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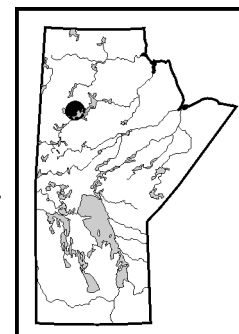
ERRATA:

The publisher/department name in the bibliographic reference cited immediately below the title of each GS report should read

Manitoba Industry, Economic Development and Mines instead of **Manitoba Industry, Trade and Mines**.

**GS-7 Rare earth element studies of soils and vegetation over
the MacBride Lake massive sulphide deposit and the MacLellan
mine Rainbow gold zone, Lynn Lake area, Manitoba
(NTS 64C15 and 64B13)**

by G.H. Gale



Gale, G.H. 2003: Rare earth element studies of soils and vegetation over the MacBride Lake massive sulphide deposit and the MacLellan mine Rainbow gold zone, Lynn Lake area, Manitoba; *in* Report of Activities 2003, Manitoba Industry, Trade and Mines, Manitoba Geological Survey, p. 50.

Summary

Soil and spruce bark samples were collected along transects across the surface expression of the MacBride Lake Zn-rich massive sulphide deposit and the gold-bearing Rainbow Zone at the MacLellan mine. Data from these samples will determine if the rare earth element geochemical signatures observed in association with mineralization in bedrock are present in soils and vegetation overlying these deposit types.

Project objective

Investigations of rock samples from exhalites laterally equivalent to volcanogenic massive sulphide (VMS) deposits has revealed the presence of positive Eu anomalies that can be used to vector VMS deposits (Gale et al., 1997, 1999; GS-9, this volume). An orientation survey was designed to test soil and vegetation samples over the stratabound and exhalative (?) gold-bearing Rainbow Zone at the MacLellan mine and the Zn-rich VMS deposit at MacBride Lake. The objective is to determine if positive Eu anomalies are present in either the soils or vegetation overlying the mineralization and, if present, whether they can be used to guide exploration. Recent advances in ICP-MS analytical techniques permit determination of rare earth elements at much lower concentrations than previously available by neutron activation methods.

Project progress

The gold-bearing zone at the MacLellan gold deposit is overlain by glaciofluvial sands and clays that have been partly disturbed by mining activities. The orientation survey consisted of digging approximately 20 pits along a transect normal to the surface projection of the Rainbow Zone. Samples collected at four different depths within the soil profile have been submitted for analysis by partial leach methods. Spruce bark samples collected adjacent to the pits have been submitted for analysis of trace metals and rare earth elements; these data will determine if elements that are anomalous in the soils are also anomalous in the adjacent vegetation.

The MacBride Lake zinc-rich VMS deposit is overlain by glaciofluvial clays. Twenty sites were sampled along three transects that traverse the overlying rocks, zinc mineralization and alteration zone of the deposit. Four samples were collected for partial leach analysis at 5 cm intervals in the clay from each pit. Spruce bark samples were collected at each site.

Selected soil samples will be analyzed by the Enzyme LeachSM method to determine the optimum sample depth for detection of the rare earth elements. Results will be reported when available.

Economic significance

These studies are being undertaken to investigate the applicability of using the rare earth elements in discriminating geophysical anomalies related to barren mineralization from those associated with economic mineral deposits. If successful, the application of this technique may result in the identification of new deposits in the Lynn Lake area.

References

- Gale, G.H., Dabek, L.B. and Fedikow, M.A.F. 1997: The application of rare earth element analyses in the exploration for volcanogenic massive sulfide type deposits; *Exploration and Mining Geology*, v. 6, no. 3, p. 233–252.
- Gale, G.H., Dabek, L.B. and Fedikow, M.A.F. 1997: The use of rare earth element analyses in the exploration for massive sulphide type deposits in volcanic rocks – progress report; *in* Report of Activities 1997, Manitoba Energy and Mines, p. 147–55.