

GEOLOGY OF THE BONAVISTA (NTS 2C/11) MAP AREA, NEWFOUNDLAND

Leon Normore

Ediacaran and Cambrian rocks in the Bonavista map area (NTS 2C/11, 10), northern Bonavista Peninsula, were mapped at 1:50,000 scale in 2009. One of the primary goals for this area is to determine whether the region consists of two distinct Neoproterozoic sedimentary basins, represented by the “Avalon east basin”, in the Spillars Cove to Port Union area, and the “Avalon west basin”, in the Cape Bonavista (Plate 1) to Plate Cove East area, or if there is a continuous stratigraphic succession through the entire Bonavista Peninsula. The “Avalon east basin” contains the well-documented stratigraphy of the Conception–St. John’s–Signal Hill groups and has been thoroughly mapped in the Catalina Dome region where there are locally abundant Ediacaran fossils in numerous localities. The “Avalon west basin”, which contains deltaic/marginal marine sedimentary rocks of the Rocky Harbour Formation overlain by continental red beds of the Crown Hill Formation, was the focus of this year’s field work.

The Neoproterozoic stratigraphic framework of the “Avalon west basin”, developed by Sean O’Brien (2003–2006), was carried to the interior of the map area. Sedimentary structures, including megawave ripples (Plate 2), major slumping (Plate 3) and the cyclical upwards-coarsening sequences, help define the Rocky Harbour Formation as a wave-dominated, deltaic depositional environment. The overlying terrestrial red-bed sequence of the Crown Hill Formation represents the continued regression into a fluvial- to alluvial-dominated facies, with gypsum molds (Plate 6) polygonal desiccation mud-cracks (Plate 7 and 8) clearly demonstrating subaerial exposure and prolonged arid climatic conditions.

Mafic dykes and submarine volcanic rocks were also mapped in this sedimentary rock-dominated region. Ten mafic dykes (Plates 9, 10 and 11) crosscut the sedimentary rocks of the Rocky Harbour Formation and radiate from a point in the central area of the Bonavista Peninsula, approximately equidistant from Upper Amherst Cove and Port Union. This is also the location of the Bull Arm Formation pillow basalts (Plate 12), and Bull Arm Formation magma is possibly the source of the dykes.



Plate 4: Multiple ripple beds representing variably paleoflow conditions, Green Island, Bonavista Bay.



Plate 8: Differential compaction of sand-filled mudcrack and surrounding siltstone, Red Cliff, Bonavista Bay.

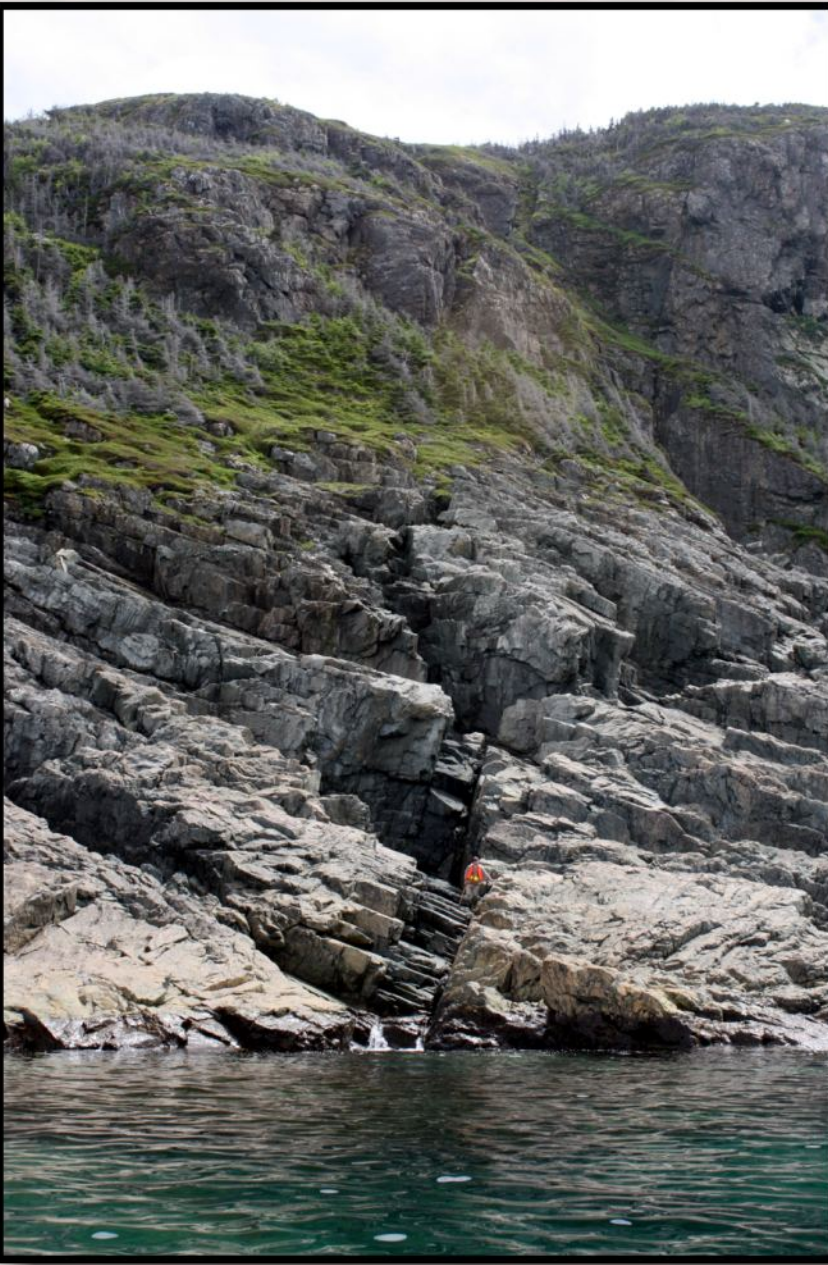


Plate 9: Dyke located on Burnt Head; approximately 2 m thick, bearing 012° with a 70° dip to the east.



Plate 1: Cape Bonavista



Plate 5: Redox boundary cross-cutting stratigraphy within the Bonavista Formation, Keels, Bonavista Bay.



Plate 10: Dyke located near “red rocks”, north of Bayleys Cove, Bonavista Bay; 10m thick, bearing 014° with a 79° dip to the east.



Plate 2: Straight to sinuous-crested, occasionally bifurcating, symmetric, pebbly megaripples within the Rocky Harbour Formation located near Knights Point, Blackhead Bay; deposited in a high-energy, wave-dominated, shoreface environment; note iceberg for scale.



Plate 6: Bladed gypsum molds within the Crown Hill Formation, Brook Point, Bonavista Bay.



Plate 11: The Wolf Head Dyke is a black, fine-grained mafic dyke, approximately 20 m wide with brecciated margins and an epidote-altered core. It is near vertical, bearing 150°, and corresponds with a strong, linear, aeromagnetic anomaly. This is the largest dyke found on the Bonavista Peninsula. Photo looking east; note person on south contact of dyke for scale.



Plate 3: Slumped horizon, approximately 115 cm thick, within the Rocky Harbour Formation located near Wolf Head, Bonavista Bay; note intensity of folding increases up through the unit and original paleoslope is to the right (southeast).



Plate 7: Polygonal desiccation mud-cracks within the Crown Hill Formation located near Duntara, Broad Cove, representing prolonged subaerial exposure of shallow lakes.



Plate 12: Sharp irregular contact represents the unconformity between pillow basalts of the Bull Arm Formation and overlying siltstones of the Rocky Harbour Formation.