

Using whole rock geochemistry to locate the source of igneous erratics from drumlins on the Atlantic coast of Nova Scotia

Rudolph R. Stea¹ and Georgia Pe-Piper²

¹*Nova Scotia Department of Natural Resources, Halifax, Nova Scotia B3J 2T9, Canada <stea@is.dal.ca>*

²*Department of Geology, Saint Mary's University, Halifax, Nova Scotia B3H 3C3, Canada*

Whole rock geochemistry has been determined for erratics from the surface Lawrencetown Till in two drumlins on the Atlantic coast of Nova Scotia. The geochemical data, particularly trace element composition, allows source rocks to be identified more precisely than by visual identification or petrographic microscopy. A drumlin near Lunenburg contains erratics of Neoproterozoic arc-related plutonic rocks and basalts that outcrop only in a small area near Parrsboro in the Cobequid Highlands. Some associated erratics of granite precisely match a small late Devonian pluton in the same area and other granites and rhyolite could also be derived from late Devonian rocks in the same area. The type section of the Lawrencetown Till contains different Neoproterozoic plutonic rocks of a type found in the eastern Cobequid Highlands,

together with a distinctive late Devonian granite with sodic amphiboles that is restricted to a small area near the Debert River. Both these source areas indicate a southward flow of ice (Escuminac Phase) from an ice centre in the vicinity of Prince Edward Island (Escuminac Ice Centre), which deposited the Lawrencetown Till from fast-flowing ice streams that terminated at the edge of the continental shelf. Earlier southeastward-flowing ice (Caledonia Phase) deposited the Hartlen Till that forms the core of the drumlin. Drumlins in Nova Scotia are complex palimpsest landforms that formed by till-accretion, and evolved in surface form throughout multiple flow events.