

U-Pb geochronology and the evolution of the Grenville Province of western Labrador

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The Grenville Province of western Labrador comprises the Lac Joseph Terrane (LJT) (dominated by two leucosome migmatites intruded by granite and gabbro), structurally underlain to the northwest by the Molson Lake Terrane (MLT) comprising only metagneous rocks.

Monazite from both melt generations within LJT migmatites formed during leucosome crystallization between 1640-1600 Ma (Labradorian Orogeny); most zircon fractions from these melts

show premetamorphic inheritance. However, zircons from shear zones within the migmatites are concordant around 1630 Ma, implying that shearing and the synkinematic mineral assemblage sillimanite-biotite-garnet within these shear zones, and by extension the same assemblage ubiquitous throughout the LJT migmatites outside the shear zones, must be of Labradorian age. Granites and gabbros within the LJT are also of Labradorian age. Although no U-Pb evidence was found to suggest that the LJT

experienced significant Grenvillian heating, foliated Grenville-age granitic dykes cross-cut migmatitic layering.

Granites within the adjacent MLT formed at about 1645 Ma and have therefore been correlated with the Trans Labrador Batholith. MLT gabbro of the Shabogamo Intrusive Suite crystallized at about 1429 Ma (zircon). New mineral growth and partial resetting of zircon in both MLT rock types indicate they

were strongly affected during the Grenvillian Orogeny between about 1000-990 Ma.

Shear zones at the MLT-LJT boundary contain Grenville-age titanite and strongly reset zircon documenting Grenvillian shearing. The Labradorian LJT was therefore emplaced, with only minor structural reworking, during the Grenvillian Orogeny against the MLT while it was being deformed.