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U-Pb age dating in the Ashuanipi, Minto and La Grande subprovinces in 2007-2008

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Abstract

This report presents the U-Pb geochronology results for zircons from four samples collected in the Rivière Sérigny area in 2007 (NTS map sheets 24C and 23N) and for six samples collected from the Rivière Eastmain area in 2001 and 2007 (NTS map sheets 33B and 33C, Baie-James). The analyses were performed using two methods, isotope dilution (ID-TIMS) and laser ablation (LA-MC-ICPMS).

Minto Subprovince, Rivière Sérigny area:

Sample 2007-CG-1091 (NTS map sheet 24C04) is a foliated tonalite belonging to the Favard Suite (2750 to 2740 Ma), a very widespread tonalitic unit in the south and west of the Minto Subprovince. The tonalite yielded a crystallization age of 2701.1 ± 2.1 Ma, younger than the average age of the unit. It is possible this tonalite is related to a magmatic event that affected the northeast La Grande Subprovince.

Sample 2007-CG-1141 (NTS map sheet 24C06) is from a porphyritic quartz monzodiorite intrusion belonging to the Maurel Suite (2707 to 2686 Ma). This unit is found in the southeast Minto Subprovince and also intruded the northeast La Grande. The age obtained (2694.2 ± 1.1 Ma) and the intrusion's lithological characteristics confirm it belongs to the Maurel Suite monzodiorite.

Ashuanipi Subprovince, Rivière Sérigny area:

Sample 2007-MS-0061 (NTS map sheet 23N10) is a biotite-bearing diatexite belonging to the Opiscoteo Suite (2682 to 2650 Ma), a characteristic and widespread unit in the Ashuanipi. The sample's age of 2660.6 ± 3.6 Ma is conformable with the age of the unit.

La Grande Subprovince, Rivière Sérigny area:

Sample 2007-IL-3319 (NTS map sheet 23N07) comes from a felsic horizon in the Cania volcano-sedimentary belt. This belt, assigned to the Gayot Complex (2880 to 2873 Ma), was found in a recently discovered inlier of the La Grande Subprovince in the Ashuanipi Subprovince. The age of 2629.7 ± 3.5 Ma obtained for the sample suggests that the felsic horizon corresponds to a late injection related to an Ashuanipi magmatic event. A secondary age of 2877.3 ± 14.8 Ma is interpreted as an inherited age from the volcanic sequence.

La Grande Subprovince, Rivière Eastmain area:

Sample 2007-CM-2099 (NTS map sheet 33C11) is a bedded sandstone of volcanoclastic origin from the uppermost part of the Pilipas Formation, in the Opinaca Reservoir area. This unit represents a sequence of non-migmatized sedimentary rocks, ranging from tens of metres to hundreds of metres thick, discordantly overlying basalts. The LA-MC-ICP-MS analyses revealed a single zircon population dated at 2731.8 ± 2.2 Ma, suggesting a single source for these sandstones.

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Sample 2007-DB-1045 (NTS map sheet 33C11) is a quartz-plagioclase-phyric tuff from the uppermost part of the Bernou Formation. The geochronological analysis yielded a crystallization age of 2722.0 ± 1.5 Ma, which indicates that the Bernou Formation belongs to the second volcanic cycle of the Eastmain Group (2739 to 2720 Ma).

Sample 2007-JF-5016 (NTS map sheet 33C11) is from a late phase of the Duxbury Batholith. The biotite-bearing quartz diorite yielded a crystallization age of 2704.7 ± 0.9 Ma, close to the age obtained earlier for a gneissic tonalite from the same unit (2709 ± 2 Ma), confirming that the Duxbury Batholith can be considered as a syntectonic intrusion of the Eastmain Belt.

Sample SGNO-2001-10 (NTS map sheet 33B06) is a pegmatitic monzogranite from the Village Batholith. The crystallization age of 2697 ± 4 Ma for this sample corresponds to the youngest episode (at about 2697 Ma) previously recognized in the tonalitic facies of this same intrusion. The age of this latter phase was estimated at 2720 ± 2 Ma, placing the Village Batholith among the syntectonic intrusions of the Middle and Lower Eastmain greenstone belts. Two monazite grains yielded a magmatic age of 2676.4 ± 1.6 Ma, or about 20 Ma younger than the age obtained for the zircons. These results suggest that monazite crystallization is related to the emplacement of pockets of pegmatite.

Sample 2007-DB-1112 (NTS map sheet 33C10) is a massive granodiorite from the Rotis Pluton. This unit is part of the string of late tectonic intrusions emplaced along the contact zone between the Opinaca and La Grande subprovinces. A crystallization age of 2671.8 ± 1.9 Ma was obtained for this pluton, comparable to the ages obtained for late intrusives found elsewhere in the Baie-James region.

Sample SGNO-2001-03 (NTS map sheet 33B04) is a late mafic dyke crosscutting two main fabrics and the gold-bearing quartz-tourmaline veins of the Eau Claire deposit. Most of the analyzed zircons are xenocrysts with an average age of 2728.2 ± 2.1 Ma, which probably corresponds to the age of the dyke host rocks. A zircon fragment gave an age of 2609 Ma, which represents the maximum age of the dyke's emplacement.