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IN SITU U-Pb DATING AND Hf ISOTOPE GEOCHEMISTRY OF ZIRCONS FROM GRANITES AND RELATED ROCKS OF THE GARZON AREA, EASTERN CORDILLERA OF COLOMBIA: TIMING AND SOURCE OF THE MAGMATISM ON THE NORTHWESTERN ANDES, PRELIMINARY INSIGHTS.

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Granitic magmatism is widespread in the Eastern Cordillera at the Colombian Andes, where different magmatic events have been recognized from Neoproterozoic to present. At the southern part of Eastern Cordillera, the so-called "Garzon Massif", a Neoproterozoic Metamorphic Basement that is fault-limited at the west with a large number of monzogranitic to syenitic and minor dioritic intrusions has built some units like Algeciras, Altamira and Sombrerillo, all of them with Jurassic ages. U-Pb ages were obtained from zircons by LA-MC-ICP-MS method: a monzogranite with 176 ± 2 Ma and a sub-volcanic porphyritic rhyolite with quartz-feldspare spherulitic intergrowths of 172 ± 1 Ma from Algeciras Unit, a granodiorite of 162 ± 3 Ma and a porphyritic rhyolite of 175 ± 3 Ma belonging to the Altamira Unit, a monzogranite of 189 ± 7 Ma and a dacite of 167 ± 2 Ma from the Sombrerillo Unit. The obtained εHf(t) parameters are variable. A sub-volcanic rock shows the most positive values of εHf(t), the rhyolite with spherulitic intergrowths exhibits εHf(t) = +14.6 to +7.9, followed by a dacite (+12.0 to +5.1) and another type of rhyolite (+4.6 to -3.6). Some intrusive rocks have similar values: Algeciras monzogranite has εHf(t) = -5.0 to +0.9 and Sombrerrilo monzogranite has -6.0 to +3.4, while the Altamira granodiorite has -6.4 to +3.8. Some inherented zircons with concordant ages of 1365 ± 12 Ma with εHf(t) = +8.9 and 982 ± 33 Ma with εHf(t) = -3.5 are found in the rhyolite samples of Algeciras and Altamira Batholiths, respectively. The isotopic signature of zircons of a granulite sample of the metamorphic basement with an age of 1003 ± 2 Ma yield εHf(t) values ranging from -2.7 to +2.5. Besides the fact that the Garzon Massif is composed of different rocks with different ages and sources, the formation processes of these rocks are not yet well established. Negative εHf(t) values for the granitic rocks of the Garzon Massif are probably related to continental crust melt generated by an oceanic crust returned to the mantle by subduction that produced Hf-enriched melt. Variations in this values may represent different crustal contamination levels and a possible contribution from the depleted mantle. Positive εHf(t) values of the volcanic and sub-volcanic rocks may be associated to similar (or the same) depleted mantle source with a minor crustal contamination. These data are consistent with the theory of an oceanic crust subducted behind the northwestern border of the Gondwana during the Jurassic. This orogeny produced a widespread magmatism in the Andes, in which granitoids in Garzon Massif began their crystallization at ca. 190 Ma with the monzogranite facies of the Sombrerillo unit at its southern part, and continued with a principal pulse at 176 to 172 Ma represented by some intrusive and volcanic felsic facies in the Altamira and Algeciras units. Finally, some plugs of intermediary compositions crystallized at 167 to 162 Ma. This work is sponsored by CNPq.