U-Pb and Lu-Hf data of a Late Devonian granite from Bajo de la Leona, eastern Deseado Massif, Southern Patagonia (Argentina)

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The middle to late Paleozoic orogenic evolution of Patagonia is well-documented by Devonian to Permian magmatism in the North Patagonian and Deseado massifs, and further west along the Andes. This evolution has been explained by collisional or accretionary models (*e.g.*, (1), (2)). In particular, Devonian intrusions are mainly exposed in the North Patagonian Andes and the western North Patagonian Massif along a NNW-SSE-striking belt, though relics of coeval, mainly juvenile magmatism are also recorded to the west in Chile (*e.g.*, (2), (3)).

In the eastern sector of the Deseado Massif, high- to medium-grade metamorphic rocks, gabbro-diorites, and granites were included into the Río Deseado Complex. These rocks crop out in Bajo de la Leona and the Dos Hermanos, Tres Hermanas, El Sacrificio, and El Laurel farms. SHRIMP U-Pb isotopic dating of zircons from granites of the Río Deseado Complex yielded ages between *ca*. 450 Ma (Dos Hermanos Granite) and *ca*. 344 Ma (Mina La Leona Granite) (*e.g.*, (4)). In Bajo de la Leona, migmatites, gneisses, schists, and granitoids of the Río Deseado Complex (pre-Permian) crop out. In addition to the Mina La Leona Granite, another Paleozoic granite crops out in the area, whose coupled LA-ICP-MS U-Pb and Lu-Hf isotopic data in zircons are here presented. 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 (5).

The studied sample is a high-K calc-alkaline and peraluminous granite mainly composed of quartz, K-feldspar, biotite, and Na-plagioclase. Twenty-three zircons from this granite were analyzed. They are mainly prismatic and show magmatic oscillatory zoning. The best estimate U-Pb concordia age for the crystallization of the studied sample (24 spots) is *ca*. 362 Ma (Famennian). Regarding the Lu-Hf isotopic data, results show variable subchondritic ($\varepsilon Hf_{(t)}$ = –15/–1; $T_{DM\text{-}Hf}$ = 2.0-1.3 Ga) to suprachondritic ($\varepsilon Hf_{(t)}$ = 0/+6; $T_{DM\text{-}Hf}$ = 1.3-0.9 Ga) compositions. Results show a geochemical and isotopic fingerprint comparable to coeval intrusions exposed between the North Patagonian Andes and the North Patagonian Massif, thus indicating that the Bajo de la Leona magmatism might have represented the southernmost expression of the Devonian continental magmatic arc.

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(2) Rapela et al. (2021). Gondwana Research 96: 1–21.
(3) Serra-Varela et al. (2021). Journal of South American Earth Sciences 109: 103283.
(4) Pankhurst et al. (2003). Journal of South American Earth Sciences 16: 27–44.
(5) Souza et al. (2017). Abstract. 2° Workshop of Inorganic Mass Spectrometry. Brazil.