

Geology of the Belle Côte Road orthogneiss, Cape Breton Highlands, Nova Scotia

Jo Price

Department of Earth Sciences, Dalhousie University, Halifax, Nova Scotia B3H 3J5, Canada

Geological mapping (1:10 000 scale) and sampling of the Belle Côte Road orthogneiss and associated units, south-central Cape Breton Highlands, was undertaken in the summer of 1996. The purpose of this study is to better characterize and interpret the Belle Côte Road orthogneiss by more fully describing the field relationships of the units, carrying out a petrographic study of the rocks, and obtaining geochemical and $^{40}\text{Ar}/^{39}\text{Ar}$ data to constrain the tectonic setting and metamorphic history of the rocks.

Field mapping during this study has revealed that the Belle Côte Road orthogneiss (previously dated at 442 ± 3 Ma; U-Pb zircon) intruded the First Fork Brook gneiss and that both of these units are intruded by the Taylors Barren Pluton (previously dated at 430 ± 2 Ma; U-Pb zircon). The Belle Côte Road orthogneiss is a relatively homogenous, well foliated, locally megacrystic, leucocratic granite containing quartz + K-spar + plagioclase + biotite \pm epidote \pm garnet \pm muscovite \pm titanite \pm opaque minerals \pm apatite. It exhibits a mainly gneissic texture while still preserving some of its

original igneous texture. The unit also includes minor amounts of glimmerite, amphibolite, and paragneiss.

The First Fork Brook gneiss consists of mainly heterogeneous, strongly foliated, coarse to fine grained amphibolite containing hornblende + K-spar + plagioclase + quartz \pm biotite \pm garnet \pm titanite \pm epidote \pm opaques. Minor units of paragneiss are also present within the amphibolite and are conformable with the principle foliation. The First Fork Brook gneiss occurs mainly in the eastern side of the map area and may represent mafic flows interbedded with sediments, much like the rocks observed in the Jumping Brook metamorphic suite elsewhere in the Cape Breton Highlands.

Preliminary geochemical data suggest the Belle Côte Road orthogneiss has a granodioritic to tonalitic composition with an average SiO_2 content of about 70%. The orthogneiss is peraluminous with A/CNK ratios of 1.05-1.2. The First Forks Brook gneiss is of basaltic to andesitic composition. Trace element data suggest that both units may have formed in a volcanic arc setting.