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Las Matras pluton, Cuyania terrane, Argentina: is it truly Mesoproterozoic, or is it Early Permian derived from Mesoproterozoic ?

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The tonalitic-trondhjemitic Las Matras pluton of central Argentina –viewed to form part of the southernmost Cuyania terrane, e.g. Sato et al. [1]– has been previously dated by the Rb-Sr method at 1212 ± 47 Ma, Sato et al. [1], and by U-Pb conventional zircon age at 1244 ± 42 Ma, Sato et al. [2]. Notably, the latter authors have emphasized the conspicuous character of this pluton in regards of its lack of deformation, as well as its very shallow emplacement (e.g. granophiric textures of some areas), in strong contrast to the nearby, highly deformed Mesoproterozoic orthogneisses of the Cerro La Ventana Formation (ca. 1.2 Ga; Cingolani et al. [3]), considered to be representative of the southern Cuyania basement. Furthermore, it is also worth noting that the Middle- to Late Ordovician (Famatinian) orogeny, related to the accretion of the Cuyania terrane to the southwestern Gondwana border, has also not affected the Las Matras pluton either mechanically or thermally, e.g. Sato et al. [1], Sato et al. [2]. In addition, also worth of noting is the fact that the Las Matras pluton would seem not to have any equivalent unit within the southern Appalachian, from where the Cuyania terrane is thought to have rifted away at latest Early Cambrian times, e.g. Astini et al. [4], later to be docked to southwestern Gondwana.

We have recently obtained a zircon U-Pb SHRIMP age on a diorite of the Las Matras pluton that yielded 1232.7 ± 6.5 Ma (2 sigma, MSWD 1.3; sub-rounded grains: eroded?). This calculation disregards a single Early Permian value obtained for a magmatic zircon grain from the same sample –two readings: 291.8 ± 3.1 Ma and 279.4 ± 3.7 Ma.

Admittedly, we have still not identified any new Early Permian zircon grains in the Las Matras pluton so as to enable us to validate the latter age, although we should mention that it is not uncommon in U-Pb SHRIMP geochronology to spot only and solely inherited zircon grains hence not obtaining the real crystallization age of the studied magmatic rock.

Given the geological considerations referred to above, as well as the geographic/regional geologic context of the Gondwanan magmatism in central Argentina –where a hypothetically Early Permian Las Matras pluton could fit perfectly well–, we wish to raise the question as to whether the newly obtained age, 1232.7 ± 6.5 Ma, could possibly represent a Mesoproterozoic age inherited from the substratum of the Las Matras pluton, rather than its actual crystallization age. Hafnium determinations in progress are bound to contribute to answer this question (e.g. does the Early Permian zircon derive from Mesoproterozoic crust?). Similarly, paleomagnetic testing the Las Matras pluton could also help with unravelling the history of this ´enigmatic´ unit.

References:

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