RP 2005-01(A)

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New isotopic ages in the Québec portion of the Blake River Group and adjacent units

Benoit Lafrance[1], Donald W. Davis[2], Jean Goutier[1], James Moorhead[1], Pierre Pilote[1], Patrick Mercier-Langevin[3], Benoît Dubé[4], Alan G. Galley[4], Wulf U. Mueller[5]

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Keywords: age dating, Blake River, Cadillac, volcanic rocks, zircon, Archean

Abstract

U/Pb age dating was carried out by the Ministère des Ressources naturelles et de la Faune (MRNF) in the context of the Doyon-Bousquet-LaRonde mining camp synthesis. The project was realized in partnership with Agnico-Eagle, Barrick, Cambior and Ressources Yorbeau mining companies as well as the Geological Survey of Canada. The results provide a better understanding of the volcanic, metallogenic and tectonic evolution of the entire Blake River Group.

Eleven sites were sampled from the 2000 to the 2002 field seasons. Eight samples were collected from volcanic rocks belonging to various formations of the Blake River Group. One sample comes from the Mooshla Pluton, another from a dyke of intermediate composition that cuts the mineralization in the Doyon mine, and a wacke belonging to the Cadillac Group. Three of these samples were not dated because they either did not contain any zircon (Quémont rhyolite and Doyon mine dyke) or only contained highly altered zircons (Warrenmac rhyodacite). The analyses were carried out in the *Royal Ontario Museum* laboratory by D.W. Davis.

Results show in the study area that volcanism associated with the Blake River Group extends from 2701 to 2696 Ma. The Fish-roe rhyolite (2701 Ma) of the Rouyn-Pelletier Formation is the oldest volcanism. The lower member of the Bousquet Formation has an age ranging from 2699 Ma (Bousquet rhyolitic sill) to 2698 Ma (Doyon glomeroporphyritic dacite). The upper member of the Bousquet Formation is also dated at 2698 Ma (Doyon rhyodacite-rhyolite). This means that the Bousquet volcanic complex, which is more or less 1.5 km thick, was built over a short period of one million years. The results also suggest that the oldest part of the Reneault-Dufresnoy Formation is synchronous with the Bousquet Formation, whereas the upper part of the sequence, with ages of 2697 Ma (Joannès rhyolite) and 2696 Ma (Cléricy rhyolite), contains the youngest rocks of the Blake River Group. This implies that the various formations composing the Blake River Group do not represent a simple stratigraphic pile, but different, geographically isolated, synchronous volcanic complexes.

The 2697 Ma age obtained from a trondhjemitic plagioclase-quartz porphyry associated to a late stage of the Mooshla Pluton suggests that this part of the pluton is synvolcanic with the Bousquet Formation of the Blake River Group. The ages of three different zircon populations (2722, 2697 and 2687 Ma) from the wacke associated with the iron formations of the Cadillac Group are similar to those already measured elsewhere in the sedimentary rocks of the Cadillac and Kewagama groups. This implies the existence of a period of more or less 10 million years between the Blake River Group volcanism and the Cadillac Group sedimentation.

1 - Ministère des Ressources naturelles et de la Faune

2 - University of Toronto

3 - Institut national de la recherche scientifique – Eau terre et environnement

4 - Geological Survey of Canada

5 - Université du Québec à Chicoutimi

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