Metamorphic evolution of low-pressure metapelite in the Escoumins Supracrustal Belt, central Grenville Province, Québec, Canada

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The Escoumins Supracrustal Belt (ESB) belongs to the low-pressure belt of the central Grenville Province and represents high levels of orogenic crust, which were metamorphosed at amphibolite-facies conditions during the Grenvillian orogeny (1090–980 Ma). It consists of Pinwarian age (1.50–1.46 Ga) metasedimentary and metavolcanic rocks (Saint-Siméon group) and their plutonic counterparts, interpreted as remnants of an oceanic arc system accreted to Laurentia around ~1.4 Ga, and was invaded by Grenvillian-age intrusions. Evidence for amphibolite facies conditions is provided by the presence of hornblende – plagioclase – epidote in metavolcanic rocks, and garnet – biotite – quartz – K-feldspar – plagioclase ± muscovite ± sillimanite ± cordierite in metapelitic rocks. Preliminary ages for the metamorphism in this area are 1001 ± 3 Ma and 983 ± 3 Ma (titanite from dacitic tuff).

Metapelites are an important constituent of the lower Saint Paul-du-Nord formation and were sampled in four distinct locations across the belt. This study documents for the first time the low-pressure metamorphism in this region. Detailed petrography, SEM–MLA analysis, phase equilibria modelling, and in-situ U–Pb dating of monazites are used to constrain the metamorphic evolution of these rocks. For instance, preliminary results of phase equilibria modelling have shown that these rocks reached their metamorphic peak between 600–690°C and pressures between 3.5–5 kb. The data are consistent with a large change in temperature relative to pressure in both the retrograde and prograde path, and imply a high geothermal gradient. These results will add constraints on the metamorphic evolution of the low-pressure belt which in turn, will aid in piecing together the tectonic model of the Grenville Province.

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