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THE HARP LAKE COMPLEX, LABRADOR, AND THE MORIN COMPLEX, QUEBEC: EXAMPLES OF IGNEOUS AND META-IGNEOUS ANORTHOSITIC COMPLEXES IN THE EASTERN CANADIAN SHIELD

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ABSTRACT

The Harp Lake complex underlies about 10 000 km^2 in central Labrador. Approximately 75 percent of the complex comprises leucotroctolites, leucogabbros, leuconorites and anorthosite. Layered structures are widespread in these rocks but do not define a simple structural entity. Younger pyroxene and olivine-bearing adamellites make up most of the remainder of the complex. Olivine gabbros, gabbros and diorites are present at the margins of the anorthositic rocks and occur as dikes and small intrusive masses within the complex. Analyzed pyroxenes and feldspars form continuous solid solution series from the anorthositic rocks through rocks of intermediate composition to the adamellites. Orthopyroxenes range from En_{74} to En_{21} and plagioclases from An_{72} to An_6.

The Morin meta-igneous complex in Quebec comprises an anorthositic massif (chiefly anorthosite and leucogabbro) that underlies about 2 500 km^2 together with a similar area of closely spatially associated pyroxene quartz monzonites with lesser proportions of gabbro and pyroxene monzodiorite. Dikes of pyroxene monzodiorite cut only anorthositic rocks and dikes of pyroxene quartz monzonite cut both anorthositic rocks and pyroxene monzodiorites. Measured pyroxene and feldspar compositions form continuous solid solution series from the anorthositic rocks through pyroxene monzodiorites to pyroxene quartz monzonites. The range of orthopyroxenes is from En_{77} to En_{36} and plagioclases from An_{57} to An_{24}. The lower degree of iron enrichment in the pyroxenes by comparison with Harp Lake is in accord with a greater abundance of oxide minerals in the rocks and numerous oxide mineral deposits suggesting higher oxygen fugacities in equilibrium with the Morin magmas.

The mineral chemistry of both complexes implies the operation of continuing magmatic processes during their evolution. The unmetamorphosed Harp Lake complex permits some useful constraints to be placed on possible models for its magmatic evolution. The mineral chemistry of the metamorphosed Morin complex, as well as reflecting its prior igneous history, allows an understanding of the nature of the metamorphism of the complex following its crystallization.

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