
**GEOLOGICAL SURVEY OF CANADA**

**OPEN FILE 5546**

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# Geochemical reanalysis of archived till samples from northernmost Manitoba

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## Introduction

This report contains results of reanalyses of archived surface till samples from northern Manitoba that are shown on Fig. 1 and listed in Appendix 1. During regional mapping in the 1980s, 420 till samples were collected across northernmost Manitoba, and their clay fraction (<0.002 mm) was analysed for Co, Cu, Fe, Mo, Mn, Ni, Pb, and Zn using AAS methods after an aqua regia digestion. Arsenic was analysed by colourimetry, and U by fluorimetric methods. The results were recently released as GSC Open File 5320 (Dredge and Pehrsson, 2006). The present report complements the data and interpretations found in GSC Open File 5320. The silt+clay size fraction (<0.063 mm) of some of these samples was reanalyzed using ICP-ES and INAA methods in order to obtain a more complete inventory of the geochemical nature of surface tills. However, because more than half of the original samples could not be retrieved from the GSC sample archive, only 158 samples were reanalysed, and these are mainly from NTS 54 E, 54F, 54L, and some from 64J, 64N, 640. Although more data is now available for some sites, there is a major gap in the regional coverage in the reanalysed samples.

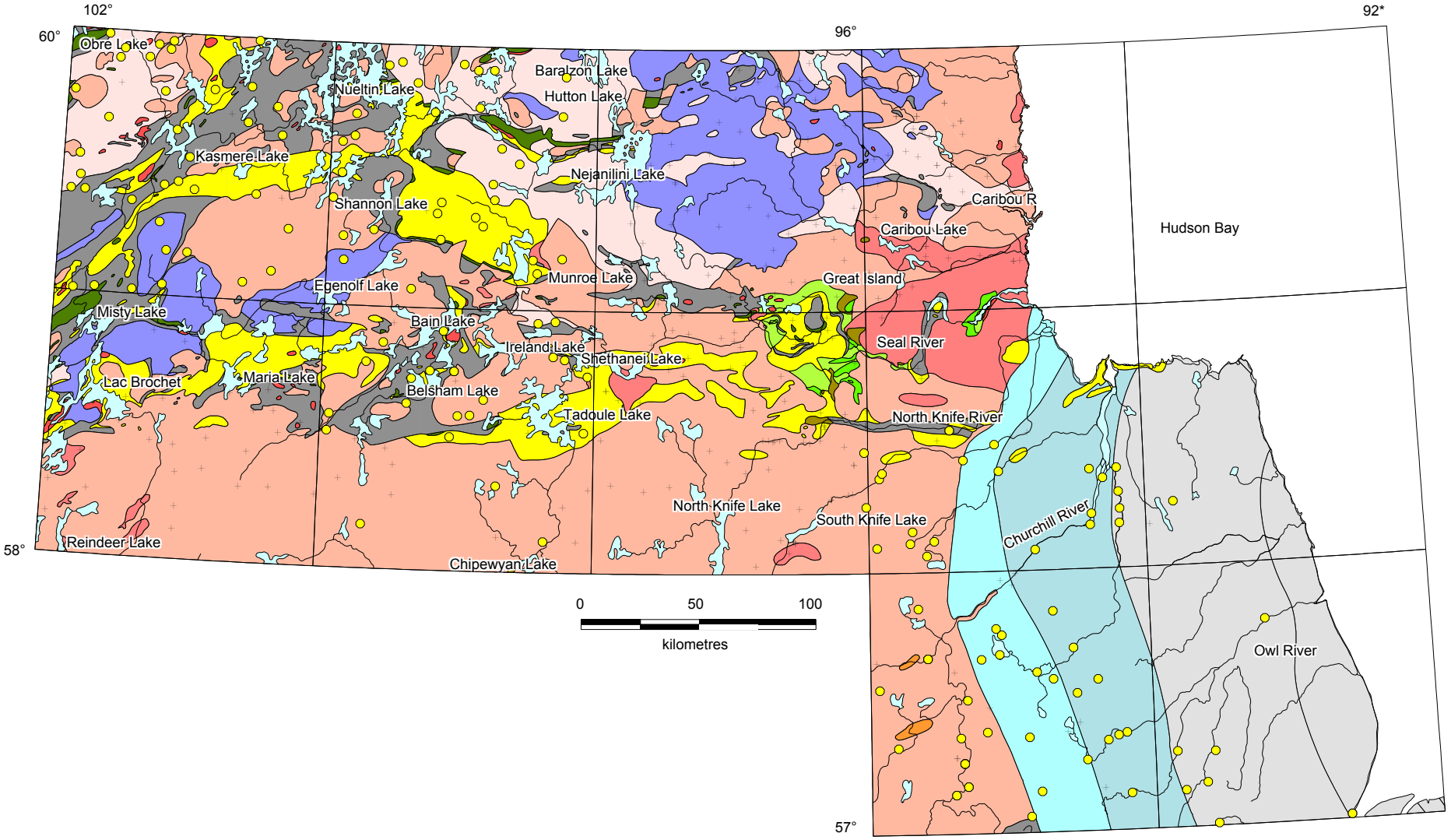


Figure 1. Location of reanalysed samples (circles) and additional sample sites from the old analysis (crosses)

## Regional setting

The bedrock and Quaternary geology of the region are summarized below. More detailed descriptions are available in Open File 5320 (Dredge and Pehrsson, 2006).

*Bedrock geology*

The area lies within the Archean-Paleoproterozoic Hearne domain of the Churchill Province of the Canadian Shield, and the Paleozoic Hudson Platform. Granitoid complexes of Archean age in the Hearne consist of granodiorite and related gneiss (Fig. 2, unit 19a) into which small gabbro bodies (unit 29a) have been intruded, and a hypersthene-bearing granite body east of Nejanilini Lake (unit 20).

Metasedimentary and metavolcanic rocks of presumed Paleoproterozoic age include mafic and felsic volcanic rocks around Great Island/Seal River (units 21 and 22), as well as the Fox River sills, which occur directly south of the Nelson River (south of the map area). Some of the metasedimentary and metavolcanic rocks could be of Archean, rather than Paleoproterozoic age.

Greywacke- and pelite-derived paragneiss and migmatite are major constituents of the Wollaston and Seal River groups (unit 23). Arkosic gneiss (unit 26), and

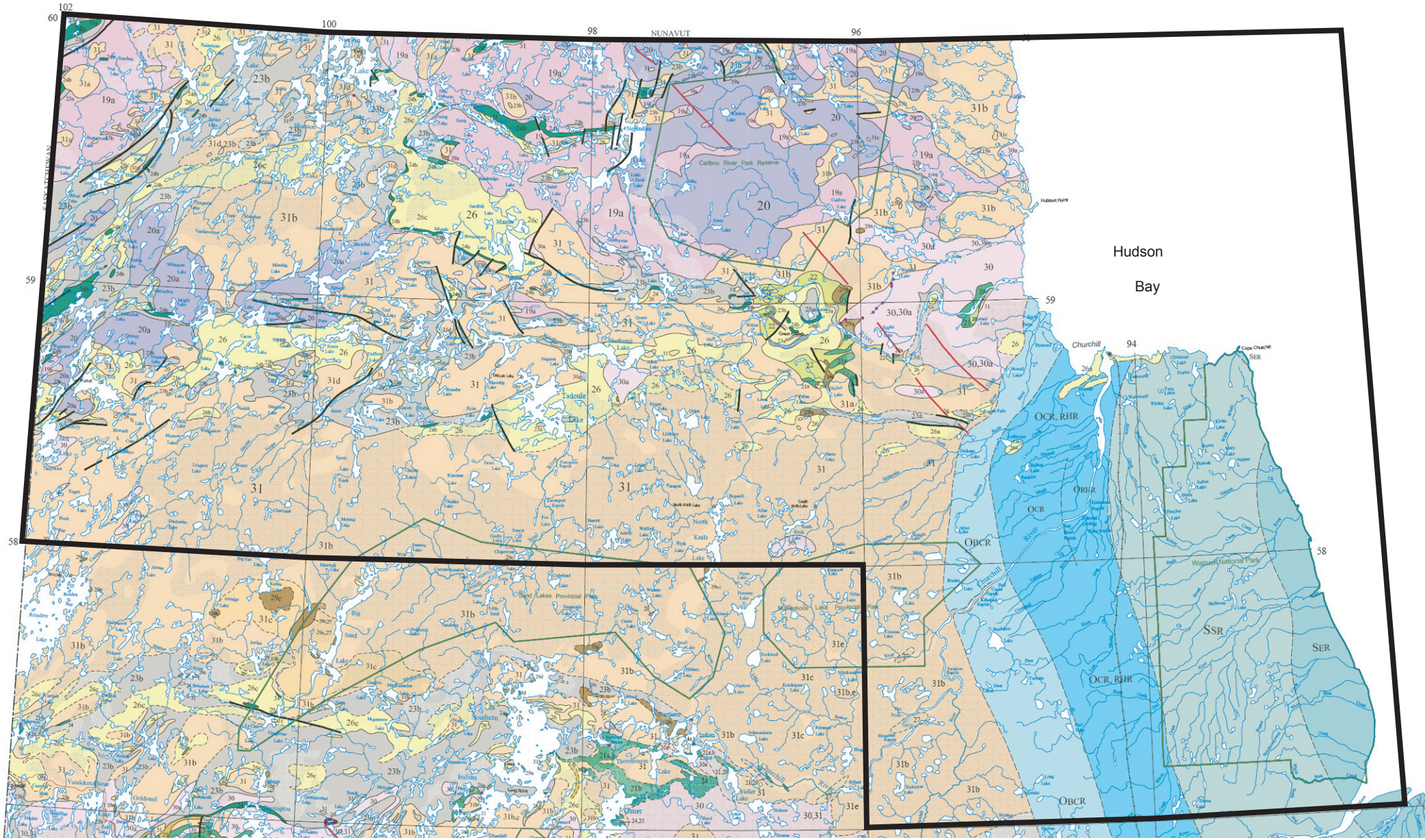


Figure 2. Bedrock geology (Manitoba Geological Survey, 1979 and 2006)

## PHANEROZOIC

### Cenozoic

#### Tertiary

##### Paleocene

**TTM** — Turtle Mountain Formation (~158m): Goodlands Member: bentonitic carbonaceous sand, silt and clay; thin lignite beds. Peace Garden Member: grey silty shale and minor sand.

### Mesozoic

#### Cretaceous

##### Upper Cretaceous

**KB** — Boissevain Formation (30-42m): greenish-grey sandstone; minor shale, in part kaolinitic.

**KRM** (c / o / m) — Riding Mountain Formation (285-340m): Coulter Member (c): soft grey bentonitic clayey siltstone and shale. Odanah Member (o): hard grey siliceous shale. Millwood Member (m): soft greenish bentonitic shale.

**KVR** — Vermilion River Formation (50-190m): Morden Member: black carbonaceous shale. Boyne Member: grey calcareous speckled shale and carbonaceous shale. Pembina Member: thinly interbedded carbonaceous shale, bentonite, and bentonitic shale.

**KF** — Favel Formation (15-45m): calcareous speckled shale (Second Specks); minor limestone, bentonite and oil shale.

##### Upper and Lower Cretaceous

**KA** — Ashville Formation (55-115m): dark grey carbonaceous shale, in part bituminous; minor sand, silt and bentonite. (Local occurrence of thick bar-type sandstone in subsurface: Ashville or Viking Sand).

##### Lower Cretaceous

**KSR** — Swan River Formation (0-105m): sandstone, in places glauconitic; kaolinitic shale, minor lignite. May include some non-marine Jurassic beds in the north. Also includes channel &/or karst fill within Palaeozoic outcrop belt. Locally missing from outcrop sequence due to non-deposition.

#### Jurassic

**J** — Amaranth Formation: red argillaceous dolomitic siltstone and sandstone overlain by gypsum or anhydrite. Reston Formation: limestone and dolomite, shale interbeds. Melita Formation: fine-grained sandstone, variegated shale, minor limestone. Total Jurassic thickness 0-280m.

### Paleozoic

#### Permian (?)

**P** — St. Martin Complex (0-300m): carbonate breccia (fragments Ordovician to Devonian), polymictic breccia, granitic micro-breccia, trachyandesite. Comprises crater fill in crypto-explosion (meteorite impact?) structure.

#### Devonian

##### Upper and Middle Devonian

**DSR** — Souris River Formation (65-95m): sequence of basal red shale (First Red Beds), argillaceous micrite, high-Ca micritic limestone, and upper dolomite in northern area; complex facies of limestone and dolomite to the south.

##### Middle Devonian

**DDB** — Dawson Bay Formation (45-60m): sequence of basal red shale (Second Red Beds); bituminous dolomite grading upward to micritic limestone to brachiopod biomicrite (high-Ca); red to grey fossiliferous calcareous shale; highly fossiliferous coral stromatoporoid limestone (high-Ca), locally dolomitized.

**DW / DEP** — Elm Point Formation: high-Ca limestone biomicrite (platform facies). Winnipegosis Formation: Lower Member: dolomitized platform facies (grades laterally to DEP). Upper Member: thin inter-reef bituminous laminates or thick reefal carbonates (DWR). Total thickness 12-105m.

**DA** — Ashern Formation (5-12m): dolomitic shale and argillaceous dolomite, red to greenish grey; local basal breccia.

### HUDSON BAY BASIN AREA

**DMR** — Moose River Formation (~50m): fine-to med-grained dolomite limestone, argillite limestone and argillite dolomite; minor anhydrite, chert, red shale.

**DK** — Kwataboahegan Formation (~45m): limestone, med-to dark-brown, fossiliferous, bituminous, partly reefal; minor dolomite.

##### Lower Devonian

**DSTR** — Stooping River Formation (~80m): aphanitic to finely crystalline limestone, sparsely fossiliferous; minor argillite limestone and dolomite.

**DKR** — Kenogami River Formation (~10m): Upper Member (u): finely crystalline to aphanitic limestone; thin interbeds argillite silty sandy dolomite.

##### Silurian

**SKR** — Kenogami River Formation (~200m): Lower Member (l): dolomite, slightly calcareous and argillite; some limestone and dolomite limestone; minor anhydrite Middle Member (m): red-brown to green-grey calcareous argillite sandy siltstone and silty shale; minor sandstone; some gypsum.

**SAT** — Attawapiskat Formation (30-60m): limestone, crypto-crystalline to calcarenitic and oolitic, in part reefal, vuggy. Interfingers laterally with SKR.

**SER** — Ekwan River Formation (~45m): limestone, skeletal calcarenites; in part argillaceous and dolomitic.

**SSR** — Severn River Formation (~235m): limestone, dolomitic limestone and dolomite, very fine grained, fucoidal; in part algal bioclastic and pelletal; minor anhydrite and shale.

##### Ordovician (and Lower Silurian)

**ORHR** — Red Head Rapids Formation (~25m): dolomite, thin-bedded microcrystalline; in part silty and argillaceous.

##### Upper Ordovician

**OCR** — Churchill River Group (~145m): Caution Creek and Chasm Creek formations: limestone, slightly to moderately dolomitic and argillaceous, microcrystalline, variably bioclastic; minor shale, dolomite, chert and anhydrite.

**OBCR** — Bad Cache Rapids Group (~70m): Portage Chute Formation: thin basal sandstone-shale member; limestone, mottled, slightly dolomitic and argillaceous, variably fossiliferous; considerable nodular chert and siliceous limestone. Surprise Creek Formation: microcrystalline dolomite, slightly bioclastic, prominent bituminous lamination; some anhydrite and salt clasts.

##### Silurian

**S** (A) — Interlake Group (50-105m): Fisher Branch (FB), Inwood (I), Moose Lk (ML), Atikameg (A), East Arm (EA) and Cedar Lake (CL) formations: micritic, fossiliferous, stromatolitic and biostromal dolomites with several sandy/argillaceous marker beds.

##### Ordovician (and Lower Silurian)

**OS** — Stonewall Formation (10-20m): dolomite, fine grained, sparsely fossiliferous, in part conglomeratic. Medial sandy argillaceous marker may define Ordovician-Silurian boundary.

##### Upper Ordovician

**OSM** (gw / sp) — Stony Mountain Formation (35-45m): Gunn and Penientiary members (gp): calcareous shale, fossiliferous limetone and argillaceous dolomite. Gunton and William members (gw): nodular dolomite and sandy argillaceous dolomite.

**ORR** (fg / s / ch / dh) — Red River Formation (45-150m): Dog Head Member (dh): mottled dolomitic limestone; passes northward to dolomite. Cat Head Member (ch): cherty dolomite; passes sourthward to mottled limestone. Selkirk Member (s): mottled dolomitic limestone and limestone; passes northward to dolomite Fort Garry Member (fg): massive to laminated dolomite; minor argillaceous dolomite and high-Ca limestone; in part cherty.

**OW** — Winnipeg Formation (0-60m): basal sandstone overlain by complex sequence of quartzose sandstone and shale.

## SYMBOLS

- Geological boundary (defined or approximate)
- Geological boundary - Precambrian (gradational, inferred from aeromagnetic signature and trend)
- Geological boundary - Phanerozoic (estimated; sub-surface projected to bedrock where thickness of overburden exceeds 15 metres; subcrop
- Fault
- Estimated limit of structural disturbance: Phanerozoic Lake St. Martin, Denbeigh (Denby) and Highrock Lake structures
- Limit of Hudsonian tectonic overprint on the Superior Province (defined or approximate; inferred from aeromagnetic signature)
- Superior Boundary Zone margins under Phanerozoic cover extrapolated from aeromagnetic trends, etc.
- Structure contour on Precambrian basement beneath Phanerozoic cover. Contour interval: 100m

## PRECAMBRIAN

### Proterozoic

**32** — Diabase dykes (Mackenzie swarm), known, and interpreted from aeromagnetic anomalies.

### CHURCHILL PROVINCE

#### Intrusive Rocks

**31** — Granite, granodiorite and tonalite: (31a) fluorite granite; (31b) porphyritic granite and pegmatite; (31c) hypersthene-bearing porphyritic granite-monzonite; (31d) leucogranite-leucotonalite; (31e) hornblende granite-syenite.

**30** — Tonalite-granodiorite: (30a) tonalite-granodiorite gneiss; (30b) quartz-eye tonalite.

**29** — Mafic to intermediate rocks: (29a) gabbro; (29b) anorthositic gabbro; (29c) diorite; (29d) tonalite-diorite; (29e) hypersthene-bearing tonalite-diorite, enderbite.

**28** — Ultramafic rocks (28a) peridotite-pyroxenite; (28b) serpentinite; (28c) hornblendite-hornblende peridotite and pyroxenite.

#### Metamorphic and Metasedimentary Rocks

**27** — Migmatite, agmatite and gneiss complex.

**26** — Arkose-, arenite-, and quartzite-derived gneiss and migmatite (Sickle Group, Missi Group and Sickle Metamorphic Suite): (26a) orthoquartzite and minor conglomerate (includes Churchill quartzite and Great Island quartzite of possibly younger age); (26b) arkose, feldspathic wacke, conglomerate and quartzite; (26c) arkosic gneiss and migmatite, local arkosic wacke; (26d) felsic gneiss of unknown derivation.

**25** — Metaconglomerate with minor arkosic gneiss.

**24** — Amphibolite and mafic gneiss: (24a) calc-silicate gneiss and interlayered amphibolite; (24b) calc-silicate rocks, local quartzite and/or marble; (24c) iron formation.

**23** — Greywacke- and mudstone-derived gneiss and migmatite (Amisk Group and Wasekwan Group in part; Nokomis Group and Burntwood River Metamorphic Suite: (23a) greywacke, argillite, slate and metagreywacke, local minor grit and conglomerate; (23b) psammitic and semi-pelitic gneiss, pelitic schist and migmatite.

#### Metavolcanic Rocks (includes Amisk and Wasekwan Groups and Great Island volcanic rocks)

**22** — Felsic metavolcanic rocks, flows and pyroclastic deposits: (22a) rhyolite; (22b) dacite.

**21** — Mafic and intermediate metavolcanic flows, pyroclastic deposits and associated metasediments; local ultramafic flows: (21a) andesite; (21b) basalt; (21c) ultramafic flows.

#### Archean and Inferred Archean

**20** — Charnockite-mangerite and derived granitoid gneiss: (20a) remobilized granite and granitoid orthogneiss.

**19** — Granitoid complexes: (19a) grey, foliated granodiorite and granodioritic gneiss; (19b) enderbite and pyroxene-granulites and abundant local supracrustal rafts.

### SUPERIOR PROVINCE AND SUPERIOR BOUNDARY ZONE

#### Proterozoic

**18** — Granite, granodiorite: (18a) granodiorite with inclusions of unit (15).

**17** — Metasedimentary and mafic/ultramafic metavolcanic rocks, serpentinized peridotite, serpentinite, pyroxenite and mafic/ultramafic differentiated intrusions of the Fox River belt and Ospwagan Group (17a) shale, dolomitic limestone, siltstone, sandstone, iron formation; (17b) basalt and komatiite; (17c) iron formation.

**16** — Amphibolite.

**15** — Layered migmatitic gneiss derived from units (4) to (9), aplite and pegmatite: (15a) transitional zone containing migmatitic gneiss and rocks of units (4) to (9).

**14** — Mafic/ultramafic and diabase dykes (Molson swarm), known, and interpreted from aeromagnetic anomalies.

#### Archean

##### Late Intrusive Rocks

**13** — Granite, minor granodiorite.

**12** — Granodiorite, minor tonalite and migmatite.

##### Late Metasedimentary and Metavolcanic Rocks (Oxford Lake Group, Island Lake Series, San Antonio Formation)

**11** — Greywacke, conglomerate, arkose, arenite.

**10** — Mafic and felsic fragmental volcanic rocks, porphyritic mafic to felsic flows, derived sediments.

##### Metamorphosed Early Intrusive Rocks, Gneisses and Migmatites

**9** — Migmatitic gneiss containing tonalite (8) and amphibolite (5).

**8** — Tonalite, minor granodiorite, granite, related gneiss: (8a) tonalitic and granodioritic gneiss, migmatitic gneiss, augen-gneiss; inclusions of units (5) and (6); (8b) undifferentiated granitic rocks.

**7** — Felsic granulites with minor gabbro and anorthosite: enderbite, opdalite, charnockite, and related gneiss; inclusions of units (5a) and (6).

**6** — Metasedimentary gneiss.

**5** — Amphibolite: (5a) mafic and minor ultramafic granulite, banded iron formation, quartzite, and calc-silicate rocks.

**4** — Gabbro, gabbronorite: (4a) diorite; (4b) anorthosite.

##### Early Metavolcanic and Metasedimentary Rocks (Rice Lake Group, Hayes River Group)

**3** — Greywacke, mudstone, conglomerate, arkose, banded iron formation.

**2** — Felsic to intermediate, mainly pyroclastic volcanic rocks; some flows, minor intrusive and sedimentary rocks.

**1** — Basalt, minor andesite, minor sedimentary and mafic intrusive rocks; ultramafic rocks (serpentinite, serpentinized peridotite, pyroxenite) and differentiated ultramafic/mafic intrusions.

#### Ultramafic Rocks (associated with units 1, 4, 17, 21 and 28)

- Serpentinized peridotite, serpentinite, pyroxenite.
- Serpentinized peridotite, serpentinite, pyroxenite, under Phanerozoic cover, known from diamond drill hole intersections and interpreted from aeromagnetic anomalies
- Differentiated mafic/ultramafic intrusions (small, large)
- As above, under Phanerozoic cover. Known from diamond drill hole intersections and interpreted from aeromagnetic anomalies
- Extensive drift-covered areas with little or no bedrock exposure; geology inferred almost entirely from aeromagnetic signature and trend

slivers of calc-silicate rocks including quartzite and marble (unit 24b) occur in these and other parts of the area. Late Paleoproterozoic plutons (unit 31) of granite and granodiorite constitute the Chipewyan/Wathaman batholith and Hudson granite suites. Porphyritic granite, fluorite-bearing granite, granite gneiss and pegmatite occur in the northeast (unit 31) and are interpreted to include the Nueltin granite suite.

Paleozoic rocks of the Hudson Platform occupy the southeast part of the map area and overlie Precambrian basement. These consist chiefly of limestone and dolomite of Ordovician and Silurian age. Paleozoic units containing limestone and red shale occur east of the map area under Hudson Bay.

*Quaternary geology*

The distribution of the various tills and postglacial deposits, as well as ice-flow indicators, are shown on the surface materials and landforms map for this study area (Dredge et al., 2007). Evidence from northern Manitoba indicates that this region was continuously covered by glacial ice during the entire Wisconsin Glaciation, but that the area lies within the zone of convergence of ice flowing southward from a centre in Keewatin, and ice flowing westward from or across Hudson Bay. One of the last known positions of the confluence of Keewatin and Hudsonian ice is marked by a sandy interlobate moraine near South Knife Lake (South Knife moraine). Till of Keewatin provenance tends to have a sandy, non-

calcareous matrix, while that of Labradorean/Hudsonian provenance is silty and calcareous. The map depicting matrix carbonate contents in surface tills (Fig. 3) indicates that ice of eastern provenance extended west and north of the South Knife moraine, suggesting that the convergence zone shifted, even during deglaciation. Keewatin till varies in thickness from <1 m to >5m, while the Hudsonian/Labradorean till, consisting of multiple till sheets, is up to 40 m thick. South of the Seal River, till is covered by glaciolacustrine sediments, and below elevations of about 140-180 m, glaciomarine deposits are common in the east.

The composition of the till is a product of bedrock source character, direction of glacial transport and distance of transport. The surface till, the material sampled for this report, may be a product of reworking from multiple ice flow events, but its composition most closely reflects the late-glacial ice-flow patterns, which have been determined from striae and glacial landforms. For the relatively thin tills of northern (Keewatin) provenance, much of the surface till most likely reflects late-glacial and deglacial ice-flow events. In areas of bouldery till with ribbed moraine, the drift may have been carried for fairly short distances. Consequently, geochemical values in those areas may reflect concentrations in nearby bedrock. In contrast, silty tills of eastern provenance probably contain more components inherited from underlying tills and also more far-travelled material. Element values determined from the sampled upper zones of the silty till may reflect average concentrations from local to distant easterly sources. The distribution of total matrix carbonate in till (Fig. 3) indicates that there has been some transport

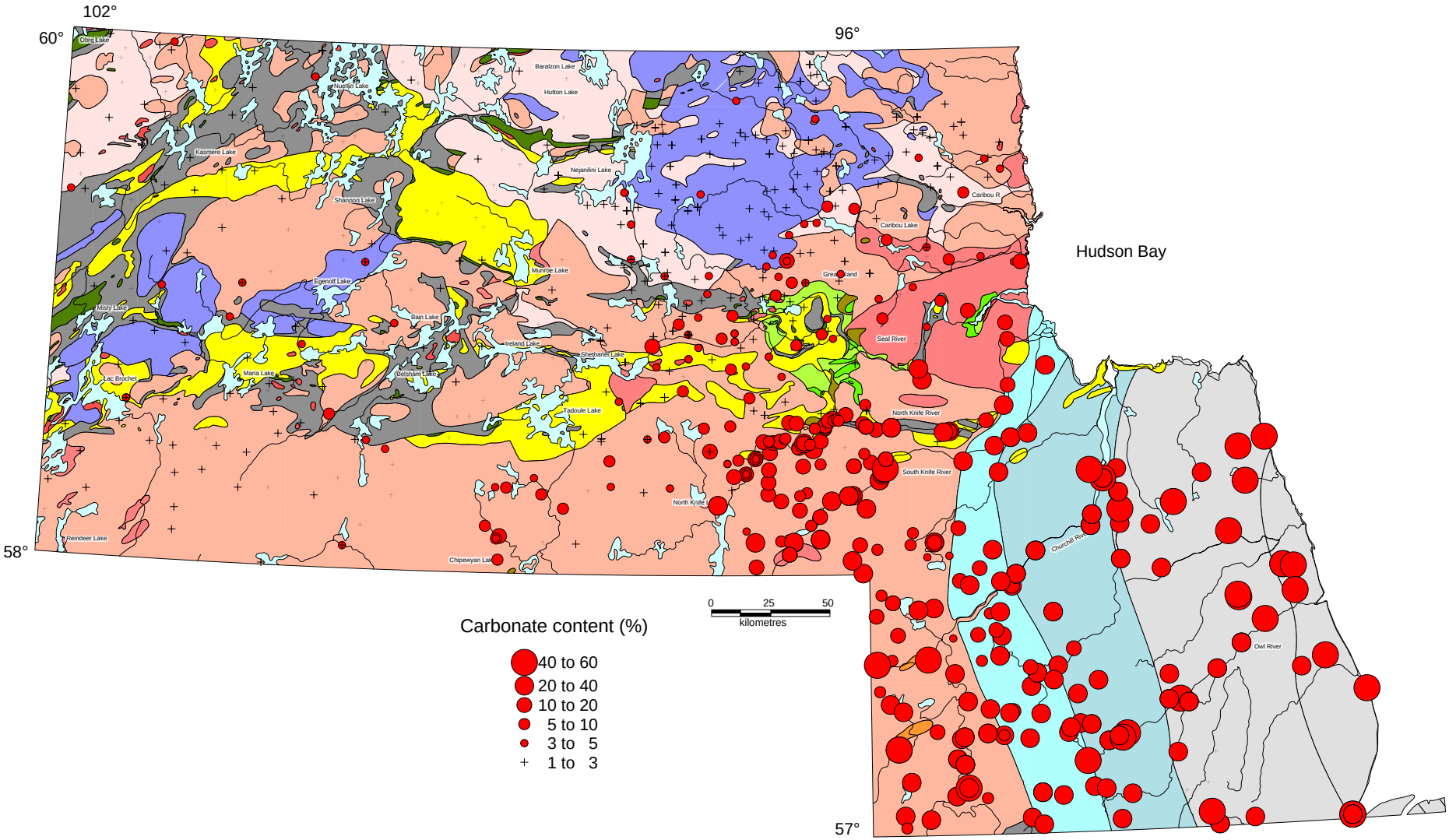


Figure 3. Distribution of carbonate in the <2mm till fraction, determined by HCl digestion

of material for distances of >175 km westward beyond the Paleozoic carbonate shelf. Also, clasts of red shale in some till units indicate transport westward from known bedrock sources beneath Hudson Bay (Sanford et al., 1979).

**Methods and quality control.**

Bulk samples of till were dry sieved, and the <0.063 mm fraction was separated at the GSC Sedimentology Laboratory following procedures described by Girard et al (2004). The <0.063 mm (silt + clay) fraction was used for the reanalysis, so that the results obtained could be compared with the broader regional geochemical surveys farther south (e.g. Kaszycki, 1989: Lenton and Kaszycki, 2005: McMartin et al, 2007).

The samples from northernmost Manitoba were submitted for Inductively Coupled Plasma – Atomic Emission spectrometry (ICP-ES analysis) and Induced Neutron Activation Analysis (INAA analysis). For the ICP analyses, 0.5 g aliquots were subjected to aqua regia leach for one hour, and then analysed for 30 elements at Acme Laboratories, Vancouver, BC. The neutron activation analyses on Au + 34 elements were done at Actlabs, Ancaster, ON. The results of these analyses are presented in Appendices 2 and 3. Analyses which yielded concentrations below detection limits are reported as half the detection limit.

Duplicate samples and standards were used for quality control, and QA/QC results are presented in Appendices 4 and 5. The precision and accuracy of the samples for most elements are good where element concentrations are slightly above the lower detection limit.

**Summary of results**

The distribution of elements using the new ICP-ES and INAA data are portrayed on maps in Appendices 6 and 7. Detailed interpretations of the results of the reanalysis are not presented in this report, due to the number of samples across the region that were not reanalysed. Interpretations presented in Open File 5320 (Dredge and Pehrsson, 2006) remain valid, and generally present a more complete picture of the area. Some findings of interest that have arisen from the subset of samples that were reanalyzed are summarized below.

*Comparison of old AAS results with the new reanalysed data*

Although it is difficult to compare results from the new analysis with the previous 11-element analysis because of the different sample populations and different size fractions used, the results between the old AAS data and new ICP-ES analyses appear to be fairly consistent.

Element concentrations of reanalysed samples are generally lower than in the original analysis, as would be expected when using the silt + clay, rather than the clay fraction. Scattergrams (Appendix 8), using data from sites common to both the old AAS and the new ICP-ES analyses, show a reasonable correlation between the two data sets for most of the elements. The correlation is low, however, for Co and Cu, as well as for elements such as U, As and Mo (not shown) where values are at or near the lower detection limit.

The geographical distribution of elements follows similar patterns in both the old and new analyses (Appendix 6), with the additional elements in the reanalyses contributing additional data. Sites with anomalously high concentrations of elements in the old analysis tended to have high concentrations in the same and associated elements in the reanalysis.

These relationships mean that the old analysis, which has more complete geographical coverage and used slightly different procedures, provides a good representation of the background till geochemistry for northernmost Manitoba. The reanalysis from the sample subset contributes additional data on a larger suite of elements.

*Results of the new ICP and INAA analyses*

ICP and INAA data generally correlate well statistically, as shown in the scattergrams in Appendix 9. Sites with high element concentrations in the new ICP analyses tended to have correspondingly high element concentrations in the INAA analyses. INAA values are typically slightly higher than corresponding ICP values, suggesting that digestion of minerals with aqua regia is incomplete for many elements. The plots for sodium and barium show poor correlations between the two methods, indicating that the feldspars (Na) and barite (Ba) in particular are not dissolved in an aqua regia solution. Also, correlations are poor where element concentrations are at or near detection limit by one or both methods. The example for uranium is shown in Appendix 9, for which the detection limit by the ICP method is 8 ppm, whereas the INAA detection limit is 0.5 ppm.

Sites with multiple element anomalies, or major single anomalies, are listed in Appendices 10 and 11, and are shown on Fig. 4. Anomalous concentrations are considered to be those above the 95$^{th}$ percentile. A brief summary is given below. More detailed portrayals of element concentrations are shown on the element distribution maps in Appendices 6 and 7.

High gold concentrations are grouped into an area from Baralzon Lake south to Munroe Lake in the north central part of the study area. These could originate from rocks mapped as mafic gneiss in that area, and from meta-arkose units to the south. This grouping of high gold concentrations is additional to the relatively

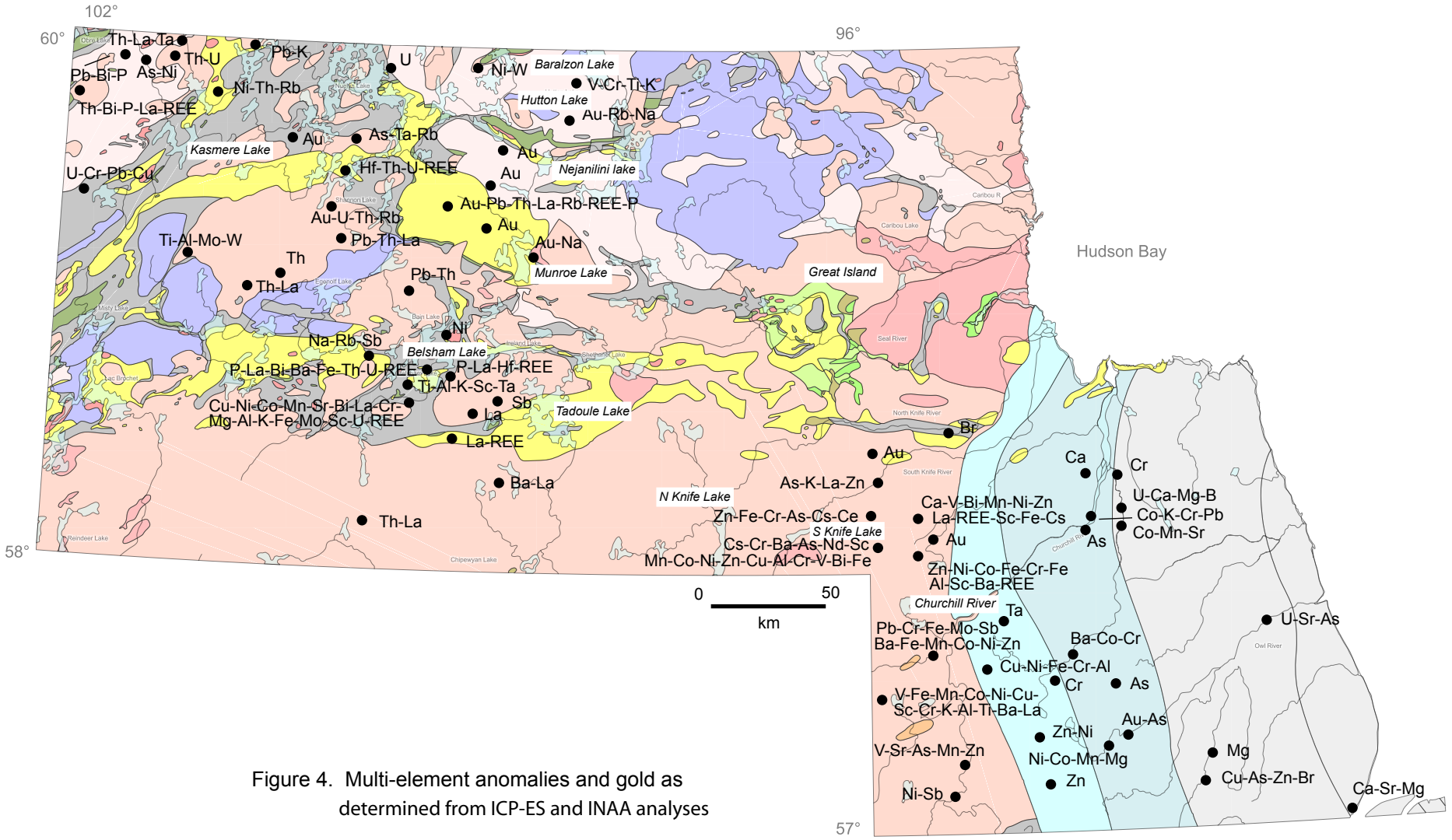


Figure 4. Multi-element anomalies and gold as determined from ICP-ES and INAA analyses

high Au values in till from the Great Island area (Dredge and Pehrsson, 2006), which was not in the subset of samples that was reanalysed. Some gold and arsenic anomalies southeast of, and down-ice from, the Great Island area, however, show up in the reanalysis.

High Th-La-Pb-REE and U concentrations are present in the northwestern part of the study area, including the Wollaston belt, which is known for its uranium occurrences. Similar high elemental concentrations are present southeast of the Wollaston belt, in areas where Th has been glacially transported from greywacke-derived gneisses.

High Bi-V-La and REE are concentrated in granite batholiths.

In the Hutton Lake area (near Baralzon Lake in the north central part of the study area), the old AAS analysis suggested that at least one site was anomalous in Co-Cr-Ni-Zn-Cu-Mn. The reanalysis confirms high concentrations of Cu-Cr as well as Ti-Fe-Ba-V.

Several sites around Belsham Lake, about 50 km west of Tadoule Lake, yielded multi-element anomalies. Site 80DU248, lying within greywackes, is anomalous in Cu-Co-Mn-Fe-Bi-V-La-Cr-Ba-Ti-Al-K according to the ICP-ES analysis, and in Co-Fe-Mo-Sc-U-La-REE by INAA methods. This site has the highest concentrations of many elements in the study area.

The highest concentrations of Ni, Co, Cr, Cu and Zn are located at several sites lying just west of the Precambrian/Paleozoic contact, and at a site in metasediments lying about 50 km west of Tadoule Lake. Cr-Ni-Co-Cu-Zn anomalies, along with other elements, are present in the southeast part of the study area in both the old analysis, and the reanalysed data presented in this report. Cu-Zn concentrations in till above or to the west of Paleozoic platform rocks could be derived from Mississippi Valley type deposits originating in the underlying limestone. Cr-Ni-Co concentrations are more problematical. Some may relate to unmapped mafic bodies west of the Paleozoic/Precambrian contact (Dredge and Pehrsson, 2006).

Elevated Ca-Sr-B-Mg-Mn concentrations appear to be common in till overlying Paleozoic carbonate terrain and in tills transported westward beyond the Paleozoic//Precambrian contact. The westward extent of high Ca and Mg concentrations is particularly interesting in that it corresponds to the limit of carbonate till determined by HCl digestion (Fig. 3). The ICP-ES data suggests that the limit of carbonate till, and therefore of westward glacial transport from Labradorean/Hudsonian source areas, lies in the vicinity of Chipewyan Lake (cf Fig 3). The INAA data confirm these results, although they show that low concentrations of calcium (trace to 4%) are present beyond this area, in the northwest part of the map area. These low concentrations are thought to be derived from calcsilicate rocks and small marble outcrops known to occur in this

region. The slightly lower concentrations of Ca in the ICP-ES data, compared to the INAA data (Appendix 12), suggest that the calcium was not totally digested in the aqua regia preparation used in the ICP-ES analysis. The reanalysed ICP data on the silt+clay fraction accord well with carbonate till results previously determined by total HCl digestion, and to some degree, to limestone pebble counts from till (Appendix 12, and Dredge and Pehrsson, 2006).

**References**

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Appendix 1. Site locations

| NTS | Site | Yr | Sample | SampNum | Easting | Northing | Zone | NAD |
|---|---|---|---|---|---|---|---|---|
| 54E | 25/6/7 | 78DU | 31 | 78DU031 | 417112 | 6382208 | 15 | 27 |
| 54F | 26/6/5 | 78DU | 36 | 78DU036 | 465090 | 6349057 | 15 | 27 |
| 54E | 28/6/6 | 78DU | 53 | 78DU053 | 399579 | 6412203 | 15 | 27 |
| 54F | 7/1/04 | 78DU | 84 | 78DU084 | 489266 | 6403986 | 15 | 27 |
| 54E | 7/2/05 | 78DU | 91 | 78DU091 | 410719 | 6348257 | 15 | 27 |
| 54E | 7/2/06 | 78DU | 94 | 78DU094 | 420101 | 6356271 | 15 | 27 |
| 54L | 7/4/02 | 78DU | 103 | 78DU103 | 430000 | 6448000 | 15 | 27 |
| 54L | 7/4/03 | 78DU | 105 | 78DU105 | 430400 | 6454200 | 15 | 27 |
| 54L | 7/4/04 | 78DU | 109 | 78DU109 | 430200 | 6461400 | 15 | 27 |
| 54L | 7/4/05 | 78DU | 110 | 78DU110 | 429980 | 6471500 | 15 | 27 |
| 54L | 7/4/07 | 78DU | 114 | 78DU114 | 423900 | 6467600 | 15 | 27 |
| 54L | 7/6/03 | 78DU | 123 | 78DU123 | 417600 | 6447900 | 15 | 27 |
| 54L | 7/6/05 | 78DU | 128 | 78DU128 | 393600 | 6438600 | 15 | 27 |
| 54L | 7/7/01 | 78DU | 129 | 78DU129 | 360200 | 6491200 | 15 | 27 |
| 54L | 7/7/01 | 78DU | 131 | 78DU131 | 360200 | 6491200 | 15 | 27 |
| 54E | 7/9/02 | 78DU | 143 | 78DU143 | 391402 | 6386662 | 15 | 27 |
| 54E | 7/9/04 | 78DU | 147 | 78DU147 | 407431 | 6396190 | 15 | 27 |
| 54E | 7/10/02 | 78DU | 150 | 78DU150 | 342546 | 6416138 | 15 | 27 |
| 54L | 7/11/02 | 78DU | 164 | 78DU164 | 342100 | 6449000 | 15 | 27 |
| 54L | 7/11/04 | 78DU | 166 | 78DU166 | 326600 | 6442800 | 15 | 27 |
| 54L | 7/11/05 | 78DU | 167 | 78DU167 | 340800 | 6444000 | 15 | 27 |
| 54L | 7/11/06 | 78DU | 168 | 78DU168 | 347600 | 6438400 | 15 | 27 |
| 54L | 7/11/07 | 78DU | 170 | 78DU170 | 351000 | 6444500 | 15 | 27 |
| 54E | 13/7/2 | 78DU | 184 | 78DU184 | 368140 | 6393169 | 15 | 27 |
| 54E | 13/7/3 | 78DU | 185 | 78DU185 | 375952 | 6394805 | 15 | 27 |
| 54E | 13/7/4 | 78DU | 195 | 78DU195 | 377333 | 6403152 | 15 | 27 |
| 54E | 13/7/5 | 78DU | 196 | 78DU196 | 375071 | 6405897 | 15 | 27 |
| 54E | 14/7/5 | 78DU | 203 | 78DU203 | 408013 | 6376852 | 15 | 27 |
| 54E | 14/7/7 | 78DU | 204 | 78DU204 | 398193 | 6383351 | 15 | 27 |
| 54L | 16/7/4 | 78DU | 224 | 78DU224 | 323500 | 6483800 | 15 | 27 |
| 54L | 16/7/6 | 78DU | 228 | 78DU228 | 323000 | 6460500 | 15 | 27 |
| 54L | 16/7/8 | 78DU | 231 | 78DU231 | 379900 | 6472700 | 15 | 27 |
| 54L | 18/7/12 | 78DU | 250 | 78DU250 | 418400 | 6471600 | 15 | 27 |
| 54L | 19/7/2 | 78DU | 257 | 78DU257 | 329200 | 6472200 | 15 | 27 |
| 54L | 19/7/3 | 78DU | 261 | 78DU261 | 330600 | 6474500 | 15 | 27 |
| 54L | 19/7/7 | 78DU | 270 | 78DU270 | 365200 | 6478200 | 15 | 27 |
| 54L | 19/7/8 | 78DU | 272 | 78DU272 | 378800 | 6484100 | 15 | 27 |
| 54E | 21/7/1 | 78DU | 295 | 78DU295 | 361306 | 6376225 | 15 | 27 |
| 54E | 21/7/4 | 78DU | 299 | 78DU299 | 357641 | 6360362 | 15 | 27 |
| 54E | 21/7/6 | 78DU | 309 | 78DU309 | 358533 | 6349449 | 15 | 27 |
| 54E | 21/7/6 | 78DU | 311 | 78DU311 | 358547 | 6349500 | 15 | 27 |
| 54E | 21/7/6 | 78DU | 312 | 78DU312 | 358547 | 6349500 | 15 | 27 |
| 54E | 21/7/6 | 78DU | 313 | 78DU313 | 358547 | 6349500 | 15 | 27 |
| 54E | 21/7/8 | 78DU | 319 | 78DU319 | 368925 | 6362220 | 15 | 27 |
| 54E | 21/7/10 | 78DU | 323 | 78DU323 | 386644 | 6359158 | 15 | 27 |
| 54F | 23/7/6 | 78DU | 345 | 78DU345 | 449073 | 6349747 | 15 | 27 |
| 54E | 24/7/1 | 78DU | 347 | 78DU347 | 345429 | 6394783 | 15 | 27 |
| 54E | 24/7/1 | 78DU | 349 | 78DU349 | 345429 | 6394783 | 15 | 27 |
| 54E | 24/7/1 | 78DU | 351 | 78DU351 | 345429 | 6394783 | 15 | 27 |
| 54E | 21/7/5 | 78DU | 356 | 78DU356 | 324235 | 6382405 | 15 | 27 |
| 54E | 24/7/9 | 78DU | 359 | 78DU359 | 330855 | 6357377 | 15 | 27 |
| 54E | 26/7/1 | 78DU | 385 | 78DU385 | 390713 | 6335898 | 15 | 27 |
| 54E | 26/7/2 | 78DU | 387 | 78DU387 | 385708 | 6325480 | 15 | 27 |
| 54E | 26/7/9 | 78DU | 394 | 78DU394 | 428779 | 6333261 | 15 | 27 |
| 54F | 27/7/3 | 78DU | 396 | 78DU396 | 451921 | 6333089 | 15 | 27 |
| 54F | 27/7/4 | 78DU | 398 | 78DU398 | 461149 | 6335915 | 15 | 27 |
| 54F | 27/7/7 | 78DU | 399 | 78DU399 | 465047 | 6318260 | 15 | 27 |
| 54E | 28/7/7 | 78DU | 417 | 78DU417 | 354296 | 6336235 | 15 | 27 |

Appendix 1. Site locations

| NTS | Site | Yr | Sample | SampNum | Easting | Northing | Zone | NAD |
|---|---|---|---|---|---|---|---|---|
| 54E | 28/7/8 | 78DU | 418 | 78DU419 | 354296 | 6336235 | 15 | 27 |
| 54E | 28/7/8 | 78DU | 423 | 78DU423 | 359522 | 6339512 | 15 | 27 |
| 54E | 28/7/9 | 78DU | 424 | 78DU425 | 359522 | 6339512 | 15 | 27 |
| 54F | 29/7/8 | 78DU | 437 | 78DU437 | 521461 | 6318939 | 15 | 27 |
| 54F | 29/7/8 | 78DU | 439 | 78DU439 | 521461 | 6318939 | 15 | 27 |
| 54E | 31/7/3 | 78DU | 451 | 78DU451 | 428051 | 6359010 | 15 | 27 |
| 54E | 31/7/5 | 78DU | 458 | 78DU458 | 424579 | 6358072 | 15 | 27 |
| 54L | 31/7/8 | 78DU | 465 | 78DU465 | 418400 | 6452600 | 15 | 27 |
| 54K | 8/1/04 | 78DU | 473 | 78DU473 | 453218 | 6455846 | 15 | 27 |
| 64J | 7/4/06 | 80DU | 14 | 80DU014 | 445753 | 6494031 | 14 | 27 |
| 64J | 7/8/07 | 80DU | 50 | 80DU050 | 460420 | 6447407 | 14 | 27 |
| 64J | 7/9/01 | 80DU | 53 | 80DU053 | 511152 | 6501440 | 14 | 27 |
| 64J | 7/9/04 | 80DU | 57 | 80DU057 | 554054 | 6488424 | 14 | 27 |
| 64J | 7/9/08 | 80DU | 61 | 80DU061 | 505483 | 6494706 | 14 | 27 |
| 64J | 14/7/6 | 80DU | 93 | 80DU093 | 538098 | 6441844 | 14 | 27 |
| 64J | 16/7/5 | 80DU | 118 | 80DU118 | 517263 | 6464922 | 14 | 27 |
| 64J | 17/7/3 | 80DU | 126 | 80DU126 | 467946 | 6524761 | 14 | 27 |
| 64J | 17/7/5 | 80DU | 129 | 80DU129 | 493490 | 6530135 | 14 | 27 |
| 64J | 17/7/7 | 80DU | 131 | 80DU131 | 498367 | 6513224 | 14 | 27 |
| 64J | 17/7/7 | 80DU | 133 | 80DU133 | 498367 | 6513224 | 14 | 27 |
| 64J | 17/7/8 | 80DU | 134 | 80DU134 | 488119 | 6513205 | 14 | 27 |
| 64O | 26/7/1 | 80DU | 137 | 80DU137 | 462627 | 6572481 | 14 | 27 |
| 64O | 26/7/4 | 80DU | 140 | 80DU140 | 491040 | 6584753 | 14 | 27 |
| 64O | 26/7/5 | 80DU | 141 | 80DU141 | 489454 | 6580042 | 14 | 27 |
| 64O | 26/7/6 | 80DU | 142 | 80DU142 | 491165 | 6568943 | 14 | 27 |
| 64O | 27/7/3 | 80DU | 146 | 80DU146 | 542819 | 6562004 | 14 | 27 |
| 64O | 27/7/5 | 80DU | 147 | 80DU147 | 530504 | 6561228 | 14 | 27 |
| 64J | 28/7/2 | 80DU | 153 | 80DU153 | 533542 | 6534434 | 14 | 27 |
| 64J | 28/7/3 | 80DU | 154 | 80DU154 | 540819 | 6535328 | 14 | 27 |
| 64J | 28/7/5 | 80DU | 157 | 80DU157 | 555057 | 6512384 | 14 | 27 |
| 64J | 28/7/7 | 80DU | 158 | 80DU158 | 545251 | 6519249 | 14 | 27 |
| 64J | 28/7/8 | 80DU | 159 | 80DU159 | 540264 | 6520336 | 14 | 27 |
| 64J | 28/7/11 | 80DU | 161 | 80DU161 | 460951 | 6516395 | 14 | 27 |
| 64J | 28/7/12 | 80DU | 162 | 80DU162 | 480288 | 6509771 | 14 | 27 |
| 64O | 27/7/1 | 80DU | 167 | 80DU167 | 449744 | 6569655 | 14 | 27 |
| 64O | 27/7/8 | 80DU | 173 | 80DU173 | 532431 | 6555596 | 14 | 27 |
| 64J | 8/1/13 | 80DU | 184 | 80DU184 | 444896 | 6486843 | 14 | 27 |
| 64N | 8/2/02 | 80DU | 188 | 80DU188 | 426322 | 6571676 | 14 | 27 |
| 64N | 8/2/09 | 80DU | 191 | 80DU191 | 412195 | 6585899 | 14 | 27 |
| 64O | 8/2/12 | 80DU | 194 | 80DU194 | 444966 | 6585682 | 14 | 27 |
| 64N | 8/3/02 | 80DU | 197 | 80DU197 | 407986 | 6616266 | 14 | 27 |
| 64N | 8/3/04 | 80DU | 198 | 80DU198 | 420363 | 6623271 | 14 | 27 |
| 64N | 8/3/06 | 80DU | 199 | 80DU199 | 412038 | 6651099 | 14 | 27 |
| 64O | 8/4/01 | 80DU | 211 | 80DU211 | 515953 | 6608251 | 14 | 27 |
| 64O | 8/4/02 | 80DU | 212 | 80DU212 | 523683 | 6601906 | 14 | 27 |
| 64O | 8/4/06 | 80DU | 219 | 80DU219 | 541600 | 6622500 | 14 | 27 |
| 64O | 8/5/04 | 80DU | 220 | 80DU220 | 467202 | 6642347 | 14 | 27 |
| 64O | 8/5/05 | 80DU | 221 | 80DU221 | 472742 | 6643891 | 14 | 27 |
| 64O | 8/5/08 | 80DU | 223 | 80DU223 | 499006 | 6643591 | 14 | 27 |
| 64O | 8/5/09 | 80DU | 224 | 80DU224 | 505100 | 6641113 | 14 | 27 |
| 64O | 8/5/10 | 80DU | 225 | 80DU225 | 511862 | 6641321 | 14 | 27 |
| 64O | 8/5/14 | 80DU | 227 | 80DU227 | 542457 | 6639274 | 14 | 27 |
| 64O | 8/5/17 | 80DU | 228 | 80DU228 | 506241 | 6625319 | 14 | 27 |
| 64O | 8/5/20 | 80DU | 230 | 80DU230 | 479549 | 6635190 | 14 | 27 |
| 64J | 8/6/09 | 80DU | 241 | 80DU241 | 497116 | 6485309 | 14 | 27 |
| 64J | 8/7/01 | 80DU | 243 | 80DU243 | 500283 | 6494286 | 14 | 27 |
| 64J | 8/7/03 | 80DU | 248 | 80DU248 | 478500 | 6499200 | 14 | 27 |
| 64N | 8/8/02 | 80DU | 249 | 80DU249 | 348784 | 6616932 | 14 | 27 |

Appendix 1. Site locations

| NTS | Site | Yr | Sample | SampNum | Easting | Northing | Zone | NAD |
|---|---|---|---|---|---|---|---|---|
| 64N | 8/8/06 | 80DU | 252 | 80DU252 | 334302 | 6628762 | 14 | 27 |
| 64N | 8/8/08 | 80DU | 253 | 80DU253 | 348282 | 6652473 | 14 | 27 |
| 64N | 8/8/09 | 80DU | 254 | 80DU254 | 353067 | 6642499 | 14 | 27 |
| 64N | 8/9/02 | 80DU | 265 | 80DU265 | 371560 | 6573116 | 14 | 27 |
| 64N | 8/9/04 | 80DU | 267 | 80DU267 | 359479 | 6582122 | 14 | 27 |
| 64N | 8/9/06 | 80DU | 268 | 80DU268 | 339481 | 6586416 | 14 | 27 |
| 64N | 8/9/07 | 80DU | 269 | 80DU269 | 333558 | 6586712 | 14 | 27 |
| 64N | 8/9/08 | 80DU | 270 | 80DU270 | 337574 | 6592528 | 14 | 27 |
| 64N | 8/9/12 | 80DU | 271 | 80DU271 | 373229 | 6588940 | 14 | 27 |
| 64N | 8/9/13 | 80DU | 272 | 80DU272 | 379064 | 6590404 | 14 | 27 |
| 64N | 8/9/14 | 80DU | 273 | 80DU273 | 385950 | 6587128 | 14 | 27 |
| 64O | 8/10/02 | 80DU | 275 | 80DU275 | 508967 | 6574953 | 14 | 27 |
| 64O | 8/10/07 | 80DU | 280 | 80DU280 | 512713 | 6592995 | 14 | 27 |
| 64O | 8/10/08 | 80DU | 282 | 80DU282 | 513589 | 6586330 | 14 | 27 |
| 64O | 8/10/09 | 80DU | 284 | 80DU284 | 505684 | 6578745 | 14 | 27 |
| 64O | 8/11/01 | 80DU | 285 | 80DU285 | 479127 | 6547722 | 14 | 27 |
| 64O | 8/11/06 | 80DU | 292 | 80DU292 | 450151 | 6559344 | 14 | 27 |
| 64N | 8/11/07 | 80DU | 294 | 80DU294 | 419365 | 6553610 | 14 | 27 |
| 64N | 8/12/01 | 80DU | 296 | 80DU296 | 369367 | 6648310 | 14 | 27 |
| 64N | 8/12/02 | 80DU | 297 | 80DU297 | 374412 | 6646367 | 14 | 27 |
| 64N | 8/12/04 | 80DU | 298 | 80DU298 | 375620 | 6649872 | 14 | 27 |
| 64N | 8/12/06 | 80DU | 301 | 80DU301 | 409280 | 6631411 | 14 | 27 |
| 64N | 8/12/08 | 80DU | 302 | 80DU302 | 393561 | 6629789 | 14 | 27 |
| 64N | 8/12/09 | 80DU | 303 | 80DU303 | 372489 | 6628582 | 14 | 27 |
| 64N | 8/12/10 | 80DU | 305 | 80DU305 | 365546 | 6642903 | 14 | 27 |
| 64N | 12/8/12A | 80DU | 306 | 80DU306 | 354973 | 6646374 | 14 | 27 |
| 64N | 13/8/2 | 80DU | 307 | 80DU307 | 422670 | 6611207 | 14 | 27 |
| 64O | 14/8/5 | 80DU | 315 | 80DU315 | 487261 | 6622926 | 14 | 27 |
| 64O | 14/8/8 | 80DU | 317 | 80DU317 | 453954 | 6621459 | 14 | 27 |
| 64O | 14/8/10 | 80DU | 319 | 80DU319 | 453477 | 6612129 | 14 | 27 |
| 64O | 8/4/11 | 80DU | 320 | 80DU320 | 448466 | 6609536 | 14 | 27 |
| 64O | 14/8/12 | 80DU | 321 | 80DU321 | 448493 | 6596356 | 14 | 27 |
| 64N | 14/8/13 | 80DU | 322 | 80DU322 | 383648 | 6600842 | 14 | 27 |
| 64N | 14/8/14 | 80DU | 323 | 80DU323 | 377951 | 6612285 | 14 | 27 |
| 64N | 14/8/18 | 80DU | 326 | 80DU326 | 337084 | 6601610 | 14 | 27 |
| 64N | 15/8/3 | 80DU | 328 | 80DU328 | 383583 | 6560405 | 14 | 27 |
| 64N | 15/8/5 | 80DU | 329 | 80DU329 | 374684 | 6561082 | 14 | 27 |
| 64N | 15/8/8 | 80DU | 331 | 80DU331 | 335604 | 6544591 | 14 | 27 |
| 64N | 15/8/9 | 80DU | 332 | 80DU332 | 344621 | 6545249 | 14 | 27 |
| 64N | 15/8/11 | 80DU | 334 | 80DU334 | 360536 | 6544376 | 14 | 27 |
| 64N | 15/8/12 | 80DU | 335 | 80DU335 | 373276 | 6546685 | 14 | 27 |
| 64N | 15/8/14 | 80DU | 337 | 80DU337 | 407383 | 6548550 | 14 | 27 |

Appendix 2. ICP_ES data

| ELEMENT | Mo | Cu | Pb | Zn | Ag | Ni | Co | Mn | Fe | As | U | Au | Th | Sr | Cd | Sb | Bi | V | Ca | P | La | Cr | Mg | Ba | Ti | B | Al | Na | K | W |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SAMPLES | ppm | ppm | ppm | ppm | ppm | ppm | ppm | ppm | % | ppm | ppm | ppm | ppm | ppm | ppm | ppm | ppm | ppm | % | % | ppm | ppm | % | ppm | % | ppm | % | % | % | ppm |
| DETECTION | 1 | 1 | 3 | 1 | 0.3 | 1 | 1 | 1 | 0.01 | 2 | 8 | 2 | 1 | 1 | 0.5 | 3 | 3 | 1 | 0.01 | 0.01 | 1 | 1 | 0.01 | 1 | 0.01 | 1 | 0.01 | 0.01 | 0.01 | 2 |
| 78DU031 | 1 | 14 | 5 | 32 | 0.1 | 17 | 7 | 310 | 1.73 | 1 | 8 | 1 | 12 | 55 | 0.3 | 1 | 3 | 28 | 8.92 | 0.05 | 24 | 25 | 3.05 | 60 | 0.07 | 13 | 0.95 | 0.03 | 0.27 | 1 |
| 78DU036 | 1 | 8 | 3 | 17 | 0.1 | 10 | 3 | 180 | 0.99 | 1 | 4 | 1 | 7 | 53 | 0.3 | 1 | 1 | 16 | 9.79 | 0.04 | 16 | 13 | 4.23 | 26 | 0.04 | 14 | 0.58 | 0.01 | 0.11 | 1 |
| 78DU053 | 1 | 12 | 7 | 31 | 0.1 | 19 | 7 | 510 | 1.73 | 1 | 8 | 1 | 13 | 49 | 0.3 | 1 | 4 | 22 | 7.69 | 0.04 | 26 | 23 | 2.39 | 51 | 0.05 | 10 | 0.86 | 0.02 | 0.21 | 2 |
| 78DU084 | 1 | 11 | 9 | 24 | 0.1 | 17 | 7 | 379 | 1.31 | 2 | 12 | 1 | 7 | 70 | 0.3 | 1 | 6 | 21 | 12.08 | 0.04 | 16 | 17 | 3.62 | 56 | 0.02 | 12 | 0.60 | 0.01 | 0.13 | 1 |
| 78DU091 | 1 | 15 | 5 | 30 | 0.1 | 14 | 5 | 277 | 1.69 | 2 | 4 | 1 | 6 | 66 | 0.3 | 1 | 4 | 28 | 9.60 | 0.05 | 18 | 26 | 2.66 | 44 | 0.07 | 10 | 0.91 | 0.02 | 0.16 | 1 |
| 78DU094 | 1 | 14 | 7 | 39 | 0.1 | 25 | 10 | 592 | 1.71 | 2 | 4 | 1 | 10 | 59 | 0.7 | 1 | 6 | 24 | 9.65 | 0.04 | 21 | 21 | 4.65 | 59 | 0.04 | 18 | 0.87 | 0.01 | 0.18 | 1 |
| 78DU103 | 1 | 16 | 8 | 34 | 0.1 | 21 | 10 | 625 | 1.84 | 1 | 4 | 1 | 8 | 71 | 0.3 | 1 | 3 | 30 | 9.16 | 0.05 | 20 | 31 | 2.72 | 86 | 0.07 | 11 | 1.04 | 0.03 | 0.24 | 1 |
| 78DU105 | 1 | 9 | 3 | 23 | 0.1 | 13 | 5 | 288 | 1.16 | 2 | 11 | 1 | 7 | 61 | 0.3 | 3 | 1 | 19 | 12.39 | 0.03 | 16 | 17 | 5.89 | 45 | 0.05 | 21 | 0.67 | 0.02 | 0.18 | 1 |
| 78DU109 | 1 | 14 | 7 | 32 | 0.1 | 18 | 7 | 317 | 1.74 | 2 | 4 | 1 | 14 | 61 | 0.3 | 1 | 5 | 28 | 7.63 | 0.05 | 26 | 26 | 2.28 | 76 | 0.08 | 11 | 0.98 | 0.03 | 0.30 | 1 |
| 78DU110 | 1 | 15 | 4 | 33 | 0.1 | 18 | 7 | 346 | 1.78 | 1 | 8 | 1 | 9 | 62 | 0.3 | 1 | 5 | 29 | 8.82 | 0.05 | 22 | 27 | 3.23 | 61 | 0.07 | 13 | 1.02 | 0.03 | 0.25 | 1 |
| 78DU114 | 1 | 14 | 4 | 32 | 0.1 | 17 | 7 | 329 | 1.76 | 1 | 4 | 1 | 12 | 68 | 0.3 | 1 | 4 | 28 | 9.66 | 0.05 | 24 | 26 | 2.99 | 73 | 0.07 | 15 | 1.03 | 0.03 | 0.29 | 1 |
| 78DU123 | 1 | 16 | 17 | 37 | 0.1 | 20 | 8 | 362 | 1.99 | 3 | 4 | 1 | 14 | 57 | 0.3 | 1 | 4 | 31 | 7.49 | 0.05 | 29 | 30 | 2.29 | 75 | 0.09 | 11 | 1.16 | 0.03 | 0.33 | 1 |
| 78DU128 | 1 | 14 | 6 | 33 | 0.1 | 18 | 7 | 365 | 1.78 | 1 | 4 | 1 | 10 | 68 | 0.3 | 1 | 4 | 28 | 8.85 | 0.05 | 21 | 27 | 3.13 | 61 | 0.06 | 12 | 0.99 | 0.03 | 0.23 | 1 |
| 78DU129 | 1 | 4 | 5 | 11 | 0.1 | 6 | 2 | 155 | 0.84 | 1 | 4 | 1 | 11 | 55 | 0.3 | 1 | 1 | 12 | 8.81 | 0.05 | 21 | 10 | 2.58 | 15 | 0.04 | 9 | 0.31 | 0.01 | 0.08 | 1 |
| 78DU131 | 1 | 8 | 6 | 26 | 0.1 | 14 | 4 | 200 | 1.44 | 2 | 4 | 1 | 12 | 33 | 0.3 | 1 | 1 | 24 | 3.43 | 0.06 | 24 | 21 | 1.53 | 46 | 0.06 | 7 | 0.71 | 0.02 | 0.23 | 1 |
| 78DU143 | 1 | 13 | 5 | 31 | 0.1 | 16 | 6 | 276 | 1.65 | 2 | 9 | 1 | 11 | 53 | 0.3 | 1 | 4 | 26 | 8.76 | 0.05 | 24 | 24 | 3.04 | 54 | 0.07 | 12 | 0.95 | 0.02 | 0.25 | 1 |
| 78DU147 | 1 | 15 | 9 | 39 | 0.1 | 20 | 9 | 473 | 1.99 | 2 | 8 | 1 | 15 | 32 | 0.3 | 1 | 6 | 26 | 3.52 | 0.05 | 31 | 25 | 1.44 | 66 | 0.06 | 6 | 1.01 | 0.02 | 0.28 | 1 |
| 78DU150 | 1 | 16 | 6 | 38 | 0.1 | 21 | 8 | 428 | 2.00 | 3 | 12 | 1 | 11 | 61 | 0.3 | 1 | 5 | 32 | 9.17 | 0.05 | 23 | 30 | 2.56 | 63 | 0.07 | 10 | 1.24 | 0.02 | 0.23 | 1 |
| 78DU164 | 1 | 16 | 9 | 50 | 0.1 | 26 | 9 | 364 | 2.58 | 1 | 4 | 1 | 23 | 24 | 0.3 | 1 | 8 | 39 | 0.50 | 0.06 | 55 | 38 | 0.85 | 105 | 0.11 | 7 | 1.86 | 0.03 | 0.34 | 1 |
| 78DU166 | 1 | 23 | 7 | 59 | 0.1 | 30 | 12 | 507 | 2.89 | 3 | 4 | 1 | 19 | 20 | 0.3 | 1 | 7 | 41 | 0.39 | 0.05 | 43 | 39 | 0.79 | 110 | 0.09 | 7 | 1.99 | 0.02 | 0.40 | 1 |
| 78DU167 | 1 | 10 | 7 | 41 | 0.1 | 19 | 7 | 290 | 2.01 | 2 | 4 | 1 | 15 | 18 | 0.3 | 1 | 4 | 31 | 0.47 | 0.05 | 33 | 29 | 0.57 | 66 | 0.07 | 5 | 1.44 | 0.02 | 0.19 | 1 |
| 78DU168 | 1 | 16 | 9 | 45 | 0.1 | 29 | 10 | 444 | 2.32 | 2 | 4 | 1 | 20 | 17 | 0.3 | 3 | 3 | 33 | 0.36 | 0.05 | 48 | 32 | 0.60 | 106 | 0.07 | 5 | 1.67 | 0.02 | 0.25 | 1 |
| 78DU170 | 1 | 15 | 7 | 36 | 0.1 | 18 | 7 | 287 | 1.94 | 1 | 4 | 1 | 16 | 47 | 0.3 | 1 | 3 | 31 | 6.26 | 0.06 | 29 | 28 | 2.16 | 71 | 0.09 | 10 | 1.17 | 0.03 | 0.29 | 1 |
| 78DU184 | 1 | 19 | 5 | 39 | 0.1 | 24 | 8 | 401 | 2.33 | 3 | 4 | 1 | 18 | 19 | 0.3 | 1 | 6 | 35 | 1.21 | 0.05 | 42 | 32 | 1.04 | 78 | 0.07 | 7 | 1.48 | 0.02 | 0.20 | 1 |
| 78DU185 | 1 | 14 | 6 | 34 | 0.1 | 19 | 8 | 373 | 1.81 | 1 | 4 | 1 | 9 | 69 | 0.3 | 1 | 1 | 29 | 8.80 | 0.05 | 21 | 28 | 3.00 | 62 | 0.07 | 12 | 1.05 | 0.03 | 0.23 | 1 |
| 78DU195 | 1 | 16 | 6 | 32 | 0.1 | 19 | 7 | 357 | 1.81 | 4 | 4 | 1 | 12 | 51 | 0.3 | 1 | 3 | 28 | 8.40 | 0.04 | 24 | 27 | 2.72 | 57 | 0.06 | 11 | 1.15 | 0.02 | 0.20 | 1 |
| 78DU196 | 1 | 12 | 9 | 41 | 0.1 | 20 | 8 | 209 | 1.92 | 1 | 4 | 1 | 14 | 30 | 0.3 | 1 | 6 | 32 | 3.90 | 0.05 | 29 | 31 | 2.69 | 66 | 0.09 | 11 | 1.36 | 0.02 | 0.25 | 1 |
| 78DU203 | 1 | 17 | 8 | 35 | 0.1 | 20 | 8 | 261 | 1.84 | 2 | 4 | 1 | 8 | 51 | 0.3 | 1 | 1 | 31 | 7.71 | 0.05 | 21 | 32 | 2.67 | 60 | 0.07 | 11 | 1.23 | 0.02 | 0.16 | 1 |
| 78DU204 | 1 | 17 | 6 | 33 | 0.1 | 21 | 8 | 413 | 1.91 | 2 | 4 | 1 | 10 | 65 | 0.3 | 1 | 3 | 31 | 8.75 | 0.04 | 21 | 30 | 2.64 | 53 | 0.07 | 11 | 1.22 | 0.02 | 0.19 | 1 |
| 78DU224 | 1 | 10 | 4 | 23 | 0.1 | 15 | 5 | 244 | 1.37 | 3 | 4 | 1 | 14 | 22 | 0.3 | 1 | 4 | 21 | 2.36 | 0.06 | 30 | 20 | 1.64 | 38 | 0.06 | 9 | 0.80 | 0.02 | 0.14 | 1 |
| 78DU228 | 1 | 18 | 12 | 44 | 0.1 | 22 | 8 | 341 | 2.23 | 3 | 4 | 1 | 16 | 30 | 0.3 | 1 | 3 | 36 | 2.79 | 0.05 | 33 | 32 | 2.00 | 85 | 0.09 | 11 | 1.47 | 0.03 | 0.27 | 1 |
| 78DU231 | 1 | 11 | 5 | 24 | 0.1 | 14 | 5 | 269 | 1.39 | 2 | 4 | 1 | 10 | 54 | 0.3 | 1 | 1 | 22 | 9.04 | 0.04 | 20 | 19 | 2.86 | 43 | 0.06 | 12 | 0.77 | 0.02 | 0.20 | 1 |
| 78DU250 | 1 | 8 | 1 | 20 | 0.1 | 11 | 4 | 254 | 1.00 | 1 | 4 | 1 | 8 | 54 | 0.3 | 1 | 1 | 17 | 12.21 | 0.03 | 14 | 15 | 6.86 | 36 | 0.04 | 31 | 0.61 | 0.02 | 0.16 | 1 |
| 78DU257 | 1 | 14 | 9 | 34 | 0.1 | 18 | 7 | 351 | 2.00 | 4 | 4 | 1 | 14 | 49 | 0.3 | 1 | 4 | 31 | 7.11 | 0.05 | 27 | 27 | 2.48 | 78 | 0.08 | 12 | 1.07 | 0.02 | 0.29 | 1 |
| 78DU261 | 1 | 16 | 9 | 38 | 0.3 | 19 | 8 | 301 | 2.03 | 3 | 4 | 1 | 17 | 45 | 0.3 | 1 | 4 | 34 | 5.29 | 0.06 | 33 | 30 | 1.75 | 72 | 0.09 | 8 | 1.15 | 0.03 | 0.30 | 1 |
| 78DU270 | 1 | 14 | 7 | 34 | 0.1 | 16 | 6 | 305 | 1.83 | 3 | 4 | 1 | 14 | 57 | 0.3 | 1 | 5 | 32 | 8.58 | 0.05 | 28 | 26 | 2.93 | 72 | 0.08 | 12 | 1.14 | 0.03 | 0.31 | 1 |
| 78DU272 | 1 | 16 | 10 | 37 | 0.1 | 19 | 8 | 382 | 1.95 | 2 | 4 | 1 | 15 | 52 | 0.3 | 1 | 1 | 35 | 7.24 | 0.05 | 31 | 28 | 2.37 | 74 | 0.09 | 11 | 1.14 | 0.03 | 0.31 | 1 |
| 78DU295 | 1 | 15 | 9 | 35 | 0.1 | 21 | 8 | 339 | 2.04 | 2 | 4 | 1 | 9 | 56 | 0.3 | 3 | 6 | 36 | 8.39 | 0.05 | 23 | 32 | 2.65 | 62 | 0.07 | 10 | 1.35 | 0.02 | 0.21 | 1 |
| 78DU299 | 1 | 17 | 9 | 37 | 0.1 | 20 | 8 | 387 | 1.94 | 2 | 4 | 1 | 9 | 65 | 0.3 | 1 | 5 | 35 | 9.91 | 0.05 | 21 | 30 | 2.63 | 64 | 0.07 | 10 | 1.17 | 0.02 | 0.23 | 1 |
| 78DU309 | 1 | 17 | 11 | 38 | 0.1 | 20 | 7 | 353 | 1.95 | 1 | 4 | 1 | 9 | 70 | 0.3 | 1 | 3 | 35 | 9.89 | 0.05 | 20 | 31 | 2.75 | 62 | 0.07 | 10 | 1.15 | 0.02 | 0.24 | 1 |
| 78DU311 | 1 | 17 | 6 | 41 | 0.1 | 22 | 9 | 481 | 2.08 | 4 | 4 | 1 | 9 | 72 | 0.3 | 1 | 5 | 38 | 9.62 | 0.05 | 22 | 32 | 2.74 | 75 | 0.07 | 11 | 1.26 | 0.03 | 0.25 | 1 |
| 78DU312 | 1 | 13 | 10 | 30 | 0.3 | 17 | 7 | 375 | 1.56 | 3 | 8 | 1 | 9 | 70 | 0.3 | 1 | 3 | 24 | 9.71 | 0.05 | 22 | 20 | 2.79 | 70 | 0.03 | 8 | 0.80 | 0.01 | 0.18 | 1 |
| 78DU313 | 1 | 15 | 8 | 33 | 0.1 | 18 | 9 | 509 | 1.85 | 2 | 4 | 1 | 9 | 58 | 0.3 | 1 | 6 | 26 | 8.35 | 0.05 | 23 | 20 | 2.43 | 67 | 0.03 | 7 | 0.80 | 0.01 | 0.16 | 1 |
| 78DU319 | 1 | 17 | 9 | 33 | 0.1 | 20 | 8 | 378 | 1.89 | 2 | 8 | 1 | 9 | 63 | 0.3 | 1 | 3 | 34 | 9.92 | 0.05 | 22 | 29 | 2.71 | 60 | 0.07 | 9 | 1.24 | 0.02 | 0.20 | 2 |
| 78DU323 | 1 | 15 | 9 | 41 | 0.1 | 22 | 9 | 251 | 1.97 | 1 | 4 | 1 | 10 | 45 | 0.3 | 1 | 5 | 39 | 6.52 | 0.05 | 25 | 35 | 2.97 | 70 | 0.08 | 11 | 1.46 | 0.02 | 0.22 | 2 |

Appendix 2. ICP_ES data

| ELEMENT | Mo | Cu | Pb | Zn | Ag | Ni | Co | Mn | Fe | As | U | Au | Th | Sr | Cd | Sb | Bi | V | Ca | P | La | Cr | Mg | Ba | Ti | B | Al | Na | K | W |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 78DU345 | 1 | 9 | 8 | 18 | 0.1 | 10 | 4 | 194 | 1.06 | 3 | 12 | 1 | 7 | 60 | 0.3 | 1 | 1 | 19 | 11.52 | 0.04 | 17 | 15 | 3.95 | 30 | 0.05 | 13 | 0.62 | 0.02 | 0.10 | 1 |
| 78DU347 | 1 | 17 | 13 | 47 | 0.1 | 24 | 10 | 458 | 2.24 | 2 | 4 | 1 | 16 | 75 | 0.3 | 1 | 4 | 36 | 10.48 | 0.04 | 31 | 28 | 3.45 | 100 | 0.08 | 13 | 1.30 | 0.03 | 0.34 | 1 |
| 78DU349 | 1 | 11 | 7 | 31 | 0.1 | 17 | 7 | 377 | 1.38 | 3 | 4 | 1 | 8 | 76 | 0.3 | 1 | 4 | 24 | 12.30 | 0.04 | 18 | 18 | 3.76 | 50 | 0.04 | 12 | 0.77 | 0.02 | 0.18 | 1 |
| 78DU351 | 1 | 12 | 9 | 33 | 0.1 | 17 | 7 | 354 | 1.58 | 4 | 4 | 1 | 9 | 75 | 0.3 | 3 | 1 | 26 | 10.47 | 0.04 | 20 | 20 | 3.14 | 55 | 0.04 | 11 | 0.79 | 0.02 | 0.19 | 1 |
| 78DU356 | 1 | 21 | 9 | 54 | 0.1 | 27 | 11 | 544 | 2.67 | 1 | 4 | 1 | 18 | 28 | 0.3 | 1 | 5 | 40 | 2.12 | 0.05 | 39 | 34 | 1.23 | 107 | 0.10 | 7 | 1.66 | 0.02 | 0.34 | 1 |
| 78DU359 | 1 | 11 | 6 | 29 | 0.1 | 16 | 6 | 347 | 1.45 | 2 | 4 | 1 | 8 | 79 | 0.3 | 1 | 3 | 25 | 11.99 | 0.04 | 19 | 20 | 3.37 | 50 | 0.04 | 11 | 0.77 | 0.02 | 0.19 | 1 |
| 78DU385 | 1 | 18 | 9 | 39 | 0.1 | 21 | 8 | 378 | 2.06 | 1 | 4 | 1 | 9 | 68 | 0.3 | 1 | 6 | 37 | 9.84 | 0.05 | 22 | 32 | 2.63 | 65 | 0.08 | 10 | 1.23 | 0.03 | 0.25 | 2 |
| 78DU387 | 1 | 16 | 9 | 32 | 0.1 | 19 | 8 | 337 | 1.78 | 1 | 4 | 1 | 8 | 58 | 0.3 | 1 | 3 | 34 | 9.29 | 0.05 | 21 | 31 | 2.84 | 59 | 0.08 | 10 | 1.25 | 0.02 | 0.17 | 1 |
| 78DU394 | 1 | 10 | 8 | 21 | 0.1 | 12 | 5 | 283 | 1.22 | 4 | 4 | 1 | 7 | 65 | 0.3 | 1 | 1 | 21 | 11.27 | 0.04 | 17 | 16 | 3.27 | 34 | 0.05 | 10 | 0.63 | 0.02 | 0.13 | 1 |
| 78DU396 | 1 | 12 | 4 | 31 | 0.1 | 16 | 5 | 235 | 1.61 | 1 | 4 | 1 | 10 | 49 | 0.3 | 1 | 1 | 29 | 8.79 | 0.04 | 22 | 25 | 3.10 | 44 | 0.07 | 11 | 1.08 | 0.02 | 0.19 | 3 |
| 78DU398 | 1 | 19 | 8 | 29 | 0.1 | 15 | 5 | 200 | 1.62 | 3 | 4 | 1 | 11 | 44 | 0.3 | 1 | 1 | 33 | 8.07 | 0.05 | 24 | 23 | 3.38 | 55 | 0.06 | 13 | 0.97 | 0.02 | 0.20 | 1 |
| 78DU399 | 1 | 16 | 7 | 32 | 0.1 | 18 | 8 | 346 | 1.80 | 1 | 4 | 1 | 10 | 68 | 0.3 | 1 | 3 | 29 | 10.31 | 0.05 | 22 | 25 | 2.85 | 54 | 0.06 | 12 | 0.90 | 0.02 | 0.25 | 1 |
| 78DU417 | 1 | 17 | 5 | 36 | 0.1 | 20 | 8 | 399 | 1.87 | 2 | 8 | 1 | 7 | 73 | 0.3 | 1 | 4 | 33 | 10.47 | 0.05 | 20 | 29 | 2.72 | 58 | 0.07 | 10 | 1.07 | 0.02 | 0.22 | 1 |
| 78DU419 | 1 | 14 | 8 | 35 | 0.1 | 18 | 7 | 322 | 1.76 | 1 | 4 | 1 | 10 | 71 | 0.3 | 1 | 1 | 31 | 10.18 | 0.05 | 24 | 25 | 2.63 | 60 | 0.06 | 11 | 1.01 | 0.02 | 0.26 | 1 |
| 78DU423 | 1 | 15 | 8 | 33 | 0.1 | 17 | 7 | 360 | 1.74 | 1 | 4 | 1 | 7 | 70 | 0.3 | 1 | 3 | 32 | 10.72 | 0.05 | 18 | 27 | 2.79 | 52 | 0.07 | 10 | 1.01 | 0.02 | 0.19 | 1 |
| 78DU425 | 1 | 10 | 7 | 26 | 0.1 | 13 | 5 | 311 | 1.26 | 1 | 4 | 1 | 7 | 62 | 0.3 | 1 | 1 | 21 | 11.56 | 0.04 | 17 | 17 | 4.00 | 42 | 0.04 | 13 | 0.68 | 0.02 | 0.15 | 1 |
| 78DU437 | 1 | 9 | 4 | 20 | 0.1 | 14 | 5 | 288 | 1.18 | 1 | 4 | 1 | 6 | 76 | 0.3 | 1 | 3 | 19 | 13.55 | 0.03 | 14 | 16 | 4.62 | 44 | 0.04 | 12 | 0.68 | 0.02 | 0.19 | 1 |
| 78DU439 | 1 | 14 | 6 | 30 | 0.1 | 18 | 8 | 401 | 1.63 | 1 | 8 | 1 | 10 | 62 | 0.3 | 1 | 1 | 29 | 9.17 | 0.05 | 21 | 23 | 2.53 | 66 | 0.07 | 10 | 0.93 | 0.03 | 0.26 | 1 |
| 78DU451 | 1 | 12 | 8 | 28 | 0.1 | 15 | 6 | 285 | 1.46 | 1 | 4 | 1 | 9 | 61 | 0.3 | 1 | 4 | 25 | 9.99 | 0.04 | 19 | 21 | 3.12 | 49 | 0.06 | 10 | 0.80 | 0.02 | 0.19 | 1 |
| 78DU458 | 1 | 14 | 7 | 35 | 0.1 | 19 | 7 | 371 | 1.72 | 1 | 4 | 1 | 12 | 48 | 0.3 | 1 | 3 | 28 | 7.70 | 0.04 | 26 | 24 | 2.54 | 72 | 0.06 | 10 | 0.95 | 0.02 | 0.26 | 1 |
| 78DU465 | 1 | 14 | 7 | 34 | 0.1 | 18 | 8 | 417 | 1.72 | 1 | 4 | 1 | 10 | 66 | 0.3 | 1 | 1 | 30 | 9.26 | 0.05 | 21 | 26 | 2.73 | 84 | 0.07 | 12 | 1.02 | 0.05 | 0.25 | 1 |
| 78DU473 | 1 | 7 | 6 | 18 | 0.1 | 9 | 3 | 182 | 0.98 | 1 | 4 | 1 | 8 | 60 | 0.3 | 1 | 3 | 17 | 13.12 | 0.03 | 16 | 16 | 5.94 | 31 | 0.05 | 21 | 0.59 | 0.02 | 0.15 | 1 |
| 80DU014 | 1 | 2 | 4 | 8 | 0.1 | 3 | 1 | 58 | 0.59 | 1 | 4 | 1 | 25 | 3 | 0.3 | 1 | 3 | 8 | 0.08 | 0.04 | 45 | 7 | 0.10 | 19 | 0.04 | 1 | 0.52 | 0.01 | 0.06 | 1 |
| 80DU050 | 1 | 4 | 7 | 15 | 0.1 | 7 | 3 | 93 | 1.00 | 1 | 4 | 1 | 33 | 4 | 0.3 | 1 | 6 | 14 | 0.07 | 0.05 | 58 | 12 | 0.20 | 40 | 0.06 | 1 | 1.04 | 0.01 | 0.09 | 1 |
| 80DU053 | 1 | 3 | 4 | 15 | 0.1 | 5 | 2 | 109 | 0.84 | 1 | 4 | 1 | 17 | 6 | 0.3 | 3 | 4 | 13 | 0.16 | 0.05 | 40 | 11 | 0.20 | 41 | 0.06 | 1 | 0.53 | 0.01 | 0.12 | 1 |
| 80DU057 | 1 | 4 | 3 | 23 | 0.1 | 6 | 3 | 165 | 1.05 | 1 | 4 | 1 | 17 | 8 | 0.3 | 1 | 4 | 15 | 0.16 | 0.04 | 48 | 11 | 0.25 | 39 | 0.07 | 1 | 0.61 | 0.01 | 0.14 | 1 |
| 80DU061 | 1 | 9 | 6 | 26 | 0.1 | 7 | 4 | 126 | 1.22 | 1 | 4 | 1 | 21 | 7 | 0.3 | 1 | 6 | 17 | 0.12 | 0.03 | 73 | 14 | 0.27 | 41 | 0.09 | 1 | 0.90 | 0.01 | 0.09 | 1 |
| 80DU093 | 1 | 5 | 5 | 18 | 0.1 | 8 | 4 | 174 | 1.18 | 1 | 4 | 1 | 19 | 10 | 0.3 | 1 | 5 | 18 | 0.20 | 0.05 | 49 | 14 | 0.30 | 44 | 0.07 | 3 | 0.72 | 0.01 | 0.13 | 1 |
| 80DU118 | 1 | 9 | 7 | 30 | 0.1 | 11 | 5 | 213 | 1.66 | 1 | 4 | 1 | 19 | 14 | 0.3 | 1 | 5 | 26 | 0.15 | 0.03 | 55 | 21 | 0.42 | 69 | 0.11 | 1 | 1.23 | 0.01 | 0.12 | 1 |
| 80DU126 | 1 | 3 | 5 | 11 | 0.1 | 5 | 2 | 93 | 0.81 | 1 | 4 | 1 | 21 | 7 | 0.3 | 1 | 5 | 12 | 0.20 | 0.06 | 45 | 10 | 0.17 | 25 | 0.05 | 1 | 0.45 | 0.01 | 0.08 | 2 |
| 80DU129 | 1 | 2 | 5 | 8 | 0.1 | 4 | 2 | 83 | 0.67 | 1 | 4 | 1 | 14 | 7 | 0.3 | 3 | 3 | 12 | 0.18 | 0.06 | 30 | 9 | 0.14 | 22 | 0.04 | 1 | 0.40 | 0.01 | 0.07 | 2 |
| 80DU131 | 1 | 5 | 4 | 23 | 0.1 | 6 | 3 | 145 | 1.11 | 1 | 4 | 1 | 24 | 11 | 0.3 | 1 | 6 | 17 | 0.27 | 0.07 | 53 | 14 | 0.28 | 35 | 0.08 | 1 | 0.53 | 0.01 | 0.18 | 1 |
| 80DU133 | 1 | 4 | 4 | 22 | 0.1 | 6 | 3 | 132 | 1.05 | 1 | 4 | 1 | 17 | 7 | 0.3 | 3 | 3 | 16 | 0.15 | 0.04 | 34 | 13 | 0.29 | 29 | 0.07 | 1 | 0.76 | 0.01 | 0.14 | 1 |
| 80DU134 | 2 | 13 | 5 | 23 | 0.1 | 10 | 4 | 96 | 1.61 | 1 | 4 | 1 | 26 | 9 | 0.3 | 4 | 7 | 25 | 0.05 | 0.04 | 54 | 15 | 0.36 | 74 | 0.09 | 1 | 1.04 | 0.01 | 0.33 | 1 |
| 80DU137 | 1 | 7 | 7 | 24 | 0.1 | 11 | 5 | 237 | 1.31 | 1 | 4 | 1 | 25 | 9 | 0.3 | 1 | 5 | 20 | 0.18 | 0.05 | 41 | 20 | 0.35 | 63 | 0.08 | 1 | 1.31 | 0.01 | 0.19 | 1 |
| 80DU140 | 1 | 3 | 4 | 7 | 0.1 | 4 | 2 | 81 | 0.69 | 1 | 4 | 1 | 15 | 7 | 0.3 | 1 | 1 | 12 | 0.21 | 0.07 | 28 | 10 | 0.13 | 23 | 0.04 | 1 | 0.34 | 0.01 | 0.07 | 1 |
| 80DU141 | 1 | 4 | 4 | 13 | 0.1 | 7 | 3 | 163 | 1.06 | 1 | 4 | 1 | 19 | 14 | 0.3 | 1 | 6 | 18 | 0.26 | 0.05 | 46 | 13 | 0.23 | 31 | 0.08 | 1 | 0.55 | 0.02 | 0.09 | 1 |
| 80DU142 | 1 | 2 | 4 | 5 | 0.1 | 4 | 1 | 69 | 0.62 | 1 | 4 | 1 | 14 | 5 | 0.3 | 1 | 4 | 11 | 0.17 | 0.06 | 27 | 9 | 0.09 | 16 | 0.04 | 1 | 0.34 | 0.01 | 0.04 | 1 |
| 80DU146 | 1 | 1 | 1 | 4 | 0.1 | 2 | 1 | 44 | 0.46 | 1 | 4 | 1 | 10 | 7 | 0.3 | 1 | 1 | 8 | 0.14 | 0.04 | 20 | 6 | 0.06 | 14 | 0.03 | 1 | 0.31 | 0.01 | 0.02 | 1 |
| 80DU147 | 1 | 4 | 3 | 14 | 0.1 | 6 | 3 | 177 | 0.94 | 1 | 4 | 1 | 13 | 11 | 0.3 | 1 | 4 | 17 | 0.18 | 0.04 | 28 | 12 | 0.24 | 34 | 0.07 | 1 | 0.56 | 0.02 | 0.09 | 1 |
| 80DU153 | 1 | 2 | 1 | 9 | 0.1 | 4 | 1 | 79 | 0.62 | 1 | 4 | 1 | 14 | 7 | 0.3 | 1 | 3 | 10 | 0.17 | 0.05 | 27 | 8 | 0.11 | 16 | 0.04 | 1 | 0.37 | 0.01 | 0.05 | 1 |
| 80DU154 | 1 | 1 | 1 | 6 | 0.1 | 2 | 1 | 60 | 0.53 | 1 | 4 | 1 | 12 | 6 | 0.3 | 1 | 1 | 9 | 0.13 | 0.04 | 26 | 7 | 0.08 | 13 | 0.04 | 1 | 0.29 | 0.01 | 0.04 | 1 |
| 80DU157 | 1 | 3 | 3 | 15 | 0.1 | 6 | 3 | 94 | 0.86 | 1 | 4 | 1 | 14 | 7 | 0.3 | 1 | 1 | 14 | 0.13 | 0.04 | 28 | 11 | 0.21 | 24 | 0.06 | 1 | 0.68 | 0.01 | 0.12 | 1 |
| 80DU158 | 1 | 3 | 3 | 11 | 0.1 | 6 | 3 | 127 | 0.79 | 1 | 4 | 1 | 16 | 8 | 0.3 | 1 | 1 | 13 | 0.16 | 0.05 | 35 | 12 | 0.23 | 32 | 0.06 | 1 | 0.50 | 0.01 | 0.13 | 1 |
| 80DU159 | 1 | 4 | 5 | 18 | 0.1 | 8 | 4 | 136 | 1.31 | 2 | 4 | 1 | 18 | 8 | 0.3 | 1 | 3 | 19 | 0.12 | 0.02 | 37 | 15 | 0.34 | 35 | 0.09 | 1 | 0.96 | 0.02 | 0.17 | 1 |
| 80DU161 | 1 | 2 | 7 | 34 | 0.1 | 10 | 4 | 122 | 1.17 | 1 | 4 | 1 | 18 | 4 | 0.3 | 1 | 5 | 14 | 0.08 | 0.02 | 31 | 14 | 0.32 | 33 | 0.08 | 1 | 1.03 | 0.01 | 0.20 | 1 |
| 80DU162 | 1 | 12 | 7 | 26 | 0.1 | 12 | 6 | 180 | 2.03 | 1 | 4 | 1 | 23 | 5 | 0.3 | 1 | 5 | 37 | 0.06 | 0.02 | 48 | 28 | 0.70 | 59 | 0.16 | 1 | 1.80 | 0.02 | 0.58 | 2 |

Appendix 2. ICP_ES data

| ELEMENT | Mo | Cu | Pb | Zn | Ag | Ni | Co | Mn | Fe | As | U | Au | Th | Sr | Cd | Sb | Bi | V | Ca | P | La | Cr | Mg | Ba | Ti | B | Al | Na | K | W |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 80DU167 | 1 | 4 | 17 | 32 | 0.1 | 14 | 3 | 89 | 1.06 | 2 | 4 | 1 | 41 | 5 | 0.3 | 1 | 4 | 12 | 0.12 | 0.04 | 59 | 24 | 0.23 | 25 | 0.06 | 1 | 0.95 | 0.02 | 0.11 | 1 |
| 80DU173 | 1 | 2 | 3 | 11 | 0.1 | 4 | 2 | 148 | 0.74 | 1 | 4 | 1 | 13 | 9 | 0.3 | 3 | 1 | 13 | 0.21 | 0.04 | 33 | 10 | 0.13 | 24 | 0.05 | 1 | 0.41 | 0.01 | 0.05 | 1 |
| 80DU184 | 1 | 3 | 5 | 7 | 0.1 | 3 | 2 | 82 | 0.59 | 1 | 4 | 1 | 23 | 6 | 0.3 | 1 | 1 | 9 | 0.14 | 0.04 | 50 | 7 | 0.11 | 20 | 0.04 | 1 | 0.41 | 0.01 | 0.06 | 1 |
| 80DU188 | 1 | 2 | 5 | 10 | 0.1 | 4 | 2 | 58 | 0.59 | 2 | 4 | 1 | 27 | 5 | 0.3 | 1 | 1 | 8 | 0.14 | 0.06 | 44 | 7 | 0.12 | 15 | 0.04 | 1 | 0.50 | 0.01 | 0.06 | 1 |
| 80DU191 | 1 | 2 | 3 | 7 | 0.1 | 6 | 2 | 84 | 0.69 | 1 | 4 | 1 | 18 | 5 | 0.3 | 1 | 1 | 12 | 0.15 | 0.05 | 32 | 11 | 0.18 | 17 | 0.05 | 1 | 0.47 | 0.01 | 0.08 | 1 |
| 80DU194 | 1 | 12 | 15 | 34 | 0.1 | 11 | 3 | 120 | 1.24 | 1 | 4 | 1 | 35 | 5 | 0.3 | 1 | 5 | 19 | 0.09 | 0.03 | 52 | 12 | 0.31 | 34 | 0.08 | 1 | 1.05 | 0.02 | 0.22 | 1 |
| 80DU197 | 1 | 5 | 5 | 7 | 0.1 | 6 | 2 | 65 | 0.71 | 1 | 4 | 1 | 18 | 8 | 0.3 | 1 | 1 | 11 | 0.18 | 0.05 | 34 | 10 | 0.11 | 18 | 0.04 | 1 | 0.38 | 0.01 | 0.05 | 2 |
| 80DU198 | 1 | 2 | 6 | 5 | 0.1 | 3 | 1 | 54 | 0.51 | 1 | 4 | 1 | 18 | 8 | 0.3 | 1 | 3 | 8 | 0.19 | 0.06 | 32 | 6 | 0.09 | 17 | 0.03 | 1 | 0.27 | 0.01 | 0.04 | 2 |
| 80DU199 | 1 | 14 | 19 | 30 | 0.1 | 15 | 5 | 138 | 1.57 | 1 | 4 | 1 | 24 | 6 | 0.3 | 3 | 6 | 28 | 0.11 | 0.04 | 37 | 25 | 0.52 | 51 | 0.11 | 1 | 1.30 | 0.02 | 0.35 | 1 |
| 80DU211 | 1 | 2 | 1 | 4 | 0.1 | 4 | 1 | 47 | 0.48 | 1 | 4 | 1 | 9 | 6 | 0.3 | 1 | 3 | 8 | 0.15 | 0.05 | 18 | 6 | 0.06 | 9 | 0.03 | 1 | 0.32 | 0.01 | 0.03 | 1 |
| 80DU212 | 1 | 3 | 3 | 5 | 0.1 | 5 | 1 | 52 | 0.57 | 1 | 4 | 1 | 14 | 5 | 0.3 | 1 | 3 | 10 | 0.14 | 0.06 | 26 | 7 | 0.07 | 11 | 0.03 | 1 | 0.40 | 0.01 | 0.03 | 1 |
| 80DU219 | 1 | 9 | 7 | 28 | 0.1 | 10 | 4 | 268 | 1.19 | 1 | 4 | 1 | 13 | 7 | 0.3 | 1 | 4 | 17 | 0.17 | 0.05 | 22 | 13 | 0.29 | 38 | 0.09 | 1 | 0.68 | 0.02 | 0.23 | 1 |
| 80DU220 | 1 | 4 | 6 | 10 | 0.1 | 4 | 2 | 106 | 0.68 | 1 | 4 | 1 | 18 | 10 | 0.3 | 1 | 3 | 11 | 0.21 | 0.06 | 34 | 8 | 0.14 | 19 | 0.04 | 1 | 0.41 | 0.01 | 0.07 | 1 |
| 80DU221 | 1 | 10 | 12 | 21 | 0.1 | 10 | 4 | 102 | 1.05 | 1 | 4 | 1 | 19 | 5 | 0.3 | 1 | 3 | 18 | 0.11 | 0.05 | 32 | 15 | 0.27 | 30 | 0.07 | 1 | 0.94 | 0.01 | 0.17 | 3 |
| 80DU223 | 1 | 7 | 4 | 10 | 0.1 | 5 | 3 | 148 | 0.80 | 1 | 4 | 1 | 17 | 6 | 0.3 | 1 | 1 | 13 | 0.18 | 0.06 | 30 | 8 | 0.12 | 16 | 0.04 | 1 | 0.47 | 0.01 | 0.06 | 1 |
| 80DU224 | 1 | 4 | 3 | 15 | 0.1 | 6 | 2 | 76 | 0.88 | 1 | 4 | 1 | 19 | 4 | 0.3 | 1 | 3 | 12 | 0.15 | 0.05 | 27 | 8 | 0.11 | 12 | 0.05 | 1 | 0.50 | 0.01 | 0.07 | 1 |
| 80DU225 | 1 | 4 | 3 | 7 | 0.1 | 5 | 2 | 93 | 0.64 | 1 | 4 | 1 | 15 | 8 | 0.3 | 1 | 1 | 10 | 0.20 | 0.06 | 27 | 10 | 0.09 | 15 | 0.04 | 1 | 0.33 | 0.01 | 0.04 | 1 |
| 80DU227 | 1 | 16 | 6 | 35 | 0.1 | 21 | 8 | 263 | 1.81 | 1 | 4 | 1 | 13 | 16 | 0.3 | 1 | 5 | 32 | 0.27 | 0.06 | 32 | 30 | 0.58 | 130 | 0.16 | 1 | 1.12 | 0.02 | 0.33 | 1 |
| 80DU228 | 1 | 4 | 5 | 8 | 0.1 | 3 | 1 | 91 | 0.63 | 1 | 4 | 1 | 16 | 10 | 0.3 | 1 | 1 | 10 | 0.23 | 0.06 | 30 | 7 | 0.09 | 20 | 0.04 | 1 | 0.31 | 0.01 | 0.05 | 1 |
| 80DU230 | 1 | 2 | 3 | 6 | 0.1 | 3 | 1 | 46 | 0.54 | 1 | 4 | 1 | 17 | 6 | 0.3 | 1 | 1 | 8 | 0.15 | 0.05 | 28 | 6 | 0.08 | 12 | 0.03 | 1 | 0.32 | 0.01 | 0.03 | 1 |
| 80DU241 | 1 | 6 | 8 | 17 | 0.1 | 12 | 6 | 230 | 1.17 | 1 | 4 | 1 | 25 | 6 | 0.3 | 1 | 5 | 18 | 0.11 | 0.04 | 53 | 15 | 0.44 | 61 | 0.07 | 4 | 1.05 | 0.01 | 0.17 | 1 |
| 80DU243 | 1 | 7 | 7 | 21 | 0.1 | 9 | 4 | 145 | 1.25 | 1 | 4 | 1 | 17 | 10 | 0.3 | 1 | 4 | 20 | 0.09 | 0.02 | 46 | 15 | 0.31 | 50 | 0.08 | 1 | 1.10 | 0.01 | 0.09 | 1 |
| 80DU248 | 1 | 19 | 9 | 41 | 0.1 | 15 | 11 | 555 | 2.93 | 1 | 4 | 1 | 23 | 11 | 0.3 | 1 | 9 | 42 | 0.11 | 0.03 | 53 | 30 | 0.98 | 210 | 0.15 | 4 | 1.73 | 0.01 | 0.58 | 1 |
| 80DU249 | 1 | 6 | 4 | 11 | 0.1 | 9 | 3 | 82 | 0.86 | 1 | 4 | 1 | 9 | 8 | 0.3 | 1 | 1 | 15 | 0.21 | 0.06 | 16 | 15 | 0.20 | 15 | 0.06 | 1 | 0.42 | 0.01 | 0.07 | 1 |
| 80DU252 | 1 | 3 | 8 | 22 | 0.1 | 4 | 3 | 148 | 1.28 | 1 | 4 | 1 | 33 | 12 | 0.3 | 1 | 8 | 17 | 0.33 | 0.09 | 78 | 8 | 0.21 | 38 | 0.10 | 3 | 0.54 | 0.02 | 0.14 | 1 |
| 80DU253 | 1 | 5 | 6 | 25 | 0.1 | 9 | 4 | 165 | 1.59 | 1 | 4 | 1 | 17 | 11 | 0.3 | 1 | 7 | 23 | 0.27 | 0.08 | 34 | 15 | 0.44 | 29 | 0.09 | 1 | 0.80 | 0.01 | 0.10 | 1 |
| 80DU254 | 1 | 8 | 20 | 43 | 0.1 | 11 | 5 | 252 | 1.72 | 1 | 4 | 1 | 13 | 13 | 0.3 | 1 | 7 | 28 | 0.24 | 0.07 | 27 | 17 | 0.38 | 23 | 0.10 | 1 | 0.86 | 0.01 | 0.13 | 1 |
| 80DU265 | 1 | 4 | 4 | 6 | 0.1 | 6 | 2 | 75 | 0.64 | 1 | 4 | 1 | 14 | 5 | 0.3 | 1 | 3 | 11 | 0.16 | 0.05 | 26 | 9 | 0.11 | 15 | 0.04 | 1 | 0.49 | 0.01 | 0.06 | 1 |
| 80DU267 | 1 | 3 | 3 | 7 | 0.1 | 4 | 2 | 85 | 0.71 | 1 | 4 | 1 | 16 | 8 | 0.3 | 1 | 1 | 13 | 0.25 | 0.06 | 35 | 10 | 0.16 | 27 | 0.05 | 1 | 0.48 | 0.01 | 0.07 | 1 |
| 80DU268 | 1 | 19 | 14 | 29 | 0.1 | 22 | 5 | 120 | 1.73 | 1 | 4 | 1 | 19 | 5 | 0.3 | 1 | 6 | 29 | 0.10 | 0.03 | 28 | 33 | 0.44 | 36 | 0.11 | 1 | 1.41 | 0.02 | 0.22 | 3 |
| 80DU269 | 1 | 10 | 3 | 20 | 0.1 | 13 | 5 | 156 | 1.31 | 1 | 4 | 1 | 14 | 8 | 0.3 | 1 | 4 | 24 | 0.19 | 0.04 | 28 | 21 | 0.40 | 30 | 0.10 | 1 | 0.89 | 0.02 | 0.11 | 1 |
| 80DU270 | 1 | 5 | 1 | 12 | 0.1 | 9 | 3 | 81 | 0.99 | 1 | 4 | 1 | 10 | 6 | 0.3 | 1 | 1 | 17 | 0.12 | 0.03 | 16 | 11 | 0.21 | 14 | 0.07 | 1 | 0.68 | 0.01 | 0.04 | 1 |
| 80DU271 | 1 | 9 | 6 | 19 | 0.1 | 10 | 4 | 103 | 1.22 | 1 | 4 | 1 | 15 | 7 | 0.3 | 1 | 5 | 23 | 0.15 | 0.04 | 31 | 19 | 0.37 | 38 | 0.09 | 1 | 1.16 | 0.01 | 0.14 | 1 |
| 80DU272 | 1 | 7 | 5 | 14 | 0.1 | 11 | 4 | 67 | 0.91 | 2 | 4 | 1 | 15 | 4 | 0.3 | 1 | 3 | 13 | 0.12 | 0.05 | 31 | 13 | 0.19 | 24 | 0.05 | 1 | 0.77 | 0.01 | 0.09 | 1 |
| 80DU273 | 1 | 4 | 6 | 7 | 0.1 | 6 | 2 | 67 | 0.69 | 1 | 4 | 1 | 15 | 4 | 0.3 | 1 | 1 | 11 | 0.12 | 0.04 | 26 | 10 | 0.12 | 19 | 0.04 | 1 | 0.54 | 0.01 | 0.06 | 1 |
| 80DU275 | 1 | 2 | 1 | 4 | 0.1 | 3 | 1 | 43 | 0.51 | 1 | 4 | 1 | 13 | 5 | 0.3 | 1 | 1 | 9 | 0.12 | 0.05 | 23 | 6 | 0.05 | 9 | 0.03 | 1 | 0.37 | 0.01 | 0.02 | 1 |
| 80DU280 | 1 | 3 | 3 | 5 | 0.1 | 4 | 1 | 68 | 0.56 | 1 | 4 | 1 | 12 | 9 | 0.3 | 1 | 1 | 10 | 0.21 | 0.06 | 25 | 7 | 0.07 | 16 | 0.04 | 3 | 0.27 | 0.01 | 0.03 | 1 |
| 80DU282 | 1 | 3 | 1 | 5 | 0.1 | 4 | 1 | 54 | 0.56 | 1 | 4 | 1 | 13 | 5 | 0.3 | 1 | 1 | 9 | 0.12 | 0.05 | 25 | 7 | 0.07 | 13 | 0.03 | 1 | 0.46 | 0.01 | 0.02 | 2 |
| 80DU284 | 1 | 1 | 1 | 4 | 0.1 | 3 | 1 | 57 | 0.56 | 1 | 4 | 1 | 13 | 7 | 0.3 | 1 | 1 | 10 | 0.17 | 0.05 | 25 | 8 | 0.06 | 12 | 0.04 | 1 | 0.34 | 0.01 | 0.02 | 1 |
| 80DU285 | 1 | 10 | 12 | 21 | 0.1 | 6 | 3 | 115 | 1.18 | 1 | 4 | 1 | 30 | 5 | 0.3 | 1 | 1 | 18 | 0.13 | 0.05 | 43 | 10 | 0.25 | 28 | 0.09 | 1 | 0.78 | 0.01 | 0.16 | 1 |
| 80DU292 | 1 | 3 | 6 | 13 | 0.1 | 5 | 2 | 68 | 0.81 | 2 | 4 | 1 | 19 | 4 | 0.3 | 1 | 6 | 13 | 0.09 | 0.03 | 33 | 9 | 0.18 | 16 | 0.05 | 1 | 0.88 | 0.01 | 0.05 | 1 |
| 80DU294 | 1 | 2 | 8 | 9 | 0.1 | 2 | 1 | 50 | 0.61 | 3 | 4 | 1 | 33 | 4 | 0.3 | 1 | 7 | 9 | 0.11 | 0.03 | 52 | 6 | 0.10 | 17 | 0.04 | 1 | 0.52 | 0.01 | 0.05 | 1 |
| 80DU296 | 1 | 7 | 5 | 19 | 0.1 | 13 | 4 | 113 | 1.24 | 1 | 4 | 1 | 9 | 8 | 0.3 | 1 | 8 | 25 | 0.18 | 0.06 | 20 | 21 | 0.35 | 14 | 0.09 | 1 | 0.68 | 0.01 | 0.10 | 1 |
| 80DU297 | 1 | 4 | 3 | 11 | 0.1 | 7 | 2 | 96 | 0.86 | 2 | 4 | 1 | 7 | 9 | 0.3 | 1 | 1 | 16 | 0.18 | 0.05 | 16 | 11 | 0.23 | 22 | 0.05 | 1 | 0.52 | 0.01 | 0.06 | 1 |
| 80DU298 | 1 | 4 | 11 | 22 | 0.1 | 11 | 3 | 78 | 1.03 | 3 | 4 | 1 | 35 | 5 | 0.3 | 1 | 7 | 16 | 0.11 | 0.02 | 53 | 12 | 0.39 | 26 | 0.07 | 1 | 0.99 | 0.01 | 0.12 | 2 |
| 80DU301 | 1 | 4 | 8 | 6 | 0.1 | 5 | 2 | 44 | 0.67 | 1 | 4 | 1 | 15 | 4 | 0.3 | 1 | 6 | 12 | 0.11 | 0.04 | 26 | 8 | 0.13 | 12 | 0.04 | 1 | 0.60 | 0.01 | 0.04 | 1 |
| 80DU302 | 1 | 2 | 10 | 13 | 0.1 | 8 | 3 | 82 | 1.05 | 2 | 4 | 1 | 38 | 3 | 0.3 | 1 | 6 | 18 | 0.07 | 0.02 | 43 | 13 | 0.35 | 14 | 0.07 | 1 | 0.81 | 0.01 | 0.11 | 1 |

Appendix 2. ICP_ES data

| ELEMENT | Mo | Cu | Pb | Zn | Ag | Ni | Co | Mn | Fe | As | U | Au | Th | Sr | Cd | Sb | Bi | V | Ca | P | La | Cr | Mg | Ba | Ti | B | Al | Na | K | W |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 80DU303 | 1 | 14 | 4 | 21 | 0.1 | 11 | 4 | 139 | 1.35 | 2 | 4 | 1 | 9 | 8 | 0.3 | 1 | 6 | 27 | 0.17 | 0.04 | 20 | 17 | 0.47 | 20 | 0.10 | 1 | 0.91 | 0.01 | 0.08 | 2 |
| 80DU305 | 1 | 9 | 8 | 29 | 0.1 | 20 | 4 | 138 | 1.86 | 3 | 4 | 1 | 10 | 7 | 0.3 | 1 | 6 | 34 | 0.15 | 0.08 | 19 | 21 | 0.37 | 20 | 0.09 | 1 | 1.48 | 0.01 | 0.06 | 1 |
| 80DU306 | 1 | 7 | 6 | 20 | 0.1 | 6 | 3 | 116 | 1.19 | 3 | 4 | 1 | 9 | 10 | 0.3 | 1 | 1 | 20 | 0.17 | 0.04 | 23 | 11 | 0.25 | 16 | 0.08 | 1 | 0.61 | 0.01 | 0.05 | 1 |
| 80DU307 | 1 | 12 | 10 | 20 | 0.1 | 13 | 4 | 95 | 1.04 | 3 | 4 | 1 | 20 | 6 | 0.3 | 1 | 5 | 17 | 0.14 | 0.04 | 35 | 16 | 0.27 | 33 | 0.06 | 1 | 0.85 | 0.01 | 0.16 | 1 |
| 80DU315 | 1 | 1 | 4 | 5 | 0.1 | 4 | 1 | 58 | 0.59 | 1 | 4 | 1 | 13 | 7 | 0.3 | 1 | 4 | 10 | 0.16 | 0.04 | 24 | 7 | 0.08 | 15 | 0.04 | 1 | 0.42 | 0.01 | 0.02 | 2 |
| 80DU317 | 1 | 6 | 6 | 11 | 0.1 | 8 | 3 | 71 | 0.92 | 2 | 4 | 1 | 17 | 7 | 0.3 | 1 | 4 | 15 | 0.11 | 0.02 | 31 | 14 | 0.18 | 20 | 0.06 | 1 | 0.84 | 0.01 | 0.06 | 1 |
| 80DU319 | 1 | 11 | 7 | 19 | 0.1 | 14 | 6 | 151 | 1.16 | 2 | 4 | 1 | 19 | 6 | 0.3 | 1 | 7 | 20 | 0.11 | 0.03 | 36 | 19 | 0.26 | 36 | 0.07 | 1 | 0.99 | 0.01 | 0.16 | 1 |
| 80DU320 | 1 | 8 | 4 | 17 | 0.1 | 6 | 2 | 88 | 0.91 | 1 | 4 | 1 | 19 | 5 | 0.3 | 1 | 5 | 13 | 0.10 | 0.04 | 38 | 9 | 0.18 | 33 | 0.06 | 1 | 0.74 | 0.01 | 0.11 | 1 |
| 80DU321 | 1 | 8 | 7 | 12 | 0.1 | 8 | 2 | 88 | 0.82 | 3 | 4 | 1 | 28 | 6 | 0.3 | 1 | 6 | 13 | 0.19 | 0.07 | 47 | 11 | 0.15 | 19 | 0.04 | 1 | 0.43 | 0.01 | 0.08 | 2 |
| 80DU322 | 1 | 4 | 8 | 10 | 0.1 | 6 | 2 | 132 | 0.64 | 1 | 4 | 1 | 16 | 7 | 0.3 | 1 | 4 | 11 | 0.21 | 0.06 | 30 | 7 | 0.16 | 16 | 0.04 | 1 | 0.39 | 0.01 | 0.08 | 1 |
| 80DU323 | 1 | 2 | 5 | 6 | 0.1 | 8 | 3 | 53 | 0.89 | 1 | 4 | 1 | 14 | 2 | 0.3 | 1 | 1 | 20 | 0.13 | 0.04 | 20 | 14 | 0.27 | 9 | 0.07 | 1 | 0.57 | 0.01 | 0.07 | 2 |
| 80DU326 | 1 | 5 | 9 | 10 | 0.1 | 6 | 2 | 69 | 0.98 | 1 | 4 | 1 | 12 | 6 | 0.3 | 1 | 4 | 20 | 0.17 | 0.04 | 14 | 11 | 0.16 | 11 | 0.06 | 1 | 0.46 | 0.01 | 0.04 | 1 |
| 80DU328 | 1 | 9 | 11 | 25 | 0.1 | 11 | 5 | 191 | 1.57 | 1 | 4 | 1 | 24 | 11 | 0.3 | 1 | 7 | 26 | 0.12 | 0.01 | 42 | 22 | 0.47 | 79 | 0.11 | 1 | 1.64 | 0.02 | 0.27 | 1 |
| 80DU329 | 1 | 3 | 8 | 20 | 0.1 | 7 | 3 | 92 | 0.96 | 1 | 4 | 1 | 21 | 5 | 0.3 | 1 | 1 | 15 | 0.10 | 0.04 | 33 | 12 | 0.22 | 27 | 0.06 | 1 | 0.78 | 0.01 | 0.10 | 1 |
| 80DU331 | 1 | 4 | 5 | 9 | 0.3 | 5 | 2 | 89 | 0.68 | 1 | 4 | 1 | 13 | 7 | 0.3 | 1 | 3 | 12 | 0.21 | 0.06 | 31 | 9 | 0.17 | 26 | 0.04 | 1 | 0.42 | 0.01 | 0.06 | 1 |
| 80DU332 | 1 | 2 | 8 | 5 | 0.1 | 5 | 2 | 76 | 0.77 | 1 | 4 | 1 | 14 | 4 | 0.3 | 1 | 3 | 15 | 0.14 | 0.05 | 25 | 13 | 0.15 | 15 | 0.05 | 1 | 0.39 | 0.01 | 0.04 | 1 |
| 80DU334 | 1 | 2 | 4 | 6 | 0.1 | 3 | 1 | 69 | 0.64 | 1 | 4 | 1 | 18 | 6 | 0.3 | 1 | 3 | 11 | 0.18 | 0.05 | 36 | 7 | 0.10 | 15 | 0.04 | 1 | 0.33 | 0.01 | 0.04 | 1 |
| 80DU335 | 1 | 2 | 1 | 5 | 0.1 | 3 | 1 | 38 | 0.54 | 1 | 4 | 1 | 19 | 3 | 0.3 | 1 | 1 | 9 | 0.11 | 0.04 | 33 | 7 | 0.08 | 12 | 0.03 | 1 | 0.38 | 0.01 | 0.03 | 1 |
| 80DU337 | 1 | 3 | 9 | 13 | 0.1 | 4 | 2 | 57 | 0.75 | 1 | 4 | 1 | 37 | 3 | 0.3 | 1 | 6 | 11 | 0.08 | 0.04 | 55 | 8 | 0.16 | 18 | 0.04 | 1 | 0.66 | 0.01 | 0.08 | 1 |

Appendix 3. INAA data

| Analyte Symbol | Au | Ag | As | Ba | Br | Ca | Co | Cr | Cs | Fe | Hf | Hg | Ir | Mo | Na | Ni | Rb | Sb | Sc | Se | Sn | Sr | Ta | Th | U |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Unit Symbol | ppb | ppm | ppm | ppm | ppm | % | ppm | ppm | ppm | % | ppm | ppm | ppb | ppm | % | ppm | ppm | ppm | ppm | ppm | % | % | ppm | ppm | ppm |
| Detection | 2 | 5 | 0.5 | 50 | 0.5 | 1 | 1 | 5 | 1 | 0.01 | 1 | 1 | 5 | 1 | 0.01 | 20 | 15 | 0.1 | 0.1 | 3 | 0.02 | 0.05 | 0.5 | 0.2 | 0.5 |
| 78DU031 | 1 | 3 | 5.8 | 320 | 0.3 | 9 | 11 | 50 | 4 | 2.38 | 5 | 0.5 | 3 | 0.5 | 1.31 | 10 | 7 | 0.4 | 6.8 | 1 | 0.01 | 0.03 | 0.3 | 13.9 | 2.5 |
| 78DU036 | 1 | 3 | 2.5 | 460 | 4.9 | 11 | 5 | 33 | 2 | 1.29 | 5 | 0.5 | 3 | 0.5 | 0.91 | 10 | 7 | 0.1 | 4.3 | 1 | 0.01 | 0.03 | 0.3 | 8.0 | 0.3 |
| 78DU053 | 1 | 3 | 4.3 | 340 | 4.8 | 14 | 6 | 45 | 2 | 1.87 | 5 | 0.5 | 3 | 0.5 | 0.72 | 10 | 7 | 0.1 | 5.4 | 1 | 0.01 | 0.03 | 0.3 | 7.6 | 2.2 |
| 78DU084 | 1 | 3 | 5.5 | 900 | 0.3 | 11 | 10 | 56 | 5 | 2.51 | 7 | 0.5 | 3 | 0.5 | 1.31 | 10 | 7 | 0.4 | 8.0 | 1 | 0.01 | 0.03 | 0.3 | 19.1 | 0.3 |
| 78DU091 | 1 | 3 | 4.3 | 480 | 4.9 | 13 | 9 | 56 | 2 | 2.50 | 6 | 0.5 | 3 | 0.5 | 1.14 | 10 | 7 | 0.4 | 8.0 | 1 | 0.01 | 0.03 | 0.3 | 8.2 | 1.4 |
| 78DU094 | 1 | 3 | 3.5 | 570 | 4.5 | 12 | 14 | 50 | 2 | 2.09 | 5 | 0.5 | 3 | 4 | 0.70 | 10 | 91 | 0.4 | 6.3 | 1 | 0.01 | 0.03 | 0.3 | 10.8 | 2.0 |
| 78DU103 | 1 | 3 | 4.3 | 550 | 3.5 | 13 | 13 | 58 | 2 | 2.14 | 4 | 0.5 | 3 | 14 | 0.97 | 10 | 7 | 0.1 | 6.9 | 1 | 0.01 | 0.03 | 0.3 | 8.2 | 0.3 |
| 78DU105 | 1 | 3 | 0.3 | 320 | 5.0 | 18 | 7 | 33 | 3 | 1.42 | 4 | 0.5 | 3 | 0.5 | 0.84 | 10 | 79 | 0.1 | 4.9 | 1 | 0.01 | 0.03 | 0.3 | 9.4 | 1.7 |
| 78DU109 | 1 | 3 | 0.3 | 590 | 2.3 | 8 | 11 | 38 | 4 | 2.29 | 5 | 0.5 | 3 | 0.5 | 1.50 | 10 | 7 | 0.1 | 7.0 | 1 | 0.01 | 0.03 | 0.3 | 14.5 | 3.3 |
| 78DU110 | 1 | 3 | 2.2 | 670 | 0.3 | 14 | 12 | 68 | 2 | 2.55 | 5 | 0.5 | 3 | 0.5 | 1.24 | 10 | 110 | 0.1 | 7.8 | 1 | 0.01 | 0.03 | 0.3 | 11.7 | 0.3 |
| 78DU114 | 7 | 3 | 1.8 | 680 | 3.3 | 10 | 10 | 43 | 3 | 2.03 | 5 | 0.5 | 3 | 5 | 1.10 | 10 | 7 | 0.1 | 6.6 | 1 | 0.01 | 0.03 | 0.3 | 13.2 | 4.3 |
| 78DU123 | 1 | 3 | 8.6 | 840 | 0.3 | 10 | 12 | 54 | 4 | 2.85 | 5 | 0.5 | 3 | 0.5 | 1.55 | 10 | 125 | 0.1 | 8.4 | 1 | 0.01 | 0.03 | 0.3 | 19.7 | 4.2 |
| 78DU128 | 1 | 3 | 4.2 | 680 | 3.6 | 11 | 10 | 48 | 4 | 2.41 | 6 | 0.5 | 3 | 0.5 | 1.13 | 10 | 51 | 0.4 | 7.8 | 1 | 0.01 | 0.03 | 0.3 | 12.5 | 0.3 |
| 78DU129 | 1 | 3 | 2.1 | 510 | 2.8 | 8 | 5 | 29 | 1 | 1.32 | 5 | 0.5 | 3 | 0.5 | 1.35 | 10 | 89 | 0.1 | 4.5 | 1 | 0.04 | 0.03 | 0.3 | 11.6 | 2.6 |
| 78DU131 | 1 | 3 | 3.1 | 790 | 7.7 | 5 | 7 | 42 | 1 | 1.85 | 6 | 0.5 | 3 | 0.5 | 1.59 | 10 | 7 | 0.1 | 5.8 | 1 | 0.01 | 0.03 | 0.3 | 14.7 | 3.2 |
| 78DU143 | 1 | 3 | 3.4 | 580 | 3.2 | 10 | 8 | 45 | 3 | 2.18 | 5 | 0.5 | 3 | 0.5 | 1.22 | 10 | 92 | 0.2 | 6.6 | 1 | 0.01 | 0.03 | 0.3 | 14.3 | 0.3 |
| 78DU147 | 1 | 3 | 4.3 | 830 | 0.3 | 5 | 13 | 69 | 5 | 2.64 | 7 | 0.5 | 3 | 10 | 1.29 | 10 | 83 | 0.1 | 8.6 | 1 | 0.01 | 0.03 | 0.3 | 19.5 | 3.5 |
| 78DU150 | 1 | 3 | 5.5 | 570 | 0.3 | 8 | 10 | 52 | 3 | 2.22 | 5 | 0.5 | 3 | 0.5 | 0.97 | 10 | 7 | 0.4 | 7.1 | 1 | 0.01 | 0.03 | 0.3 | 9.9 | 1.4 |
| 78DU164 | 1 | 3 | 4.6 | 780 | 0.3 | 0.5 | 10 | 56 | 6 | 3.26 | 6 | 0.5 | 3 | 0.5 | 1.84 | 10 | 156 | 0.1 | 10.4 | 1 | 0.01 | 0.03 | 0.3 | 27.5 | 4.1 |
| 78DU166 | 1 | 3 | 4.8 | 1050 | 0.3 | 0.5 | 17 | 81 | 7 | 3.59 | 7 | 0.5 | 3 | 0.5 | 1.23 | 10 | 133 | 0.1 | 11.8 | 1 | 0.01 | 0.03 | 0.3 | 21.5 | 0.3 |
| 78DU167 | 1 | 3 | 4.8 | 810 | 0.3 | 0.5 | 10 | 63 | 1 | 2.79 | 7 | 0.5 | 3 | 0.5 | 1.50 | 10 | 85 | 0.1 | 9.3 | 1 | 0.01 | 0.03 | 0.3 | 18.8 | 2.6 |
| 78DU168 | 1 | 3 | 4.1 | 680 | 0.3 | 0.5 | 13 | 60 | 3 | 2.81 | 6 | 0.5 | 3 | 0.5 | 1.26 | 10 | 99 | 0.1 | 9.4 | 1 | 0.01 | 0.03 | 0.3 | 20.6 | 0.3 |
| 78DU170 | 10 | 3 | 4.4 | 730 | 0.3 | 7 | 9 | 41 | 3 | 2.54 | 6 | 0.5 | 3 | 0.5 | 1.55 | 10 | 90 | 0.1 | 7.8 | 1 | 0.01 | 0.03 | 0.3 | 18.4 | 3.0 |
| 78DU184 | 1 | 3 | 4.3 | 890 | 3.8 | 0.5 | 11 | 61 | 3 | 2.91 | 8 | 0.5 | 3 | 0.5 | 1.34 | 10 | 98 | 0.1 | 9.8 | 1 | 0.01 | 0.03 | 0.3 | 20.9 | 3.3 |
| 78DU185 | 1 | 3 | 4.9 | 450 | 2.8 | 11 | 9 | 57 | 2 | 2.36 | 6 | 0.5 | 3 | 0.5 | 1.01 | 10 | 78 | 0.2 | 7.5 | 1 | 0.01 | 0.03 | 0.3 | 8.9 | 1.8 |
| 78DU195 | 1 | 3 | 2.8 | 700 | 4.0 | 7 | 10 | 49 | 3 | 2.18 | 5 | 0.5 | 3 | 0.5 | 1.03 | 10 | 72 | 0.1 | 6.9 | 1 | 0.01 | 0.03 | 0.3 | 13.4 | 0.8 |
| 78DU196 | 1 | 3 | 0.3 | 600 | 3.6 | 4 | 8 | 55 | 3 | 2.50 | 5 | 0.5 | 3 | 0.5 | 1.33 | 10 | 75 | 0.1 | 7.8 | 1 | 0.01 | 0.03 | 3.8 | 16.1 | 2.1 |
| 78DU203 | 1 | 3 | 3.2 | 430 | 5.3 | 8 | 10 | 51 | 2 | 2.55 | 6 | 0.5 | 3 | 0.5 | 1.08 | 10 | 64 | 0.3 | 8.4 | 1 | 0.01 | 0.03 | 0.3 | 8.7 | 1.5 |
| 78DU204 | 1 | 3 | 4.9 | 560 | 3.7 | 10 | 9 | 52 | 2 | 2.07 | 4 | 0.5 | 3 | 0.5 | 0.93 | 10 | 77 | 0.4 | 7.1 | 1 | 0.01 | 0.03 | 0.3 | 8.9 | 0.3 |
| 78DU224 | 11 | 3 | 2.4 | 600 | 0.3 | 4 | 6 | 36 | 1 | 1.84 | 6 | 0.5 | 3 | 0.5 | 1.55 | 10 | 90 | 0.1 | 6.8 | 1 | 0.01 | 0.03 | 0.3 | 15.1 | 3.4 |
| 78DU228 | 1 | 3 | 6.6 | 680 | 3.8 | 4 | 12 | 64 | 2 | 3.17 | 7 | 0.5 | 3 | 0.5 | 1.34 | 10 | 124 | 0.1 | 10.4 | 1 | 0.01 | 0.03 | 0.3 | 16.9 | 0.3 |
| 78DU231 | 1 | 3 | 3.7 | 570 | 3.7 | 8 | 8 | 34 | 2 | 1.78 | 4 | 0.5 | 3 | 0.5 | 1.19 | 10 | 51 | 0.1 | 5.8 | 1 | 0.01 | 0.03 | 0.3 | 10.9 | 0.3 |
| 78DU250 | 1 | 3 | 2.0 | 430 | 4.7 | 15 | 6 | 25 | 1 | 1.23 | 3 | 0.5 | 3 | 0.5 | 0.71 | 10 | 48 | 0.1 | 4.1 | 1 | 0.01 | 0.03 | 0.3 | 7.1 | 1.1 |
| 78DU257 | 1 | 3 | 2.3 | 610 | 0.3 | 6 | 9 | 54 | 2 | 2.31 | 5 | 0.5 | 3 | 0.5 | 1.39 | 10 | 76 | 0.2 | 6.9 | 1 | 0.01 | 0.03 | 0.3 | 15.2 | 3.2 |
| 78DU261 | 1 | 3 | 5.4 | 740 | 0.3 | 0.5 | 11 | 51 | 3 | 2.46 | 5 | 0.5 | 3 | 0.5 | 1.57 | 10 | 108 | 0.3 | 7.6 | 1 | 0.01 | 0.03 | 0.3 | 18.5 | 2.4 |
| 78DU270 | 1 | 3 | 4.5 | 550 | 4.6 | 7 | 10 | 49 | 2 | 2.74 | 6 | 0.5 | 3 | 0.5 | 1.28 | 10 | 95 | 0.2 | 7.7 | 1 | 0.01 | 0.03 | 0.3 | 14.7 | 0.3 |
| 78DU272 | 1 | 3 | 4.0 | 750 | 3.7 | 9 | 11 | 43 | 3 | 2.29 | 4 | 0.5 | 3 | 6 | 1.38 | 10 | 101 | 0.1 | 7.1 | 1 | 0.01 | 0.03 | 0.3 | 15.9 | 2.4 |
| 78DU295 | 1 | 3 | 3.8 | 630 | 0.3 | 8 | 11 | 59 | 2 | 2.58 | 5 | 0.5 | 3 | 0.5 | 1.06 | 10 | 63 | 0.1 | 8.4 | 1 | 0.04 | 0.03 | 0.3 | 10.2 | 0.3 |
| 78DU299 | 1 | 3 | 3.5 | 580 | 0.3 | 9 | 9 | 58 | 1 | 2.36 | 4 | 0.5 | 3 | 0.5 | 1.05 | 10 | 40 | 0.1 | 7.8 | 1 | 0.01 | 0.06 | 0.3 | 8.8 | 1.9 |
| 78DU309 | 1 | 3 | 2.8 | 550 | 2.5 | 8 | 8 | 54 | 3 | 2.27 | 4 | 0.5 | 3 | 0.5 | 0.96 | 10 | 87 | 0.1 | 7.1 | 1 | 0.01 | 0.03 | 0.3 | 9.2 | 1.2 |
| 78DU311 | 1 | 3 | 3.4 | 450 | 2.7 | 10 | 11 | 58 | 3 | 2.55 | 5 | 0.5 | 3 | 0.5 | 0.94 | 10 | 83 | 0.4 | 8.0 | 1 | 0.01 | 0.03 | 0.3 | 9.1 | 0.3 |
| 78DU312 | 1 | 3 | 3.4 | 650 | 3.7 | 13 | 9 | 46 | 2 | 2.11 | 6 | 0.5 | 3 | 4 | 0.80 | 10 | 46 | 0.1 | 7.0 | 1 | 0.01 | 0.03 | 2.8 | 9.9 | 2.7 |
| 78DU313 | 1 | 3 | 3.3 | 620 | 0.3 | 8 | 13 | 51 | 2 | 2.34 | 7 | 0.5 | 3 | 0.5 | 0.75 | 10 | 67 | 0.1 | 7.7 | 1 | 0.01 | 0.03 | 0.3 | 10.6 | 2.9 |

Appendix 3. INAA data

| Analyte Symbol | Au | Ag | As | Ba | Br | Ca | Co | Cr | Cs | Fe | Hf | Hg | Ir | Mo | Na | Ni | Rb | Sb | Sc | Se | Sn | Sr | Ta | Th | U |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Unit Symbol | ppb | ppm | ppm | ppm | ppm | % | ppm | ppm | ppm | % | ppm | ppm | ppb | ppm | % | ppm | ppm | ppm | ppm | ppm | % | % | ppm | ppm | ppm |
| 78DU319 | 7 | 3 | 3.4 | 490 | 3.5 | 9 | 9 | 51 | 2 | 2.27 | 4 | 0.5 | 3 | 0.5 | 1.01 | 10 | 7 | 0.1 | 7.2 | 1 | 0.01 | 0.03 | 0.3 | 10.5 | 0.3 |
| 78DU323 | 1 | 3 | 3.5 | 940 | 0.3 | 8 | 11 | 71 | 3 | 2.56 | 5 | 0.5 | 3 | 0.5 | 1.21 | 10 | 47 | 0.1 | 8.8 | 1 | 0.01 | 0.03 | 0.3 | 11.9 | 3.2 |
| 78DU345 | 1 | 3 | 0.3 | 400 | 5.2 | 13 | 5 | 27 | 2 | 1.41 | 4 | 0.5 | 3 | 0.5 | 1.03 | 10 | 40 | 0.1 | 4.6 | 1 | 0.01 | 0.03 | 0.3 | 8.1 | 2.1 |
| 78DU347 | 1 | 3 | 3.6 | 450 | 3.7 | 13 | 11 | 51 | 3 | 2.76 | 5 | 0.5 | 3 | 47 | 0.78 | 10 | 85 | 0.3 | 7.5 | 1 | 0.01 | 0.03 | 0.3 | 16.1 | 2.5 |
| 78DU349 | 6 | 3 | 3.8 | 580 | 4.1 | 13 | 10 | 39 | 3 | 1.79 | 4 | 0.5 | 3 | 8 | 0.74 | 10 | 43 | 0.3 | 5.7 | 1 | 0.01 | 0.06 | 0.3 | 9.6 | 2.5 |
| 78DU351 | 1 | 3 | 4.2 | 530 | 3.2 | 11 | 8 | 49 | 2 | 2.24 | 5 | 0.5 | 3 | 0.5 | 0.88 | 10 | 86 | 0.5 | 6.5 | 1 | 0.01 | 0.03 | 0.3 | 10.6 | 2.4 |
| 78DU356 | 7 | 3 | 4.4 | 830 | 3.4 | 0.5 | 14 | 64 | 4 | 3.26 | 6 | 0.5 | 3 | 0.5 | 1.37 | 10 | 150 | 0.3 | 10.8 | 1 | 0.01 | 0.03 | 0.3 | 19.5 | 3.6 |
| 78DU359 | 1 | 3 | 4.1 | 550 | 4.5 | 12 | 8 | 46 | 2 | 1.94 | 5 | 0.5 | 3 | 0.5 | 0.78 | 10 | 52 | 0.1 | 6.2 | 1 | 0.01 | 0.03 | 0.3 | 9.2 | 3.1 |
| 78DU385 | 1 | 3 | 4.3 | 620 | 0.3 | 14 | 12 | 61 | 1 | 2.80 | 5 | 0.5 | 3 | 0.5 | 1.23 | 10 | 109 | 0.1 | 8.8 | 1 | 0.01 | 0.03 | 0.3 | 11.2 | 2.5 |
| 78DU387 | 1 | 3 | 3.4 | 440 | 4.3 | 10 | 9 | 59 | 2 | 2.39 | 5 | 0.5 | 3 | 0.5 | 0.98 | 10 | 36 | 0.1 | 8.1 | 1 | 0.01 | 0.03 | 0.3 | 8.5 | 1.4 |
| 78DU394 | 5 | 3 | 4.5 | 380 | 3.1 | 11 | 7 | 36 | 1 | 1.69 | 4 | 0.5 | 3 | 0.5 | 1.08 | 10 | 72 | 0.3 | 5.6 | 1 | 0.01 | 0.03 | 0.3 | 8.4 | 0.3 |
| 78DU396 | 1 | 3 | 3.3 | 510 | 5.6 | 9 | 8 | 56 | 2 | 2.17 | 4 | 0.5 | 3 | 0.5 | 1.10 | 10 | 69 | 0.1 | 7.2 | 1 | 0.01 | 0.03 | 0.3 | 11.4 | 0.3 |
| 78DU398 | 1 | 3 | 6.3 | 690 | 7.2 | 8 | 9 | 48 | 2 | 2.19 | 5 | 0.5 | 3 | 0.5 | 1.17 | 10 | 62 | 0.1 | 6.6 | 1 | 0.01 | 0.03 | 0.3 | 13.5 | 0.3 |
| 78DU399 | 1 | 3 | 4.2 | 500 | 4.8 | 12 | 12 | 47 | 3 | 2.36 | 4 | 0.5 | 3 | 0.5 | 1.02 | 10 | 53 | 0.3 | 7.0 | 1 | 0.01 | 0.03 | 2.5 | 11.5 | 2.7 |
| 78DU417 | 1 | 3 | 3.9 | 610 | 0.3 | 11 | 9 | 58 | 4 | 2.46 | 5 | 0.5 | 3 | 0.5 | 1.07 | 160 | 51 | 0.5 | 7.8 | 1 | 0.01 | 0.03 | 0.3 | 9.7 | 2.5 |
| 78DU419 | 1 | 3 | 3.2 | 690 | 0.3 | 11 | 10 | 61 | 3 | 2.28 | 5 | 0.5 | 3 | 10 | 1.00 | 10 | 52 | 0.3 | 7.1 | 1 | 0.01 | 0.03 | 0.3 | 11.7 | 2.1 |
| 78DU423 | 1 | 3 | 4.8 | 520 | 2.4 | 13 | 9 | 58 | 2 | 2.31 | 5 | 0.5 | 3 | 0.5 | 1.02 | 10 | 62 | 0.4 | 7.3 | 1 | 0.01 | 0.03 | 0.3 | 8.6 | 0.3 |
| 78DU425 | 1 | 3 | 2.2 | 420 | 4.6 | 14 | 8 | 43 | 2 | 1.67 | 5 | 0.5 | 3 | 0.5 | 0.83 | 10 | 55 | 0.1 | 5.8 | 1 | 0.01 | 0.03 | 0.3 | 9.3 | 1.7 |
| 78DU437 | 1 | 3 | 3.1 | 470 | 3.7 | 15 | 8 | 37 | 2 | 1.53 | 3 | 0.5 | 3 | 0.5 | 0.60 | 10 | 68 | 0.1 | 5.2 | 1 | 0.01 | 0.03 | 0.8 | 6.9 | 2.0 |
| 78DU439 | 8 | 3 | 4.8 | 670 | 2.8 | 11 | 11 | 49 | 3 | 2.36 | 5 | 0.5 | 3 | 0.5 | 1.29 | 10 | 77 | 0.1 | 7.1 | 1 | 0.01 | 0.03 | 0.3 | 13.2 | 0.3 |
| 78DU451 | 1 | 3 | 5.6 | 680 | 3.3 | 13 | 10 | 53 | 3 | 2.25 | 5 | 0.5 | 3 | 10 | 1.21 | 10 | 75 | 0.3 | 7.1 | 1 | 0.01 | 0.03 | 0.3 | 11.2 | 0.3 |
| 78DU458 | 15 | 3 | 3.1 | 740 | 2.7 | 10 | 9 | 52 | 3 | 2.37 | 6 | 0.5 | 3 | 0.5 | 1.24 | 10 | 73 | 0.1 | 7.6 | 1 | 0.01 | 0.03 | 0.3 | 16.9 | 3.3 |
| 78DU465 | 1 | 3 | 4.8 | 740 | 4.2 | 12 | 13 | 65 | 3 | 2.69 | 6 | 0.5 | 3 | 0.5 | 1.31 | 10 | 72 | 0.1 | 8.4 | 1 | 0.01 | 0.03 | 0.3 | 15.2 | 0.3 |
| 78DU473 | 1 | 3 | 3.1 | 350 | 3.2 | 15 | 5 | 36 | 2 | 1.43 | 4 | 0.5 | 3 | 0.5 | 0.92 | 10 | 68 | 0.1 | 4.6 | 1 | 0.01 | 0.03 | 0.3 | 8.2 | 1.9 |
| 80DU014 | 1 | 3 | 2.9 | 670 | 0.3 | 0.5 | 4 | 12 | 3 | 1.07 | 10 | 0.5 | 3 | 0.5 | 2.03 | 10 | 119 | 0.1 | 3.8 | 1 | 0.01 | 0.03 | 0.3 | 23.3 | 2.7 |
| 80DU050 | 1 | 3 | 0.3 | 670 | 0.3 | 3 | 5 | 33 | 3 | 1.37 | 12 | 0.5 | 3 | 0.5 | 1.79 | 10 | 151 | 0.1 | 5.3 | 1 | 0.01 | 0.03 | 2.8 | 29.1 | 4.3 |
| 80DU053 | 1 | 3 | 1.4 | 560 | 0.3 | 0.5 | 4 | 29 | 1 | 1.27 | 9 | 0.5 | 3 | 0.5 | 1.80 | 10 | 124 | 0.5 | 4.4 | 1 | 0.01 | 0.03 | 0.3 | 15.6 | 2.1 |
| 80DU057 | 1 | 3 | 2.3 | 760 | 0.3 | 0.5 | 6 | 31 | 2 | 1.62 | 10 | 0.5 | 3 | 0.5 | 1.84 | 10 | 156 | 0.1 | 5.9 | 1 | 0.01 | 0.03 | 0.3 | 16.8 | 3.6 |
| 80DU061 | 4 | 3 | 1.1 | 680 | 2.4 | 0.5 | 5 | 32 | 2 | 2.14 | 13 | 0.5 | 3 | 62 | 1.99 | 10 | 114 | 0.1 | 6.6 | 1 | 0.01 | 0.03 | 0.3 | 18.4 | 3.4 |
| 80DU093 | 1 | 3 | 3.4 | 920 | 0.3 | 0.5 | 6 | 34 | 5 | 1.78 | 11 | 0.5 | 3 | 0.5 | 1.90 | 10 | 78 | 0.1 | 6.7 | 1 | 0.01 | 0.03 | 0.3 | 20.7 | 4.1 |
| 80DU118 | 7 | 3 | 4.4 | 950 | 0.3 | 0.5 | 7 | 47 | 4 | 2.25 | 10 | 0.5 | 3 | 0.5 | 1.82 | 10 | 133 | 0.1 | 8.1 | 1 | 0.01 | 0.03 | 0.3 | 20.0 | 5.8 |
| 80DU126 | 1 | 3 | 2.2 | 800 | 0.3 | 0.5 | 4 | 26 | 2 | 1.38 | 11 | 0.5 | 3 | 0.5 | 2.13 | 10 | 116 | 0.1 | 5.1 | 1 | 0.01 | 0.03 | 0.3 | 19.4 | 4.7 |
| 80DU129 | 1 | 3 | 4.0 | 770 | 0.3 | 0.5 | 4 | 29 | 2 | 1.34 | 10 | 0.5 | 3 | 0.5 | 2.27 | 150 | 121 | 0.1 | 4.7 | 1 | 0.01 | 0.03 | 0.3 | 15.4 | 3.7 |
| 80DU131 | 1 | 3 | 3.4 | 790 | 0.3 | 0.5 | 4 | 29 | 2 | 1.75 | 14 | 0.5 | 3 | 0.5 | 1.94 | 10 | 111 | 0.1 | 6.6 | 1 | 0.01 | 0.03 | 0.3 | 23.6 | 5.4 |
| 80DU133 | 1 | 3 | 2.0 | 610 | 0.3 | 0.5 | 6 | 29 | 2 | 1.47 | 9 | 0.5 | 3 | 0.5 | 1.92 | 10 | 135 | 0.3 | 5.8 | 1 | 0.01 | 0.03 | 0.3 | 16.0 | 1.7 |
| 80DU134 | 1 | 3 | 2.8 | 1100 | 0.3 | 0.5 | 8 | 31 | 4 | 2.38 | 15 | 0.5 | 3 | 5 | 2.12 | 10 | 168 | 0.1 | 7.9 | 1 | 0.01 | 0.03 | 0.3 | 34.3 | 7.0 |
| 80DU137 | 1 | 3 | 3.9 | 720 | 0.3 | 0.5 | 8 | 35 | 3 | 1.82 | 10 | 0.5 | 3 | 0.5 | 2.00 | 10 | 171 | 0.1 | 6.3 | 1 | 0.01 | 0.03 | 0.3 | 25.2 | 3.1 |
| 80DU140 | 1 | 3 | 1.7 | 610 | 0.3 | 0.5 | 4 | 20 | 2 | 1.14 | 9 | 0.5 | 3 | 0.5 | 2.05 | 10 | 100 | 0.2 | 4.2 | 1 | 0.01 | 0.03 | 0.3 | 12.0 | 2.0 |
| 80DU141 | 1 | 3 | 1.5 | 590 | 1.2 | 0.5 | 3 | 31 | 1 | 1.59 | 11 | 0.5 | 3 | 0.5 | 2.13 | 10 | 108 | 0.5 | 6.4 | 1 | 0.01 | 0.03 | 0.3 | 17.9 | 4.5 |
| 80DU142 | 1 | 3 | 2.7 | 630 | 0.3 | 0.5 | 4 | 27 | 2 | 1.25 | 10 | 0.5 | 3 | 0.5 | 2.44 | 10 | 115 | 0.1 | 4.4 | 1 | 0.01 | 0.03 | 0.3 | 14.0 | 3.1 |
| 80DU146 | 6 | 3 | 3.1 | 720 | 1.1 | 0.5 | 1 | 23 | 1 | 0.96 | 8 | 0.5 | 3 | 0.5 | 2.07 | 10 | 67 | 0.1 | 3.9 | 1 | 0.01 | 0.03 | 2.3 | 9.1 | 2.1 |
| 80DU147 | 18 | 3 | 2.4 | 580 | 0.3 | 0.5 | 7 | 36 | 3 | 1.94 | 10 | 0.5 | 3 | 0.5 | 2.43 | 10 | 124 | 0.3 | 6.0 | 1 | 0.01 | 0.03 | 0.3 | 14.0 | 2.9 |
| 80DU153 | 1 | 3 | 2.3 | 810 | 1.2 | 0.5 | 4 | 22 | 2 | 1.26 | 9 | 0.5 | 3 | 0.5 | 2.15 | 10 | 116 | 0.1 | 4.8 | 1 | 0.01 | 0.03 | 0.3 | 13.2 | 2.2 |
| 80DU154 | 1 | 3 | 2.3 | 700 | 1.5 | 0.5 | 4 | 23 | 2 | 1.17 | 9 | 0.5 | 3 | 0.5 | 2.19 | 10 | 107 | 0.1 | 4.2 | 1 | 0.01 | 0.03 | 0.3 | 11.9 | 2.9 |

Appendix 3. INAA data

| Analyte Symbol | Au | Ag | As | Ba | Br | Ca | Co | Cr | Cs | Fe | Hf | Hg | Ir | Mo | Na | Ni | Rb | Sb | Sc | Se | Sn | Sr | Ta | Th | U |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Unit Symbol | ppb | ppm | ppm | ppm | ppm | % | ppm | ppm | ppm | % | ppm | ppm | ppb | ppm | % | ppm | ppm | ppm | ppm | ppm | % | % | ppm | ppm | ppm |
| 80DU157 | 1 | 3 | 3.7 | 720 | 0.3 | 0.5 | 5 | 31 | 2 | 1.50 | 10 | 0.5 | 3 | 0.5 | 2.09 | 10 | 137 | 0.3 | 5.7 | 1 | 0.01 | 0.03 | 0.3 | 14.8 | 2.9 |
| 80DU158 | 1 | 3 | 2.6 | 780 | 0.3 | 0.5 | 3 | 33 | 2 | 1.42 | 11 | 0.5 | 3 | 2 | 2.15 | 10 | 110 | 0.1 | 5.8 | 1 | 0.01 | 0.03 | 0.3 | 16.4 | 3.3 |
| 80DU159 | 1 | 3 | 1.3 | 920 | 0.3 | 0.5 | 6 | 42 | 2 | 1.87 | 11 | 0.5 | 3 | 2 | 2.12 | 10 | 135 | 0.3 | 7.1 | 1 | 0.01 | 0.03 | 0.3 | 18.8 | 3.4 |
| 80DU161 | 1 | 3 | 2.0 | 710 | 0.3 | 2 | 5 | 22 | 2 | 1.51 | 9 | 0.5 | 3 | 0.5 | 2.52 | 10 | 195 | 0.5 | 5.5 | 1 | 0.01 | 0.03 | 2.5 | 17.7 | 5.3 |
| 80DU162 | 1 | 3 | 2.3 | 630 | 0.3 | 0.5 | 6 | 41 | 4 | 2.28 | 11 | 0.5 | 3 | 0.5 | 1.53 | 10 | 154 | 0.3 | 9.3 | 1 | 0.01 | 0.03 | 3.4 | 21.9 | 5.0 |
| 80DU167 | 1 | 3 | 0.3 | 580 | 2.1 | 0.5 | 4 | 39 | 3 | 1.40 | 11 | 0.5 | 3 | 0.5 | 2.15 | 10 | 153 | 0.1 | 4.6 | 1 | 0.01 | 0.03 | 0.3 | 40.1 | 7.0 |
| 80DU173 | 8 | 3 | 2.9 | 840 | 0.3 | 3 | 2 | 33 | 2 | 1.35 | 11 | 0.5 | 3 | 0.5 | 2.21 | 10 | 98 | 0.3 | 5.5 | 1 | 0.01 | 0.03 | 0.3 | 14.1 | 2.3 |
| 80DU184 | 1 | 3 | 2.6 | 680 | 0.3 | 0.5 | 3 | 21 | 2 | 0.99 | 12 | 0.5 | 3 | 0.5 | 2.02 | 10 | 118 | 0.1 | 4.0 | 1 | 0.01 | 0.03 | 1.3 | 24.0 | 3.8 |
| 80DU188 | 8 | 3 | 3.7 | 670 | 1.0 | 0.5 | 3 | 19 | 2 | 0.98 | 9 | 0.5 | 3 | 0.5 | 2.02 | 10 | 121 | 0.1 | 3.8 | 1 | 0.01 | 0.03 | 0.3 | 26.1 | 4.5 |
| 80DU191 | 1 | 3 | 3.4 | 640 | 0.3 | 0.5 | 4 | 30 | 2 | 1.25 | 9 | 0.5 | 3 | 3 | 2.14 | 10 | 125 | 0.1 | 4.7 | 1 | 0.01 | 0.03 | 0.3 | 18.0 | 3.2 |
| 80DU194 | 16 | 3 | 3.7 | 620 | 0.3 | 0.5 | 4 | 26 | 3 | 1.63 | 11 | 0.5 | 3 | 0.5 | 2.29 | 10 | 188 | 0.1 | 5.5 | 1 | 0.01 | 0.03 | 0.3 | 37.6 | 7.3 |
| 80DU197 | 1 | 3 | 2.6 | 620 | 0.3 | 0.5 | 3 | 19 | 2 | 1.10 | 8 | 0.5 | 3 | 0.5 | 2.00 | 10 | 87 | 0.2 | 3.6 | 1 | 0.01 | 0.03 | 0.3 | 17.6 | 3.4 |
| 80DU198 | 1 | 3 | 1.8 | 630 | 0.3 | 2 | 3 | 20 | 2 | 1.00 | 9 | 0.5 | 3 | 0.5 | 2.13 | 10 | 140 | 0.3 | 3.8 | 1 | 0.01 | 0.03 | 0.3 | 19.1 | 2.0 |
| 80DU199 | 8 | 3 | 2.2 | 680 | 0.3 | 0.5 | 7 | 32 | 6 | 1.80 | 8 | 0.5 | 3 | 0.5 | 2.12 | 10 | 138 | 0.1 | 6.8 | 1 | 0.01 | 0.03 | 0.3 | 25.2 | 6.8 |
| 80DU211 | 41 | 3 | 2.5 | 700 | 1.5 | 3 | 4 | 18 | 2 | 1.09 | 10 | 0.5 | 3 | 0.5 | 2.23 | 10 | 111 | 0.2 | 4.6 | 1 | 0.01 | 0.03 | 0.3 | 10.8 | 1.4 |
| 80DU212 | 1 | 3 | 2.3 | 720 | 2.1 | 2 | 3 | 27 | 2 | 1.17 | 11 | 0.5 | 3 | 0.5 | 2.13 | 10 | 94 | 0.1 | 4.4 | 3 | 0.01 | 0.03 | 0.3 | 14.3 | 1.9 |
| 80DU219 | 23 | 3 | 2.2 | 780 | 0.3 | 0.5 | 7 | 40 | 2 | 1.76 | 9 | 0.5 | 3 | 0.5 | 2.51 | 10 | 169 | 0.1 | 5.9 | 1 | 0.01 | 0.03 | 0.3 | 15.1 | 0.3 |
| 80DU220 | 1 | 3 | 3.5 | 740 | 0.3 | 0.5 | 4 | 32 | 3 | 1.15 | 10 | 0.5 | 3 | 0.5 | 2.30 | 10 | 129 | 0.1 | 4.8 | 1 | 0.01 | 0.03 | 0.3 | 18.4 | 6.5 |
| 80DU221 | 9 | 3 | 1.9 | 650 | 1.6 | 0.5 | 6 | 36 | 4 | 1.56 | 10 | 0.5 | 3 | 0.5 | 2.10 | 10 | 92 | 0.1 | 6.0 | 1 | 0.01 | 0.03 | 0.3 | 20.2 | 6.5 |
| 80DU223 | 9 | 3 | 3.7 | 720 | 0.3 | 3 | 4 | 33 | 2 | 1.42 | 11 | 0.5 | 3 | 0.5 | 2.35 | 10 | 67 | 0.3 | 5.1 | 1 | 0.01 | 0.03 | 2.3 | 17.8 | 3.5 |
| 80DU224 | 1 | 3 | 3.1 | 660 | 1.7 | 0.5 | 5 | 35 | 1 | 1.58 | 11 | 0.5 | 3 | 0.5 | 2.30 | 10 | 133 | 0.1 | 5.4 | 1 | 0.01 | 0.03 | 0.3 | 18.6 | 3.4 |
| 80DU225 | 1 | 3 | 3.1 | 710 | 1.0 | 0.5 | 4 | 35 | 1 | 1.29 | 11 | 0.5 | 3 | 2 | 2.30 | 140 | 104 | 0.3 | 5.1 | 1 | 0.01 | 0.03 | 0.3 | 14.6 | 2.4 |
| 80DU227 | 1 | 3 | 2.1 | 760 | 2.3 | 2 | 10 | 54 | 3 | 2.43 | 10 | 0.5 | 3 | 0.5 | 1.97 | 10 | 162 | 0.1 | 8.0 | 1 | 0.01 | 0.03 | 1.7 | 11.8 | 2.2 |
| 80DU228 | 1 | 3 | 0.6 | 730 | 0.3 | 0.5 | 4 | 21 | 1 | 1.25 | 11 | 0.5 | 3 | 0.5 | 2.27 | 10 | 124 | 0.1 | 5.1 | 3 | 0.01 | 0.03 | 0.3 | 15.3 | 3.0 |
| 80DU230 | 1 | 3 | 1.3 | 600 | 1.2 | 0.5 | 4 | 24 | 2 | 1.15 | 11 | 0.5 | 3 | 0.5 | 2.12 | 10 | 120 | 0.1 | 4.3 | 1 | 0.01 | 0.03 | 0.3 | 16.3 | 3.2 |
| 80DU241 | 1 | 3 | 2.9 | 860 | 0.3 | 0.5 | 7 | 28 | 3 | 1.72 | 12 | 0.5 | 3 | 0.5 | 1.78 | 10 | 78 | 0.4 | 6.1 | 1 | 0.01 | 0.03 | 2.1 | 27.5 | 5.7 |
| 80DU243 | 8 | 3 | 1.8 | 730 | 0.3 | 0.5 | 5 | 36 | 2 | 1.69 | 10 | 0.5 | 3 | 0.5 | 1.79 | 10 | 113 | 0.1 | 6.2 | 1 | 0.01 | 0.03 | 1.7 | 17.4 | 4.8 |
| 80DU248 | 1 | 3 | 2.6 | 880 | 0.3 | 0.5 | 13 | 54 | 5 | 3.58 | 12 | 0.5 | 3 | 78 | 1.00 | 10 | 143 | 0.4 | 12.7 | 1 | 0.01 | 0.03 | 0.3 | 23.9 | 7.3 |
| 80DU249 | 1 | 3 | 2.1 | 680 | 0.3 | 1 | 4 | 40 | 2 | 1.51 | 9 | 0.5 | 3 | 0.5 | 2.23 | 10 | 87 | 0.2 | 5.5 | 1 | 0.01 | 0.03 | 1.9 | 8.2 | 2.7 |
| 80DU252 | 1 | 3 | 1.7 | 750 | 0.3 | 0.5 | 3 | 15 | 3 | 1.66 | 13 | 0.5 | 3 | 0.5 | 1.81 | 10 | 125 | 0.1 | 6.1 | 1 | 0.01 | 0.03 | 0.3 | 28.2 | 2.7 |
| 80DU253 | 1 | 3 | 1.4 | 750 | 0.3 | 1 | 4 | 22 | 1 | 1.80 | 10 | 0.5 | 3 | 0.5 | 1.65 | 10 | 132 | 0.1 | 5.9 | 1 | 0.01 | 0.03 | 3.5 | 13.7 | 3.6 |
| 80DU254 | 5 | 3 | 2.6 | 740 | 1.7 | 0.5 | 6 | 28 | 4 | 1.97 | 10 | 0.5 | 3 | 0.5 | 2.31 | 10 | 111 | 0.3 | 6.8 | 1 | 0.01 | 0.03 | 1.9 | 11.5 | 5.8 |
| 80DU265 | 1 | 3 | 2.3 | 580 | 0.3 | 0.5 | 3 | 21 | 2 | 1.08 | 8 | 0.5 | 3 | 0.5 | 2.00 | 10 | 85 | 0.1 | 3.8 | 1 | 0.01 | 0.03 | 0.3 | 13.2 | 2.3 |
| 80DU267 | 1 | 3 | 2.5 | 540 | 0.3 | 2 | 3 | 21 | 2 | 1.06 | 9 | 0.5 | 3 | 0.5 | 2.09 | 10 | 108 | 0.1 | 4.4 | 1 | 0.01 | 0.03 | 1.8 | 14.2 | 3.3 |
| 80DU268 | 1 | 3 | 1.4 | 590 | 2.0 | 0.5 | 7 | 43 | 4 | 2.16 | 8 | 0.5 | 3 | 4 | 2.10 | 10 | 134 | 0.1 | 6.8 | 1 | 0.01 | 0.03 | 2.4 | 17.4 | 6.5 |
| 80DU269 | 1 | 3 | 0.3 | 800 | 0.3 | 3 | 7 | 38 | 3 | 1.99 | 8 | 0.5 | 3 | 0.5 | 2.24 | 10 | 137 | 0.1 | 6.7 | 1 | 0.01 | 0.03 | 0.3 | 13.0 | 2.6 |
| 80DU270 | 1 | 3 | 1.5 | 640 | 1.8 | 0.5 | 5 | 27 | 2 | 1.57 | 8 | 0.5 | 3 | 2 | 2.17 | 10 | 96 | 0.1 | 5.7 | 1 | 0.01 | 0.03 | 2 | 10.2 | 2.4 |
| 80DU271 | 9 | 3 | 2.3 | 660 | 1.7 | 0.5 | 5 | 31 | 4 | 1.58 | 7 | 0.5 | 3 | 0.5 | 1.90 | 10 | 90 | 0.1 | 6.2 | 1 | 0.01 | 0.03 | 2.1 | 15.4 | 5.3 |
| 80DU272 | 1 | 3 | 3.7 | 550 | 0.3 | 0.5 | 6 | 23 | 2 | 1.37 | 10 | 0.5 | 3 | 0.5 | 1.84 | 10 | 92 | 0.1 | 4.6 | 1 | 0.01 | 0.03 | 0.3 | 15.8 | 5.9 |
| 80DU273 | 1 | 5 | 1.8 | 620 | 0.3 | 0.5 | 3 | 20 | 2 | 1.02 | 8 | 0.5 | 3 | 0.5 | 1.95 | 10 | 105 | 0.2 | 3.8 | 1 | 0.01 | 0.03 | 1.9 | 14.7 | 3.8 |
| 80DU275 | 7 | 3 | 1.6 | 670 | 0.9 | 0.5 | 3 | 19 | 1 | 1.04 | 10 | 0.5 | 3 | 0.5 | 2.13 | 10 | 107 | 0.1 | 4.0 | 1 | 0.01 | 0.03 | 0.3 | 11.9 | 2.7 |
| 80DU280 | 19 | 3 | 1.9 | 740 | 0.3 | 0.5 | 4 | 15 | 1 | 1.12 | 10 | 0.5 | 3 | 0.5 | 2.16 | 10 | 70 | 0.1 | 4.5 | 1 | 0.01 | 0.03 | 0.3 | 12.0 | 2.6 |
| 80DU282 | 1 | 3 | 2.3 | 720 | 2.0 | 2 | 3 | 15 | 2 | 1.14 | 10 | 0.5 | 3 | 0.5 | 2.32 | 10 | 89 | 0.1 | 4.3 | 1 | 0.01 | 0.03 | 0.3 | 13.4 | 3.1 |
| 80DU284 | 12 | 3 | 2.4 | 730 | 1.6 | 0.5 | 2 | 26 | 1 | 1.19 | 9 | 0.5 | 3 | 0.5 | 2.21 | 10 | 86 | 0.2 | 4.4 | 1 | 0.03 | 0.03 | 0.3 | 12.6 | 2.1 |

Appendix 3. INAA data

| Analyte Symbol | Au | Ag | As | Ba | Br | Ca | Co | Cr | Cs | Fe | Hf | Hg | Ir | Mo | Na | Ni | Rb | Sb | Sc | Se | Sn | Sr | Ta | Th | U |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Unit Symbol | ppb | ppm | ppm | ppm | ppm | % | ppm | ppm | ppm | % | ppm | ppm | ppb | ppm | % | ppm | ppm | ppm | ppm | ppm | % | % | ppm | ppm | ppm |
| 80DU285 | 1 | 3 | 4.3 | 750 | 0.3 | 0.5 | 5 | 22 | 2 | 1.83 | 12 | 0.5 | 3 | 0.5 | 2.38 | 10 | 139 | 0.4 | 5.6 | 1 | 0.01 | 0.03 | 0.3 | 31.4 | 5.8 |
| 80DU292 | 1 | 3 | 2.9 | 780 | 3.9 | 0.5 | 3 | 28 | 1 | 1.30 | 9 | 0.5 | 3 | 0.5 | 2.13 | 10 | 111 | 0.1 | 5.2 | 1 | 0.01 | 0.03 | 0.3 | 20.6 | 4.3 |
| 80DU294 | 1 | 3 | 2.5 | 770 | 1.9 | 0.5 | 1 | 23 | 1 | 1.10 | 11 | 0.5 | 3 | 4 | 2.13 | 10 | 175 | 0.1 | 3.8 | 1 | 0.01 | 0.03 | 0.3 | 38.0 | 3.9 |
| 80DU296 | 1 | 3 | 0.3 | 650 | 0.3 | 0.5 | 6 | 52 | 3 | 2.23 | 9 | 0.5 | 3 | 2 | 2.34 | 10 | 7 | 0.1 | 6.8 | 1 | 0.01 | 0.03 | 0.3 | 10.9 | 2.8 |
| 80DU297 | 1 | 3 | 2.5 | 800 | 0.3 | 2 | 5 | 31 | 3 | 1.54 | 9 | 0.5 | 3 | 0.5 | 2.11 | 10 | 122 | 0.3 | 6.2 | 1 | 0.01 | 0.03 | 3.7 | 7.6 | 0.3 |
| 80DU298 | 1 | 3 | 2.8 | 910 | 2.5 | 0.5 | 5 | 32 | 4 | 1.42 | 8 | 0.5 | 3 | 0.5 | 1.97 | 10 | 159 | 0.1 | 4.9 | 1 | 0.01 | 0.03 | 3.7 | 38.9 | 3.7 |
| 80DU301 | 1 | 3 | 1.3 | 530 | 1.3 | 0.5 | 5 | 19 | 3 | 1.07 | 8 | 0.5 | 3 | 0.5 | 2.08 | 10 | 117 | 0.2 | 3.8 | 1 | 0.01 | 0.03 | 0.3 | 16.1 | 3.3 |
| 80DU302 | 1 | 3 | 2.6 | 580 | 2.1 | 0.5 | 5 | 27 | 6 | 1.40 | 9 | 0.5 | 3 | 0.5 | 2.13 | 220 | 274 | 0.1 | 5.2 | 1 | 0.01 | 0.03 | 0.3 | 37.3 | 5.2 |
| 80DU303 | 4 | 3 | 0.3 | 610 | 0.3 | 0.5 | 8 | 47 | 2 | 1.93 | 7 | 0.5 | 3 | 0.5 | 2.14 | 150 | 103 | 0.3 | 7.5 | 1 | 0.01 | 0.03 | 0.3 | 8.7 | 0.3 |
| 80DU305 | 1 | 3 | 5.0 | 760 | 3.7 | 0.5 | 8 | 56 | 3 | 2.75 | 12 | 0.5 | 3 | 0.5 | 2.33 | 240 | 7 | 0.1 | 7.1 | 1 | 0.01 | 0.03 | 0.3 | 11.3 | 3.2 |
| 80DU306 | 1 | 3 | 4.4 | 570 | 0.3 | 0.5 | 5 | 22 | 2 | 1.78 | 8 | 0.5 | 3 | 0.5 | 2.11 | 10 | 66 | 0.1 | 6.3 | 1 | 0.01 | 0.03 | 0.3 | 8.9 | 2.4 |
| 80DU307 | 10 | 3 | 4.1 | 740 | 0.3 | 0.5 | 4 | 28 | 1 | 1.34 | 8 | 0.5 | 3 | 0.5 | 1.83 | 10 | 159 | 0.3 | 4.1 | 1 | 0.01 | 0.03 | 1.7 | 20.1 | 3.5 |
| 80DU315 | 1 | 3 | 3.0 | 610 | 1.3 | 0.5 | 3 | 28 | 2 | 1.18 | 10 | 0.5 | 3 | 0.5 | 2.06 | 10 | 130 | 0.1 | 4.7 | 1 | 0.01 | 0.03 | 0.3 | 12.6 | 2.8 |
| 80DU317 | 1 | 3 | 2.1 | 650 | 2.3 | 0.5 | 6 | 32 | 3 | 1.37 | 10 | 0.5 | 3 | 0.5 | 1.93 | 10 | 123 | 0.1 | 5.0 | 1 | 0.01 | 0.03 | 0.3 | 18.5 | 2.6 |
| 80DU319 | 1 | 3 | 5.1 | 730 | 0.3 | 0.5 | 8 | 44 | 5 | 1.65 | 10 | 0.5 | 3 | 0.5 | 1.94 | 10 | 185 | 0.1 | 5.6 | 1 | 0.01 | 0.03 | 2.8 | 21.8 | 4.6 |
| 80DU320 | 1 | 3 | 0.3 | 680 | 2.0 | 0.5 | 4 | 23 | 2 | 1.31 | 8 | 0.5 | 3 | 0.5 | 2.05 | 10 | 154 | 0.1 | 4.3 | 1 | 0.01 | 0.03 | 0.3 | 18.5 | 4.7 |
| 80DU321 | 1 | 3 | 3.0 | 770 | 0.3 | 0.5 | 5 | 26 | 2 | 1.38 | 15 | 0.5 | 3 | 0.5 | 2.18 | 10 | 141 | 0.1 | 5.1 | 1 | 0.01 | 0.03 | 0.3 | 30.0 | 6.1 |
| 80DU322 | 1 | 3 | 3.5 | 650 | 0.3 | 0.5 | 3 | 18 | 4 | 1.13 | 10 | 0.5 | 3 | 4 | 2.20 | 180 | 166 | 0.4 | 4.0 | 1 | 0.01 | 0.03 | 0.3 | 18.3 | 3.9 |
| 80DU323 | 1 | 3 | 2.1 | 490 | 0.3 | 0.5 | 4 | 23 | 4 | 1.36 | 8 | 0.5 | 3 | 0.5 | 2.60 | 10 | 7 | 0.1 | 5.3 | 1 | 0.01 | 0.03 | 0.3 | 15.3 | 3.1 |
| 80DU326 | 1 | 6 | 2.2 | 760 | 1.2 | 2 | 5 | 22 | 2 | 1.52 | 7 | 0.5 | 3 | 0.5 | 2.19 | 10 | 120 | 0.1 | 5.3 | 1 | 0.01 | 0.03 | 0.3 | 10.0 | 3.0 |
| 80DU328 | 1 | 3 | 1.8 | 540 | 2.4 | 0.5 | 8 | 40 | 4 | 1.95 | 9 | 0.5 | 3 | 60 | 1.78 | 10 | 152 | 0.4 | 7.4 | 1 | 0.01 | 0.06 | 0.3 | 22.0 | 4.1 |
| 80DU329 | 1 | 3 | 5.2 | 630 | 1.5 | 3 | 5 | 25 | 3 | 1.36 | 6 | 0.5 | 3 | 0.5 | 1.98 | 10 | 144 | 0.3 | 4.8 | 1 | 0.01 | 0.03 | 2.8 | 21.0 | 4.3 |
| 80DU331 | 1 | 3 | 2.5 | 740 | 0.3 | 0.5 | 4 | 25 | 2 | 1.28 | 10 | 0.5 | 3 | 2 | 2.04 | 10 | 85 | 0.1 | 5.1 | 1 | 0.01 | 0.03 | 0.3 | 14.2 | 2.8 |
| 80DU332 | 1 | 3 | 1.4 | 570 | 0.3 | 3 | 4 | 29 | 2 | 1.32 | 9 | 0.5 | 3 | 0.5 | 1.94 | 10 | 101 | 0.1 | 4.3 | 1 | 0.01 | 0.03 | 2.9 | 12.5 | 2.5 |
| 80DU334 | 1 | 3 | 2.5 | 590 | 0.3 | 0.5 | 4 | 15 | 1 | 1.07 | 9 | 0.5 | 3 | 0.5 | 2.12 | 10 | 138 | 0.1 | 3.9 | 1 | 0.01 | 0.03 | 0.3 | 18.6 | 4.5 |
| 80DU335 | 1 | 3 | 2.3 | 420 | 0.3 | 0.5 | 3 | 19 | 2 | 0.91 | 9 | 0.5 | 3 | 0.5 | 2.08 | 10 | 114 | 0.1 | 3.4 | 1 | 0.01 | 0.03 | 0.3 | 18.9 | 2.4 |
| 80DU337 | 1 | 3 | 2.6 | 600 | 2.6 | 5 | 3 | 18 | 2 | 1.02 | 9 | 0.5 | 3 | 0.5 | 2.06 | 10 | 159 | 0.1 | 3.5 | 1 | 0.01 | 0.03 | 0.3 | 37.2 | 3.5 |

Appendix 3. INAA data

| Analyte Symbol | W | Zn | La | Ce | Nd | Sm | Eu | Tb | Yb | Lu | Mass |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Unit Symbol | ppm | ppm | ppm | ppm | ppm | ppm | ppm | ppm | ppm | ppm | g |
| Detection | 1 | 50 | 0.5 | 3 | 5 | 0.1 | 0.2 | 0.5 | 0.2 | 0.05 | |
| 78DU031 | 0.5 | 25 | 33.2 | 49 | 3 | 3.8 | 0.8 | 0.3 | 1.8 | 0.27 | 18.2 |
| 78DU036 | 0.5 | 25 | 20.3 | 32 | 17 | 2.5 | 0.7 | 0.3 | 1.4 | 0.22 | 29.7 |
| 78DU053 | 0.5 | 25 | 25.4 | 42 | 13 | 3.2 | 0.6 | 0.3 | 1.8 | 0.27 | 12.8 |
| 78DU084 | 0.5 | 25 | 45.0 | 76 | 29 | 5.7 | 1.0 | 0.3 | 2.5 | 0.38 | 12.6 |
| 78DU091 | 0.5 | 25 | 27.4 | 32 | 42 | 2.6 | 0.7 | 0.3 | 1.2 | 0.19 | 5.77 |
| 78DU094 | 0.5 | 25 | 29.1 | 53 | 23 | 3.6 | 0.9 | 0.3 | 2.1 | 0.31 | 21.5 |
| 78DU103 | 0.5 | 25 | 26.6 | 45 | 14 | 3.3 | 0.8 | 0.3 | 1.6 | 0.24 | 21.1 |
| 78DU105 | 0.5 | 110 | 22.0 | 39 | 23 | 2.7 | 0.4 | 0.3 | 1.4 | 0.20 | 13.4 |
| 78DU109 | 0.5 | 25 | 35.6 | 55 | 25 | 4.1 | 0.9 | 0.3 | 1.4 | 0.22 | 18 |
| 78DU110 | 0.5 | 25 | 32.9 | 55 | 26 | 4.2 | 1.0 | 0.3 | 1.7 | 0.26 | 13.1 |
| 78DU114 | 0.5 | 25 | 31.5 | 54 | 22 | 3.6 | 0.9 | 0.3 | 1.7 | 0.26 | 21.3 |
| 78DU123 | 0.5 | 25 | 44.7 | 71 | 32 | 4.9 | 1.1 | 0.3 | 2.0 | 0.30 | 12.7 |
| 78DU128 | 0.5 | 25 | 33.1 | 66 | 18 | 4.2 | 1.2 | 0.3 | 1.9 | 0.28 | 13.5 |
| 78DU129 | 0.5 | 25 | 28.9 | 52 | 17 | 3.2 | 0.8 | 0.3 | 1.6 | 0.24 | 28.5 |
| 78DU131 | 0.5 | 25 | 35.7 | 68 | 29 | 4.1 | 0.9 | 0.3 | 2.0 | 0.30 | 25.8 |
| 78DU143 | 0.5 | 25 | 33.0 | 65 | 24 | 4.2 | 0.9 | 0.3 | 1.7 | 0.26 | 19.3 |
| 78DU147 | 0.5 | 25 | 49.9 | 106 | 35 | 5.8 | 1.4 | 0.3 | 3.0 | 0.46 | 18.5 |
| 78DU150 | 0.5 | 25 | 29.6 | 61 | 18 | 3.5 | 0.9 | 0.3 | 1.7 | 0.26 | 24.2 |
| 78DU164 | 0.5 | 25 | 72.6 | 114 | 44 | 7.2 | 1.5 | 0.3 | 2.8 | 0.41 | 14.7 |
| 78DU166 | 0.5 | 25 | 59.0 | 113 | 41 | 6.9 | 1.7 | 0.3 | 3.1 | 0.47 | 21.3 |
| 78DU167 | 0.5 | 25 | 47.3 | 94 | 35 | 5.5 | 1.4 | 0.3 | 2.7 | 0.40 | 17.1 |
| 78DU168 | 4 | 25 | 56.8 | 100 | 49 | 7.2 | 1.5 | 0.3 | 3.3 | 0.50 | 26.1 |
| 78DU170 | 0.5 | 25 | 40.1 | 61 | 26 | 4.5 | 1.1 | 0.3 | 2.1 | 0.31 | 17.5 |
| 78DU184 | 0.5 | 25 | 57.4 | 70 | 36 | 6.5 | 1.4 | 0.3 | 3.4 | 0.51 | 24.1 |
| 78DU185 | 0.5 | 25 | 28.9 | 31 | 3 | 2.6 | 0.8 | 0.3 | 1.4 | 0.21 | 9 |
| 78DU195 | 0.5 | 25 | 34.0 | 50 | 23 | 4.0 | 0.8 | 0.3 | 1.9 | 0.28 | 21.2 |
| 78DU196 | 0.5 | 25 | 38.1 | 58 | 25 | 4.1 | 0.9 | 0.3 | 1.9 | 0.28 | 20.6 |
| 78DU203 | 0.5 | 25 | 30.4 | 35 | 3 | 2.9 | 0.9 | 0.3 | 1.4 | 0.21 | 8.33 |
| 78DU204 | 0.5 | 25 | 27.5 | 42 | 17 | 3.4 | 0.9 | 0.3 | 1.8 | 0.27 | 24.3 |
| 78DU224 | 0.5 | 25 | 38.1 | 52 | 19 | 4.4 | 1.0 | 0.3 | 2.4 | 0.36 | 25.4 |
| 78DU228 | 0.5 | 70 | 47.3 | 48 | 34 | 0.4 | 1.2 | 1.0 | 2.0 | 0.30 | 6.51 |
| 78DU231 | 3 | 25 | 27.8 | 42 | 17 | 3.3 | 0.8 | 0.3 | 1.4 | 0.21 | 25.7 |
| 78DU250 | 0.5 | 25 | 18.7 | 30 | 18 | 2.3 | 0.1 | 0.3 | 1.0 | 0.15 | 23.7 |
| 78DU257 | 2 | 25 | 37.4 | 101 | 21 | 4.3 | 0.9 | 0.3 | 2.1 | 0.31 | 23.9 |
| 78DU261 | 0.5 | 25 | 44.0 | 109 | 28 | 4.7 | 1.2 | 0.3 | 2.1 | 0.31 | 22.9 |
| 78DU270 | 0.5 | 60 | 37.8 | 52 | 3 | 3.1 | 0.9 | 0.3 | 1.3 | 0.20 | 6.07 |
| 78DU272 | 0.5 | 25 | 38.7 | 109 | 23 | 4.3 | 0.8 | 0.3 | 1.8 | 0.27 | 21 |
| 78DU295 | 0.5 | 25 | 33.0 | 91 | 27 | 4.1 | 1.0 | 0.3 | 2.1 | 0.31 | 18.3 |
| 78DU299 | 0.5 | 25 | 29.0 | 83 | 25 | 3.5 | 0.8 | 0.3 | 1.7 | 0.25 | 22.4 |
| 78DU309 | 0.5 | 25 | 26.3 | 82 | 19 | 3.3 | 0.5 | 0.3 | 1.4 | 0.20 | 24.3 |
| 78DU311 | 0.5 | 50 | 29.3 | 33 | 3 | 2.3 | 0.9 | 0.3 | 1.4 | 0.21 | 9.04 |
| 78DU312 | 0.5 | 60 | 30.7 | 89 | 26 | 3.8 | 1.0 | 0.3 | 1.8 | 0.27 | 22.3 |
| 78DU313 | 0.5 | 25 | 32.9 | 97 | 25 | 3.9 | 1.0 | 0.3 | 2.4 | 0.36 | 25.3 |

Appendix 3. INAA data

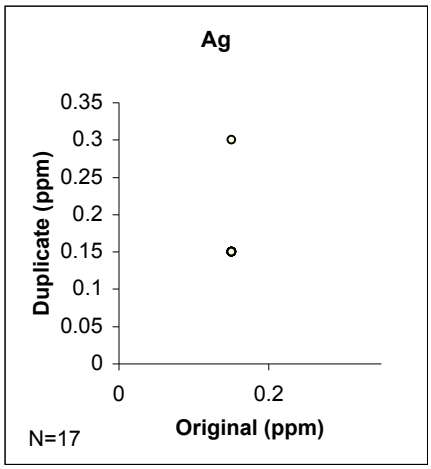
| Analyte Symbol | W | Zn | La | Ce | Nd | Sm | Eu | Tb | Yb | Lu | Mass |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Unit Symbol | ppm | ppm | ppm | ppm | ppm | ppm | ppm | ppm | ppm | ppm | g |
| 78DU319 | 0.5 | 25 | 28.6 | 83 | 20 | 3.5 | 0.8 | 0.6 | 1.8 | 0.27 | 24.4 |
| 78DU323 | 0.5 | 25 | 34.4 | 54 | 19 | 4.0 | 1.1 | 0.3 | 1.9 | 0.28 | 20.6 |
| 78DU345 | 0.5 | 25 | 21.1 | 33 | 10 | 2.5 | 0.5 | 0.3 | 1.5 | 0.22 | 30.9 |
| 78DU347 | 0.5 | 50 | 37.9 | 43 | 25 | 3.0 | 0.6 | 0.3 | 1.3 | 0.20 | 7.27 |
| 78DU349 | 3 | 80 | 25.1 | 39 | 25 | 2.9 | 0.8 | 0.3 | 1.5 | 0.22 | 22.6 |
| 78DU351 | 0.5 | 25 | 29.1 | 44 | 17 | 3.5 | 1.0 | 0.3 | 1.5 | 0.22 | 24.3 |
| 78DU356 | 0.5 | 25 | 49.9 | 78 | 34 | 6.1 | 1.4 | 0.3 | 3.1 | 0.47 | 21.6 |
| 78DU359 | 0.5 | 25 | 26.4 | 38 | 21 | 3.2 | 0.9 | 0.3 | 1.8 | 0.27 | 20.9 |
| 78DU385 | 3 | 150 | 32.4 | 53 | 31 | 4.1 | 0.8 | 0.3 | 1.9 | 0.28 | 13.1 |
| 78DU387 | 0.5 | 25 | 28.7 | 31 | 3 | 2.8 | 0.9 | 0.3 | 1.4 | 0.21 | 6.14 |
| 78DU394 | 0.5 | 25 | 24.3 | 41 | 18 | 3.1 | 0.9 | 0.3 | 1.7 | 0.25 | 23.4 |
| 78DU396 | 0.5 | 25 | 30.3 | 42 | 28 | 3.9 | 1.1 | 0.3 | 1.8 | 0.27 | 22.2 |
| 78DU398 | 0.5 | 130 | 33.1 | 50 | 24 | 4.0 | 1.0 | 0.3 | 1.9 | 0.28 | 23.7 |
| 78DU399 | 0.5 | 90 | 32.2 | 50 | 20 | 3.8 | 1.0 | 0.3 | 1.8 | 0.27 | 20.8 |
| 78DU417 | 0.5 | 25 | 28.5 | 58 | 17 | 3.7 | 0.9 | 0.3 | 1.7 | 0.25 | 20.8 |
| 78DU419 | 0.5 | 130 | 32.5 | 65 | 26 | 3.8 | 0.9 | 0.3 | 1.8 | 0.27 | 20.5 |
| 78DU423 | 0.5 | 25 | 26.1 | 53 | 19 | 3.5 | 0.8 | 0.3 | 1.7 | 0.25 | 22.1 |
| 78DU425 | 0.5 | 25 | 24.9 | 50 | 21 | 3.1 | 0.9 | 0.3 | 1.7 | 0.25 | 24.6 |
| 78DU437 | 0.5 | 100 | 21.3 | 44 | 3 | 2.7 | 0.7 | 0.3 | 1.3 | 0.19 | 22.4 |
| 78DU439 | 3 | 25 | 31.8 | 60 | 21 | 3.9 | 1.1 | 0.3 | 2.0 | 0.30 | 18.9 |
| 78DU451 | 0.5 | 25 | 31.3 | 64 | 3 | 4.0 | 0.8 | 0.3 | 1.9 | 0.28 | 14.4 |
| 78DU458 | 0.5 | 25 | 40.9 | 77 | 31 | 4.7 | 1.0 | 0.3 | 2.3 | 0.34 | 23.5 |
| 78DU465 | 0.5 | 140 | 36.0 | 74 | 34 | 4.9 | 1.1 | 0.3 | 2.4 | 0.36 | 11.2 |
| 78DU473 | 0.5 | 25 | 22.4 | 45 | 12 | 2.4 | 0.8 | 0.3 | 1.2 | 0.19 | 15.1 |
| 80DU014 | 0.5 | 25 | 52.9 | 104 | 22 | 5.7 | 1.0 | 0.9 | 2.9 | 0.44 | 27.7 |
| 80DU050 | 0.5 | 25 | 69.8 | 136 | 33 | 7.1 | 1.0 | 0.3 | 3.4 | 0.51 | 29.8 |
| 80DU053 | 0.5 | 25 | 44.5 | 92 | 25 | 4.6 | 0.9 | 0.3 | 2.7 | 0.40 | 34.1 |
| 80DU057 | 0.5 | 100 | 55.2 | 97 | 30 | 5.8 | 1.0 | 0.3 | 3.4 | 0.51 | 30.6 |
| 80DU061 | 0.5 | 60 | 84.3 | 67 | 3 | 4.8 | 1.4 | 0.3 | 2.7 | 0.40 | 9.7 |
| 80DU093 | 0.5 | 25 | 63.6 | 123 | 38 | 7.2 | 1.4 | 0.3 | 4.2 | 0.63 | 22.6 |
| 80DU118 | 0.5 | 25 | 69.8 | 134 | 39 | 7.7 | 1.5 | 0.3 | 4.1 | 0.61 | 17.7 |
| 80DU126 | 0.5 | 25 | 54.2 | 102 | 28 | 5.8 | 1.0 | 0.3 | 3.6 | 0.54 | 31.8 |
| 80DU129 | 0.5 | 80 | 39.0 | 73 | 20 | 4.4 | 0.9 | 0.3 | 2.5 | 0.37 | 28.8 |
| 80DU131 | 0.5 | 25 | 64.1 | 118 | 36 | 7.0 | 1.4 | 0.3 | 4.5 | 0.67 | 27.8 |
| 80DU133 | 0.5 | 25 | 40.9 | 77 | 23 | 4.7 | 1.0 | 0.3 | 2.9 | 0.44 | 30.1 |
| 80DU134 | 0.5 | 25 | 87.5 | 165 | 43 | 8.9 | 1.4 | 2.2 | 4.9 | 0.74 | 17.7 |
| 80DU137 | 0.5 | 25 | 53.2 | 113 | 33 | 5.3 | 1.0 | 0.3 | 2.4 | 0.36 | 20.1 |
| 80DU140 | 0.5 | 25 | 31.9 | 66 | 17 | 3.8 | 0.8 | 0.3 | 2.1 | 0.31 | 32 |
| 80DU141 | 0.5 | 130 | 54.4 | 103 | 32 | 5.8 | 1.2 | 0.3 | 3.4 | 0.51 | 24.8 |
| 80DU142 | 0.5 | 25 | 36.6 | 75 | 13 | 4.3 | 1.0 | 0.3 | 2.7 | 0.41 | 24.4 |
| 80DU146 | 0.5 | 25 | 25.3 | 51 | 15 | 3.0 | 0.9 | 0.3 | 1.8 | 0.27 | 27 |
| 80DU147 | 0.5 | 25 | 38.9 | 71 | 3 | 3.5 | 1.4 | 0.3 | 1.8 | 0.27 | 5.76 |
| 80DU153 | 0.5 | 25 | 32.7 | 61 | 20 | 3.8 | 0.8 | 0.3 | 2.5 | 0.38 | 29.7 |
| 80DU154 | 0.5 | 25 | 33.6 | 63 | 17 | 3.7 | 0.9 | 0.3 | 2.2 | 0.33 | 27.9 |

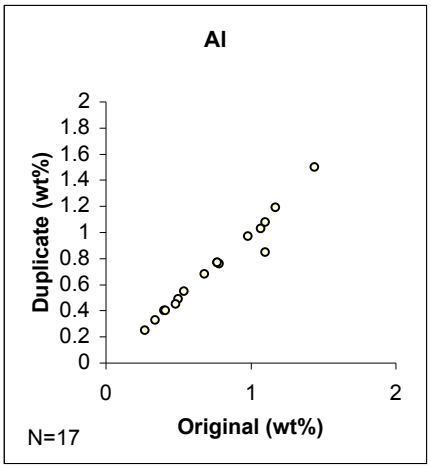
Appendix 3. INAA data

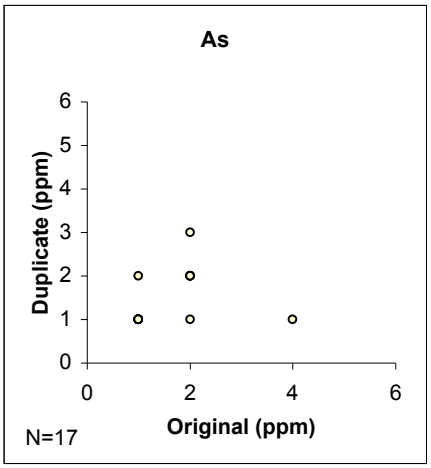
| Analyte Symbol | W | Zn | La | Ce | Nd | Sm | Eu | Tb | Yb | Lu | Mass |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Unit Symbol | ppm | ppm | ppm | ppm | ppm | ppm | ppm | ppm | ppm | ppm | g |
| 80DU157 | 0.5 | 25 | 36.3 | 72 | 17 | 4.1 | 1.1 | 0.3 | 2.6 | 0.39 | 22.9 |
| 80DU158 | 0.5 | 25 | 45.5 | 88 | 24 | 4.9 | 1.0 | 0.3 | 2.6 | 0.39 | 25.5 |
| 80DU159 | 0.5 | 25 | 49.0 | 96 | 25 | 5.6 | 1.3 | 0.3 | 3.2 | 0.47 | 20.7 |
| 80DU161 | 0.5 | 110 | 40.0 | 79 | 20 | 4.9 | 0.8 | 0.3 | 2.8 | 0.43 | 22.3 |
| 80DU162 | 0.5 | 25 | 56.6 | 106 | 37 | 6.2 | 1.3 | 0.3 | 3.6 | 0.54 | 24.3 |
| 80DU167 | 0.5 | 25 | 74.2 | 138 | 33 | 6.7 | 0.9 | 0.3 | 2.2 | 0.33 | 24.3 |
| 80DU173 | 0.5 | 25 | 43.6 | 78 | 23 | 4.5 | 1.0 | 0.3 | 2.6 | 0.39 | 26.7 |
| 80DU184 | 0.5 | 25 | 62.3 | 119 | 34 | 6.7 | 1.2 | 0.3 | 3.4 | 0.50 | 26.6 |
| 80DU188 | 0.5 | 25 | 53.3 | 102 | 30 | 5.5 | 0.7 | 0.8 | 2.1 | 0.31 | 27 |
| 80DU191 | 0.5 | 25 | 40.7 | 84 | 26 | 4.5 | 0.9 | 0.3 | 2.4 | 0.36 | 27.4 |
| 80DU194 | 0.5 | 25 | 67.9 | 133 | 36 | 7.3 | 0.9 | 0.3 | 4.6 | 0.69 | 18.1 |
| 80DU197 | 0.5 | 25 | 41.1 | 79 | 23 | 4.6 | 0.8 | 0.3 | 2.2 | 0.33 | 31.9 |
| 80DU198 | 0.5 | 25 | 42.4 | 83 | 20 | 4.9 | 0.9 | 0.3 | 2.2 | 0.33 | 29.5 |
| 80DU199 | 0.5 | 25 | 49.9 | 100 | 24 | 5.7 | 0.9 | 0.3 | 2.6 | 0.39 | 21.5 |
| 80DU211 | 0.5 | 25 | 25.7 | 52 | 13 | 3.2 | 0.8 | 0.3 | 2.1 | 0.31 | 24.7 |
| 80DU212 | 0.5 | 25 | 32.9 | 66 | 15 | 3.8 | 0.9 | 1.2 | 2.2 | 0.33 | 23.7 |
| 80DU219 | 0.5 | 25 | 30.8 | 63 | 14 | 3.6 | 0.8 | 0.3 | 2.1 | 0.31 | 14.9 |
| 80DU220 | 0.5 | 25 | 48.9 | 94 | 29 | 5.7 | 1.2 | 0.3 | 2.9 | 0.44 | 20.5 |
| 80DU221 | 0.5 | 25 | 43.5 | 87 | 24 | 5.2 | 1.0 | 1.2 | 2.8 | 0.42 | 19.7 |
| 80DU223 | 0.5 | 25 | 37.0 | 72 | 19 | 4.1 | 0.9 | 0.9 | 2.6 | 0.39 | 23.8 |
| 80DU224 | 0.5 | 25 | 32.4 | 62 | 22 | 4.1 | 1.1 | 0.3 | 2.9 | 0.44 | 20.6 |
| 80DU225 | 3 | 25 | 36.4 | 72 | 22 | 4.1 | 1.0 | 0.3 | 2.2 | 0.33 | 28.3 |
| 80DU227 | 0.5 | 25 | 40.6 | 41 | 3 | 2.9 | 1.0 | 0.3 | 1.6 | 0.24 | 9.15 |
| 80DU228 | 0.5 | 25 | 38.7 | 75 | 19 | 4.5 | 1.0 | 0.3 | 2.7 | 0.41 | 27.2 |
| 80DU230 | 0.5 | 25 | 37.7 | 86 | 21 | 4.4 | 0.8 | 0.3 | 2.7 | 0.41 | 28.2 |
| 80DU241 | 0.5 | 25 | 72.6 | 148 | 33 | 7.8 | 1.3 | 0.3 | 4.2 | 0.63 | 18.6 |
| 80DU243 | 0.5 | 25 | 54.3 | 104 | 30 | 5.5 | 1.0 | 0.3 | 2.9 | 0.44 | 23.4 |
| 80DU248 | 0.5 | 25 | 77.3 | 81 | 3 | 4.6 | 2.2 | 0.3 | 4.2 | 0.63 | 6.31 |
| 80DU249 | 0.5 | 25 | 20.5 | 43 | 14 | 2.8 | 0.9 | 0.3 | 1.9 | 0.28 | 26.4 |
| 80DU252 | 0.5 | 25 | 79.8 | 152 | 47 | 7.9 | 1.4 | 1.8 | 4.0 | 0.60 | 23.2 |
| 80DU253 | 0.5 | 25 | 35.9 | 71 | 22 | 4.1 | 1.0 | 0.3 | 2.5 | 0.38 | 30.8 |
| 80DU254 | 0.5 | 25 | 29.1 | 52 | 15 | 3.1 | 1.1 | 0.3 | 1.9 | 0.28 | 28.9 |
| 80DU265 | 0.5 | 25 | 31.5 | 61 | 19 | 3.8 | 0.7 | 0.3 | 1.9 | 0.28 | 27 |
| 80DU267 | 0.5 | 25 | 41.3 | 77 | 21 | 4.8 | 1.0 | 0.3 | 2.4 | 0.36 | 26.8 |
| 80DU268 | 0.5 | 25 | 34.3 | 71 | 15 | 4.1 | 0.9 | 0.3 | 1.8 | 0.27 | 25.2 |
| 80DU269 | 0.5 | 25 | 33.0 | 68 | 17 | 3.2 | 1.0 | 0.3 | 1.7 | 0.25 | 24.7 |
| 80DU270 | 0.5 | 25 | 20.7 | 47 | 13 | 2.7 | 0.8 | 0.3 | 1.8 | 0.27 | 27.2 |
| 80DU271 | 0.5 | 25 | 36.4 | 75 | 18 | 4.3 | 0.8 | 0.3 | 2.0 | 0.30 | 20.3 |
| 80DU272 | 0.5 | 25 | 43.0 | 85 | 27 | 5.0 | 1.0 | 0.3 | 2.6 | 0.39 | 23 |
| 80DU273 | 0.5 | 25 | 33.0 | 63 | 14 | 3.8 | 0.8 | 0.3 | 2.1 | 0.31 | 28.2 |
| 80DU275 | 0.5 | 25 | 28.8 | 53 | 14 | 3.4 | 0.9 | 0.3 | 2.2 | 0.33 | 26.9 |
| 80DU280 | 0.5 | 25 | 33.7 | 66 | 21 | 4.0 | 0.9 | 0.3 | 2.3 | 0.34 | 23.9 |
| 80DU282 | 0.5 | 25 | 31.8 | 65 | 17 | 3.6 | 0.9 | 0.3 | 2.1 | 0.31 | 26.9 |
| 80DU284 | 0.5 | 25 | 32.0 | 66 | 21 | 3.8 | 0.9 | 0.3 | 2.1 | 0.31 | 26.9 |

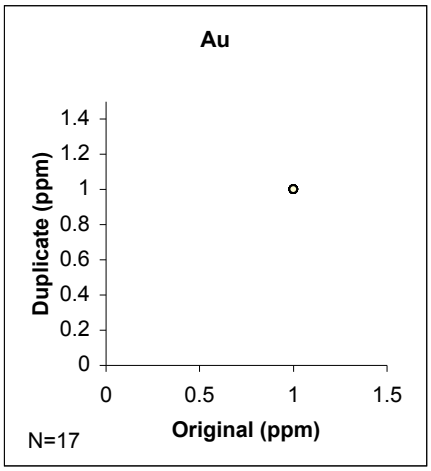
Appendix 3. INAA data

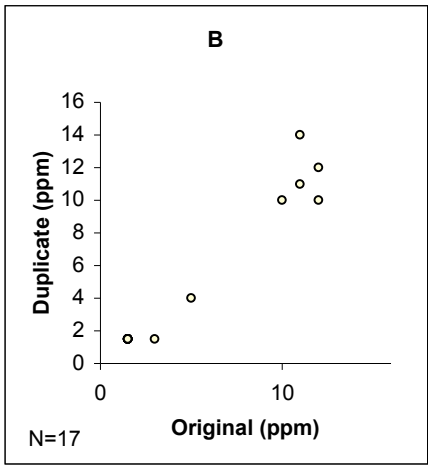
| Analyte Symbol | W | Zn | La | Ce | Nd | Sm | Eu | Tb | Yb | Lu | Mass |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Unit Symbol | ppm | ppm | ppm | ppm | ppm | ppm | ppm | ppm | ppm | ppm | g |
| 80DU285 | 0.5 | 25 | 57.2 | 112 | 26 | 5.8 | 1.0 | 0.3 | 2.8 | 0.42 | 20.8 |
| 80DU292 | 0.5 | 25 | 47.2 | 96 | 17 | 5.2 | 1.0 | 0.3 | 2.5 | 0.38 | 21.5 |
| 80DU294 | 0.5 | 25 | 69.8 | 132 | 37 | 6.8 | 1.0 | 0.3 | 2.6 | 0.39 | 22.5 |
| 80DU296 | 0.5 | 25 | 25.3 | 50 | 3 | 2.9 | 1.0 | 0.3 | 1.6 | 0.24 | 23.7 |
| 80DU297 | 0.5 | 25 | 23.2 | 56 | 11 | 3.0 | 0.9 | 0.3 | 1.8 | 0.27 | 22.8 |
| 80DU298 | 0.5 | 25 | 64.8 | 118 | 29 | 4.7 | 0.9 | 0.3 | 1.6 | 0.24 | 23.2 |
| 80DU301 | 0.5 | 25 | 32.2 | 62 | 20 | 3.5 | 0.8 | 0.3 | 2.0 | 0.30 | 28.9 |
| 80DU302 | 0.5 | 25 | 52.2 | 98 | 31 | 5.1 | 0.7 | 2.0 | 2.2 | 0.33 | 24.1 |
| 80DU303 | 0.5 | 25 | 25.3 | 45 | 3 | 3.1 | 1.0 | 0.3 | 1.5 | 0.22 | 23.7 |
| 80DU305 | 0.5 | 25 | 27.2 | 61 | 3 | 3.2 | 1.1 | 0.3 | 1.7 | 0.25 | 14.9 |
| 80DU306 | 0.5 | 25 | 30.3 | 58 | 19 | 3.2 | 0.9 | 0.3 | 1.8 | 0.27 | 22.2 |
| 80DU307 | 0.5 | 25 | 43.1 | 87 | 24 | 4.9 | 0.8 | 0.3 | 1.9 | 0.28 | 24.4 |
| 80DU315 | 0.5 | 25 | 32.2 | 64 | 18 | 3.7 | 0.9 | 0.3 | 2.1 | 0.31 | 27.4 |
| 80DU317 | 0.5 | 25 | 41.4 | 79 | 18 | 4.3 | 1.0 | 0.3 | 2.0 | 0.30 | 25.2 |
| 80DU319 | 0.5 | 25 | 50.6 | 94 | 31 | 5.5 | 1.2 | 0.3 | 2.2 | 0.33 | 17.3 |
| 80DU320 | 0.5 | 25 | 47.4 | 89 | 21 | 4.5 | 1.0 | 0.3 | 1.8 | 0.27 | 27.1 |
| 80DU321 | 0.5 | 25 | 65.5 | 148 | 46 | 7.3 | 1.1 | 0.3 | 3.3 | 0.50 | 21.7 |
| 80DU322 | 0.5 | 25 | 41.9 | 84 | 27 | 5.4 | 1.2 | 0.3 | 2.3 | 0.34 | 17.4 |
| 80DU323 | 0.5 | 25 | 25.2 | 55 | 16 | 3.3 | 0.8 | 0.3 | 1.6 | 0.24 | 20.5 |
| 80DU326 | 0.5 | 25 | 16.7 | 38 | 11 | 2.2 | 0.8 | 0.3 | 1.5 | 0.22 | 29 |
| 80DU328 | 3 | 25 | 49.7 | 62 | 3 | 3.4 | 1.2 | 0.3 | 1.6 | 0.24 | 7.66 |
| 80DU329 | 0.5 | 25 | 40.3 | 81 | 16 | 3.9 | 0.9 | 0.3 | 2.2 | 0.33 | 19.7 |
| 80DU331 | 0.5 | 25 | 41.0 | 84 | 19 | 5.0 | 1.1 | 0.3 | 2.3 | 0.34 | 24.6 |
| 80DU332 | 0.5 | 25 | 32.0 | 72 | 16 | 3.7 | 0.8 | 0.3 | 2.2 | 0.33 | 27.4 |
| 80DU334 | 0.5 | 25 | 47.3 | 92 | 25 | 5.2 | 0.9 | 0.3 | 2.5 | 0.38 | 27.1 |
| 80DU335 | 0.5 | 25 | 38.6 | 75 | 14 | 4.3 | 0.9 | 0.3 | 2.0 | 0.30 | 27.3 |
| 80DU337 | 0.5 | 90 | 65.0 | 125 | 36 | 6.2 | 0.8 | 0.3 | 1.9 | 0.28 | 25.1 |

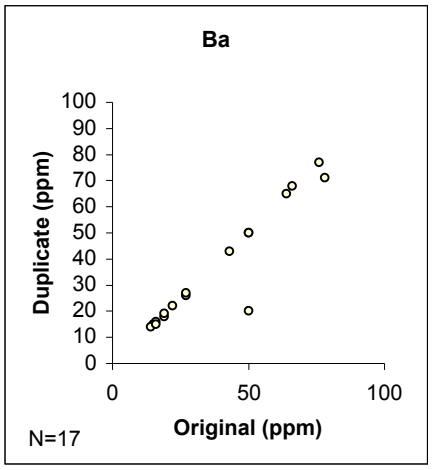

Ag
Duplicate (ppm)
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
0
0.2
Original (ppm)
N=17

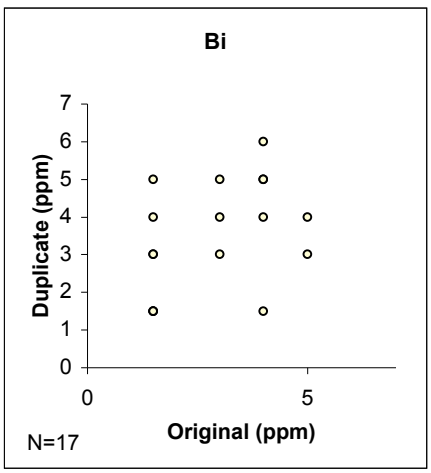

Al
Duplicate (wt%)
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0
1
2
Original (wt%)
N=17

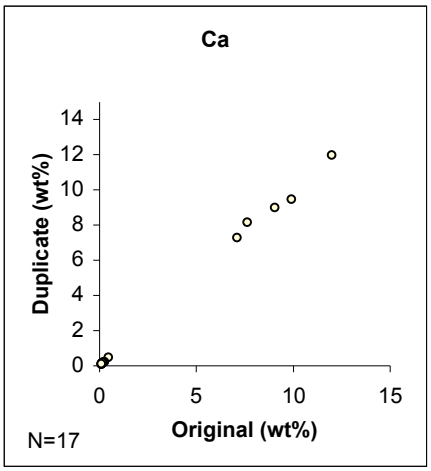

As
Duplicate (ppm)
6
5
4
3
2
1
0
0
2
4
6
Original (ppm)
N=17

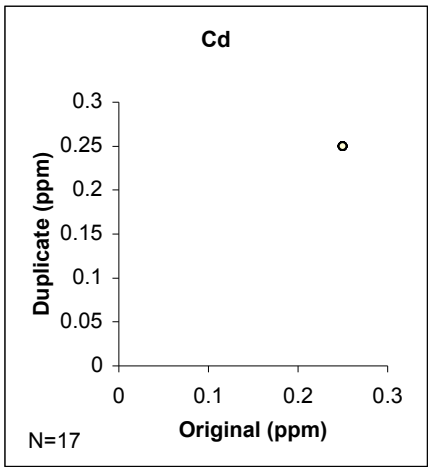

Au
Duplicate (ppm)
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0
0.5
1
1.5
Original (ppm)
N=17

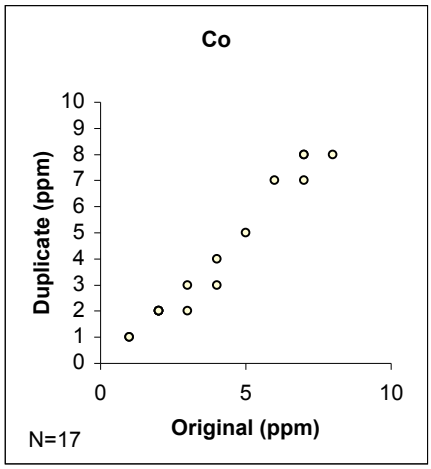

B
Duplicate (ppm)
16
14
12
10
8
6
4
2
0
0
10
Original (ppm)
N=17

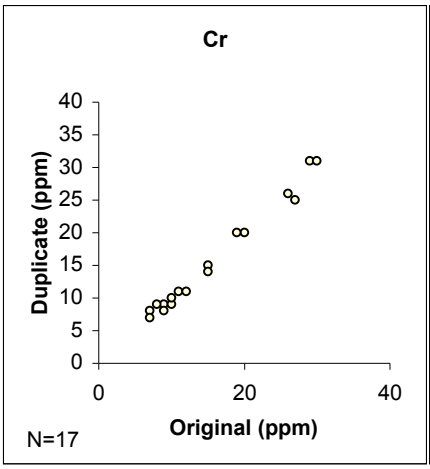

Ba
Duplicate (ppm)
100
90
80
70
60
50
40
30
20
10
0
0
50
100
Original (ppm)
N=17

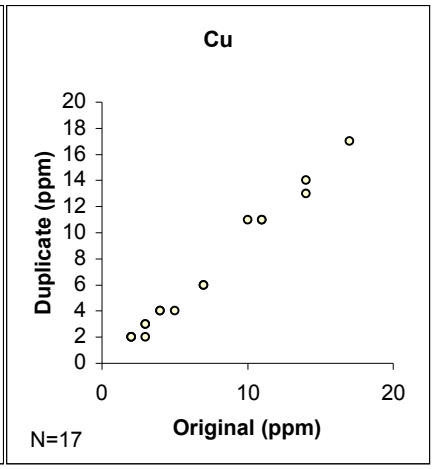

Bi
Duplicate (ppm)
7
6
5
4
3
2
1
0
0
5
Original (ppm)
N=17

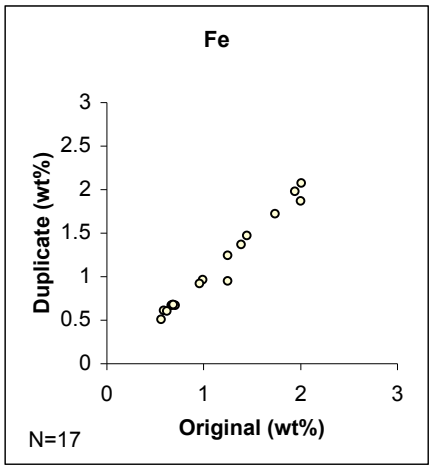

Ca
Duplicate (wt%)
14
12
10
8
6
4
2
0
0
5
10
15
Original (wt%)
N=17

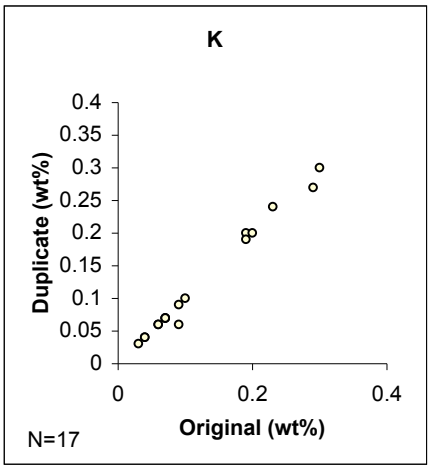

Cd
Duplicate (ppm)
0.3
0.25
0.2
0.15
0.1
0.05
0
0
0.1
0.2
0.3
Original (ppm)
N=17

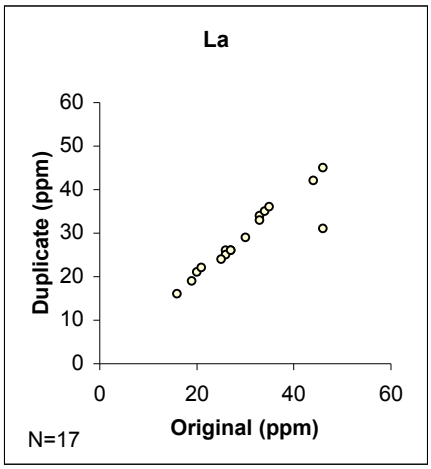

Co
Duplicate (ppm)
Original (ppm)
N=17

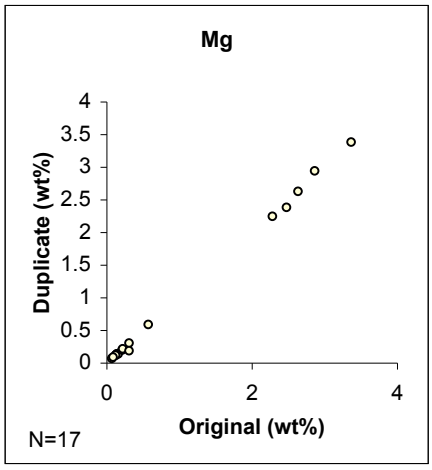

Cr
Duplicate (ppm)
Original (ppm)
N=17

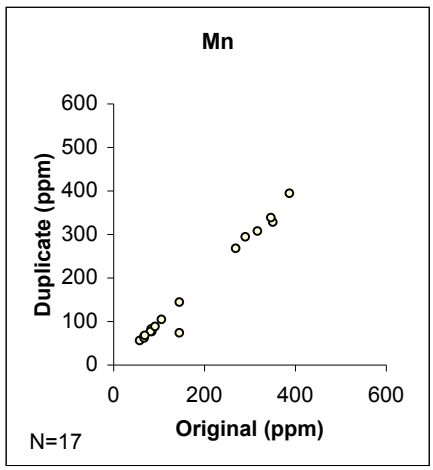

Cu
Duplicate (ppm)
Original (ppm)
N=17

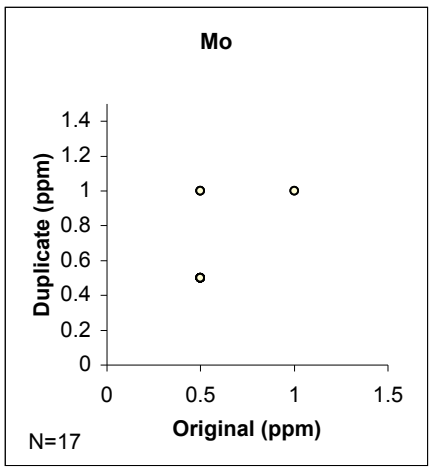

Fe
Duplicate (wt%)
Original (wt%)
N=17

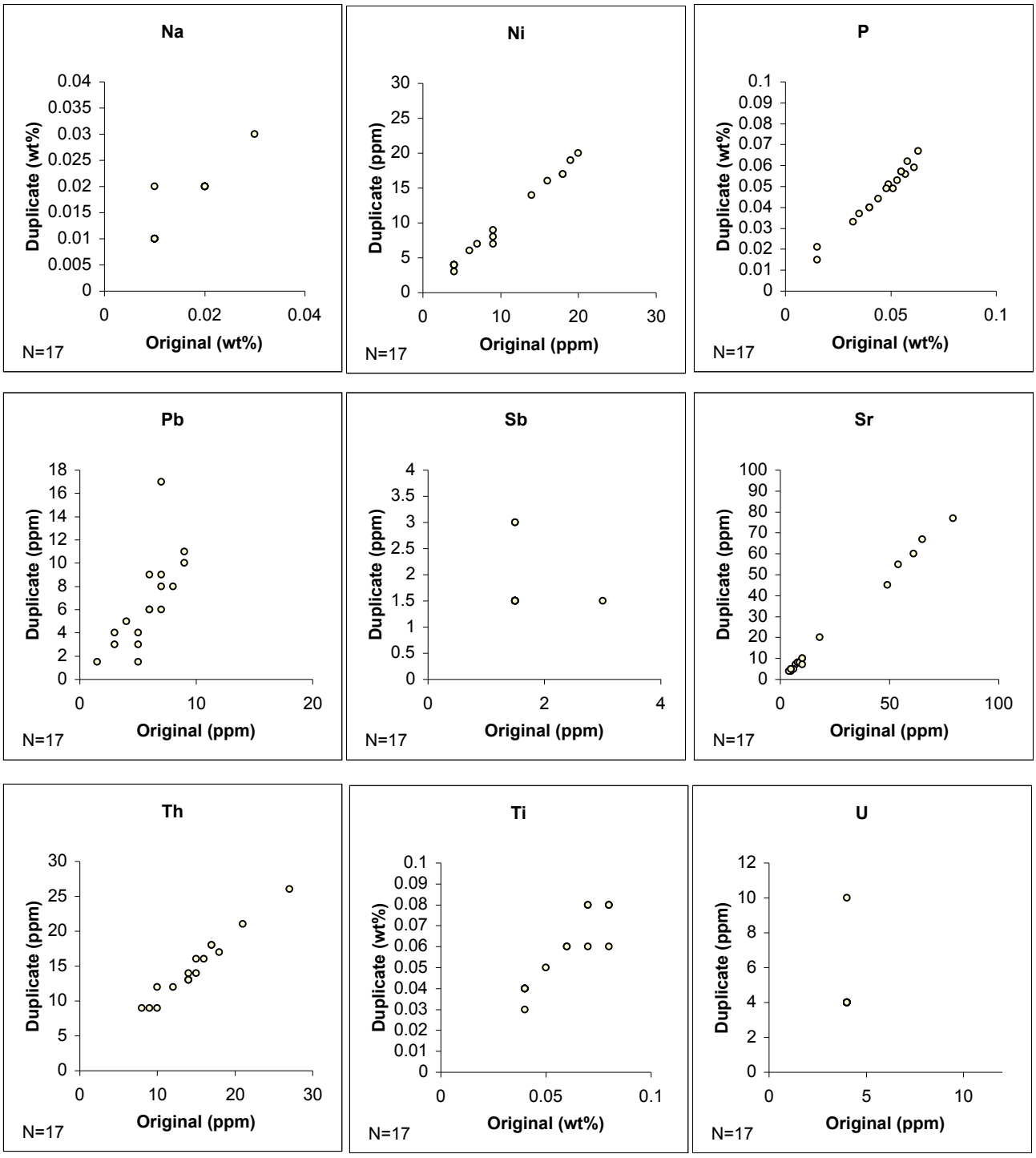

K
Duplicate (wt%)
Original (wt%)
N=17

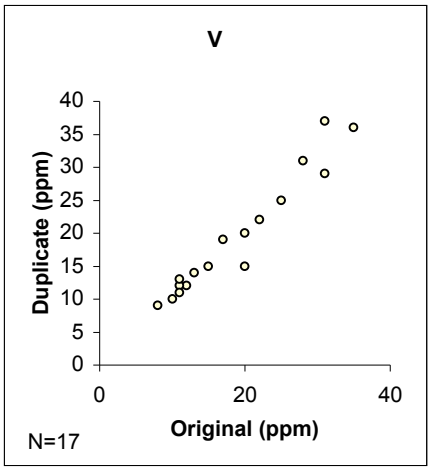

La
Duplicate (ppm)
Original (ppm)
N=17

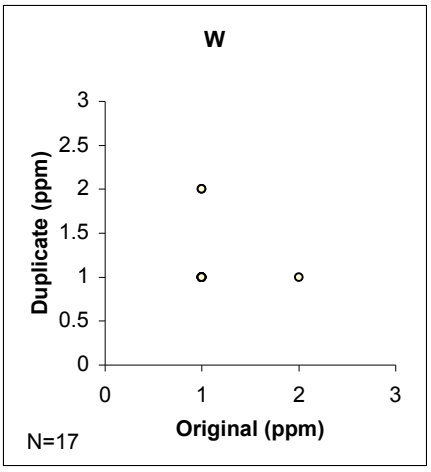

Mg
Duplicate (wt%)
Original (wt%)
N=17

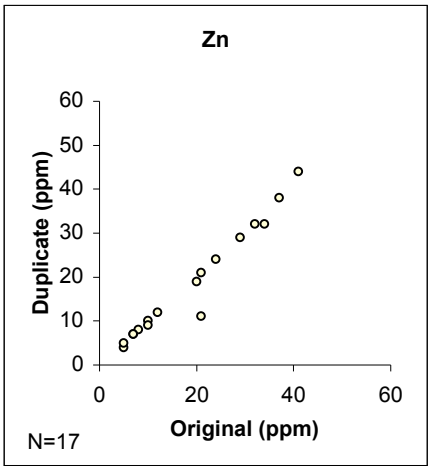

Mn
Duplicate (ppm)
Original (ppm)
N=17

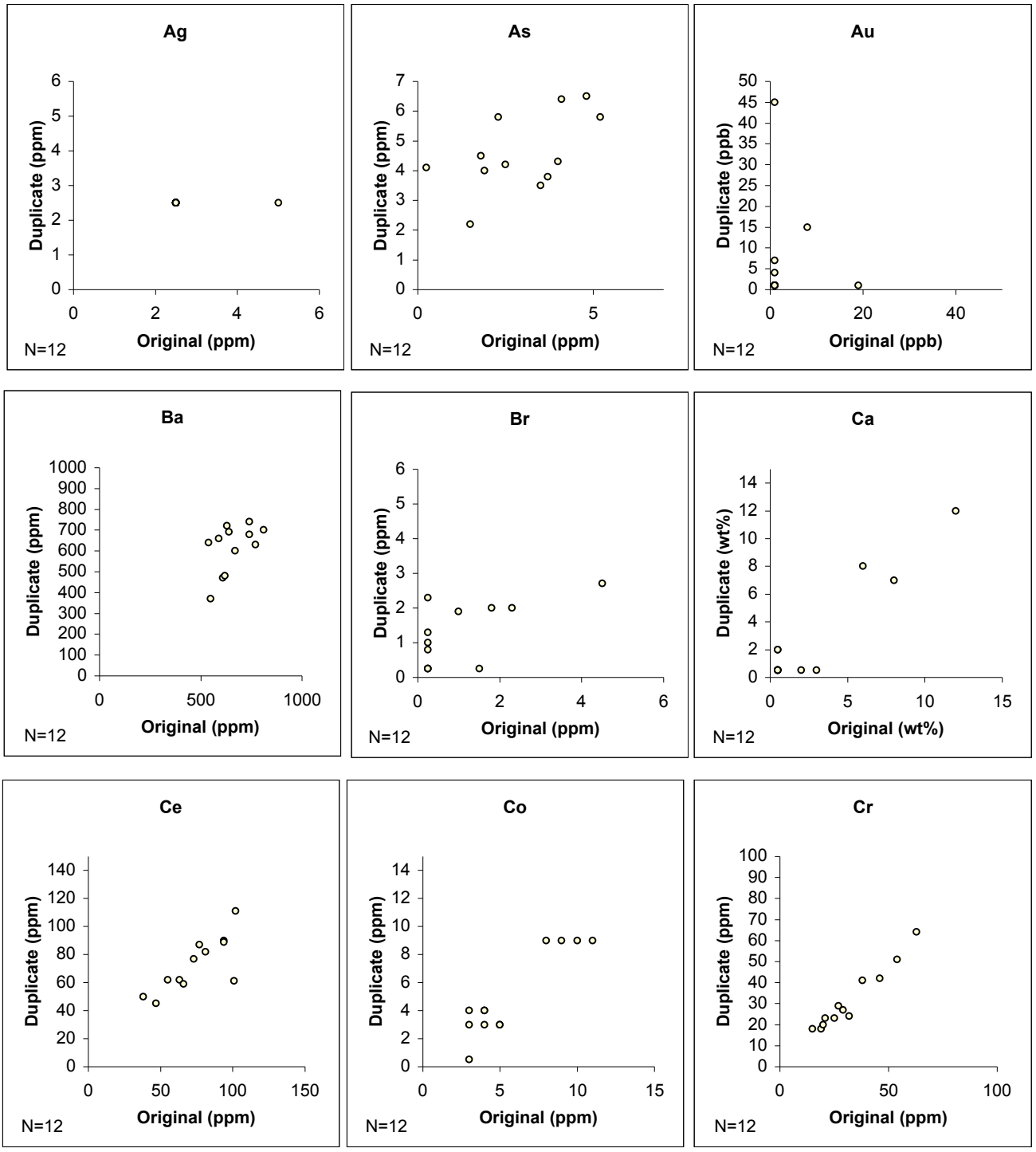

Mo
Duplicate (ppm)
Original (ppm)
N=17

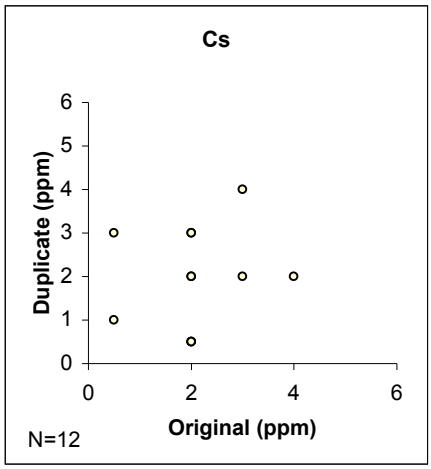

Na
Duplicate (wt%)
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
0
0.02
0.04
Original (wt%)
N=17
Ni
Duplicate (ppm)
30
25
20
15
10
5
0
0
10
20
30
Original (ppm)
N=17
P
Duplicate (wt%)
0.1
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
0
0.05
0.1
Original (wt%)
N=17
Pb
Duplicate (ppm)
18
16
14
12
10
8
6
4
2
0
0
10
20
Original (ppm)
N=17
Sb
Duplicate (ppm)
4
3.5
3
2.5
2
1.5
1
0.5
0
0
2
4
Original (ppm)
N=17
Sr
Duplicate (ppm)
100
90
80
70
60
50
40
30
20
10
0
0
50
100
Original (ppm)
N=17
Th
Duplicate (ppm)
30
25
20
15
10
5
0
0
10
20
30
Original (ppm)
N=17
Ti
Duplicate (wt%)
0.1
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
0
0.05
0.1
Original (wt%)
N=17
U
Duplicate (ppm)
12
10
8
6
4
2
0
0
5
10
Original (ppm)
N=17

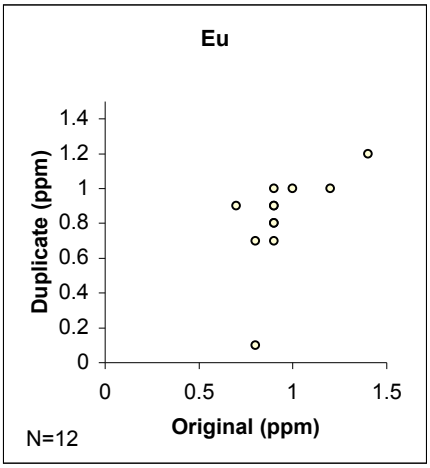

V
Duplicate (ppm)
Original (ppm)
N=17
0
5
10
15
20
25
30
35
40
0
20
40

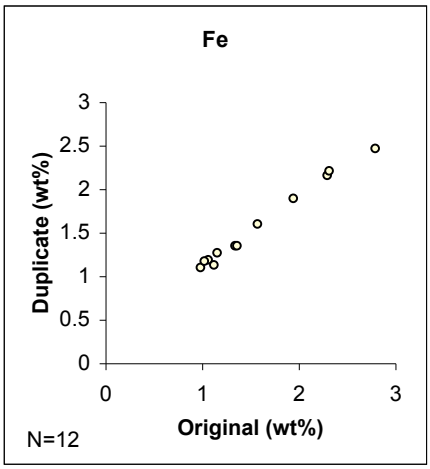

W
Duplicate (ppm)
Original (ppm)
N=17
0
0.5
1
1.5
2
2.5
3
0
1
2
3

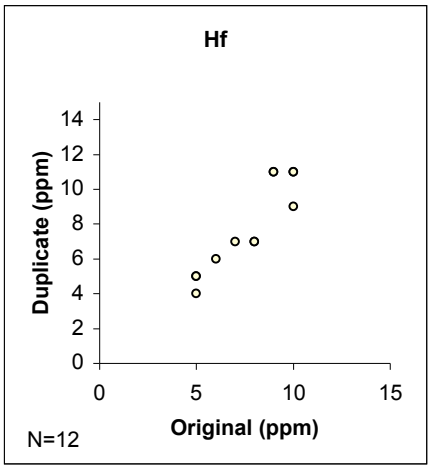

Zn
Duplicate (ppm)
Original (ppm)
N=17
0
10
20
30
40
50
60
0
20
40
60

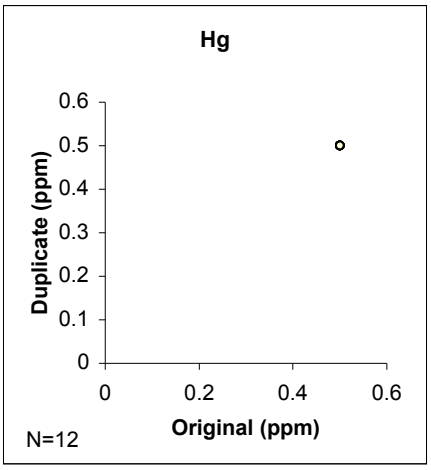

Ag
Duplicate (ppm)
Original (ppm)
N=12
As
Duplicate (ppm)
Original (ppm)
N=12
Au
Duplicate (ppb)
Original (ppb)
N=12
Ba
Duplicate (ppm)
Original (ppm)
N=12
Br
Duplicate (ppm)
Original (ppm)
N=12
Ca
Duplicate (wt%)
Original (wt%)
N=12
Ce
Duplicate (ppm)
Original (ppm)
N=12
Co
Duplicate (ppm)
Original (ppm)
N=12
Cr
Duplicate (ppm)
Original (ppm)
N=12

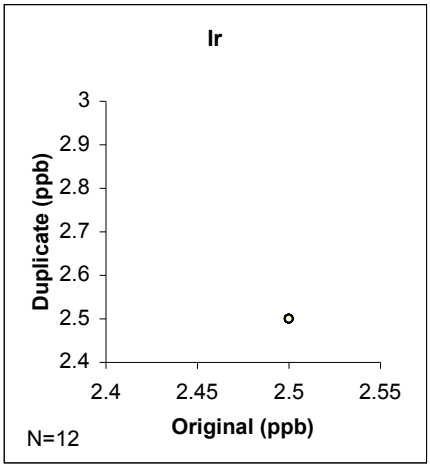

Cs
Duplicate (ppm)
Original (ppm)
N=12

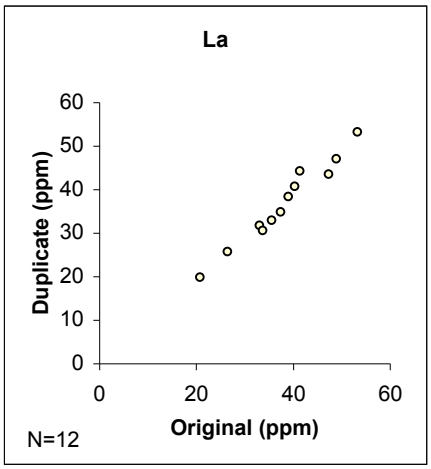

Eu
Duplicate (ppm)
Original (ppm)
N=12

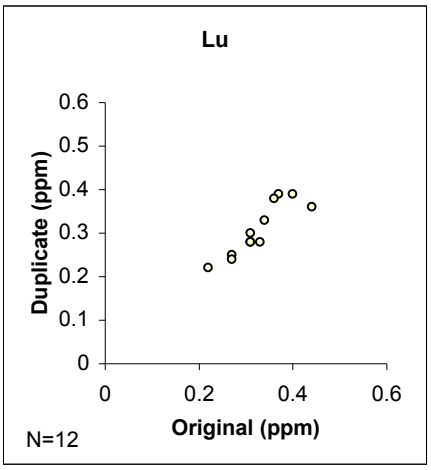

Fe
Duplicate (wt%)
Original (wt%)
N=12

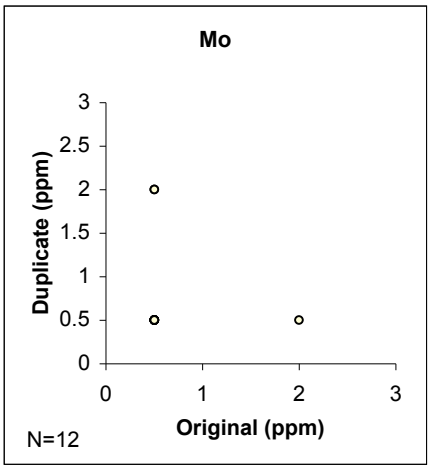

Hf
Duplicate (ppm)
Original (ppm)
N=12

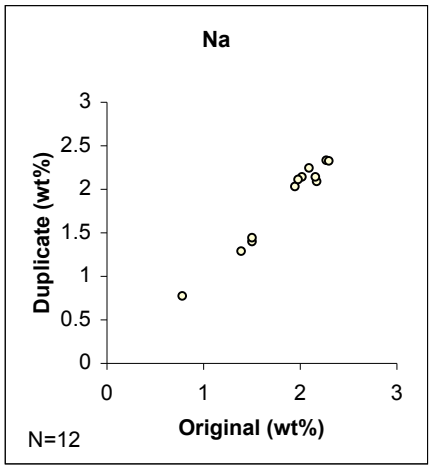

Hg
Duplicate (ppm)
Original (ppm)
N=12

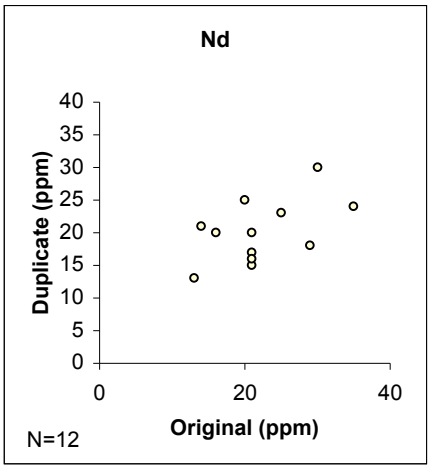

Ir
Duplicate (ppb)
Original (ppb)
N=12


La
Duplicate (ppm)
Original (ppm)
N=12


Lu
Duplicate (ppm)
Original (ppm)
N=12


Mo
Duplicate (ppm)
Original (ppm)
N=12


Na
Duplicate (wt%)
Original (wt%)
N=12


Nd
Duplicate (ppm)
Original (ppm)
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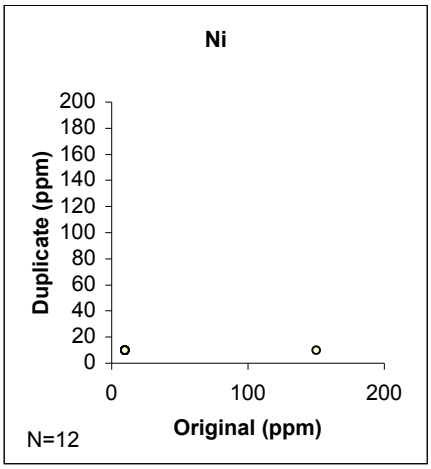
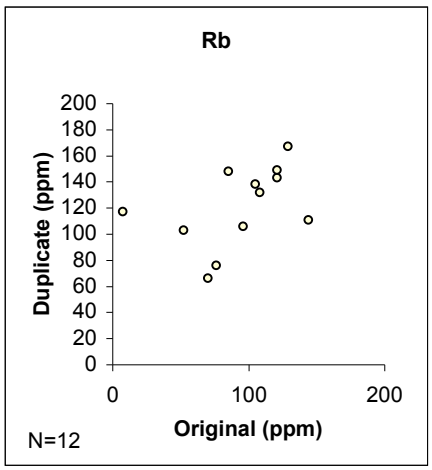
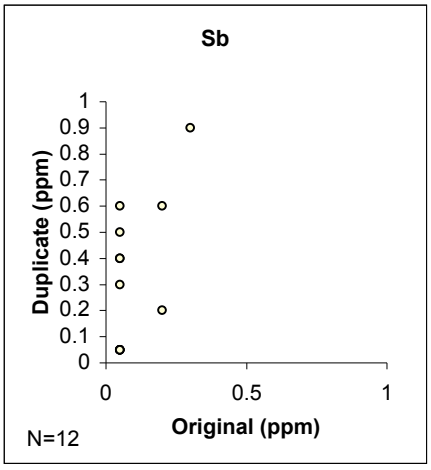
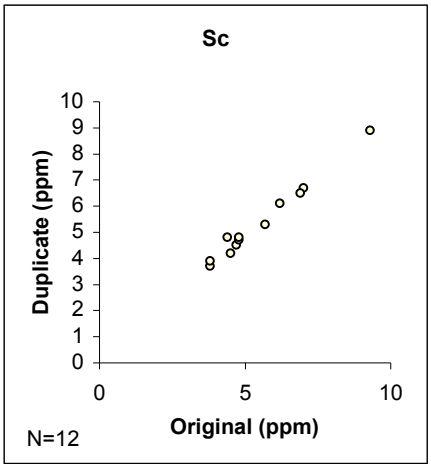
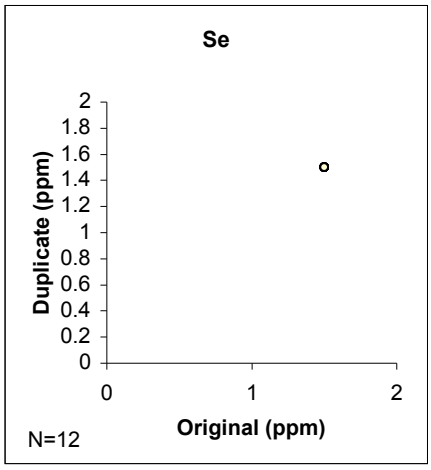
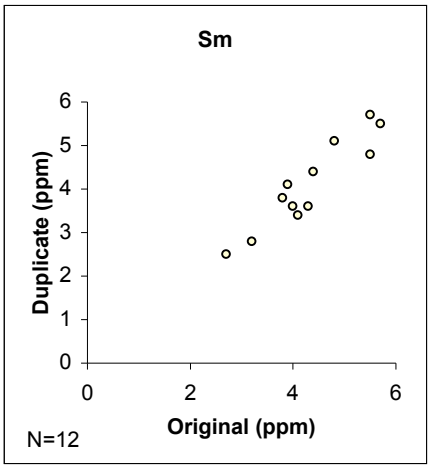

Ni
Duplicate (ppm)
Original (ppm)
N=12

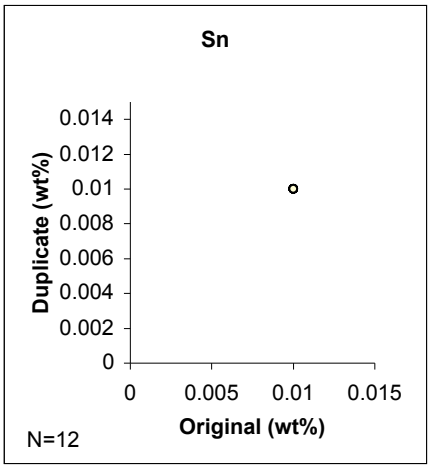

Rb
Duplicate (ppm)
Original (ppm)
N=12

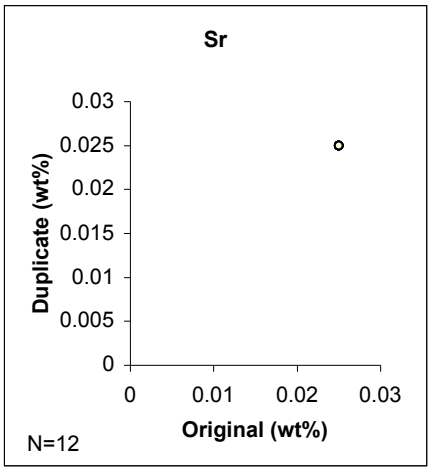

Sb
Duplicate (ppm)
Original (ppm)
N=12

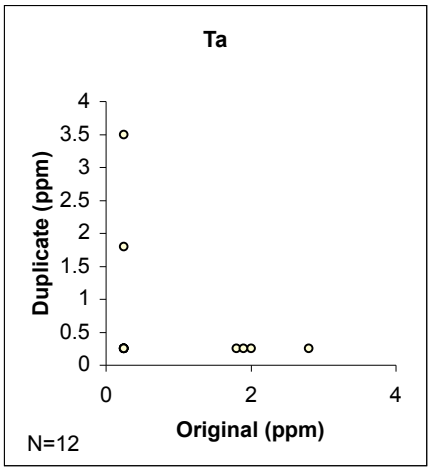

Sc
Duplicate (ppm)
Original (ppm)
N=12

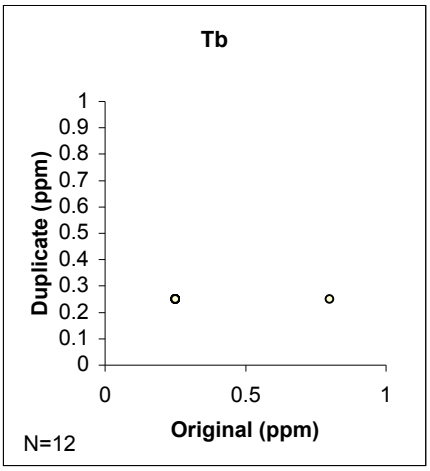

Se
Duplicate (ppm)
Original (ppm)
N=12

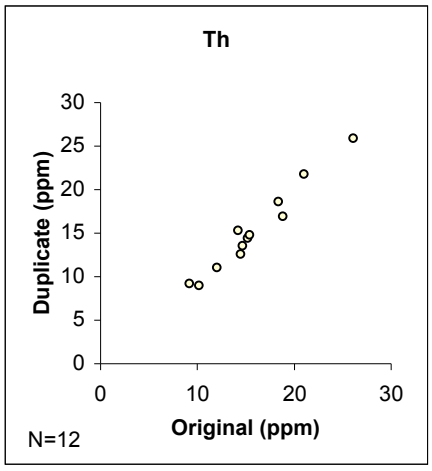

Sm
Duplicate (ppm)
Original (ppm)
N=12

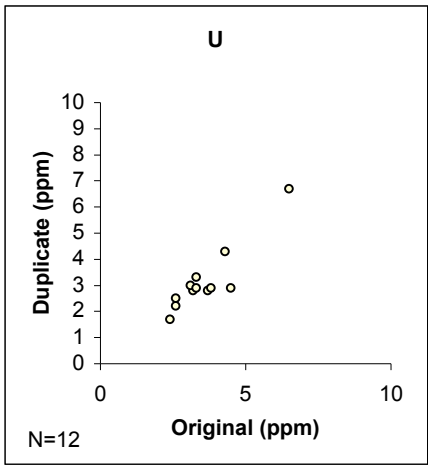

Sn
Duplicate (wt%)
Original (wt%)
N=12

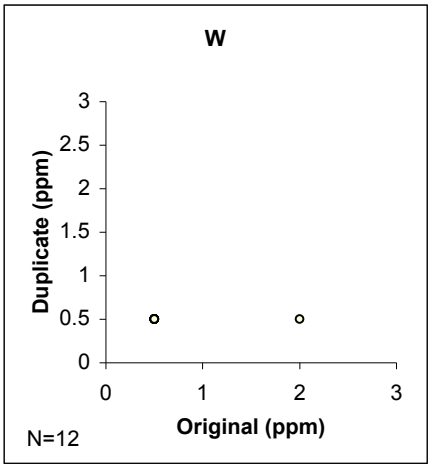

Sr
Duplicate (wt%)
0.03
0.025
0.02
0.015
0.01
0.005
0
0
0.01
0.02
0.03
Original (wt%)
N=12

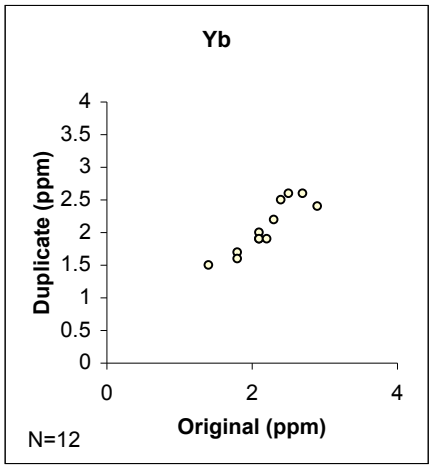

Ta
Duplicate (ppm)
4
3.5
3
2.5
2
1.5
1
0.5
0
0
2
4
Original (ppm)
N=12

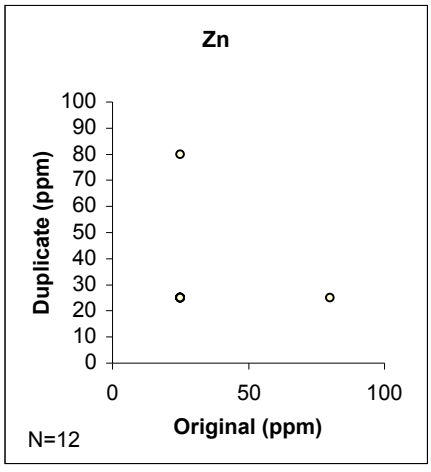

Tb
Duplicate (ppm)
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0
0.5
1
Original (ppm)
N=12

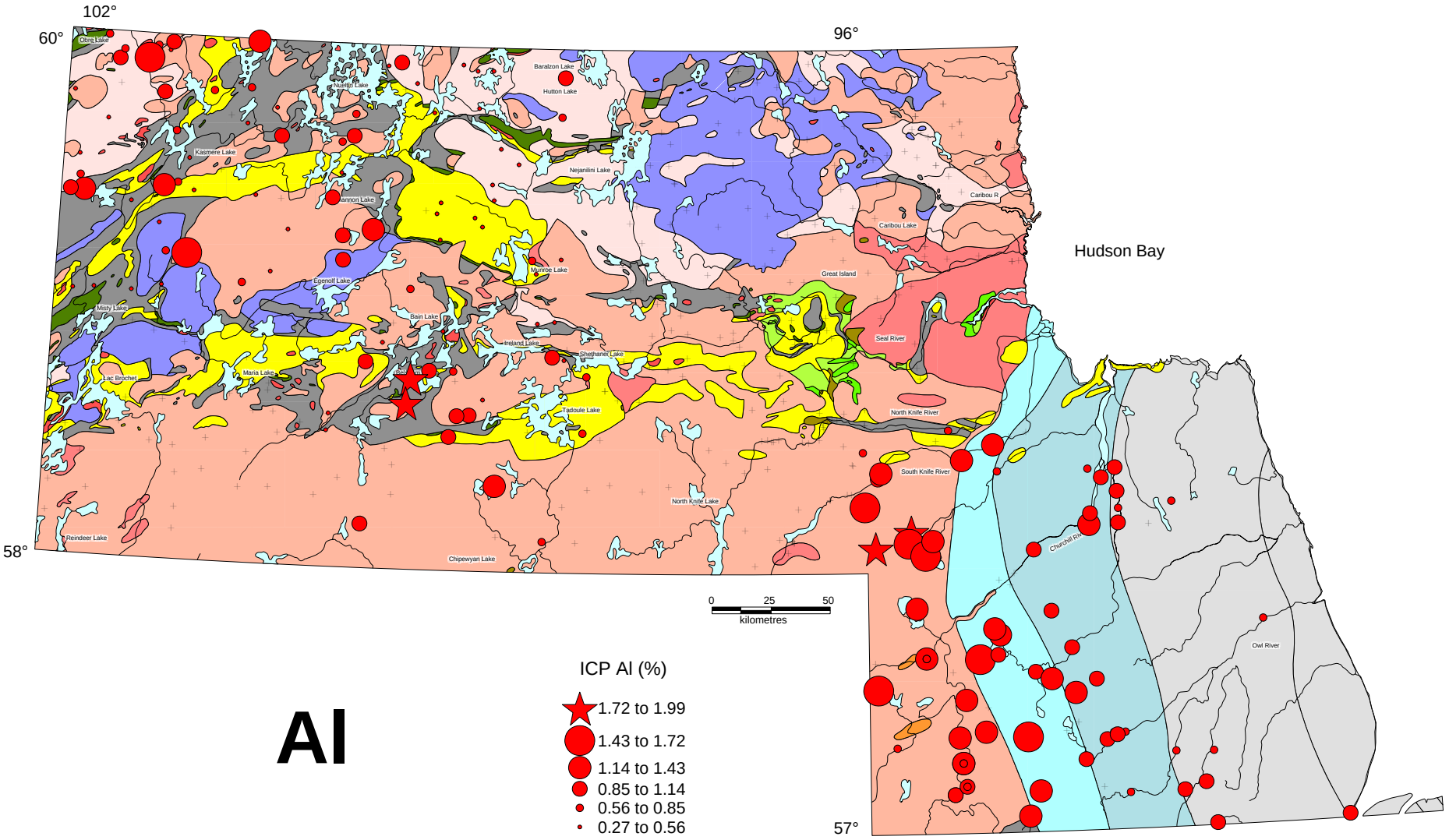

Th
Duplicate (ppm)
30
25
20
15
10
5
0
0
10
20
30
Original (ppm)
N=12


U
Duplicate (ppm)
10
9
8
7
6
5
4
3
2
1
0
0
5
10
Original (ppm)
N=12

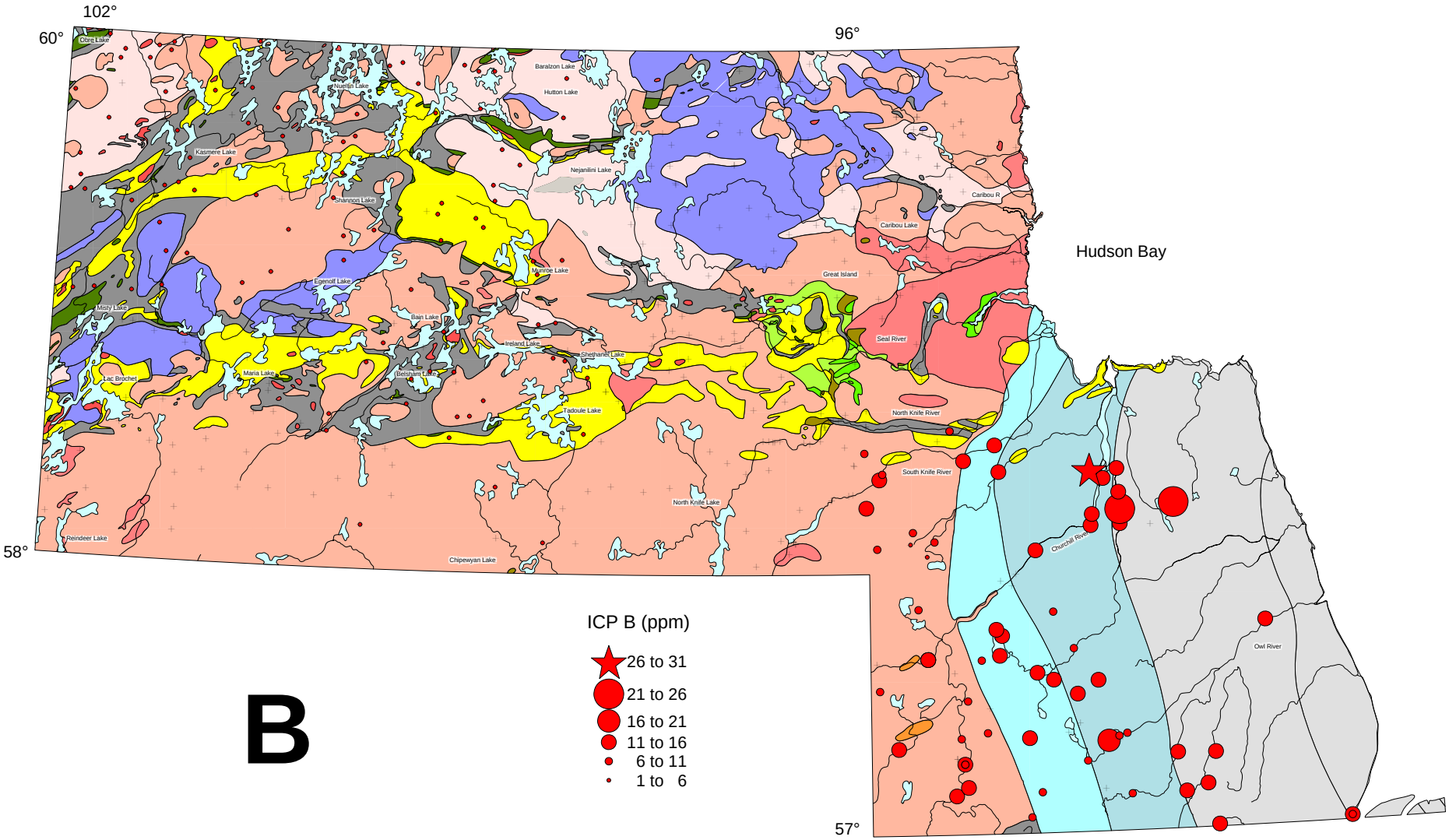

W
Duplicate (ppm)
3
2.5
2
1.5
1
0.5
0
0
1
2
3
Original (ppm)
N=12

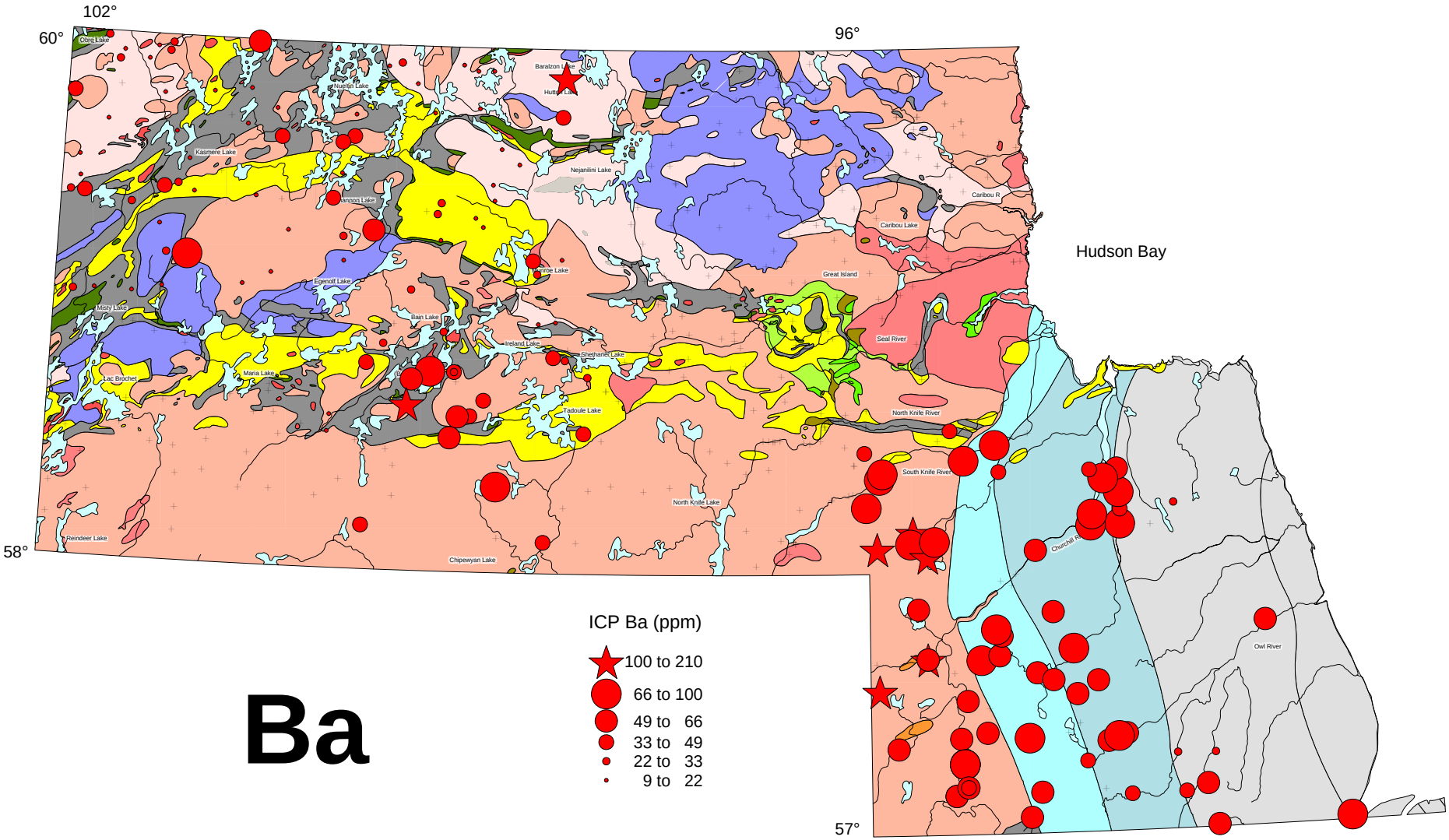

Yb
Duplicate (ppm)
4
3.5
3
2.5
2
1.5
1
0.5
0
0
2
4
Original (ppm)
N=12

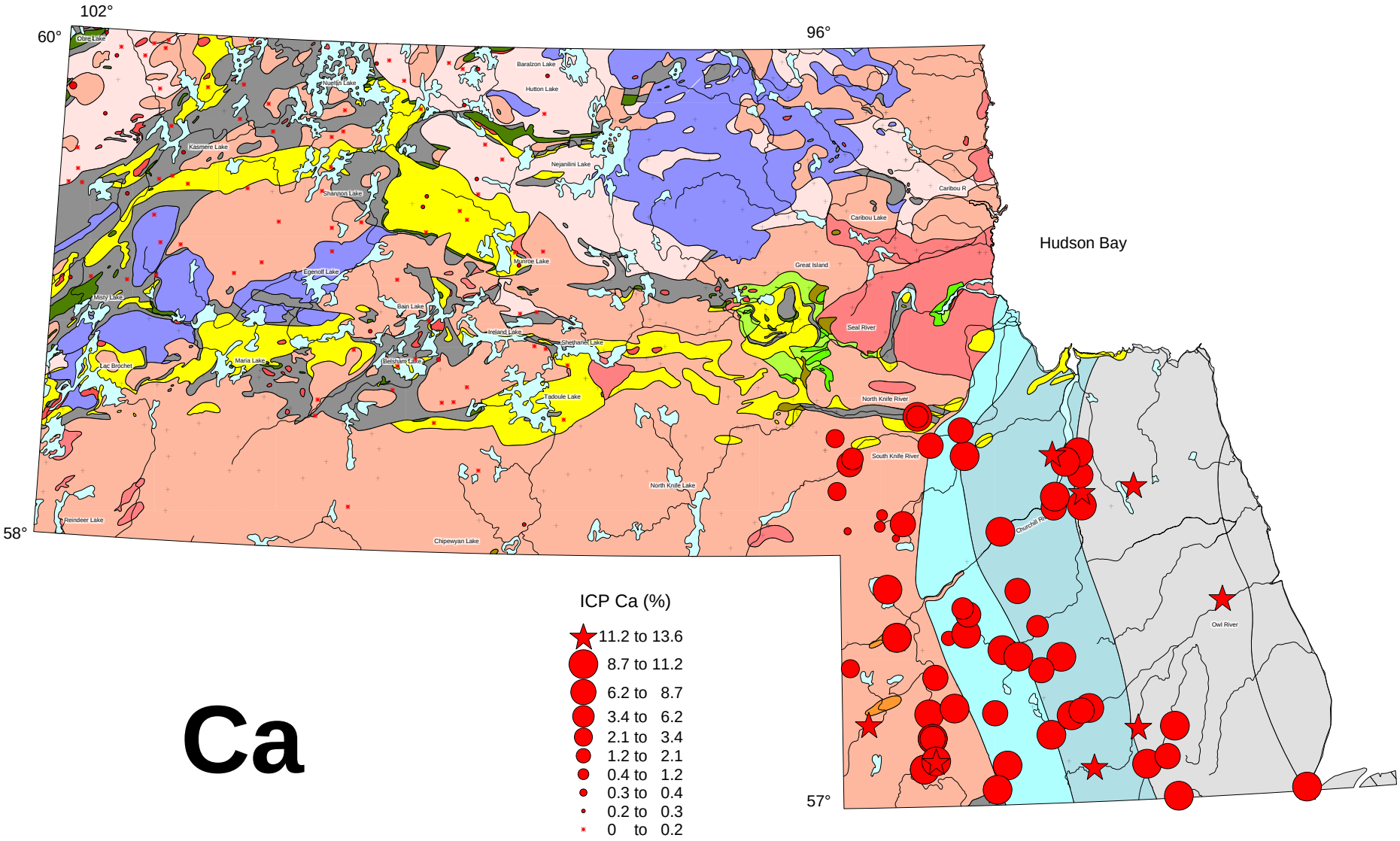

Zn
Duplicate (ppm)
100
90
80
70
60
50
40
30
20
10
0
0
50
100
Original (ppm)
N=12



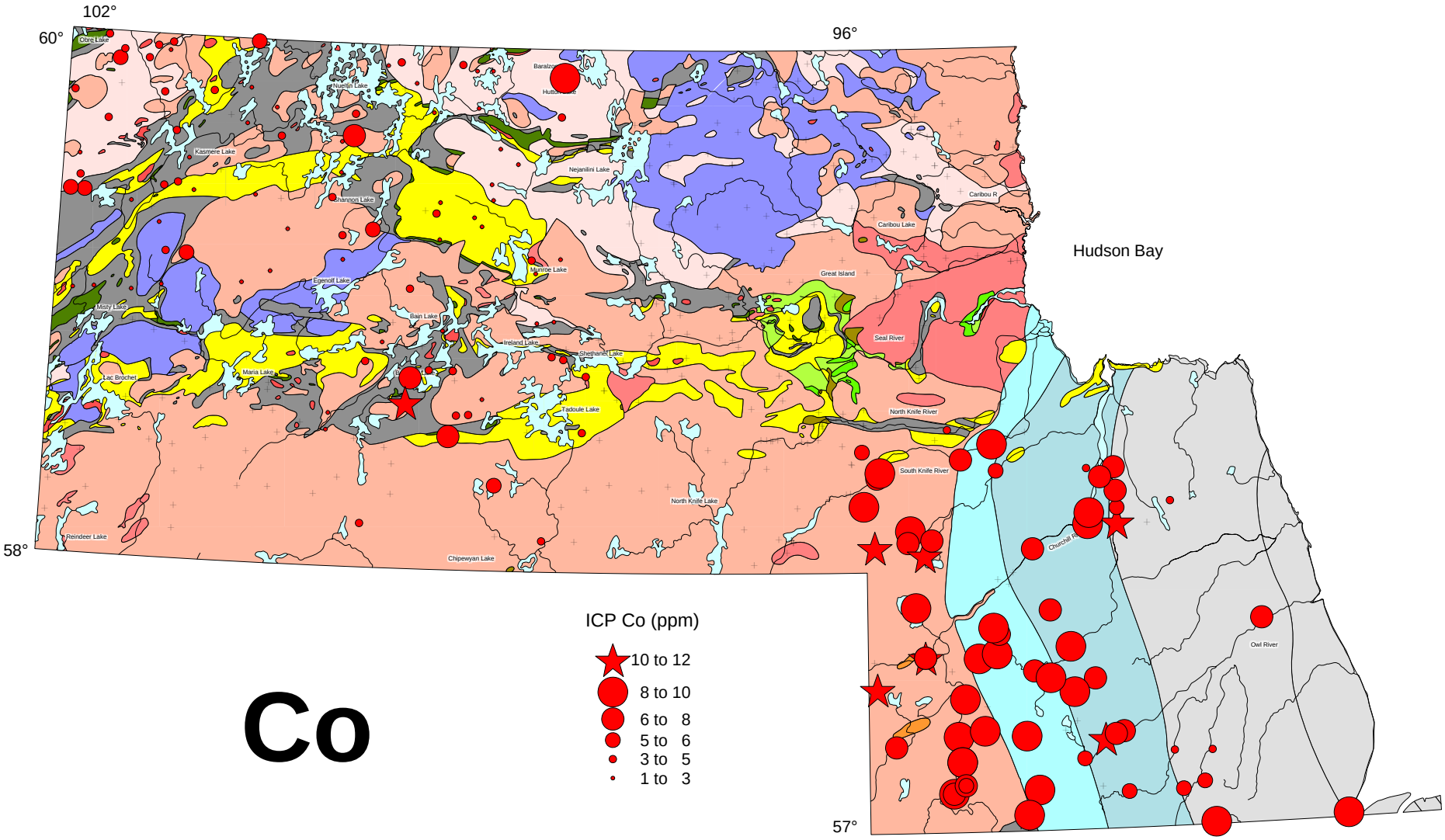

Appendix 6. Geochemical maps: ICP-ES results (<0.063 mm till fraction). Crosses refer to sites that were not reanalysed

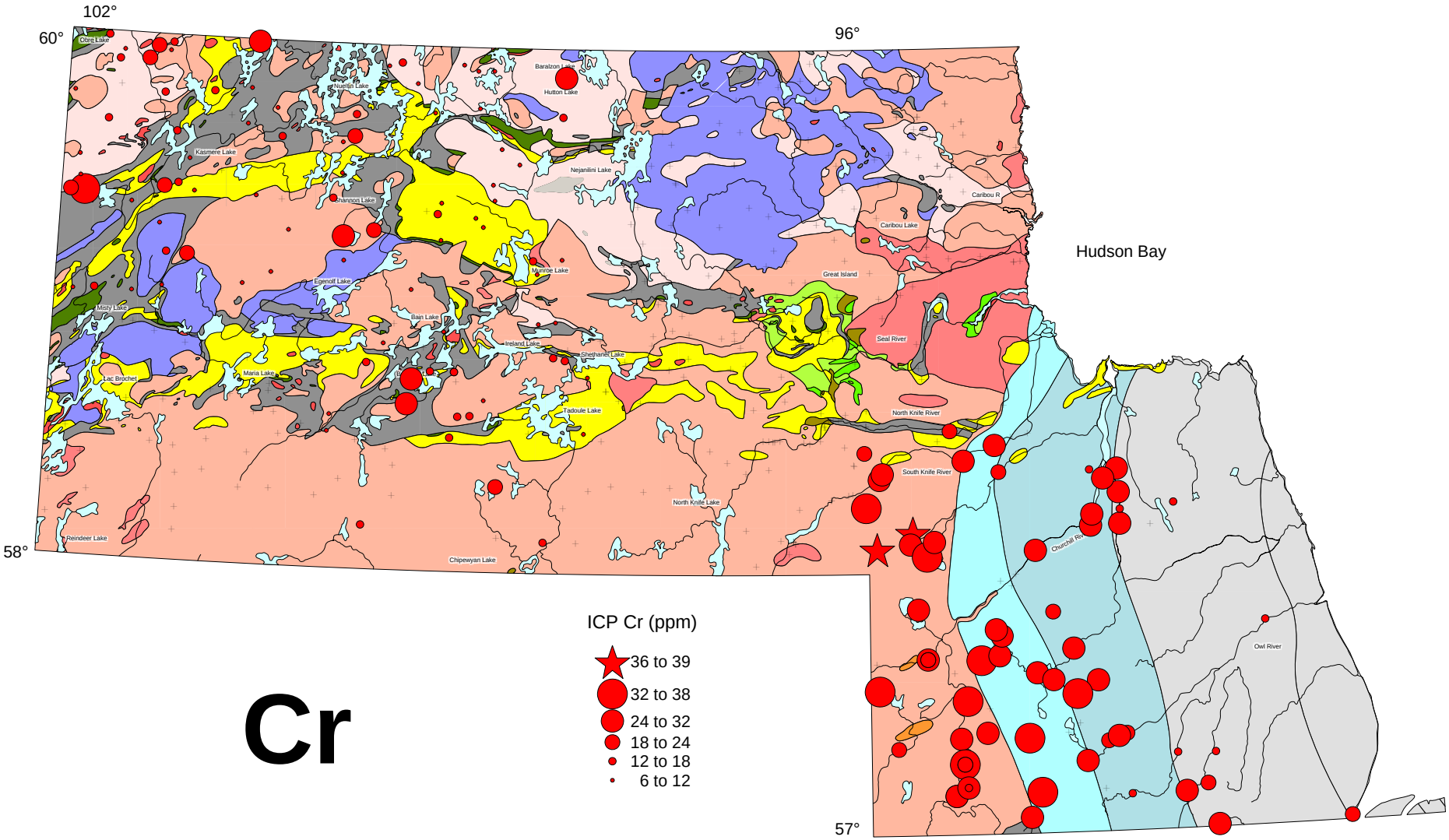

102°
60°
96°
58°
57°
Hudson Bay
Baralzon Lake
Hutton Lake
Nejanilini Lake
Caribou R
Caribou Lake
Great Island
Seal River
North Knife River
South Knife River
North Knife Lake
Chipewyan Lake
Reindeer Lake
Owl River
Churchill River
Kasmere Lake
Shannon Lake
Egenolf Lake
Misty Lake
Bain Lake
Ireland Lake
Maria Lake
Lac Brochet
Tadoule Lake
Munroe Lake
Shethanei Lake
ICP B (ppm)
26 to 31
21 to 26
16 to 21
11 to 16
6 to 11
1 to 6
B

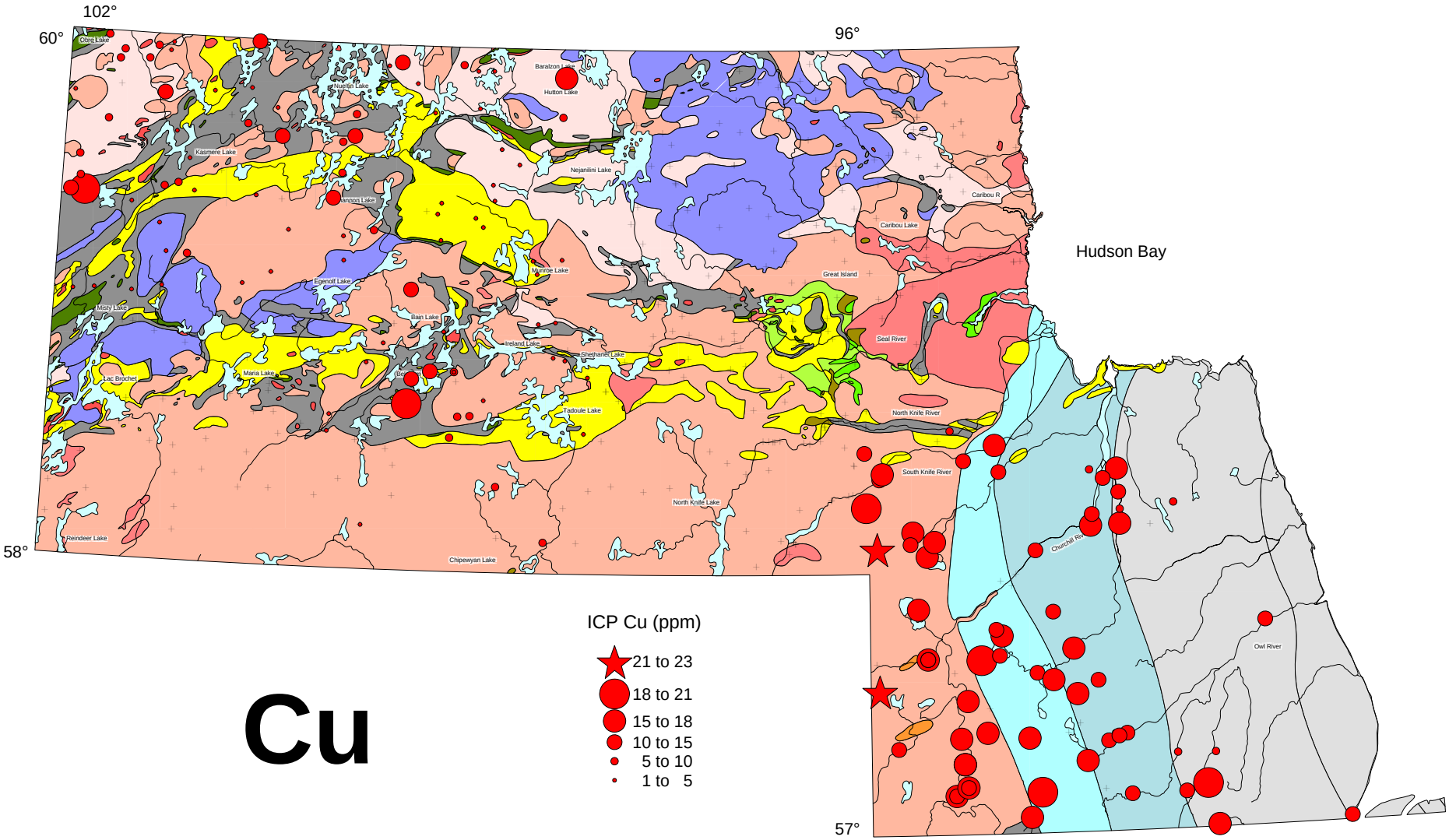

102°
60°
96°
58°
57°
Hudson Bay
Ohno Lake
Baralzon Lake
Nueltin Lake
Kasmere Lake
Nejanilini Lake
Caribou R
Caribou Lake
Egenolf Lake
Great Island
Misty Lake
Bain Lake
Seal River
Ireland Lake
Shethanei Lake
Lac Brochet
Maria Lake
Tadoule Lake
North Knife River
South Knife River
North Knife Lake
Reindeer Lake
Chipewyan Lake
Owl River
ICP Ba (ppm)
100 to 210
66 to 100
49 to 66
33 to 49
22 to 33
9 to 22
Ba

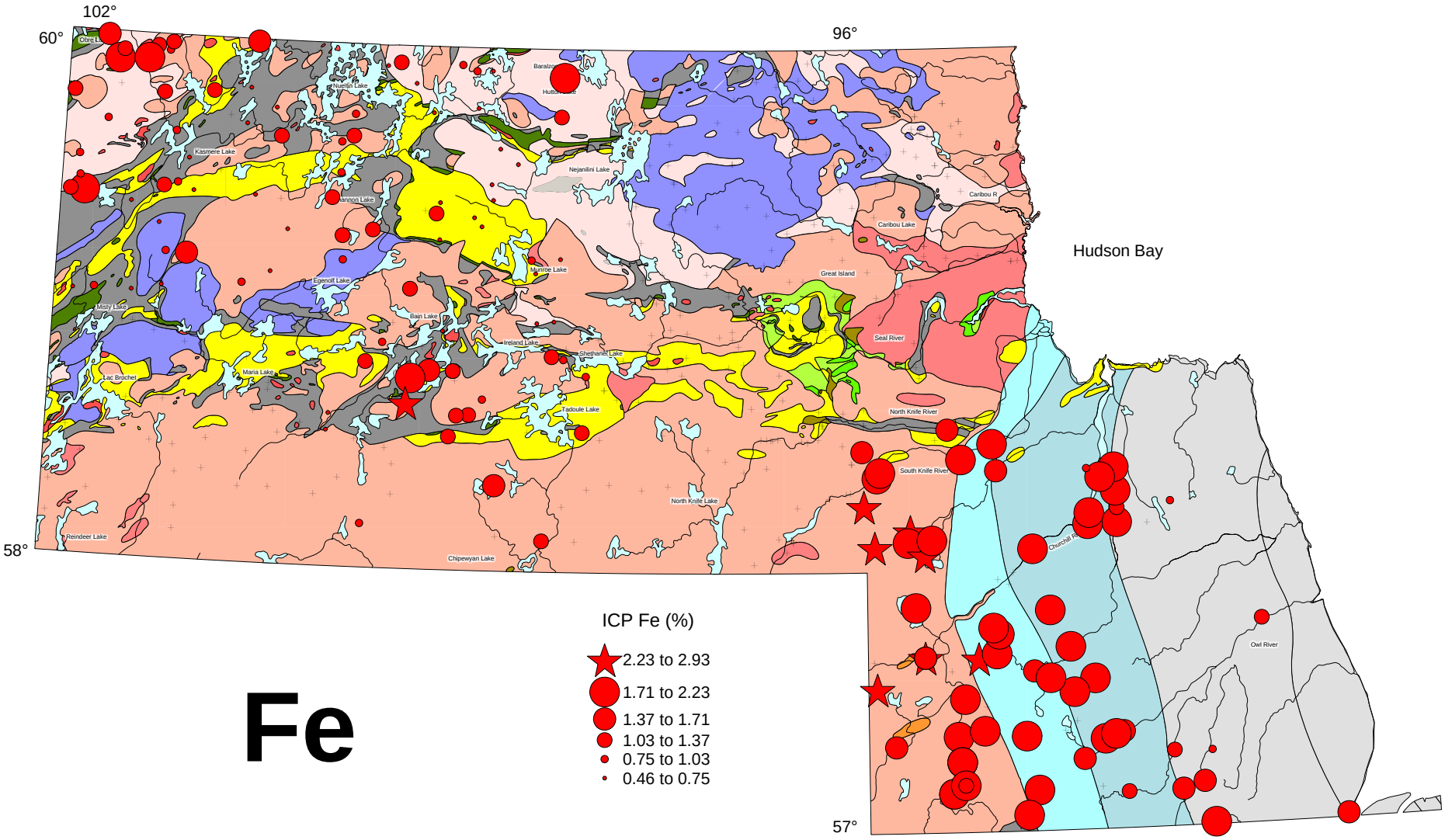

102°
60°
96°
58°
57°
Hudson Bay
Otine Lake
Baralzon Lake
Nueltin Lake
Hutton Lake
Kasmere Lake
Nejanilini Lake
Shannon Lake
Caribou R
Caribou Lake
Munroe Lake
Great Island
Egenolf Lake
Misty Lake
Bain Lake
Ireland Lake
Seal River
Shethanei Lake
Lac Brochet
Maria Lake
Beshaw Lake
Tadoule Lake
North Knife River
South Knife River
North Knife Lake
Reindeer Lake
Chipewyan Lake
Churchill R.
Owl River
ICP Ca (%)
11.2 to 13.6
8.7 to 11.2
6.2 to 8.7
3.4 to 6.2
2.1 to 3.4
1.2 to 2.1
0.4 to 1.2
0.3 to 0.4
0.2 to 0.3
0 to 0.2

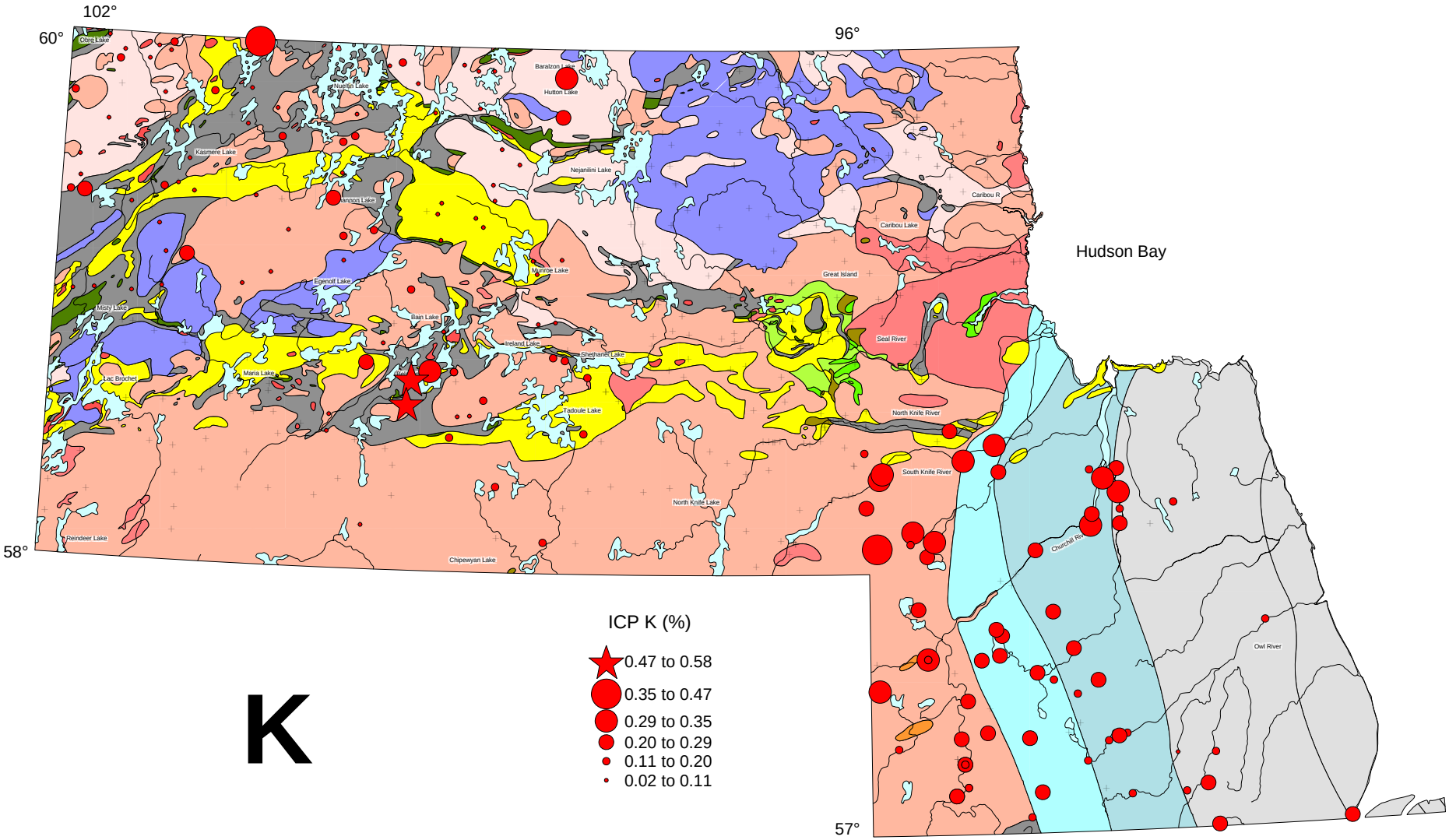
# Ca

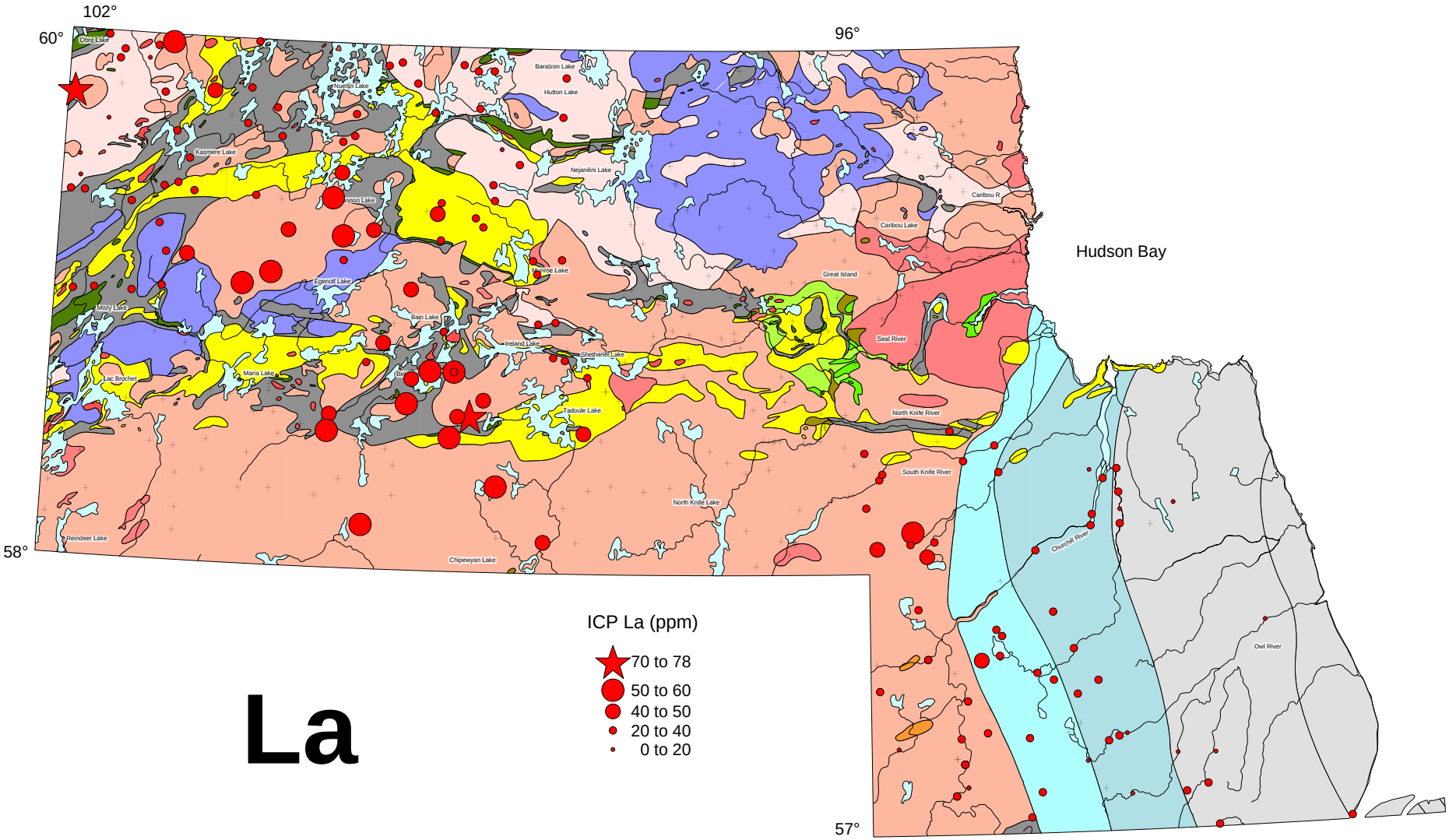

102°
60°
96°
58°
57°
Hudson Bay
Kasmere Lake
Nejanilini Lake
Caribou R
Caribou Lake
Great Island
Seal River
North Knife River
South Knife River
North Knife Lake
Tadoule Lake
Lac Brochet
Maria Lake
Ireland Lake
Bain Lake
Egenolf Lake
Misty Lake
Munroe Lake
Reindeer Lake
Chipewyan Lake
Owl River
Co
ICP Co (ppm)
10 to 12
8 to 10
6 to 8
5 to 6
3 to 5
1 to 3

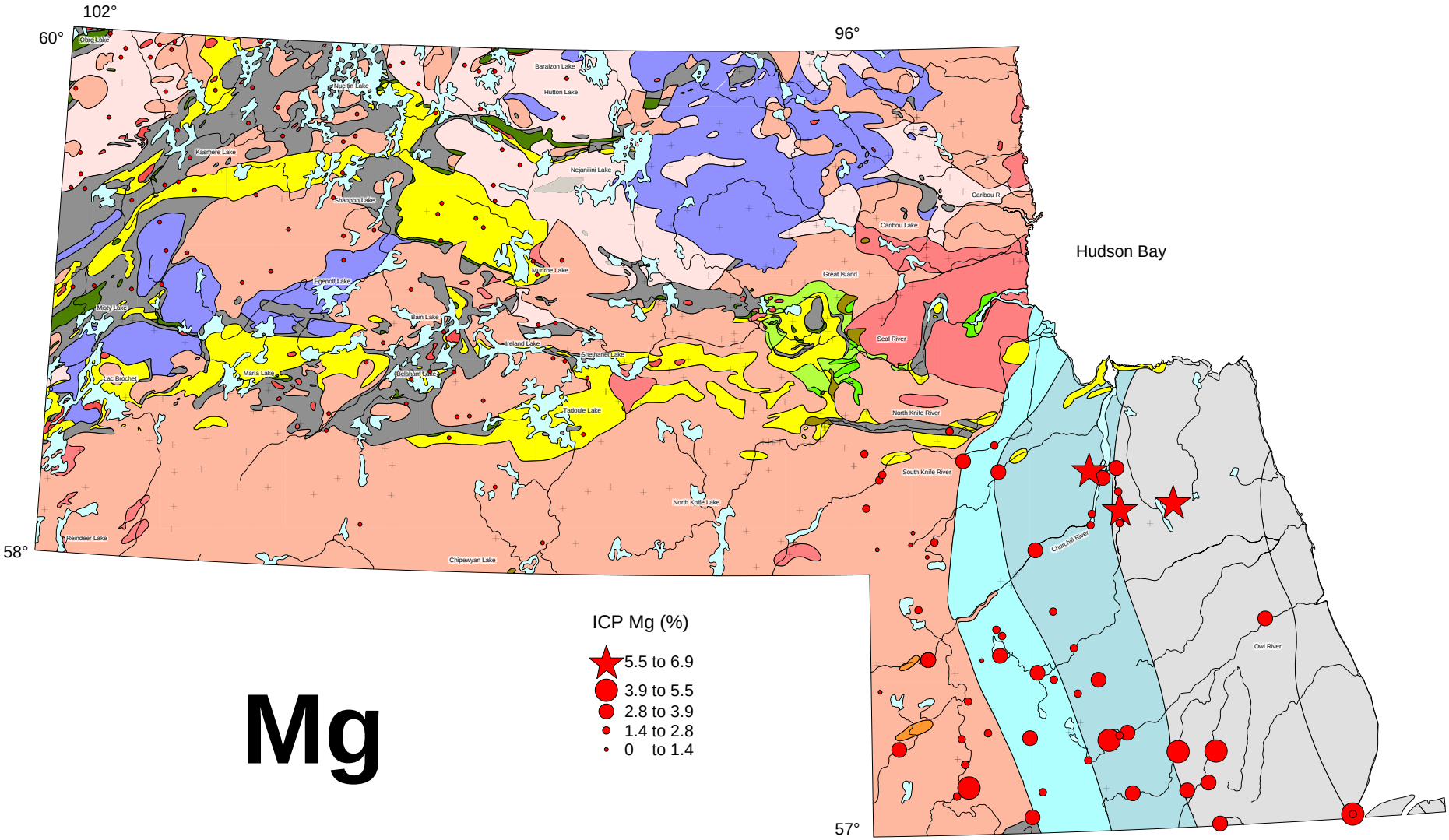

102°
60°
96°
58°
57°
Hudson Bay
Otine Lake
Baralzon Lake
Hutton Lake
Nueltin Lake
Kasmere Lake
Nejanilini Lake
Shannon Lake
Caribou R
Caribou Lake
Munroe Lake
Great Island
Egenolf Lake
Misty Lake
Bain Lake
Ireland Lake
Seal River
Shethanei Lake
Lac Brochet
Maria Lake
Tadoule Lake
North Knife River
South Knife River
North Knife Lake
Reindeer Lake
Chipewyan Lake
Churchill Riv
Owl River
ICP Cr (ppm)
36 to 39
32 to 38
24 to 32
18 to 24
12 to 18
6 to 12
Cr

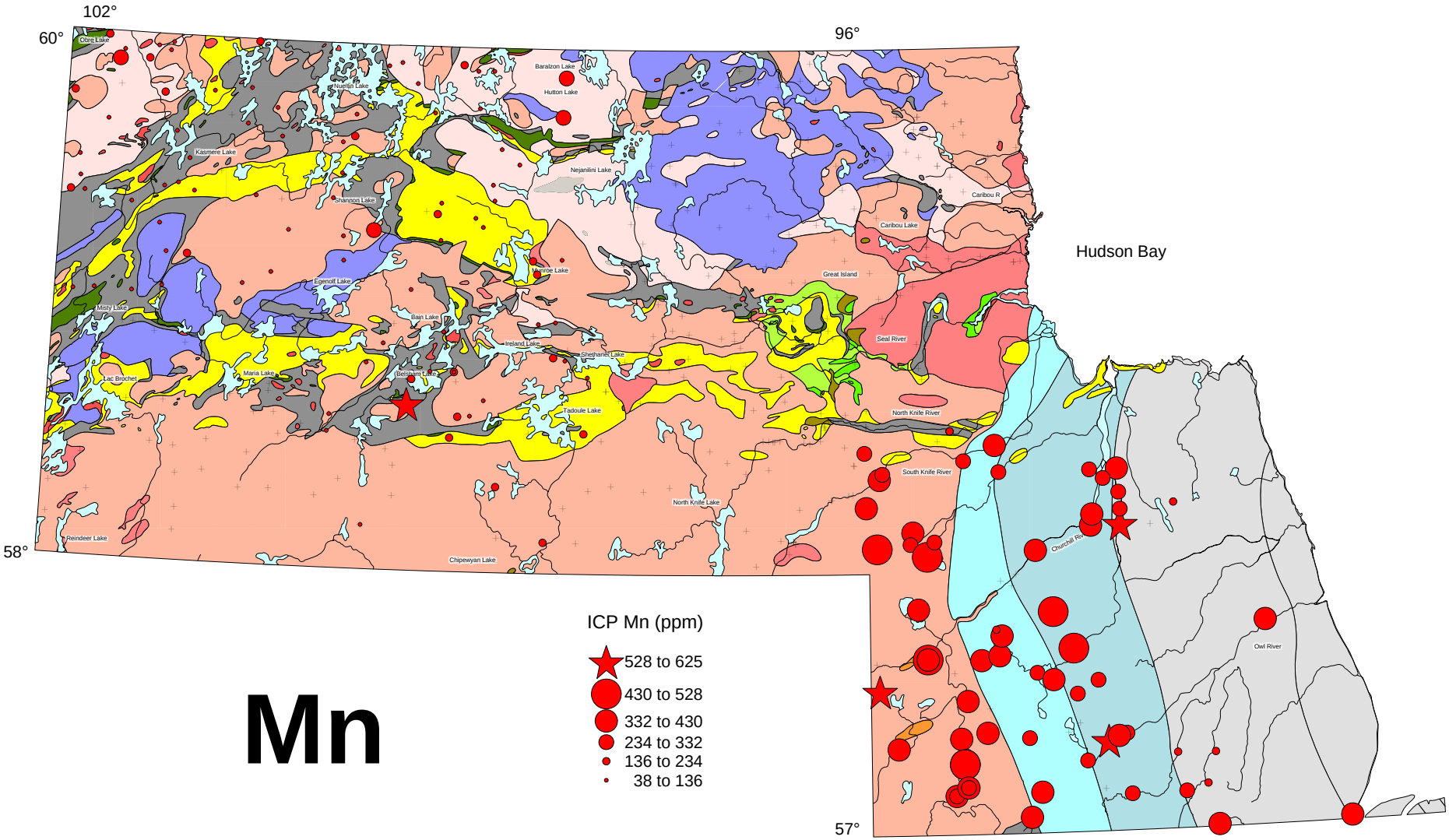

102°
60°
96°
58°
57°
Hudson Bay
Ohno Lake
Baralzon Lake
Nuetlin Lake
Hutton Lake
Kasmere Lake
Nejanilini Lake
Caribou R
Caribou Lake
Munroe Lake
Great Island
Egenolf Lake
Misty Lake
Bain Lake
Seal River
Ireland Lake
Shethanei Lake
Lac Brochet
Maria Lake
Tadoule Lake
North Knife River
South Knife River
North Knife Lake
Reindeer Lake
Chipewyan Lake
Churchill Riv
Owl River
ICP Cu (ppm)
21 to 23
18 to 21
15 to 18
10 to 15
5 to 10
1 to 5
Cu

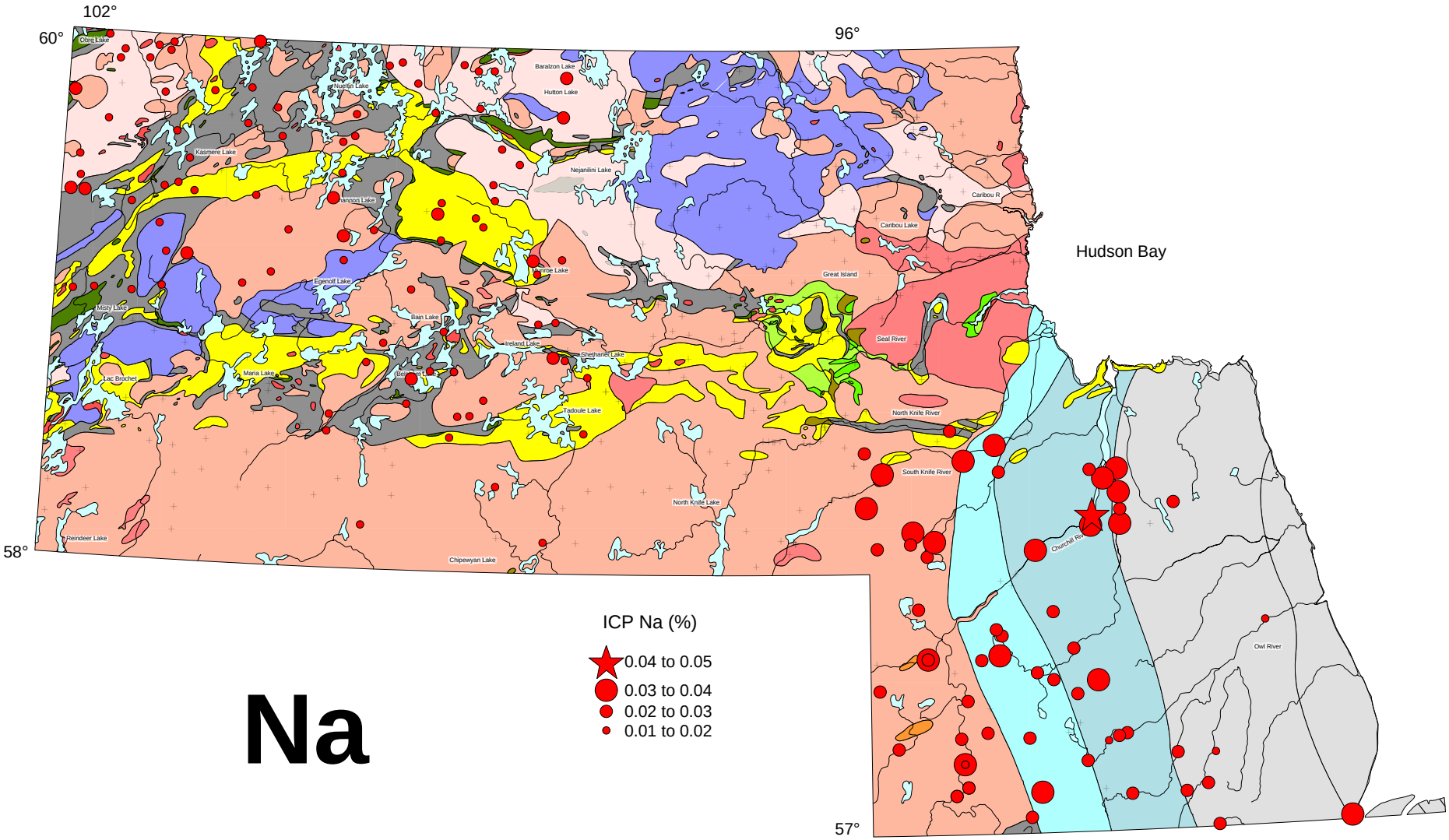

102°
60°
96°
58°
57°
Hudson Bay
Kasmere Lake
Nejanilini Lake
Caribou R
Caribou Lake
Great Island
Munroe Lake
Egenolf Lake
Misty Lake
Bain Lake
Ireland Lake
Seal River
Shethanei Lake
Lac Brochet
Maria Lake
Tadoule Lake
North Knife River
South Knife River
North Knife Lake
Reindeer Lake
Chipewyan Lake
Owl River
ICP Fe (%)
2.23 to 2.93
1.71 to 2.23
1.37 to 1.71
1.03 to 1.37
0.75 to 1.03
0.46 to 0.75
Fe

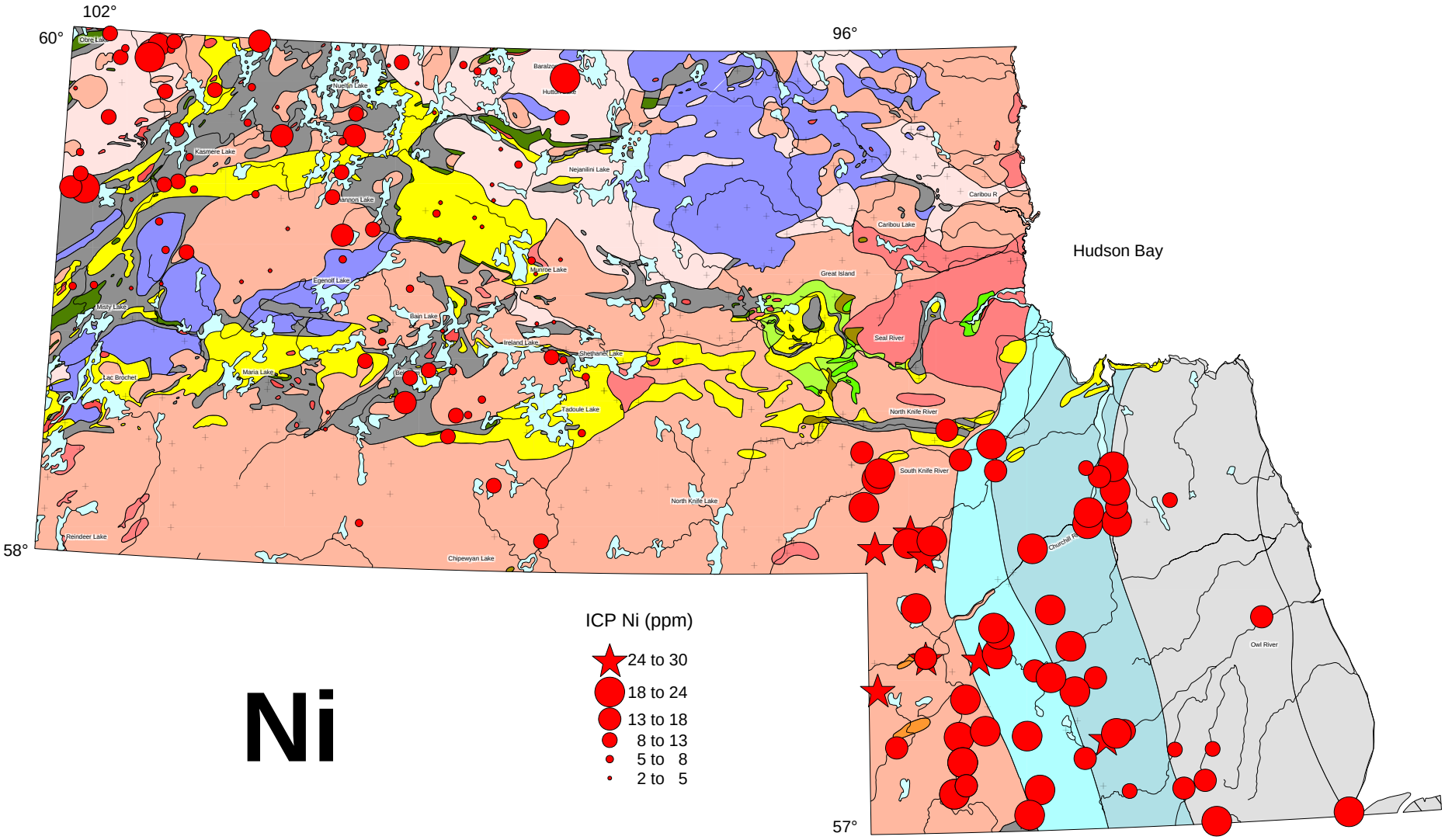

102°
60°
96°
58°
57°
Hudson Bay
Ohno Lake
Baralzon Lake
Nueltin Lake
Hutton Lake
Kasmere Lake
Nejanilini Lake
Caribou R
Caribou Lake
Munroe Lake
Great Island
Egenolf Lake
Misty Lake
Bain Lake
Seal River
Ireland Lake
Shethanei Lake
Lac Brochet
Maria Lake
Tadoule Lake
North Knife River
South Knife River
North Knife Lake
Reindeer Lake
Chipewyan Lake
Churchill Riv
Owl River
ICP K (%)
0.47 to 0.58
0.35 to 0.47
0.29 to 0.35
0.20 to 0.29
0.11 to 0.20
0.02 to 0.11
K

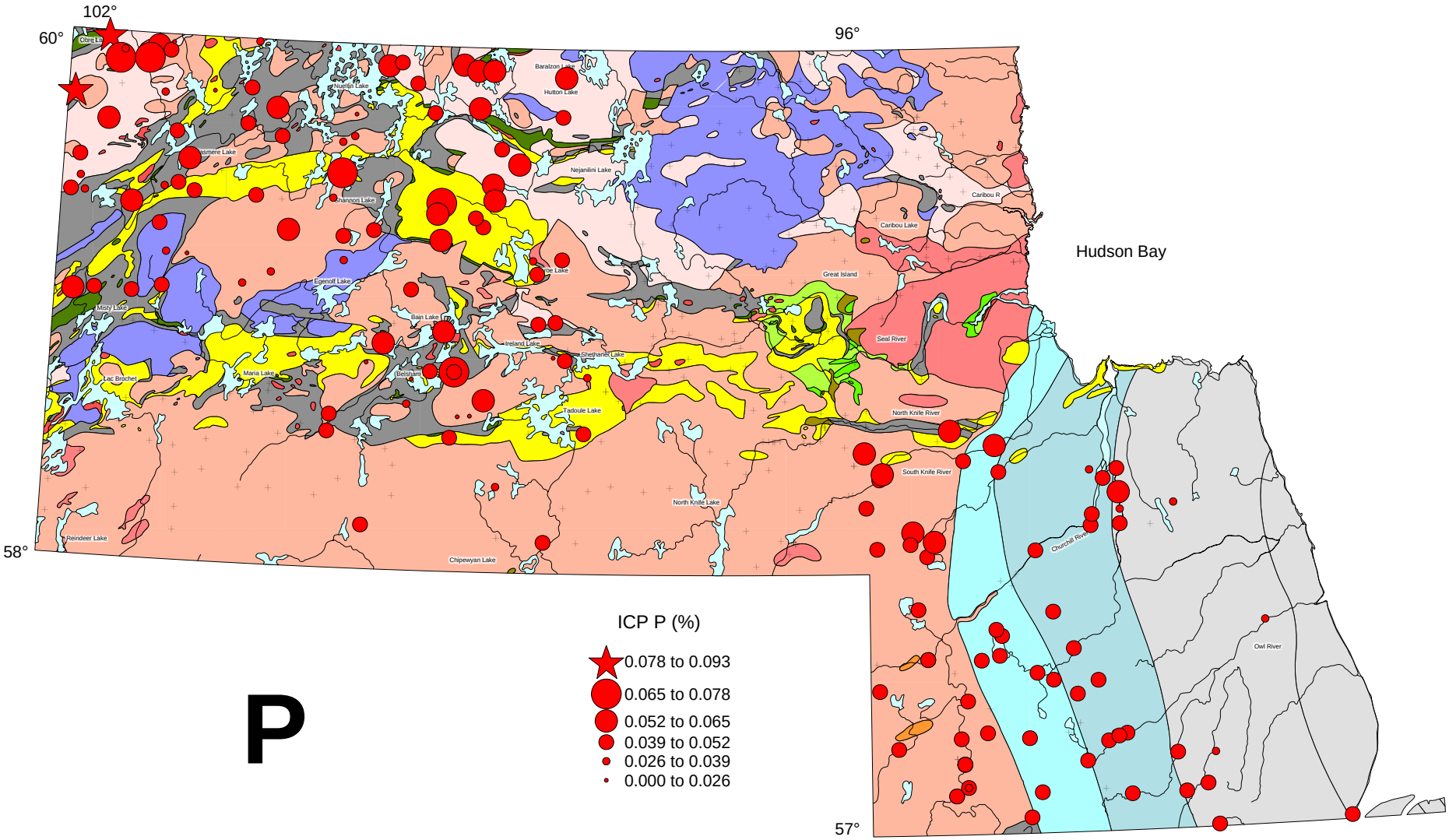

102°
60°
96°
58°
57°
Hudson Bay
Ohno Lake
Baralzon Lake
Hutton Lake
Nueltin Lake
Kasmere Lake
Nejanilini Lake
Caribou R
Caribou Lake
Great Island
Monroe Lake
Egenolf Lake
Misty Lake
Bain Lake
Ireland Lake
Seal River
Shethanei Lake
Lac Brochet
Maria Lake
Tadoule Lake
North Knife River
South Knife River
North Knife Lake
Reindeer Lake
Chipewyan Lake
Churchill River
Owl River
ICP La (ppm)
70 to 78
50 to 60
40 to 50
20 to 40
0 to 20
La

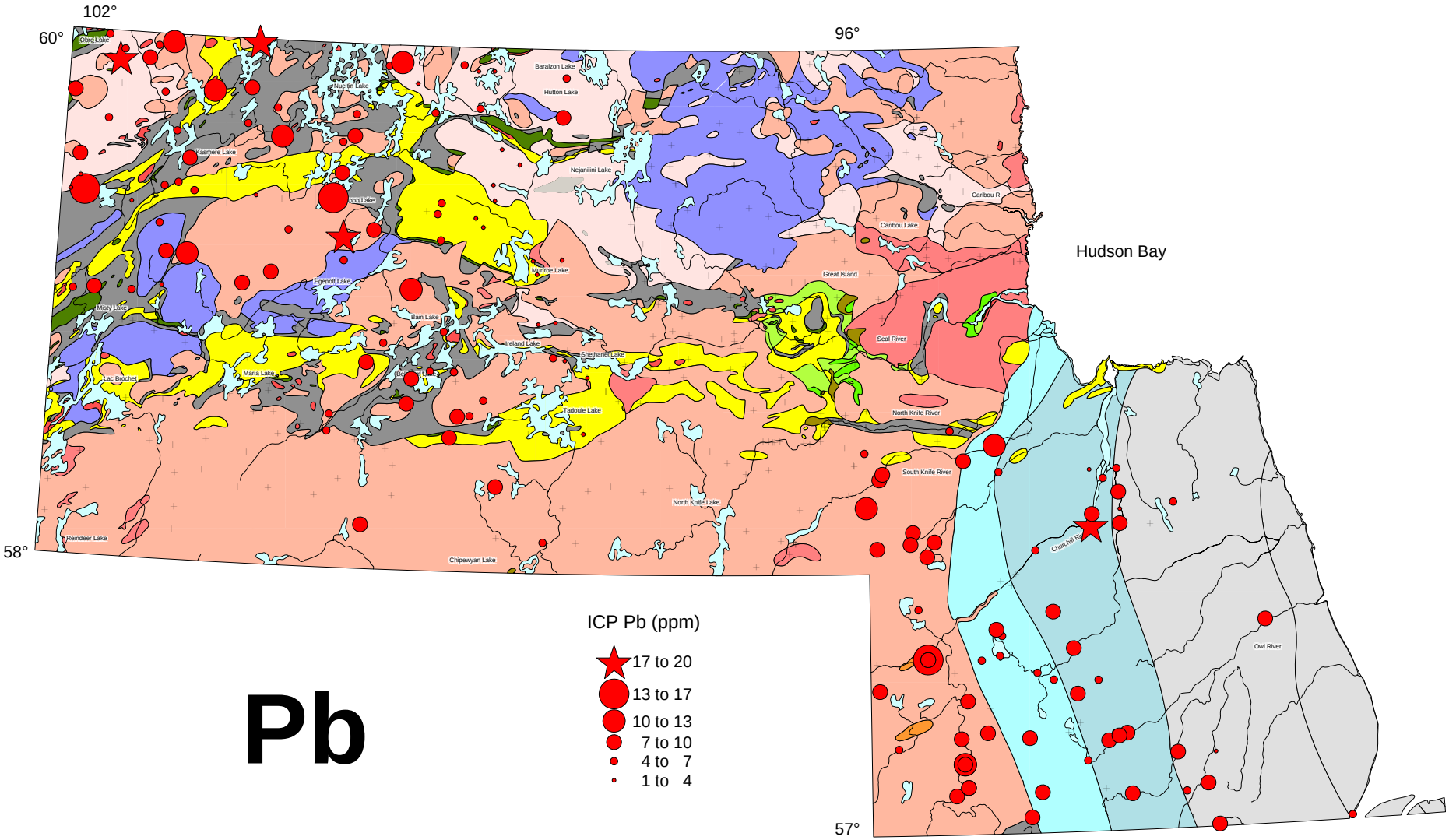

102°
60°
96°
58°
57°
Hudson Bay
Baralzon Lake
Hutton Lake
Nejanilini Lake
Caribou R
Caribou Lake
Great Island
Seal River
North Knife River
South Knife River
North Knife Lake
Churchill River
Owl River
Chipewyan Lake
Reindeer Lake
Lac Brochet
Maria Lake
Tadoule Lake
Ireland Lake
Bain Lake
Egenolf Lake
Misty Lake
Munroe Lake
Shannon Lake
Kasmere Lake
Nueltin Lake
Otter Lake
Mg
ICP Mg (%)
5.5 to 6.9
3.9 to 5.5
2.8 to 3.9
1.4 to 2.8
0 to 1.4

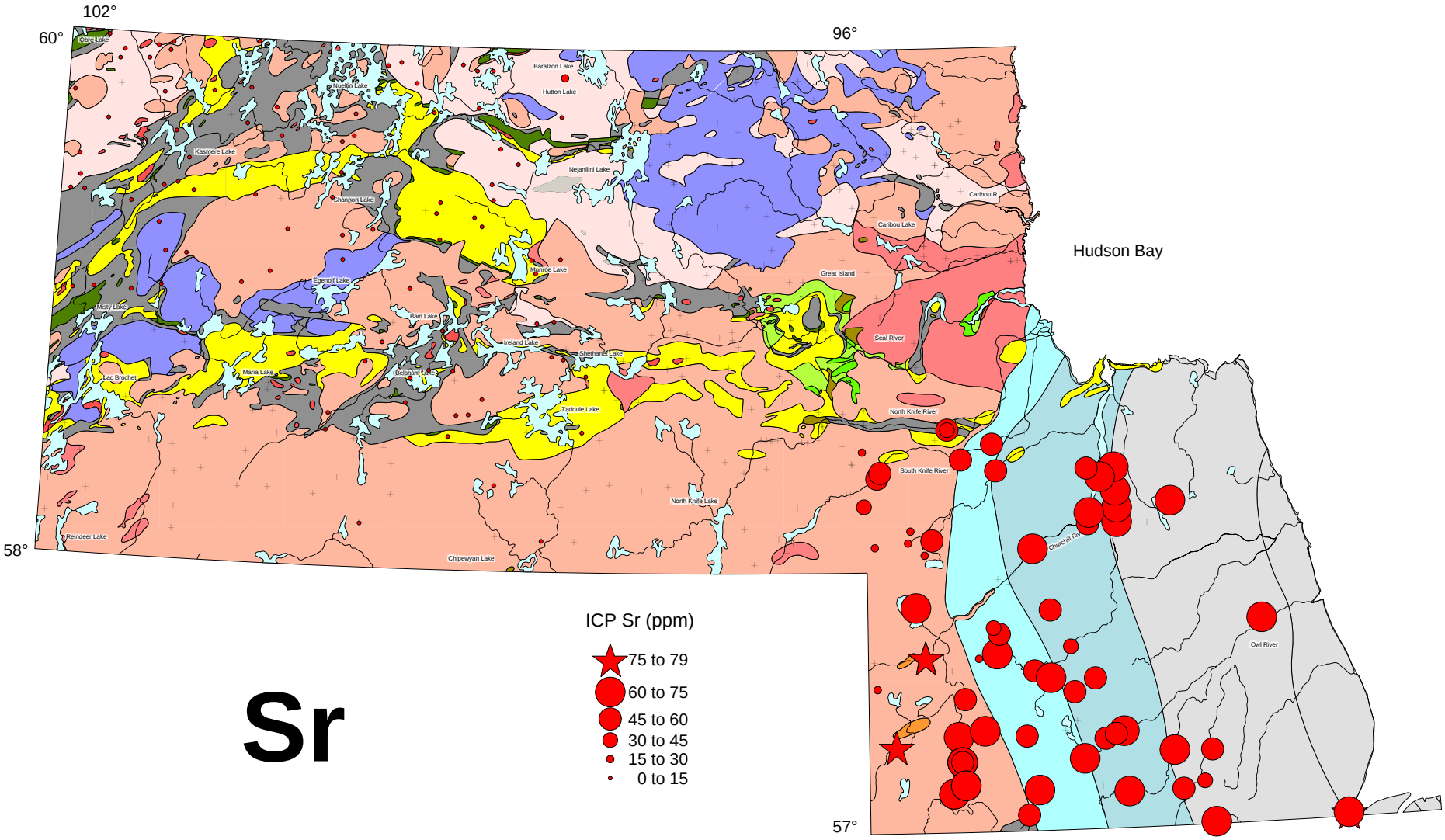

102°
60°
96°
58°
57°
Hudson Bay
Baralzon Lake
Hutton Lake
Nejanilini Lake
Caribou R
Caribou Lake
Great Island
Seal River
North Knife River
South Knife River
North Knife Lake
Chipewyan Lake
Reindeer Lake
Owl River
Churchill Riv
Kasmere Lake
Shannon Lake
Egenolf Lake
Misty Lake
Bain Lake
Ireland Lake
Maria Lake
Lac Brochet
Tadoule Lake
Shethanei Lake
Monroe Lake
ICP Mn (ppm)
528 to 625
430 to 528
332 to 430
234 to 332
136 to 234
38 to 136
Mn

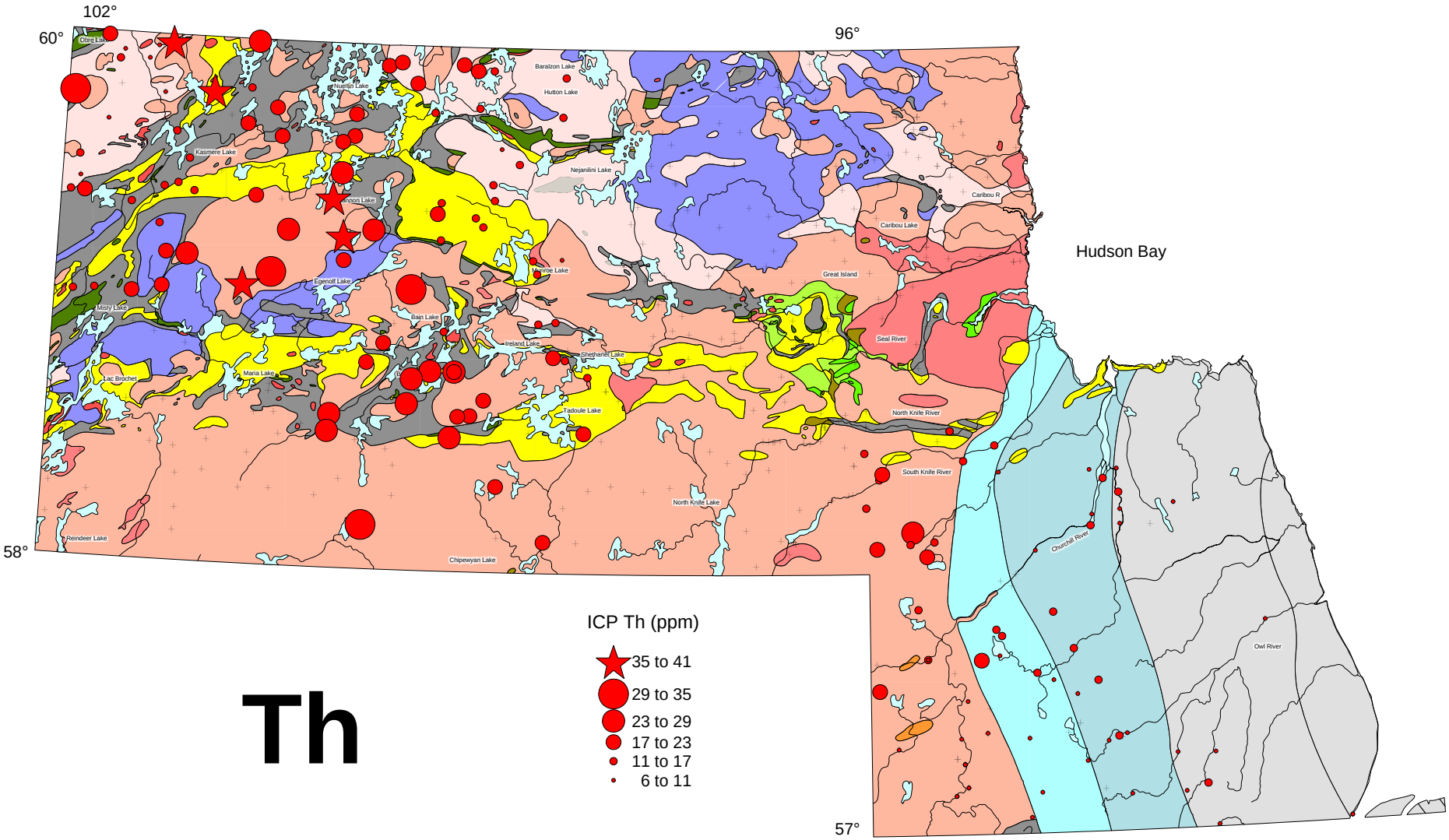

102°
60°
96°
58°
57°
Hudson Bay
Baralzon Lake
Hutton Lake
Kasmere Lake
Nejanilini Lake
Caribou R
Caribou Lake
Egenolf Lake
Munroe Lake
Great Island
Misty Lake
Bain Lake
Seal River
Ireland Lake
Shethanei Lake
Lac Brochet
Maria Lake
Tadoule Lake
North Knife River
South Knife River
North Knife Lake
Reindeer Lake
Chipewyan Lake
Owl River
ICP Na (%)
0.04 to 0.05
0.03 to 0.04
0.02 to 0.03
0.01 to 0.02
Na

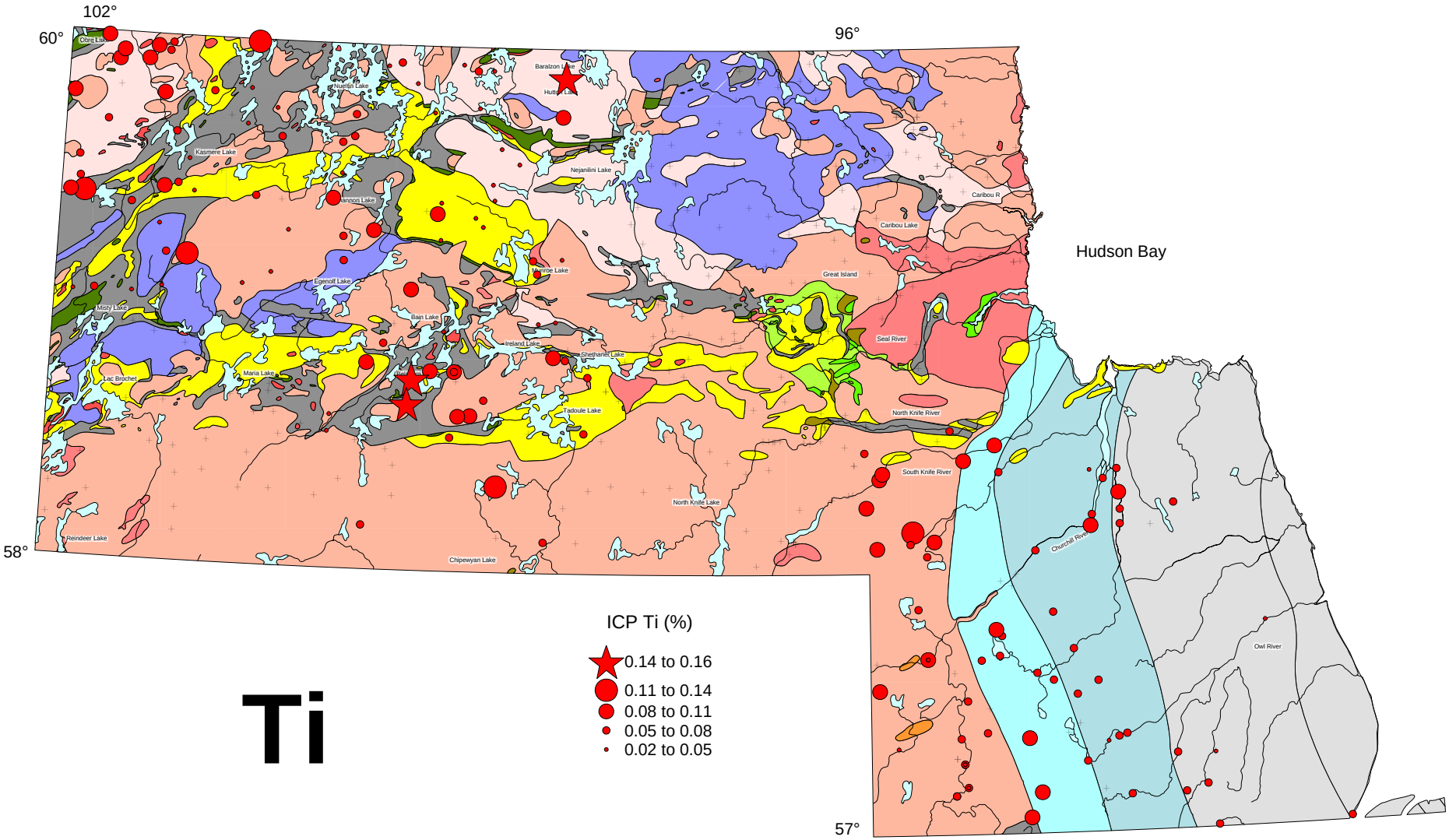

102°
60°
96°
58°
57°
Hudson Bay
Ni
ICP Ni (ppm)
24 to 30
18 to 24
13 to 18
8 to 13
5 to 8
2 to 5
Kasmere Lake
Nejanilini Lake
Caribou R
Caribou Lake
Great Island
Seal River
North Knife River
South Knife River
North Knife Lake
Tadoule Lake
Lac Brochet
Maria Lake
Ireland Lake
Bain Lake
Misty Lake
Egenolf Lake
Munroe Lake
Reindeer Lake
Chipewyan Lake
Owl River

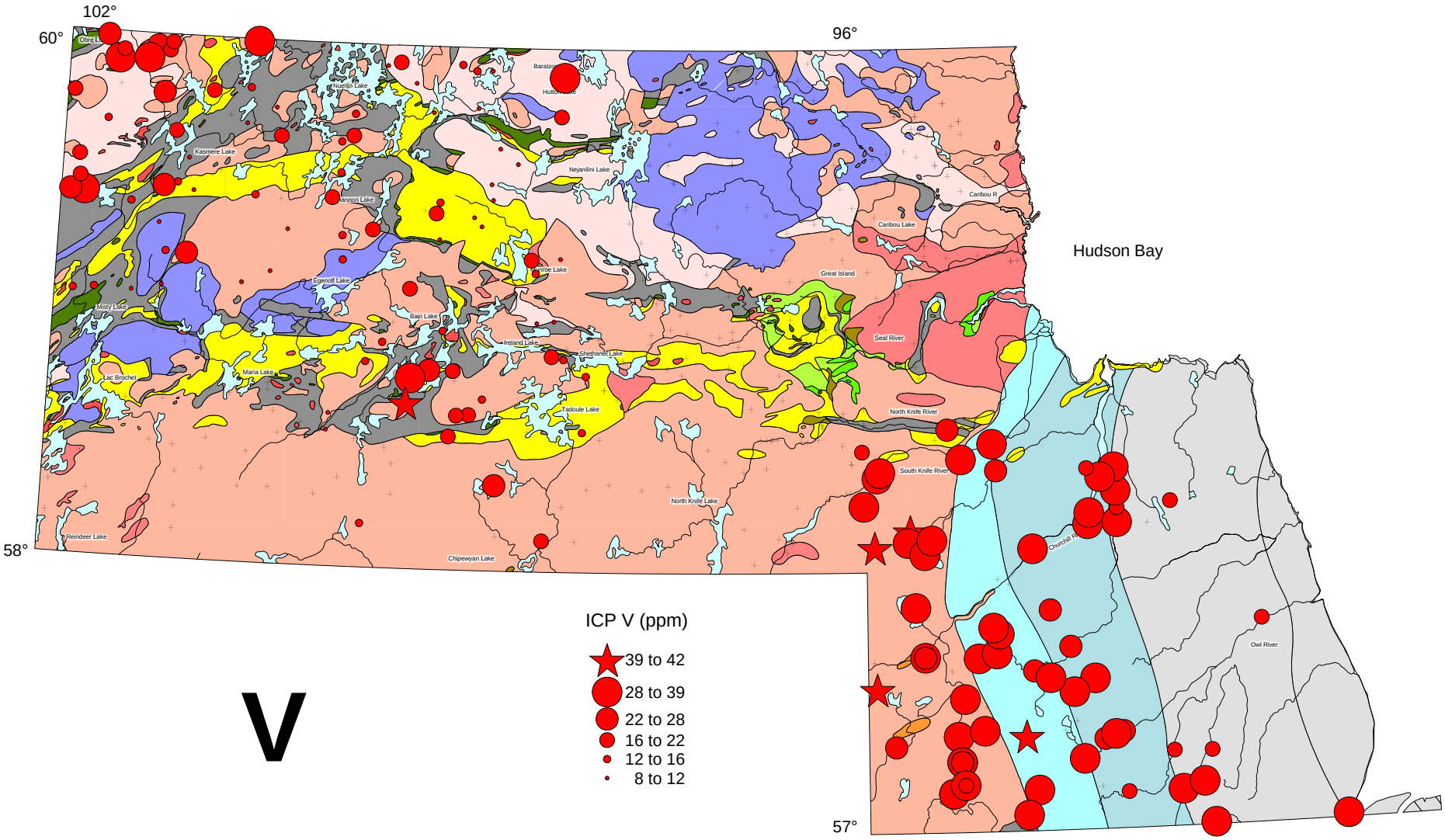

102°
60°
96°
58°
57°
Hudson Bay
Baralzon Lake
Hutton Lake
Nejanilini Lake
Caribou R
Caribou Lake
Great Island
Seal River
North Knife River
South Knife River
North Knife Lake
Tadoule Lake
Shethanei Lake
Ireland Lake
Bain Lake
Egenolf Lake
Misty Lake
Lac Brochet
Maria Lake
Reindeer Lake
Chipewyan Lake
Owl River
ICP P (%)
0.078 to 0.093
0.065 to 0.078
0.052 to 0.065
0.039 to 0.052
0.026 to 0.039
0.000 to 0.026
P

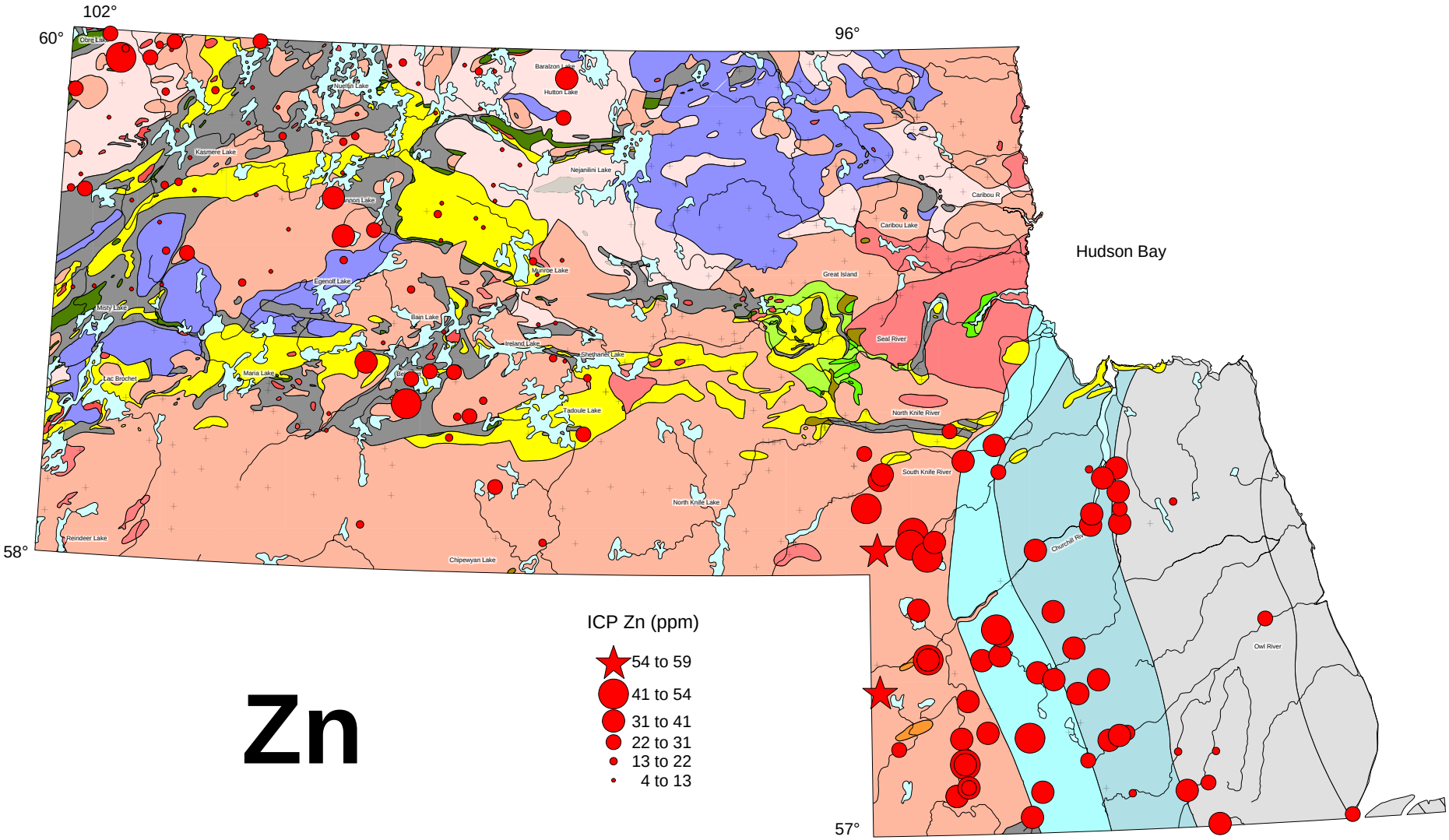

102°
60°
96°
58°
57°
Hudson Bay
Baralzon Lake
Hutton Lake
Nejanilini Lake
Caribou R
Caribou Lake
Great Island
Seal River
North Knife River
South Knife River
North Knife Lake
Tadoule Lake
Munroe Lake
Egenolf Lake
Misty Lake
Bain Lake
Ireland Lake
Shethanei Lake
Maria Lake
Lac Brochet
Reindeer Lake
Chipewyan Lake
Owl River
Pb
ICP Pb (ppm)
17 to 20
13 to 17
10 to 13
7 to 10
4 to 7
1 to 4

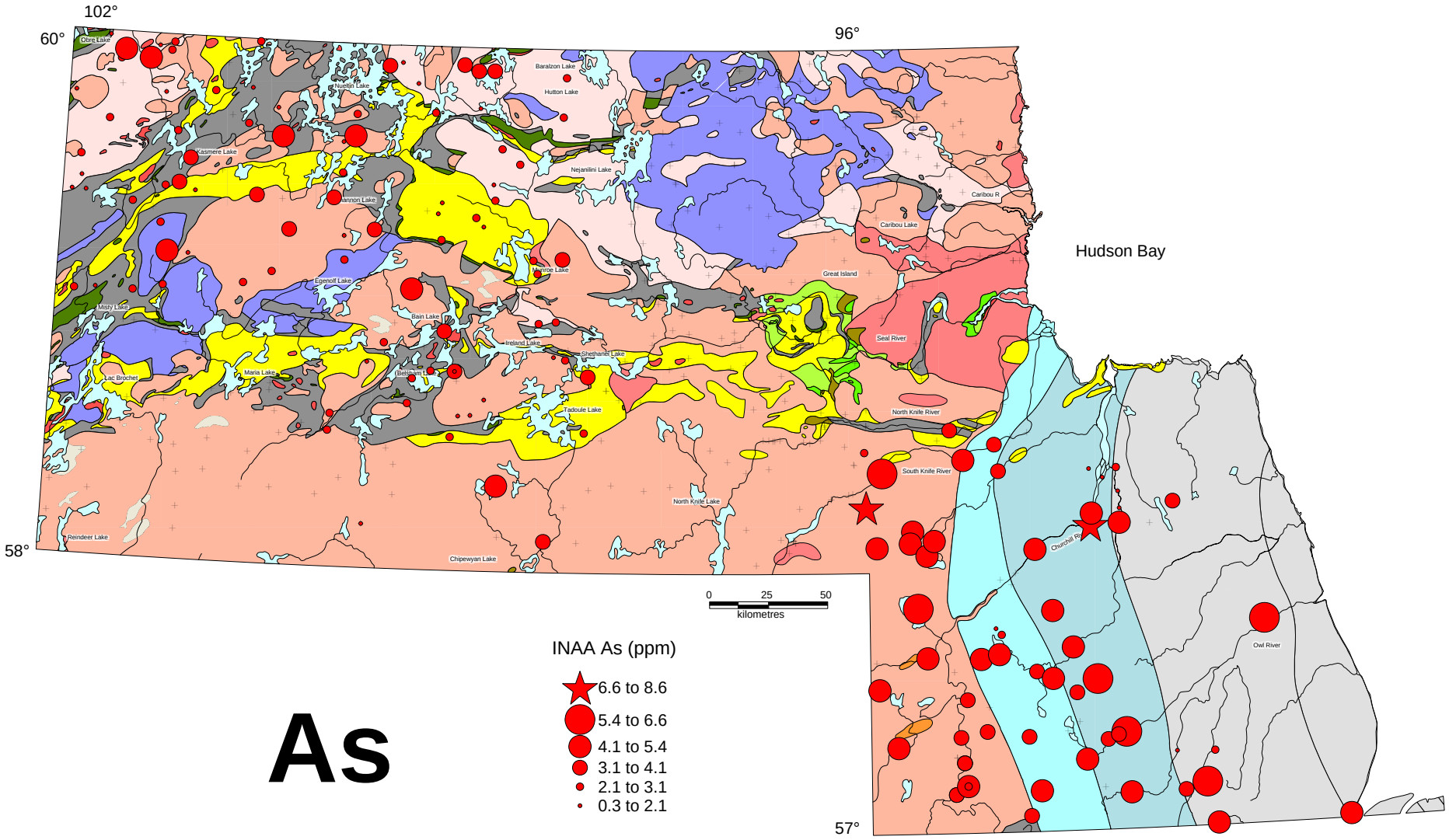

102°
60°
96°
58°
57°
Hudson Bay
Baralzon Lake
Hutton Lake
Nejanilini Lake
Caribou R
Caribou Lake
Great Island
Seal River
North Knife River
South Knife River
North Knife Lake
Chipewyan Lake
Reindeer Lake
Lac Brochet
Maria Lake
Tadoule Lake
Ireland Lake
Bain Lake
Misty Lake
Egenolf Lake
Munroe Lake
Shannon Lake
Kasmere Lake
Owl River
Churchill Riv
Sr
ICP Sr (ppm)
75 to 79
60 to 75
45 to 60
30 to 45
15 to 30
0 to 15


102°
60°
96°
58°
57°
Hudson Bay
Baralzon Lake
Hutton Lake
Nueltin Lake
Kasmere Lake
Nejanilini Lake
Caribou R
Caribou Lake
Great Island
Seal River
Egenolf Lake
Misty Lake
Bain Lake
Ireland Lake
Shethanei Lake
Lac Brochet
Maria Lake
Tadoule Lake
North Knife River
South Knife River
North Knife Lake
Reindeer Lake
Chipewyan Lake
Churchill River
Owl River
ICP Th (ppm)
35 to 41
29 to 35
23 to 29
17 to 23
11 to 17
6 to 11
Th

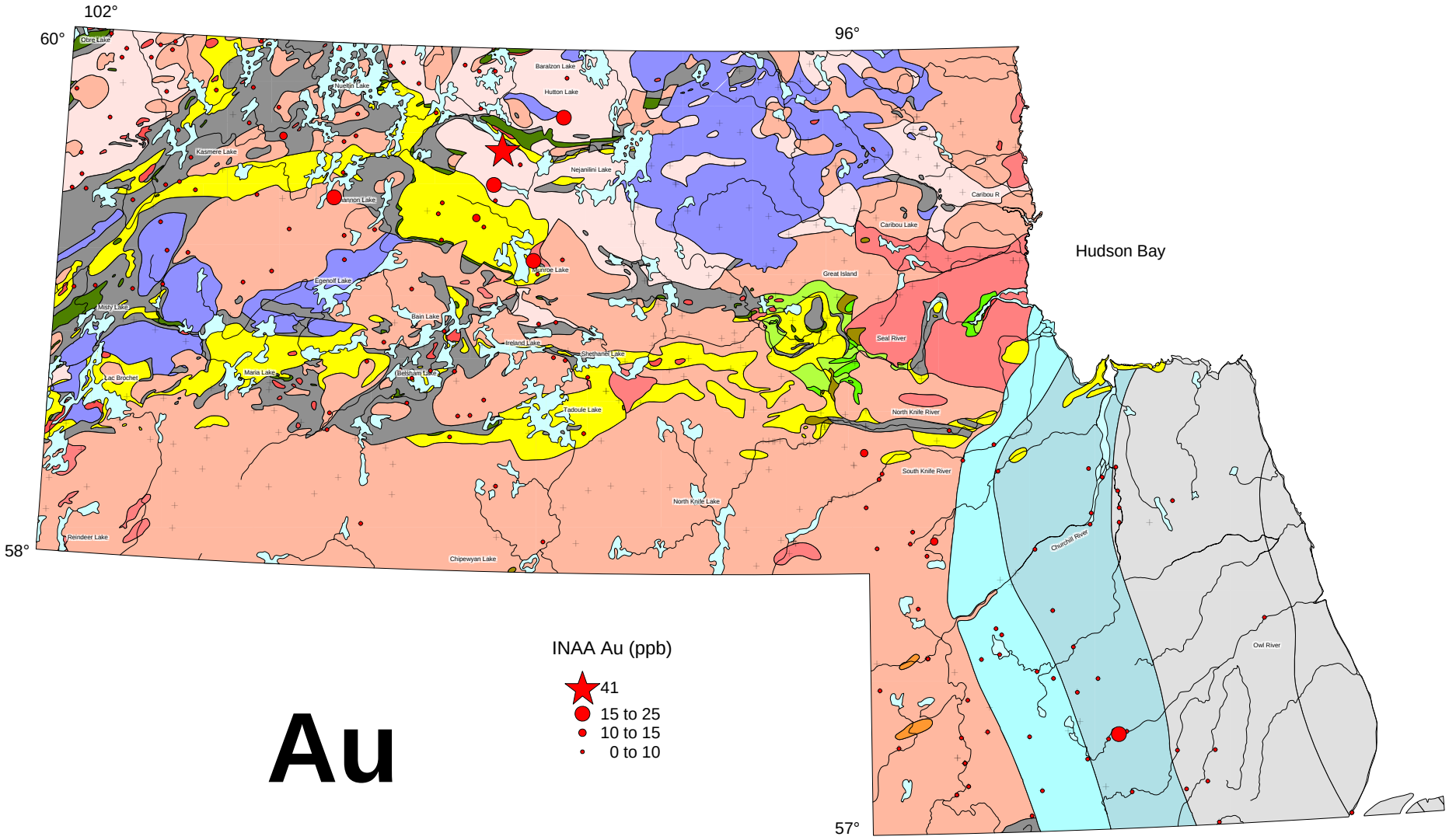

102°
60°
96°
58°
57°
Hudson Bay
Baralzon Lake
Hunter Lake
Nueltin Lake
Kasmere Lake
Nejanilini Lake
Caribou R
Caribou Lake
Egenolf Lake
Munroe Lake
Great Island
Misty Lake
Bain Lake
Ireland Lake
Seal River
Shethanei Lake
Lac Brochet
Maria Lake
Tadoule Lake
North Knife River
South Knife River
North Knife Lake
Reindeer Lake
Chipewyan Lake
Churchill River
Owl River
ICP Ti (%)
0.14 to 0.16
0.11 to 0.14
0.08 to 0.11
0.05 to 0.08
0.02 to 0.05
Ti

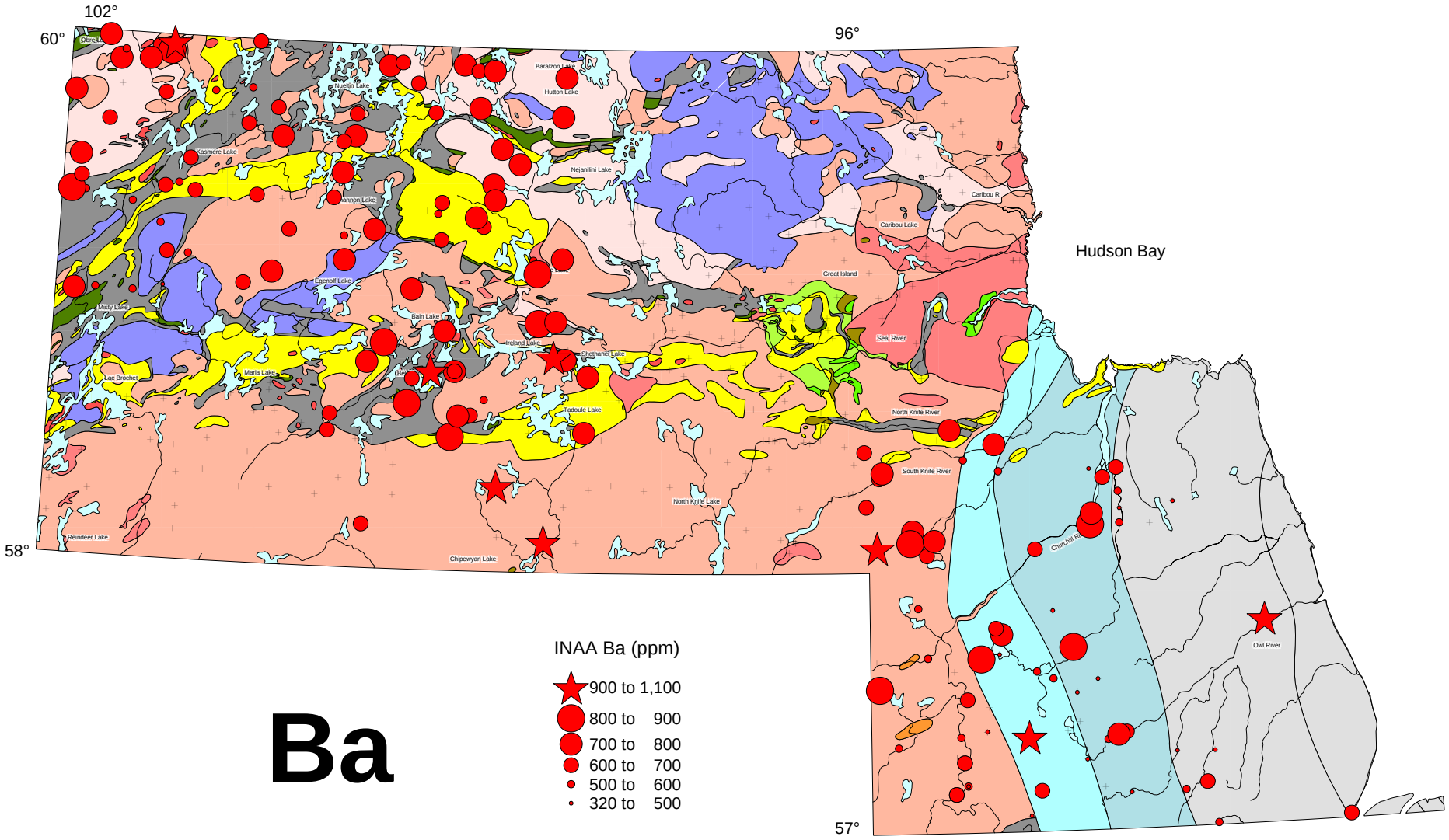

102°
60°
96°
58°
57°
Hudson Bay
Kasmere Lake
Nejanilini Lake
Caribou R
Caribou Lake
Egenolf Lake
Misty Lake
Bain Lake
Ireland Lake
Seal River
Great Island
Lac Brochet
Maria Lake
Tadoule Lake
North Knife River
South Knife River
North Knife Lake
Reindeer Lake
Chipewyan Lake
Owl River
V
ICP V (ppm)
39 to 42
28 to 39
22 to 28
16 to 22
12 to 16
8 to 12

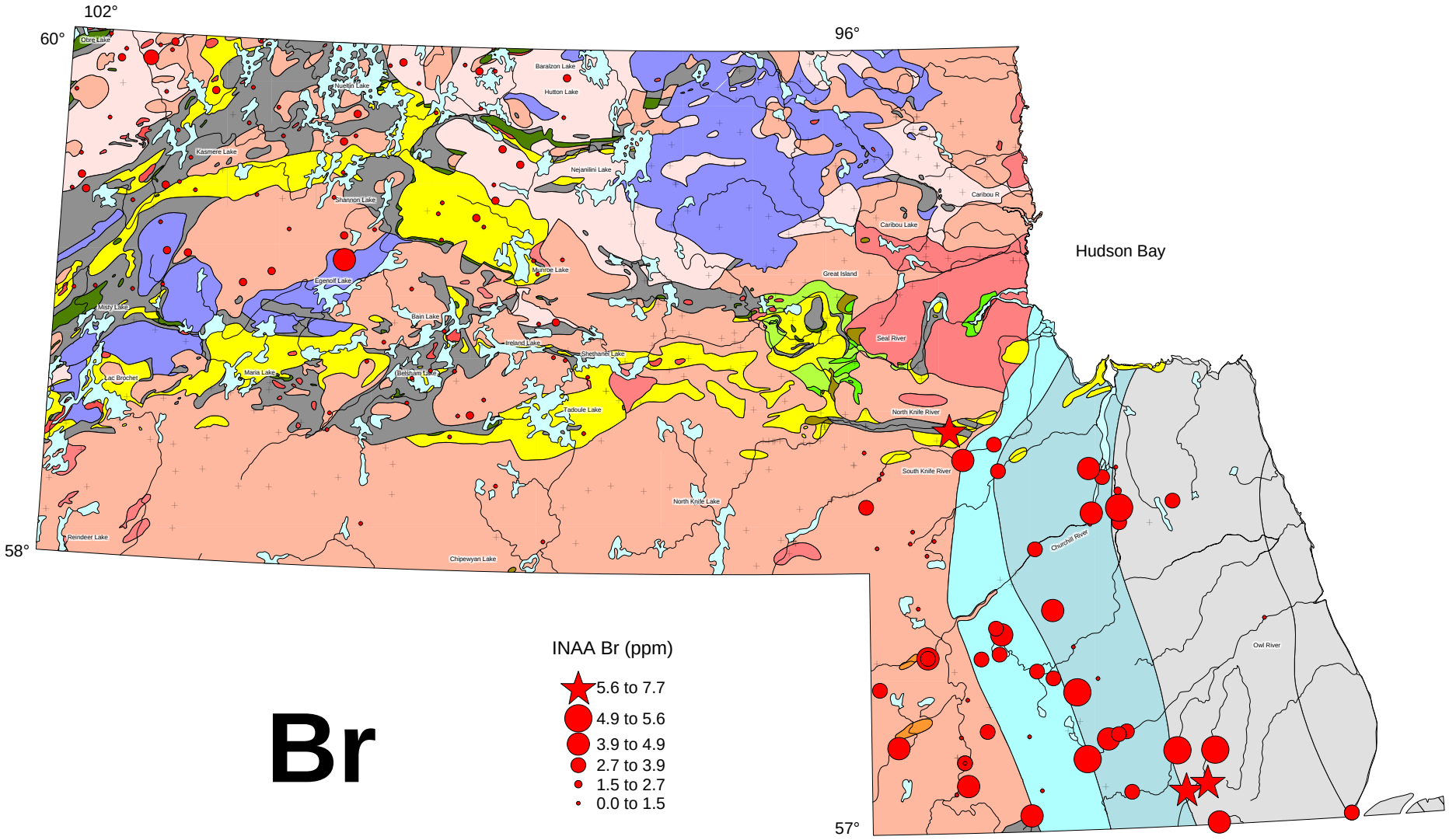

102°
60°
96°
58°
57°
Hudson Bay
Baralzon Lake
Hutton Lake
Nueltin Lake
Kasmere Lake
Nejanilini Lake
Caribou R
Caribou Lake
Munroe Lake
Great Island
Egenolf Lake
Misty Lake
Bain Lake
Ireland Lake
Seal River
Shethanei Lake
Lac Brochet
Maria Lake
Tadoule Lake
North Knife River
South Knife River
North Knife Lake
Reindeer Lake
Chipewyan Lake
Churchill Riv
Owl River
ICP Zn (ppm)
54 to 59
41 to 54
31 to 41
22 to 31
13 to 22
4 to 13
Zn

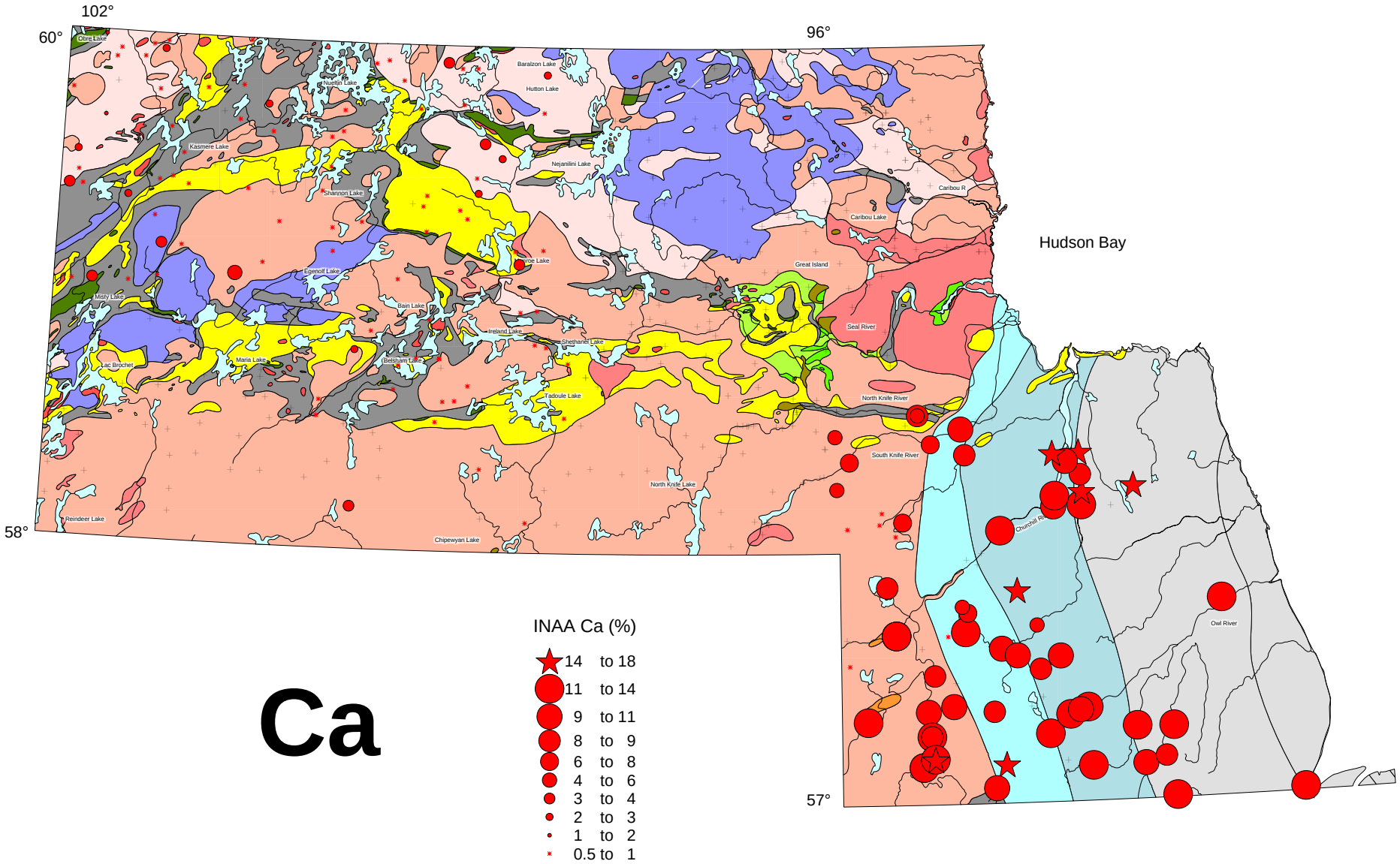



Appendix 7. Geochemical maps: INAA results (<0.063 mm till fraction). Crosses refer to sites that were not reanalysed

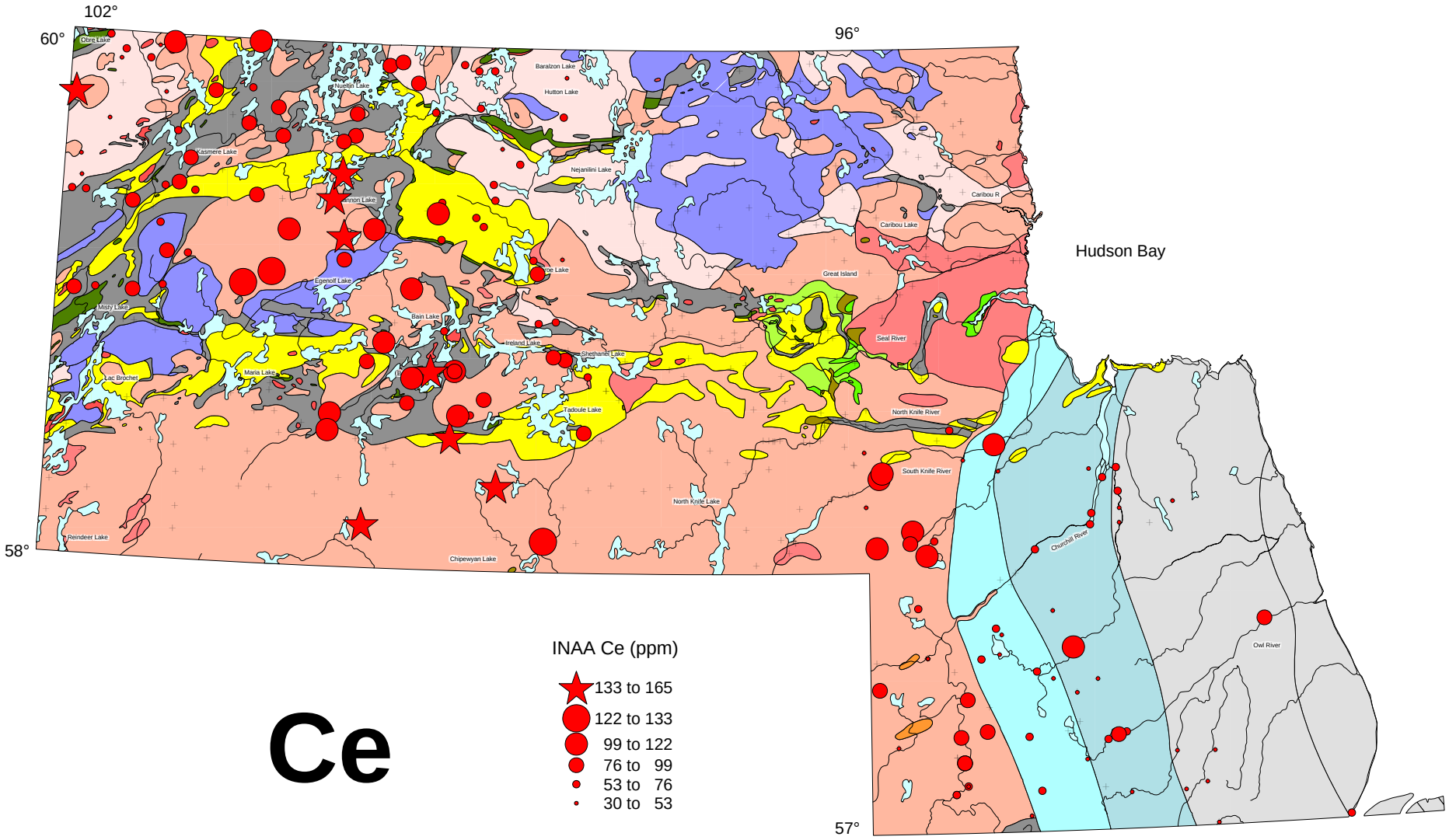

102°
60°
96°
58°
57°
Hudson Bay
Obre Lake
Baralzon Lake
Nueltin Lake
Hutton Lake
Kasmere Lake
Nejanilini Lake
Cannon Lake
Caribou R
Caribou Lake
Munroe Lake
Great Island
Egenolf Lake
Mary Lake
Bain Lake
Seal River
Ireland Lake
Shethanei Lake
Lac Brochet
Maria Lake
Tadoule Lake
North Knife River
South Knife River
North Knife Lake
Reindeer Lake
Chipewyan Lake
Churchill River
Owl River
INAA Au (ppb)
41
15 to 25
10 to 15
0 to 10
Au

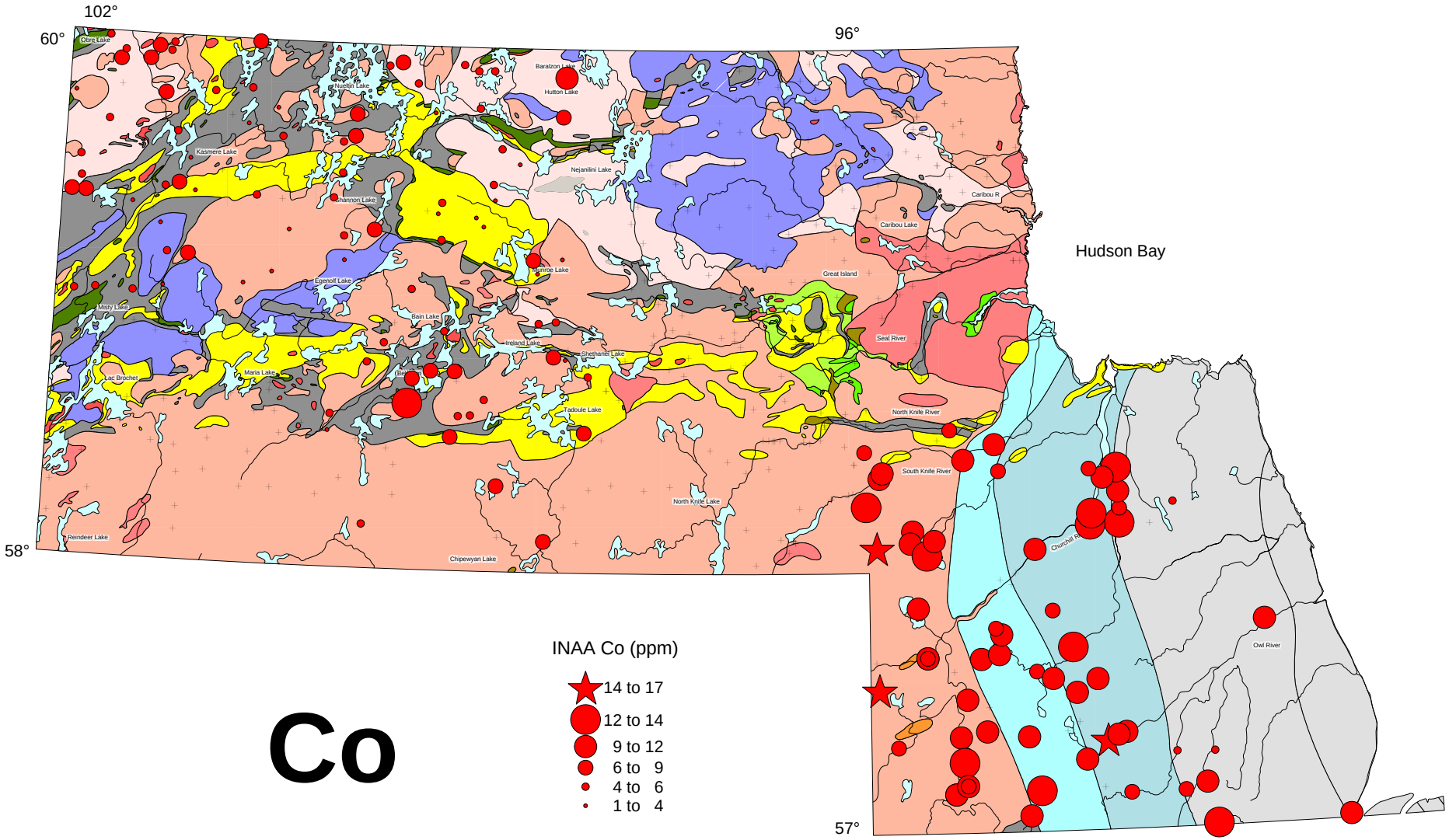

102°
60°
96°
58°
57°
Hudson Bay
Baralzon Lake
Hutton Lake
Nueltin Lake
Kasmere Lake
Nejanilini Lake
Cannon Lake
Caribou R
Caribou Lake
Great Island
Egenolf Lake
Mary Lake
Bain Lake
Ireland Lake
Seal River
Shethanei Lake
Lac Brochet
Maria Lake
Tadoule Lake
North Knife River
South Knife River
North Knife Lake
Reindeer Lake
Chipewyan Lake
Churchill R
Owl River
INAA Ba (ppm)
900 to 1,100
800 to 900
700 to 800
600 to 700
500 to 600
320 to 500
Ba

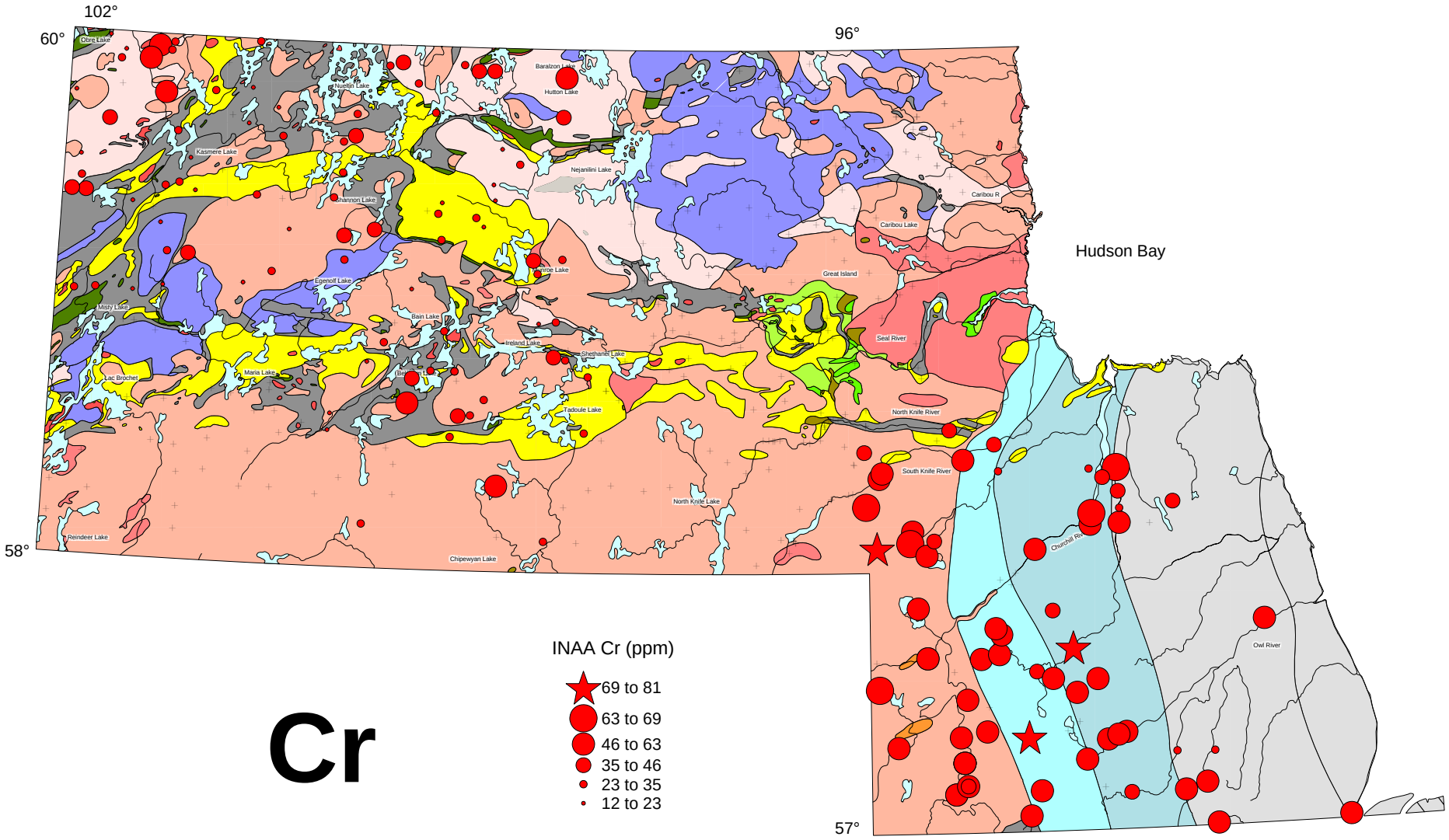

102°
60°
96°
58°
57°
Hudson Bay
Obre Lake
Baralzon Lake
Nueltin Lake
Hutton Lake
Kasmere Lake
Nejanilini Lake
Shannon Lake
Caribou R
Caribou Lake
Great Island
Munroe Lake
Egenolf Lake
Mary Lake
Bain Lake
Seal River
Ireland Lake
Sheshanes Lake
Lac Brochet
Maria Lake
Tadoule Lake
North Knife River
South Knife River
North Knife Lake
Reindeer Lake
Chipewyan Lake
Churchill River
Owl River
INAA Br (ppm)
5.6 to 7.7
4.9 to 5.6
3.9 to 4.9
2.7 to 3.9
1.5 to 2.7
0.0 to 1.5
Br

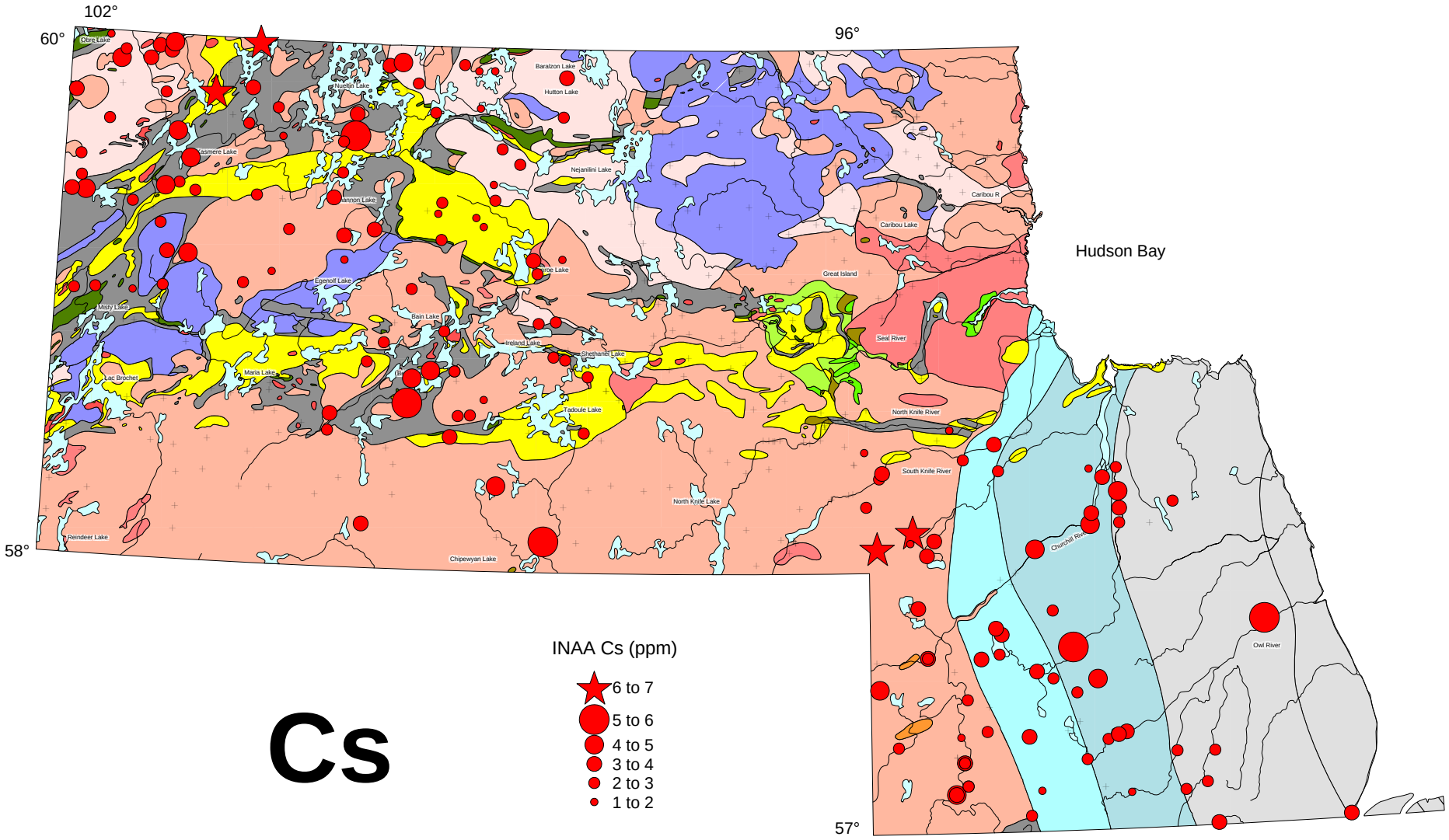


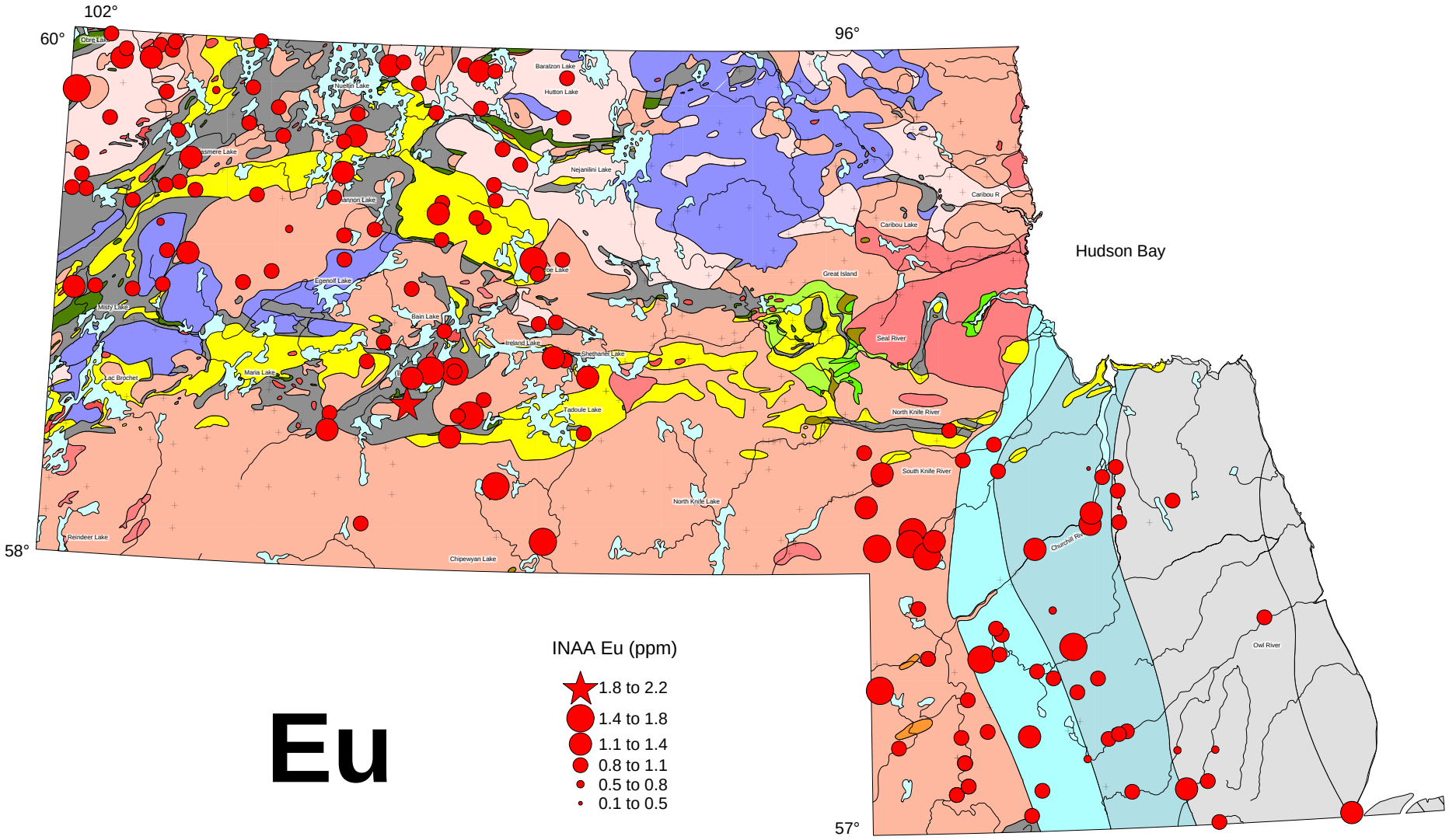

Appendix 7. Geochemical maps: INAA results (<0.063 mm till fraction). Crosses refer to sites that were not reanalysed

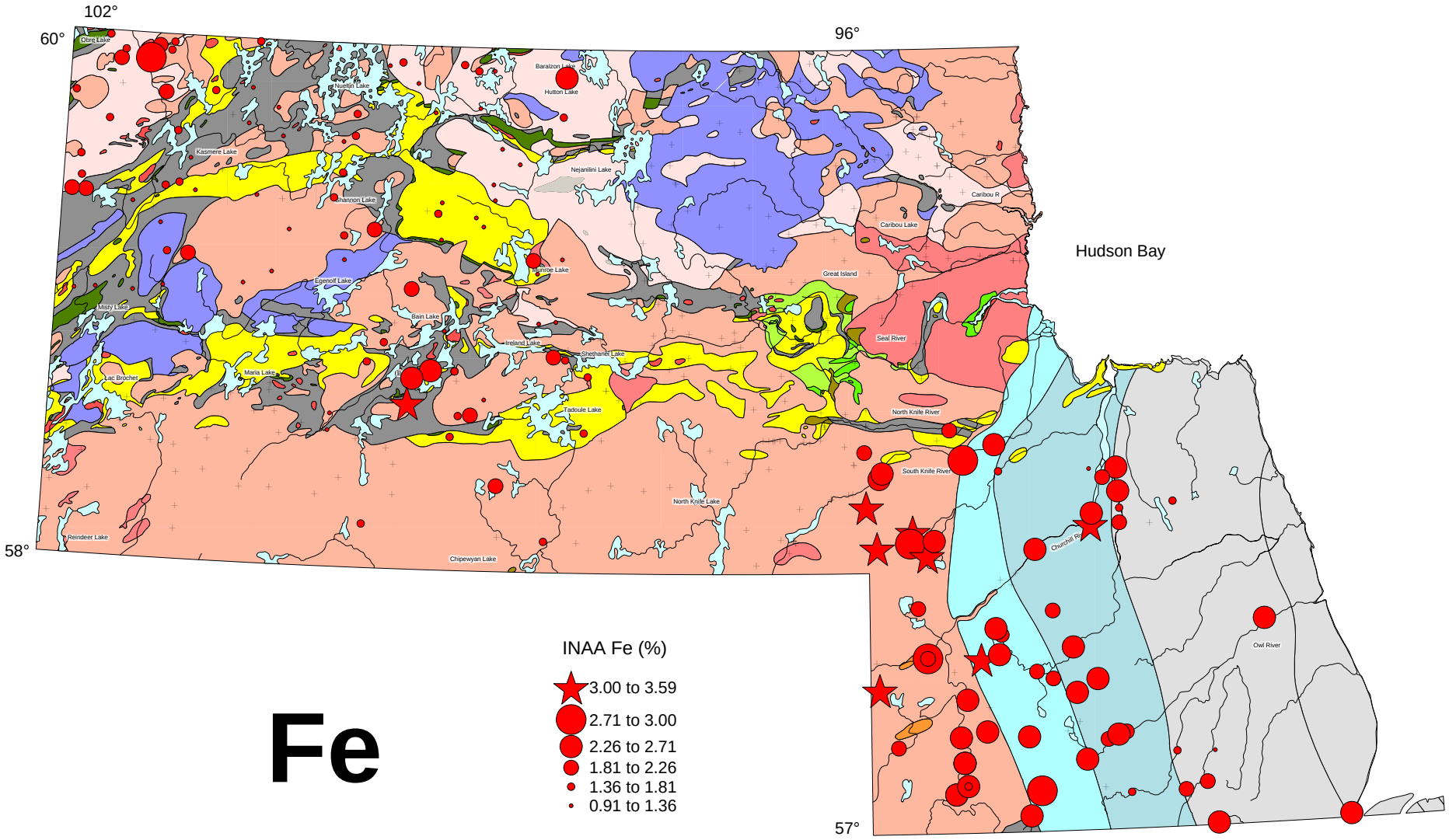

102°
60°
96°
58°
57°
Hudson Bay
Obre Lake
Nueltin Lake
Baralzon Lake
Hutton Lake
Kasmere Lake
Nejanilini Lake
Caribou R
Caribou Lake
Egenolf Lake
Great Island
Bain Lake
Seal River
Ireland Lake
Maria Lake
Lac Brochet
Tadoule Lake
North Knife River
South Knife River
North Knife Lake
Reindeer Lake
Chipewyan Lake
Churchill River
Owl River
INAA Ce (ppm)
133 to 165
122 to 133
99 to 122
76 to 99
53 to 76
30 to 53
Ce

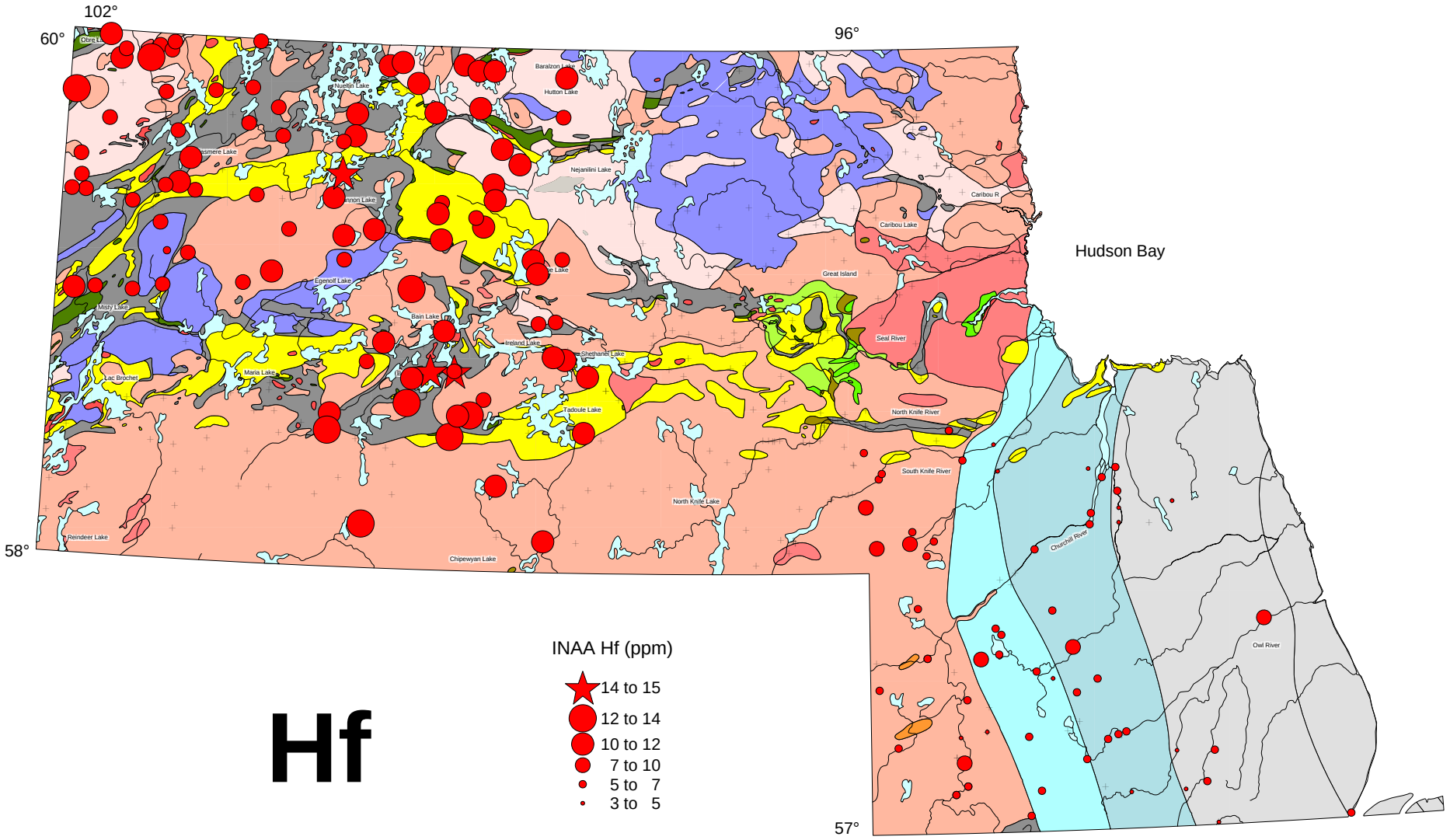

102°
60°
96°
58°
57°
Hudson Bay
Obre Lake
Baralzon Lake
Nueltin Lake
Hutton Lake
Kasmere Lake
Nejanilini Lake
Shannon Lake
Caribou R
Caribou Lake
Great Island
Egenolf Lake
Bain Lake
Ireland Lake
Seal River
Lac Brochet
Maria Lake
Tadoule Lake
North Knife River
South Knife River
North Knife Lake
Reindeer Lake
Chipewyan Lake
Owl River
INAA Co (ppm)
14 to 17
12 to 14
9 to 12
6 to 9
4 to 6
1 to 4
Co

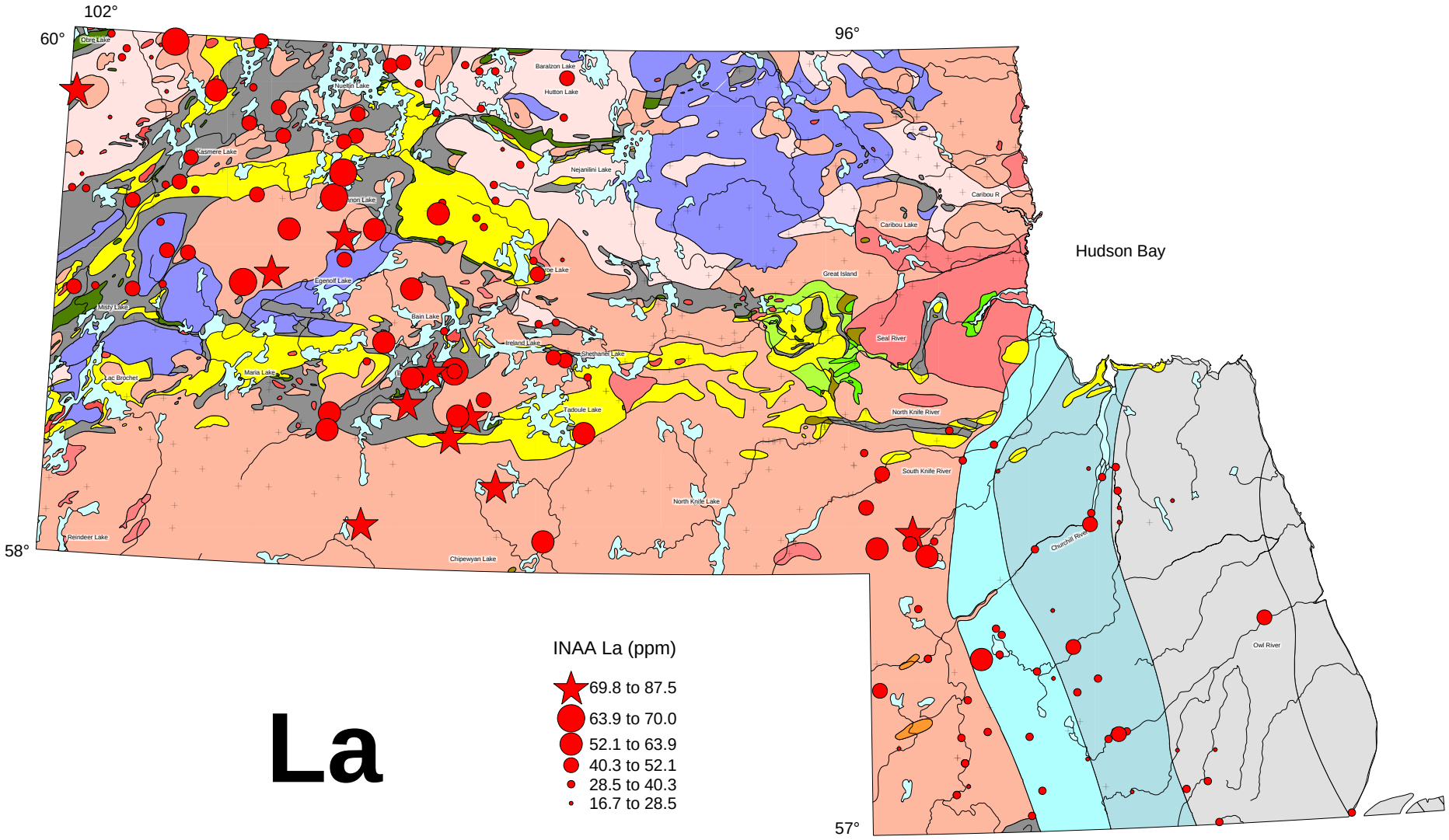

102°
60°
96°
58°
57°
Hudson Bay
Obre Lake
Baralzon Lake
Nueltin Lake
Hutton Lake
Kasmere Lake
Nejanilini Lake
Shannon Lake
Caribou R
Caribou Lake
Egenolf Lake
Great Island
Bain Lake
Seal River
Ireland Lake
Maria Lake
Lac Brochet
Tadoule Lake
North Knife River
South Knife River
North Knife Lake
Reindeer Lake
Chipewyan Lake
Owl River
INAA Cr (ppm)
69 to 81
63 to 69
46 to 63
35 to 46
23 to 35
12 to 23
Cr

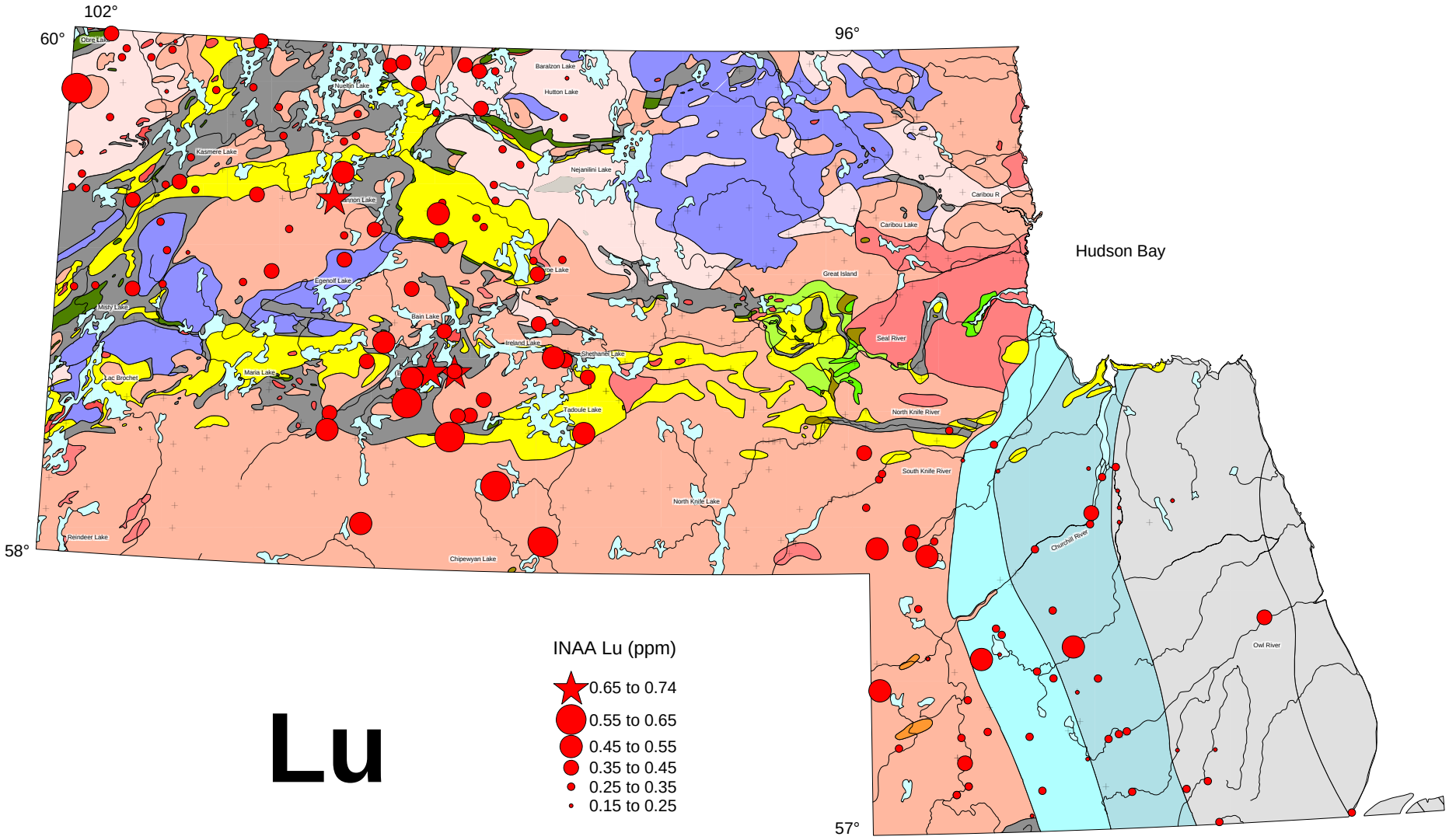

102°
60°
96°
58°
57°
Hudson Bay
Obre Lake
Baralzon Lake
Nueltin Lake
Hutton Lake
Nejanilini Lake
Caribou R
Caribou Lake
Great Island
Seal River
Egenolf Lake
Bain Lake
Ireland Lake
Maria Lake
Lac Brochet
Tadoule Lake
North Knife River
South Knife River
North Knife Lake
Reindeer Lake
Chipewyan Lake
Churchill River
Owl River
INAA Cs (ppm)
6 to 7
5 to 6
4 to 5
3 to 4
2 to 3
1 to 2
Cs

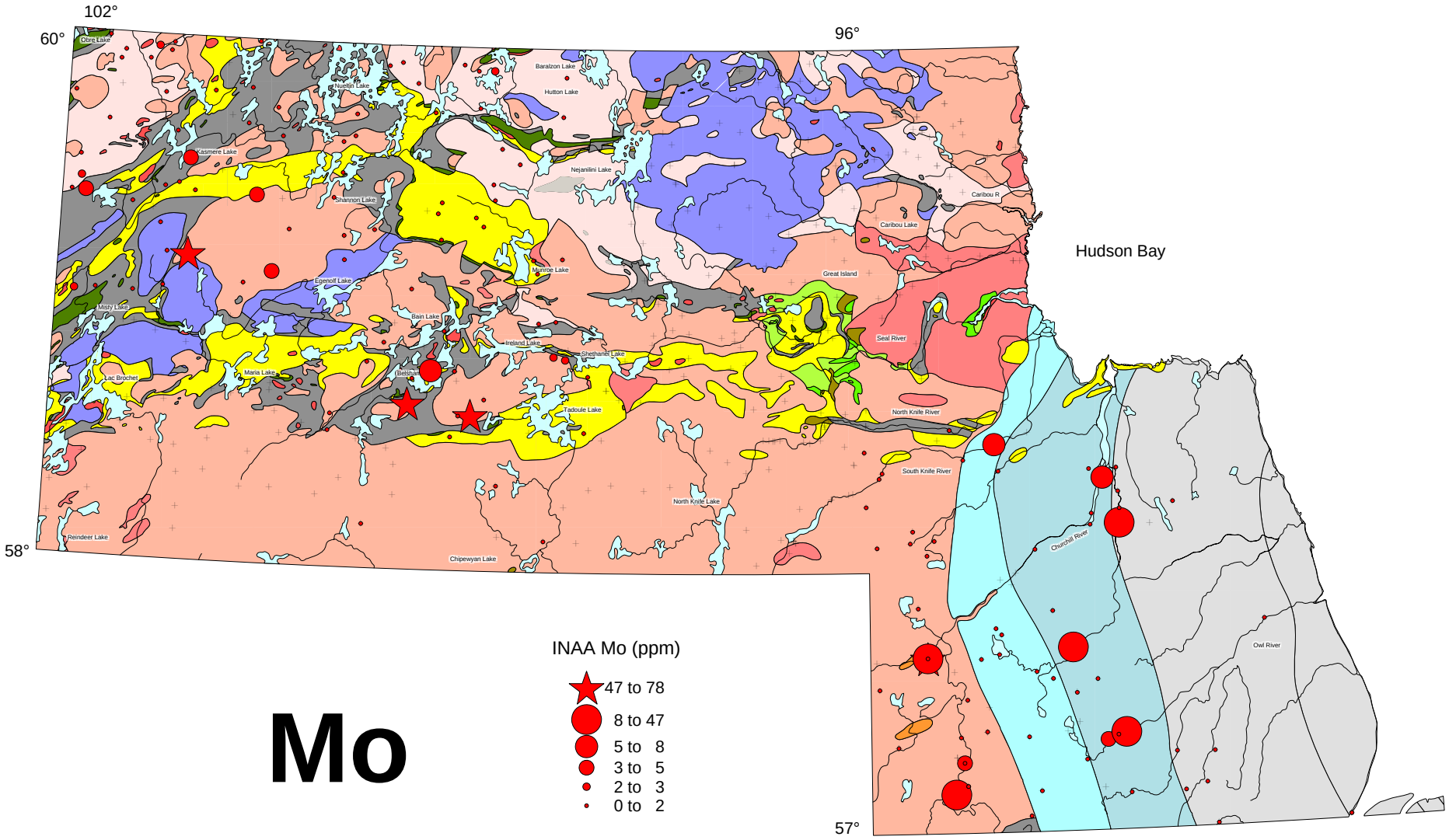

102°
60°
96°
58°
57°
Hudson Bay
Baralzon Lake
Hutton Lake
Nejanilini Lake
Caribou R
Caribou Lake
Great Island
Seal River
North Knife River
South Knife River
North Knife Lake
Tadoule Lake
Ireland Lake
Bain Lake
Egenolf Lake
Maria Lake
Lac Brochet
Reindeer Lake
Chipewyan Lake
Owl River
Eu
INAA Eu (ppm)
1.8 to 2.2
1.4 to 1.8
1.1 to 1.4
0.8 to 1.1
0.5 to 0.8
0.1 to 0.5

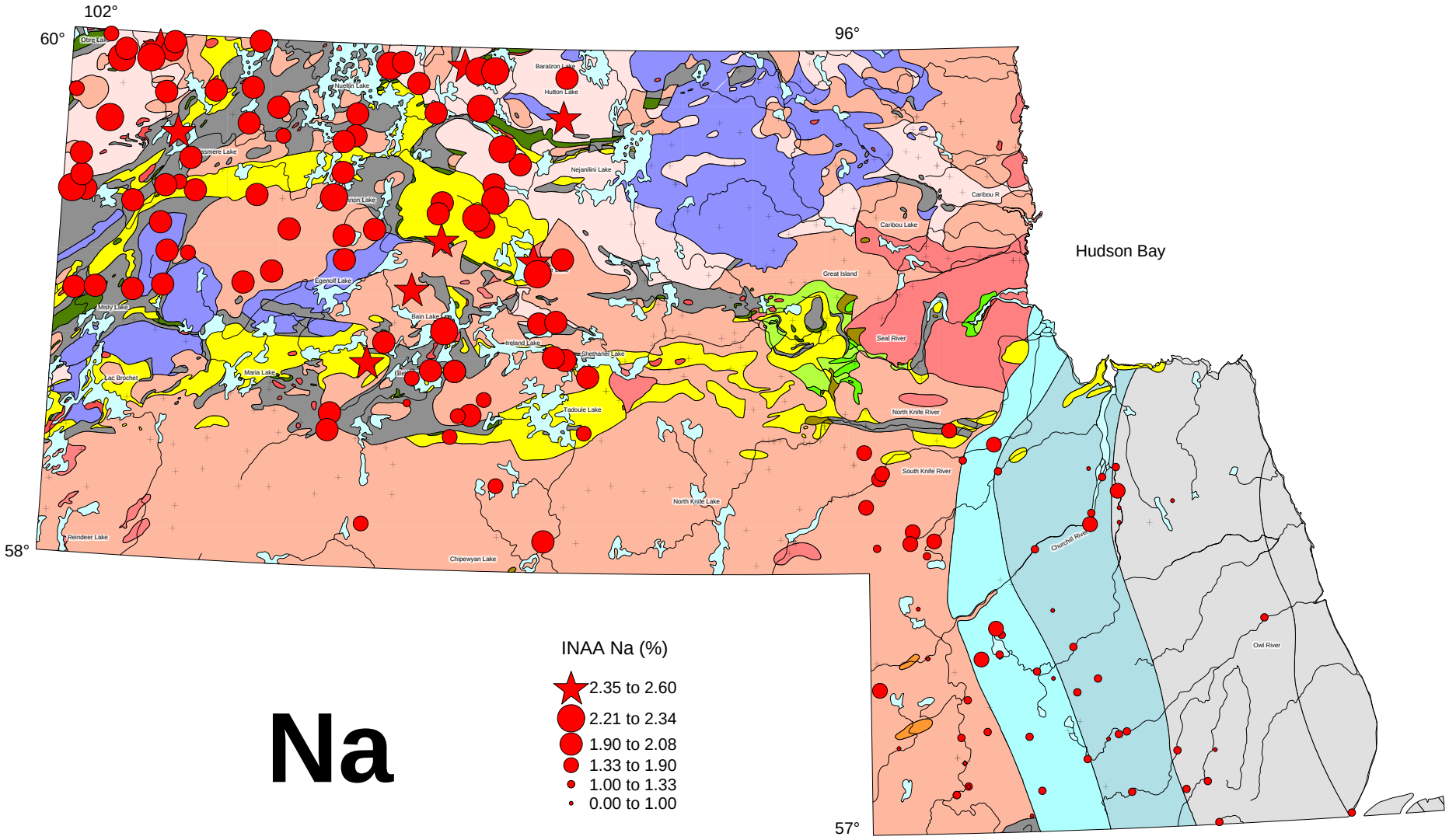

102°
60°
96°
58°
57°
Hudson Bay
Obre Lake
Baralzon Lake
Hutton Lake
Nueltin Lake
Kasmere Lake
Nejanilini Lake
Shannon Lake
Caribou R
Caribou Lake
Great Island
Munroe Lake
Egenolf Lake
Mary Lake
Bain Lake
Seal River
Ireland Lake
Shethanei Lake
Lac Brochet
Maria Lake
Tadoule Lake
North Knife River
South Knife River
North Knife Lake
Reindeer Lake
Chipewyan Lake
Churchill R
Owl River
INAA Fe (%)
3.00 to 3.59
2.71 to 3.00
2.26 to 2.71
1.81 to 2.26
1.36 to 1.81
0.91 to 1.36
Fe

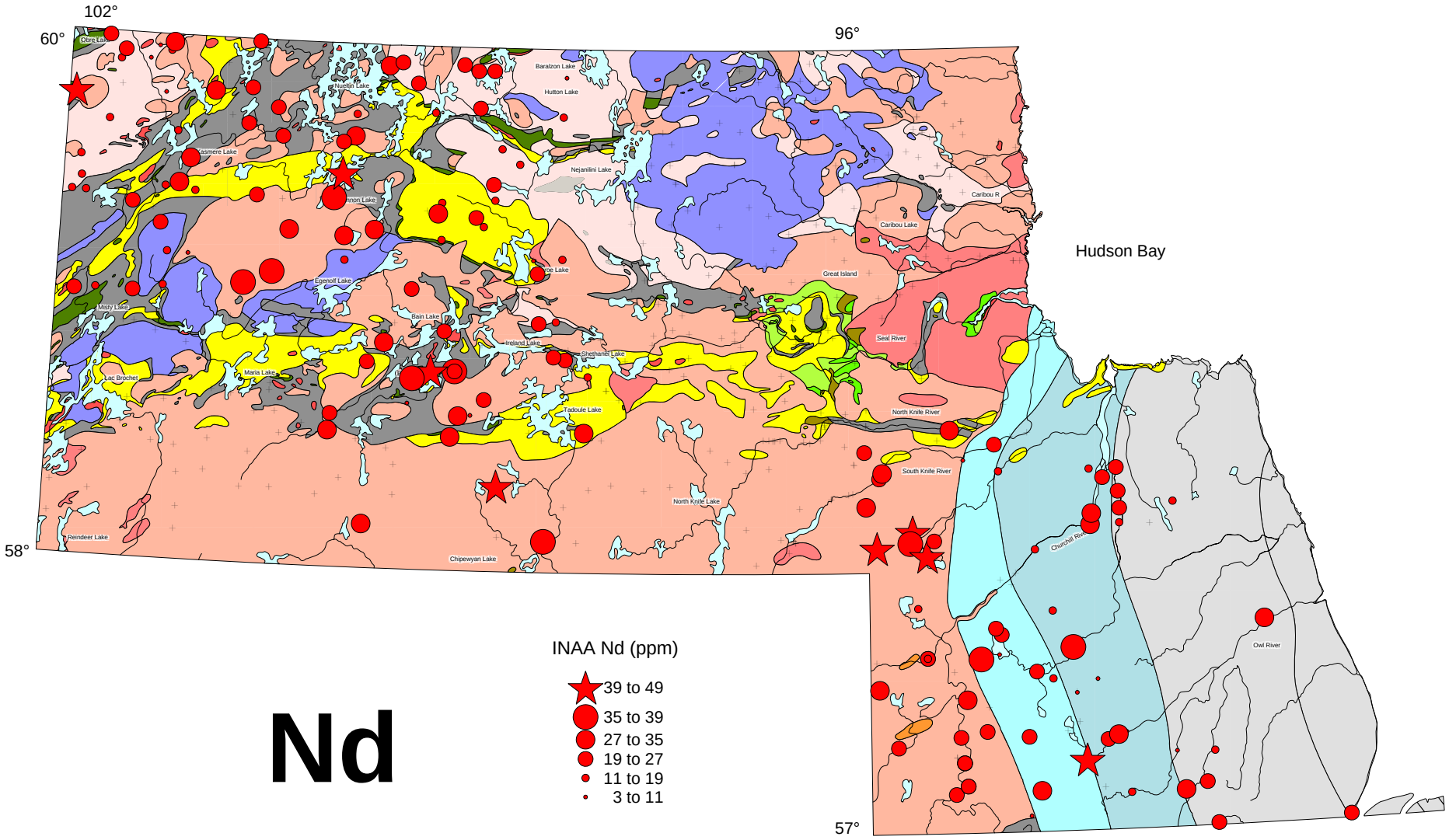

102°
60°
96°
58°
57°
Hudson Bay
Baralzon Lake
Hutton Lake
Nejanilini Lake
Caribou R
Caribou Lake
Great Island
Seal River
North Knife River
South Knife River
North Knife Lake
Churchill River
Owl River
Tadoule Lake
Ireland Lake
Bain Lake
Egenolf Lake
Maria Lake
Lac Brochet
Reindeer Lake
Chipewyan Lake
INAA Hf (ppm)
14 to 15
12 to 14
10 to 12
7 to 10
5 to 7
3 to 5
Hf

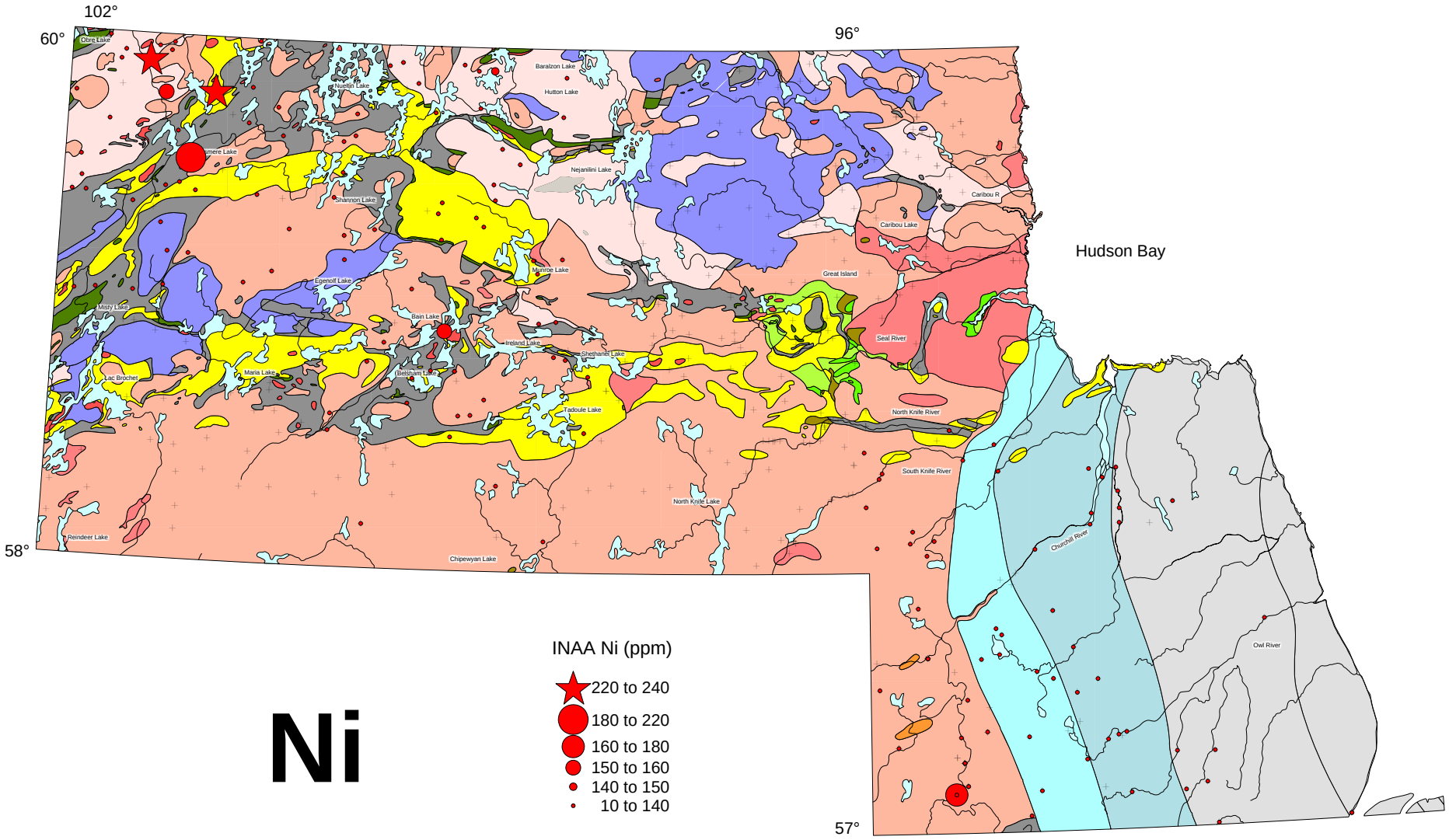

102°
60°
96°
58°
57°
Hudson Bay
Obre Lake
Baralzon Lake
Nueltin Lake
Hutton Lake
Kasmere Lake
Nejanilini Lake
Caribou R
Caribou Lake
Egenolf Lake
Great Island
Bain Lake
Seal River
Ireland Lake
Maria Lake
Lac Brochet
Tadoule Lake
North Knife River
South Knife River
North Knife Lake
Reindeer Lake
Chipewyan Lake
Churchill River
Owl River
INAA La (ppm)
69.8 to 87.5
63.9 to 70.0
52.1 to 63.9
40.3 to 52.1
28.5 to 40.3
16.7 to 28.5
La

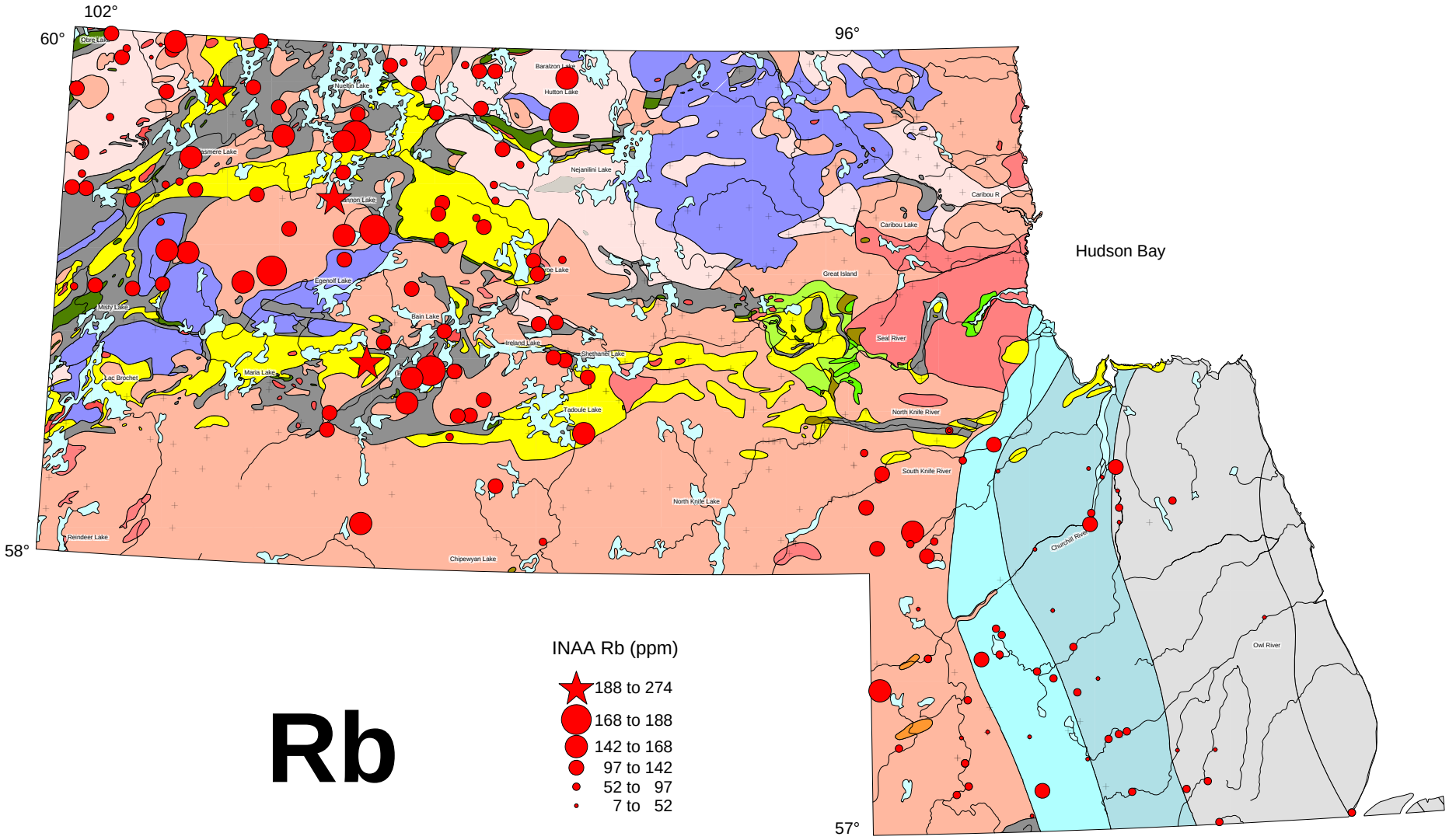

102°
60°
96°
Hudson Bay
58°
57°
Obre Lake
Nueltin Lake
Baralzon Lake
Hutton Lake
Kasmere Lake
Nejanilini Lake
Caribou R
Caribou Lake
Egenoll Lake
Great Island
Bain Lake
Ireland Lake
Seal River
Lac Brochet
Maria Lake
Tadoule Lake
North Knife River
South Knife River
North Knife Lake
Reindeer Lake
Chipewyan Lake
Churchill River
Owl River
INAA Lu (ppm)
0.65 to 0.74
0.55 to 0.65
0.45 to 0.55
0.35 to 0.45
0.25 to 0.35
0.15 to 0.25
Lu

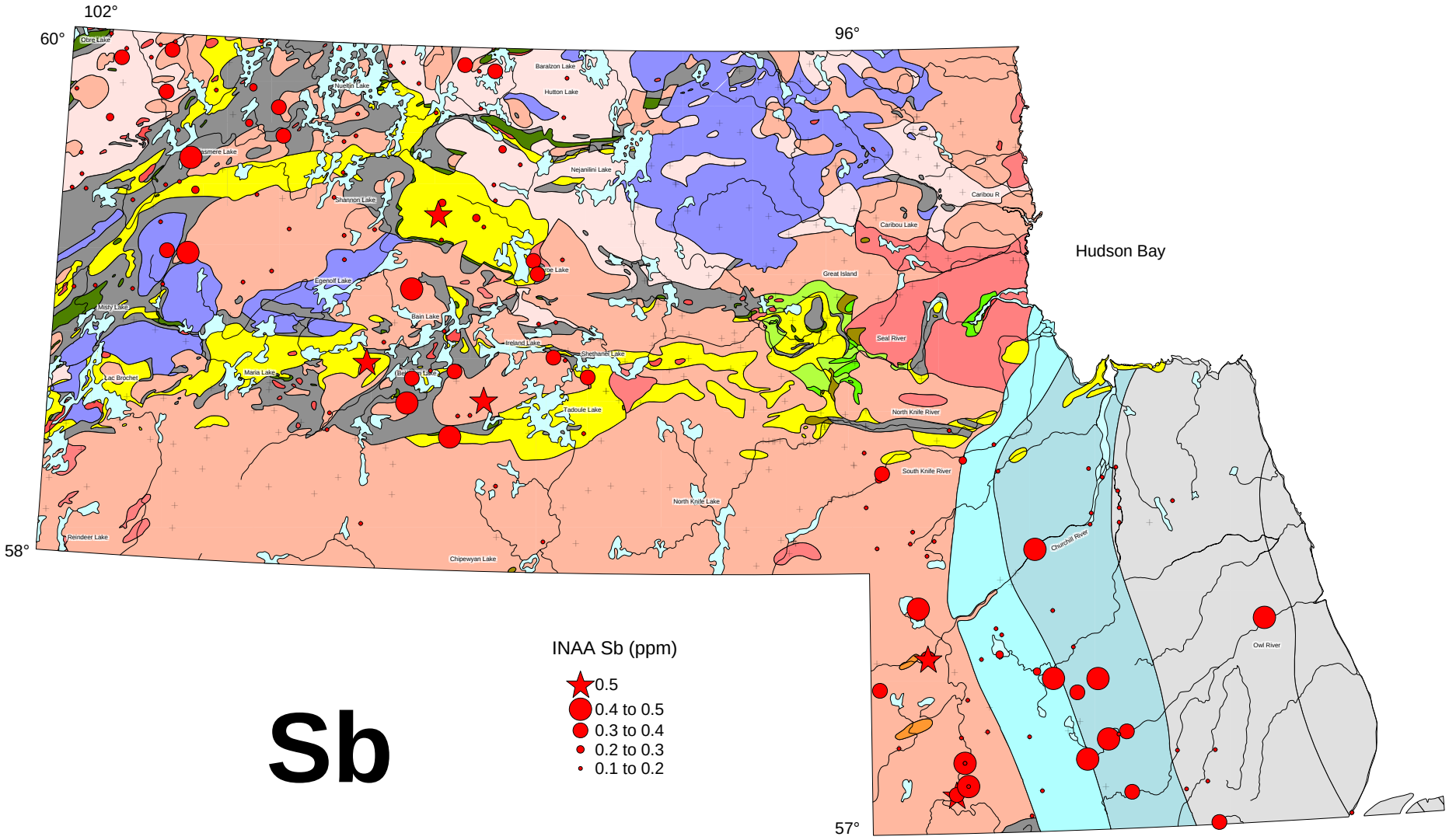

102°
60°
96°
58°
57°
Hudson Bay
Obre Lake
Baralzon Lake
Nueltin Lake
Hutton Lake
Kasmere Lake
Nejanilini Lake
Shannon Lake
Caribou R
Caribou Lake
Great Island
Monroe Lake
Egenolf Lake
Mary Lake
Bain Lake
Ireland Lake
Seal River
Sheshanes Lake
Lac Brochet
Maria Lake
Tadoule Lake
North Knife River
South Knife River
North Knife Lake
Reindeer Lake
Chipewyan Lake
Churchill River
Owl River
INAA Mo (ppm)
47 to 78
8 to 47
5 to 8
3 to 5
2 to 3
0 to 2
Mo

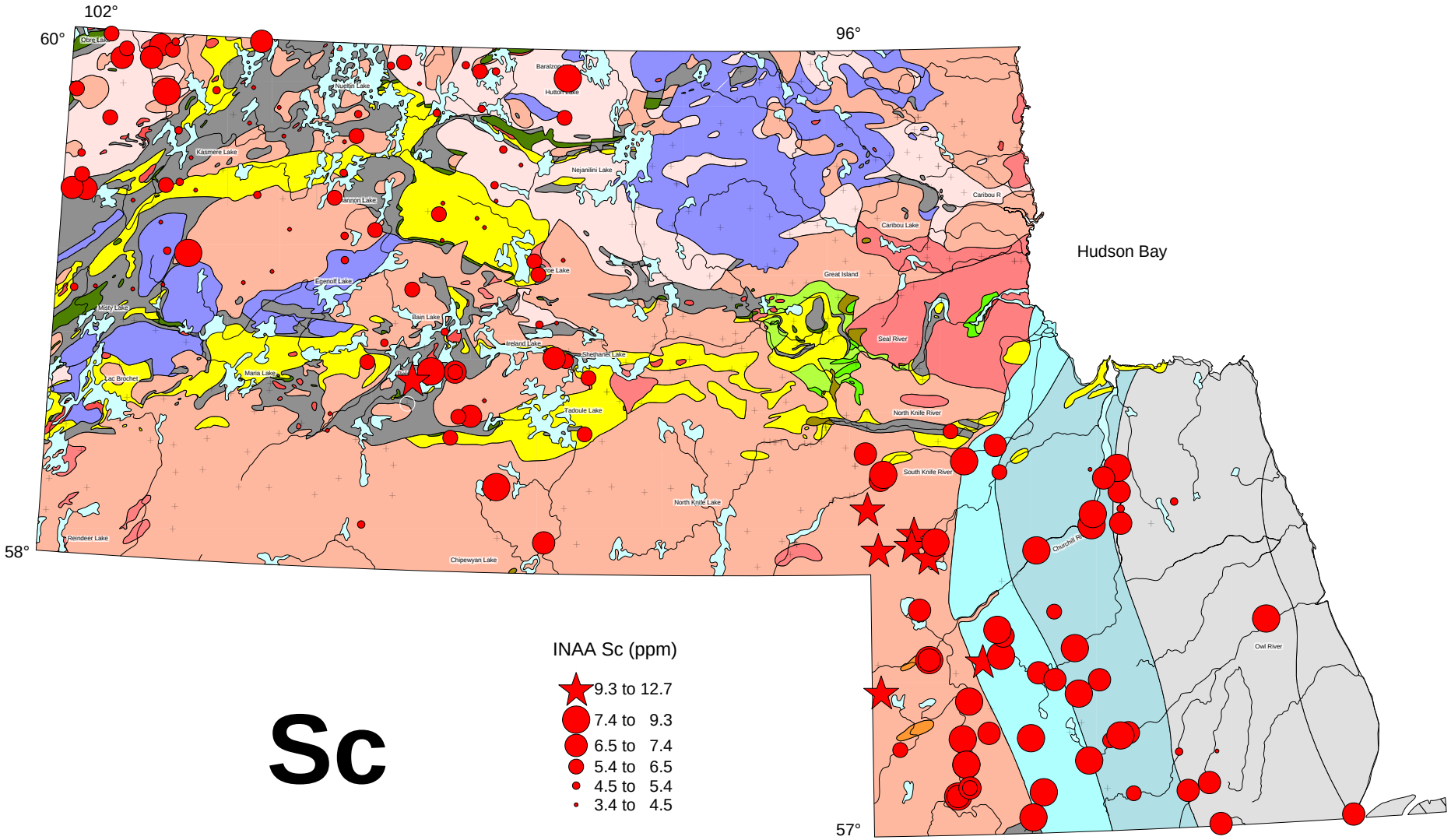

102°
60°
96°
58°
57°
Hudson Bay
Baralzon Lake
Hutton Lake
Nejanilini Lake
Caribou R
Caribou Lake
Great Island
Seal River
North Knife River
South Knife River
North Knife Lake
Churchill River
Owl River
Egenolf Lake
Bain Lake
Ireland Lake
Shethanei Lake
Tadoule Lake
Maria Lake
Lac Brochet
Reindeer Lake
Chipewyan Lake
INAA Na (%)
2.35 to 2.60
2.21 to 2.34
1.90 to 2.08
1.33 to 1.90
1.00 to 1.33
0.00 to 1.00
Na

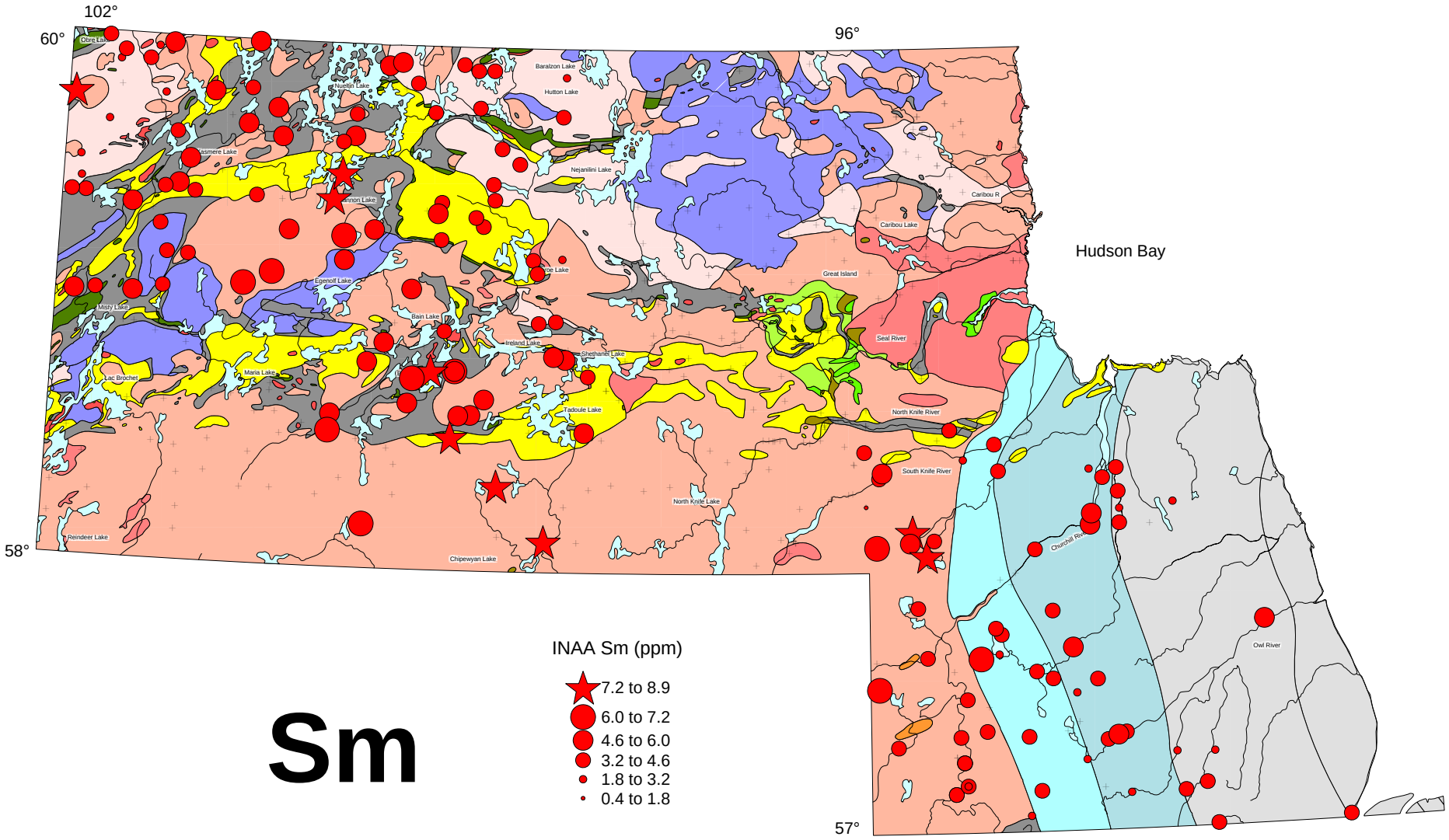

102°
60°
96°
58°
57°
Hudson Bay
Baralzon Lake
Hutton Lake
Nejanilini Lake
Caribou R
Caribou Lake
Great Island
Seal River
North Knife River
South Knife River
North Knife Lake
Tadoule Lake
Ireland Lake
Bain Lake
Egenolf Lake
Maria Lake
Lac Brochet
Reindeer Lake
Chipewyan Lake
Owl River
Nd
INAA Nd (ppm)
39 to 49
35 to 39
27 to 35
19 to 27
11 to 19
3 to 11


102°
60°
96°
58°
57°
Hudson Bay
Obre Lake
Baralzon Lake
Nueltin Lake
Hutton Lake
Nejanilini Lake
Shannon Lake
Caribou R
Caribou Lake
Great Island
Monroe Lake
Egenolf Lake
Bain Lake
Ireland Lake
Seal River
Sheshanes Lake
Lac Brochet
Maria Lake
Tadoule Lake
North Knife River
South Knife River
North Knife Lake
Reindeer Lake
Chipewyan Lake
Churchill River
Owl River
INAA Ni (ppm)
220 to 240
180 to 220
160 to 180
150 to 160
140 to 150
10 to 140
Ni

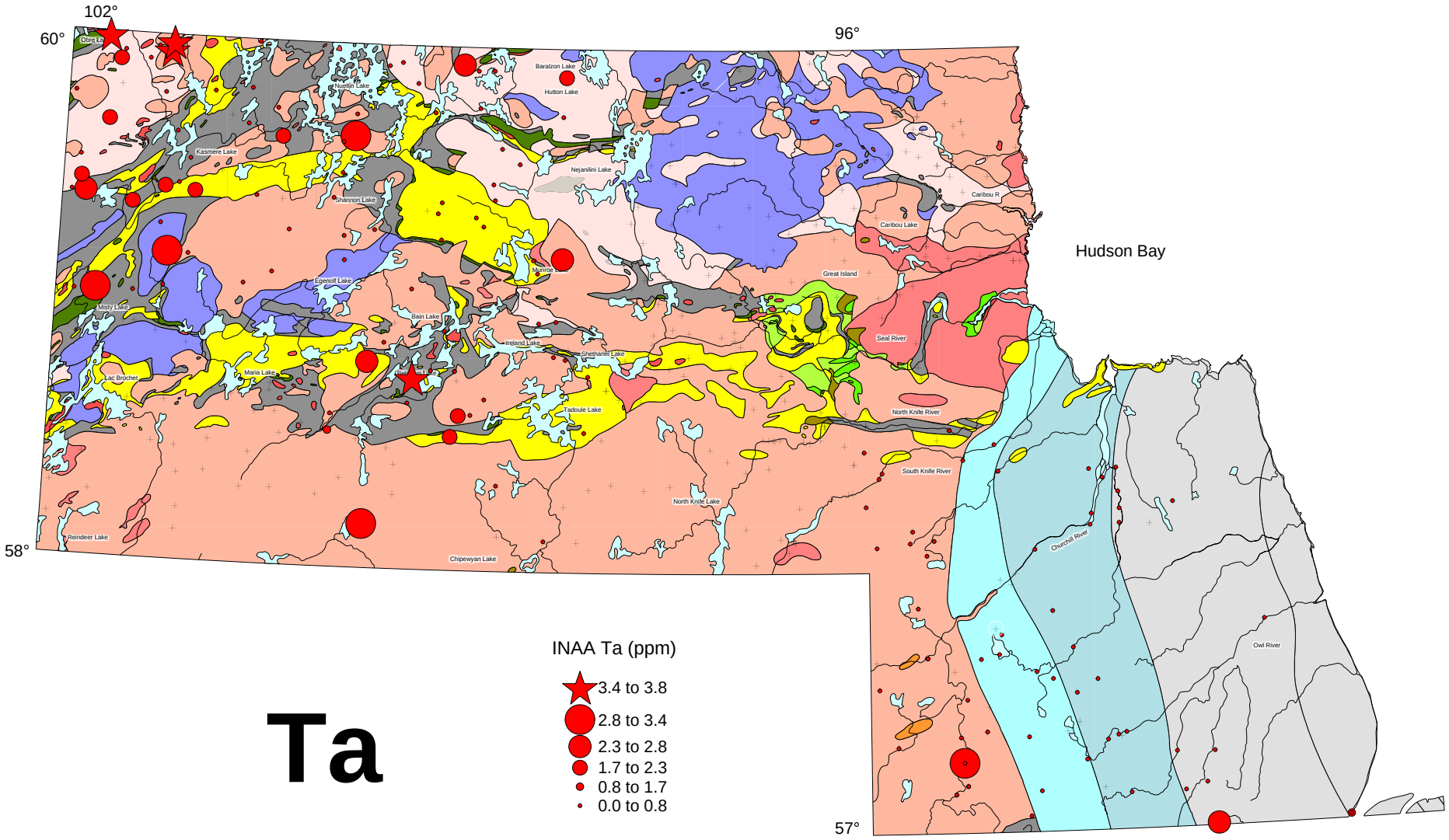

102°
60°
96°
58°
57°
Hudson Bay
Obre Lake
Nueltin Lake
Baralzon Lake
Hutton Lake
Nejanilini Lake
Caribou R
Caribou Lake
Great Island
Seal River
Egenolf Lake
Mary Lake
Bain Lake
Ireland Lake
Shethanei Lake
Maria Lake
Lac Brochet
Tadoule Lake
North Knife River
South Knife River
North Knife Lake
Reindeer Lake
Chipewyan Lake
Churchill River
Owl River
INAA Rb (ppm)
188 to 274
168 to 188
142 to 168
97 to 142
52 to 97
7 to 52
Rb


102°
60°
96°
58°
57°
Hudson Bay
Obre Lake
Baralzon Lake
Nueltin Lake
Hutton Lake
Nejanilini Lake
Caribou R
Caribou Lake
Shannon Lake
Egenolf Lake
Great Island
Seal River
Bain Lake
Ireland Lake
Sheshanes Lake
Maria Lake
Lac Brochet
Tadoule Lake
North Knife River
South Knife River
North Knife Lake
Reindeer Lake
Chipewyan Lake
Churchill River
Owl River
INAA Sb (ppm)
0.5
0.4 to 0.5
0.3 to 0.4
0.2 to 0.3
0.1 to 0.2
Sb

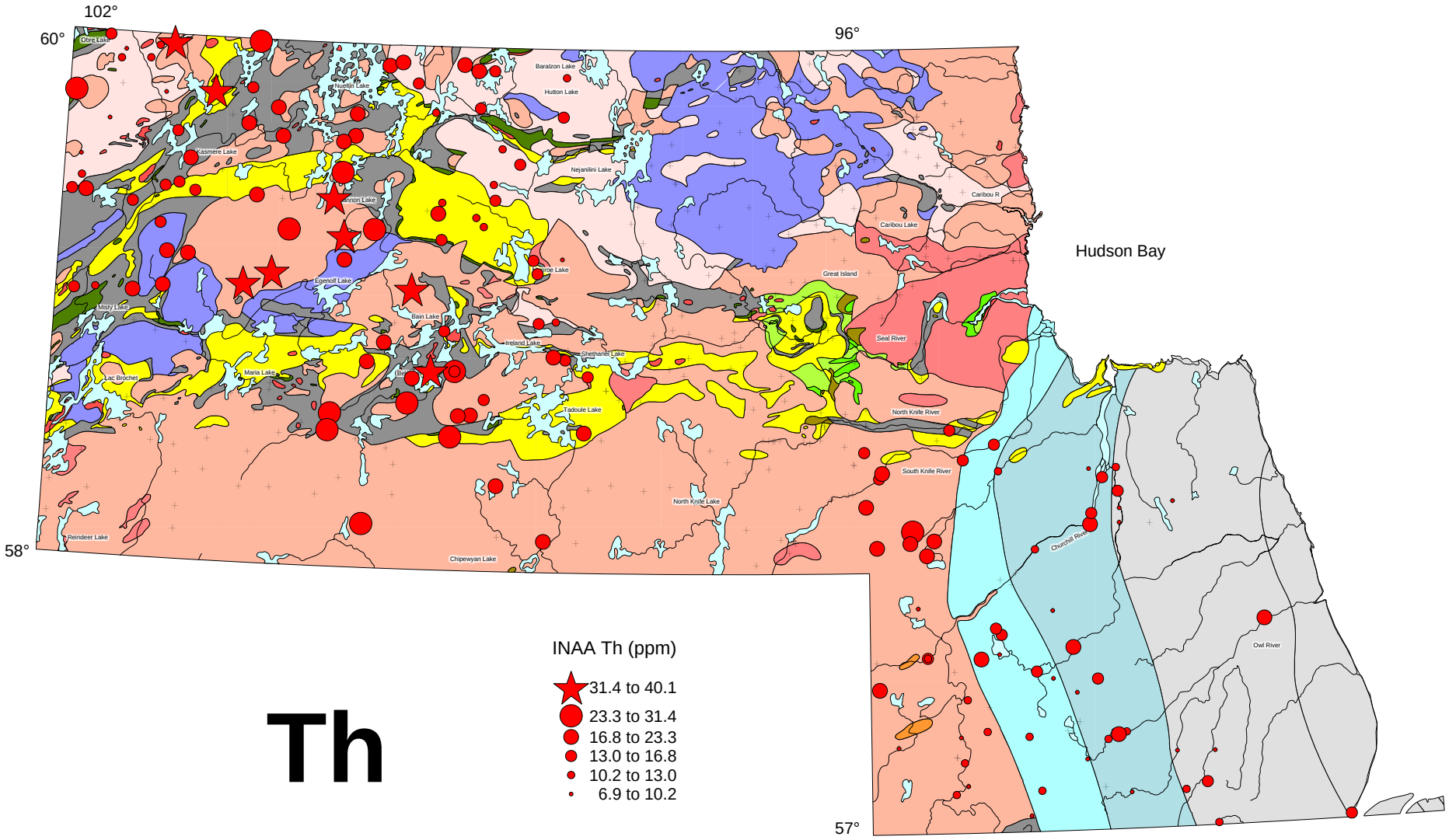

102°
60°
96°
58°
57°
Hudson Bay
Sc
INAA Sc (ppm)
9.3 to 12.7
7.4 to 9.3
6.5 to 7.4
5.4 to 6.5
4.5 to 5.4
3.4 to 4.5
Kasmere Lake
Nejanilini Lake
Caribou Lake
Great Island
Seal River
Egenolf Lake
Bain Lake
Ireland Lake
Maria Lake
Lac Brochet
Tadoule Lake
North Knife River
South Knife River
North Knife Lake
Reindeer Lake
Chipewyan Lake
Owl River

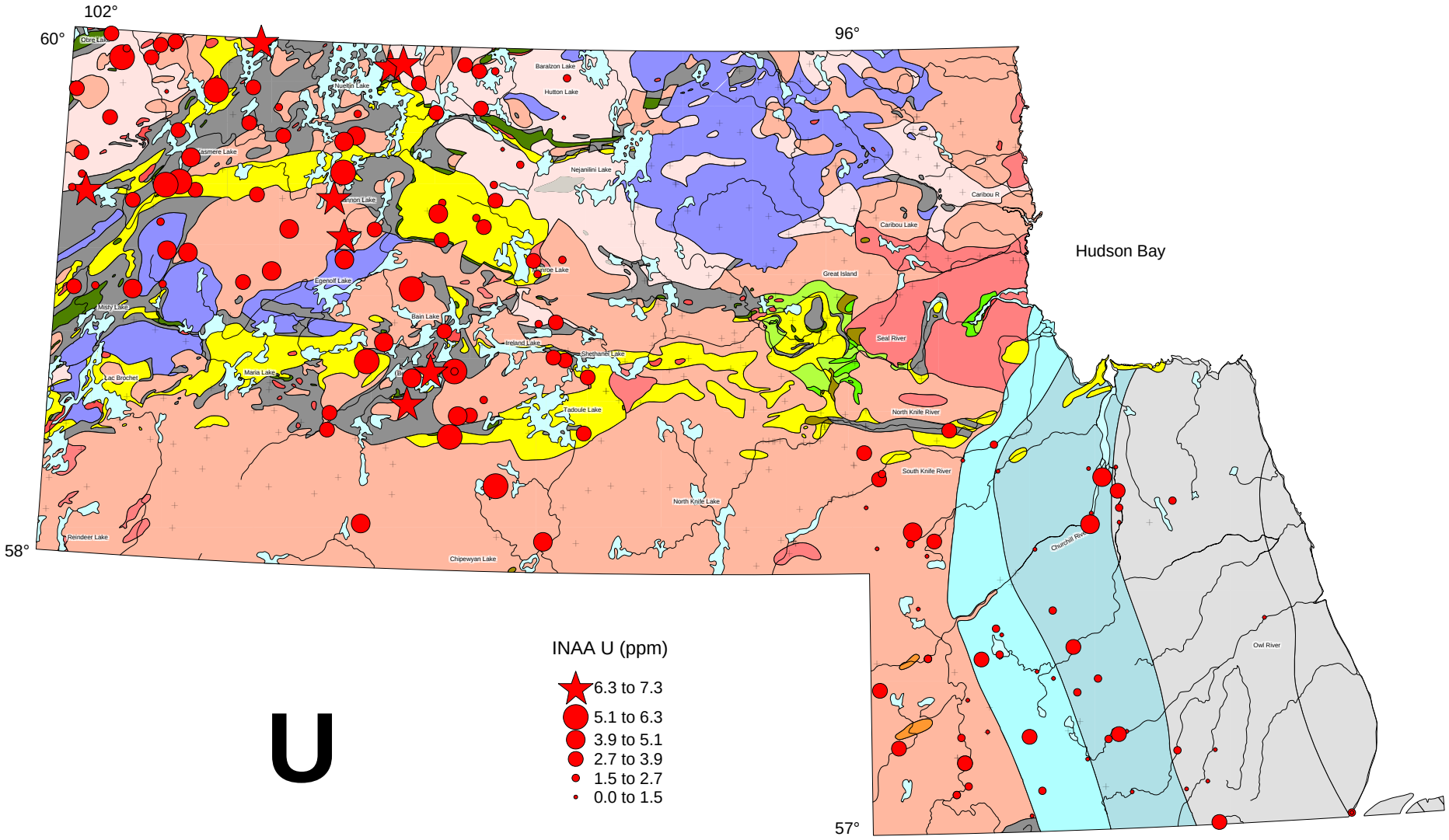


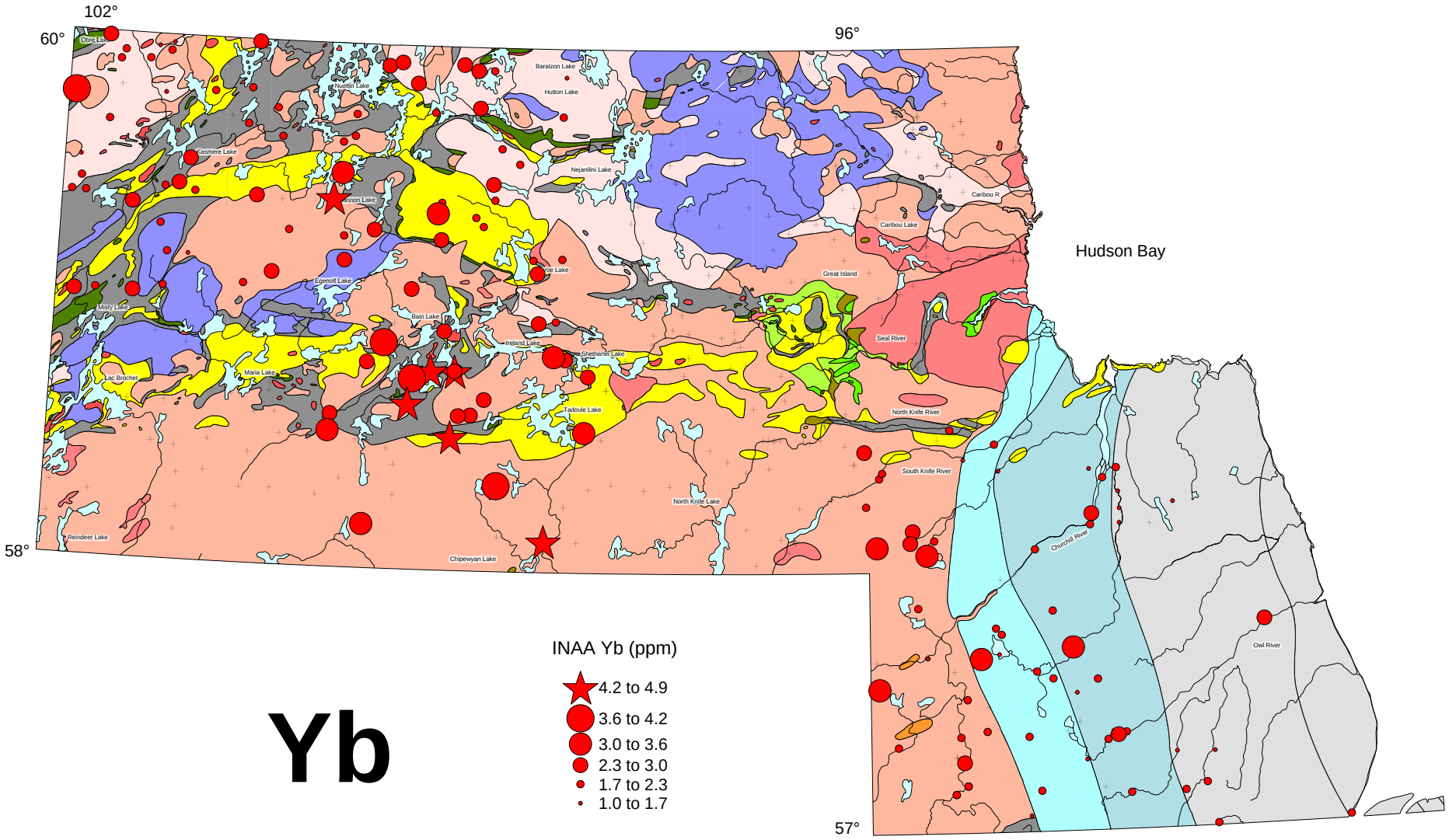

Appendix 7. Geochemical maps: INAA results (<0.063 mm till fraction). Crosses refer to sites that were not reanalysed

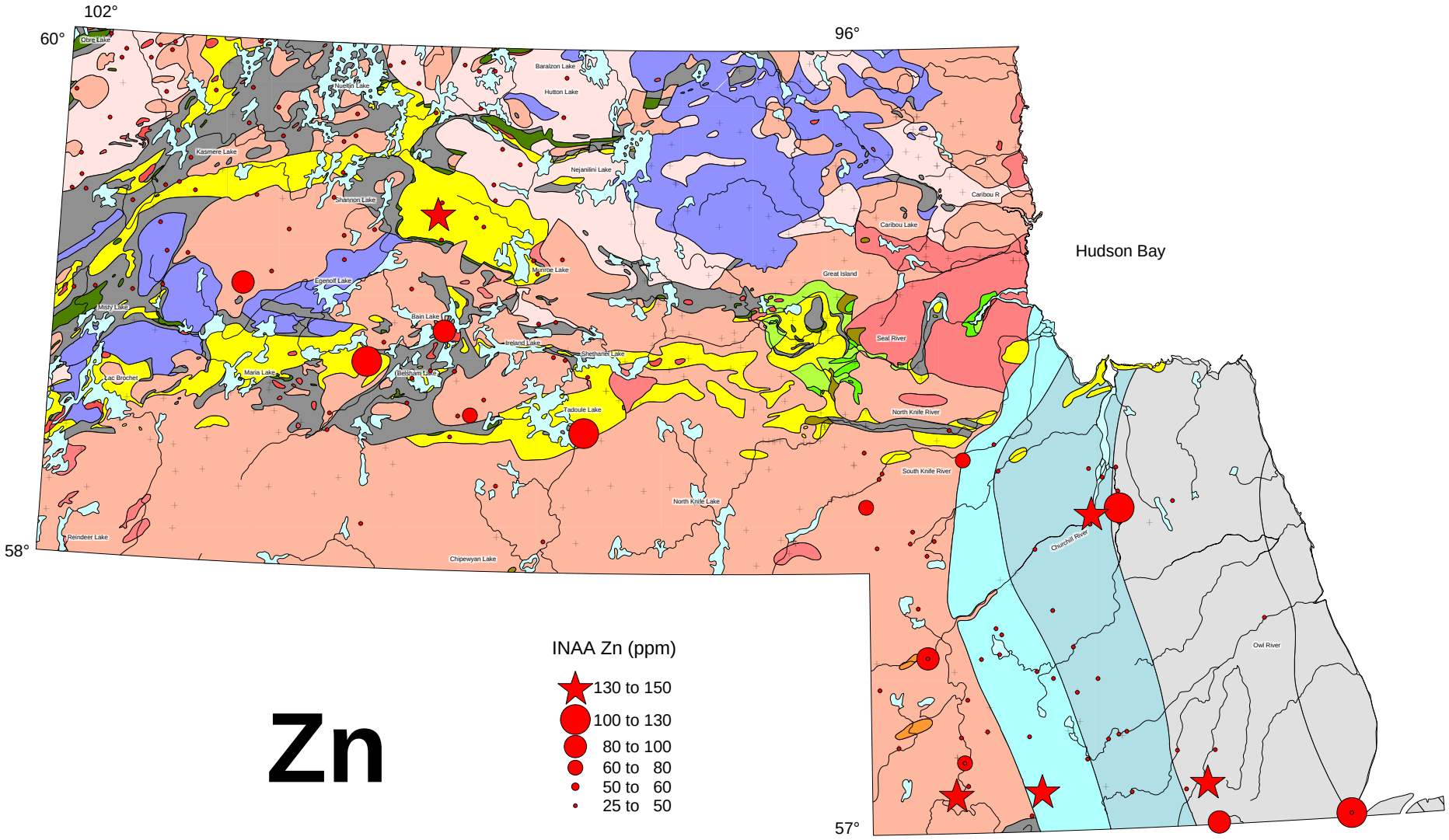



Appendix 7. Geochemical maps: INAA results (<0.063 mm till fraction). Crosses refer to sites that were not reanalysed

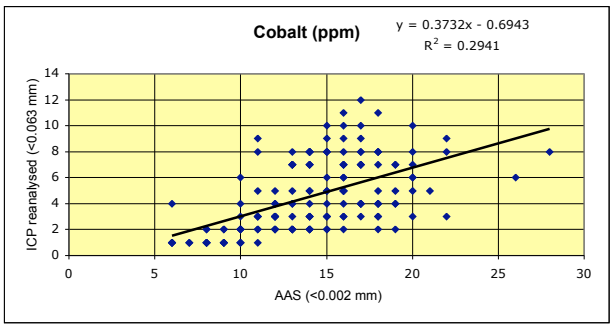

102°
60°
96°
58°
57°
Hudson Bay
Obre Lake
Baralzon Lake
Nueltin Lake
Hutton Lake
Kasmere Lake
Nejanilini Lake
Caribou R
Caribou Lake
Egenolf Lake
Great Island
Bain Lake
Seal River
Ireland Lake
Maria Lake
Lac Brochet
Tadoule Lake
North Knife River
South Knife River
North Knife Lake
Reindeer Lake
Chipewyan Lake
Churchill River
Owl River
INAA Th (ppm)
31.4 to 40.1
23.3 to 31.4
16.8 to 23.3
13.0 to 16.8
10.2 to 13.0
6.9 to 10.2
Th

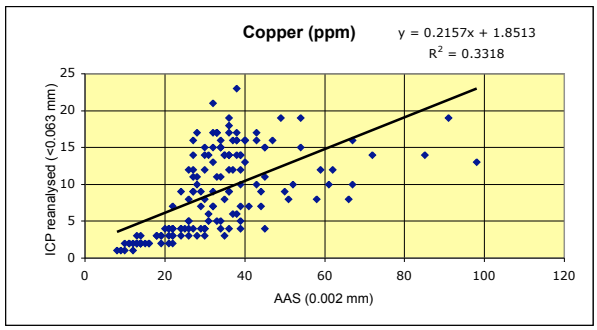

102°
60°
96°
58°
57°
Hudson Bay
Obre Lake
Nueltin Lake
Baralzon Lake
Hutton Lake
Nejanilini Lake
Caribou R
Caribou Lake
Great Island
Seal River
North Knife River
South Knife River
Churchill River
Owl River
North Knife Lake
Tadoule Lake
Shethanei Lake
Ireland Lake
Bain Lake
Egenolf Lake
Lac Brochet
Maria Lake
Reindeer Lake
Chipewyan Lake
INAA U (ppm)
6.3 to 7.3
5.1 to 6.3
3.9 to 5.1
2.7 to 3.9
1.5 to 2.7
0.0 to 1.5
U

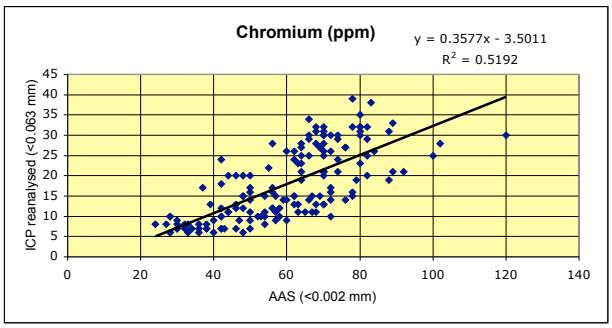

102°
60°
96°
58°
57°
Hudson Bay
Obre Lake
Nueltin Lake
Baralzon Lake
Hutton Lake
Kasmere Lake
Nejanilini Lake
Caribou R
Caribou Lake
Egenoll Lake
Great Island
Bain Lake
Seal River
Ireland Lake
Maria Lake
Lac Brochet
Tadoule Lake
North Knife River
South Knife River
North Knife Lake
Reindeer Lake
Chipewyan Lake
Churchill River
Owl River
INAA Yb (ppm)
4.2 to 4.9
3.6 to 4.2
3.0 to 3.6
2.3 to 3.0
1.7 to 2.3
1.0 to 1.7
Yb

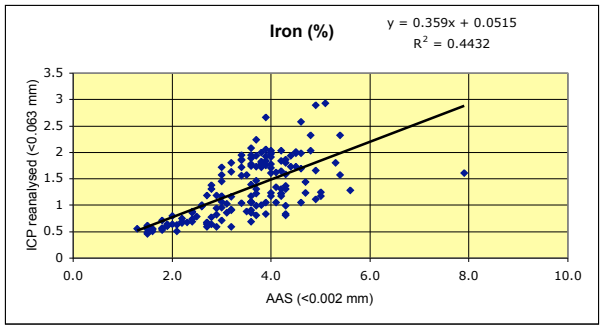


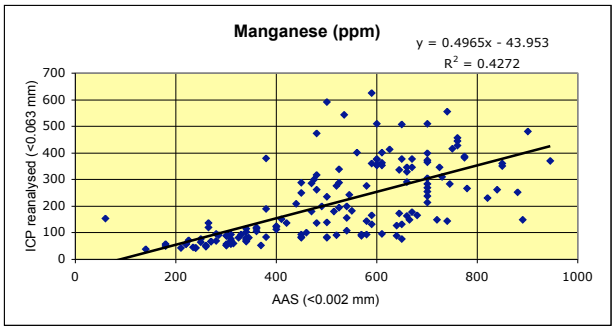

Appendix 7. Geochemical maps: INAA results (<0.063 mm till fraction). Crosses refer to sites that were not reanalysed

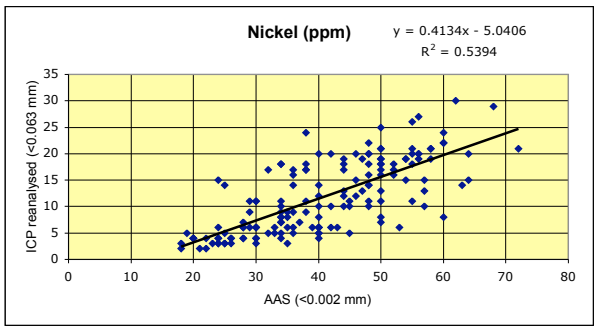

Cobalt (ppm)
y = 0.3732x - 0.6943
R2 = 0.2941
ICP reanalysed (<0.063 mm)
AAS (<0.002 mm)

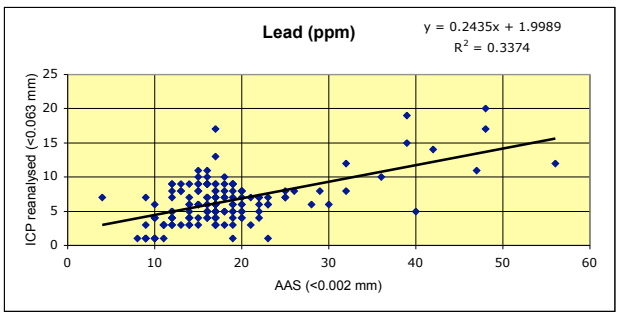

Copper (ppm)
y = 0.2157x + 1.8513
R2 = 0.3318
ICP reanalysed (<0.063 mm)
AAS (0.002 mm)

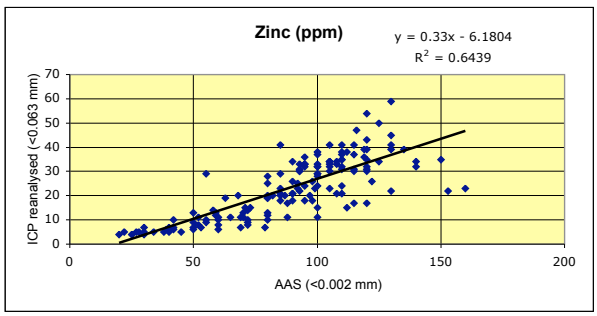

Chromium (ppm)
y = 0.3577x - 3.5011
R2 = 0.5192
ICP reanalysed (<0.063 mm)
AAS (<0.002 mm)

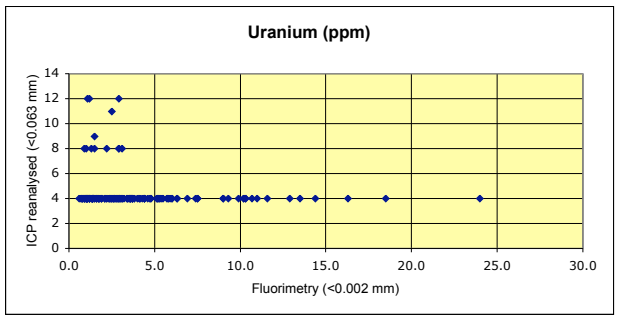

Iron (%)
y = 0.359x + 0.0515
R2 = 0.4432
ICP reanalysed (<0.063 mm)
AAS (<0.002 mm)

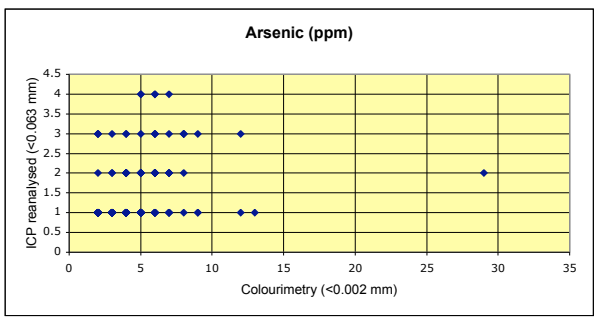

Manganese (ppm)
y = 0.4965x - 43.953
R2 = 0.4272
ICP reanalysed (<0.063 mm)
AAS (<0.002 mm)

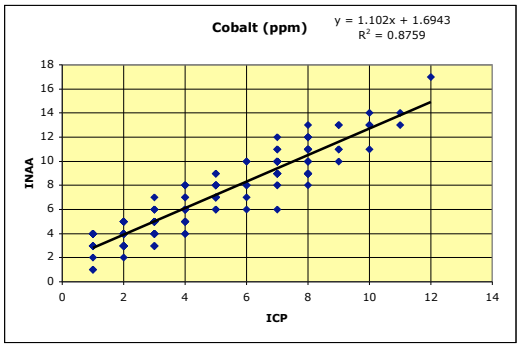

Nickel (ppm)
y = 0.4134x - 5.0406
R2 = 0.5394
ICP reanalysed (<0.063 mm)
AAS (<0.002 mm)

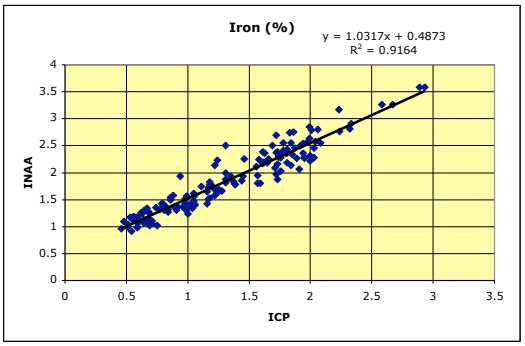

Lead (ppm)
y = 0.2435x + 1.9989
R2 = 0.3374
ICP reanalysed (<0.063 mm)
AAS (<0.002 mm)

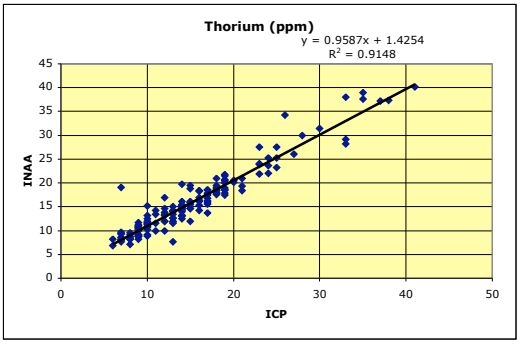

Zinc (ppm)
y = 0.33x - 6.1804
R2 = 0.6439
ICP reanalysed (<0.063 mm)
AAS (<0.002 mm)

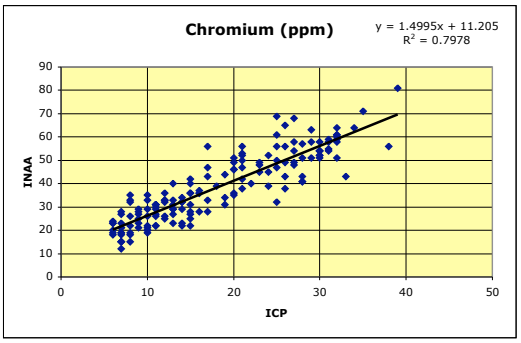

Uranium (ppm)
ICP reanalysed (<0.063 mm)
Fluorimetry (<0.002 mm)

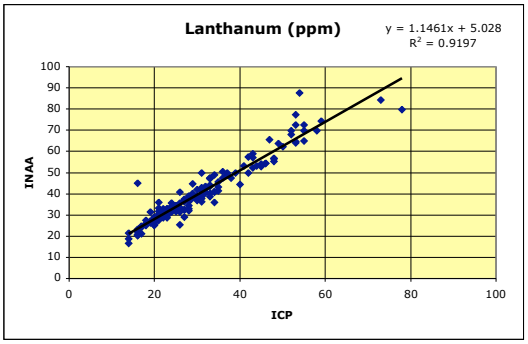

Arsenic (ppm)
ICP reanalysed (<0.063 mm)
Colourimetry (<0.002 mm)

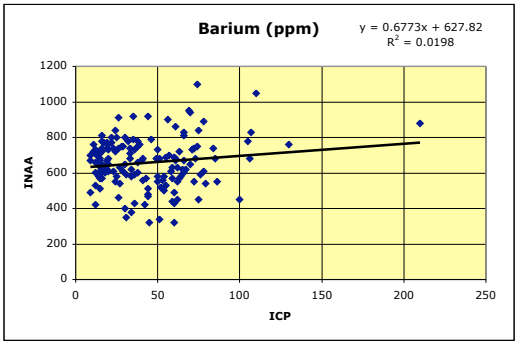

Cobalt (ppm)
y = 1.102x + 1.6943
R² = 0.8759
INAA
ICP

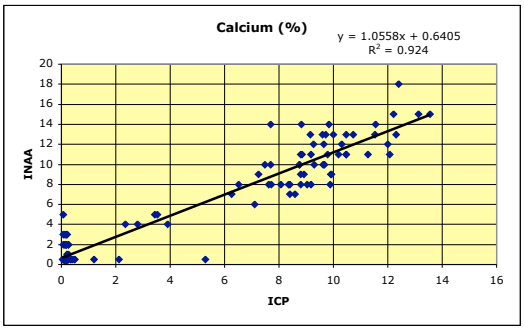

Iron (%)
y = 1.0317x + 0.4873
R² = 0.9164
INAA
ICP

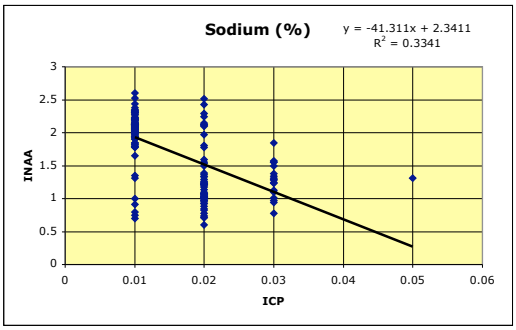

Thorium (ppm)
y = 0.9587x + 1.4254
R² = 0.9148
INAA
ICP

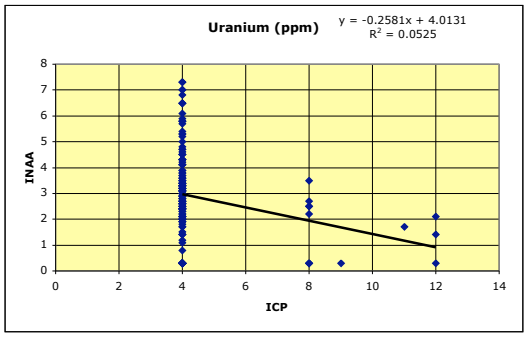

Chromium (ppm)
y = 1.4995x + 11.205
R² = 0.7978
INAA
ICP


Lanthanum (ppm)
y = 1.1461x + 5.028
R² = 0.9197
INAA
ICP


Barium (ppm)
y = 0.6773x + 627.82
R² = 0.0198
INAA
ICP


Calcium (%)
y = 1.0558x + 0.6405
R² = 0.924
INAA
ICP


Sodium (%)
y = -41.311x + 2.3411
R² = 0.3341
INAA
ICP


Uranium (ppm)
y = -0.2581x + 4.0131
R² = 0.0525
INAA
ICP

Appendix 10. Table of ICP-ES anomalies

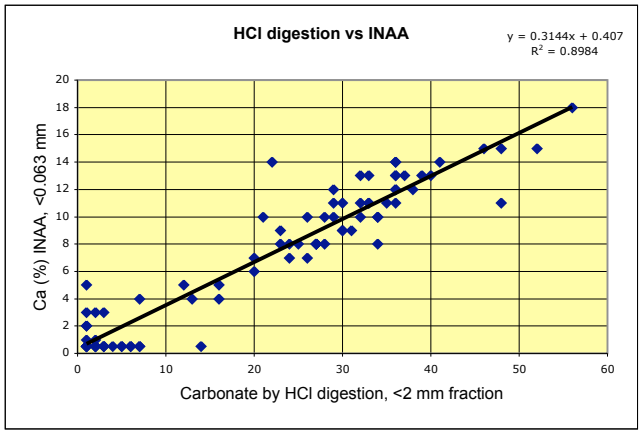
| ELEMENT | Cu | Pb | Zn | Ag | Ni | Co | Mn | Fe | As | U | Au | Th | Sr | Bi | V | Ca | P | La | Cr | Mg | Ba | Ti | B | Al | Na | K |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 78DU036 | | | | | | | | | | | | | | | | | | | | x | | | | | | |
| 78DU053 | | | | | | | x | | | | | | | | | | | | | | | | | | | |
| 78DU084 | | | | | | | | | | **x** | | | x | | | x | | | | | | | | | | |
| 78DU094 | | | | | x | x | **x** | | | | | | | | | | | | | x | | | | | | |
| 78DU103 | | | | | | x | **x** | | | | | | x | | | | | | | | x | | | | | |
| 78DU105 | | | | | | | | | | x | | | | | | x | | | | x | | | **x** | | | |
| 78DU123 | | | | | | | | | | | | | | | | | | | x | | | | | | | x |
| 78DU147 | | | | | | x | | | | | | | | | | | | | | | | | | | | |
| 78DU150 | | | | | | | | | | **x** | | | | | | | | | | | | | | | | |
| 78DU164 | | | x | | x | x | | x | | | | | | **x** | x | | | x | **x** | | x | x | | **x** | | |
| 78DU166 | **x** | | **x** | | **x** | **x** | x | **x** | | | | | | x | **x** | | | | **x** | | x | | | **x** | | |
| 78DU167 | | | x | | | | | | | | | | | | | | | | | | | | | | | |
| 78DU168 | | | x | | **x** | x | | x | | | | | | | | | | | x | | x | | | x | | |
| 78DU184 | x | | | | x | | | x | | | | | | | | | | | x | | | | x | x | | |
| 78DU203 | | | | | | | | | | | | | | | | | | | x | | | | | | | |
| 78DU228 | x | x | x | | x | | | x | | | | | | | | | | | x | | | | | | | |
| 78DU250 | | | | | | | | | | | | | | | | x | | | | **x** | | | **x** | | | |
| 78DU261 | | | x | | | | | | | | | | | | | | | x | | | | | | | | x |
| 78DU295 | | | | | | x | | | | | | | | | | | | | | | | | | | | |
| 78DU311 | | | x | | x | | x | | | | | | x | | x | | | | | | | | | | | |
| 78DU323 | | | x | | x | | | | | | | | | | | | | | | | | | | | | |
| 78DU345 | | | | | | | | | | **x** | | | | | | | | | | | | | | | | |
| 78DU347 | | x | x | | x | x | | x | | | | | x | | | | | | | | x | | x | | | |
| 78DU356 | **x** | | **x** | | x | **x** | x | x | | | | | | | x | | | | x | | x | | | x | | x |
| 78DU385 | | | | | | | | | | | | | | | x | | | | | | | | | | | |
| 78DU398 | x | | | | | | | | | | | | | | | | | | | | | | | | | |
| 78DU437 | | | | | | | | | | | | | **x** | | | **x** | | | | **x** | | | | | | |
| 78DU465 | | | | | | | | | | | | | | | | | | | | | | | | | **x** | |
| 78DU473 | | | | | | | | | | | | | | | | **x** | | | | **x** | | | **x** | | | |
| 80DU050 | | | | | | | | | | | | x | | | | | | x | | | | | | | | |
| 80DU061 | | | | | | | | | | | | | | | | | | x | | | | | | | | |
| 80DU118 | | | | | | | | | | | | | | | | | | x | | | | x | | | | |
| 80DU131 | | | | | | | | | | | | | | | | | x | | | | | | | | | |
| 80DU134 | | | | | | | | | | | | | | x | | | | x | | | | | | | | |
| 80DU140 | | | | | | | | | | | | | | | | | x | | | | | | | | | |
| 80DU162 | | | | | | | | | | | | | | | x | | | | | | | **x** | | x | | **x** |
| 80DU167 | | x | | | | | | | | | | **x** | | | | | | x | | | | | | | | |
| 80DU194 | | x | | | | | | | | | | x | | | | | | x | | | | | | | | |
| 80DU199 | | **x** | | | | | | | | | | | | | | | | | | | | | | | | x |
| 80DU227 | | | | | | | | | | | | | | | | | x | | | | **x** | **x** | | | | x |
| 80DU221 | | x | | | | | | | | | | | | | | | | | | | | | | | | |
| 80DU248 | x | | x | | | **x** | **x** | **x** | | | | | | **x** | **x** | | | | | | **x** | x | | x | | **x** |
| 80DU252 | | | | | | | | | | | | x | | **x** | | | **x** | **x** | | | | | | | | |
| 80DU254 | | **x** | | | | | | | | | | | | x | | | x | | | | | | | | | |
| 80DU268 | x | x | | | | | | | | | | | | | | | | | x | | | | | | | |
| 80DU285 | | x | | | | | | | | | | x | | | | | | | | | | | | | | |
| 80DU294 | | | | | | | | | | | | | | x | | | | | | | | | | | | |
| 80DU296 | | | | | | | | | | | | | | x | | | | | | | | | | | | |
| 80DU298 | | | | | | | | | | | | x | | x | | | | | | | | | | | | |
| 80DU302 | | | | | | | | | | | | **x** | | | | | | | | | | | | | | |
| 80DU305 | | | | | | | | | | | | | | | | | x | | | | | | | x | | |
| 80DU321 | | | | | | | | | | | | | | | | | x | | | | | | | | | |
| 80DU328 | | | | | | | | | | | | | | x | | | | | | | | x | | x | | |
| 80DU337 | | | | | | | | | | | | x | | | | | | x | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | **x** | | Value ≥ 99th percentile | | | | | | | | | | | | | | | | | | | | | | | |
| | x | | Value ≥ 95th percentile | | | | | | | | | | | | | | | | | | | | | | | |
| | | | Site with multiple anomalies | | | | | | | | | | | | | | | | | | | | | | | |

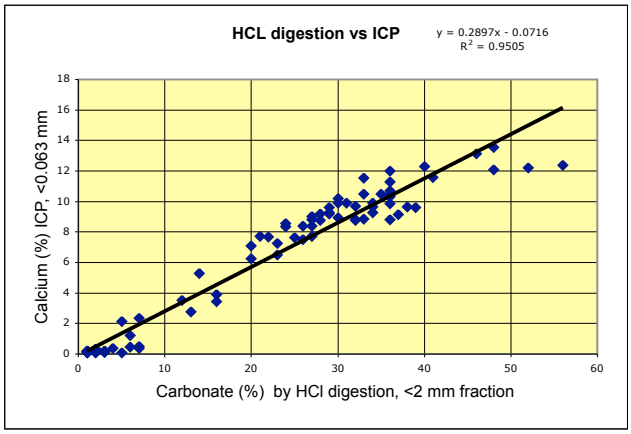
Appendix 11. Table of INAA anomalies

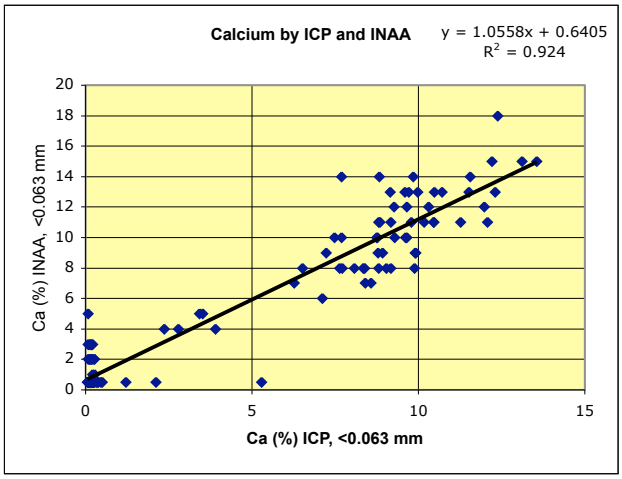
| Element | Au | As | Ba | Br | Ca | Co | Cr | Cs | Fe | Hf | Mo | Na | Ni | Rb | Sb | Sc | Ta | Th | U | W | Zn | La | Ce | Nd | Sm | Eu | Tb | Yb | Lu |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 78DU031 | | x | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 78DU084 | | x | | | | | | x | | | | | | | | | | | | | | | | | | | | | |
| 78DU103 | | | | | | x | | | | | | | | | | | | | | | | | | | | | | | |
| 78DU094 | | | | | | **x** | | | | | | | | | | | | | | | | | | | | | | | |
| 78DU105 | | | | x | **x** | | | | | | | | | | | | | | | | | | | | | | | | |
| 78DU110 | | | | | x | | x | | | | | | | | | | | | | | | | | | | | | | |
| 78DU123 | | **x** | | | | | | | x | | | | | | | | | | | | | | | | | | | | |
| 78DU131 | | | | **x** | | | | | | | | | | | | | | | | | | | | | | | | | |
| 78DU147 | | | | | | x | **x** | x | | | | | | | | | | | | | | | | | | x | | | |
| 78DU150 | | x | | | | | | | | | | | | | x | | | | | | | | | | | | | | |
| 78DU164 | | | | | | | | x | **x** | | | | | | | x | | | | | | x | | x | x | **x** | | | |
| 78DU166 | | | **x** | | | **x** | **x** | **x** | **x** | | | | | | | **x** | | | | | | | | x | | x | | | |
| 78DU168 | | | | | | x | | | x | | | | | | | x | | | | | | | | **x** | x | **x** | | | |
| 78DU170 | x | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 78DU196 | | | | | | | | | | | | | | | | | **x** | | | | | | | | | | | | |
| 78DU224 | x | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 78DU228 | | **x** | | | | | x | | x | | | | | | | x | | | | | | | | | | | x | | |
| 78DU261 | | x | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 78DU312 | | | | | | | | | | | | | | | | | x | | | | | | | | | | | | |
| 78DU313 | | | | | | x | | | | | | | | | | | | | | | | | | | | | | | |
| 78DU323 | | | x | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 78DU347 | | | | | | | | | | | x | | | | | | | | | | | | | | | | | | |
| 78DU351 | | | | | | | | | | | | | | | x | | | | | | | | | | | | | | |
| 78DU356 | | | | | | **x** | x | | **x** | | | | | | | x | | | | | | | | | | | | | |
| 78DU385 | | | | | x | | | | | | | | | | | | | | | | **x** | | | | | | | | |
| 78DU398 | | x | | **x** | | | | | | | | | | | | | | | | | **x** | | | | | | | | |
| 78DU417 | | | | | | | | | | | | | **x** | | x | | | | | | | | | | | | | | |
| 78DU451 | | x | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 78DU458 | x | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 78DU465 | | | | | | x | x | | | | | | | | | | | | | | **x** | | | | | | | | |
| 80DU050 | | | | | | | | | | x | | | | | | | x | | | | | x | x | | | | | | |
| 80DU053 | | | | | | | | | | | | | | | **x** | | | | | | | | | | | | | | |
| 80DU061 | | | | | | | | | | x | **x** | | | | | | | | | | | **x** | | | | | | | |
| 80DU093 | | | x | | | | | x | | | | | | | | | | | | | | | | | x | x | | x | x |
| 80DU118 | | | **x** | | | | | | | | | | | | | | | | | | | x | x | x | x | x | | x | x |
| 80DU129 | | | | | | | | | | | | | **x** | | | | | | | | | | | | | | | | |
| 80DU131 | | | | | | | | | | **x** | | | | | | | | | | | | | | | | x | | **x** | **x** |

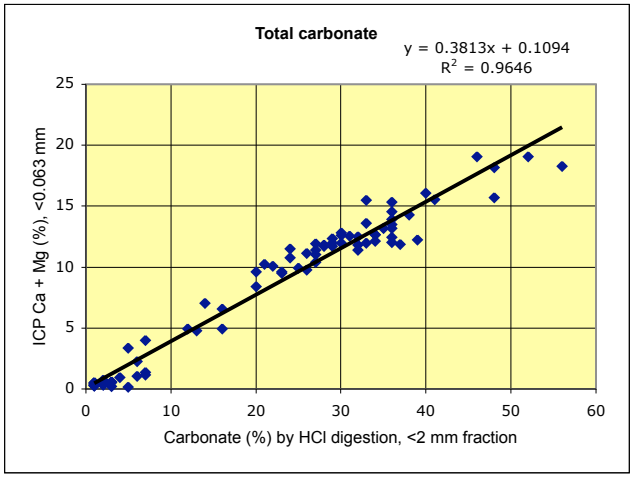
Appendix 11. Table of INAA anomalies

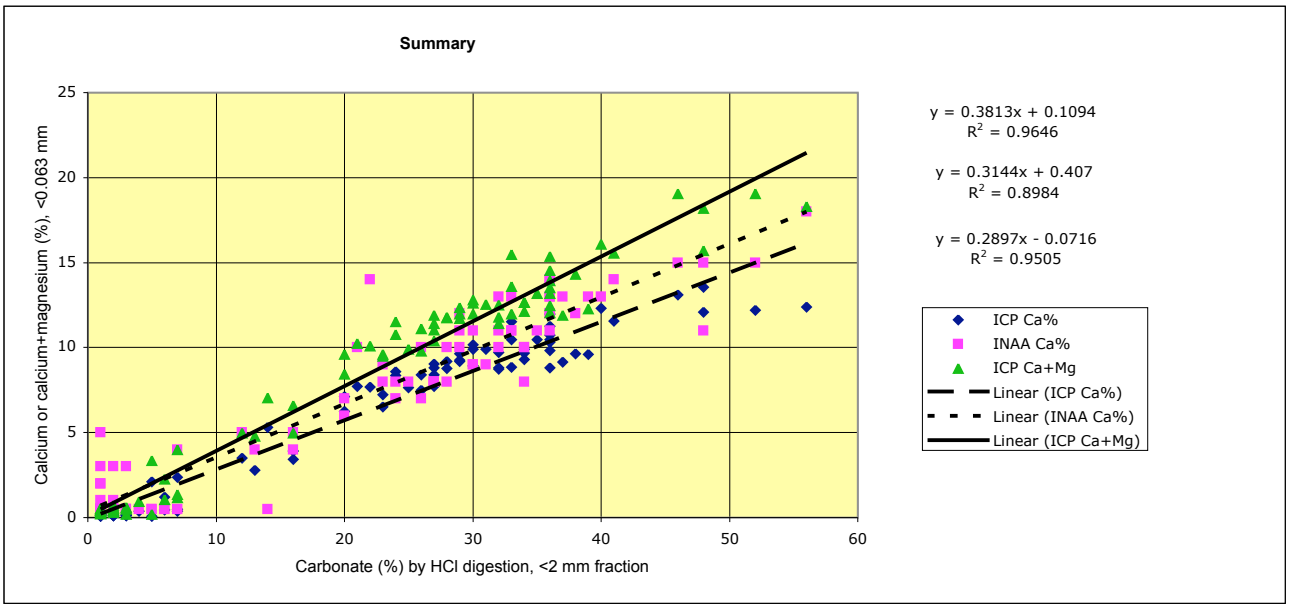
| Element | Au | As | Ba | Br | Ca | Co | Cr | Cs | Fe | Hf | Mo | Na | Ni | Rb | Sb | Sc | Ta | Th | U | W | Zn | La | Ce | Nd | Sm | Eu | Tb | Yb | Lu |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 80DU134 | | | **x** | | | | | | | **x** | | | | x | | | | x | **x** | | | **x** | **x** | x | **x** | x | **x** | **x** | **x** |
| 80DU147 | x | | | | | | | | | | | x | | | | | | | | | | | | | | x | | | |
| 80DU159 | | | x | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 80DU161 | | | | | | | | | | | | **x** | | **x** | **x** | | | | | | | | | | | | | | |
| 80DU162 | | | | | | | | | | | | | | | | x | x | | | | | | | | | | | | |
| 80DU167 | | | | | | | | | | | | | | | | | | **x** | x | | | x | x | | | | | | |
| 80DU194 | x | | | | | | | | | | | | | **x** | | | | x | **x** | | | | x | | x | | | **x** | **x** |
| 80DU199 | | | | | | | | | | | | | | | | | | | x | | | | | | | | | | |
| 80DU211 | **x** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 80DU219 | **x** | | | | | | | | | | | **x** | | x | | | | | | | | | | | | | | | |
| 80DU220 | | | | | | | | | | | | | | | | | | | x | | | | | | | | | | |
| 80DU221 | | | | | | | | | | | | | | | | | | | x | | | | | | | | x | | |
| 80DU225 | | | | | | | | | | | | | x | | | | | | | x | | | | | | | | | |
| 80DU241 | | | | | | | | | | | | | | | | | | | | | | x | **x** | | **x** | | | x | x |
| 80DU248 | | | | | | x | | x | **x** | | x | | | | x | **x** | | | **x** | | | x | | | | **x** | | x | x |
| 80DU252 | | | | | | | | | | x | | | | | | | | | | | | | **x** | **x** | **x** | x | **x** | x | x |
| 80DU253 | | | | | | | | | | | | | | | | | x | | | | | | | | | | | | |
| 80DU268 | | | | | | | | | | | | | | | | | | | x | | | | | | | | | | |
| 80DU280 | x | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 80DU284 | x | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 80DU285 | | | | | | | | | | | | | | | | | | x | | | | | | | | | | | |
| 80DU294 | | | | | | | | | | | | | | | | | | **x** | | | | x | | | | | | | |
| 80DU297 | | | | | | | | | | | | | | | | | **x** | | | | | | | | | | | | |
| 80DU298 | | | x | | | | | | | | | | | | | | **x** | **x** | | | | | | | | | | | |
| 80DU302 | | | | | | | | | | | | | **x** | **x** | | | | x | | | | | | | | | | | |
| 80DU303 | | | | | | | | | | | | | x | | | | | | | | | | | | | | | | |
| 80DU305 | | x | | | | | | | | x | | | **x** | | | | | | | | | | | | | | | | |
| 80DU307 | x | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 80DU319 | | x | | | | | | | | | | | | x | | | x | | | | | | | | | | | | |
| 80DU321 | | | | | | | | | | **x** | | | | | | | | x | x | | | | **x** | **x** | x | | | | |
| 80DU328 | | | | | | | | | | | **x** | | | | x | | | | | x | | | | | | | | | |
| 80DU329 | | x | | | | | | | | | | | | | | | x | | | | | | | | | | | | |
| 80DU332 | | | | | | | | | | | | | | | | | x | | | | | | | | | | | | |
| 80DU337 | | | | | | | | | | | | | | | | | | x | | | | | | | | | | | |
| | **x** | | Value ≥ 99th percentile | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | x | | Value ≥ 95th percentile | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | Site with multiple anomalies | | | | | | | | | | | | | | | | | | | | | | | | | | |




Calcium percentages on the <63um till fraction determined by ICP and INAA analyses, plotted against total carbonate results determined from HCl digestion on the <2mm till fraction

Appendix 12. Carbonate comparison