Inferences on glacial flow from till geochemistry and clast dispersal: Rollingdam area, New Brunswick

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A total of 267 till samples were collected in the Rollingdam area of southwestern New Brunswick, and analyzed for patterns of glacial dispersal. The concentrations of 37 base metals, trace, and rare earth elements and 18 clast lithologies, are used to define the dominant glacial transport direction in an area of complex ice-flow history. Examination of bedrock striae, flutes, and drumlins indicates that rapid stagnation of the late Wisconsinan ice sheet was preceded by at least four directions of glacial flow. These data indicate that the main (regional) south-southeastward flow direction was preceded by at least two (and possibly three) events. Glaciation was initiated by eastward-flowing ice emanating from northern Maine and followed by southwestward-moving ice likely due to growth of New Brunswick ice to the northeast of the study area. The major erosional and depositional events were accomplished by southeastward-flowing ice and this was followed by extensive meltwater activity during deglaciation.

Clast trains from known outcrops are traceable southeastward over distances greater than 36 km, while distinctive elongated geochemical trains are lost within a distance of 10 km due to homogenization of the till matrix and possibly winnowing by glacial meltwater. Most geochemical anomalies were found to form small, less than 5 km wide, bullseye-shaped patterns. In this area of New Brunswick, rapid glacier wasting and meltwater activity has likely affected the geochemical content of the till matrix. These results demonstrate that for drift prospecting exercises in areas of glacier mass-wasting, transport path and source unit are more clearly delineated by shape and size of till clast dispersal patterns, than by analysis of matrix geochemistry.