

Ultrabasic rocks from Isla Martín García (Argentina): A post-500 Ma magmatism in the Río de la Plata Craton

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The occurrence of ultrabasic (UB) rocks in the Río de la Plata Craton has been scarcely cited in the literature. In the Piedra Alta Terrane (Uruguay), UB rocks were described in the Ojosmín Complex and were related to a Proterozoic obduction process (1). In the Tandilia System (Argentina), lamprophyric ultramafic dykes were considered as precursors of the Paleoproterozoic calc-alkaline rocks of the Buenos Aires Complex (2). At Isla Martín García (IMG), located between the coasts of Argentina and Uruguay, (3) described small outcrops of 'alpine-type' UB rocks assigned to an obduction process. These rocks were included in the Martín García Complex (*op. cit.*), together with amphibolites, gneisses, granitoids, and acidic and basic dykes. (1) and (4) considered the UB rocks from IMG as the continuation of those from the Ojosmín Complex. Recently, magnetic surveys carried out in IMG allowed to establish that the UB rocks constitute subcircular bodies intruding the Proterozoic basement (5). In this work, we present the first coupled LA-ICP-MS U-Pb and Lu-Hf isotopic data in zircons from the UB unit of IMG. Concentration, separation, and U-Pb and Lu-Hf analyses of zircons were done at the Centro de Pesquisas Geocronológicas (CPGeo) of the Universidade de São Paulo, Brazil. The analytical data were obtained with a Thermo Fisher Neptune LA multicollector ICP-MS equipped with a 193 Photon laser system, following the analytical method described by (6).

The studied sample (M90) is an undeformed serpentinized peridotite with cumulate texture (#Mg = 69; Cr = 3720 ppm) composed of olivine (Fo_{84-85%}), Cr-spinel, orthopyroxene (En_{83-86%}), clinopyroxene (Wo_{43-48%}), and scarce plagioclase (An_{71-73%}). Zircons from this sample are very scarce and have different sizes and internal structures, as well as Th/U values between 0.18 and 1.17. They are interpreted as inheritance. Sixteen spots gave the following ages and Lu-Hf isotopic data: ca. 2051-2049 Ma ($\epsilon_{\text{Hf}(t)} = +3/+6$, $T_{\text{DM}} = 2.4-2.2$ Ga); ca. 1100 Ma ($\epsilon_{\text{Hf}(t)} = -1$, $T_{\text{DM}} = 1.9$ Ga); ca. 1014-931 Ma ($\epsilon_{\text{Hf}(t)} = -13/-11$, $T_{\text{DM}} = 2.5-2.3$ Ga); ca. 763 Ma ($\epsilon_{\text{Hf}(t)} = +1$, $T_{\text{DM}} = 1.5$ Ga); ca. 622 Ma ($\epsilon_{\text{Hf}(t)} = +6$, $T_{\text{DM}} = 1.1$ Ga); ca. 520-503 Ma ($\epsilon_{\text{Hf}(t)} = -8/-5$, $T_{\text{DM}} = 1.8-1.6$ Ga). The middle Cambrian age of 503 ± 6 Ma provides the maximum crystallization age for the peridotite. These new data indicates the emplacement of a post-500 Ma UB magmatism into the Río de la Plata Craton and allow to reject a genesis related to a Paleoproterozoic obduction process for the IMG peridotite. Studies currently underway will allow defining its origin and age.

- (1) Bossi and Piñeyro (2004). 4° Congreso Uruguayo de Geología: 1–11, Montevideo.
 (2) Dristas et al. (2013). Journal of South American Earth Sciences 43: 46–61.
 (3) Dalla Salda (1981). Revista de la Asociación Geológica Argentina 26: 29–43.
 (4) Segal and Crosta (2010). 10° Congreso de Mineralogía y Metalogenia: 331–334, Río Cuarto.
 (5) Benítez et al. in prep.
 (6) Souza et al. (2017). 2° Workshop of Inorganic Mass Spectrometry, São Paulo, Brazil.