

Geology of the Lac Varin area (22F/10)

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Abstract

The Lac Varin area (22F/10) is located approximately 65 km NW of Baie-Comeau. The area, which is within latitudes 49° 30' and 49° 45' and longitudes 68° 30' and 69° 00', is part of the watersheds of the Outardes and Manicouagan rivers. The rocks of the area, of Proterozoic age, belong to the polycyclic allochthonous Belt of the Grenville Province. They were grouped into two major units.

The *Varin Plutonic Suite*, to the south, mainly consists of massive to gneissic intrusions composed of granite and megacrystic quartz monzonite. The *Vallant Anorthositic Suite*, to the north, mainly consists of anorthosite, leucotroctolite, leuconorite, troctolite, gabbro-norite and olivine monzonite. The bedding and magmatic foliation are frequent in most of these facies. The rocks of all facies have been recrystallized with a northward intensification.

The rocks of the area were affected by two phases of folding. The first phase produced P1 folds associated with the regional foliation F1 which affected most of the rocks. The second phase caused the P2 folds which affected the F1 foliation. This phase is particularly well developed in the granitoids of the Varin Plutonic Suite. In the northern part of the map, E-W to SE-NW shear zones seem to be related to a major deformation zone located beyond the northern limit of the area. We attribute this zone to thrusting of the Vallant Anorthositic Suite rocks towards the north, over the gneiss unit. In the SE area, the contact between the Varin Plutonic Suite and the Vallant Anorthositic Suite is characterized by a series of normal ductile faults steeply dipping towards the north. These faults show evidence of an episode of stretch deformation that followed an episode of compression to which we attribute two phases of folding and the thrusting towards the north. Finally, late brittle faults constitute the last structural episode of the area.

The Vallant and Varin suites were emplaced under high pressure and temperature conditions. The granulite facies recrystallization of orthopyroxene suggests that the temperature and pressure conditions corresponded to those of the granulite facies and went on after the formation of the primary orthopyroxene. However, the occurrence of reaction rims between olivine or orthopyroxene and plagioclase, and between oxides and plagioclase, suggests that these phases have been disequilibrated during some time after their formation. Events of retrometamorphism corresponding to the amphibolite and greenschist facies respectively affected the rocks located north of the area and along the brittle faults.

The economic potential of the area is mainly linked to the oxide (Fe-Ti-V) and oxide-apatite (Fe-Ti-V-P) concentrations located within the rocks of the Vallant Anorthositic Suite. The area also conceals potential for architectural stone. Some sulphide showings have been recognized in the anorthosites and a few anomalies in REE have been found in the granitoid of the Varin Plutonic Suite. Oxide mineralization was classified into three types. The first type consists of Fe-Ti-V mineralization within gabbro-norites, mangerites, peridotites and nelsonites. Analyses from several sites returned the following grades (average between parenthesis): 15.6 to 62.1 % Fe₂O₃ total (44.3 %), 3.8 to 19.1 % TiO₂ (12.2 %), 203 to 1055 ppm V (691 ppm), and 0.7 to 10.7 % P₂O₅ (5.49 %). The second type is composed of Fe-Ti-V mineralization within dunites, peridotites, troctolites, leucotroctolites and leuconorites. Analyses from several sites returned the following grades (average between parenthesis): 17.3 to 64.5 % Fe²⁺O³ total (43.1 %), 6.6 % to 21.7 % TiO₂ (11.5 %), 239 to 2915 ppm V (1440 ppm), 0.01 to 0.35 % P₂O₅ (0.08 %). The third type includes Fe-Ti-V-P-REE mineralization within a fault zone. The best analytical result returned grades of 30.7 % Fe₂O₃t, 18.8 % TiO₂ and 913 ppm V.

The iridescent anorthosite of the Vallant Anorthositic Suite, the pinkish or greenish eyed granite of the Varin Plutonic Suite and the late granite (IIB) constitute targets of interest for the search of architectural stone. Several sites of interest were surveyed but the quality and the extent of the resource still have to be defined.