

Lithochemical Evidence for the Provenance of the Meguma Group, Southern Nova Scotia¹

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The whole rock composition of greywackes of the Goldenville Formation of the Meguma Group is not consistent with the interpretation of the source being a continental area of shield dimensions. This interpretation was based on the mineralogy of framework grains, the petrography of rock fragments (slate, quartzite, and granitic gneiss) and uniformity of clast petrography throughout the Meguma. The chemical composition of Goldenville greywackes indicates that most of the matrix is derived from volcanic rock fragments of intermediate (andesitic) composition and mineralogy.

A large set of whole rock chemical analyses of Meguma Group rocks has been collected while investigating the nature of the changes between its two formations. The major element distribution for greywackes of the Goldenville Formation show that they are clearly comparable to other Lower Paleozoic greywackes. Al_2O_3/SiO_2 for greywackes of similar grain size and similar sedimentological position within a bedding unit indicate only moderate sedimentological fractionation compared to greywackes deposited adjacent to a known passive continental margin. Relatively immobile TiO_2 , total Fe, and MgO indicate that any magmatic component is of intermediate composition and

consistent with sediment production from on an active continental margin. Alkali element distribution in the same samples indicates only moderate pre-erosion weathering and intermediate andesitic feldspar compositions.

The source of the sediment for the Goldenville Formation is a mix of an active magmatic arc and the continent within which the arc is being emplaced. Lithochemical variation within the Goldenville Formation is low and the Halifax Formation also contains evidence of andesitic component in the source area. The top of the Goldenville Formation however, contains greywackes with major element distribution indicating a period of decreased andesitic influence on the composition of the sediment.

This interpretation is consistent with U/Pb dates reported by others from zircon and sphene and K/Ar dates reported from muscovite of both 2500 my (continent component - zircons) and 600 my (magmatic arc component - zircons; sphene; and muscovite).

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