

Stratigraphy and Structure of the Horton Group in the Lochaber-Mulgrave Area, Nova Scotia¹

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During the summer of 2001, extensive mapping was done in the Lochaber-Mulgrave area of northern mainland Nova Scotia as part of an on-going study of stratigraphy and structure in this complex area, bounded by the Glenroy Fault on the north, the Strait of Canso on the east, the Roman Valley Fault on the south, and pre-Carboniferous rocks of the Antigonish Highlands on the west. Sedimentary rocks in the area are now assigned to the Early Devonian Knoydart Formation, Early Carboniferous Horton and Windsor groups, and Late Carboniferous Mabou Group. The Horton Group underlies most of the map area, and has been divided into four formations (from oldest to youngest): (i) Clam Harbour River Formation (Englands Lake and Goose Harbour Lake members), (ii) Tracadie Road Formation (Half moon Lake and Lincolnville members), (iii) Caledonia Mills Formation, and (iv) Steep Creek Formation. The fluvialite Englands Lake Member consists of fine- to coarse-grained sandstone and polymictic conglomerate, and maroon to green-grey siltstone. The overlying, lacustrine-deposited Goose Harbour Lake Member consists of poorly- to well-laminated green-grey siltstone and shale with interbedded dolomite. The fluvialite Halfmoon Lake Member consists of polymictic conglomerate, pebble sandstone, and quartz arenite with minor interlayered dark grey siltstone. The overlying, lacustrine-deposited Lincolnville Member consists of dark grey laminated siltstone and shale interlayered with minor quartz arenite. Rare *Lepidodendropsis* plant fossils of Tournaisian age are found in the fine-grained sandstone and shale beds. The overlying Caledonia Mills Formation consists of red to light grey, massive to well-laminated siltstone and sandstone and is interpreted to have been deposited in an arid fluvial environment. The Steep Creek Formation unconformably overlies the Goose Harbour Lake and Lincolnville members and consists of polymictic conglomerate, fine-grained to pebble sandstone, and maroon to dark grey siltstone. All of these units are lithologically similar to those assigned to the Horton Group in the St. Marys Basin. The sedimentary provenance may be confirmed through ⁴⁰Ar/³⁹Ar dating of detrital muscovite grains in the Horton Group sedimentary units.

In comparison to the Horton Group in other areas, the rocks in the Lochaber-Mulgrave area are highly deformed. In addition, most of the area has undergone low-grade regional metamorphism, and cleavage is well developed as a result of accompanying deformation. The western part of the region has open to tight, upright to overturned, northeast-trending folds with well-developed axial planar cleavage. The eastern part has tight to close, upright, north-south-trending folds with moderately developed axial planar cleavage. Folded axial plane traces and scattered cleavage orientations indicate the region has undergone polyphase deformation. The structural complexity in the Lochaber-Mulgrave area may be related to interaction between the Avalon and Meguma terranes during their juxtaposition along the Cobequid-Chedabucto fault system.

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