

SYNOPSIS

The 1997 multimedia geochemical survey of the Edmund Lake and Sharpe Lake greenstone belts has successfully delineated geochemical patterns attributable to regional metallogenic features (Wolf Bay Shear Zone, Margaret Lake granite intrusion and the Oxford Lake Group – volcanic and sedimentary subgroup contacts), as well as more localized signatures of known gold deposits in both belts. Additionally, high contrast multi-sample geochemical anomalies have been documented in areas of no known mineralization (south and west of Makataysip Lake, Sharpe Lake belt). Unique lithologies, such as high-Mg basalts and/or ultramafic rocks, have also been detected in this survey.

On The basis of the geochemistry of all sampling media, the area west of the east end of Sharpe Lake has geochemical characteristics suggestive of a base metal depositional environment, whereas the area east of Sharpe Lake would appear to be highly prospective for precious metals. The apparent association of multimedia geochemical signatures with the periphery of the mineralized Margaret Lake granite intrusion, as well as the association of an altered and mineralized quartz-feldspar porphyry at Little Stull Lake with five gold zones indicates the mineral potential for these areas.

The relatively high success rate between the various sample types in reproducing the geographic locations of geochemical anomalies is surprising given the extensive wetlands and peats in the 1997 survey area. With the exception of humus results in the area of the Twin Lakes – Seeber River gold deposits, all sample media identified the presence of known gold mineralization. Areas of anomalous geochemical response without known mineralization are also multi-media in nature. The general hostile nature of the surficial deposits in the 1997 survey area is reflected by the fact that 80% of b-horizon soil samples are lacustrine clay. Historically/traditionally this material has been viewed as having little value in mineral exploration, and has been considered to be very effective in concealing the geochemical response of buried or blind mineralized zones. The application of the enzyme leach process to these sediments has demonstrated that geochemical data useful in mineral exploration can be derived from this new approach. The success of the b-horizon/enzyme leach soil survey is mirrored by the equally successful vegetation geochemical survey, based on the collection of black spruce crown twigs. The shallow root system of this tree is often cited as problematic, limiting acquisition of metals to those derived from often allochthonous near surface deposits. The trees sampled in 1997 were observed to be rooted in the same glaciolacustrine clays as were sampled for enzyme leach analysis and suggests the essential and non-essential elements required for proper nutrition are being derived, in part, from this soil horizon. It would appear that the process or mechanism of metal dispersion from bedrock sources (groundwater and/or vapour phase transport?) may be slowed by “hostile” surficial deposits but it is not prevented.

Although carbonate abundance in the glacial tills sampled for analysis has not yet been determined, the tills are highly calcareous and as such would appear to have diminished effectiveness in geochemical prospecting. Element mobility in carbonate/alkaline environments is significantly reduced. Nevertheless, multiple high contrast geochemical responses in the <2µm and <63 µm size fractions of till were documented from both greenstone belts. The reason for this is uncertain and in an attempt to provide an explanation carbonate contents are being determined by the Geological Survey of Canada for both 1996 and 1997 till samples. Regardless of carbonate content, glacial till has proven to be an effective geochemical prospecting tool for this area.

The ability to land a helicopter at approximate 1 km sample spacings in areas of intense burn provides an excellent opportunity to examine outcrop areas previously covered or obscured by vegetation and/or sediment. The potential for observing significant indications of hydrothermal alteration and mineralization was apparent in the 1996 survey, where areally extensive massive sulphide type alteration was identified at Max Lake. In the 1997 survey, two areas of potentially significant geological observations were made at sites 249 and 266 in the Sharpe Lake belt and at sites 80, 82 and 83 in the Edmund Lake belt. At sites 249 and 266 fractured, bleached, bright yellow-stained fine to coarse grained felsic intrusions with up to 20% disseminated and veinlet pyrite are exposed. The sample media from this occurrence are characterized by a REE-U-Sb metal assemblage (63 and 10 ppm Sb in rock). Platinum group element analyses should be undertaken on rock chip samples from these occurrences and the area between the two sites and beyond should be thoroughly prospected to determine the nature of this occurrence. Base metal, massive sulphide type alteration is exposed at sites 82 and 83 where diffuse to wispy iron oxide veinlets are observed in pillow selvages and pillow basalts in association with intense silicification and an outcrop of intrusive breccia. The zone is exposed for several tens of metres at the shoreline of a small lake and appears to be continuous along strike. Site 80 is marked by two pieces of float that are angular, highly silicified, cherty rocks with pyrite laminae. The samples were collected from the shore of a small linear lake and are interpreted to be short transport erratics because of their general fragile nature. This float could have been brought to surface by permafrost/frost jacking and is representative of a strongly hydrothermally altered lithology. Areas of recent (1988-89) burn should become priorities for geological examinations.

The most significant area of multimedia geochemical anomalies occurs south and west of Makataysip Lake. The contact between Hayes River basalt and Oxford Lake Group sedimentary subgroup rocks is present in this area and represents a prime metallogenetic feature. The Twin Lakes and Seeber River gold deposits are localized at or near this contact, which represents an exciting regional geological feature with excellent residual exploration potential. The highest As contents measured in any sample media occurred in a humus sample from the area south of Makataysip Lake and includes a 1300 ppm and a 38 ppm As analysis.

The small greenstone – intrusive outlier at Barclay Lake in the Sharpe Lake belt should be reconnoitered based on its circular aeromagnetic response and multiple moderate to high contrast geochemical anomalies.

The significance of the rapid and cheap measurement of H^+ (pH) and specific conductance (conductivity) in rock and soil samples has been demonstrated in the 1997 survey results. Water-extractable metal (specific conductance) measurements are generally associated with high metal contents in rocks and soils and can provide an effective pre-screening tool in surveys of this type.