

Diagenetic effects and fluid flow along erosional boundaries in the Triassic Wolfville Formation at Rainy Cove, Nova Scotia, Canada

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Rainy Cove is located along the south shore of the Minas Basin in the Pembroke area, Nova Scotia, Canada. Cliff outcrops along the beach preserve fluvial barforms and channel deposits of the Wolfville Formation, which is a member of the Fundy Group. The Triassic Wolfville sandstones lie unconformably over the steeply dipping metasedimentary rocks of the Carboniferous Horton Group. The Wolfville Formation at this location is a coarse-grained, subangular to angular red sandstone that is well cemented with a calcite cement. The fluvial sandstones plot in the 'litharenite' to 'feldspathic litharenite' fields on the Qt-F-L (Quartz-Feldspar-Lithics) classification after Folk (1968). The Wolfville Formation sandstones have undergone varied paragenetic processes including mechanical compaction, cementation, partial dissolution of unstable feldspars and cements, and creation of secondary porosity. In the Rainy Cove outcrop, erosional surfaces separate lithofacies packages within the formation. These consist of bounding surfaces due to change or resurgence of fluvial sedimentation, as well as an intra-Triassic unconformity where a cut and fill channel eroded previously deposited fluvial sediments. Heterogeneities in porosity and permeability along erosional boundaries could create preferential pathways, baffles, or barriers to fluid flow. Sixteen samples were collected during field work at Rainy Cove from an outcrop spanning approximately 200 m. Samples were taken above and below bounding surfaces and from the main units within the formation. Thin sections from the samples will be described in detail. Descriptions can then be correlated to measured sections and erosional bounding surfaces seen in the outcrop. Planned scintillometer and permeameter readings will be used to describe lithology and permeability variance between packages. There may also be an opportunity to perform cathodoluminescence analysis on the samples and investigate phases in cementation and diagenetic history. The objective of this project is to investigate diagenetic variance across the erosional boundaries and potential impacts on fluid flow.

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