

rocks were likely formed in a post-collisional setting based on discrimination diagrams. A medium-grained granophyric monzogranite sample yielded a U-Pb (zircon) crystallization age of 418 ± 1 Ma, the same age as the Landry Brook quartz monzodiorite. The so-called “Charlo stocks” form a group of dykes and plutons west of the Dickie Brook and Landry Brook plutons and consist mainly of high-level, fine- to medium-grained, granophyric quartz monzodiorite to monzogranite with miarolitic cavities and less abundant plagioclase-amphibole dacite porphyries. Geochemical data show similarities with the Dickie Brook pluton on variation diagrams for both major and trace elements but higher Fe and lower Ca. Collectively, the lithology, whole-rock chemical data, and age are very similar, and given their spatial proximity, all of these plutons are likely to be petrogenetically related. However, they show a wide range in abundances of REE, Zr, Y, and Nb, and a correspondingly wide variation in apparent tectonic settings on discrimination diagrams from volcanic-arc to within plate or post-collisional fields. On a larger scale, slab break-off after closure of the Tetagouche-Exploits basin is most likely to be the mechanism responsible for magma formation.

Petrology, petrogenesis, economic potential, and tectonic implications of the Landry Brook, Dickie Brook, and Charlo plutons, northern New Brunswick

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The Late Silurian calc-alkaline, Landry Brook, Dickie Brook, and Charlo plutons cover a combined area of approximately 80 km² in the northeastern part of the Silurian-Devonian Tobique-Chaleur tectonostratigraphic belt in northern New Brunswick. The Landry Brook plutonic suite consists of four units: gabbro, granodiorite, quartz monzodiorite to monzogranite, and a later, mainly monzogranite unit. A significant geochemical separation (i.e., a gap) exists between the mafic and felsic rocks. A quartz monzodiorite sample from Landry Brook pluton yielded a U-Pb (zircon) crystallization age of 419.63 ± 0.23 Ma. The bimodal Dickie Brook plutonic suite consists of four units: contemporaneous (comingled) gabbro and clinopyroxene-bearing diorite to quartz diorite, meso- to melanocratic hedenbergite-quartz monzodiorite to monzogranite, and aphanitic to porphyritic felsic dykes, all cut by later basaltic dykes. REE-bearing fluoroapatite-Fe-diopside-magnetite porphyry in the eastern part of the pluton is most likely related to the late basaltic dykes. Electron microprobe analyses measured cerium (Ce), lanthanum (La), and yttrium (Y) maximum concentrations of 8891 ppm, 4406 ppm, and 3473 ppm, respectively, in apatite from the porphyry. These