

Devono-Carboniferous volcanic and plutonic rocks of Cape Breton Island, Nova Scotia

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Volcanic and interlayered sedimentary rocks of known or inferred Devono-Carboniferous age in Cape Breton Island are assigned generally to the Fisset Brook Formation, but in most areas stratigraphic relations and age range are uncertain. In addition, the relationship of possibly contemporaneous gabbroic and granitic plutons to the volcanic rocks has not been investigated. In the Gillanders Mountain area east of Lake Ainslie, our mapping shows that the Fisset Brook Formation is more extensive than previously recognized, and consists of a conglomeratic unit, overlain by basalt (with some interlayered clastic sedimentary rocks), rhyolite, and a red clastic sedimentary unit. The basalt is mainly amygdaloidal and contains well preserved peperitic structures. Spatially associated gabbroic dykes and small plutons appear to have been co-genetic with the basaltic flows, and the Gillanders Mountain syenogranitic pluton is inferred to be co-genetic with the rhyolite.

In the geologically complex area around the southern and western margins of the Creignish Hills, amygdaloidal and locally scoriaceous basalt occurs only in the southernmost part, and rhyolite forms a small dome in the northwest. A body of mixed fine- and coarse-grained gabbro is located east of the basalt, and mafic dykes are common. Associated units include felsic tuffs and varied clastic sedimentary rocks. Older quartzite, marble, phyllite, slate, and granitoid rocks occur in windows or faulted slivers throughout the area.

Petrological studies show that the mafic rocks in both the Gillanders Mountain and Creignish areas are tholeiitic transitional to alkalic, and have petrochemical signatures most likely indicative of a continental extensional setting. The felsic rocks formed in a within-plate setting, and are coeval but not comagmatic with the mafic rocks.