

Quaternary geology and till geochemistry, Bathurst Mining Camp, New Brunswick

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The objectives of the EXTECH-II Quaternary mapping and sampling project in the Bathurst Mining Camp are: (1) conduct detailed till sampling and glacial dispersal studies, defining the relative chronology of ice flow, the direction of glacial transport and dilution rate down-ice from known massive sulphide deposits, and (2) complete the 1:50 000 scale Quaternary geology mapping.

Work during 1995 involved: (1) detailed sampling of till, pebbles from till, B-horizon soil, humus, and balsam fir twigs carried out at the Restigouche deposit (102 sites); (2) till sampling conducted at the Willett mineral occur-

rence (22 sites along a 160 m trench), to investigate variations in geochemical signatures of till over different rock types), the Stratmat deposit (29 sites + 79 archived samples, extending 3 km down-ice), and the Spruce Lake Road area (46 sites around outcrops of gossanous slates and mafic volcanic rocks); (3) regional and trench-scale surficial mapping; and (4) a study of clast provenance in till at 32 bulk-till sample sites.

Geochemical analyses (ICP-ES and ICP-MS) of trace elements in the fine fraction (<63 µm) of 419 basal-till samples collected in 1994 around the Halfmile Lake and Restigouche

deposits are complete. The deposits are located in the Miramichi Highlands of north-central New Brunswick and are stratigraphically underlain by sedimentary and volcanic rocks of the Ordovician Tetagouche Group. Local topography is rugged and characterized by angular ridges and deeply incised V-shaped valleys. The main ice-flow direction was eastward (080°-110°), followed by northeastward flowing ice. Boulder erratics transported from the Mount Elizabeth Intrusive Complex deposited near the Halfmile Lake deposit confirm the east-northeast transport direction.

At Halfmile Lake, the highest concentrations of Cu-Pb-Zn and some other elements occur in a series of sites oriented along an east-west fault, paralleling the direction of

glacial flow. At the western extremity, the zone of anomalous values overlies known mineralization and gossan (Upper AB Zone). However, there is a negative Zn till anomaly directly over the gossan at the Upper AB Zone and the gossan itself contains very low Zn values. A second anomalous zone is located 300 m to the east and may be associated with underlying mineralization or glacial dispersal from the Upper AB Zone. Results from a 250 m grid survey at the Restigouche deposit indicate strong Cu, Pb, Zn and Sn values in the immediate vicinity of the deposit and a stronger anomaly in similar rocks (Mount Brittain volcanics of the Ordovician Tetagouche Group) that are structurally repeated 1 km to the north of the Restigouche deposit.