DETAILED GEOCHEMICAL TILL SAMPLING OF TWO GEOPHYSICAL ANOMALIES OF THE QUEST AREA

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ABSTRACT

The potential of geophysical anomalies can be tested using detailed geochemical till sampling. The output of such results can be used in conjunction with glacial history and glacial flow direction to aid in geologic interpretation. In this study two linear geophysical anomalies are sampled in the QUEST area to delineate potential mineralized zones. Analysis consisted of three methods: INAA on the silt+clay fraction, ICP-MS from the clay fraction, and heavy mineral concentrates from bulk samples. All three techniques show potential for identifying mineralized zones associated with geophysical anomalies.

1. INTRODUCTION

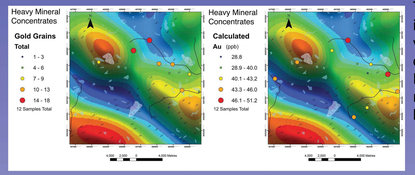
Knowledge of the glacial history, specifically the ice flow history and dominant transport direction is vital to interpret geochemical surveys. Significant knowledge gaps exist in the glacial history of the QUEST area and thus pose a significant hindrance on exploration. Geophysical surveys indicate potential anomalies but the lack of outcrop in the area hinders their interpretation. This project provides information on a more cost effective way to evaluate the potential of these geophysical anomalies. We provide detailed till-based geochemical surveys down-ice of two geophysical anomalies located within the QUEST area of 93J.

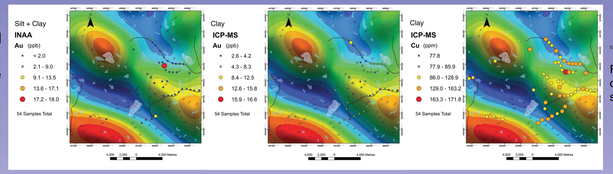
2. METHODS

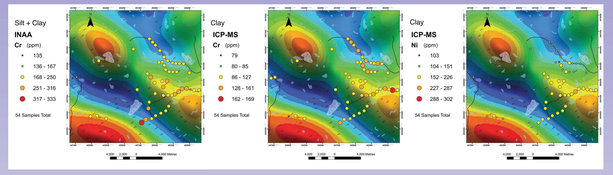
- Geophysical anomalies were selected on first derivative airborne gravity maps that showed linear anomalies.
- Only basal till samples were collected to ensure consistency. Samples were collected at a total of 135 sites. Basal till in the study area comprises a dense, dark, sandy silt matrix supported diamicton with 25-40% clasts (Fig 2.1).
- At each site three separate samples were taken: 1) for clay separation at Saskatchewan Research Council followed by ICP-MS (package 1-DX) at ACME Labs; 2) for silt+clay separation and INAA analysis (Package 1D EnH) at Activation labs; and 3) for archiving at the BC geological survey (Fig 2.2).
- At 30 of these sites >10 kg till samples were taken to have heavy mineral separation and gold grain counts carried out at Overburden Drilling Management Services. The <0.25 mm fraction of the heavy mineral concentration will then be sent for INAA analysis and any anomalous samples will have the heavy minerals identified.
- Sample locations were chosen based on distance, with a target of between 750 m to 500 m between each sample, typically dug from soil pits, and opportunistic sampling sites (ie. windblown trees, and road cuts) and ranged in depth from 0.8 m to 1.6 m below surface level.
- Samples were all later entered into a GIS database for interpretation and presentation.

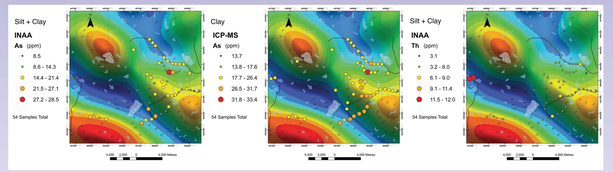
200 Road North Anomaly

The background to the images shown is the first vertical derivative geophysical base map (Geoscience BC Report 2008-08) with roads, wetlands and water bodies from NTS 93J.









3. RESULTS

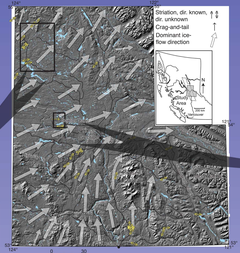


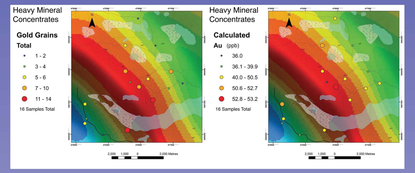
Fig 3. Quaternary project study area with locations of the two geochemical till sample sites.

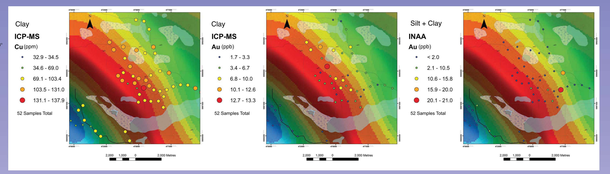
Fig 2.1 Example of till in field area.

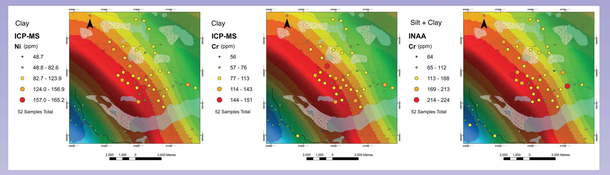
Fig 2.2 Sample pit.

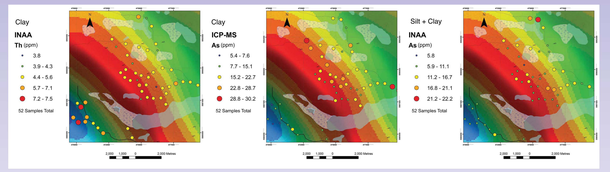
Saxton Lake Anomaly

Sampling points are shown with proportional dots, with percentile divisions of 100, 95, 75, 50, and 25. ICP-MS analytical results are from clay fractions, and INAA results are from silt + clay.



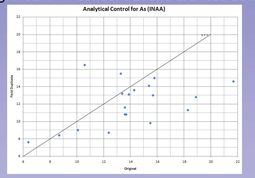


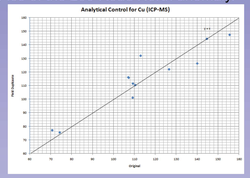




4. DISCUSSION

- The majority of the gold grains found in the heavy mineral fractions are modified and reworked indicating significant glacial transport.
- Calculated Au concentrations for heavy mineral fractions are greater with respect to both INAA and ICP-MS analytical techniques. Subsequent INAA on the <25mm fraction will be compared to these results.
- In comparison to ICP-MS, INAA yields lower concentrations for Au and As, whereas Cr yields higher concentrations.
- Till sampling of the Saxton Lake anomaly delineated a potential mineralized zone. Elements related to mineralization, such as, Cu, Au, As, Cr, Ni, tend to have highest concentration on the down ice side.
- Higher concentrations of Th to the southwest of Saxton Lake are most likely coincident with a large granitic body.
- The 200 road north anomaly shows more subdued results and is less defined by detailed geochemical till sampling. Increases of Cr, and Ni are evident on the down ice side. However, there appears to be elevated concentrations of Cr, Ni, and Cu with respect to the Saxton Lake anomaly.
- Significant Th concentrations are less defined up ice of the 200 Road North anomaly.





- Both techniques show good reproducibility, with ICP-MS showing better precision than INAA.

5. CONCLUSIONS

- Detailed geochemical till sampling down ice of geophycial anomalies is a cost effective way of identifying mineralized zones in areas where there is very little rock outcrop.
- Glacial history including glacial flow direction can help with geologic interpretation of geochemical surveys in glaciated terrains.
- Both ICP-MS and INAA are good analytical techniques to delineate potential mineralized zones. INAA is more sensitive to Cr, and ICP-MS is more sensitive to Au and As.

6. ACKNOWLEDGEMENTS

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