

## **Progress report on bedrock mapping of the pre-Devonian volcanic/sedimentary rocks in the Round Mountain area of northern Maine, USA: establishment of the Round Mountain Volcanic Sequence**

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The Round Mountain area is located in the middle section of the NE-trending “Munsungan-Winterville Anticlinorium” in northern Maine. The anticlinorium is part of the Ordovician Popelogan arc of northwestern New Brunswick and northern Maine. Bedrock mapping in the area since 2016 has made significant progress towards understanding of the pre-Devonian stratigraphic sequences and structural framework of the slightly metamorphosed and foliated volcanic and sedimentary strata.

The Round Mountain Volcanic Sequence (RMVS) is composed of alternating layers of felsic tuff (fine tuff, coarse tuff, lapilli tuff, lapilli stone, and tuffaceous breccia) and basalt (dominantly porphyritic basalt). The RMVS conformably overlays the older Chase Brook Formation of dominantly slate on its southeast and forms a NW-dipping homoclinal structure. The RMVS is identified as an independent volcanic sequence from other volcanic sequences, such as the widespread Munsungan Lake Formation (Sequence) of volcanic rocks. The difference is confirmed by discrimination diagrams such as Rb-Sr and Rb-Ba diagrams of the tuffs/cherty rocks sampled from both sequences (the trace elemental analysis was performed by a hand-held XRF analyzer). The RMVS was likely produced in a submarine half-graben, rifting setting.

The multiple “chert” layers within the RMVS that were mined by Paleo-Indians for making lithic tools are actually fine- or very-fine-grained silica-rich tuff. The “unnamed volcanic rocks – Ouv” shown on the current state map do not exist; where Ouv is shown there is a NE-striking and NW-moderately-dipping formation of slightly-foliated conglomerate and slate – named the Rowe Lake Formation in this study. It is mapped into three members, the Lower Slate Member, Conglomerate Member, and Upper Slate Member. The conglomerate is polymictic and made of predominantly pebble-size chert (cherty tuff) and volcanic rocks.

A slice of unnamed, NE-striking, dominantly pillow basalt formation occurs on the northwest side of the Upper Slate Member. Their contact is likely an unconformity. This younger basalt formation is tentatively named the Horseshoe Pond Formation in this study.

The Chase Brook Formation, probably the oldest strata (Ganderian) in the area, extends further northeast crossing the Machias River, which implies that the Winterville Formation on the east side of the River should be much narrower than what is shown on the current state map. In addition, a layer of fine vitric tuff and a layer of basalt were identified within the Chase Brook Formation, indicating periodic volcanic eruptions during the deposition of the Ganderian slate formation.