

Lithofacies of the Early Jurassic vertebrate-bearing Scots Bay Member at Wasson Bluff, Nova Scotia

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Ongoing sedimentological research on the Scots Bay Member of the McCoy Brook Formation at Wasson Bluff provides evidence of lacustrine facies that locally overlie the North Mountain Basalt. Since the first vertebrate fossils were found at Wasson Bluff in 1976 by Paul E. Olsen, the site has been the focus of extensive paleontological research. The Scots Bay Member extends as a series of micro-basin successions for several kilometres. Although it has been described in general terms as lacustrine or playa deposits a detailed sedimentological study is needed to constrain this interpretation.

The initial 10 m of strata overlying the North Mountain Basalt were measured in a trench on the beach. The basal 1.9 m corresponds to the Scots Bay Member. From this section and small exposures, four lithofacies were established using field observations and petrographic analysis. The strata lie unconformably on the basalt, filling the uneven topography on the basalt surface. The lowermost bed is a fine-to- medium-grained red-brown sandstone 0.1–0.4 m thick. Succeeding lithofacies in the trench are red claystone, grey- green mottled siltstone, and ostracod-rich biomicrite (two beds, 5 cm and 12 cm thick). The member is overlain by red fluvial sandstone with dinosaur bone fragments.

In a cliff separated from the trenched area by faults are three lithofacies not observed in the trench: vertebrate- bearing purple-grey fine-grained sandstone, green quartz- rich sandstone, and nodular limestone (a single bed 12 cm thick). The purple-grey sandstone and nodular limestone are noteworthy lithofacies. The purple-grey sandstone, draped over basalt clasts, shows a distinctive reflection of light from the abundant semionotid fish material and crumbles along laminae defined by densely packed fish material. The nodular limestone has a disrupted fabric with discontinuous concave-up laminae of varied colour, sediment-filled cracks, and minor continuous red-brown laminae. This lithofacies contains abundant pale nodules of sparry calcite that increase in proportion upwards. Disrupted fabrics are common also in the grey-green mottled siltstone, red claystone, and ostracod-rich biomicrite in the trenched section.

The sedimentology and taphonomy of the Scots Bay Member, with fish and ostracods, imply an extensive shallow lake that ponded on the basalt in the earliest stages of basin subsidence after the eruption. Disrupted fabrics indicate that the lake locally dried up periodically and the strata may represent a regressing shoreline. Dinosaur fragments imply transport of bone material into the lake and a shoreline facies.