Miramichi-Tetagouche stratigraphic relationships

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Mapping the boundary between the Miramichi and Tetagouche groups has important implications for exploration in the Bathurst Mining Camp, since stratiform sulphide deposits appear to occur only within the volcanic-dominated Tetagouche sequence. Along the Tetagouche River, local uplift during initiation of Tetagouche volcanism has resulted in the deposition of a conglomerate horizon that provides a useful marker to define the Miramichi-Tetagouche boundary. Two sections located on the Tetagouche River, one at Little Falls and the other 3 km upstream at the confluence of Patrick Brook, expose the contact relationship between the Tetagouche and Miramichi groups. The basal beds of the Tetagouche Group, the Vallée Lourdes Formation, are best exposed at Little Falls, where a thin (50 cm) conglomerate, containing siltstone pebbles derived from the underlying Patrick Brook Formation of the Miramichi Group, is overlain by some 25 m of calcareous sandstone and nodular limestone topped by 1 to 4 m of laminated, dark grey silty shale. Felsic tuff (Little Falls Member) of the overlying Nepisiguit Falls Formation contains tongues of shale injected from below. Both the tuff and underlying calcareous sandstone are trough cross-bedded indicating deposition in relatively shallow water.

Dark grey shale and medium- to thick-bedded, medium grey, wacke and siltstone exposed on the Tetagouche River at the confluence with Patrick Brook, constitute the type-section of the Patrick Brook Formation. Disruption of wacke beds has produced local horizons of blocky mélange within this turbidite sequence. Turbidites at the Patrick Brook type-section correlate with lithologically similar rocks of the Miramichi Group occurring downstream beneath the unconformity at Little Falls. Conglomerate in fault contact with the turbidites of the Patrick Brook type-section contains pebbles of siltstone like those observed at Little Falls, clearly indicating that the faulted conglomerate was originally deposited stratigraphically above the Patrick Brook Formation. A Celtic brachiopod assemblage from calcareous siltstone overlying the conglomerate indicates that the Vallée Lourdes Formation is late Arenigian to early Llanvirnian (early Ordovician) and correlates with the conodont-bearing Vallée Lourdes conglomerate at Little Falls. In other parts of the Bathurst Mining Camp, the Vallée Lourdes Formation is not present, and shales and wackes of the Patrick Brook Formation (Miramichi Group) are directly overlain by volcanic rocks of the Tetagouche Group.