New insights into the evolution of southern Dom Feliciano Belt through U-Pb and Lu-Hf isotopic data

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The Dom Feliciano Belt comprises the southern segment of Mantiqueira Province in southeastern Brazil and eastern Uruguay, whose tectonic evolution is regarded as part of the Brasiliano Cycle during the Neoproterozoic. Which comprises the amalgamation process of the cratonic blocks from South America platform (Luíz Alves and Rio de la Plata cratons) and southwestern Africa (Congo and Kalahari cratons), which culminate in the formation of West Gondwana. The eastern portion of the Dom Feliciano Belt is composed of Pelotas Batholith and Punta del Este Terrane. The first consists of several calc-alkaline to alkaline granitic suites with subordinate mafic bodies, which represent a magmatism aged between 640-550 Ma and formed by processes of crustal assimilation, mixing and mingling between acidic and basic magmas. Xenoliths of metasedimentary rocks are recognized within this granite belt, whose most expressive exposure is the Matarazzo Complex that is composed of marbles and schists with meta-igneous rocks occurring as fragments and irregular intrusive bodies. The Punta del Este Terrane comprises a basement complex of granites, gneisses and migmatites formed between 1000 and 670 Ma, and supracrustal units of metavolcano sedimentary rocks and alkaline granitoids with ages between 650 and 570 Ma. The zircon analyses in a single outcrop of granitoids with different compositions from Pelotas Batholith provided U-Pb crystallization ages at 691.5±7 Ma (granodioritic gneiss), 645.9±3.7 Ma (microdiorite), 634.4±4.4 Ma (monzogranite), 620.1±4.7 Ma (syenogranite) and 609.6±2.2 Ma (pegmatite). Lu-Hf analyses constrained a main interval of model age range between 1.9 to 1.3 Ga, with εHf(t) varying from slightly positive to strongly negative (+2 to -33). The isotopic dataset implies a multi-stage magmatism, possibly related to flare-up episodes within the batholith formation, where also present isotopic signatures with strong contribution from mixed juvenile and crustal sources with Mesoproterozoic and Statherian-Orosirian ages. U-Pb data from the Matarazzo Complex were acquired from samples of amphibolite and diorite, which yielded crystallization ages at 750±5.8 Ma and 602±5.6 Ma, respectively. A U-Pb zircon analysis was also acquired from an injection of garnet-muscovite granite in the Cerro Complex, which yielded a crystallization age at 748±10 Ma. The Tonian U-Pb ages obtained in the Matarazzo and Cerro Olivo complexes are similar to the found in the Kaoko and Gariep belts in southwestern Africa, kindred to the first stages of the evolution of Brasiliano/Pan-African cycle, also regarded as the rifting process of the blocks from Columbia paleocontinent. The Cryogenian-Ediacaran U-Pb ages obtained from the granites of the Pelotas Batholith and from the intrusive diorite in the Matarazzo Complex are related to the accretionary and collisional settings of formation of the West Gondwana tectonic framework.