106	7	S	4270	178	24.0	212	1420	0.1	15199	2250	1380	360	347	4	509	6
332107	7	S	4100	186	22.0	195	1460	0.1	13943	2260	1380	348	250	7	497	12
332108	7	S	4180	172	24.3	195	1370	0.1	14415	2150	1340	340	250	7	510	11
332109	7	S	4090	184	22.2	170	1360	0.1	13922	2150	1210	341	225	6	509	10
332110	7	S	4080	200	20.4	183	1430	0.1	13531	2160	1300	353	447	9	507	2
332111	7	S	4160	200	20.8	198	1440	0.1	13952	2200	1380	353	471	10	490	0
332112	7	S	4110	214	19.2	192	1520	0.1	13766	2350	1360	364	487	11	479	3
332113	7	S	4080	227	18.0	203	1550	0.1	13489	2440	1400	371	495	11	479	3
332114	7	S	4480	239	18.7	191	1560	0.1	13984	2490	1410	350	507	9	487	6
332115	7	S	4310	246	17.5	209	1590	0.1	14141	2510	1460	340	506	9	494	8
332116	7	S	4330	230	18.8	193	1450	0.1	14270	2360	1400	352	531	9	486	8
332117	7	S	4250	241	17.6	201	1510	0.1	14111	2360	1450	341	602	8	477	7
332118	7	S	4190	223	18.8	192	1390	0.1	14184	2220	1340	358	499	7	491	5
332119	7	S	4320	211	20.5	179	1350	0.1	14357	2070	1290	369	489	5	497	6
332120	7	S	4300	234	18.4	198	1410	0.1	14419	2240	1330	358	496	6	494	5
332121	7	S	4120	211	19.5	186	1340	0.1	14005	2170	1270	373	481	5	486	4
332122	7	S	4190	181	23.1	161	1280	0.1	15182	2080	1160	268	436	6	502	6
332123	7	S	4250	210	20.2	182	1400	0.1	15044	2290	1300	257	458	5	513	5
332124	7	S	4250	209	20.3	196	1410	0.1	15018	2290	1380	259	486	5	498	6
332201	7	S	510	31	16.5	13	48	0.3	2674	712	402	158	12	25	17	10
332202	7	S	510	31	16.5	14	44	0.3	2786	730	408	160	11	28	17	8
332203	7	S	500	26	19.2	14	45	0.3	2742	693	400	163	12	27	25	9
332204	7	S	510	29	17.6	13	43	0.3	2643	679	393	158	13	28	25	10
332205	7	S	510	33	15.5	15	48	0.3	2686	745	431	158	13	26	18	7
332206	7	S	500	32	15.6	12	43	0.3	2678	753	403	161	14	27	20	9
332207	7	S	500	33	15.2	12	47	0.3	2747	740	384	160	6	27	21	12

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332208	7	S	500	30	16.7	14	42	0.3	2780	681	393	165	6	28	30	11
332209	7	S	490	33	14.8	12	45	0.3	2731	741	395	162	6	28	21	13
332210	7	S	500	37	13.5	11	44	0.3	2730	713	364	157	15	32	20	3
332211	7	S	510	32	15.9	10	42	0.2	2704	695	357	151	16	32	16	3
332212	7	S	510	39	13.1	14	49	0.3	2691	781	402	156	15	32	27	4
332213	7	S	510	38	13.4	14	52	0.3	2739	780	412	158	15	31	20	3
332214	7	S	490	43	11.4	13	49	0.3	2702	783	403	158	15	37	18	12
332215	7	S	500	45	11.1	12	47	0.3	2558	755	390	154	17	33	13	10
332216	7	S	500	43	11.6	12	45	0.3	2646	760	390	152	17	36	20	12
332217	7	S	480	40	12.0	13	45	0.3	2642	764	410	155	21	34	17	10
332218	7	S	530	41	12.9	12	48	0.3	2850	673	363	166	17	27	25	8
332219	7	S	520	44	11.8	10	48	0.2	2807	748	394	171	16	26	20	7
332220	7	S	520	42	12.4	14	50	0.3	2760	714	377	167	17	28	22	9
332221	7	S	520	38	13.7	15	44	0.3	2717	651	355	169	19	29	19	9
332222	7	S	490	36	13.6	9	50	0.2	2687	750	380	165	18	27	23	7
332223	7	S	500	35	14.3	13	47	0.3	2741	743	371	168	17	29	22	8
332224	7	S	500	36	13.9	13	43	0.3	2762	729	381	166	17	29	17	7
332501	7	S	170	10	17.0	5	8	0.6	618	123	63	30	5	63	6	4
332502	7	S	170	10	17.0	6	10	0.6	614	122	62	32	6	66	8	4
332503	7	S	170	9	18.9	6	9	0.7	629	117	61	31	6	71	1	3
332504	7	S	170	9	18.9	5	9	0.6	627	114	62	27	5	68	6	3
332505	7	S	170	8	21.3	7	8	0.9	641	112	62	30	8	74	10	1
332506	7	S	170	10	17.0	4	9		594	114	64	31	6	72	0	2
332507	7	S	160	9	17.8	6	8	0.8	647	107	61	30	1	67	5	3
332508	7	S	150	8	18.8	6	10	0.6	624	105	59	27	1	69	2	6
332509	7	S	160	9	17.8	5	9	0.5	628	117	63	29	2	73	5	3
332510	7	S	160	11	14.5	6	10	0.6	618	110	55	30	5	69	12	0
332511	7	S	160	11	14.5	5	8	0.7	639	115	60	29	5	73	9	0
332512	7	S	160	11	14.5	7	9	0.8	651	111	60	32	5	68	5	0
332513	7	S	160	12	13.3	5	8	0.6	619	118	58	30	4	69	14	0
332514	7	S	160	12	13.3	5	8	0.6	605	107	59	29	4	81	6	4
332515	7	S	160	12	13.3	5	9	0.6	649	122	65	31	5	78	6	4
332516	7	S	160	12	13.3	6	9	0.7	644	117	58	30	7	78	4	0
332517	7	S	170	12	14.2	5	9	0.6	659	110	61	31	6	79	2	0
332518	7	S	170	12	14.2	6	8	0.7	658	122	60	36	4	62	6	5
332519	7	S	170	11	15.5	6	8	0.8	653	110	53	38	4	70	8	5

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332520	7	S	170	12	14.2	7	8	0.8	628	122	60	33	7	71	8	6
332521	7	S	170	12	14.2	7	8	0.8	617	111	55	30	6	68	4	5
332522	7	S	160	10	16.0	5	10	0.5	618	116	54	30	5	68	4	4
332523	7	S	160	10	16.0	4	7		638	114	54	31	5	70	4	4
332524	7	S	170	9	18.9	4	10		612	112	57	31	4	57	5	2
332601	7	S	26200	2600	10.1	3340	257	13.0	3328	2830	1630	131	51	6	56	1
332602	7	S	26300	2680	9.8	3170	259	12.2	3387	3050	1620	129	34	2	64	1
332603	7	S	26400	1590	16.6	1630	193	8.4	3272	1980	1020	129	45	1	58	1
332604	7	S	24900	2200	11.3	2470	221	11.2	3104	2470	1280	124	34	0	65	0
332605	7	S	25400	2060	12.3	2420	209	11.6	3328	2400	1310	127	26	1	68	0
332606	7	S	25600	2580	9.9	3160	278	11.4	3261	2850	1480	129	28	2	65	2
332607	7	S	24200	2060	11.7	1760	200	8.8	3043	2290	1110	82	30	2	58	3
332608	7	S	23800	2130	11.2	1700	200	8.5	3068	2290	1100	80	16	2	62	3
332609	7	S	24200	2180	11.1	1690	202	8.4	3271	2310	1070	80	17	1	66	3
332610	7	S	23600	2490	9.5	1830	220	8.3	2983	2350	1140	127	35	7	65	0
332611	7	S	23800	2230	10.7	1840	202	9.1	3249	2210	1130	130	38	6	70	0
332612	7	S	24500	2320	10.6	1730	212	8.2	3080	2290	1070	131	36	6	71	0
332613	7	S	25900	2450	10.6	1870	222	8.4	3220	2350	1130	129	30	6	65	0
332614	7	S	24800	2720	9.1	1650	211	7.8	3106	2420	1090	128	34	6	64	6
332615	7	S	25300	2690	9.4	1880	213	8.8	3275	2320	1190	129	30	5	67	6
332616	7	S	25100	2700	9.3	1750	205	8.5	3255	2320	1140	129	48	5	57	1
332617	7	S	24900	2670	9.3	1800	211	8.5	3245	2320	1140	128	46	5	63	0
332618	7	S	26800	2620	10.2	1750	203	8.6	3487	2260	1060	147	34	4	71	3
332619	7	S	26100	2800	9.3	1760	222	7.9	3292	2370	1060	144	35	7	68	3
332620	7	S	26400	2530	10.4	1790	201	8.9	3219	2090	1060	142	38	7	65	5
332621	7	S	26300	2450	10.7	1590	190	8.4	3443	2090	1010	144	38	5	67	4
332622	7	S	25500	2130	12.0	1810	190	9.5	4796	2140	1140	139	31	6	61	2
332623	7	S	25300	2390	10.6	1660	204	8.1	4795	2350	1070	138	32	3	66	0
332624	7	S	26100	2390	10.9	1720	199	8.6	4804	2300	1110	140	34	2	68	0
334003	7	R	180	9	20.0	11	28	0.4	777	272	161	71	2	19	17	92
334004	7	R	20	0		2	4		111	24	15	10	9	11	5	6
334025	7	R	270	20	13.5	9	13	0.7	1354	278	152	107	1	17	18	2
334026	7	R	270	20	13.5	11	22	0.5	1797	282	151	55	6	6	14	15
334028	7	R	90	6	15.0	3	3		257	70	33	18	1	15	7	21
334029	7	R	620	80	7.8	62	147	0.4	85763	718	336	354	118	5	368	1
334030	7	R	10	1		5	3	2.0	180	36	20	14	4	15	0	1

Final List of Analytical Results.
1.A. Bondar-Clegg: 12 elements.

GGU no	Loc	Type	Nb ppm	Ta ppm	Nb/Ta	U ppm	Th ppm	U/Th	Zr ppm	Ce ppm	La ppm	Y ppm	Be ppm	Li ppm	Sn ppm	Mo ppm
334031	7	R	10	0		2	2		223	35	14	14	2	10	3	9
334032	7	R	10	0		0	5		101	34	16	16	0	9	0	11
334033	7	R	10	0		2	2		112	32	13	12	2	9	5	6
334034	7	R	10	1		0	2		67	5		6	0	10	3	75
334035	7	R	240	15	16.0	9	27	0.3	1655	240	150	84	1	13	11	58
334036	7	R	40	7	5.4	7	20	0.3	773	150	98	40	1	6	5	3
334037	7	R	40	1		2	4		42	11	6	26	2	11	1	18
334038	7	R	60	3		6	9	0.7	98	32	21	15	0	9	5	6
334039	7	R	20	3		4	10		405	80	50	23	0	3	5	3
334041	7	R	7340	767	9.6	516	125	4.1	1233	1040	621	125	30	21	46	5
334041	7	R D	8090	662	12.2	484	110	4.4	1578	890	527	114	26	29	40	5
334042	7	R	780	66	11.8	45	95	0.5	3040	1130	717	163	24	14	27	10

Final List of Analytical Results.
1.B. Bondar-Clegg: 5 elements.

GGU no	Loc	Type	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Au ppb
334010	2	R	21	271	523	0.0	5
334011	2	R	24	7600	1540	4.7	9
334012	2	R	13	3040	645	0.3	0
334016	2	R	26	43	92	0.0	2
334017	2	R	41	26	4820	0.0	2
334018	2	R	398	18150	780	1.3	0
334019	2	R	31	2300	1600	1.5	52
334020	2	R	13	2525	457	0.5	0
334021	2	R	12	71	6070	0.1	0
334022	2	R	19	573	396	1.2	7
334023	2	R	19	69	115	0.5	2
334027	3	R	1485	22	46	2.7	14
334003	7	R	21	151	248	2.0	15
334004	7	R	14	10	17	0.0	0
334014	7	R	>20000	476	5150	>100.0	619
334025	7	R	23	234	54	0.0	3
334026	7	R	19	44	264	0.1	3
334028	7	R	20	92	19	0.1	6
334029	7	R	24	4640	3965	2.4	21
334030	7	R	3260	56	213	0.3	5
334031	7	R	27	25	32	0.1	3
334032	7	R	23	24	35	0.0	2
334033	7	R	18	17	12	0.0	2
334034	7	R	23	32	19	0.1	4
334035	7	R	32	107	68	0.8	5
334036	7	R	5720	49	345	0.1	6
334037	7	R	2110	29	96	0.7	10
334038	7	R	10730	42	85	2.1	75
334039	7	R	3310	35	80	0.7	6

Final List of Analytical Results.
1.C. Bondar-Clegg: Alluvial Samples.

GGU no	Loc	Type	Weight g	Nb ppm	Ta ppm	Nb/Ta	U ppm	Th ppm	U/Th	Zr ppm	Ce ppm	La ppm	Y ppm	Be ppm	Li ppm
334066	5	H	84	2860	466	6.1	318	486	0.7	18133	5350	>2000	506	29	36
334067	5	H	72	3390	392	8.6	276	1390	0.2	25240	5980	>2000	751	84	30
334050	7	H	34	70	5	14.0	4	9		377	147	70	34	2	10
334051	7	H	11	50	4		7	15	0.5	445	269	114	48	2	11
334052	7	H	20	40	4		7	16	0.4	529	165	71	35	2	8
334053	7	H	66	50	5	10.0	8	19	0.4	641	146	68	25	2	10
334054	7	H	14	130	11	11.8	7	18	0.4	639	229	99	30	3	13
334055	7	H	17	230	9	25.6	11	29	0.4	38	810	421	53	5	21
334056	7	H	12	90	7	12.9	7	14	0.5	72	117	53	31	3	12
334057	7	H	26	100	11	9.1	10	20	0.5	1148	118	52	23	2	7
334058	7	H	24	90	8	11.3	9	15	0.6	1108	158	63	32	3	10
334059	7	H	15	130	11	11.8	8	9	0.9	1884	96	42	23	2	10
334060	7	H	39	110	13	8.5	35	20	1.7	2075	142	58	29	2	9
334061	7	H	20	70	7	10.0	17	38	0.5	968	222	93	42	3	12
334062	7	H	24	100	11	9.1	19	45	0.4	1081	220	91	45	3	10
334063	7	H	24	90	10	9.0	16	23	0.7	751	197	81	35	3	10
334064	7	H	51	110	11	10.0	17	45	0.4	1355	277	112	58	3	10
334065	7	H	403	410	46	8.9	13	226	0.1	1675	622	318	86	9	13
334068	7	H	51	2890	230	12.6	251	1600	0.2	31968	6250	>2000	679	94	26
334069	7	H	27	530	62	8.5	28	162	0.2	11263	1210	582	167	12	22
334070	7	H	26	200	21	9.5	26	87	0.3	2324	700	353	113	7	14
334071	7	H	9	250	20	12.5	18	77	0.2	1727	792	428	130	12	18
334072	7	H	32	240	28	8.6	20	64	0.3	2019	621	274	114	6	13
334073	7	H	16	220	23	9.6	22	67	0.3	1277	609	263	147	5	15
334074	7	H	29	150	12	12.5	14	37	0.4	1568	379	205	78	5	15
334075	7	H	47	550	62	8.9	13	58	0.2	10289	818	411	116	10	23
334076	7	H	24	420	47	8.9	26	80	0.3	2424	700	392	105	12	23
334077	7	H	222	410	41	10.0	11	65	0.2	2446	646	318	100	9	25
334078	7	A	20000	120	8	15.0	4	13		804	180	90	47	5	11
334079	7	A	20000	140	8	17.5	5	14	0.4	872	174	99	56	5	14
334080	7	A	20000	170	10	17.0	6	15	0.4	1138	209	112	70	6	15
334081	7	A	20000	540	40	13.5	19	64	0.3	3100	1000	532	198	22	36
334082	7	H	643	640	54	11.9	9	88	0.1	7120	1460	789	165	21	35

Final List of Analytical Results.
1.C. Bondar-Clegg: Alluvial Samples.

GGU no	Loc	Type	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Au ppb	Mo ppm	Sn ppm	W ppm	Mn ppm	Ti pct	Fe pct	Source Area
334066	5	H	12	137	315	0.0	0	12	59	4	2166	2.6	6.2	Motzfeldt Centre
334067	5	H	10	335	1030	0.0	0	14	190	8	3404	1.0	5.8	Motzfeldt Centre
334050	7	H	60	24	122	0.0	10	4	2	225	474	5.7	7.9	Basement
334051	7	H	87	28	92	0.0	<20	6	5	330	716	2.3	8.2	Basement
334052	7	H	35	14	71	0.0	5	1	1	36	427	3.3	7.8	Basement
334053	7	H	56	28	102	0.0	0	0	0	2	496	2.5	13.1	Basement
334054	7	H	36	16	113	0.0	<10	3	3	20	826	2.8	12.2	Basement
334055	7	H	57	55	145	0.0	<10	11	0	4	1422	1.7	12.1	Basement
334056	7	H	32	27	64	0.0	<15	6	11	4	460	3.2	8.7	Basement
334057	7	H	26	19	58	0.0	5	1	2	4	336	6.2	12.1	Basement
334058	7	H	35	17	62	0.0	0	1	2	2	632	2.9	7.9	Basement
334059	7	H	30	11	41	0.0	<25	1	9	4	259	4.3	8.3	Basement
334060	7	H	17	11	45	0.0	0	3	9	8	293	5.0	7.8	Basement
334061	7	H	24	23	61	0.0	0	1	2	8	517	2.9	10.2	Basement
334062	7	H	25	20	64	0.0	0	1	5	24	516	4.7	9.5	Basement
334063	7	H	22	17	80	0.0	0	1	1	12	728	4.7	11.2	Basement
334064	7	H	19	18	51	0.0	0	1	3	24	421	3.4	8.8	Basement
334065	7	H	18	52	188	0.0	0	5	24	4	1104	6.8	10.2	Motzfeldt Centre
334068	7	H	25	540	1120	0.1	45	14	181	10	3032	1.5	5.8	Motzfeldt Centre
334069	7	H	29	91	178	0.2	0	7	21	16	1206	3.8	9.7	Motzfeldt Centre
334070	7	H	45	42	101	0.0	<10	3	5	4	589	1.8	6.7	Basement
334071	7	H	35	39	117	0.0	<50	3	8	4	715	2.9	6.9	Basement
334072	7	H	29	28	84	0.0	0	2	8	8	522	2.4	6.2	Basement
334073	7	H	63	31	105	0.0	<10	2	17	4	588	3.0	8.2	Basement
334074	7	H	38	42	78	0.0	<10	3	2	8	480	2.0	6.0	Basement
334075	7	H	14	230	213	0.0	0	6	23	8	1666	3.1	7.0	Motzfeldt Centre
334076	7	H	29	59	174	0.0	<10	8	18	4	1472	3.0	6.8	Other Gardar Centres
334077	7	H	16	25	129	0.0	0	5	2	4	1028	3.0	6.0	Other Gardar Centres
334078	7	A	10	13	52	0.0	0	0	6	0	354	0.3	1.4	Mixed
334079	7	A	10	12	56	0.0	0	1	8	2	383	0.3	1.5	Mixed
334080	7	A	10	13	62	0.0	0	1	11	2	423	0.4	1.5	Mixed
334081	7	A	6	44	200	0.0	0	5	28	4	1380	0.5	3.1	Motzfeldt Centre
334082	7	H	8	40	207	0.0	0	3	28	2	2052	1.8	4.8	Motzfeldt Centre

Analytical procedures, Chemex. Limits in ppm.

Element	Det. limit	Upper limit	Extraction	Method
Nb	5	10 000		X-ray fluorescence
Ta	2	10 000		Neutron activation
U	0.2	1 000		Neutron activation
Th	1	1 000		Neutron activation
Zr	5	10 000		X-ray fluorescence
Ce	2	10 000		Neutron activation
La	1	1 000		Neutron activation
Y	5	10 000		X-ray fluorescence
Be	0.1	1 000	$HClO_4$-HNO_3-HF digest.	Atomic absorption
Li	1	10 000	$HClO_4$-HNO_3-HF digest.	Atomic absorption
Sn	2	1 000	NH_4I sublim., extrac.	Atomic absorption
Mo	1	10 000	HNO_3-aqua regia digest.	Atomic absorption
SiO_2	100	990 000	Total ICP digestion	ICP-AES
TiO_2	100	990 000	Total ICP digestion	ICP-AES
Al_2O_3	100	990 000	Total ICP digestion	ICP-AES
Fe_2O_3	100	990 000	Total ICP digestion	ICP-AES
FeO	100	1000 000	Acid decomposition	Titration
MnO	100	990 000	Total ICP digestion	ICP-AES
MgO	100	990 000	Total ICP digestion	ICP-AES
CaO	100	990 000	Total ICP digestion	ICP-AES
Na_2O	100	990 000	Total ICP digestion	ICP-AES
K_2O	100	990 000	Total ICP digestion	ICP-AES
P_2O_5	100	990 000	Total ICP digestion	ICP-AES
F	20	10 000	Carbonate-nitrate fusion	Specific ion
BaO	100	990 000	Total ICP digestion	ICP-AES

ICP-AES = Inductively Coupled Plasma - Atomic Emission Spectroscopy.

Final List of Analytical Results.
2.A. Chemex: 12 elements.

GGU no	Loc	Type	Nb ppm	Ta ppm	Nb/Ta	U ppm	Th ppm	U/Th	Zr ppm	Ce ppm	La ppm	Y ppm	Be ppm	Li ppm	Sn ppm	Mo ppm
333310	1	C	70	0		7	27	0.2	398	120	69	25	5	9	2	1
333320	1	C	117	0		11	40	0.3	435	780	490	117	31	25	1	2
333330	1	C	15	0		4	8		229	91	47	24	2	9	1	1
333340	1	C	102	0		8	32	0.3	443	270	150	53	21	58	5	3
333350	1	C	651	35	18.6	43	91	0.5	2317	840	460	285	94	39	13	75
333360	1	C	5759	280	20.6	525	56	9.4	3181	900	440	126	20	90	6	1
333370	1	C	1788	94	19.0	74	200	0.4	9494	2400	1300	887	100	39	20	15
333380	1	C	605	26	23.3	45	34	1.3	3250	840	490	125	32	130	35	9
333390	1	C	24	0		5	16	0.3	368	140	74	33	5	14	2	2
333393	1	C	6300	460	13.7											
333400	1	C	1838	140	13.1	21	120	0.2	14283	2500	1500	941	50	91	5	8
333910	1	C	60	0		7	20	0.4	345	160	86	53	24	14	4	2
344320	1	C	1535	90	17.1	145	290	0.5	34743	5300	3100	900	200	43	120	1
344330	1	C	142	6	23.7	10	16	0.6	1831	280	200	120	35	440	2	6
344340	1	C	23	0		6	15	0.4	306	110	53	23	4	39	1	2
344342	1	C	7200	410	17.6											
344350	1	C	13	0		5	14	0.4	295	100	55	26	18	290	1	2
344360	1	C	396	18	22.0	29	39	0.7	2448	360	210	52	36	47	6	1
344370	1	C	150	8	18.8	11	100	0.1	770	380	240	129	100	220	4	1
344380	1	C	1001	27	37.1	65	200	0.3	2288	2300	1500	147	40	74	11	29
351010	1	C	203	14	14.5	5	11	0.5	852	270	130	53	3	21	9	1
351020	1	C	53	0		7	260	0.0	301	260	160	164	93	38	7	7
351030	1	C	400	23	17.4	19	39	0.5	3129	440	220	139	13	29	25	5
351040	1	C	270	22	12.3	65	130	0.5	12593	480	270	332	140	7	77	51
351050	1	C	495	49	10.1	100	61	1.6	21316	700	530	140	26	110	17	3
351060	1	C	1310	67	19.6	76	270	0.3	6691	1900	1100	408	57	110	11	2
351070	1	C	107	3		18	44	0.4	1013	350	210	52	26	30	5	1
351080	1	C	1270	54	23.5	115	120	1.0	5201	2300	1700	130	21	13	105	26
351090	1	C	13	0		6	13	0.4	291	130	55	24	11	26	2	1
351100	1	C	10	0		5	13	0.4	269	120	59	22	6	18	3	1
351110	1	C	10	0		6	12	0.5	261	92	50	14	3	19	1	1
351120	1	C	136	4		13	66	0.2	754	360	220	65	20	110	7	6
351130	1	C	55	2		5	47		325	170	85	56	4	8	3	2
351140	1	C	2622	195	13.4	100	39	2.6	12884	2800	1400	871	15	36	5	13

Final List of Analytical Results.
2.A. Chemex: 12 elements.

GGU no	Loc	Type	Nb ppm	Ta ppm	Nb/Ta	U ppm	Th ppm	U/Th	Zr ppm	Ce ppm	La ppm	Y ppm	Be ppm	Li ppm	Sn ppm	Mo ppm
333920	2	C	1070	91	11.8	20	37	0.5	8672	1200	650	626	6	8	10	87
333930	2	C	991	70	14.2	28	15	1.9	4453	1000	560	409	15	75	15	6
333940	2	C	1155	74	15.6	39	71	0.6	3293	730	370	231	24	41	8	3
333950	2	C	1282	100	12.8	33	54	0.6	4646	1600	870	310	19	27	2	4
333960	2	C	1531	150	10.2	93	19	4.9	799	290	160	57	11	23	2	8
333970	2	C	516	44	11.7	22	33	0.7	1408	490	280	132	14	17	7	10
333980	2	C	1080	42	25.7	43	260	0.2	4448	2400	1500	387	77	110	7	29
333990	2	C	584	36	16.2	41	32	1.3	3799	1000	540	194	10	9	12	2
334000	2	C	206	6	34.3	8	100	0.1	1141	240	140	144	25	27	2	28
344310	2	C	1521	100	15.2	75	64	1.2	16319	2800	1500	872	7	4	120	25
344390	2	C	1099	100	11.0	12	73	0.2	7562	1400	740	558	7	15	4	6
344400	2	C	164	12	13.7	7	26	0.3	944	290	150	110	31	43	5	7
351150	3	C	761	41	18.6	35	57	0.6	2247	830	440	166	17	2	24	6
351160	3	C	2708	209	13.0	175	34	5.1	1605	690	340	153	20	66	6	3
351168	3	C	6500	740	8.8											
351170	3	C	1413	107	13.2	85	31	2.7	1886	610	320	177	19	55	10	4
351180	3	C	420	22	19.1	16	34	0.5	1884	290	160	102	51	19	16	2
351190	3	C	2608	209	12.5	62	43	1.4	11874	2600	1500	939	31	52	14	3
351200	3	C	2821	185	15.2	93	53	1.8	11895	2500	1500	917	24	38	31	5
351210	3	C	1497	122	12.3	103	60	1.7	1782	530	270	149	20	14	11	3
351220	3	C	379	23	16.5	11	24	0.5	2193	350	190	82	5	10	10	2
351228	3	C	3800	430	8.8											
351230	3	C	1813	110	16.5	70	58	1.2	9722	1600	920	619	32	25	14	1
351240	3	C	1489	85	17.5	73	100	0.7	5951	1000	590	352	20	5	38	7
351250	3	C	1988	143	13.9	51	196	0.3	11338	2400	1400	891	38	15	40	1
351260	3	C	1551	108	14.4	49	71	0.7	8958	1600	890	660	36	13	69	3
351270	3	C	927	63	14.7	50	50	1.0	1653	670	360	139	26	56	3	5
351279	3	C	3700	440	8.4											
351280	3	C	938	66	14.2	53	64	0.8	4522	760	420	143	11	8	13	2
351290	3	C	1676	143	11.7	132	60	2.2	1620	770	400	181	20	27	11	9
351300	3	C	1461	117	12.5	98	63	1.5	1418	940	450	180	14	15	11	13
351310	3	C	1404	116	12.1	78	80	1.0	1954	620	300	280	41	30	16	3
351320	3	C	2180	159	13.7	152	56	2.7	2796	760	360	208	17	7	28	2
351330	3	C	990	79	12.5	18	30	0.6	4860	890	470	402	17	27	7	4

Final List of Analytical Results.
2.A. Chemex: 12 elements.

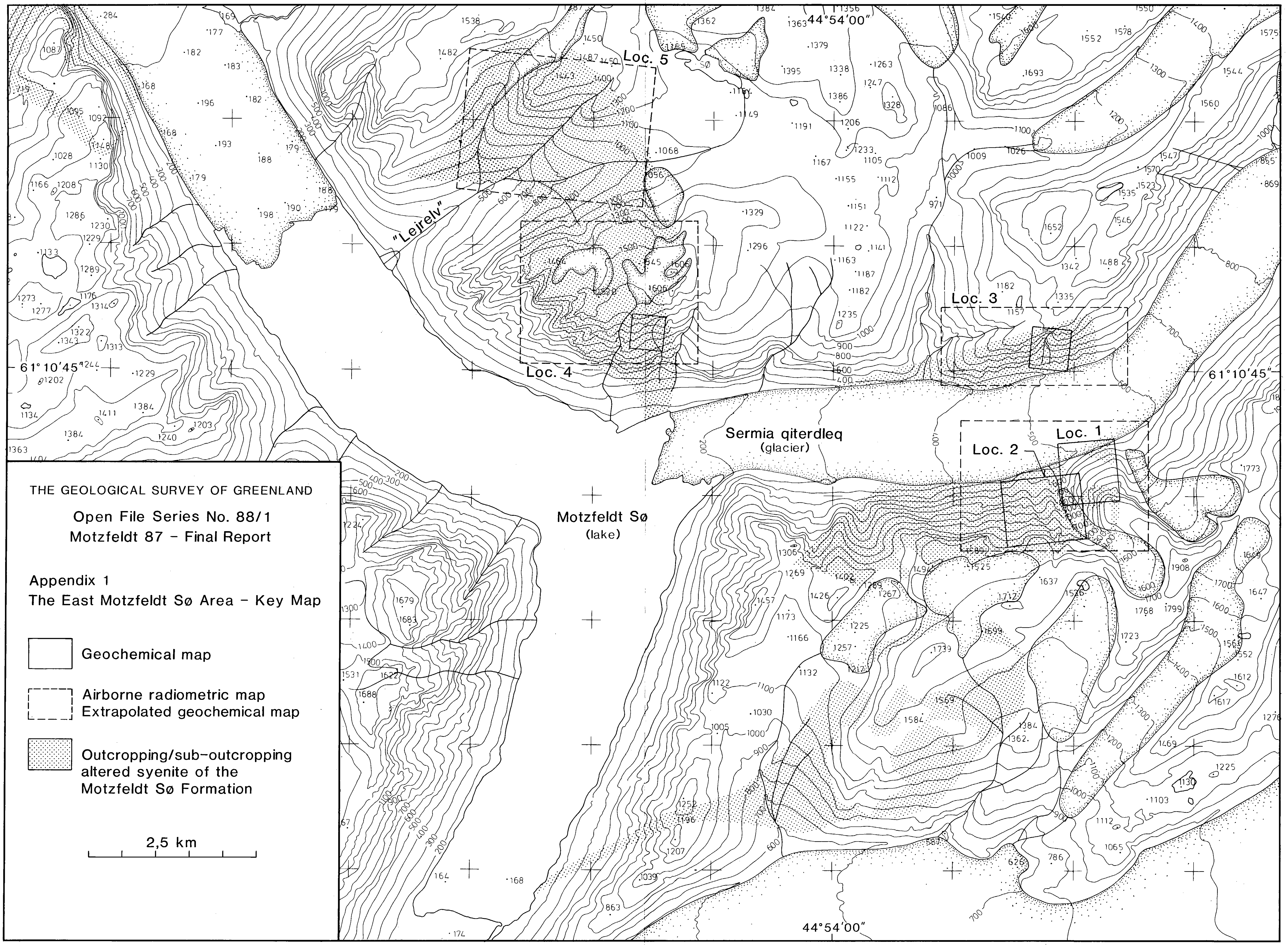
GGU no	Loc	Type	Nb ppm	Ta ppm	Nb/Ta	U ppm	Th ppm	U/Th	Zr ppm	Ce ppm	La ppm	Y ppm	Be ppm	Li ppm	Sn ppm	Mo ppm
351340	3	C	1308	90	14.5	48	57	0.8	5768	1000	530	343	19	15	30	2
351350	3	C	425	19	22.4	17	34	0.5	1750	380	180	93	13	5	14	2
351352	3	C	3600	400	9.0											
351360	3	C	997	72	13.8	62	63	1.0	1980	550	290	142	25	21	10	3
351370	3	C	1487	92	16.2	87	58	1.5	3462	900	440	216	9	2	22	4
351380	3	C	1161	100	11.6	78	55	1.4	3170	810	360	166	8	7	24	3
351390	3	C	1219	110	11.1	93	47	2.0	3199	830	400	181	13	12	12	6
351392	3	C	3400	430	7.9											
351400	3	C	2593	250	10.4	197	52	3.8	2717	1000	480	188	12	21	6	2
351400	3	C D	2800	380	7.4											
351407	3	C	3200	340	9.4											
351409	3	C	4000	480	8.3											
351410	3	C	102	5	20.4	5	12	0.4	315	184	91	0	9	80	1	14
351420	3	C	319	21	15.2	7	12	0.6	1978	490	250	203	16	2	20	1
351430	3	C	1753	110	15.9	61	240	0.3	12155	2700	1400	870	22	30	49	6
350010	4	C	616	47	13.1	40	140	0.3	951	2100	1100	150	71	3	4	7
350012	4	C	3500	390	9.0											
350020	4	C	3260	280	11.6	214	130	1.6	4722	1300	720	319	19	21	35	1
350020	4	C D	3400	380	8.9											
350027	4	C	4500	490	9.2											
350030	4	C	616	35	17.6	45	42	1.1	1107	400	200	81	20	33	8	10
350040	4	C	2271	210	10.8	157	49	3.2	2555	920	460	166	54	4	8	4
350041	4	C	2000	210	9.5											
350042	4	C	1300	130	10.0											
350043	4	C	2000	210	9.5											
350044	4	C	1100	110	10.0											
350045	4	C	1300	120	10.8											
350049	4	C	3200	380	8.4											
350050	4	C	962	49	19.6	37	110	0.3	4722	740	400	183	21	43	100	1
350051	4	C	2600	270	9.6											
350052	4	C	9100	1000	9.1											
350053	4	C	1600	170	9.4											
350060	4	C	3350	310	10.8	225	66	3.4	2871	1000	500	186	1	19	14	3
350060	4	C D	3400	410	8.3											

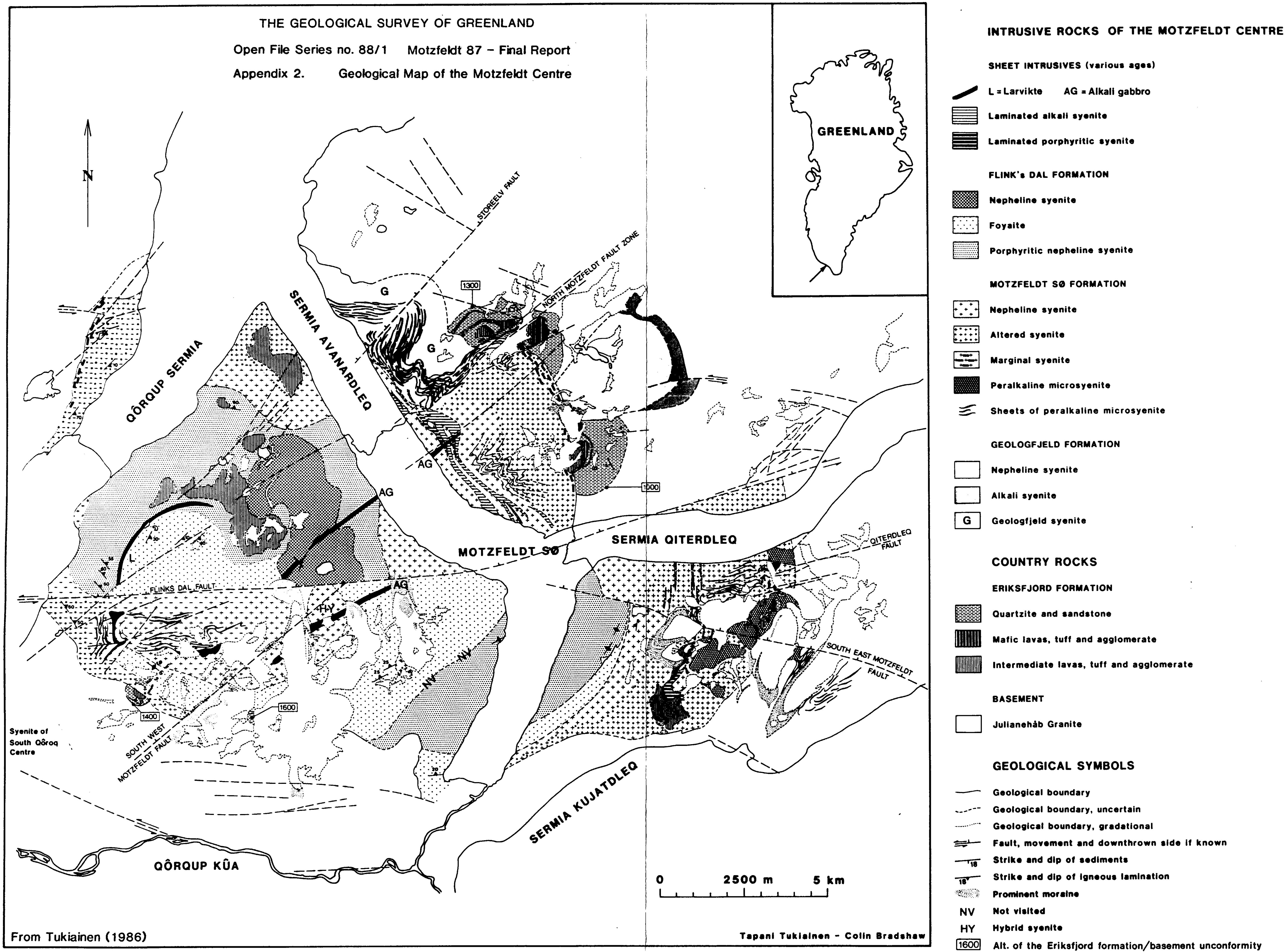
Final List of Analytical Results.
2.A. Chemex: 12 elements.

GGU no	Loc	Type	Nb ppm	Ta ppm	Nb/Ta	U ppm	Th ppm	U/Th	Zr ppm	Ce ppm	La ppm	Y ppm	Be ppm	Li ppm	Sn ppm	Mo ppm
350069	4	C	4200	450	9.3											
350070	4	C	748	47	15.9	19	140	0.1	4587	1000	590	332	58	2	25	1
351435	4	C	3900	480	8.1											
351440	4	C	3137	260	12.1	209	80	2.6	1747	870	440	156	30	5	11	10
351440	4	C D	2800	380	7.4											
351450	4	C	499	27	18.5	21	140	0.2	3590	870	440	256	41	1	19	1
351460	4	C	1550	160	9.7	132	50	2.6	1025	340	160	67	17	22	9	5
351470	4	C	423	14	30.2	26	42	0.6	2014	370	200	120	15	6	7	3
351475	4	C	3100	400	7.8											
351476	4	C	7000	910	7.7											
351480	4	C	433	25	17.3	17	36	0.5	2594	590	250	178	24	7	4	8
351490	4	C	934	63	14.8	36	90	0.4	6353	1000	520	362	43	4	43	2
351500	4	C	4001	440	9.1	294	82	3.6	1289	1800	870	136	9	4	7	3
351500	4	C D	3800	550	6.9											
350080	5	C	955	83	11.5	19	63	0.3	4726	880	460	227	19	31	6	1
350090	5	C	808	84	9.6	23	74	0.3	4797	830	470	202	32	8	31	4
350099	5	C	3500	470	7.4											
350100	5	C	3588	390	9.2	263	66	4.0	828	1000	530	147	14	39	7	7
350100	5	C D	3800	500	7.6											
350110	5	C	1553	160	9.7	108	90	1.2	4089	1200	590	197	10	1	6	12
350114	5	C	2700	370	7.3											
350115	5	C	3300	430	7.7											
350116	5	C	3300	430	7.7											
350117	5	C	4800	680	7.1											
350120	5	C	806	76	10.6	56	77	0.7	2230	1200	590	135	8	12	9	8
332125	7	S	3775	150	25.2	170	1494	0.1	13042	1900	1100	488	500	6	310	5
332225	7	S	414	30	13.8	12	44	0.3	2462	690	360	241	20	24	2	7
332525	7	S	117	9	13.0	5	10		509	100	60	25	6	54	4	2
332625	7	S	21111	1600	13.2	1525	211	7.2	3006	2400	1200	164	45	4	20	1
334041	7	R	6200	790	7.8											

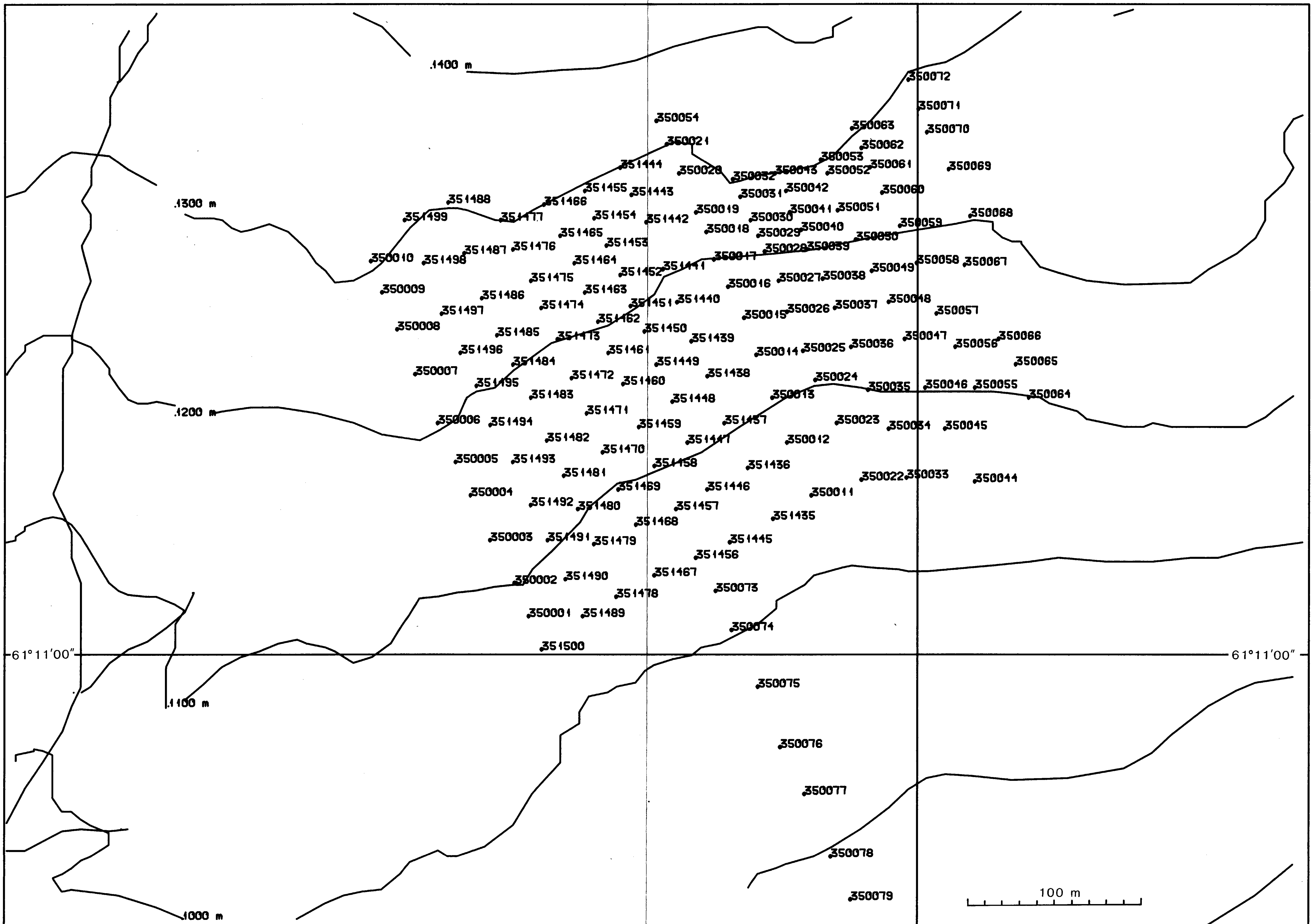
Final List of Analytical Results.
2.B. Chemex. Whole Rock.

GGU No	Loc	Type	SiO2 pct	TiO2 pct	Al2O3 pct	Fe2O3 pct	FeO pct	MnO pct	MgO pct	CaO pct	Na2O pct	K2O pct	P2O5 pct	Loi pct	Sum pct	F ppm	BaO pct
333360	1	C	59.92	0.30	13.59	7.57	2.07	0.24	0.43	0.82	8.65	3.81	0.07	0.65	98.12	1700	0.03
333393	1	C	61.70	0.29	14.99	4.27	2.84	0.33	0.18	1.03	9.02	2.88	0.08	0.57	98.18	4200	0.01
333400	1	C	55.08	0.42	10.20	12.71	4.05	0.70	0.31	1.34	6.97	4.33	0.08	1.18	97.37	4000	0.05
344342	1	C	56.55	0.52	10.53	17.51	0.48	0.49	0.19	0.54	4.90	1.17	0.07	2.70	95.65	640	0.02
351140	1	C	60.18	0.20	13.37	9.39	1.11	0.42	0.15	0.80	6.42	4.99	0.03	1.37	98.43	2500	0.04
333920	2	C	67.00	0.23	12.70	5.73	0.61	0.19	0.27	1.24	6.15	2.60	0.12	2.48	99.32	4150	0.02
333950	2	C	60.40	0.22	15.79	4.97	2.15	0.29	0.30	0.88	7.20	4.83	0.08	1.21	98.32	2300	0.01
333960	2	C	61.09	0.50	16.94	4.74	1.99	0.18	0.18	1.52	7.52	5.24	0.07	1.11	101.08	5050	0.01
344310	2	C	60.76	0.14	14.24	8.79	1.12	0.25	0.40	1.30	7.21	2.39	0.08	1.65	98.33	3050	0.03
344390	2	C	52.89	0.36	10.88	11.30	7.43	0.60	0.45	2.16	7.37	3.62	0.03	0.89	97.98	6400	0.01
351168	3	C	58.20	0.60	14.49	10.05	1.33	0.39	0.33	1.95	5.57	3.83	0.05	2.22	99.01	5850	0.05
351228	3	C	59.51	0.40	14.15	6.21	3.07	0.28	0.24	1.92	6.91	4.44	0.05	1.36	98.54	6750	0.01
351279	3	C	63.54	0.17	16.48	4.03	0.67	0.17	0.31	1.40	6.77	5.25	0.05	1.58	100.42	4800	0.01
351392	3	C	58.13	0.73	15.24	7.08	2.03	0.31	0.40	2.07	7.10	4.59	0.09	1.98	99.75	5100	0.02
351409	3	C	55.07	0.43	11.20	12.84	1.74	0.82	0.25	2.64	4.06	4.82	0.07	4.14	98.08	9700	0.03
350052	4	C	57.58	0.60	15.12	8.70	0.32	0.25	0.11	1.98	6.99	3.93	0.05	1.75	97.38	9100	0.02
350060	4	C	55.16	0.59	14.82	9.33	1.51	0.34	0.26	2.59	6.43	5.52	0.09	1.64	98.28	8950	0.02
350069	4	C	58.06	0.72	15.59	7.67	0.07	0.43	0.11	1.82	6.15	4.12	0.03	2.23	97.00	5600	0.03
351476	4	C	58.11	0.47	16.27	5.68	1.34	0.17	0.15	2.25	6.68	4.32	0.08	5.20	100.72	8400	0.01
351500	4	C	55.24	0.74	17.03	7.32	3.12	0.25	0.51	0.98	5.83	4.91	0.05	2.58	98.56	2400	0.01
350099	5	C	58.33	0.64	17.81	3.98	2.11	0.16	0.15	1.50	7.64	5.35	0.06	1.71	99.44	5600	0.00
350100	5	C	60.39	0.47	17.24	2.62	2.05	0.11	0.24	1.75	7.33	5.57	0.08	1.12	98.97	6400	0.00
350115	5	C	61.10	0.25	17.30	3.80	0.20	0.07	0.09	1.84	6.81	6.07	0.08	1.37	98.98	6700	0.01
350116	5	C	61.89	0.27	17.92	4.02	0.27	0.08	0.05	0.92	6.47	5.37	0.06	1.13	98.45	3200	0.01
350117	5	C	61.01	0.35	17.72	3.86	0.30	0.11	0.08	1.86	7.57	5.14	0.05	1.43	99.48	6600	0.00


THE GEOLOGICAL SURVEY OF GREENLAND
Open File Series No. 88/1
Motzfeldt 87 - Final Report
Appendix 1
The East Motzfeldt Sø Area - Key Map
Geochemical map
Airborne radiometric map
Extrapolated geochemical map
Outcropping/sub-outcropping altered syenite of the Motzfeldt Sø Formation
2,5 km
Loc. 1
Loc. 2
Loc. 3
Loc. 4
Loc. 5
"Lejrelv"
Sermia qiterdleq
(glacier)
Motzfeldt Sø
(lake)
61°10'45"
61°10'45"
44°54'00"
44°54'00"



THE GEOLOGICAL SURVEY OF GREENLAND
Open File Series no. 88/1 Motzfeldt 87 - Final Report
Appendix 2. Geological Map of the Motzfeldt Centre
GREENLAND
N
QÔRQUP SERMIA
SERMIA AVANARDLEQ
STOREELV FAULT
NORTH MOTZFELDT FAULT ZONE
FLINKS DAL FAULT
MOTZFELDT SØ
SERMIA QITERDLEQ
QITERDLEQ FAULT
SOUTH EAST MOTZFELDT FAULT
SOUTH WEST MOTZFELDT FAULT
SERMIA KUJATDLEQ
QÔRQUP KÛA
Syenite of South Qôroq Centre
1300
1000
1400
1600
0 2500 m 5 km
From Tukiainen (1986)
Tapani Tukiainen - Colin Bradshaw
INTRUSIVE ROCKS OF THE MOTZFELDT CENTRE
SHEET INTRUSIVES (various ages)
L = Larvikte AG = Alkali gabbro
Laminated alkali syenite
Laminated porphyritic syenite
FLINK's DAL FORMATION
Nepheline syenite
Foyaite
Porphyritic nepheline syenite
MOTZFELDT SØ FORMATION
Nepheline syenite
Altered syenite
Marginal syenite
Peralkaline microsyenite
Sheets of peralkaline microsyenite
GEOLOGFJELD FORMATION
Nepheline syenite
Alkali syenite
G Geologfjeld syenite
COUNTRY ROCKS
ERIKSFJORD FORMATION
Quartzite and sandstone
Mafic lavas, tuff and agglomerate
Intermediate lavas, tuff and agglomerate
BASEMENT
Julianehåb Granite
GEOLOGICAL SYMBOLS
Geological boundary
Geological boundary, uncertain
Geological boundary, gradational
Fault, movement and downthrown side if known
Strike and dip of sediments
Strike and dip of igneous lamination
Prominent moraine
NV Not visited
HY Hybrid syenite
1600 Alt. of the Eriksfjord formation/basement unconformity


.1400 m
.1300 m
.1200 m
.1100 m
.1000 m
61°11'00"
61°11'00"
100 m
350072
350071
350054
350063
350070
350021
350062
350053
350061
351444
350020
350032
350043
350052
350069
351455
351443
350031
350042
350060
351488
351466
350019
350041
350051
351499
351477
351454
351442
350030
350059
350068
351465
350018
350029
350040
350050
351453
351487
351476
350028
350039
350010
351498
351464
350017
351441
351452
350058
350067
350049
351475
350016
350027
350038
350009
351486
351463
350048
351451
351440
351474
350026
350037
351497
350015
350057
351462
350008
351450
351485
351473
351439
350047
350066
350056
350036
351496
350014
350025
351461
351484
351449
350065
350007
351472
351438
350024
351460
351495
350035
350046
350055
351483
350013
350064
351448
351471
350006
351494
351459
351437
350023
350034
350045
351482
351447
350012
351470
350005
351493
351458
351436
351481
350022
350033
350044
351469
351446
350004
350011
351492
351480
351457
351435
351468
350003
351491
351479
351445
351456
351467
350002
351490
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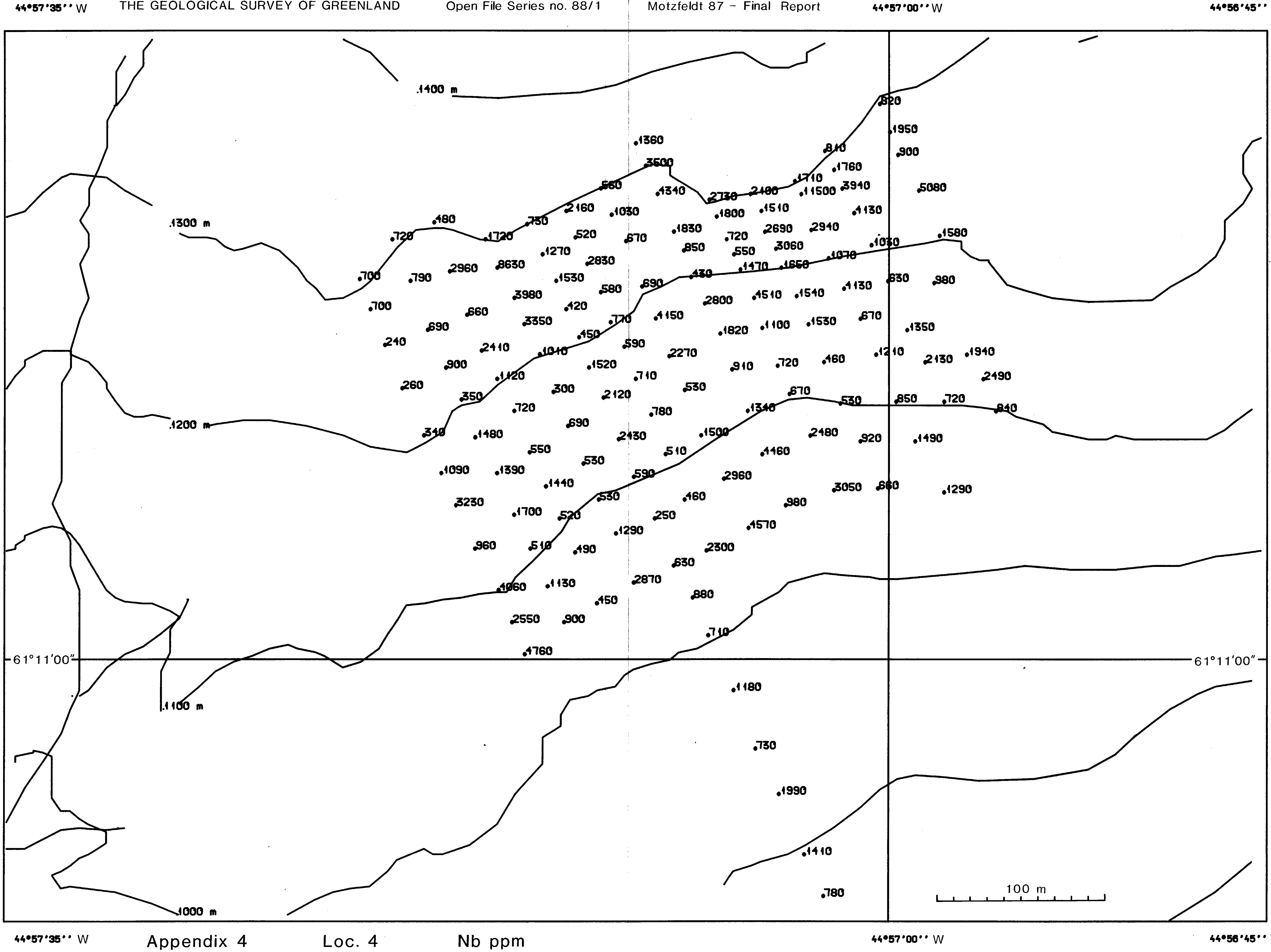
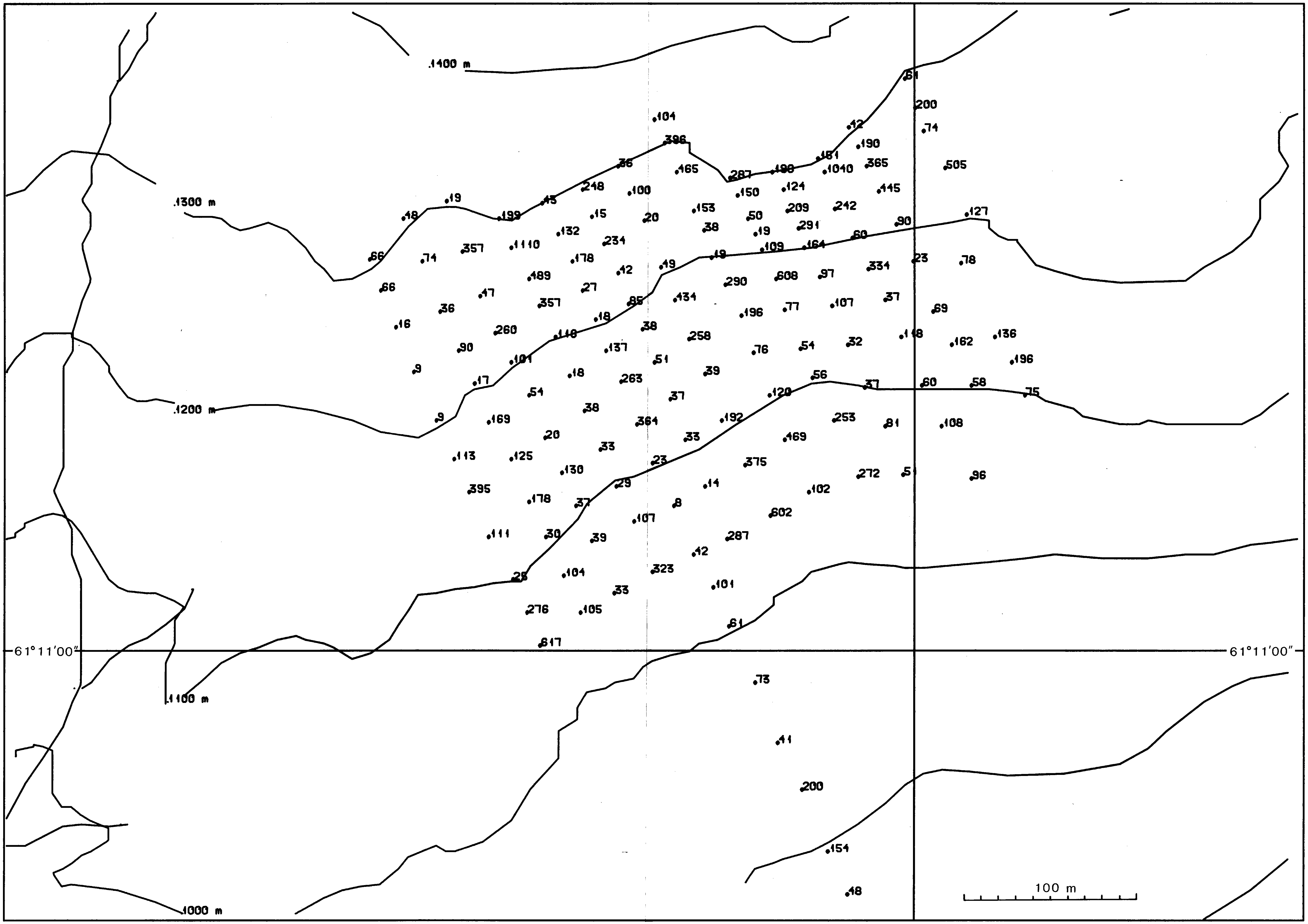
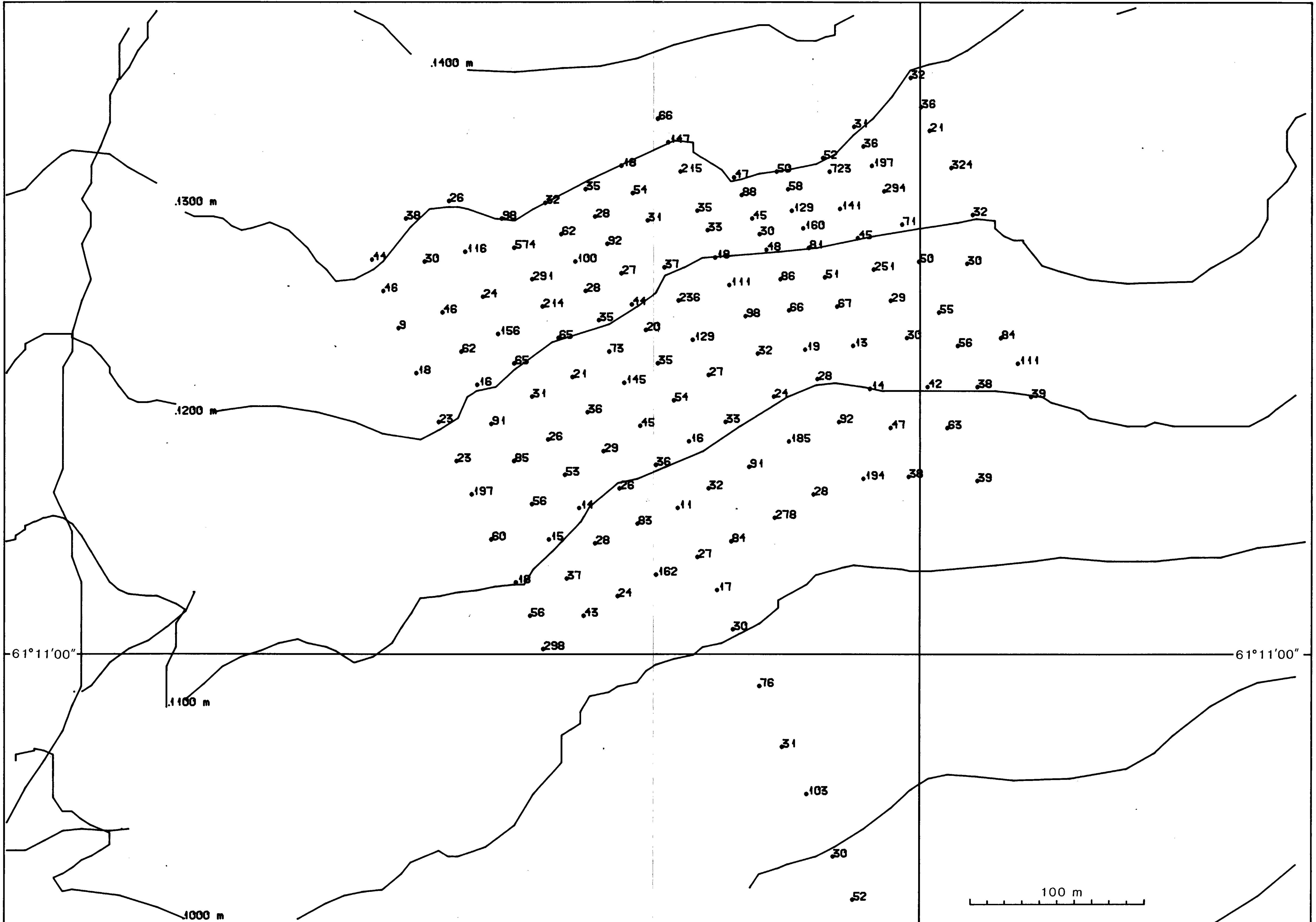
351478
350001
351489
350074
351500
350075
350076
350077
350078
350079

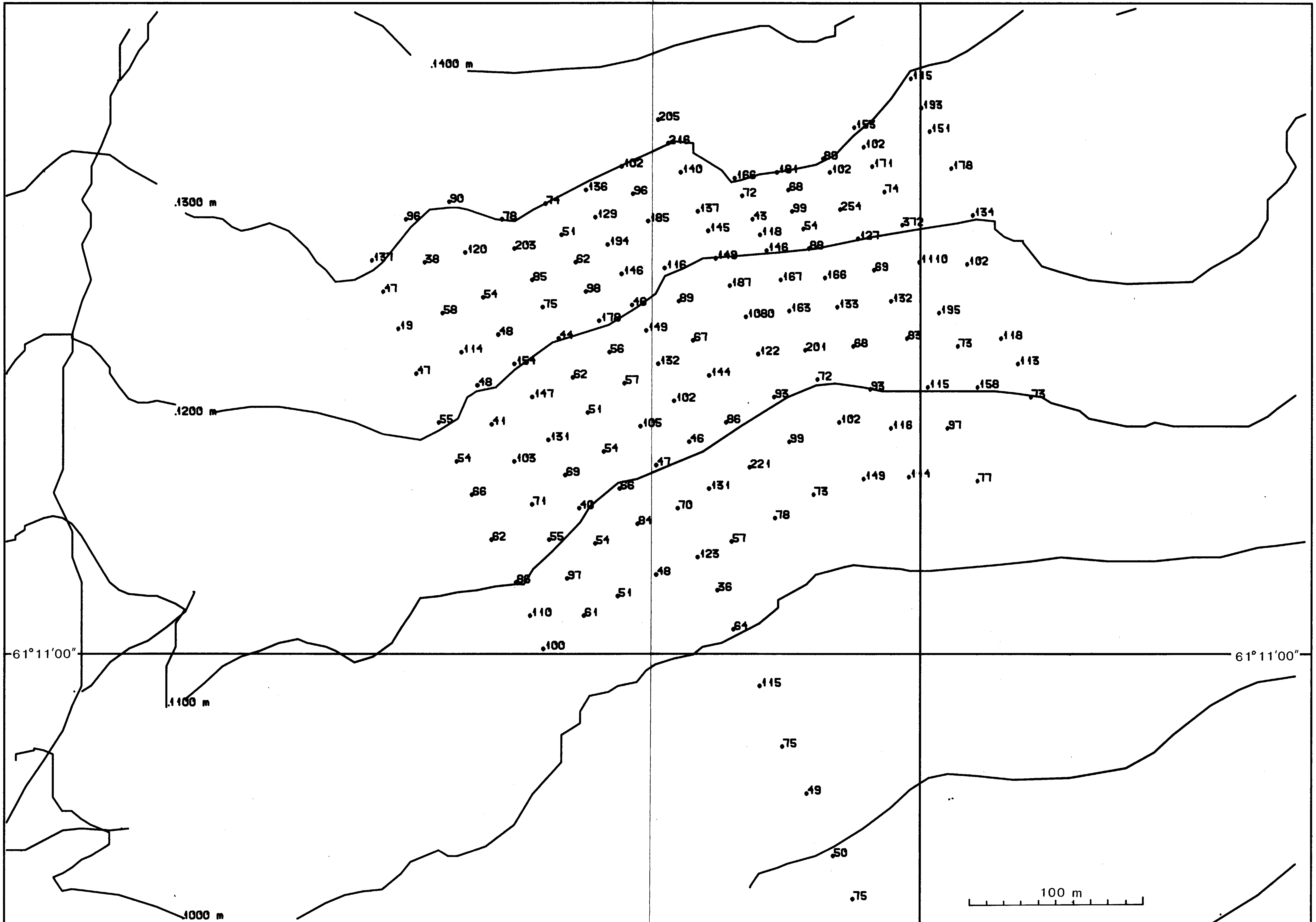


Appendix 4 Loc. 4 Nb ppm



Appendix 5 Loc. 4 Ta ppm


1400 m
1300 m
1200 m
1100 m
1000 m
61°11'00"
61°11'00"
100 m
32
36
66
21
31
147
36
52
197
18
215
47
50
723
324
35
54
58
26
32
88
294
38
98
28
31
35
129
141
45
32
62
33
30
160
71
92
45
574
100
18
48
81
44
30
116
37
50
30
251
291
27
111
86
51
46
28
24
236
29
214
44
67
46
98
66
55
35
9
156
20
65
129
30
84
62
73
32
19
13
56
65
35
111
18
21
27
28
16
145
14
42
38
31
54
24
39
23
36
91
33
92
45
47
63
26
16
185
29
23
85
36
53
91
38
194
39
197
26
32
56
14
28
11
278
83
60
15
28
84
27
162
18
37
17
24
56
43
30
298
76
31
103
30
52


1400 m
1300 m
1200 m
1100 m
1000 m
61°11'00"
61°11'00"
100 m

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Appendix 8

Minimum curvature contour map of airborne gamma–spectrometry

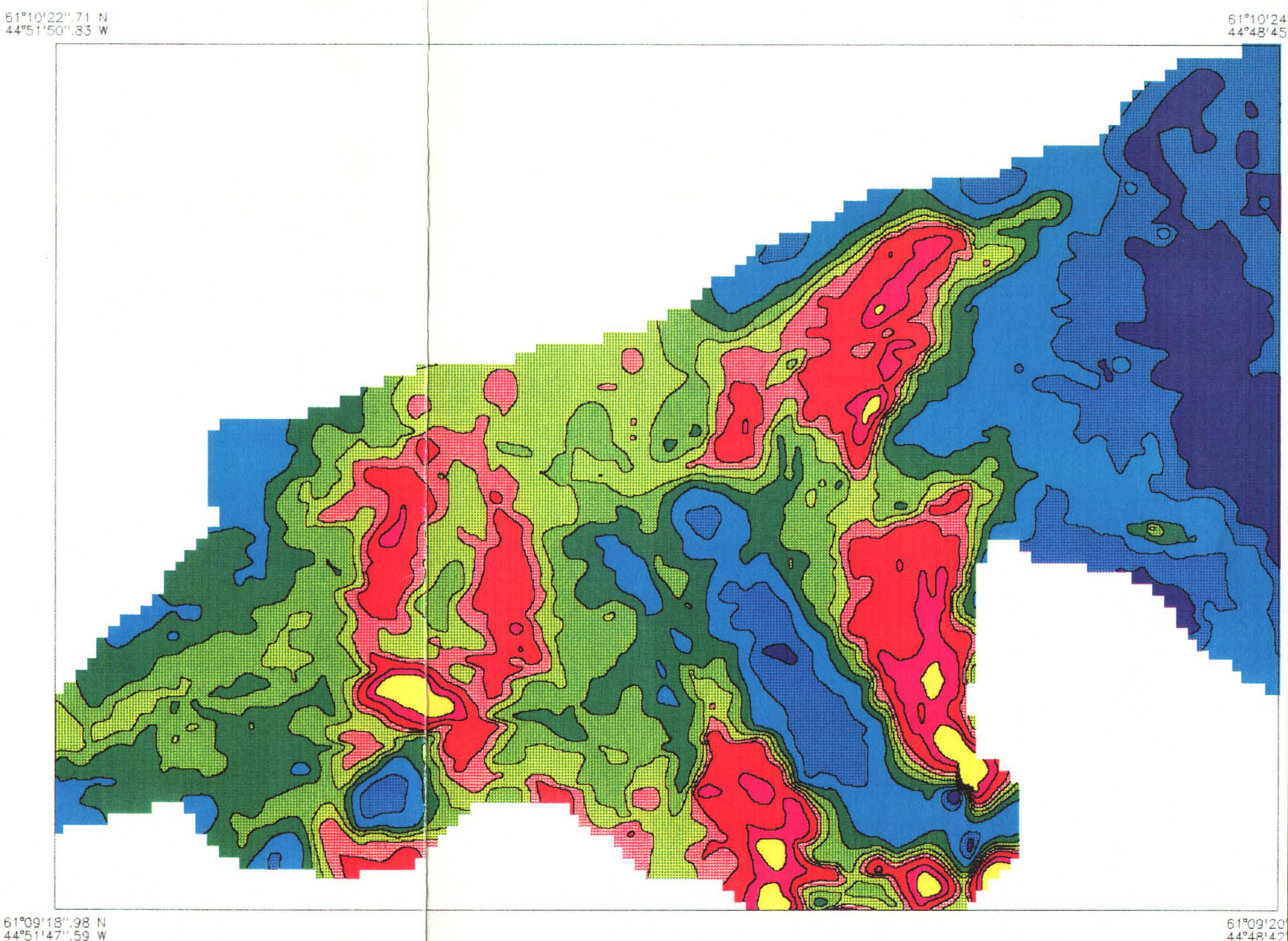
Locality 1+2 Uranium

Contour intervals

cps U

above	500
400 –	500
300 –	400
250 –	300
200 –	250
150 –	200
100 –	150
50 –	100
25 –	50
below	25

500 m



Prepared by
IMSOR Image Processing Group

THE GEOLOGICAL SURVEY OF GREENLAND
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Motzfeldt 87 – Final Report

Appendix 9

Minimum curvature contour map of airborne gamma–spectrometry

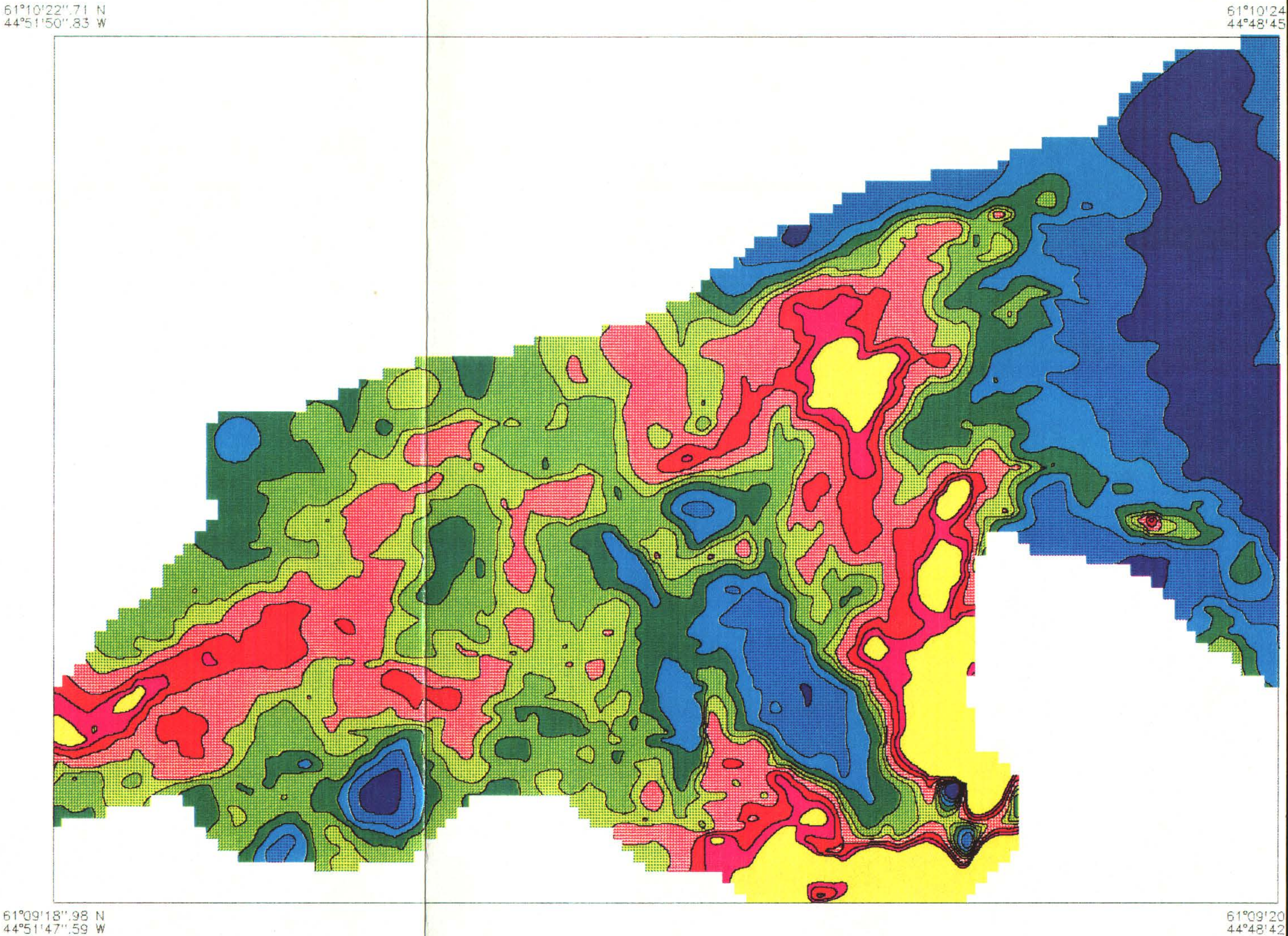
Locality 1+2 Thorium

Contour intervals

cps Th

above	600
	500 – 600
	400 – 500
	300 – 400
	250 – 300
	200 – 250
	150 – 200
	100 – 150
	50 – 100
below	50

500 m



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THE GEOLOGICAL SURVEY OF GREENLAND
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Appendix 10

Minimum curvature contour map of airborne gamma–spectrometry

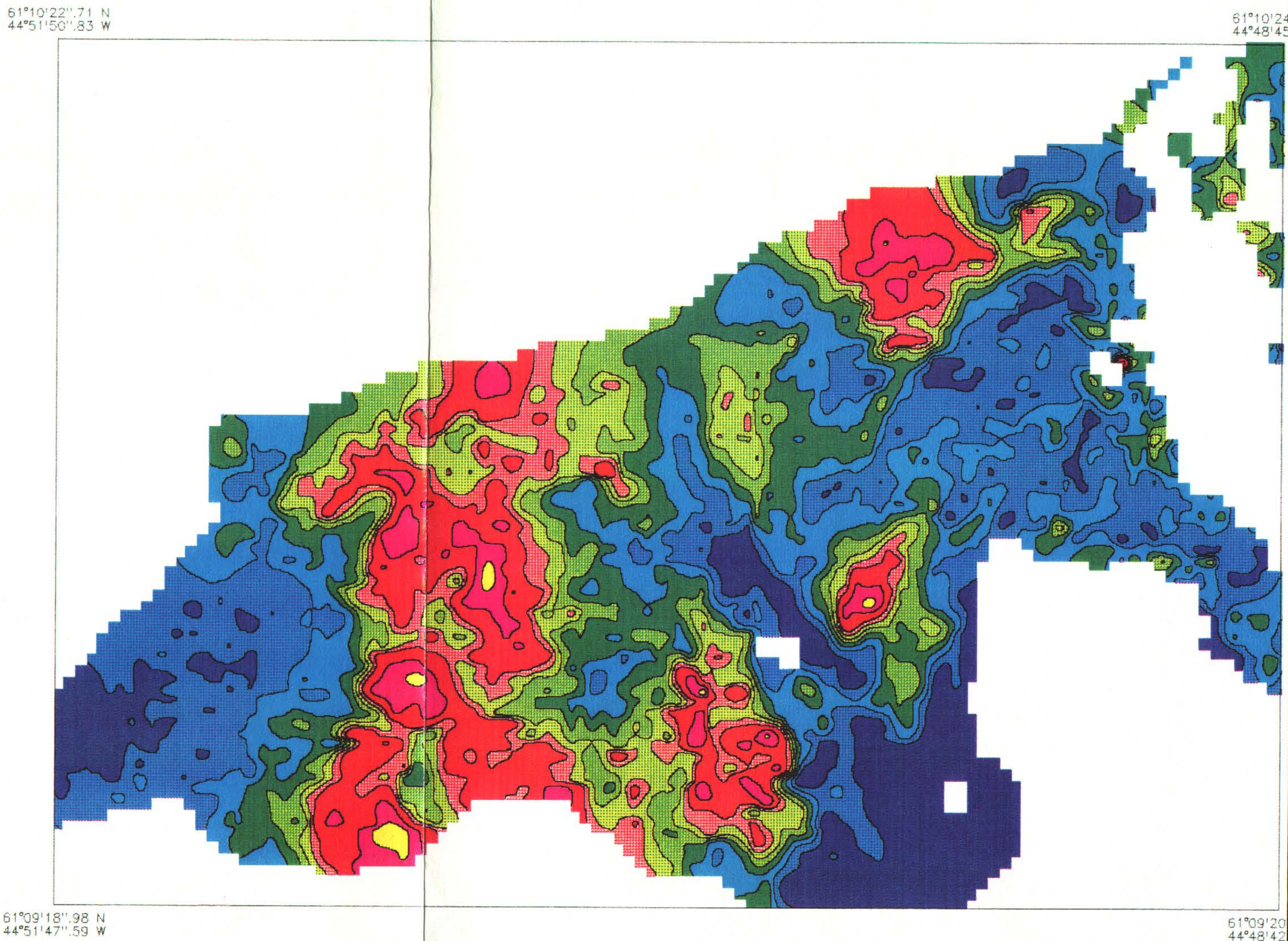
Locality 1+2   Uranium/Thorium

Contour intervals

ratio U/Th

above	1.5
1.3 –	1.5
1.0 –	1.3
0.9 –	1.0
0.8 –	0.9
0.7 –	0.8
0.6 –	0.7
0.5 –	0.6
0.4 –	0.5
below	0.4

500 m



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Appendix **11**

Minimum curvature contour map of airborne gamma–spectrometry

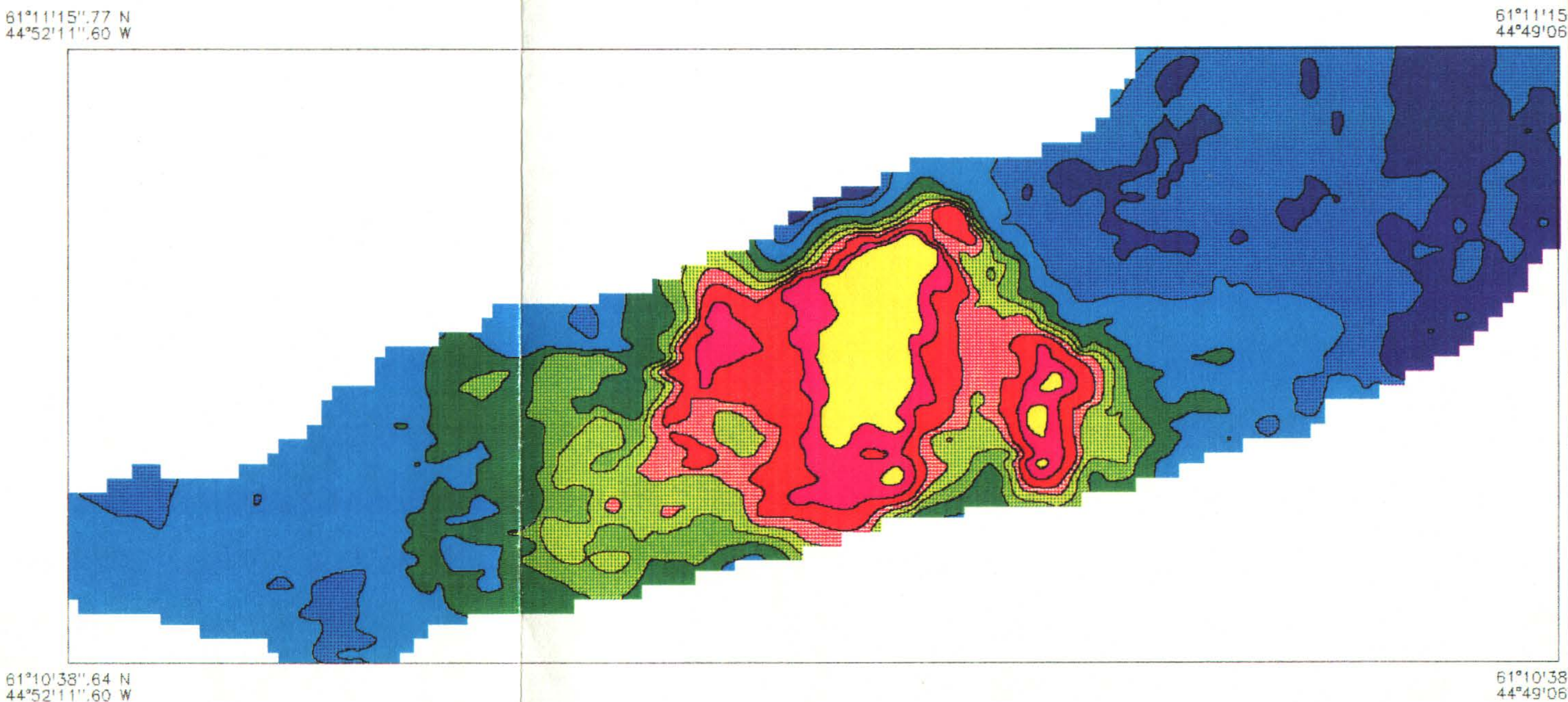
Locality 3 Uranium

Contour intervals

cps U

above	500
400 –	500
300 –	400
250 –	300
200 –	250
150 –	200
100 –	150
50 –	100
25 –	50
below	25

500 m



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Appendix 12

Minimum curvature contour map of
airborne gamma–spectrometry

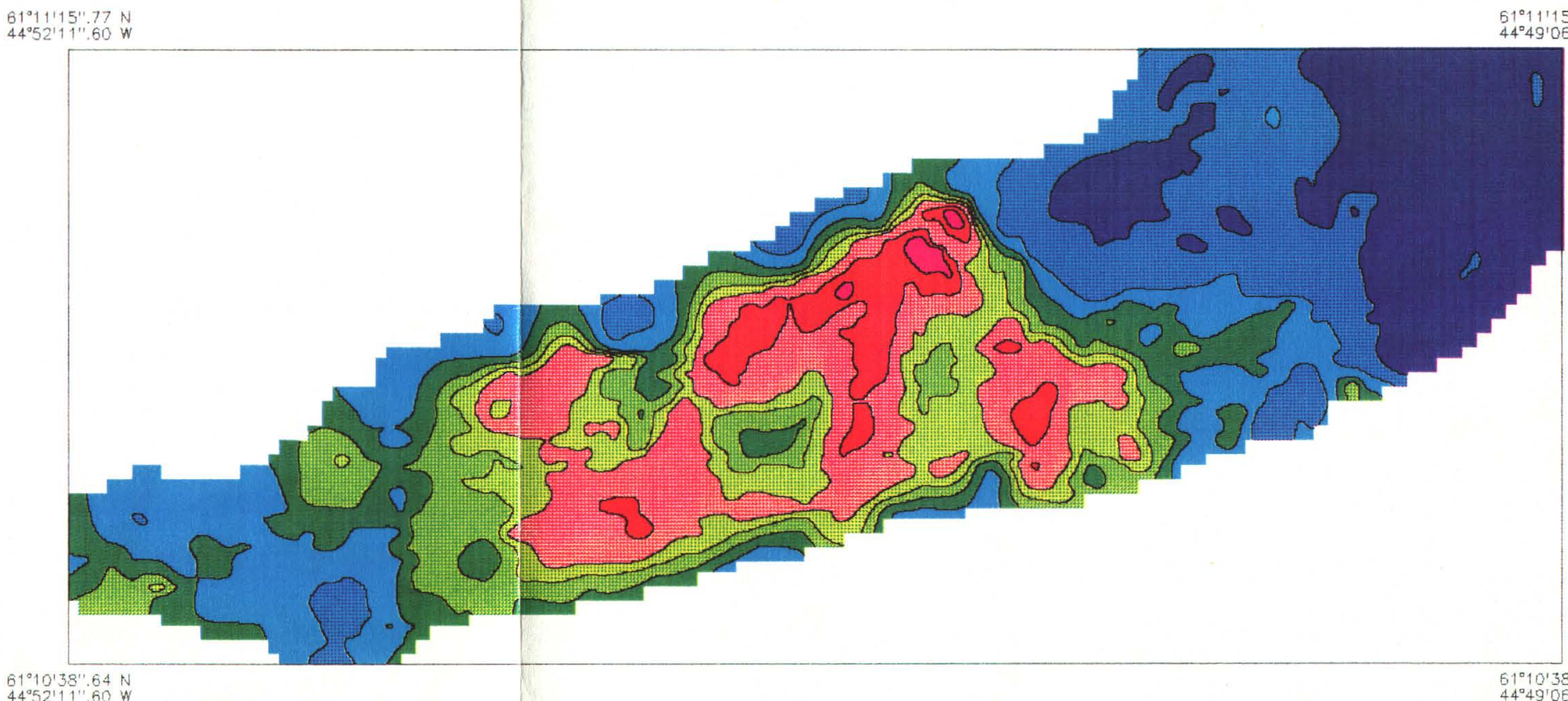
Locality 3 Thorium

Contour intervals

cps Th

above	600
	500 – 600
	400 – 500
	300 – 400
	250 – 300
	200 – 250
	150 – 200
	100 – 150
	50 – 100
below	50

500 m



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Appendix **13**

Minimum curvature contour map of airborne gamma–spectrometry

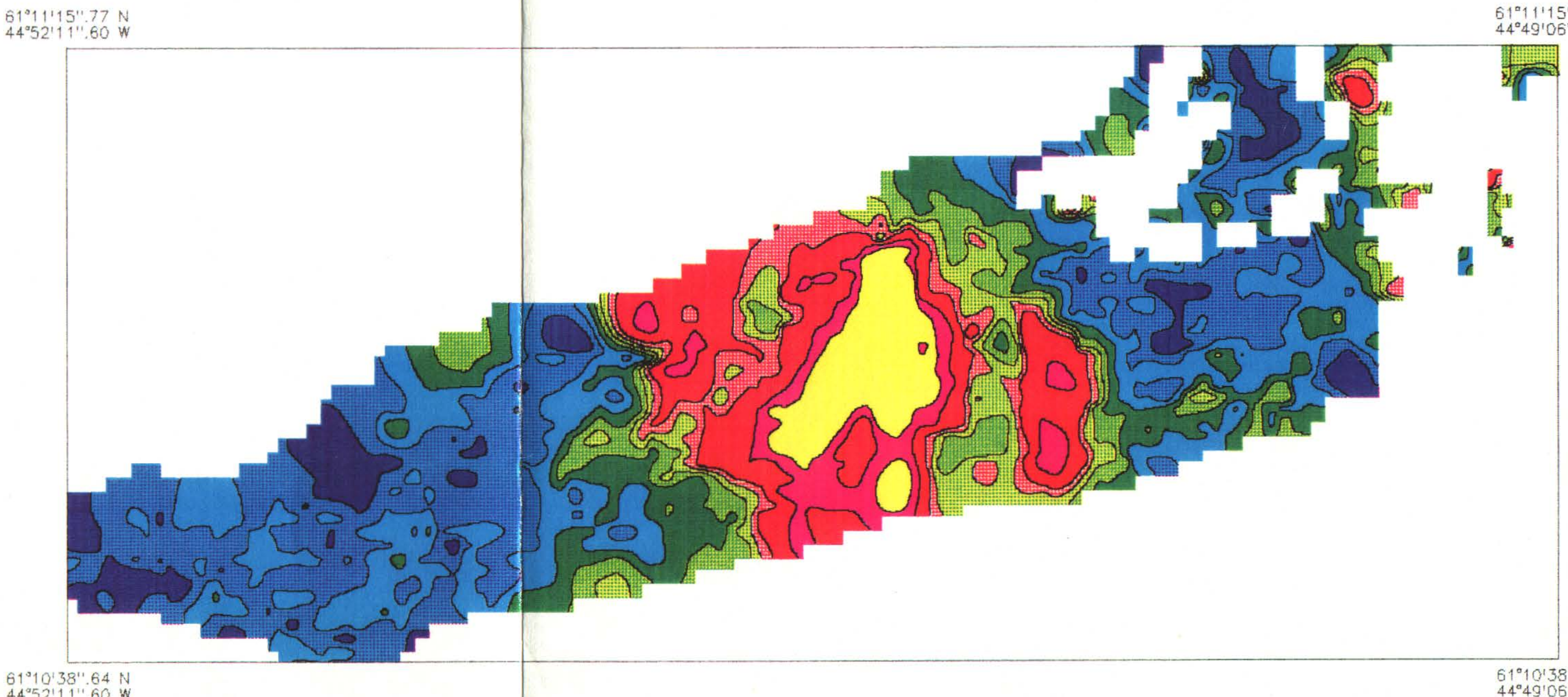
Locality 3 Uranium/Thorium

Contour intervals

ratio U/Th

above	1.5
1.3 –	1.5
1.0 –	1.3
0.9 –	1.0
0.8 –	0.9
0.7 –	0.8
0.6 –	0.7
0.5 –	0.6
0.4 –	0.5
below	0.4

500 m



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Appendix **14**

Minimum curvature contour map of airborne gamma–spectrometry

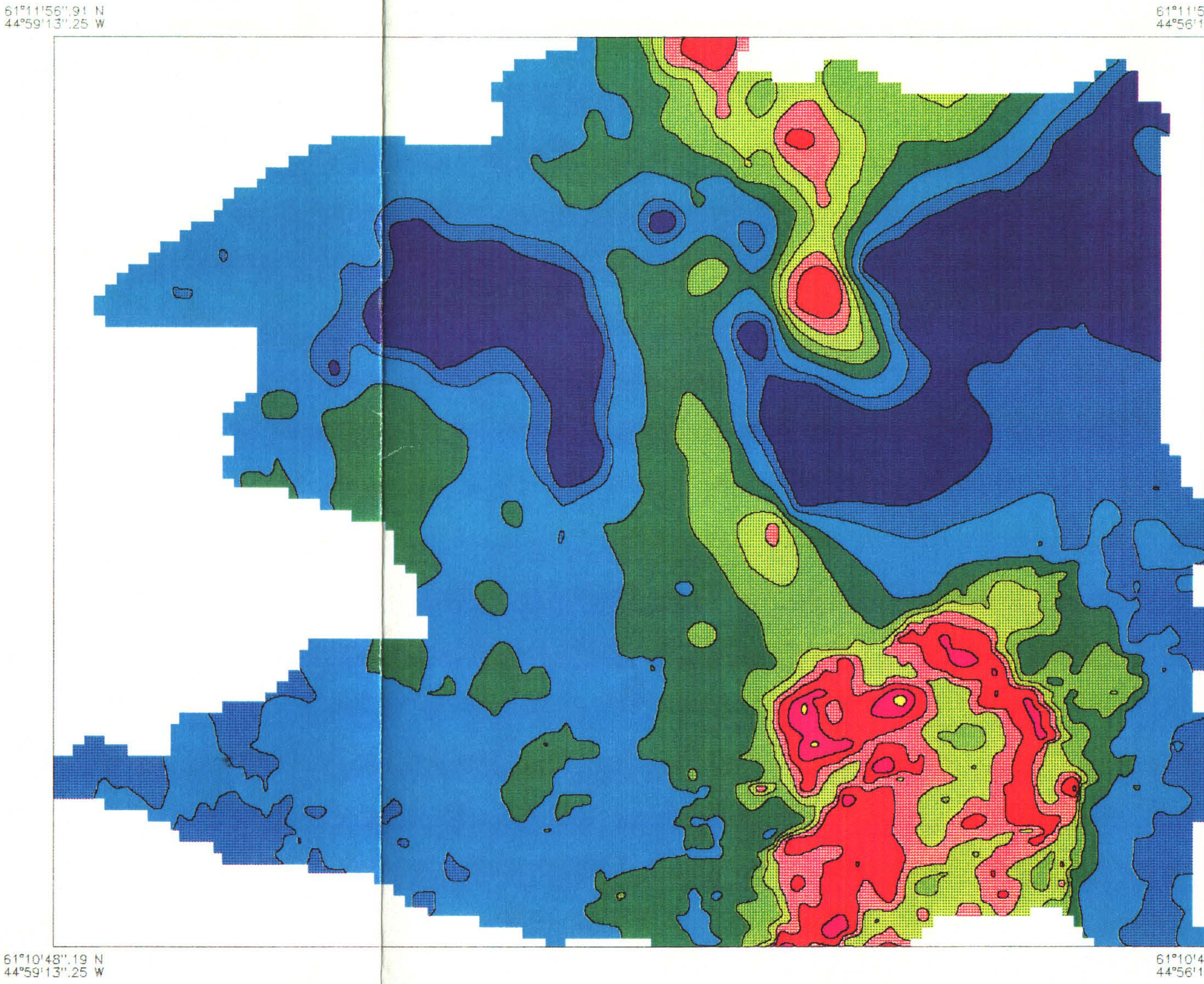
Locality 4 Uranium

Contour intervals

cps U

above	500
400 –	500
300 –	400
250 –	300
200 –	250
150 –	200
100 –	150
50 –	100
25 –	50
below	25

500 m



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Appendix **15**

Minimum curvature contour map of airborne gamma–spectrometry

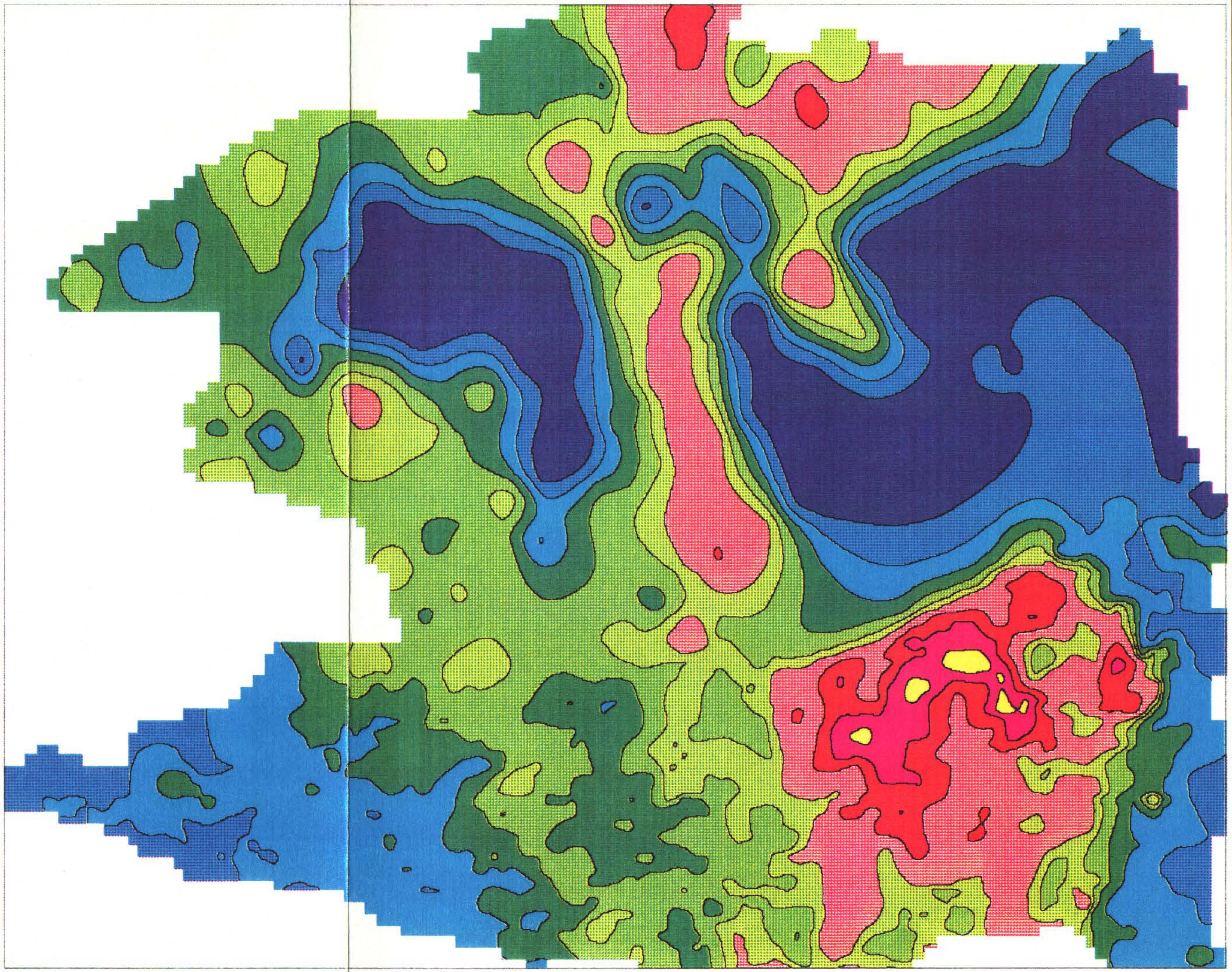
Locality 4 Thorium

Contour intervals

cps Th

above	600
500 – 600	
400 – 500	
300 – 400	
250 – 300	
200 – 250	
150 – 200	
100 – 150	
50 – 100	
below	50

500 m



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Appendix **16**

Minimum curvature contour map of airborne gamma–spectrometry

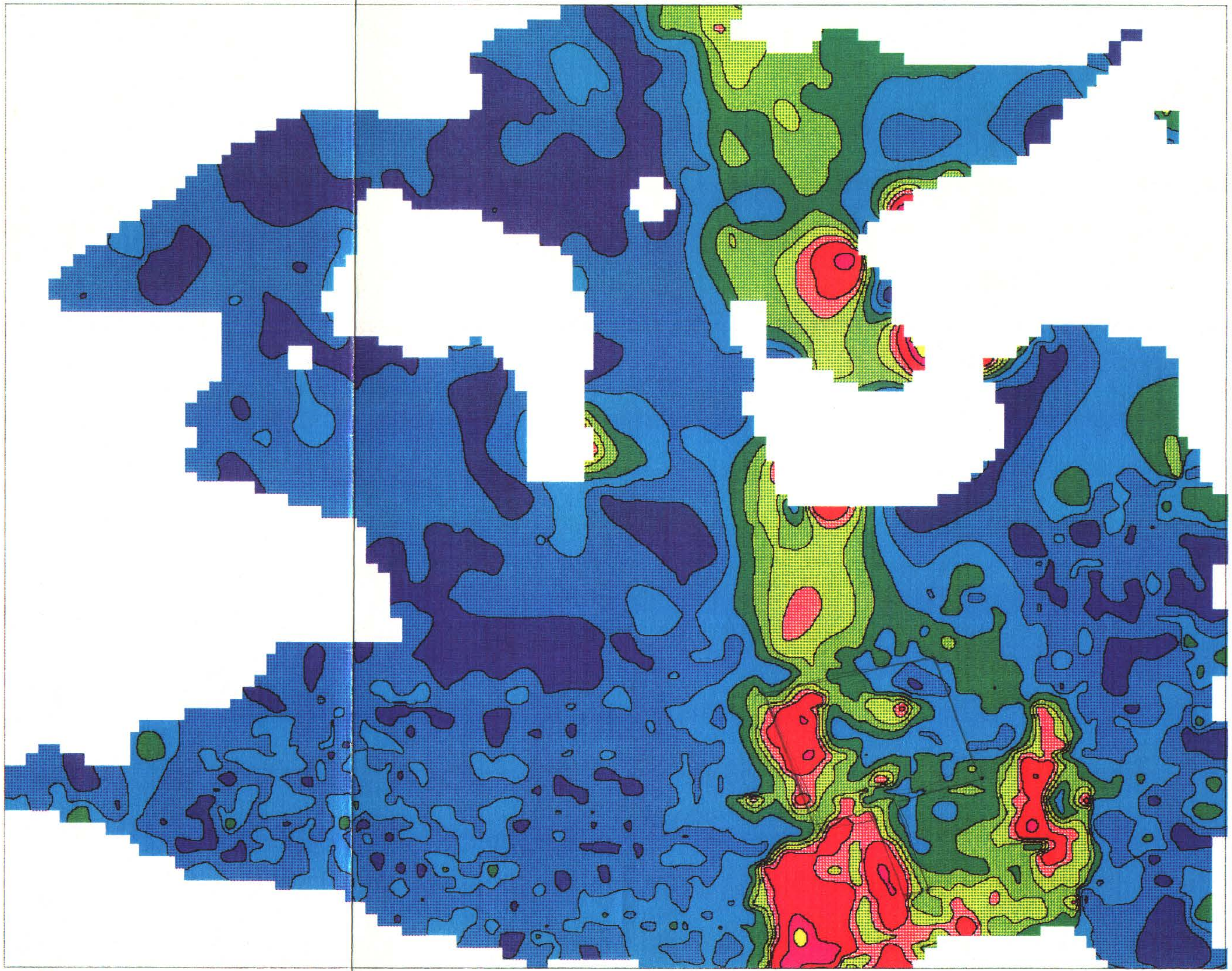
Locality 4 Uranium/Thorium

Contour intervals

ratio U/Th

- above 1.5
- 1.3 – 1.5
- 1.0 – 1.3
- 0.9 – 1.0
- 0.8 – 0.9
- 0.7 – 0.8
- 0.6 – 0.7
- 0.5 – 0.6
- 0.4 – 0.5
- below 0.4

500 m



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Appendix **17**

Minimum curvature contour map of airborne gamma–spectrometry

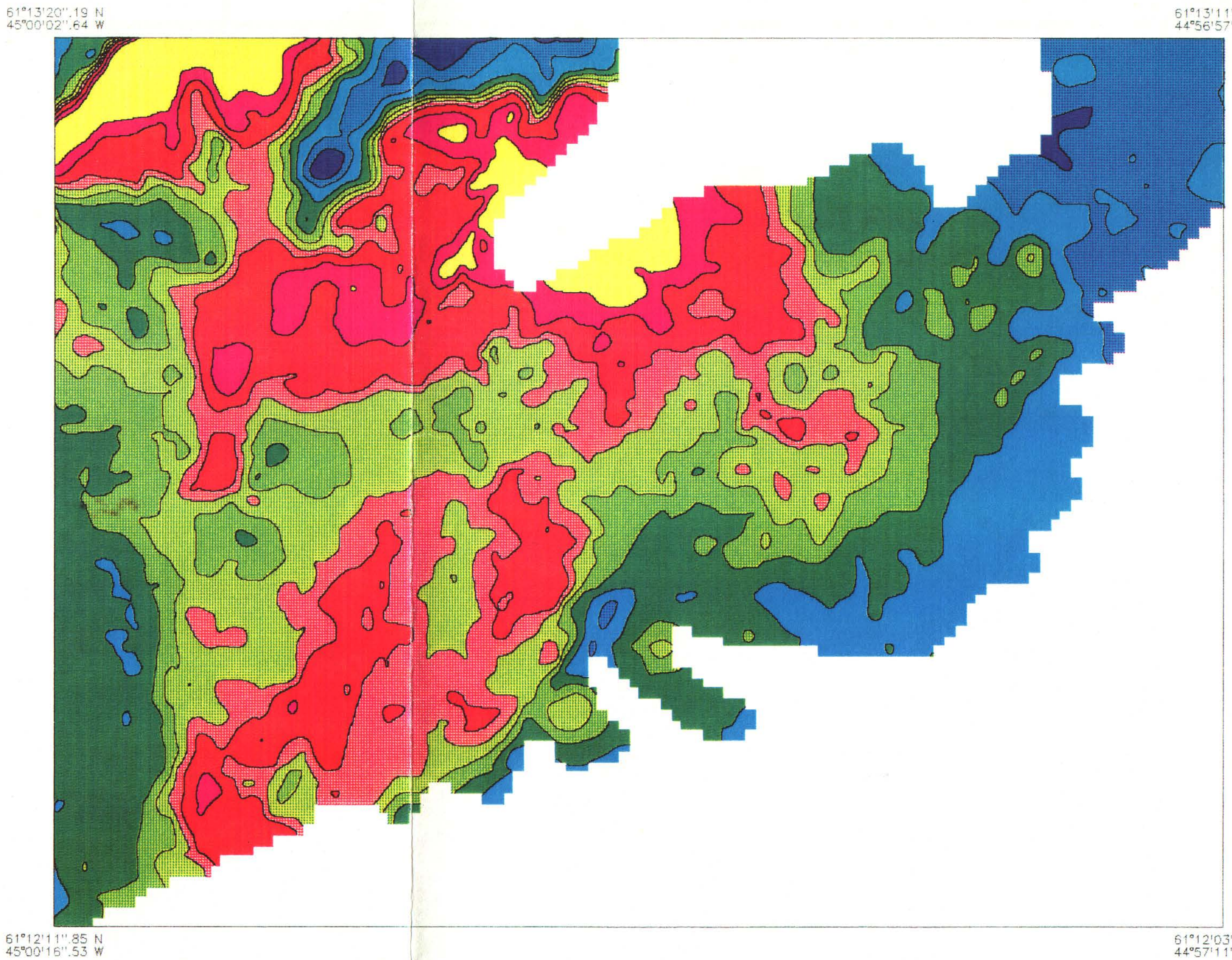
Locality 5 Uranium

Contour intervals

cps U

above	500
400	– 500
300	– 400
250	– 300
200	– 250
150	– 200
100	– 150
50	– 100
25	– 50
below	25

500 m



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Appendix **18**

Minimum curvature contour map of airborne gamma–spectrometry

Locality 5 Thorium

Contour intervals

cps Th

above	600
500 – 600	
400 – 500	
300 – 400	
250 – 300	
200 – 250	
150 – 200	
100 – 150	
50 – 100	
below	50

500 m

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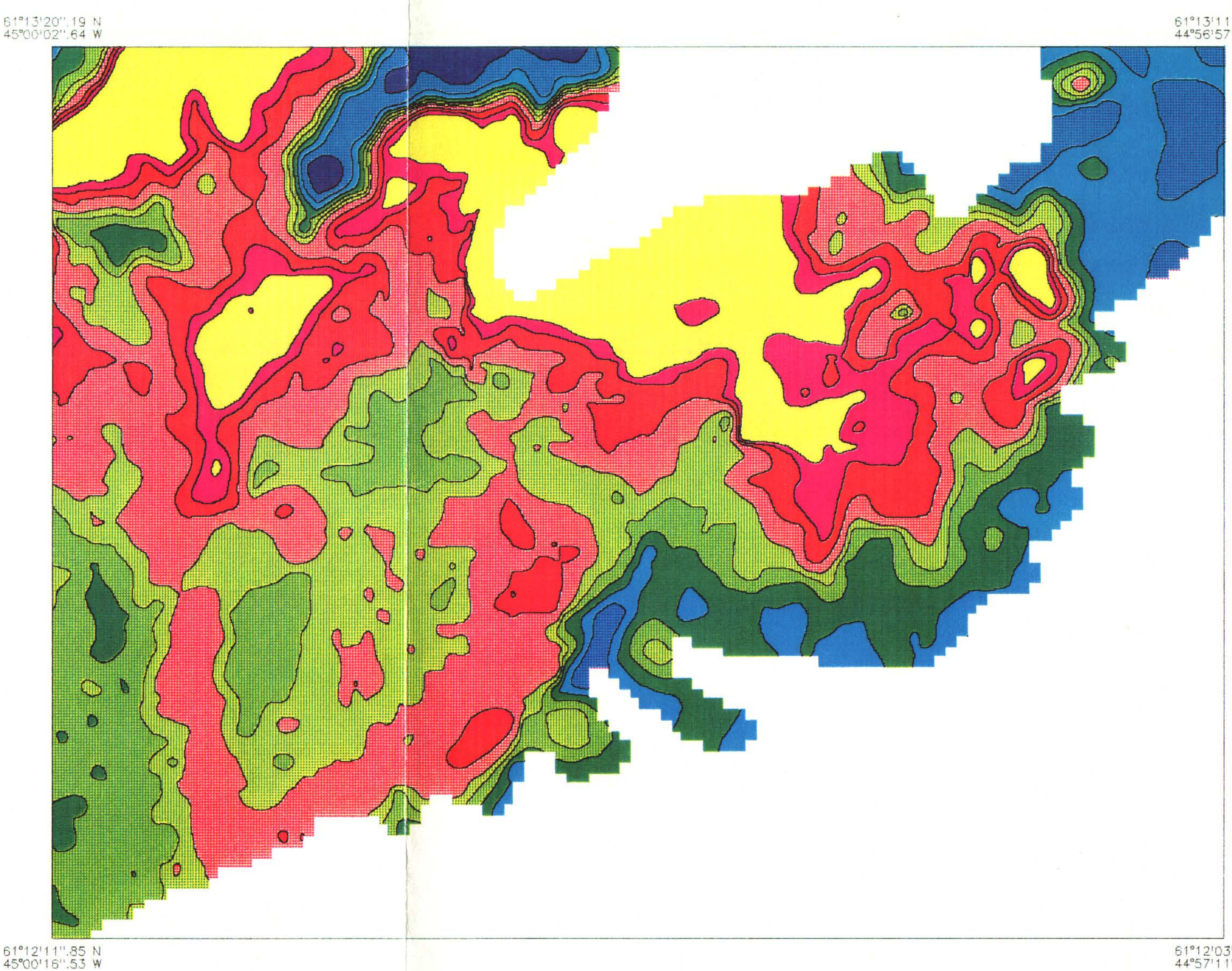

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Appendix **19**

Minimum curvature contour map of airborne gamma–spectrometry

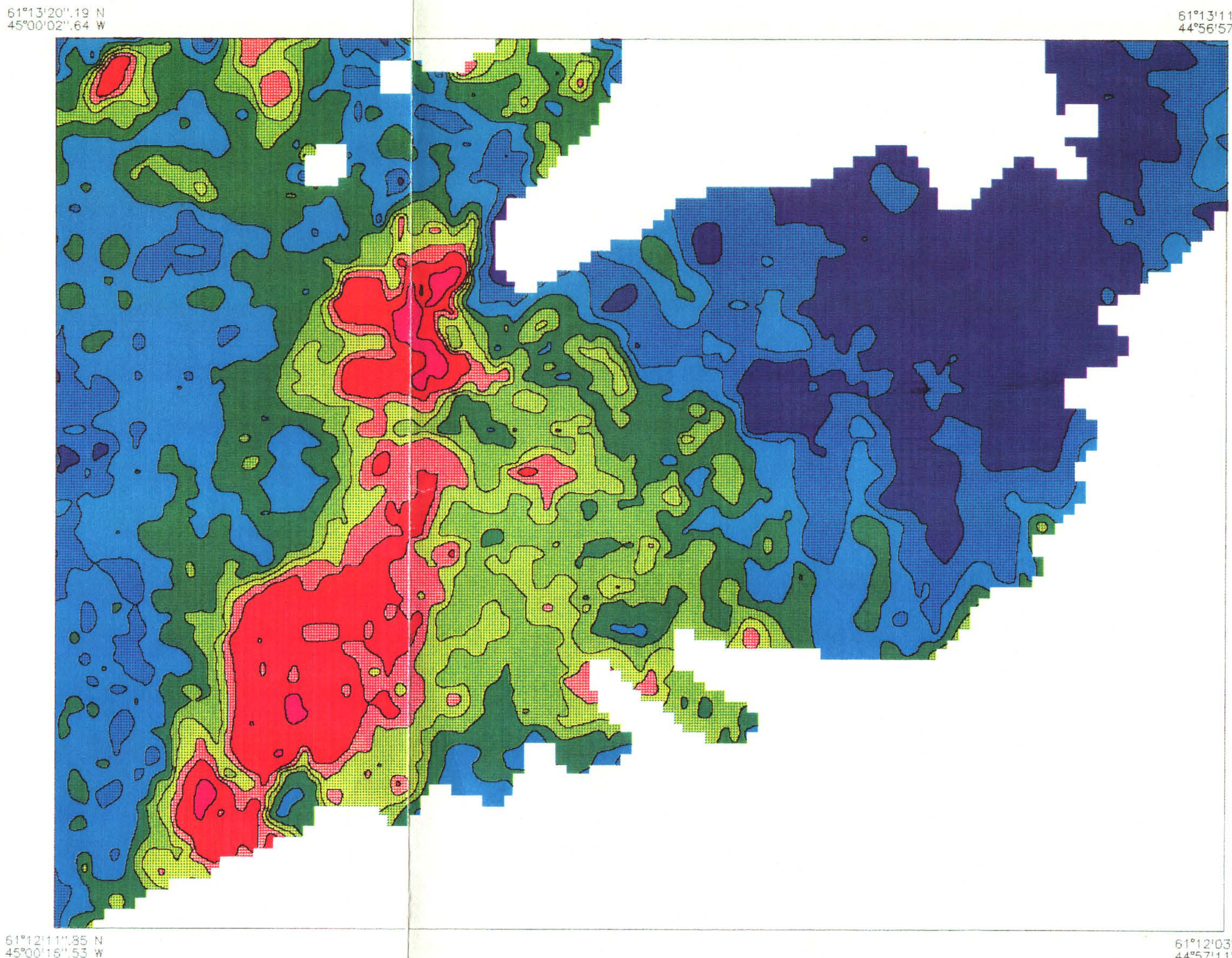
Locality 5 Uranium/Thorium

Contour intervals

ratio U/Th

above	1.5
1.3 –	1.5
1.0 –	1.3
0.9 –	1.0
0.8 –	0.9
0.7 –	0.8
0.6 –	0.7
0.5 –	0.6
0.4 –	0.5
below	0.4

500 m



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Appendix 20

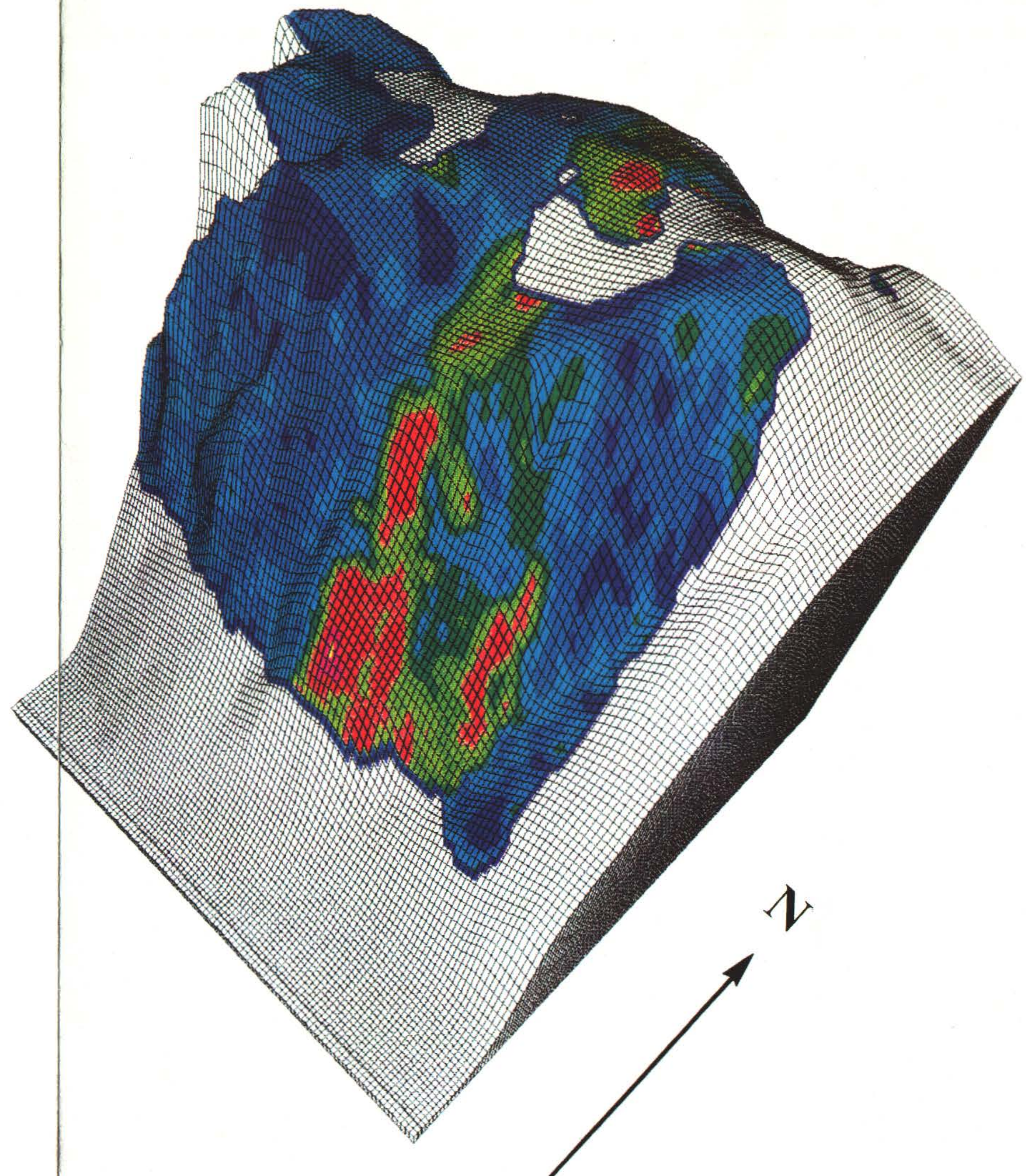
Perspective plot of terrain model with airborne gamma-spectrometry

Locality 4 Uranium/Thorium

ratio U/Th

above	1.5
1.3 –	1.5
1.0 –	1.3
0.9 –	1.0
0.8 –	0.9
0.7 –	0.8
0.6 –	0.7
0.5 –	0.6
0.4 –	0.5
0.5 –	0.4

Grid size 25 m



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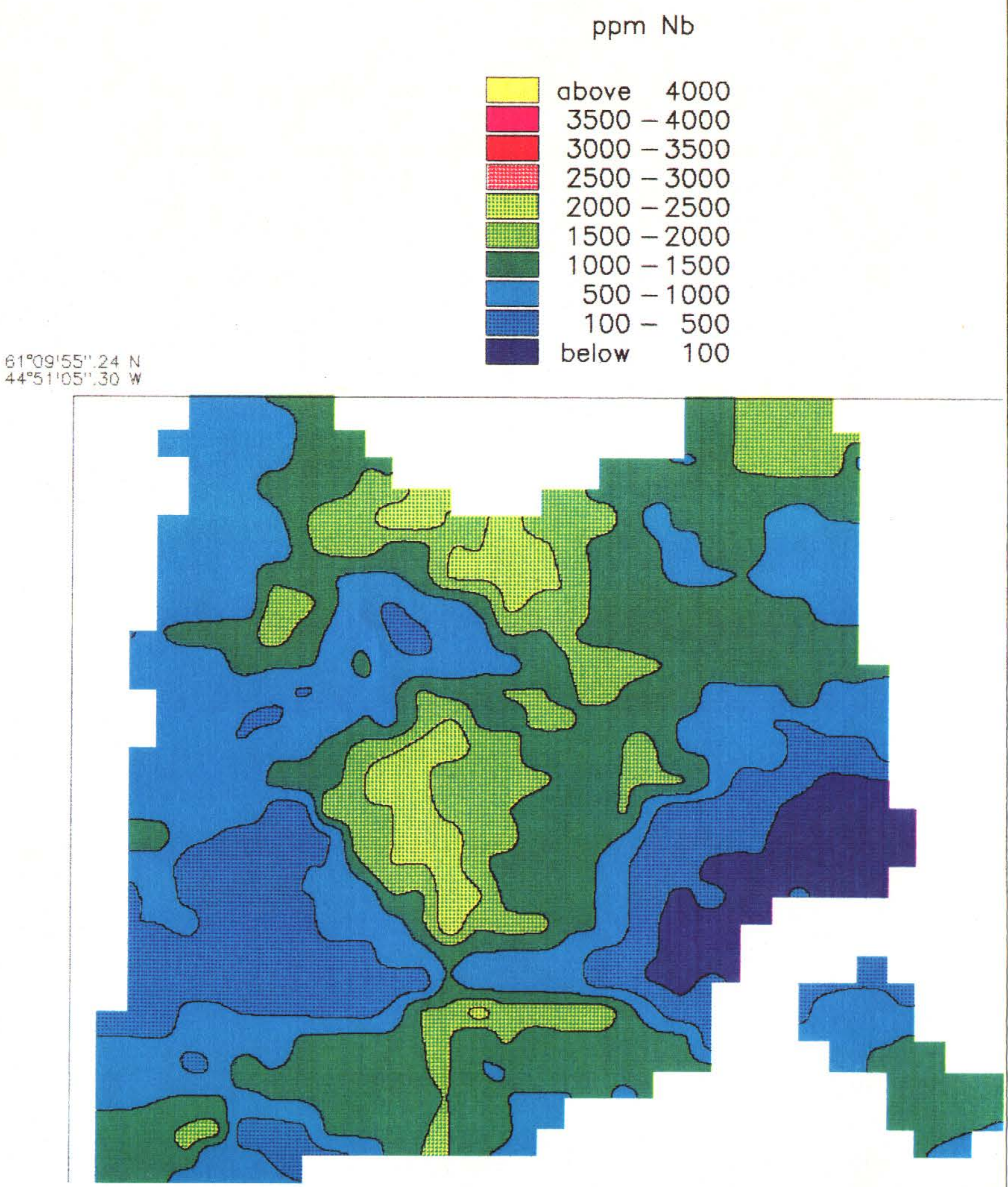
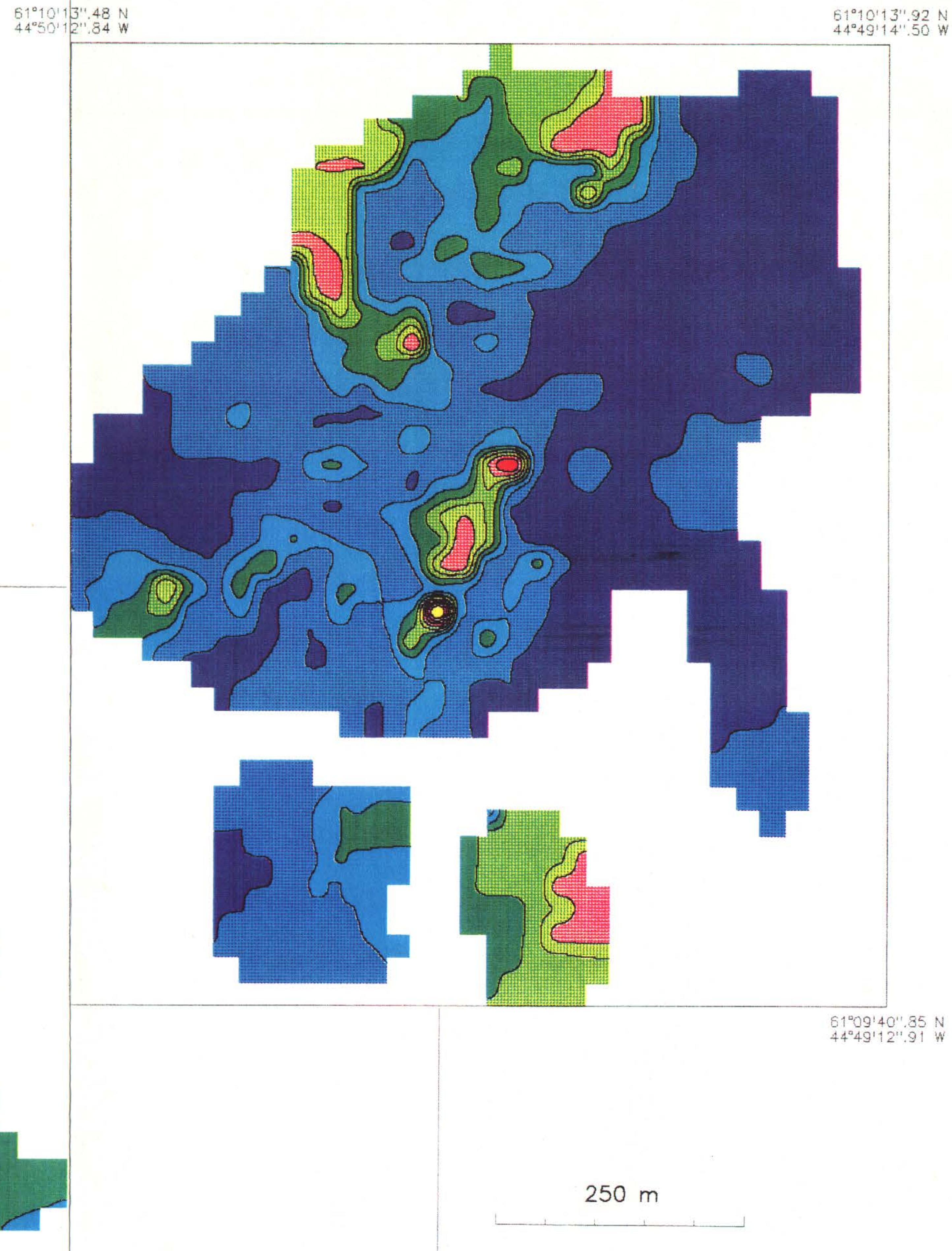
Appendix 21

Kriged contour map of chip samples

Locality 1+2 Niobium





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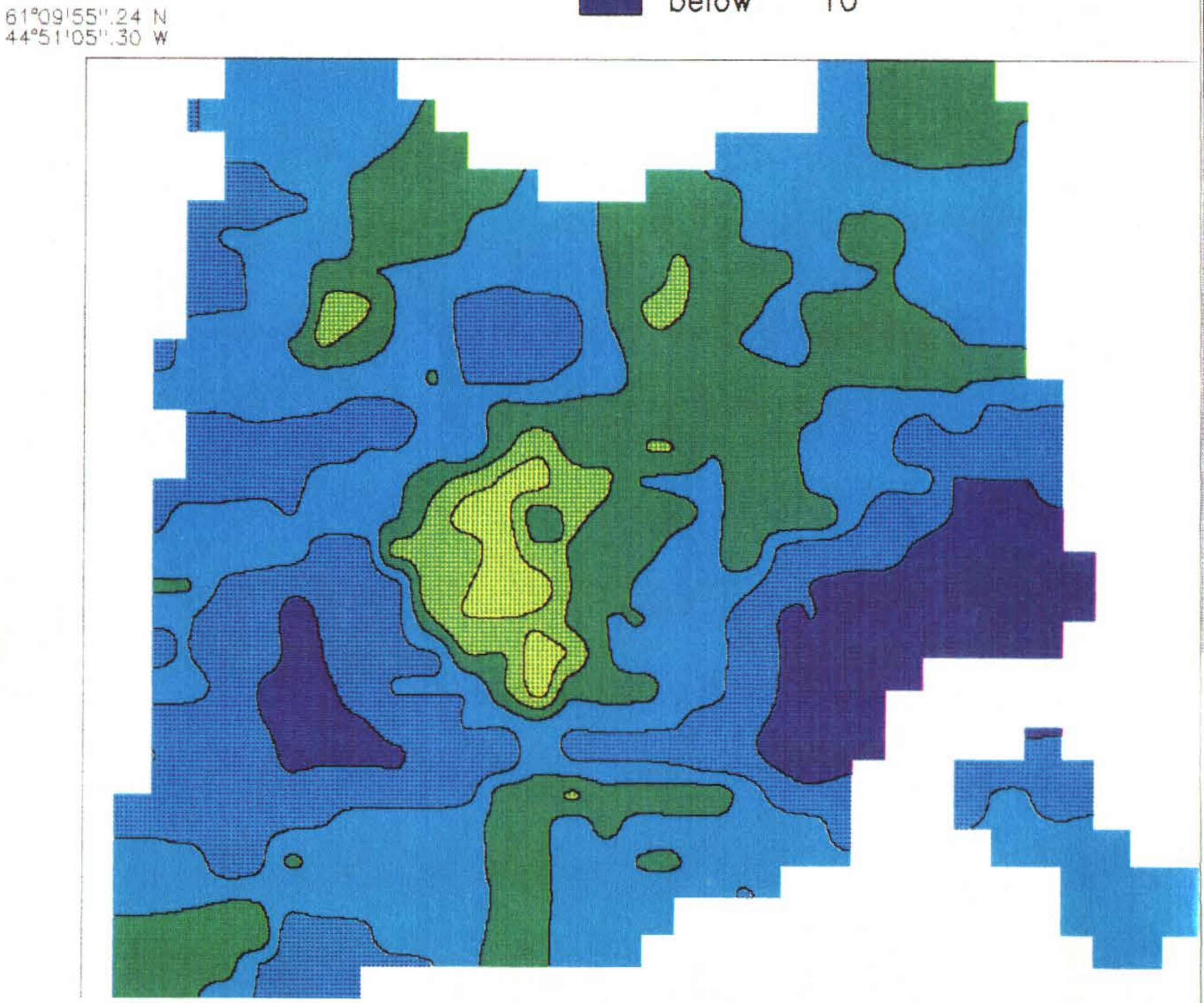
Appendix 22

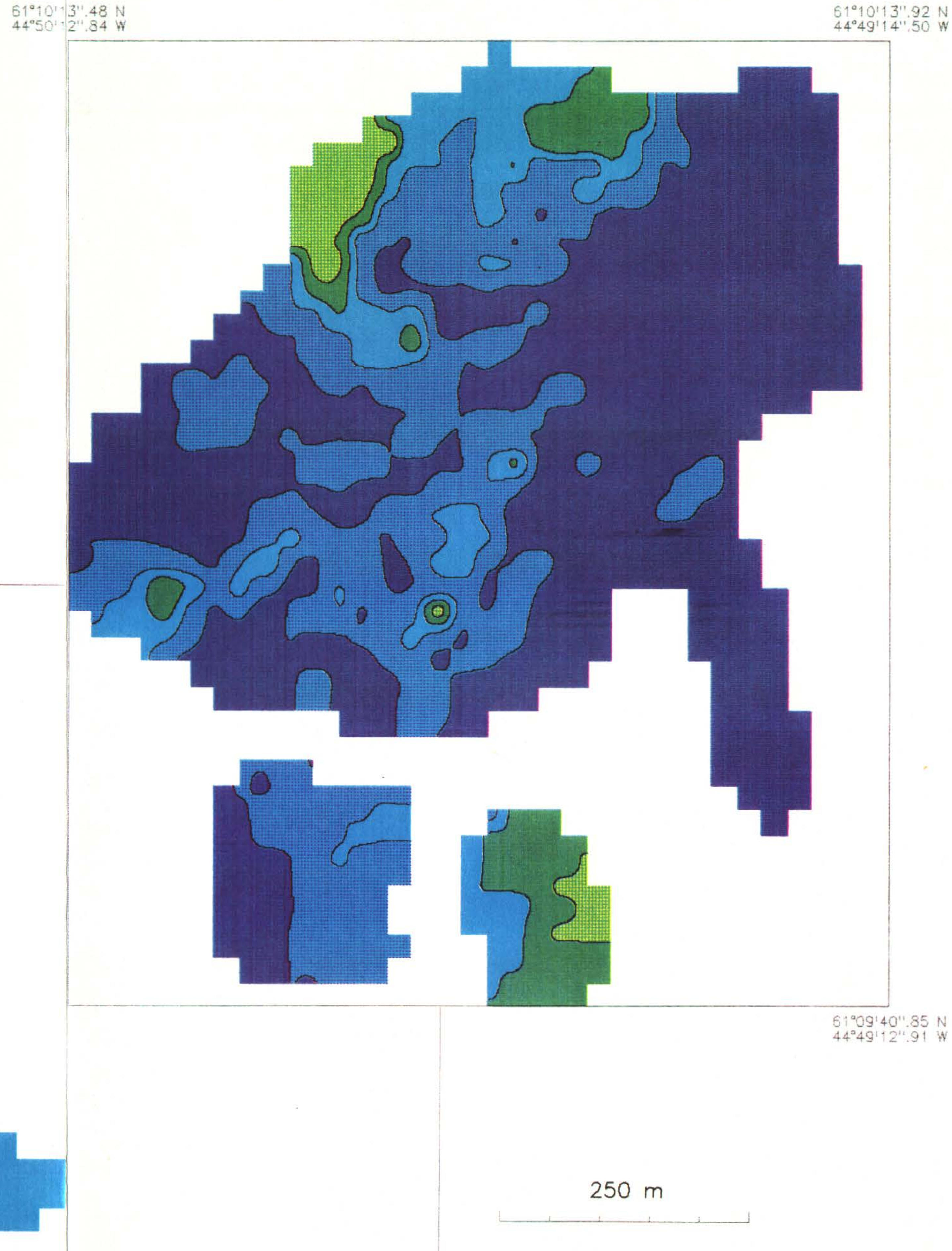
Kriged contour map of chip samples

Locality 1+2 Tantalum

ppm Ta

above 400
350 – 400
300 – 350
250 – 300
200 – 250
150 – 200
100 – 150
50 – 100
10 – 50
below 10





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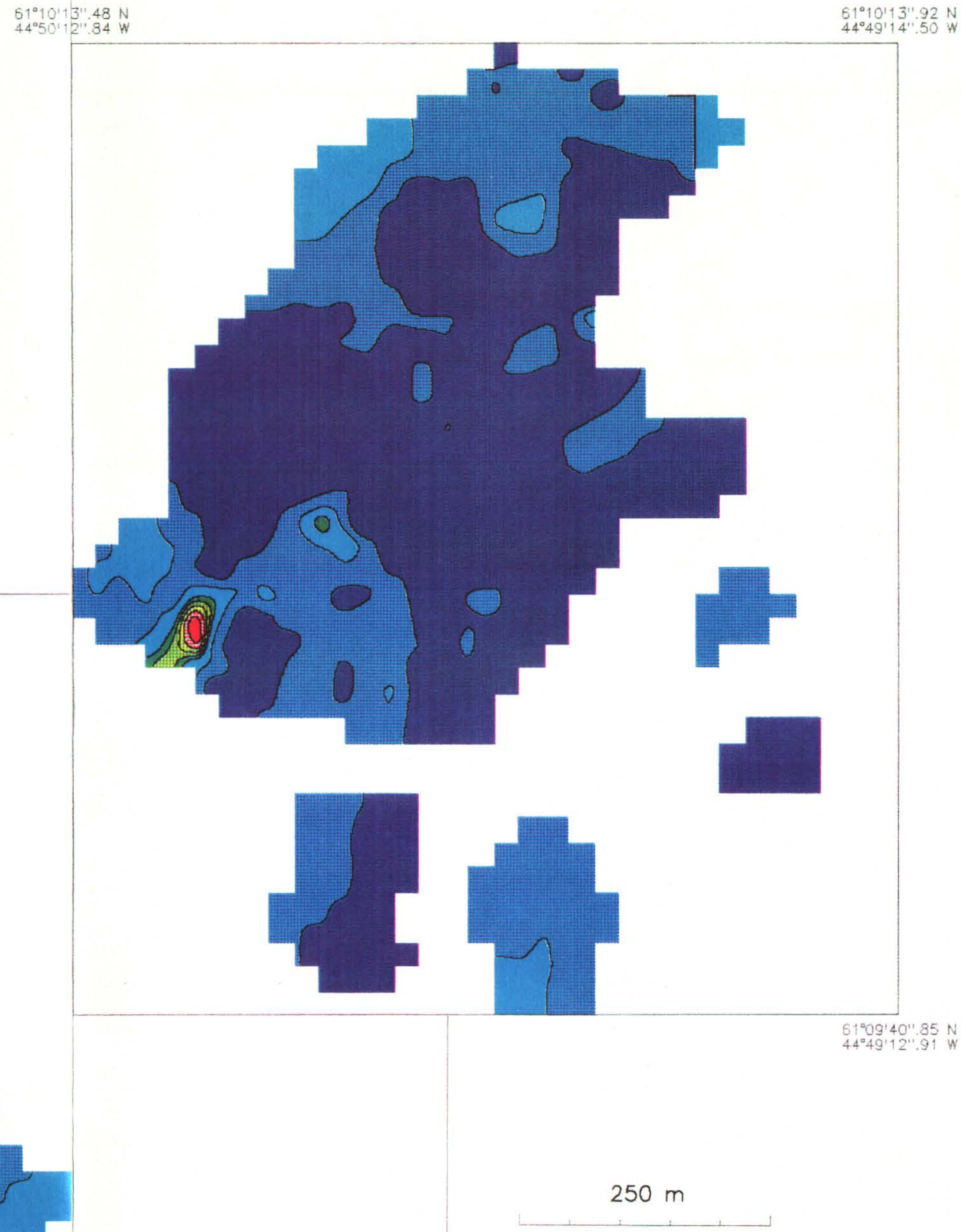
Appendix 23

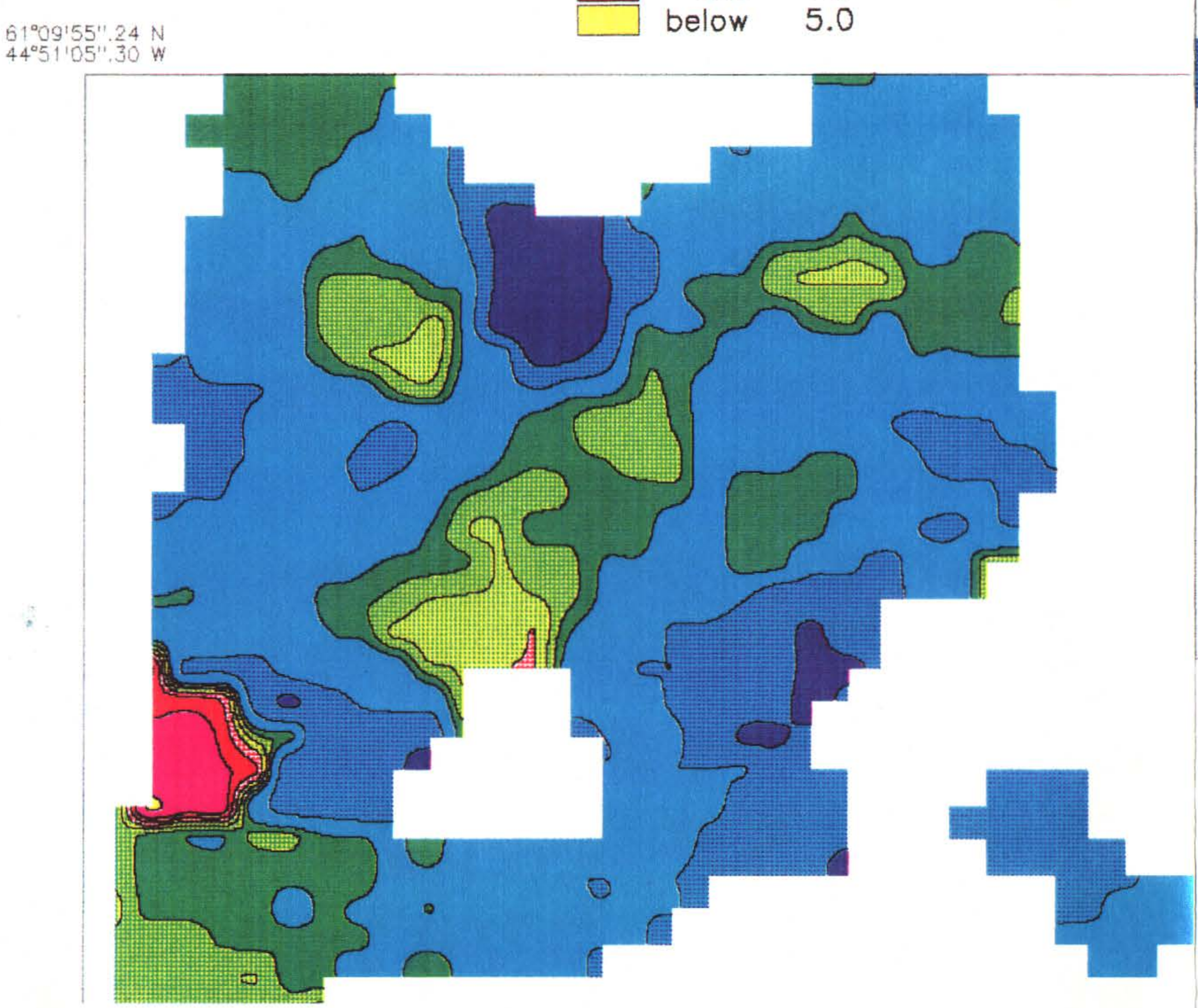
Kriged contour map of chip samples

Locality 1 + 2 Niobium/Tantalum

ratio Nb/Ta

above 20.0
15.0 – 20.0
12.0 – 15.0
11.0 – 12.0
10.0 – 11.0
9.0 – 10.0
8.0 – 9.0
7.0 – 8.0
5.0 – 7.0
below 5.0

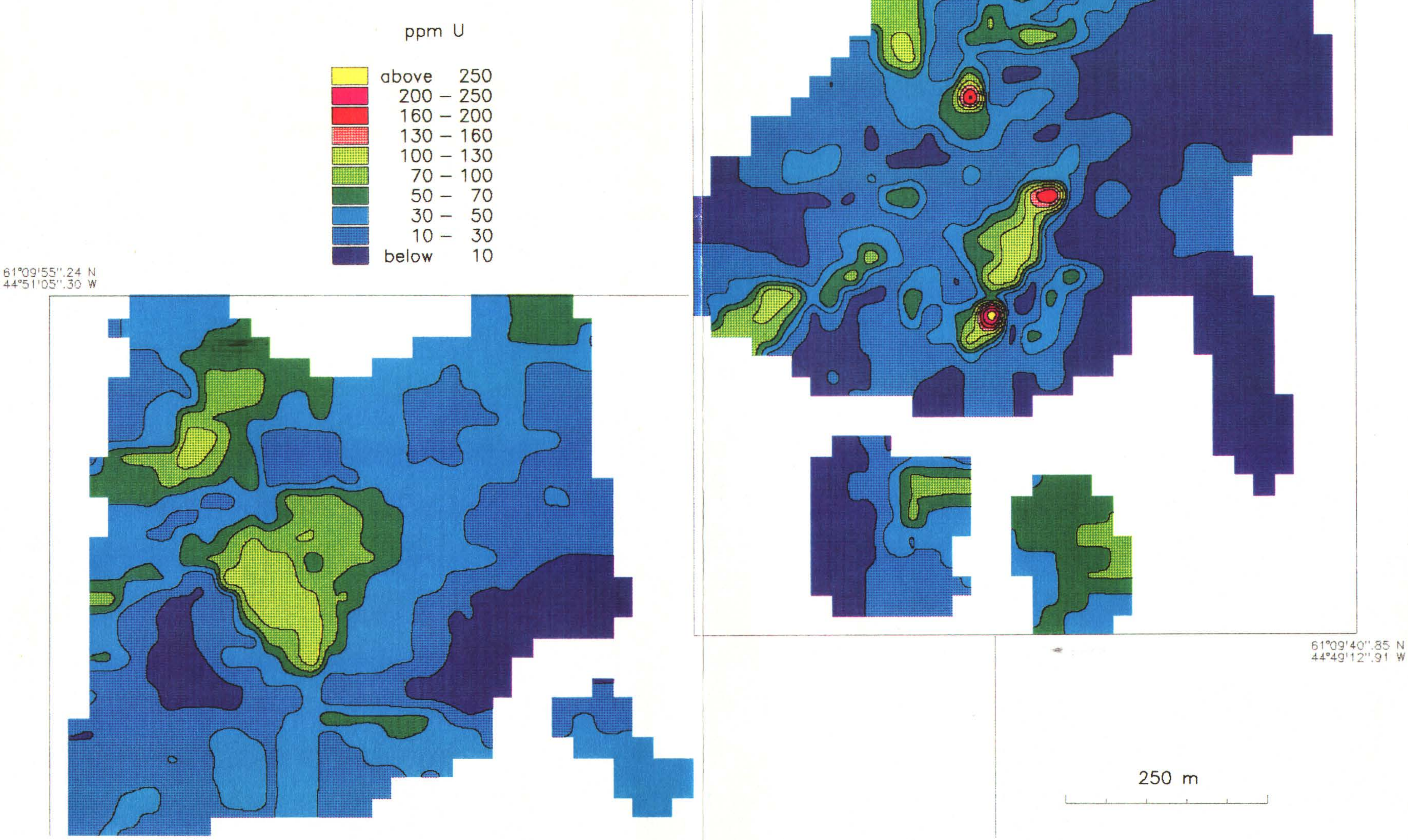




Appendix 24

Kriged contour map of chip samples

Locality 1 + 2 Uranium



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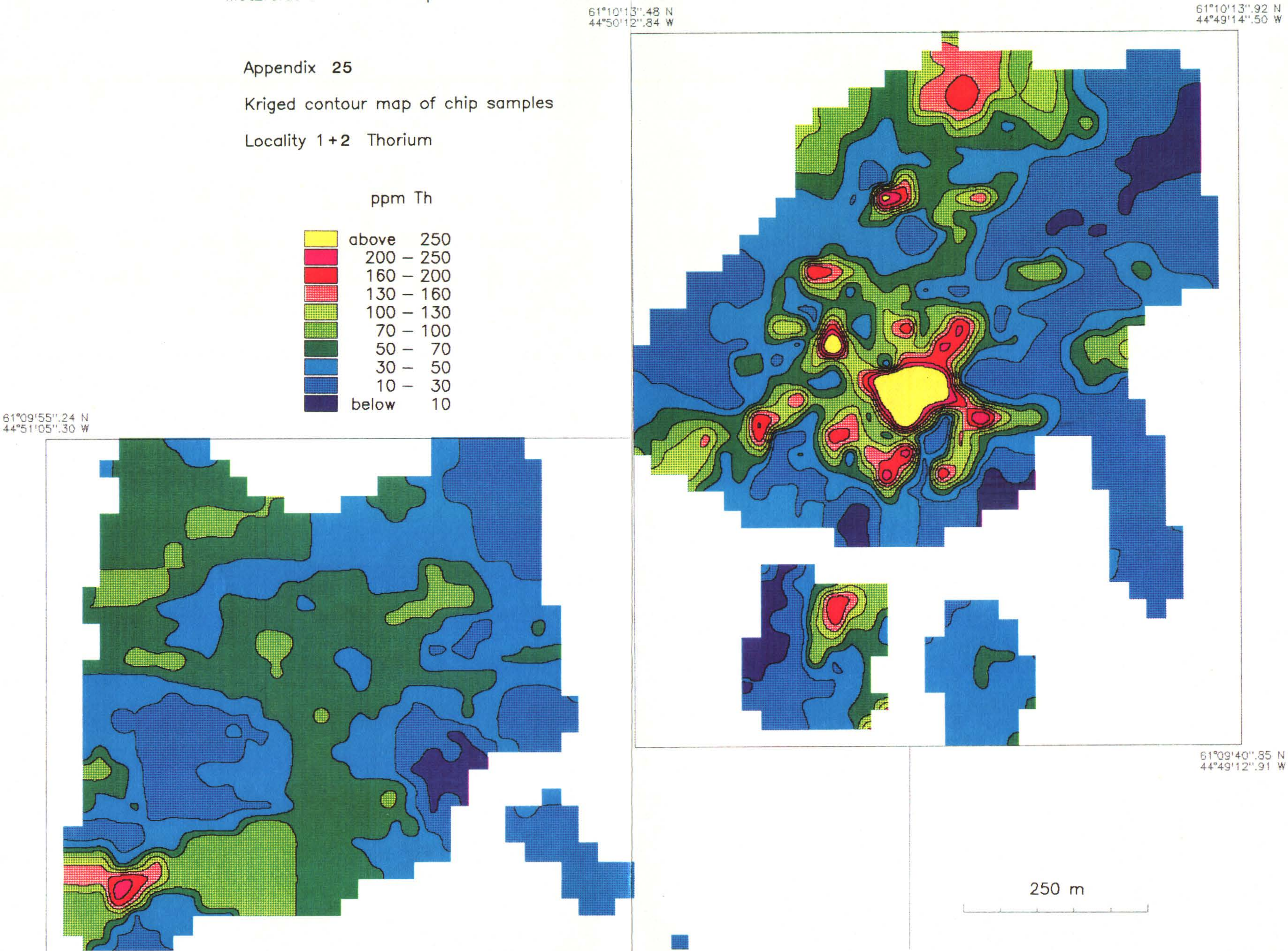
Appendix **25**

Kriged contour map of chip samples

Locality 1 + 2 Thorium



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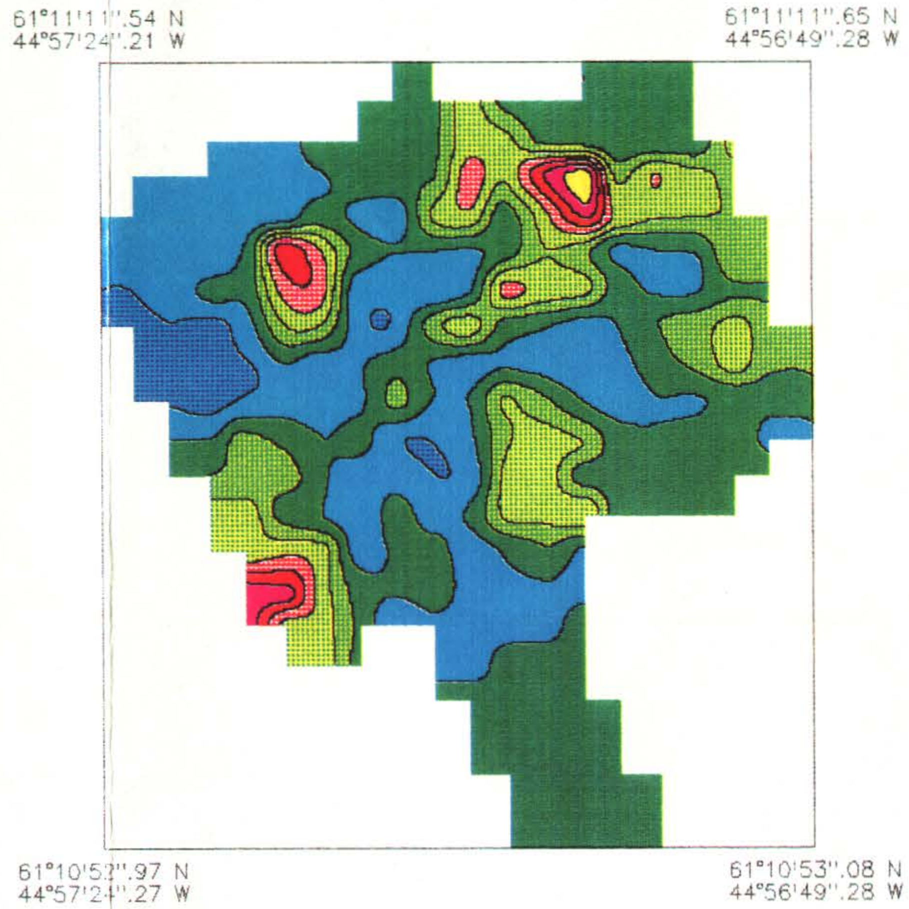
Appendix **26**

Kriged contour map of chip samples

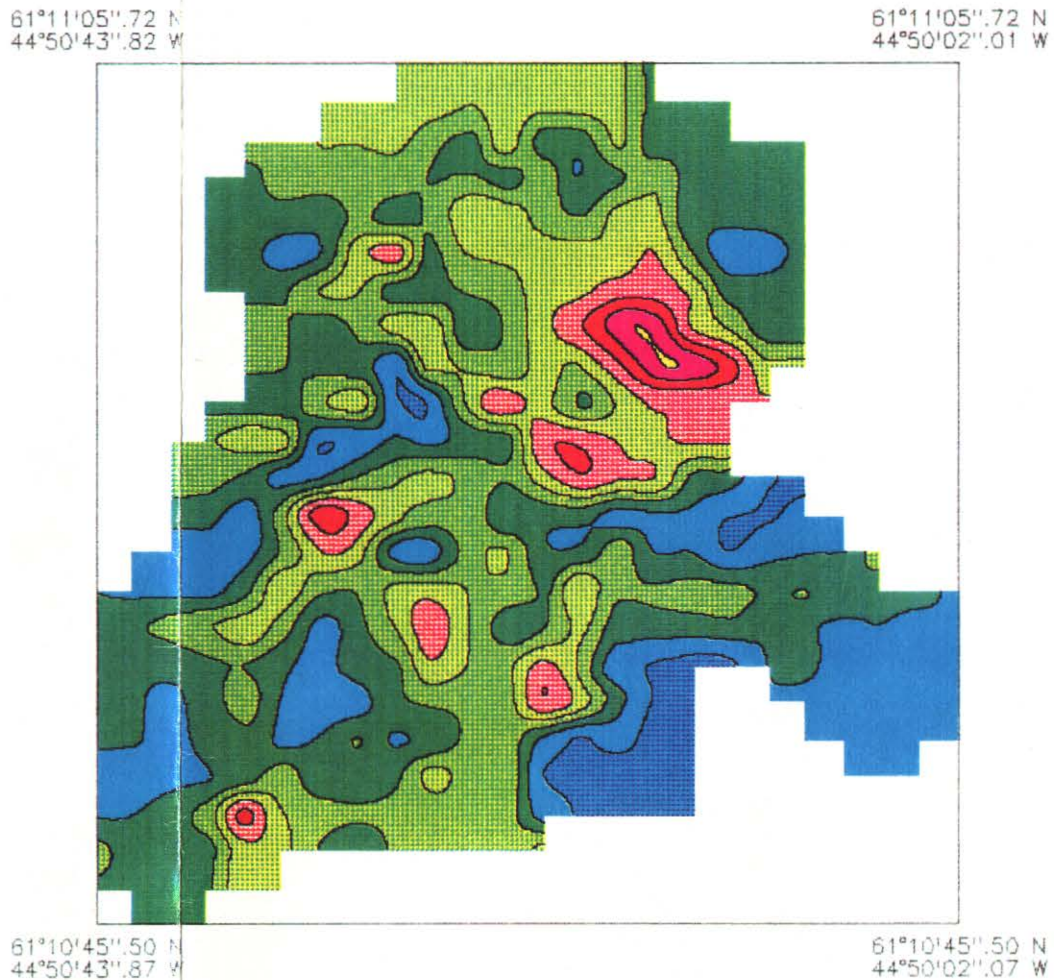
Locality 3+4 Niobium



Contour intervals

ppm Nb

- above 4000
- 3500 – 4000
- 3000 – 3500
- 2500 – 3000
- 2000 – 2500
- 1500 – 2000
- 1000 – 1500
- 500 – 1000
- 100 – 500
- below 100



250 m

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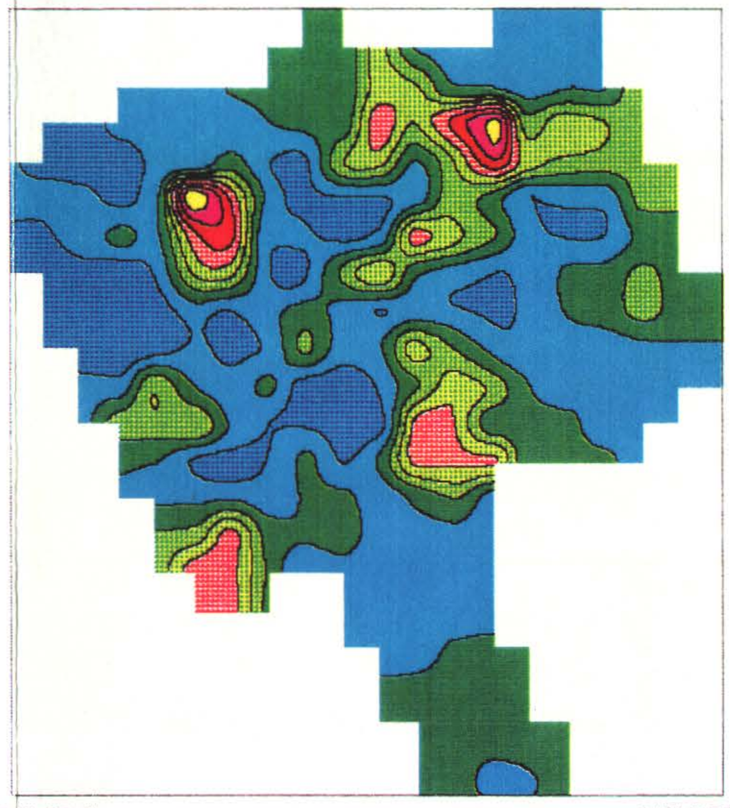
Appendix 27

Kriged contour map of chip samples

Locality 3+4 Tantalum

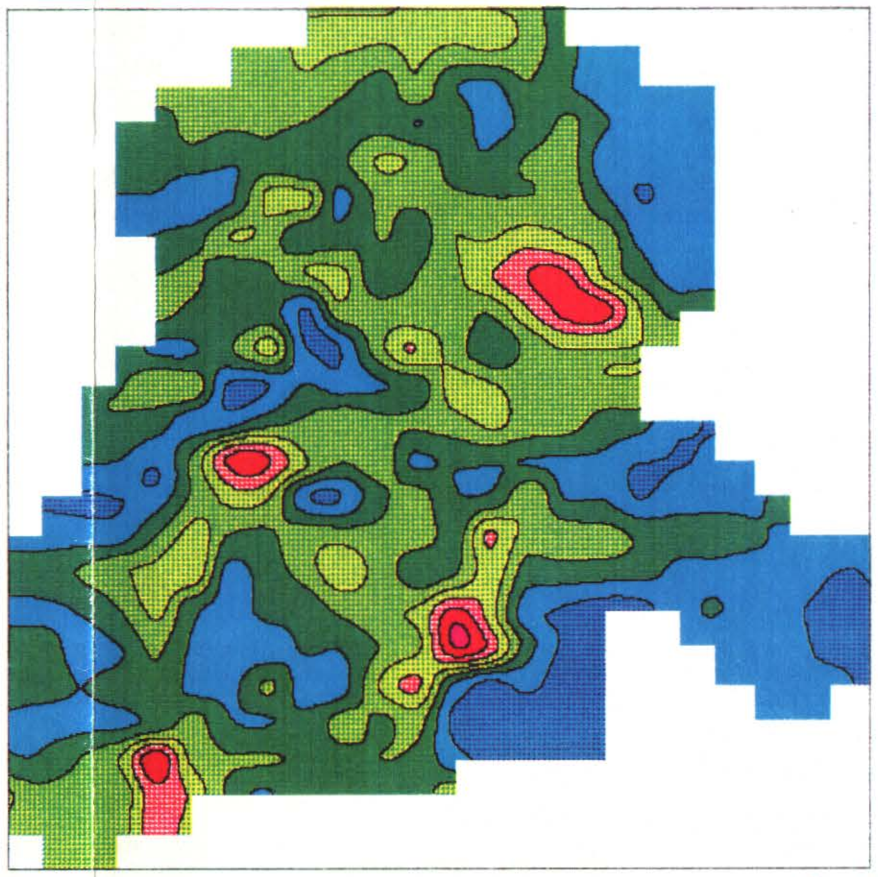


Contour intervals

ppm Ta

above	400
350 –	400
300 –	350
250 –	300
200 –	250
150 –	200
100 –	150
50 –	100
10 –	50
below	10

250 m



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Appendix 28

Kriged contour map of chip samples

Locality 3+4 Niobium/Tantalum

Contour intervals

ratio Nb/Ta

above	20.0
	15.0 –20.0
	12.0 –15.0
	11.0 –12.0
	10.0 –11.0
	9.0 –10.0
	8.0 – 9.0
	7.0 – 8.0
	5.0 – 7.0
below	5.0

250 m

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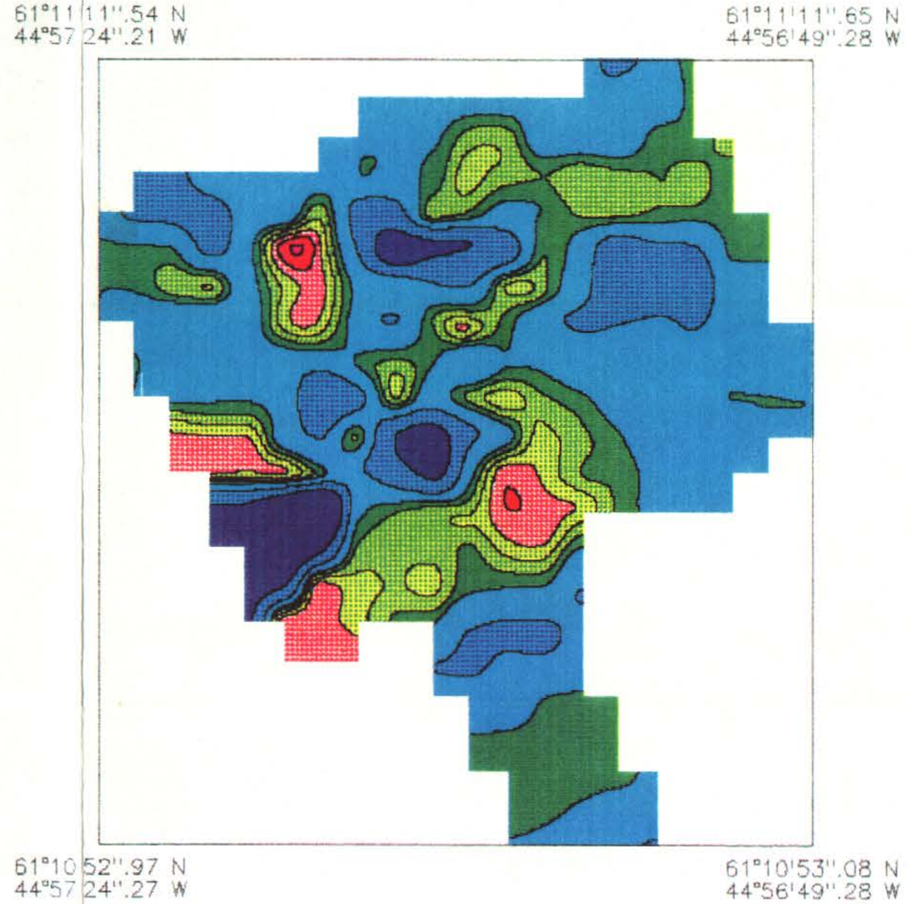

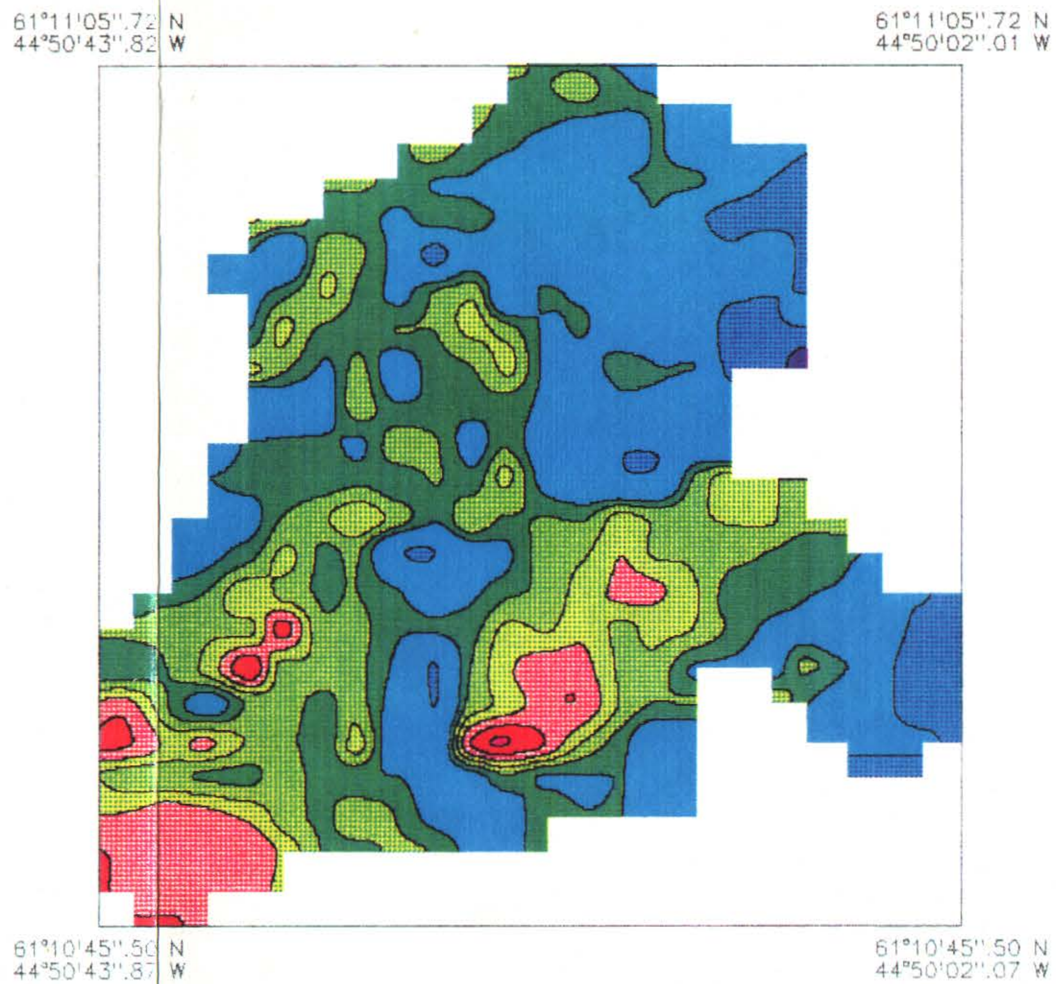

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Appendix **29**

Kriged contour map of chip samples

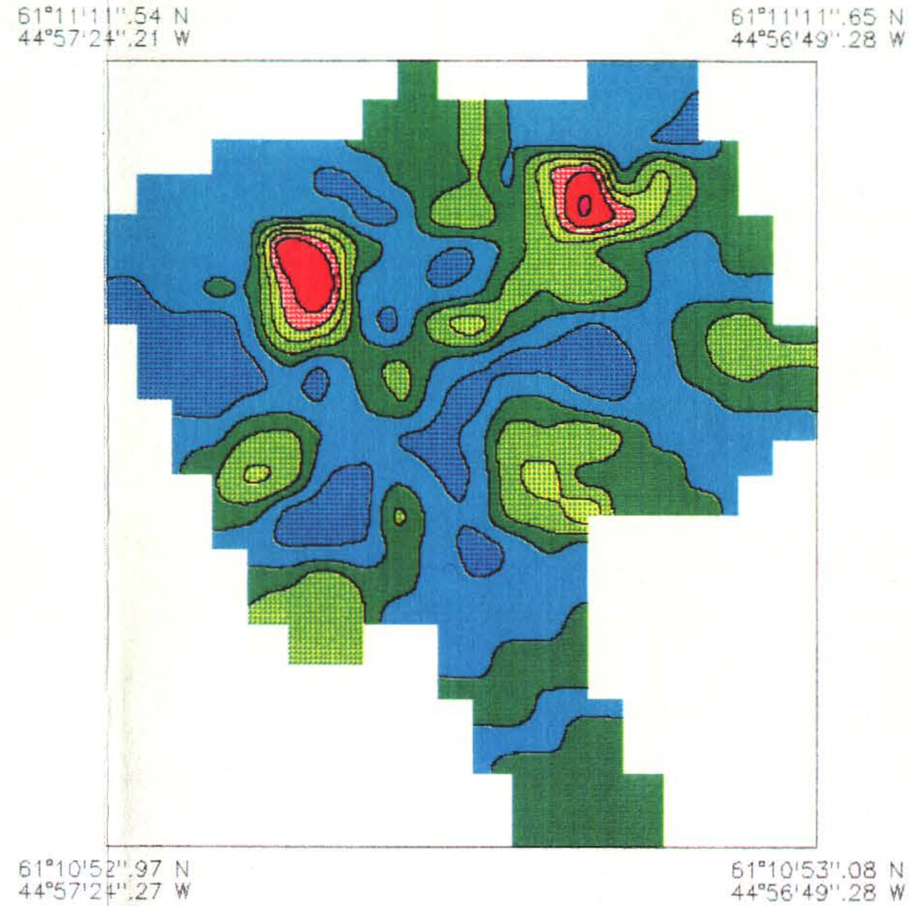
Locality 3+4 Uranium

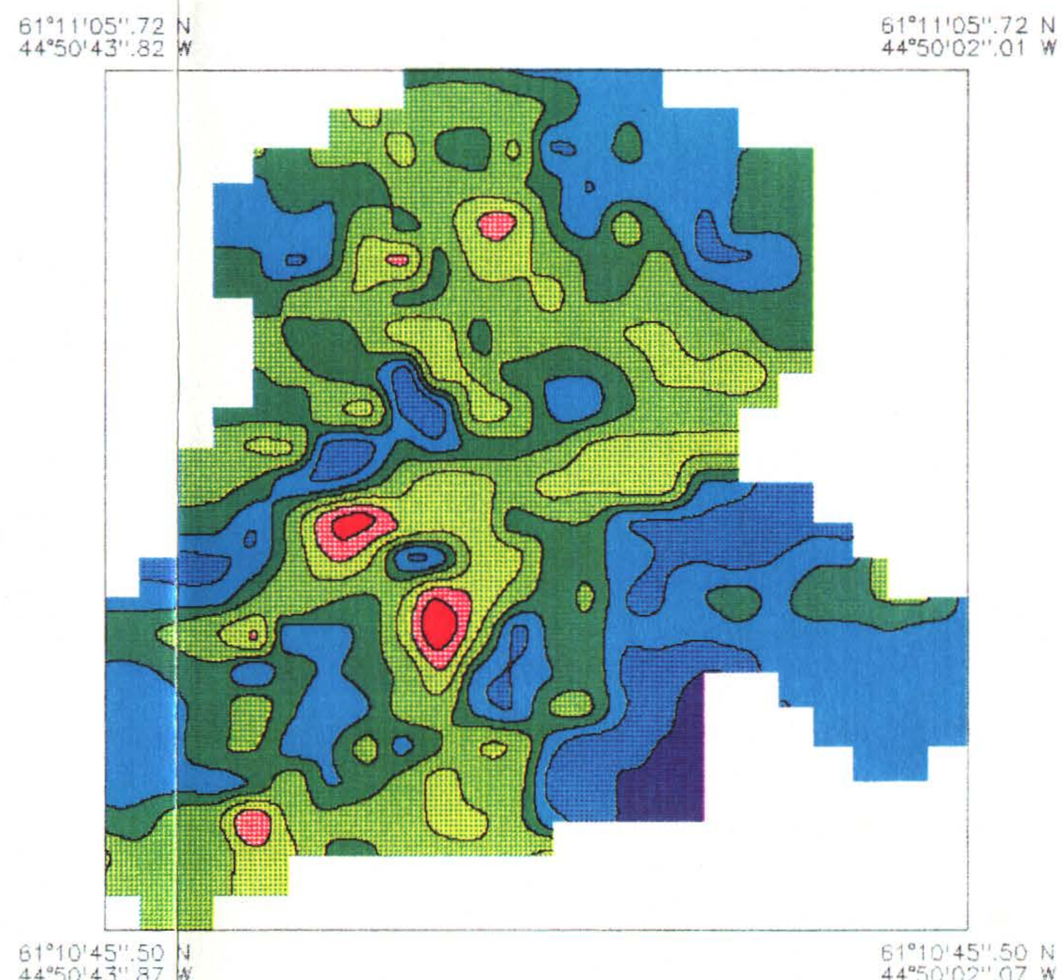
Contour intervals

ppm U

above	250
200 –	250
160 –	200
130 –	160
100 –	130
70 –	100
50 –	70
30 –	50
10 –	30
below	10

250 m





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Appendix 30

Kriged contour map of chip samples

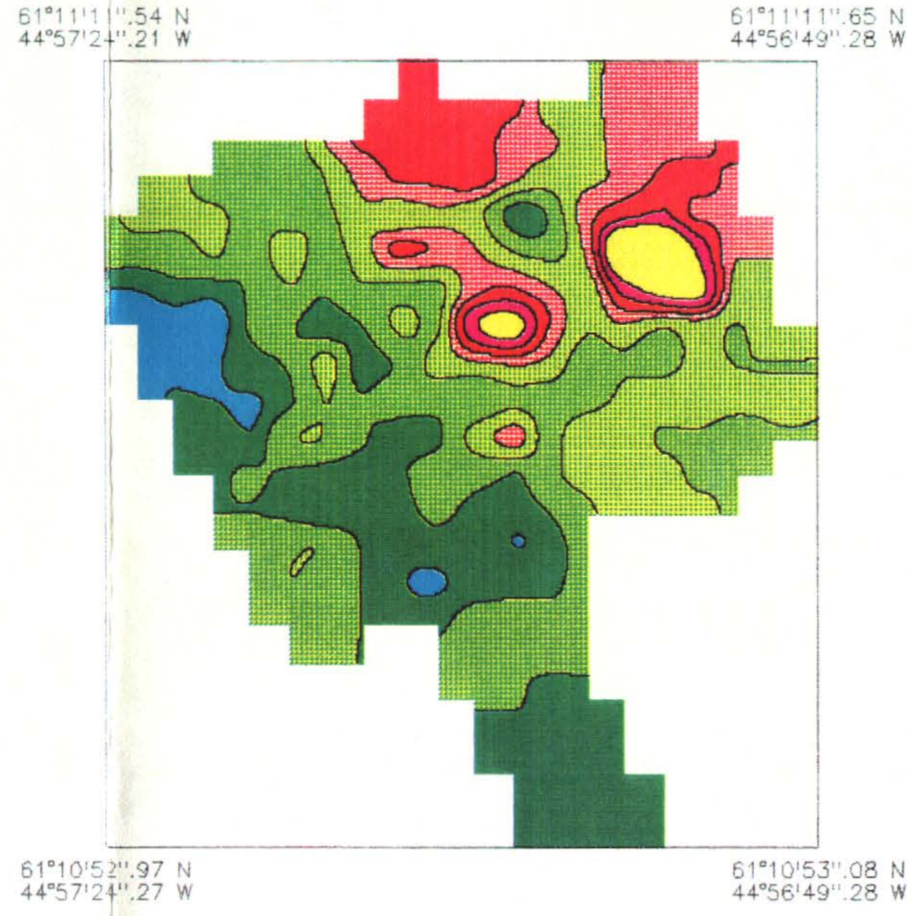
Locality 3+4 Thorium

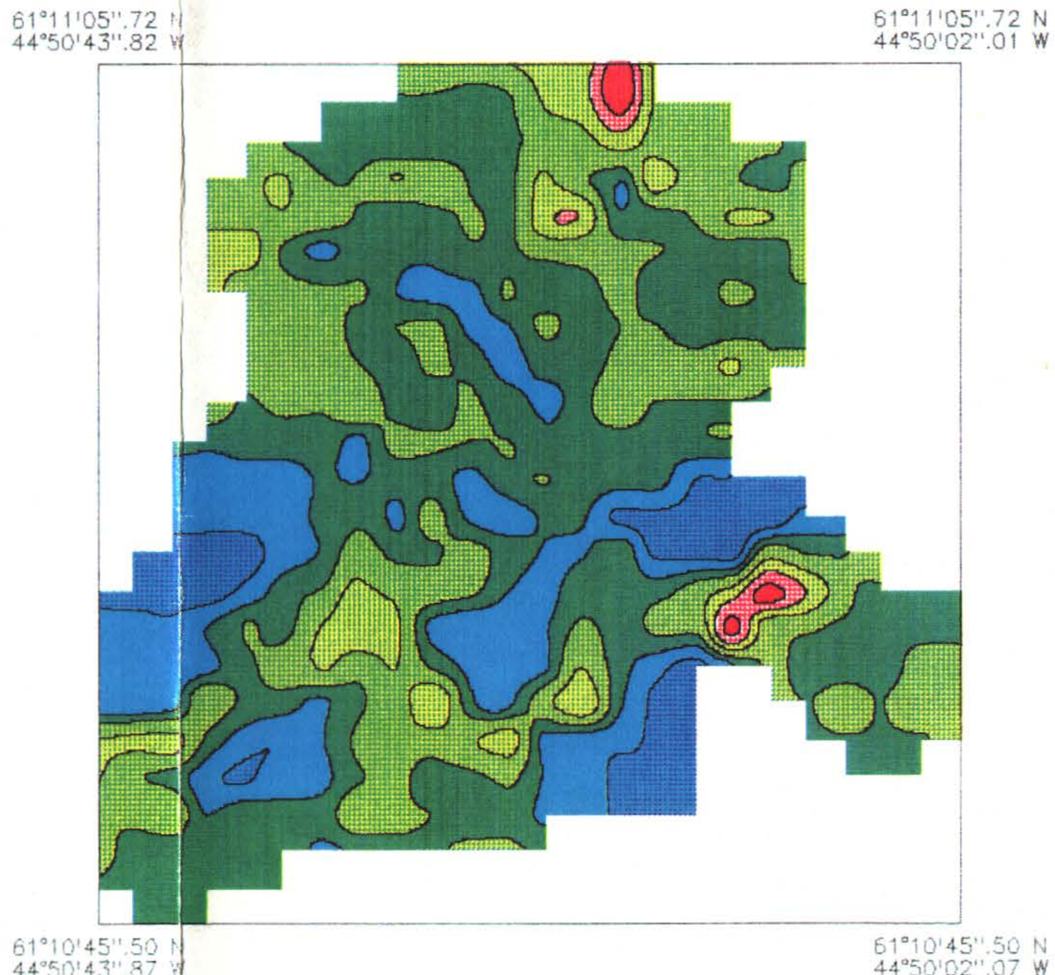
Contour intervals

ppm Th

above	250
200 –	250
160 –	200
130 –	160
100 –	130
70 –	100
50 –	70
30 –	50
10 –	30
below	10

250 m





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Appendix 31

Contour map of extrapolated chip sample values

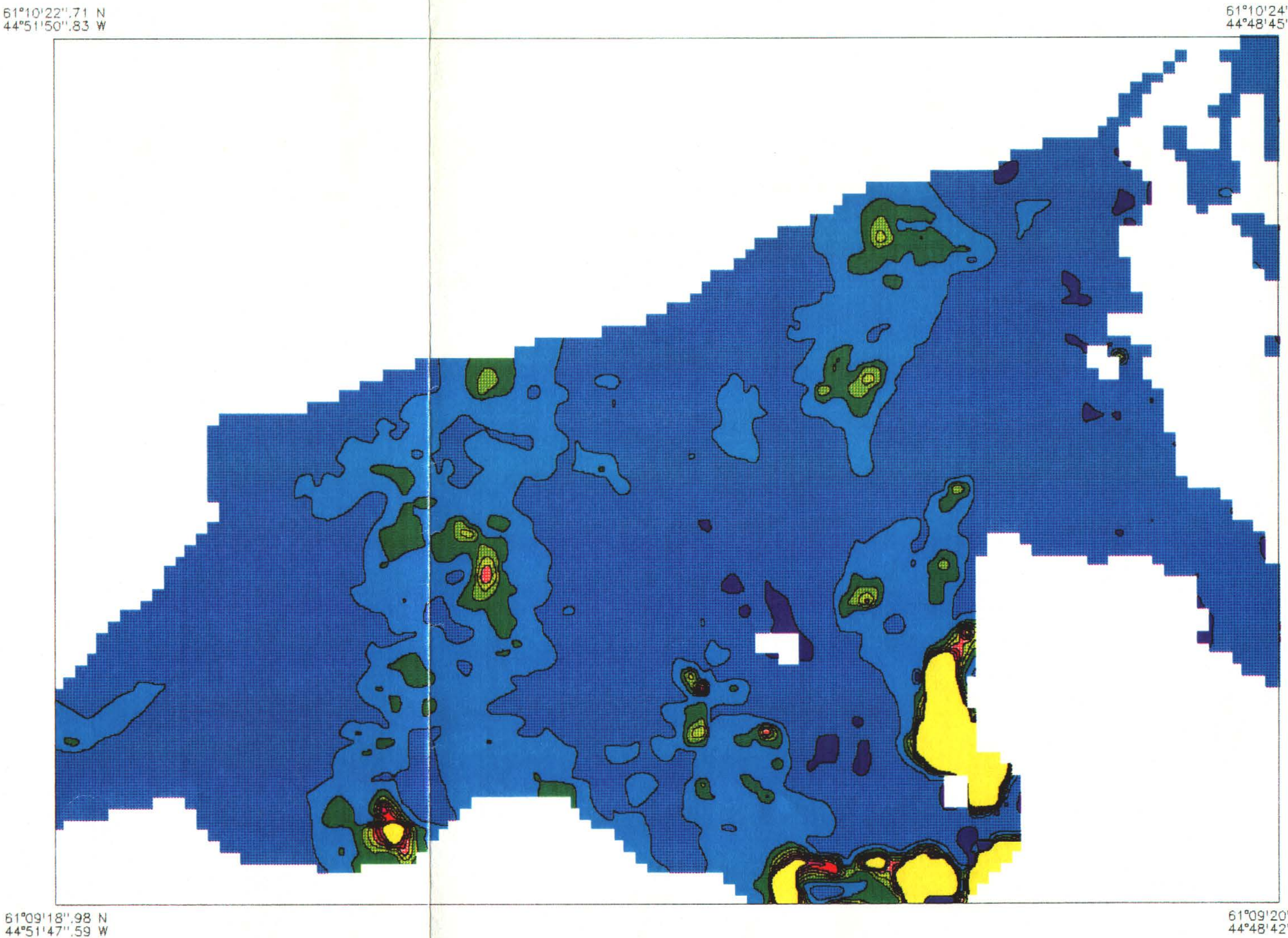
Locality 1+2 Niobium

Contour intervals

ppm Nb

above	4000
3500 –	4000
3000 –	3500
2500 –	3000
2000 –	2500
1500 –	2000
1000 –	1500
500 –	1000
100 –	500
below	100

500 m



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Appendix 32

Contour map of extrapolated chip sample values

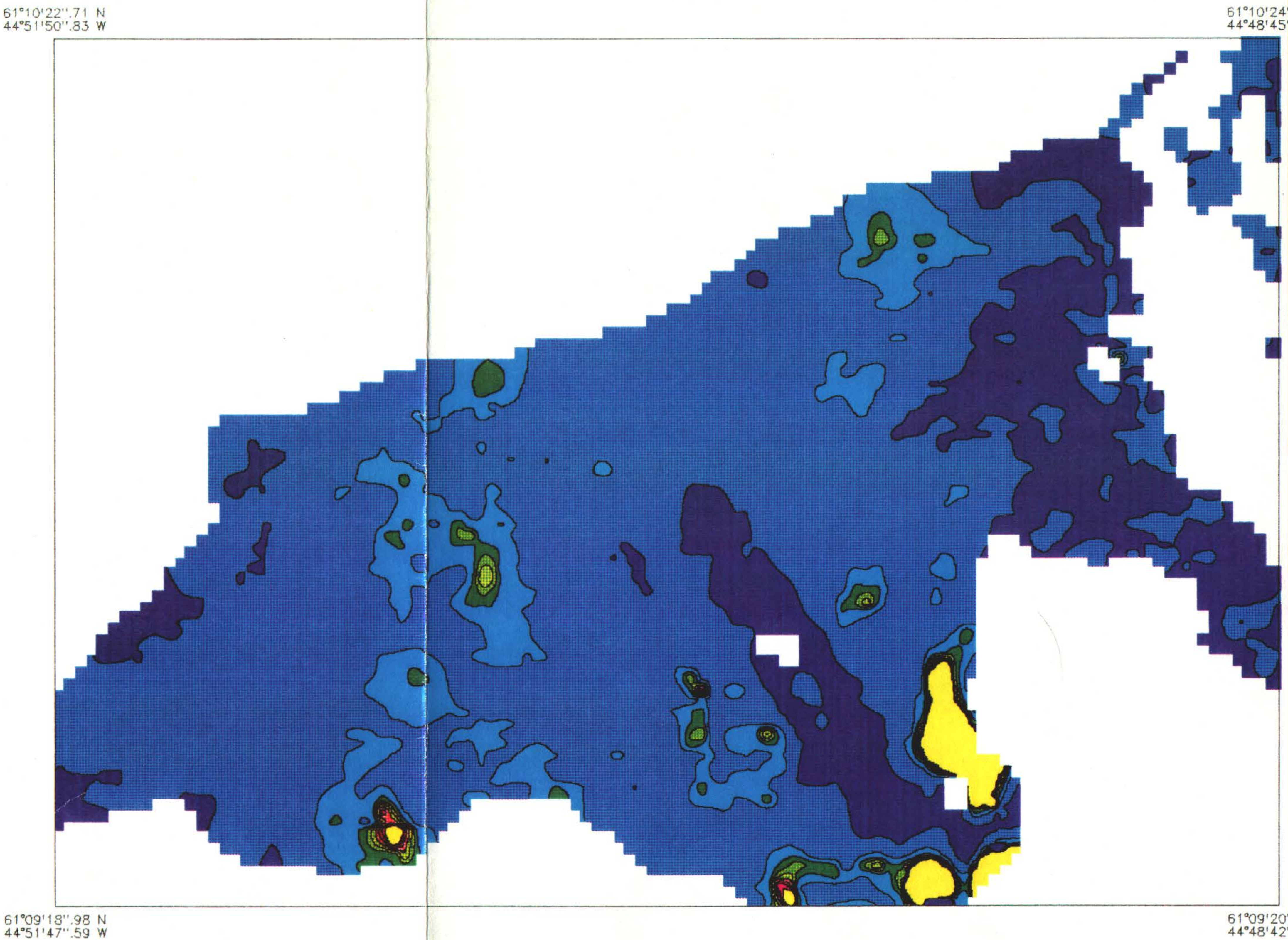
Locality 1+2 Tantalum

Contour intervals

ppm Ta

above	400
	350 – 400
	300 – 350
	250 – 300
	200 – 250
	150 – 200
	100 – 150
	50 – 100
	10 – 50
below	10

500 m



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Appendix 33

Contour map of extrapolated
chip sample values

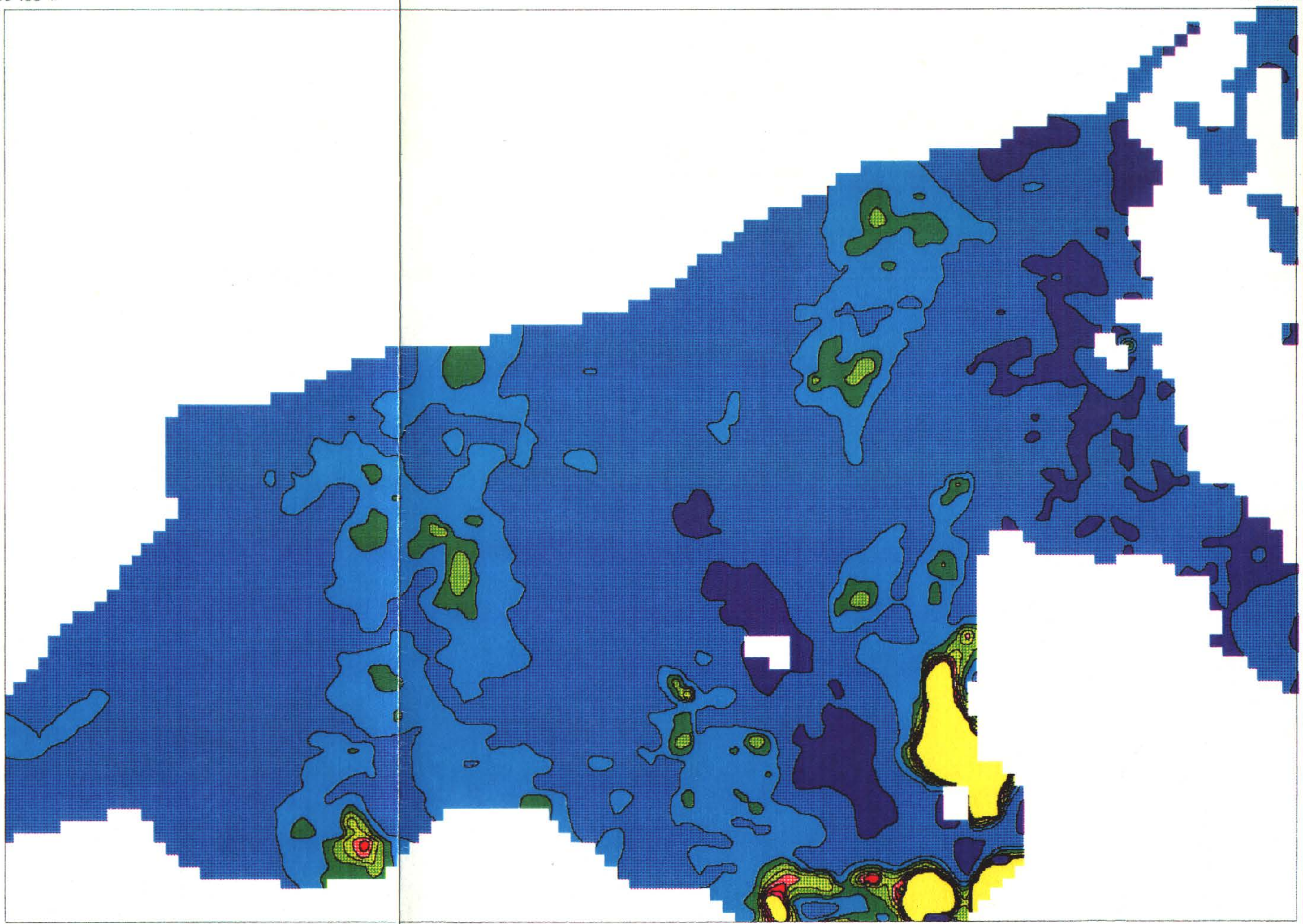
Locality 1+2 Uranium

Contour intervals

ppm U

above	250
	200 – 250
	160 – 200
	130 – 160
	100 – 130
	70 – 100
	50 – 70
	30 – 50
	10 – 30
below	10

500 m



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Appendix 34

Contour map of extrapolated chip sample values

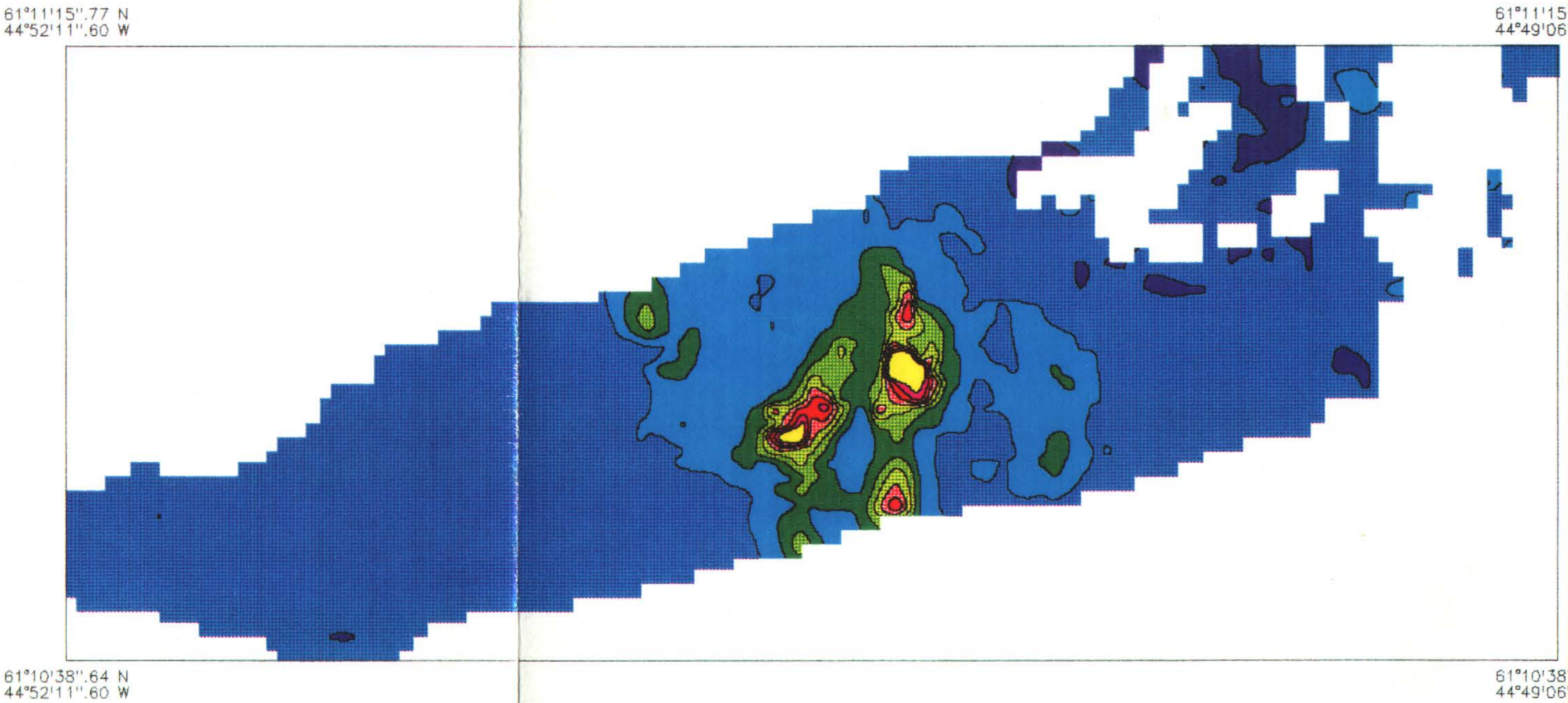
Locality 3 Niobium

Contour intervals

ppm Nb

above	4000
3500	– 4000
3000	– 3500
2500	– 3000
2000	– 2500
1500	– 2000
1000	– 1500
500	– 1000
100	– 500
below	100

500 m



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Appendix 35

Contour map of extrapolated chip sample values

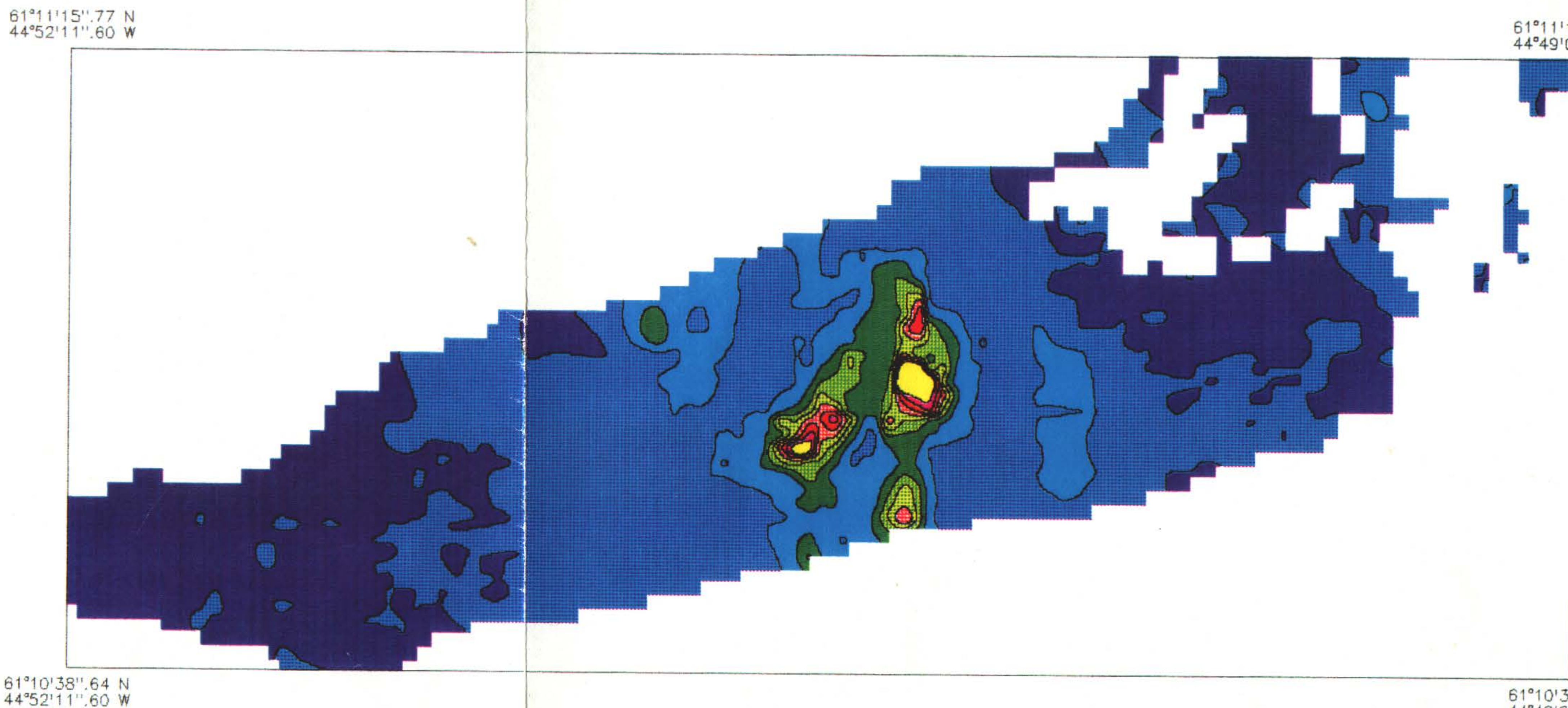
Locality 3 Tantalum

Contour intervals

ppm Ta

above	400
350 –	400
300 –	350
250 –	300
200 –	250
150 –	200
100 –	150
50 –	100
10 –	50
below	10

500 m



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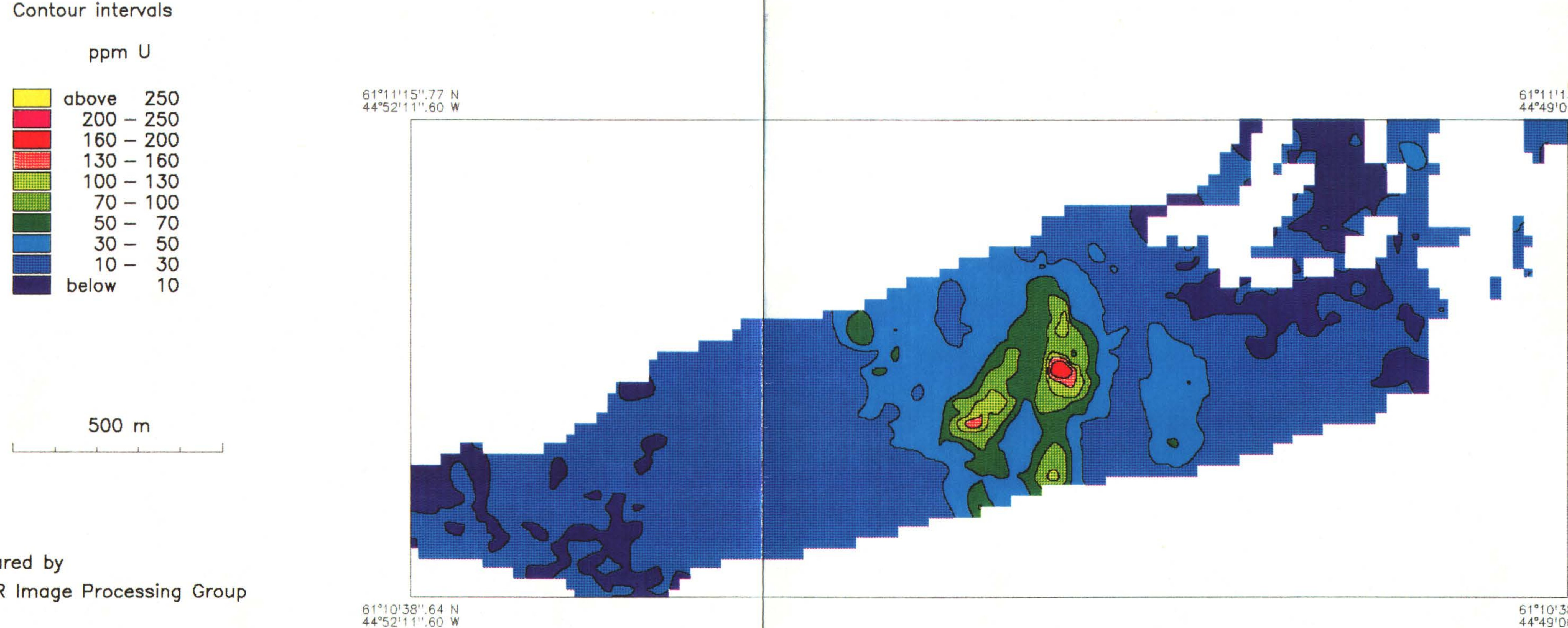
Appendix 36

Contour map of extrapolated chip sample values

Locality 3 Uranium



'repared by

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Appendix 37

Contour map of extrapolated chip sample values

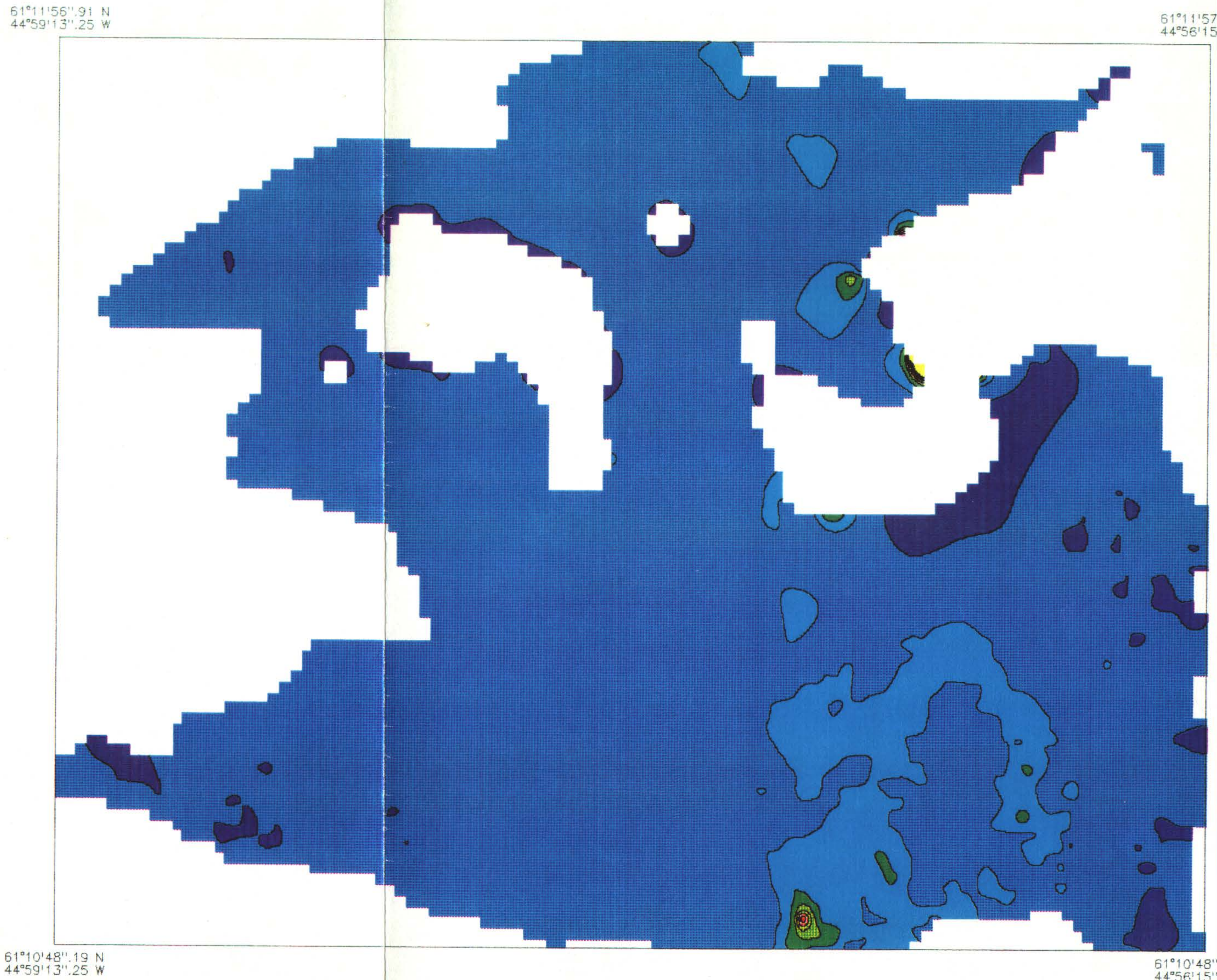
Locality 4 Niobium

Contour intervals

ppm Nb

above 4000
3500 – 4000
3000 – 3500
2500 – 3000
2000 – 2500
1500 – 2000
1000 – 1500
500 – 1000
100 – 500
below 100

500 m



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Appendix 38

Contour map of extrapolated chip sample values

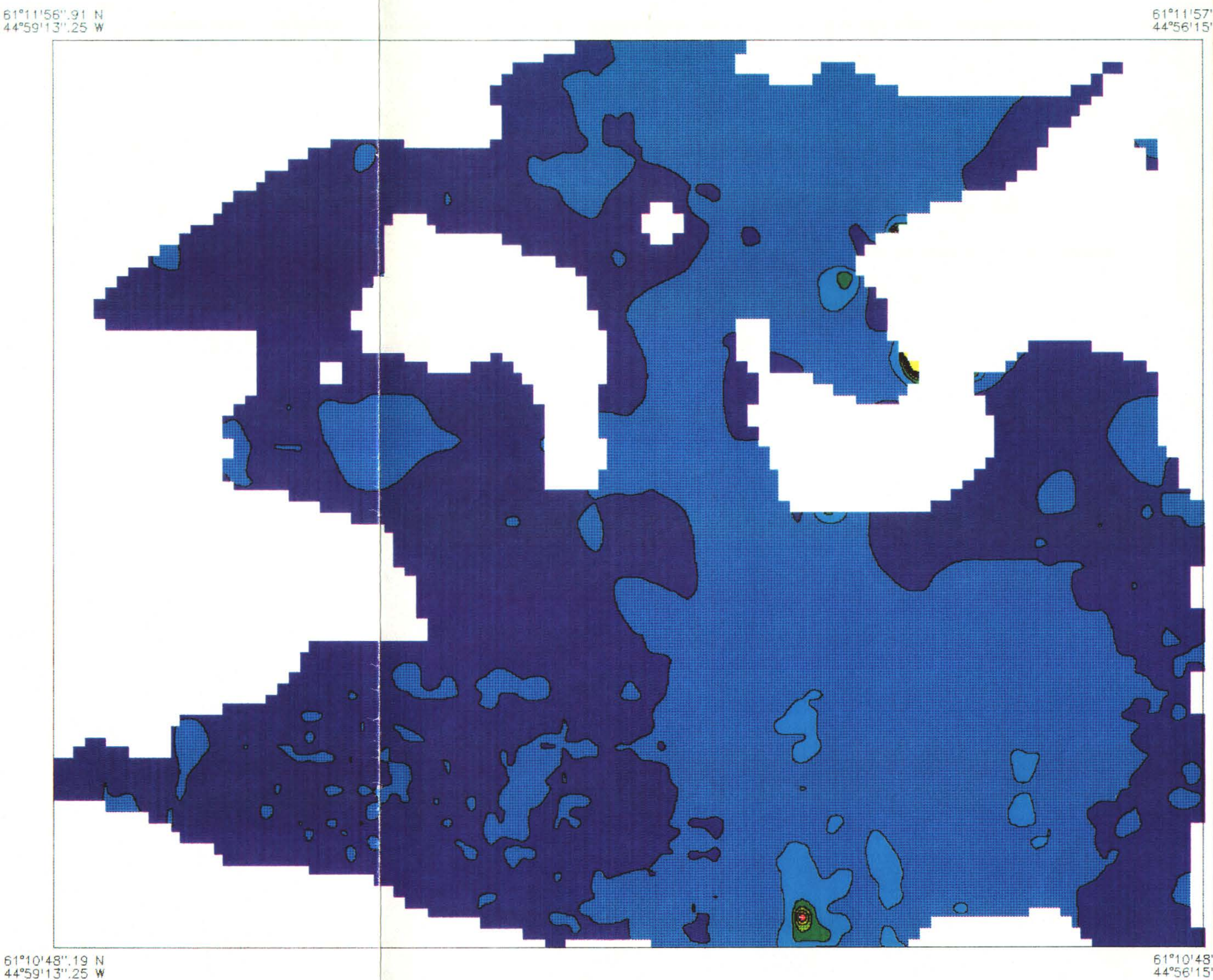
Locality 4 Tantalum

Contour intervals

ppm Ta

above	400
	350 – 400
	300 – 350
	250 – 300
	200 – 250
	150 – 200
	100 – 150
	50 – 100
	10 – 50
below	10

500 m



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Appendix **39**

Contour map of extrapolated chip sample values

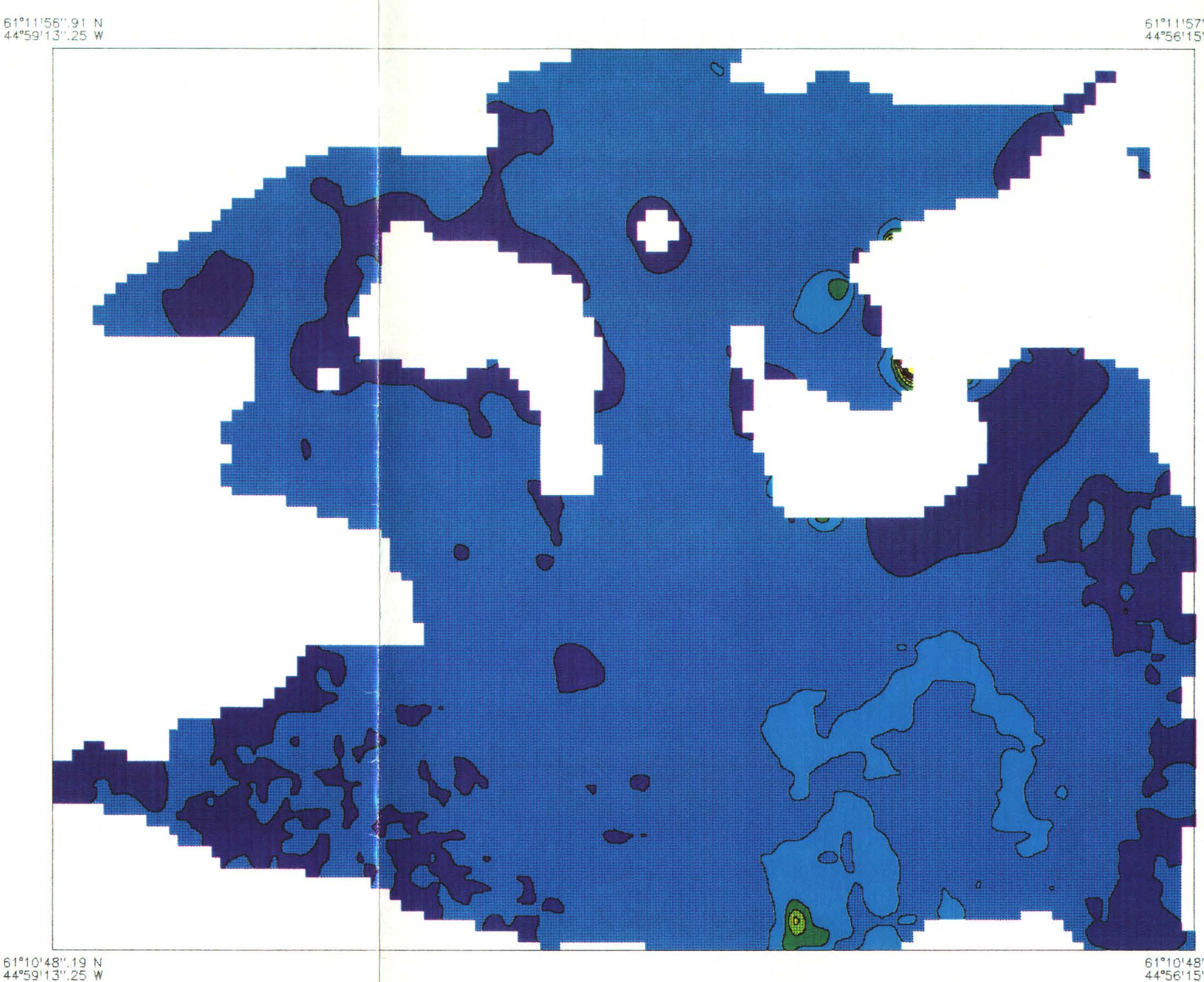
Locality 4 Uranium

Contour intervals

ppm U

above	250
200 –	250
160 –	200
130 –	160
100 –	130
70 –	100
50 –	70
30 –	50
10 –	30
below	10

500 m



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Appendix **40**

Contour map of extrapolated chip sample values

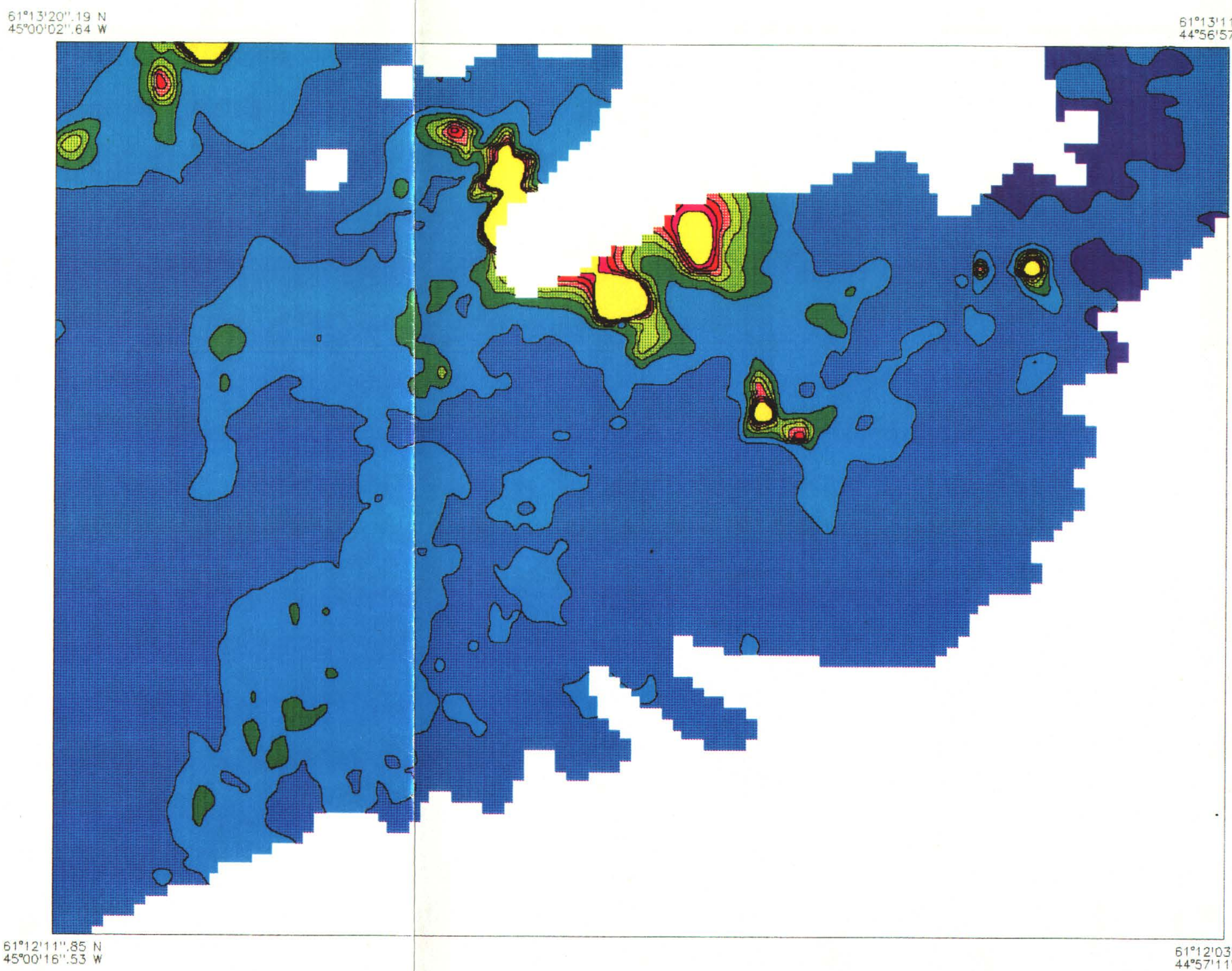
Locality 5 Niobium

Contour intervals

ppm Nb

- above 4000
- 3500 – 4000
- 3000 – 3500
- 2500 – 3000
- 2000 – 2500
- 1500 – 2000
- 1000 – 1500
- 500 – 1000
- 100 – 500
- below 100

500 m



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IMSOR Image Processing Group

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Appendix **41**

Contour map of extrapolated chip sample values

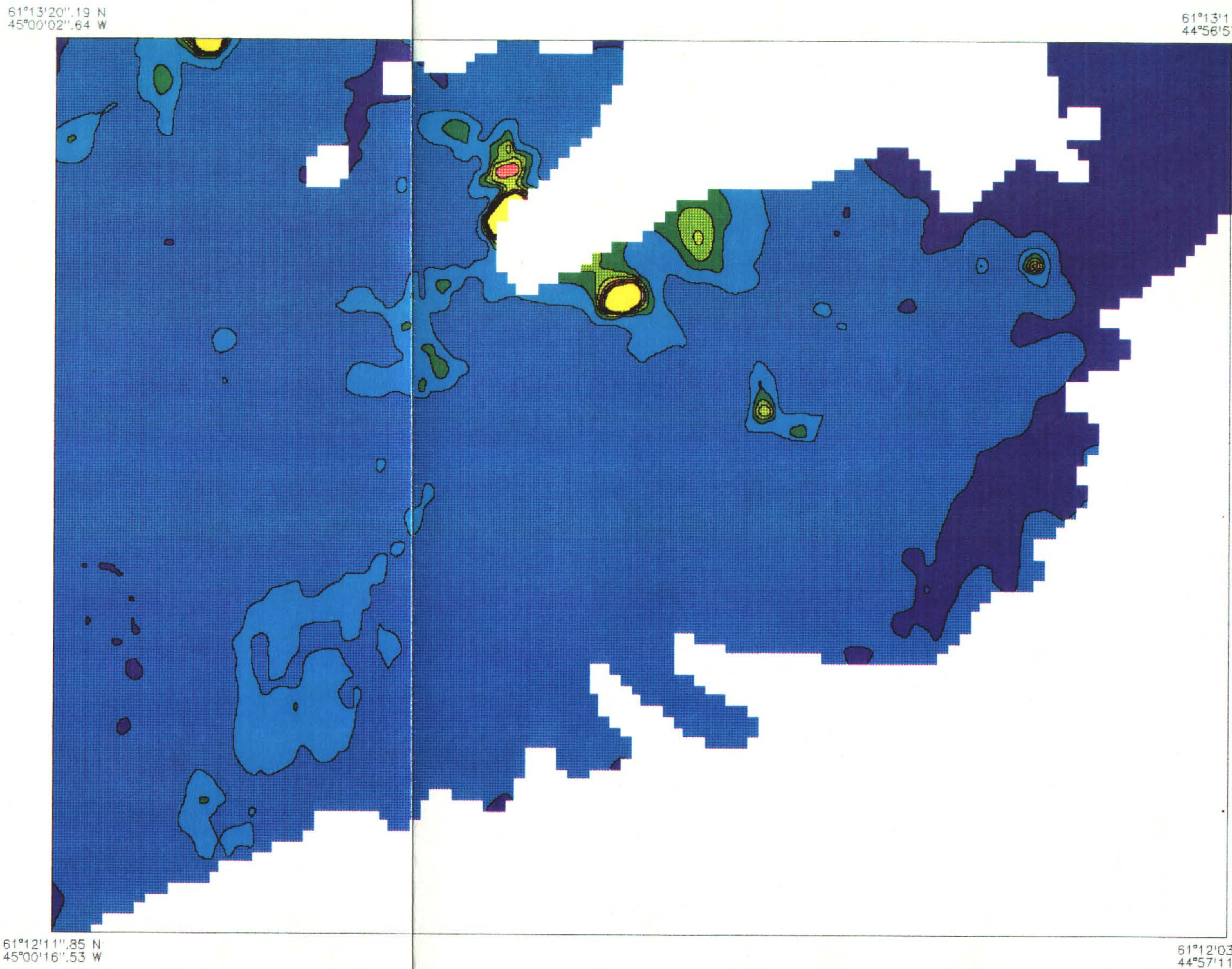
Locality 5 Tantalum

Contour intervals

ppm Ta

above	400
350 –	400
300 –	350
250 –	300
200 –	250
150 –	200
100 –	150
50 –	100
10 –	50
below	10

500 m



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Appendix **42**

Contour map of extrapolated chip sample values

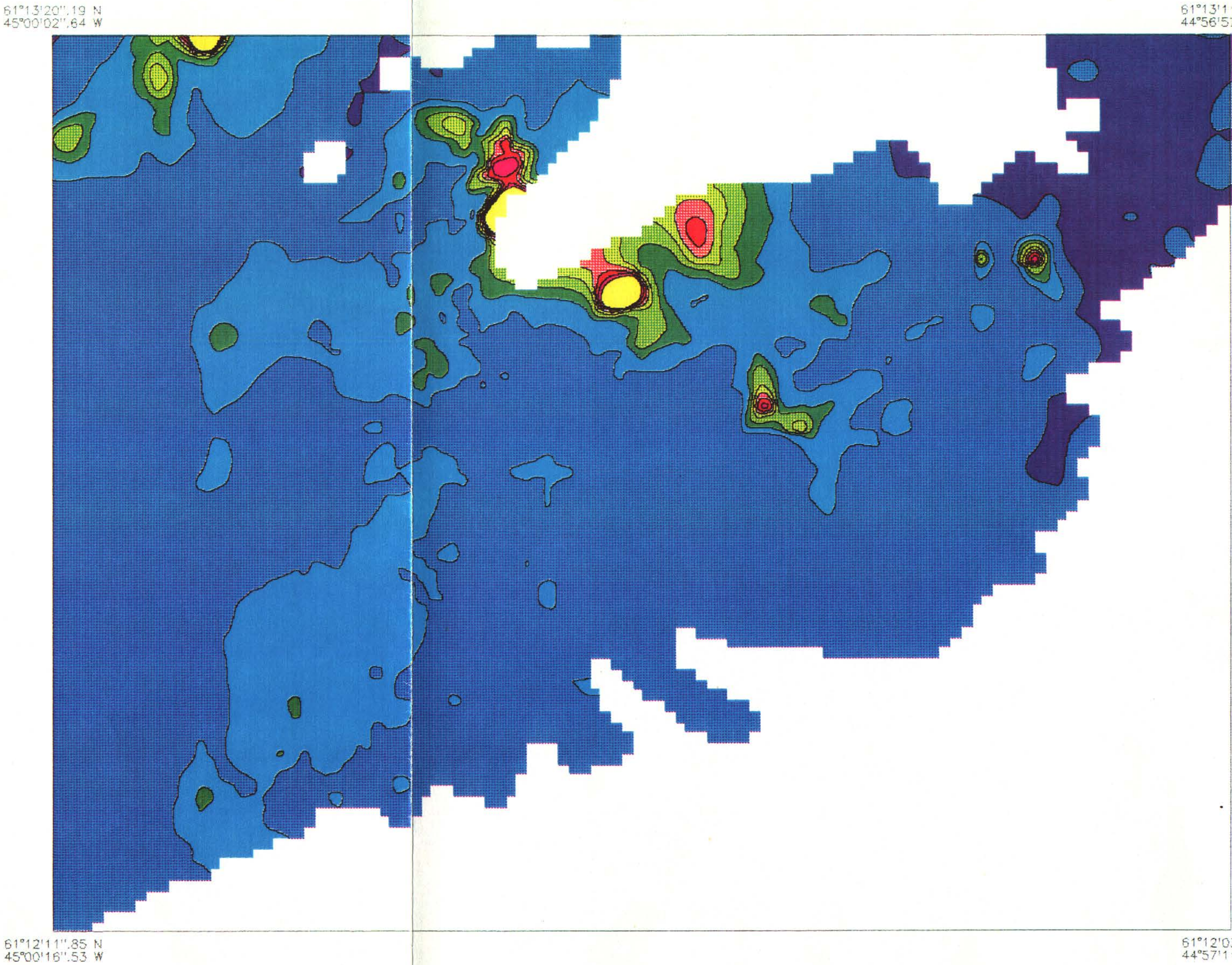
Locality 5 Uranium

Contour intervals

ppm U

above	250
200 –	250
160 –	200
130 –	160
100 –	130
70 –	100
50 –	70
30 –	50
10 –	30
below	10

500 m



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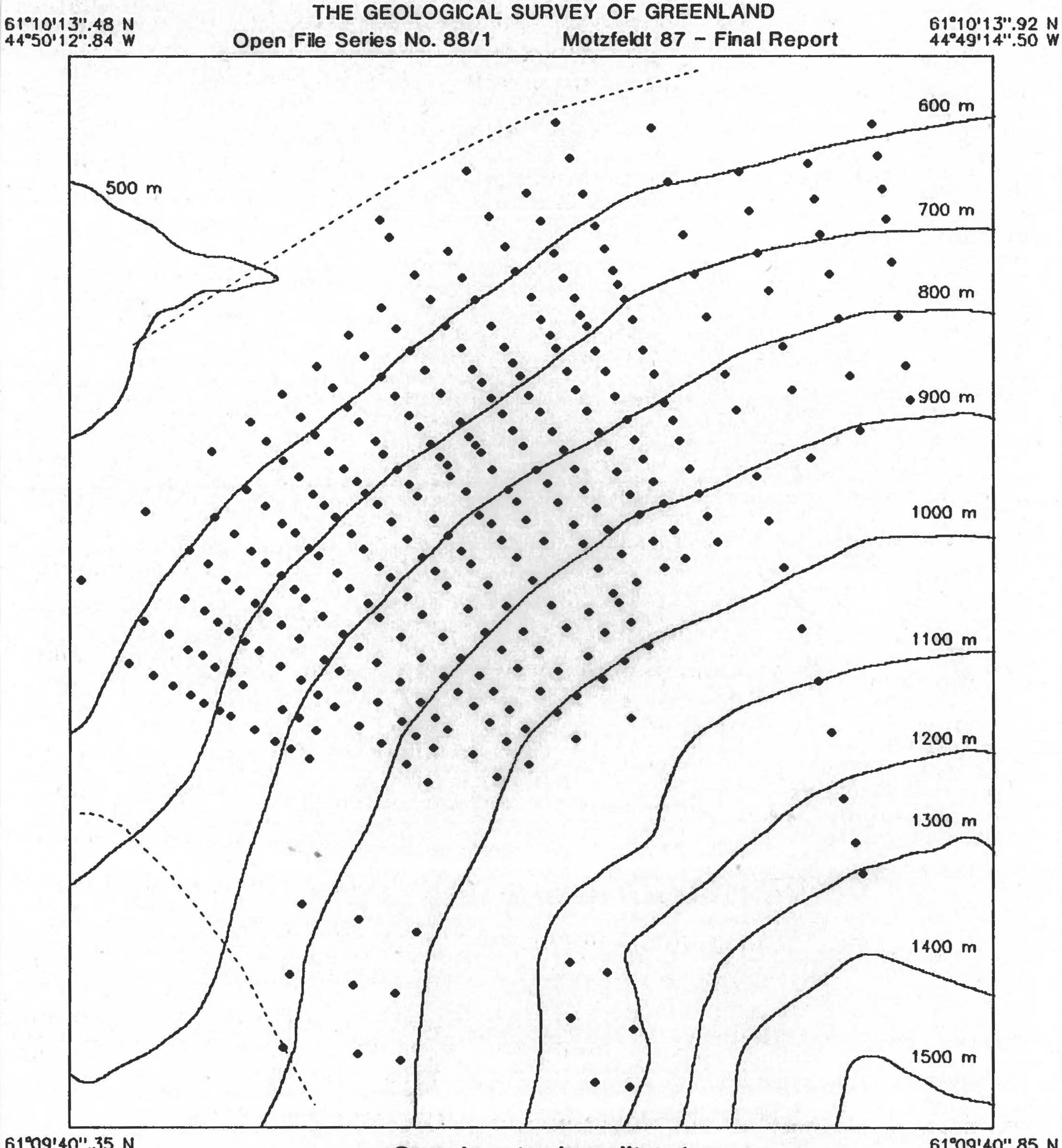
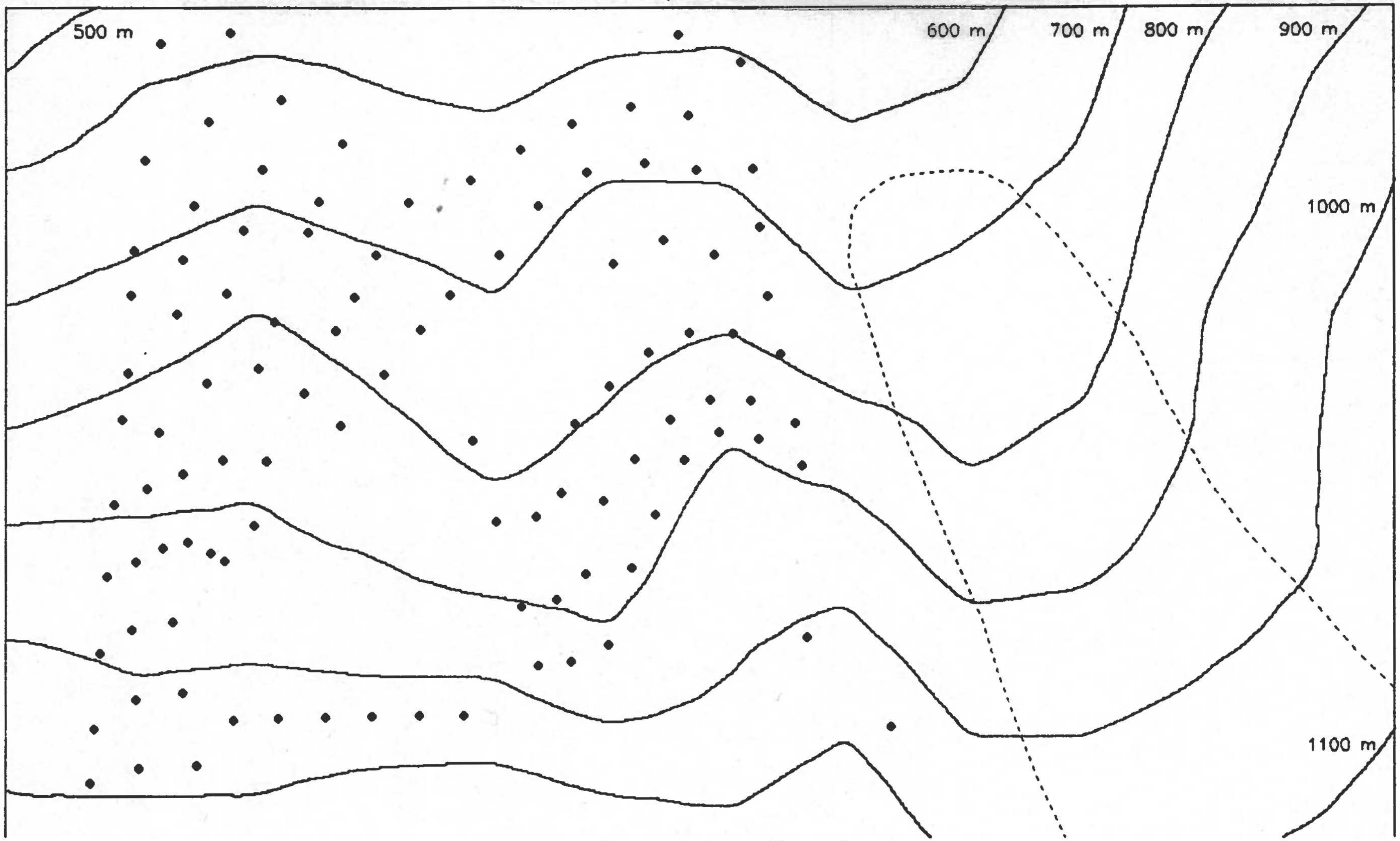
Overlays



Overlay to locality 1

61°09'55".24 N
44°51'05".30 W THE GEOLOGICAL SURVEY OF GREENLAND Open File Series No. 88/1 Motzfeldt 87 - Final Report 61°09'55".95 N
44°49'43".61 W



Overlay to locality 2

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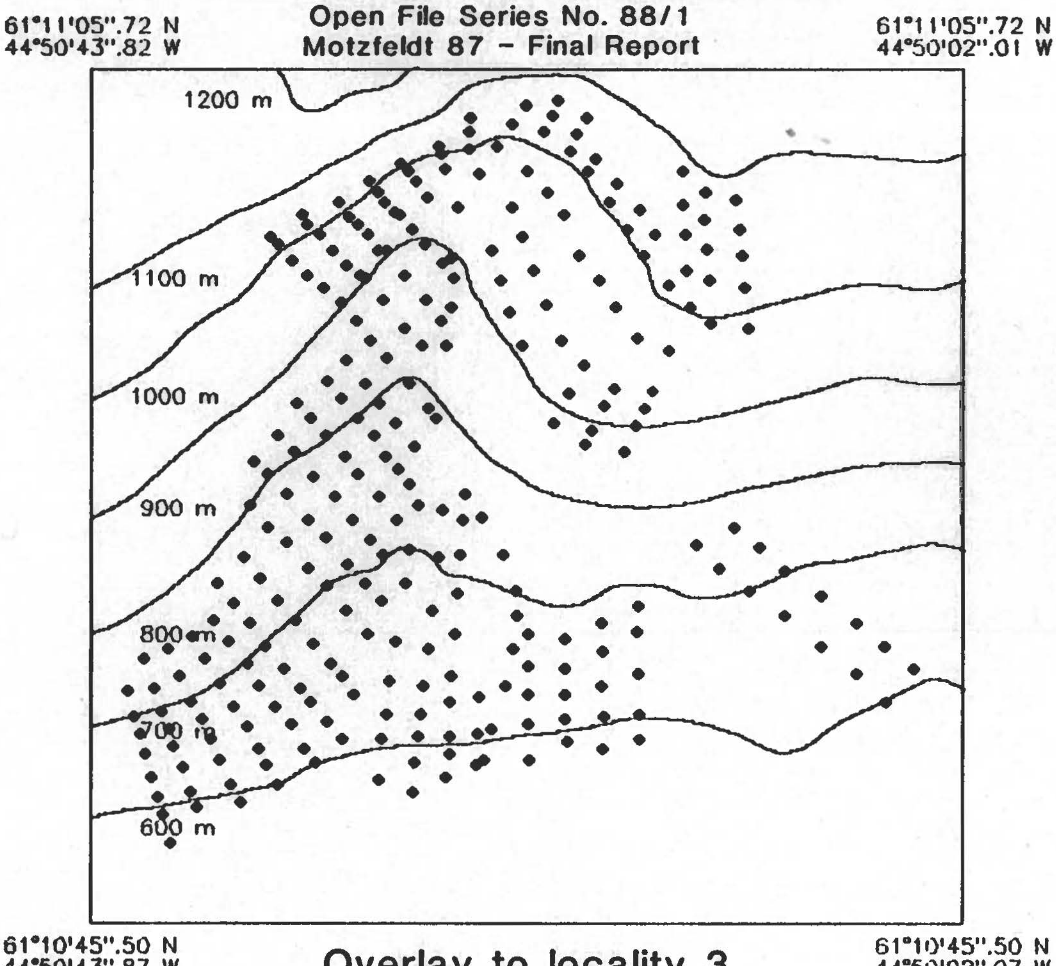
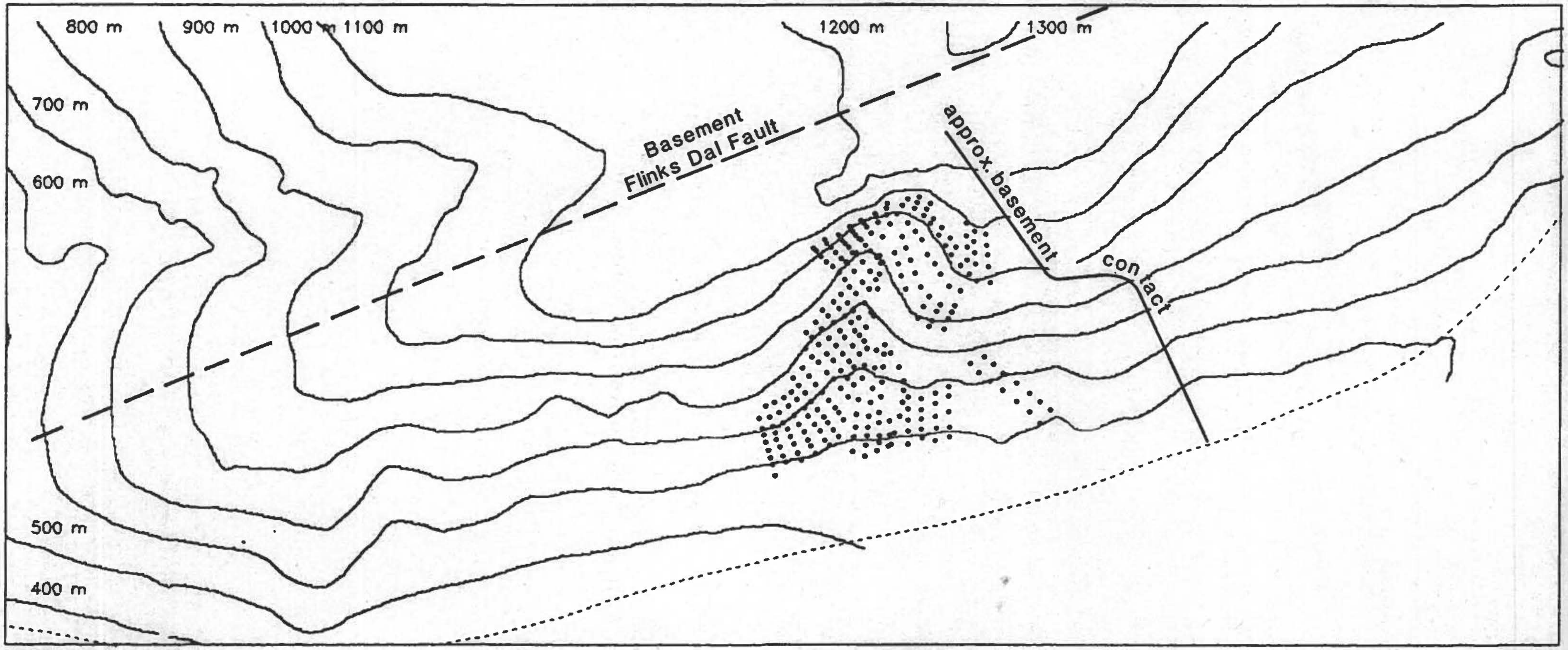


Overlay to locality 3

61°11'15".77 N
44°52'11".60 W

61°11'15
44°49'06



61°10'38".64 N
44°52'11".60 W

Overlay to locality 3

61°10'38'
44°49'06'

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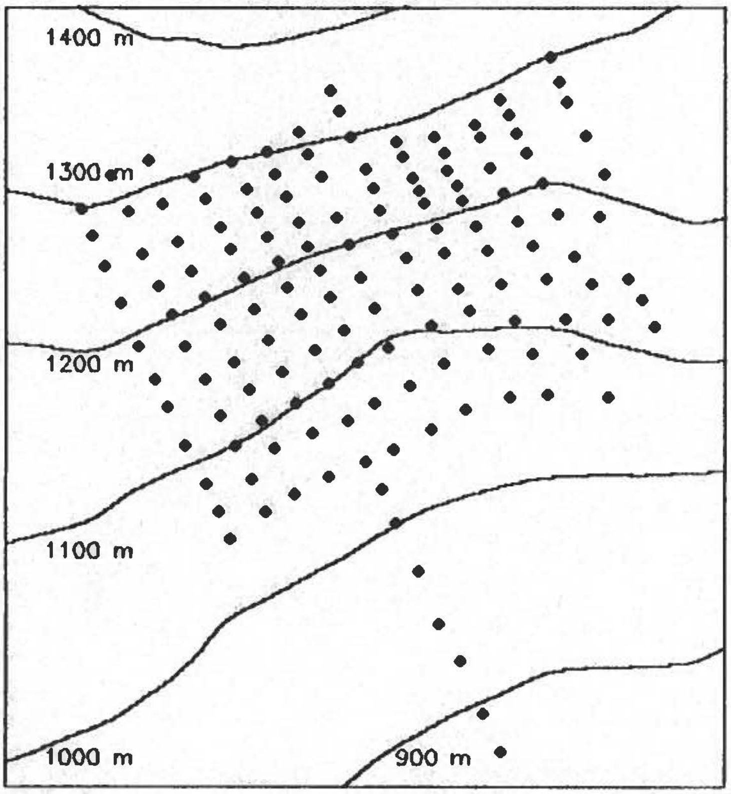
61°11'11".54 N
44°57'24".21 W

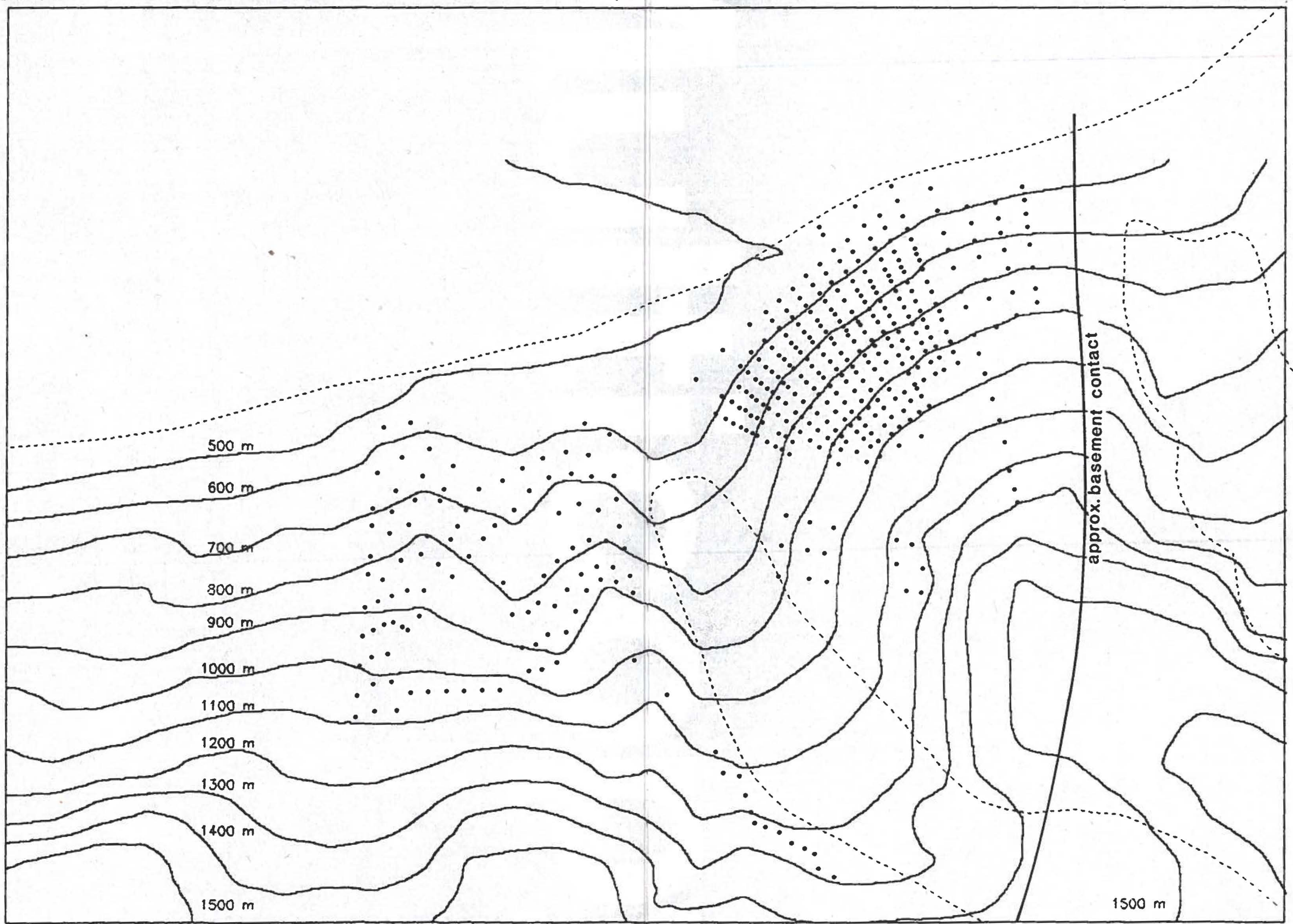
61°11'11".65 N
44°56'49".28 W



61°10'52".97 N
44°57'24".27 W

61°10'53".08 N
44°56'49".28 W

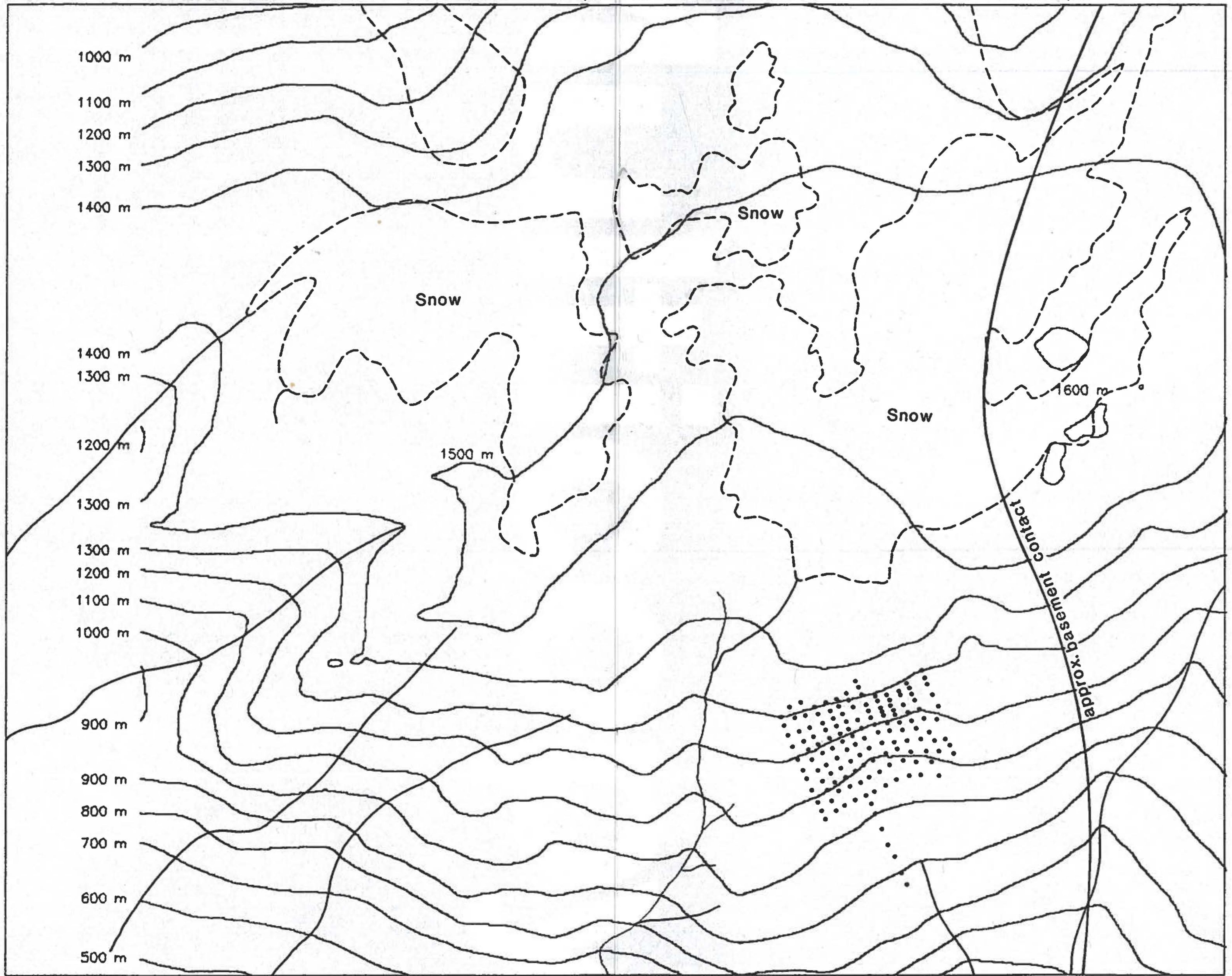
Overlay to locality 4



61°09'18".98 N
44°51'47".59 W

Overlay to locality 1+2

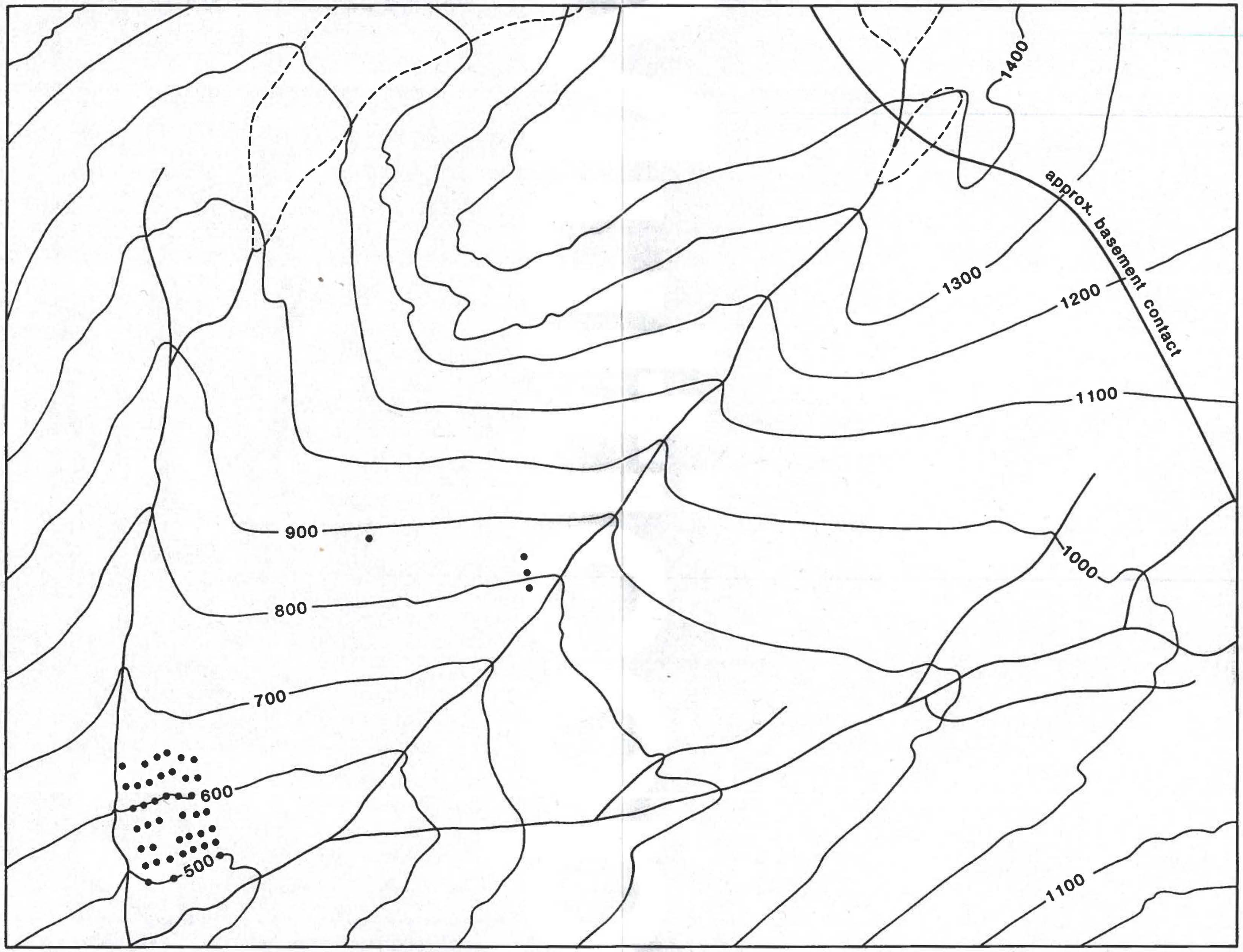
61°09'20".52 N
44°48'42".69 W



Overlay to locality 4

61°13'20"N
45°00'03"W

61°13'11"N
44°56'58"W



61°12'12"N
45°00'17"W

61°12'03"N
44°57'12"W

Overlay to locality 5