

**Contrasting Geology Across the Cradle Brook Thrusts;
Subaerial vs Marine Precambrian Environments;
Caledonia Highlands, New Brunswick**

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The Cradle Brook fault zone in southern New Brunswick separates highly deformed Precambrian terranes reflecting radically different geological environments. The zone is comprised of major southward directed thrusts and is interpreted to represent, in part, the boundary between the Central and Eastern volcanic belts of the Caledonia Highlands.

The rocks north of the fault have been deposited in a subaerial and locally subaqueous environment. Periods of intense volcanic activity produced voluminous, unsorted felsic and mafic tuffaceous deposits, highly vesiculated mafic flows and extensive

felsic flows. The felsic volcanic rocks are mostly oxidized and there is little evidence of reworking of volcanic debris. Isolated basins are represented by finely laminated and commonly normally graded fine- to medium-grained sedimentary rocks that occur as discontinuous units intercalated with the volcanic deposits. These sedimentary rocks contain variable amounts of locally derived volcanic debris. This stratigraphy has been traced to the Central Intrusive Belt north of the fault zone.

The rocks south of the fault zone have been deposited entirely in a marine environment. Periods of intense

volcanic activity also produced voluminous felsic (commonly pyritiferous) and mafic tuffaceous deposits but these are generally finer-grained than those north of the fault and are commonly reworked producing well-sorted and laminated deposits. The volcanic flows are mafic and occur as vesiculated pillow lavas and hyaloclastites. During intermittent periods of quiescence, limestone, chert, quartzite, arkose and finely laminated, fine-grained sedimentary rocks were deposited. Some of these sedimentary units are quite extensive laterally. This stratigraphy has been traced east to Fundy National Park and correlatives exist throughout the Eastern Volcanic Belt. Equivalent rocks also exist in fault blocks north of the fault along the coast near Big Salmon River.

In addition to the differences in

Precambrian stratigraphy, extensive areas south of the fault are underlain by small plugs and large bodies of felsic and mafic intrusive rocks, and by Cambrian rocks that rest unconformably on mafic pillow lavas of the Eastern Volcanic Belt. Based on a limited number of chemical analyses, the volcanic rocks north and south of the fault zone appear to possess calc-alkaline ensialic and tholeiitic-ensimatic affinities, respectively.

The structural and stratigraphic relationships imply that the subaerial rocks are older than the marine rocks and that the latter are probably near the top of the local Precambrian sequence. Limited chemical information and the abundance of intrusive rocks in the subaqueous sequence substantiate juxtaposition of very different geological regimes.