



The Transamazonian juvenile crust of French Guiana revisited: New LA-ICP-MS U-Pb and Ar/Ar geochronological data.

R. Enjolvy (1), P. Monié (1), O. Bruguier (1), C. Delor (2), P. Barbey (3), D. Bosch (1).

(1) Géosciences Montpellier, Université Montpellier 2, CNRS-UMR 5243, Place Eugène Bataillon, 34095 Montpellier cedex 05, France. (2) brgm, 3 avenue Claude-Guillemain, BP 6009, 45060 Orléans cedex 2, France. (3) CRPG, BP 20, 54501 Vandoeuvre-les-Nancy Cedex, France.

The Transamazonian orogenic event is a major Paleoproterozoic period of crustal growth (Rhyacian) at the scale of the earth. In the Guiana Shield, different stages of crustal growth have been identified by recent geochronological investigations in the “Ile de Cayenne Complex”. This study reports new LA-ICP-MS U-Pb zircon ages and Ar/Ar amphibole and biotite ages of metagabbro, amphibolite (metabasalt) and tonalite that provide time constraints on the earlier evolution of the orogen. All samples originate from a single major outcrop, the “Pointe Buzaret” on Cayenne coast.

Zircons from a metagabbro give two distinct ages, 2215 ± 7 Ma and 2144 ± 7 Ma. The 2144 Ma old zircon analyses have low Th/U ratios that point to a metamorphic origin while the 2215 Ma zircons correspond to inherited cores. Zircons from an amphibolite give a single weighted age of 2195 ± 7 Ma. The U/Pb ages of tonalite zircons are 2176 ± 7 Ma and 2107 ± 6 Ma, that correspond to different zircon morphologies. The 2176 Ma old zircons show inherited cores, while the younger ones display oscillatory zoning (vertical band), typical of magmatic growth.

$^{40}\text{Ar}/^{39}\text{Ar}$ laser probe dating of amphibole (2081-2019 Ma) and biotite (1978-1940 Ma) single grains supports slow cooling ($\approx 2\text{-}5^\circ\text{C}/\text{Ma}$) of tonalite through the argon closure temperatures of these minerals. Other $^{40}\text{Ar}/^{39}\text{Ar}$ ages from adjacent rocks range from 2065 to 1854 Ma, with evidences of recent argon loss.

These data support the formation of oceanic crust between 2215 and 2195 Ma, as

indicated by the Eorhyacian crystallization age of metagabbro, and that of amphibolite. The metamorphic overprint is only recorded by metamorphic zircons from the metagabbro (2144 ± 7 Ma). In the other lithologies, the influence of this metamorphism is limited to the crystallization of thin zircon overgrowths that could not be analysed by the LA-ICP-MS. This event is coeval with the emplacement of the basic-ultrabasic Mahury complex (Vanderhaeghe et al., 1998).

In the “Ile de Cayenne Complex”, the last stage of Transamazonian orogeny is marked by the emplacement of tonalite at 2107 ± 6 Ma, which occurred in response to the closure of island arc-basins. The inherited zircons at 2176 ± 7 Ma support the existence of an island -arc between 2180 and 2130 Ma (Delor et al., 2003). Based on these data, a new geodynamic model is proposed.