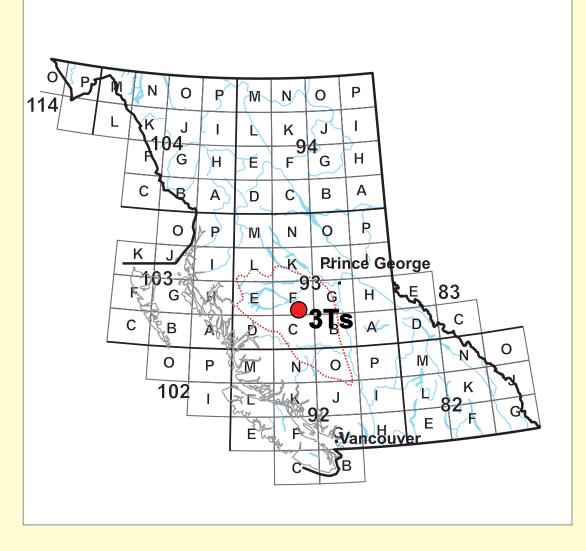
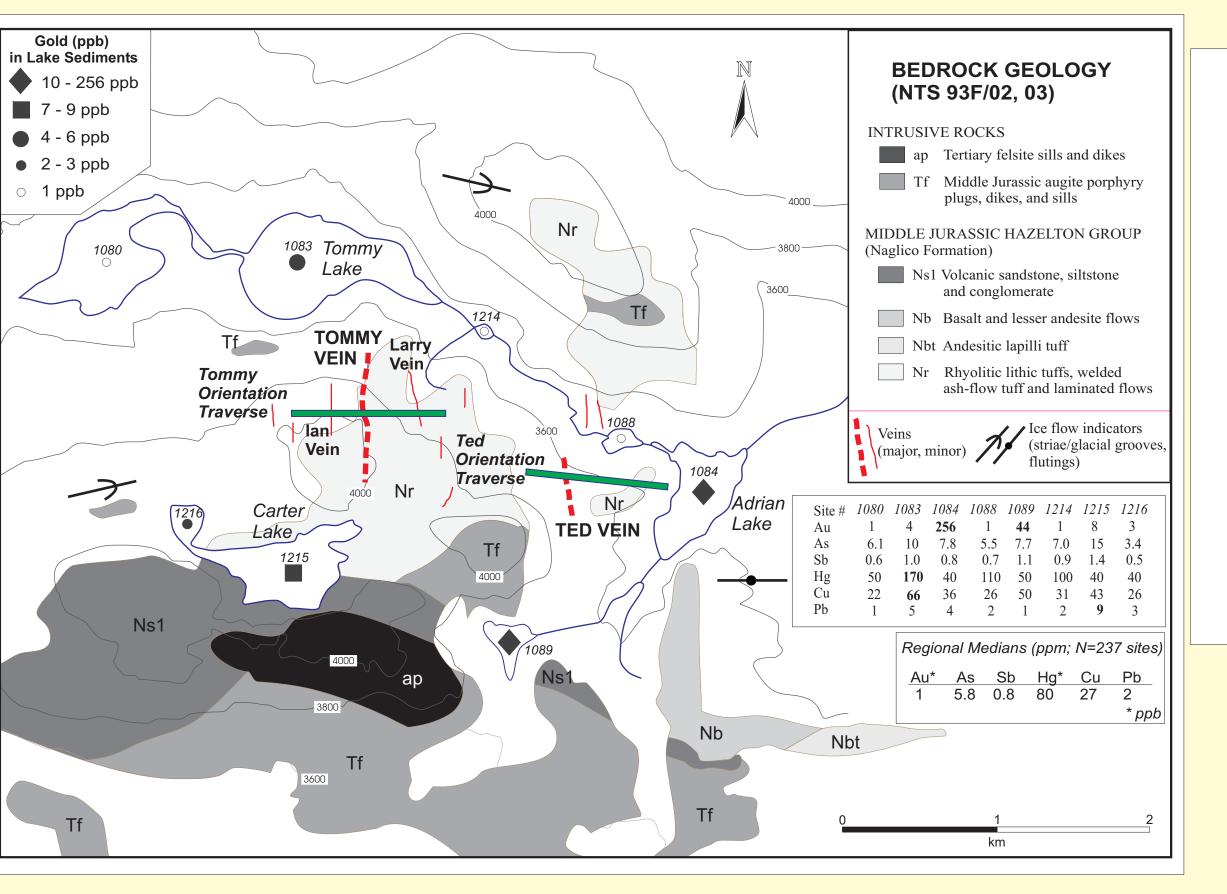
# Preliminary Results of the Cordilleran Geochemistry Project - A Comparative Study of Soil Geochemical Methods for Detecting Buried Mineral Deposits - 3Ts Au-Ag Prospect, Central British Columbia Stephen J. Cook and Colin E. Dunn, Consulting Geochemists, Victoria, B.C.

#### Introduction

Effective mineral exploration in the Nechako Plateau and adjoining regions of central British Columbia has for many years been hindered by thick forest cover, an extensive blanket of till and other glacial deposits and, locally, widespread Tertiary basalt cover. Where undertaken, regional till and lake sediment geochemical surveys have been effective as reconnaissance exploration techniques. However few publicly-available studies have been conducted here into the use of surficial geochemistry to aid in prioritizing regional geochemical anomalies, or in carrying out the most effective geochemical surveys at a property scale in areas of exotic cover. In this respect British Columbia has lagged behind other provincial and international jurisdictions in undertaking applied geochemical exploration research. This project investigates the geochemical response, in mineral and organic soils, of the 3Ts epithermal Au-Ag prospect in central B.C. The objective is to evaluate and recommend the most suitable field sampling and commercially-available laboratory geochemical methods for property-scale evaluation of buried deposits in drift-covered terrain.



Location maps of 3Ts prospect and the project area, showing locations of geochemical orientation traverse lines across the Tf Tommy and Ted veins.



Summary table of digestions and other methods used for comparative analyses of 3T's organic and mineral horizons.

## **Field and Analytical Methods**

The study comprises an integrated field and laboratory investigation of comparative soil horizons, analytical digestions and selective extraction methods on soils from transects across two of the 3Ts Au-Ag vein systems, the Tommy and Ted veins. Partial and selective extraction methods included:

- \*Aqua regia digestion (AR)
- \* Na-pyrophosphate leach
- \* Enzyme leach (EL)
- \* Mobile metal ion (MMI)
- \* Soil gas hydrocarbons (SGH)
- \* Soil desorption pyrolysis (SDP)



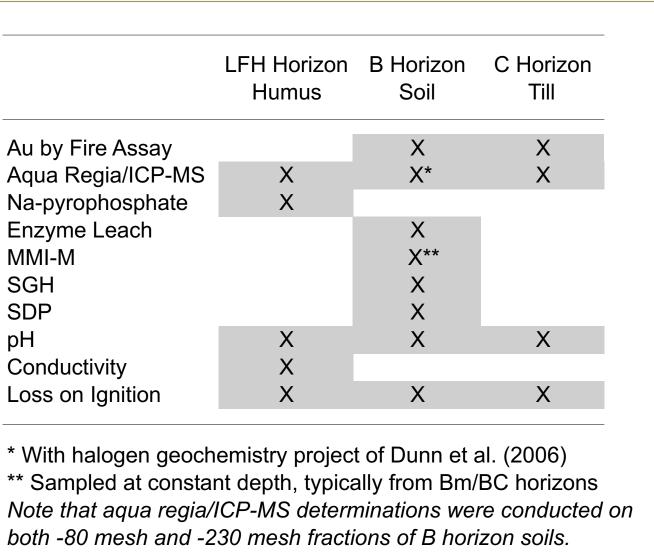
Looking southeast across 3Ts Au-Ag prospect project area across Little Adrian L. Drainage system.



Sampling humus, soil and till at site 525, at the far east end of the Tommy vein orientation transect.



Sampling of B horizon soils and humus for comparative analysis, site 506, west Tommy orientation line.



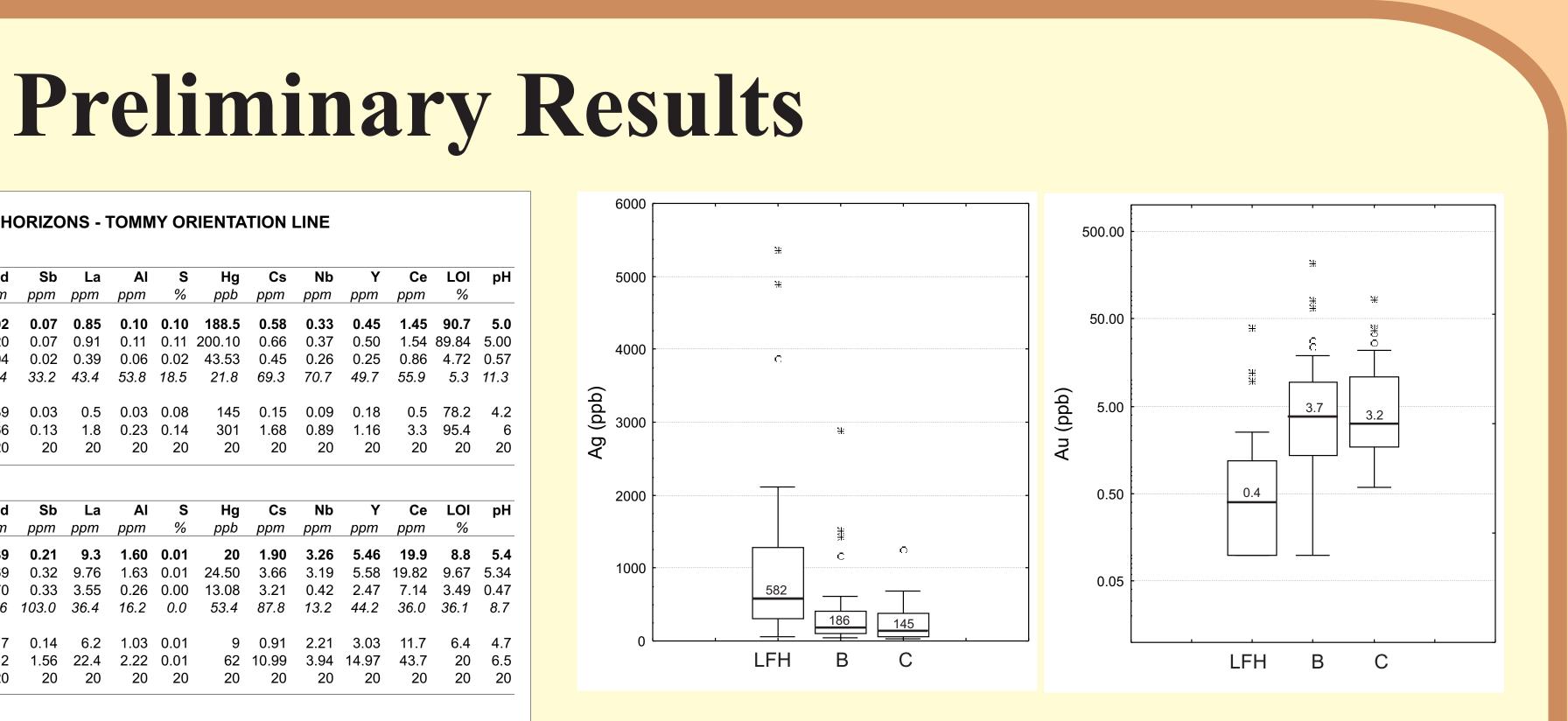
The preliminary results outlined here will focus solely on comparative AR digestion/ICP-MSAu & Ag results of LFH horizon humus, B horizon soil and C horizon till.

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Gold & silver concentrations (ppb) and response ratios in humus, B horizon soil & C horizon till over the Tommy & Ted vein transects following aqua regia digestion.

Full text of this poster is available in the corresponding report in *Geological Fieldwork 2005*. See the companion paper and poster of Dunn et al. for additional results on halogens in soils and in biogeochemical media such as Lodgepole pine and White spruce at 3Ts.

Funding for this project was provided by Geoscience BC. The authors acknowledge the field assistance of Karen Hulme, University of Adelaide, SA, and the support and assistance of Lindsay Bottomer and Dan Meldrum of Southern Rio Resources, Vancouver.



Boxplots (above) showing silver & gold in each of humus (N=36), B horizon soil (N=36) & C *horizon till (N=31) over the combined Tommy and* Ted orientation transects.

> A final report to Gesoscience BC, incorporating final results of all analytical methods, will be completed by March 31, 2006.

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Typical basal till (C) from the background western end of Tommy orientation line (site 501), showing brunisolic Bm mineral soil and LFH humus horizons.

Preliminary results from the 3Ts epithermal Au-Ag prospect show that Au and Ag by AR/ICP-MS in each of humus, B horizon soil and C horizon till all reflect, to varying degrees, the presence of Au in epithermal quartz veins at both Tommy and Ted veins. Au and Ag in till alone also reflect the presence of the Larry vein along the Tommy line. Positive AR-digestible geochemical results here are strongly influenced by the near-surface outcropping and subcropping of subvertical, highlyresistant quartz veins beneath a thin near-residual soil. they do not necessarily indicate that similar, but blind, deposits may be detected at greater depths.

Results suggest that, for property-scale geochemical exploration, B horizon mineral soils and LFH horizon organic-rich humus offer similar levels of geochemical contrast for AR-digestible Au and Ag, with B horizon soils offering slightly superior contrast overall. Brunisolic Bm horizon soils are commonly developed around the 3Ts property, primarily in basal and colluviated tills which are the dominant glacial material. However they are also developed in rubbly near-bedrock colluvium, stabilized colluvium & glaciofluvial sediments, underlining the importance of correct identification of Quaternary deposits in interpreting source directions of any anomalous geochemical patterns.

Geochemical results vary slightly from vein to vein with variations in primary mineralogy, topography and surficial cover. In general AR-digestible Au and Ag results at Tommy vein show slightly greater geochemical contrast, as shown by response ratios, than do those at Ted vein. At Tommy vein, Au response ratios for B horizon soil and humus over the vein are almost identical. Elevated Ag in humus results provide a larger geochemical footprint, but elevated Ag in B horizon soils offers slightly better anomaly contrast over the mineralization. Rubbly B horizon soils and LFH humus are developed directly over subcopping and outcropping quartz vein mineralization, and likely incorporate a significant component of near-residual mineralized fragments. There is no direct till response, as neither basal nor colluviated till is preserved directly over the Tommy vein.

B horizon mineral soils on the Ted transect, where surficial cover is more complex, also provide the best overall anomaly contrast for property-scale geochemical exploration. Au and Ag in humus, B horizon soil and till all reflect the presence of precious metals mineralization at the Ted vein to varying degrees, although geochemical response magnitudes are slightly less than those reported for Tommy vein. In addition, highly elevated Au and Ag concentrations are present in both B horizon soil and C horizon till both above and down ice of the vein.



### **Typical Soil Horizons**

*Composite soil profile (site 559)* showing preferential development of brunisolic Bm horizon in stabilized near-surface angular colluvium atop near the eastern end of the Ted IIC horizon till. Site is down ice and orientation line. No till is present at down slope of the Ted vein.



Brunisolic Bm horizon soil (site 570) developed in loose rubble and colluvium atop weathering bedrock, this site.

#### **Preliminary Conclusions**