Geology and geochemistry of the Upsalquitch Lake Anticlinorium, northwestern Bathurst Camp, New Brunswick

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The Upsalquitch Lake Anticlinorium, an east-northeasterly-trending D_1 structure, is cored by sedimentary rocks of the Cambro-Ordovician Miramichi Group and flanked by volcanic and sedimentary rocks of the Middle Ordovician Tetagouche Group. However, the stratigraphy of the Tetagouche Group is different on either side of a major thrust zone, that

Atlantic Geology, March 1997, Volume 33, Number 1
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occurs along the southeastern limb of this anticlinorium. South of this thrust, dacitic, quartz-feldspar-phyric volcanic rocks of the Nepisiguit Falls Formation (recently dated at 473 +5/-3 Ma) constitute the lower part of the Tetagouche Group. In contrast, on the northwestern limb, feldspar-crystal, lithic tuffs with subordinate aphyric to sparsely feldspar-phyric flows of the Mount Brittain Formation constitute the base of the Tetagouche Group and are overlain by alkali basalt, slates and cherts of the Camel Back Member, Boucher Brook Formation. A preliminary age of 468 ± 2 Ma has been obtained from a sample of feldspar-phyric, lithic tuff from near the top of the Mount Brittain Formation.

Most samples of the Mount Brittain Formation have equal or slightly greater abundances of high field strength and rare-earth elements than the Nepisiguit Falls Formation and Zr/Y ratios are generally higher than characteristic for the Spruce Lake Formation found to the east. However, four samples (including the sample dated) have distinctly different Nb/Y signatures and REE patterns, and are interpreted to represent a highly fractionated phase of Mount Brittain magma. Amygdaloidal pillow basalts and a distinct amygdaloidal feldspar-phyric, lapilli tuff and agglomerate unit found near the base of the Camel Back Member have Nb/Y ratios averaging 1.6 and moderately low Cr contents (<49 ppm).

The Restigouche (Zn-Pb rich) massive sulphide deposit is hosted by felsic volcanic rocks of the Mount Brittain Formation, whereas the Murray Brook (Cu-rich) deposit occurs in sedimentary rocks that either directly overlie or underlie this formation, at the eastern end of the Upsalquitch Lake Anticlinorium. The stratigraphic position of the sedimentary rocks is problematic because they are overthrust by rocks of the Camel Back Member. Recent work in the Bathurst Camp has shown that the sedimentary rocks intercalated with mafic volcanic rocks of the Boucher Brook Formation, can be geochemically distinguished from Miramichi Group sediments. Ten samples of sedimentary rock from the Murray Brook area were, therefore, analyzed to clarify the stratigraphic position of the Murray Brook deposit. Fine grained sedimentary rocks that host the Murray Brook deposit have a "Miramichi- type" geochemical signature, i.e., they have lower Cr, Ni, V, Sc and higher Th, Nb, Zr and REE than shales from the Boucher Brook Formation found in this area.