

PETROCHEMISTRY OF AMPHIBOLITES FROM THE
MIRAMICHI HIGHLANDS, NEW BRUNSWICK

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Amphibolites occur interlayered with psammite, cordierite-silimanite-bearing schists and granitic augen gneiss in the Trousers Lake area of central New Brunswick. This highly deformed amphibolite suite has previously been considered to form part of a Precambrian basement complex or to have been derived from calcareous sedimentary rocks of Cambro-Ordovician age. A similar suite of rocks to the south in the Sisson Brook area has been mapped as high-grade metamorphic equivalents of Ordovician volcanic rocks of the Tetagouche Group. Chemical analyses were performed on samples from these two suites of amphibolites with the view to resolving some of the conflicting interpretations.

Amphibolites from both suites exhibit a trend with negative slope typical of igneous rocks when plotted on a Cr versus TiO_2 variation diagram. Two samples from Sisson Brook, which were recognized in the field to have a probable sedimentary protolith, based on their lower amphibole content, fall on the sedimentary trend in this diagram and on a Zr/ TiO_2 versus Ni plot.

The Trousers Lake and Sisson Brook suites exhibit an iron-enrichment trend on an AFM diagram and are tholeiitic rather than alkalic as indicated by their Nb to Y ratios. On the other hand, previously analyzed subgreenschist - grade mafic volcanic rocks of the Tetagouche Group characteristically possess both tholeiitic and alkalic affinities.

It can be concluded that most of the amphibolites in the Miramichi Highlands were derived from an igneous protolith. Their similar chemistries suggest a common genesis for the Trousers Lake and Sisson Brook suites. They may represent a tholeiitic sequence that developed within the Ordovician Tetagouche volcanic complex earlier than the associated tholeiitic and alkalic lavas found to the east. Alternatively they may represent an entirely older basement sequence. Zircon dating presently being carried out by the Geological Survey of Canada should distinguish between the above models.