

Sedimentology and paleoenvironment of an Early Jurassic dinosaur bone bed at Wasson Bluff, Parrsboro, Nova Scotia

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The Early Jurassic McCoy Brook Formation at Wasson Bluff has been a site of dinosaur bone discoveries for over thirty years. The formation crops out on the north side of the Minas subbasin, deposited during the break up of Pangea and prior to the opening of the Atlantic Ocean. The first discovery of dinosaur bone was in 1976, and numerous excavations in 1998–2006 yielded several articulated prosauropods within a confined bone bed. This bed represents the richest prosauropod site in North America and contains the oldest dinosaur bones discovered in Canada. During field work in August 2013, led by Dr. Tim Fedak, 15 disarticulated bones and bone fragments were collected in an eastern extension of the bone bed. The dinosaur material has been well documented and the detailed sedimentology of the bone-bearing bed is of interest. Assessing the stratigraphy at Wasson Bluff is complicated by syn-depositional faulting in the Fundy rift basin. Faults are present on a metre to centimetre scale as displayed by offsets of some bone.

A 5-m section beginning at the bone-bed was described at a centimetre scale during the 2013 excavation. Based on grain size analysis with laser diffraction, poorly sorted, fine- to medium-grained sandstone predominates. In the lower part of the section, interbedded thin, red, micaceous mudstone and orange-brown sandstone show cross-beds, desiccation cracks, ripples, concave-up surfaces, and outsized, moderately rounded grains. In the upper part of the section, laminated, grey-brown sandstones have large cross-sets.

Half-grabens that formed on the surface of the North Mountain Basalt during extension produced an 8-m high paleo-cliff. As the McCoy Brook Formation infilled these grabens, basalt boulders eroded from the cliffs were incorporated into the Early Jurassic sediments. Boulders in the stratigraphic section are up to 40 cm in diameter.

Prosauropod bones were found in two beds of trough cross-bedded sandstone in the lower part of the section. Both beds contain scattered basalt boulders and, although some boulders are in contact with the bone, there is no direct correlation between boulders and bone.

These sediment characteristics indicate that the dinosaurs were preserved in a river channel with episodic flow and periodic desiccation. The outsized rounded grains suggest eolian additions to the river sediment, and the overlying cross-bedded grey-brown sandstone is probably eolian.