Petrographic and chemical variations through the Goldenville and Halifax formations, Bear River, High Head, and Broad River sections, southwestern Nova Scotia

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The Meguma terrane of southern Nova Scotia is the most outboard terrane of the northern Appalachian orogen. It is characterized by the Meguma Group, made up of the Late Proterozoic(?) – Cambrian Goldenville Formation which consists mainly of thickly bedded, massive metawacke with minor interbedded metasiltstone and slate, and the conformably overlying Cambrian to Lower Ordovician Halifax Formation, composed mainly of slate with thin beds of metasiltstone and metawacke. Although generally interpreted to have formed at a continental margin, whether that continent was Africa or some other peri-Gondwanan area is still debated.

Sedimentary rock geochemistry is a viable tool for regional correlation and provenance studies. During the summer of 2005, samples were collected from three relatively well-exposed stratigraphic sections through the Goldenville and Halifax formations in the Bear River, High Head, and Broad River areas of the Meguma terrane. The purpose of this project is to compare petrographic and chemical data from these samples to look for systematic regional or stratigraphic variations in the Meguma Group. These data will be integrated with other available geological and geochronological data to interpret the depositional/tectonic setting and provenance of the sediments that now form the Meguma Group.

Thirty-five samples were collected, ten samples over a section 12 000 m in stratigraphic thickness in the Bear River area, 12 samples over a section 7600 m in stratigraphic thickness in the High Head area, and 13 samples over a section 3200 m in stratigraphic thickness in the Broad River area. The Bear River section covers the upper part of the Goldenville Formation and the Cunard and Bear River members of the Halifax Formation, whereas the High Head section incorporates most of the Goldenville Formation and the lowest unit in the Halifax Formation. The Broad River section crosses the upper part of the Goldenville Formation and the lowest unit (Cunard member) in the Halifax Formation. The analyzed samples range in SiO2 content from about 45% to 90%. The Broad River section is bimodal, with pelitic samples (now garnet-staurolite schist) with about 45–55% SiO_2, and psammitic samples with 75–85% SiO_2. Samples from the other areas have intermediate SiO2 contents. A strong positive correlation exists between SiO2 content and quartz content, whereas an inverse correlation exists between SiO2 content, chlorite and mica content, Al_2O_3, Fe_2O_3, MgO, K_2O, P_2O_5, and loss-on-ignition. Variation in CaO and Na_2O are better linked to carbonate and feldspar content, respectively. On tectonic setting discrimina-

tion diagrams, most samples plot in active continental margin or active arc fields. Hence the common interpretation that the Meguma Group was deposited at a passive continental margin may require re-evaluation.