

Devonian and Carboniferous stratigraphy in the Guysborough - Loch Lomond area, Nova Scotia

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Devonian rocks in the Guysborough area are divided into four stratigraphic units. The oldest unit (Sunnyville Formation) consists mainly of basalt and rhyolite (U-Pb zircon age of 389 ± 2 Ma). It is overlain by polymictic, locally tuffaceous, conglomerate and sandstone (Glenkeen Formation), which can be traced east through southern Cape Breton Island, and unnamed quartz wacke and siltstone units, the latter hosting the Copper Lake Fe-Cu deposit. All of these

units are intruded by gabbroic dykes and plutons, one of which has yielded a U-Pb (baddeleyite) age of ca. 385 Ma. These early to mid-Devonian units are in faulted contact to the north, west, and south, mainly with Carboniferous rocks of the Horton Group. North of the Guysborough area, the Horton Group is divided into four units: quartz sandstone, mainly grey to black laminated siltstone, interlayered grey-green and red-maroon siltstone, and red-maroon siltstone.

The lower sandstone and siltstone units may correlate with the Fall River and Barrens formations of the Horton Group in the St. Mary's Basin, now displaced by dextral motion on the Minas fault system. Some of these Carboniferous units can also be traced to the east through Isle Madame to the Loch Lomond area in Cape Breton Island, where they have been intruded by Carboniferous gabbroic plutons (St. Peters gabbros; 339 ± 2 Ma; U-Pb zircon and baddeleyite). The strata are locally strongly deformed with north-south to east-west trending open to tight folds and rare recumbent folds. A subhorizontal to moderately southeast-dipping foliation occurs throughout the area.

The Devonian rocks in the Guysborough block, together with associated fault-bounded slivers of high-grade mylonitic granite, amphibolite, and sillimanite-garnet schist, may represent the "basement" of the St. Mary's Basin, now exposed in a positive flower structure. This structure may have formed at a megakink in the Minas fault system as a result of dextral motion between the Meguma and Avalon terranes. This structural and stratigraphic interpretation is supported by integrated airborne radar imagery and vertical gradient magnetic data.