

Resolved Silurian-Devonian stratigraphic correlation across the Québec-Maine-New Hampshire borders and its bearing on Silurian extension

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Prior to 1980, correlations between Québec and Maine/New Hampshire in the Connecticut Valley-Gaspé trough subscribed to the general interpretation that the Devonian Compton Formation in Québec equalled the Seboomook Formation (now Group) in Maine. The Frontenac Formation extended across the border but its age was uncertain. Detailed mapping in the 1980s and 1990s in each area revealed that the Compton and Seboomook belts contained mappable units, but the detailed successions in each area did not agree. Based on abundant younging directions, the Frontenac was placed in the Silurian below the Seboomook in Maine/New Hampshire but its age in Québec remained uncertain — Ordovician to Devonian.

We now recognize: 1) The Frontenac Formation, with two fault-bounded members, of thickly bedded, variably calcareous turbiditic wacke, and local bimodal volcanic rocks of extensional affinity, is Silurian based on preliminary isotope geochronology. Key sections in northern New Hampshire clearly show that the Frontenac is beneath the Compton. 2) Units within the Seboomook and Compton above

the Frontenac in all areas share lithologic character but not stratigraphic position. In Maine, the Frontenac is conformably overlain by the Ironbound Mountain Formation, thin to massively bedded mud/siltstone with graded beds and debris flows interpreted as submarine slope/slope-base deposits. Within the formation are distinctive lenses of coarse massive wacke (Grenier Member in Maine, Hall Stream Member in New Hampshire) interpreted as channel deposits. The Ironbound is overlain by well-graded turbiditic sandstone of the Northeast Carry Formation. In Québec, the base of the Devonian section is the Milan Member of the Compton, lithologically identical to the Northeast Carry. This is overlain by the Saint Ludger Member, the lithologic equivalent of the Ironbound Mountain, including the Drolet Member which corresponds to Grenier. 3) These units represent temporally and spatially variable deposition by turbidity current from multiple sources, some deltaic, in a submarine fan/slope environment of a narrow steep-sloped but relatively shallow extensional basin.