Metamorphic and Plutonic Geology on the East Shore of Lake Revelstoke Mica Creek, British Columbia

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Abstract

The Mica Creek area of the Omineca Belt of the southeastern Canadian Cordillera is a geologically complex region composed of highly deformed metamorphic rocks with minor felsic igneous intrusives. In the present study, a 300 m long roadside exposure located 2 km south of Mica Creek Village on the east side of Highway 23, was sampled and mapped. Previous work has shown that the lithologies found at this particular site include metabasites and migmatitic mica-rich schistose metapelites up to kyanite grade (Ghent et al., 2000). The felsic intrusives are trondhjemitic to granodioritic in composition (Ghent et al., 2000). Three days of field work and detailed mapping revealed a wide variety of rock types, including four different types of amphibolite, two different metapelites, two felsic intrusives, a metagranitoid and a metapyroxenite. Three of the four types of amphibolite have a gneissic, black and white banded appearance and are grouped based on whether or not they contain biotite, titanite or both garnet and titanite, respectively. The fourth type contains only biotite and hornblende and has a schistose texture. The metapelites are very mica rich and contain either garnet or both kyanite and garnet. Both felsic intrusives are trondhjemitic, however one variety is micaceous and shows evidence of deformation while the other is undeformed, pegmatitic and composed solely of quartz and plagioclase. The metapyroxenite is made up almost entirely of coarse-grained enstatite with secondary actinolite and chlorite.

The high abundance of amphibolites relative to the rest of the Mica Creek area and the presence of metapyroxenite are two of the most interesting features of this outcrop. The presence of the metapyroxenite is unexpected, as these rocks have been interpreted as a Neoproterozoic miogeoclinal sedimentary sequence that accumulated on a continental margin (Sevigny, 1988). Further analytical work on the mineral chemistry of the metapyroxenite, as well as interpretation of the field relationship of this rock to the surrounding metabasites and metapelites, may help to elucidate its origin. The amphibolites are thought to have originally been basalts that formed as a result of continental rifting (Sevigny, 1988). The only ultramafic rocks mentioned in previous studies are gneissic hornblendites that are thought to originate from a crustally contaminated mantle-derived melt (Ghent et al., 2000, Sevigny, 1988).

Geothermobarometry will aid in answering the question of how such a wide variety of rock types amalgamated in this relatively small exposure. Previous peak metamorphism pressure-temperature estimates for the Mica Creek area are in the range of 540-700°C and 5.8-7.2 kbar (Crowley et al., 2000). Electron microprobe analysis has very recently been carried out, and the results will be used to estimate pressure and temperature conditions for many of these rock types. The field mapping, petrographic data, and pressure-temperature estimates will be integrated into a model of the metamorphic history of this outcrop.

References

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