

## **Petrology of metamorphic and plutonic rocks in the Neoproterozoic Chuggin Road complex, Creignish Hills, Cape Breton Island, Nova Scotia, Canada**

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The Chuggin Road complex is a small area of Neoproterozoic metamorphic and plutonic rocks located at the northeastern tip of the Creignish Hills in the Bras d'Or terrane of west-central Cape Breton Island. It is interpreted to be part of the Bras d'Or metamorphic suite, a characteristic component of the Bras d'Or terrane typified by low-pressure, high-temperature metamorphic rocks. The Chuggin Road complex is well exposed in two quarries near Chuggin Road, from which twenty-three samples of varied metamorphic and plutonic rocks were collected in order to investigate their petrography, mineral chemistry, and whole-rock chemistry for comparison to other parts of the Bras d'Or metamorphic suite. An orthogneiss in the Chuggin Road complex previously yielded a U-Pb (zircon) age of  $561 \pm 3$  Ma, interpreted to represent the igneous crystallization age of the tonalitic protolith of the orthogneiss and providing a minimum age for the metasedimentary components of the complex.

The most abundant rock type in both quarries is biotite gneiss, dominated by plagioclase, quartz, and biotite. Some contain tourmaline and pseudomorphs interpreted to be pinitized cordierite and hence are interpreted to be paragneiss. Orthogneissic samples appear similar in hand sample but lack evidence for cordierite and contain abundant epidote. Paragneissic samples contain lower  $\text{SiO}_2$  and higher  $\text{Al}_2\text{O}_3$  and  $\text{TiO}_2$  than orthogneissic samples, but diagrams for discrimination of sedimentary or igneous protoliths do not appear to consistently classify these samples. The Chuggin Road paragneiss contains lower  $\text{SiO}_2$  than cordierite-bearing paragneiss from the Kellys Mountain gneiss. The quarries also expose minor amounts of quartzite, marble, and calc-silicate rocks, in one area overthrust by gneissic rocks.

The gneissic rocks are abundantly intruded by medium-to coarse-grained dioritic rocks brecciated by pink granitic dykes. In places the diorite grades into coarse-grained hornblende. In pegmatoid areas, hornblende crystals are up to several cm in length. The dioritic rocks are calcalkalic and chemically similar to the orthogneiss. The rocks in both quarries are cut by faults, sulphide-bearing shear zones, and rare mafic dykes.