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U-Pb dating in the Ashuanipi, La Grande, Opinaca and Abitibi subprovinces in 2008-2009

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Abstract

This report presents the results of U-P geochronology on zircons extracted from 13 samples collected in the Superior Province, and analyzed in 1995 and 2008. Among them, four samples are from the Caniapiscau Reservoir and Rivière Séigny areas (Grand Nord), four are from the Opinaca Reservoir area (Baie-James), and five are from the Abitibi.

La Grande Subprovince, Rivière Séigny area:

Sample 2008-MP-1021 is a tonalitic gneiss assigned to the Brésolles Suite (2833 to 2807 Ma), a characteristic gneiss unit in the northeast part of the La Grande Subprovince. The age of 2840.3 ± 4.1 Ma confirms the presence of this unit in an inlier of the La Grande Subprovince within the Ashuanipi Subprovince.

Ashuanipi Subprovince, Caniapiscau Reservoir area:

Sample 2008-MP-1081 is a diatexite belonging to the Caniapiscau Suite. The age of $2664.5 +8.6/-7.2$ Ma indicates this lithology is related to a melting event contemporaneous with the origin of the extensive diatexite units in the Ashuanipi Subprovince (2682 to 2650 Ma).

Sample 2008-MP-1047 is a hypersthene tonalite assigned to the Lachaine Suite. The tonalite yielded an age of $2692.0 +1.1/1.0$ Ma, suggesting the Lachaine Suite includes hypersthene tonalites of variable ages and origins.

Sample 2008-MS-0040 is a highly deformed tonalite assigned to the Beausac Suite, a tonalite unit forming large slices of diatexites and felsic intrusions in the northwest part of the Ashuanipi Subprovince. The age of 2698.8 ± 0.8 Ma, coupled with another result obtained earlier further to the west, indicates that the Beausac Suite was emplaced between 2700 and 2690 Ma.

Opinaca Subprovince, Opinaca Reservoir area:

The Giard ultramafic intrusion comprises layered ultramafic intrusions hosted in migmatitic paragneiss of the Laguiche Complex. A sample of gabbro-norite (2008-PR-6035) produced poor quality zircons that could not be analyzed. A mafic pegmatite (2008-PR-6037), first interpreted as comagmatic, yielded an age of $2619.6 +1.9/-1.4$ Ma. This age indicates that this pegmatite was not genetically associated with Giard, but with the emplacement of late tectonic granitic pegmatite intrusions in the Baie-James region.

A diatexite derived from metasediments of the Laguiche Complex was sampled with the objective of dating the migmatization and providing an age for the melted paragneiss. The restite (sample 2008-PR-6040D) and melt fraction (sample 2008-PR-6040E) were analyzed separately. The granitic melt was dated using ID-TIMS, yielding an age of 2671.6 ± 1.8 Ma, which corresponds to the main migmatization episode for the Laguiche paragneiss. The restite sample, analyzed by LA-MC-ICP-MS, gave 207Pb/206Pb ages between 2573 Ma and 3248 Ma, with a main mode at 2728 Ma representing the age of the dominant source

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for the metasedimentary rocks, and a secondary mode at 2647 Ma interpreted as the age of the late-stage migmatization phase affecting the paragneiss.

Sample 2008-PR-6060 is a bedded sandstone, unmelted, belonging to the Low Formation that constitutes the host unit for the Roberto deposit. The LA-MC-ICP-MS analysis yielded a $^{207}\text{Pb}/^{206}\text{Pb}$ age of 2717 ± 17 Ma, interpreted as the maximum age of sediment deposition. The modes associated with the oldest ages (2793, 2817 and 2858 Ma) are attributed to bedrock sources.

Abitibi Subprovince

Sample 1994-CH-01 is a quartz-plagioclase porphyry dyke that cuts across Cu-Au vein mineralization at the Copper Rand mine in Chibougamau. The re-analysis yielded an age of $2705.1 +1.7/-1.2$ Ma and confirms the earlier result obtained by Joannis (1998). This analysis fixes a minimum age of mineralization for the Copper Rand mine and demonstrates the existence of a felsic intrusive episode younger than the Chibougamau Pluton, which was emplaced between 2718 Ma and 2714 Ma.

Extensive stripping on the Dubuisson property near Val-d'Or exposed a dextral E-W shear zone injected by a quartz-carbonate gold vein. A monzonite dyke that was affected and displaced by the shear zone was analyzed, yielding an emplacement age of $2672.6 +2.1/-1.5$ Ma, thus representing a maximum age for gold mineralization and dextral shearing in the Val-d'Or area.

In the Rouyn-Noranda region, the spherulitic quartz-phyric rhyolite of the Duprat-Montbray Formation (2004-SGNO-05) yielded an age of $2697.0 +1.5/-1.3$ Ma. The Lac Turcotte quartz-feldspar-phyric dacite (2004-SGNO-09) from the Noranda Formation was dated at $2698.3 +1.2/-1.0$ Ma.

Sample VSG-94 is a quartz-phyric tonalite from the Val-St-Gilles Pluton north of La Sarre. The age of 2716 ± 3 Ma indicates that this synvolcanic intrusion is late with respect to the host volcanic rocks belonging to the Normétal Group ($2727.7 +2.6/-2.1$ Ma).