

Middle Paleozoic granite plutonism in southern Newfoundland

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Granitic and associated intermediate to mafic plutonism of Devonian to Early Carboniferous age is well represented in southern Newfoundland where the Burgeo and North Bay intrusive suites have intruded late Precambrian to Late Silurian gneisses, sedimentary and volcanic rocks. The batholiths are dominated by syn- to late tectonic biotite \pm hornblende granodiorite and granite and late to post-tectonic muscovite-biotite granite. A radiometric age of 396 Ma (U-Pb zircon) was obtained from a late phase of the North Bay Granite Suite. Syn- to late tectonic phases of the Burgeo Intrusive Suite have been dated at 428 and 415 Ma (U-Pb zircon), respectively. A brecciated granite from the Ramea Islands has been dated at 417 Ma (U-Pb zircon).

Completely post-tectonic granites extend along the south coast for 200 km. These texturally-variable biotite granites rarely contain hornblende. They cross-cut all the major tectonic features that define the various terranes. The granites are highly evolved, contain miarolitic cavities and gas breccias, and were emplaced at high structural levels. These granites display geochemical and lithological layering and the François Granite comprises two overlapping, composite, ring complexes. The Chetwynd Granite is dated at 390 Ma (U-Pb); the François Granite at 378 Ma (U-Pb); the Harbour Breton Granite at 340 Ma (Rb-Sr); the Ackley Granite at 367 to 353 Ma (Ar-Ar).

Geochemical variation in the Silurian-Devonian composite batholiths indicates calc-alkaline trends from gabbro through tonalite and granodiorite to granite. The highly evolved granites are all high-silica granites (average 72-76% SiO₂) with the more evolved phases displaying very high Rb:Sr ratios (>100). Epsilon Nd ratios indicate that the granites within the Avalon Zone have positive ϵ Nd, whereas the Dunnage-Gander Zone granites are negative. This has been interpreted as reflecting major differences in the crust. This change coincides with the Hermitage Bay Fault but not perfectly with the Dover Fault.

Mineralization is mainly associated with the high-silica granites. The Mo deposits at Rencontre Lake and Sn-W-Mo greisens at Sage Pond lie along the southern margin of the Ackley Granite. The François Granite features highly anomalous radioactivity although no significant U or Th values or alteration have been found. The Chetwynd Granite is adjacent to the Hope Brook gold mine and may have been involved in the remobilization of gold. The Burgeo Intrusive Suite may be the source of extensive W + base-metal-bearing quartz veins at Grey River. Extensive Mo-W mineralization, at Granite Lake, occurs within an extensively altered phase of the North Bay Intrusive Suite and also in epithermal quartz-wolframite veins in adjacent granodiorite.