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Paleoproterozoic Himalayan-type leucogranites disclose a late orogenic stage in the Southern São Francisco Craton (Brazil)

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Pure sediment derived melts are hallmarks of collision to post-collisional settings in modern-style plate tectonics (*e.g.* Himalayas mountain range). It remains unclear whether similar tectonics operated in the early Earth and if the archetypal magmas formed in collisional settings have evolved with time. Moreover, the production of high-K granitic magmas formed by crustal anatexis may have contributed to the stabilization of the first cratons, but the nature and timing of these events are poorly constrained. This work presents and interprets mineral chemistry, whole-rock geochemistry, and U-Pb geochronology and Lu-Hf isotope data in zircon from leucogranites of the Mineiro Belt, a Siderian-Orosirian orogenic system developed in the southern São Francisco Craton. The data is further compared to S-type Himalayan leucogranites.

The leucogranites studied come from the Cupim pluton (>80 km^2), and are divided into two main rock groups: (i) Ce-monazite bearing muscovite-biotite-monzogranites and (ii) almandine-spessartine bearing muscovite-biotite-monzogranites. They are peraluminous to strongly peraluminous (ASI>1.1), high-K, low-Mg# and low-CaO/Na_2O, and range from ~71 to 75 wt.% SiO_2. This pluton is characterized by high concentrations of incompatible trace elements (LILE, HFSE, LREE and HREE), low Sr/Ba (<0.4) ratio and negative Eu/Eu* (0.22-0.11) anomaly. Leucogranites of group (i) have lower Rb/Sr ratios (~2.5) and higher $(La/Yb)_N$ ratios (~14-20) when compared to rocks of group (ii) (Rb/Sr>7 and $(La/Yb)_N$<2). These data are consistent with the derivation of this pluton from a metasedimentary source through incongruent melting of muscovite under low temperature (<750°C), medium pressure (~5Kbar) and fluid-absent conditions. Geochemical variations can be attributed to metasedimentary source heterogeneities (clay-rich *vs.* clay-poor), accumulation of residual minerals (*e.g.* monazite, zircon and feldspar) and entrainment of peritectic minerals (*e.g.* garnet). Zircons from this pluton indicate an emplacement age of 2000Ma with abundant inheritance of older events recorded in cores (>2.5Ga). Hafnium isotope signatures of Cupim zircons (Th/U>0.1) are consistent with intra-crustal melting of metasedimentary units.

The Cupim pluton, documents a previously unknown Paleoproterozoic (*ca.*2000Ma) plutonic event that marks the termination of continental collision in the southern portion of the São Francisco Craton. Its similarity to Himalayan leucogranites provides new constraints on the secular evolution of S-type magmas through time.