THE NEOPROTEROZOIC GRANITE MAGMATISM IN THE NORTHERN BORBOREMA PROVINCE: WHAT TO TELL ABOUT TIMING AND SOURCES?

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The record of the Brasiliano orogeny in the northern Borborema Province (BP) is represented by sedimentation, magmatism, and ductile deformation coupled with low-pressure/medium to high-temperature metamorphism. Sedimentation is preserved in deeply eroded continental to marine successions directly deposited over an Archean-Paleoproterozoic basement in the context of convergent to collisional settings. Both crystalline basement and supracrustal covers were variably affected by compressive and extensional deformations partitioned along a number of NE-trending strike-slip mylonitic zones, which also had played control in segregation, ascent and emplacement of granitic magmas through distinct crustal levels. Granitic rocks comprise significant exposures of the northern BP. It encompasses suites of mafic to intermediate and felsic granitoids grouped in diverse geochemical types – a dominant suite of high-K calk-alkaline granites (sensu lato) exhibiting either coarse-grained porphyritic or medium-grained equigranular textures, apparently related by fractional crystallization; basic to intermediate terms represented by a broad spectrum of compositions including since gabbros (and norites) to granodiorites of high-K calk-alkaline to shoshonitic affinity; alkaline granites hosting Na-rich plagioclase and amphibole and/or pyroxene; beside others of minor volumetric relevance. This implies in a multiplicity of crustal reservoirs participating as sources, combined with variable influence of fractional crystallization and contamination (mingling/mixing) processes during the magmatic evolution. A plenty of U-Pb zircon ages now available for these granitoid rocks indicate long-lived magmatism (ca. 100 million years), essentially from Ediacaran towards the transition to the Cambrian period. This extensive partial melting event took place c. 1.5 billion years after the basement formation and stabilization, in the Rhyacian. By combining the zircon ages of granites and basement rocks with complementary Hf isotope data (which usually reflects the magmatic source) we demonstrate that the northern BP records at least 2 billion years of reworking history involving Meso- to Neoarchean crustal reservoirs. Evolved Hf signals are measured in all granites regardless their geochemical affinity, a condition also observed in banded and augen gneisses that comprise the basement sequences of the northern province. However, deciphering crustal source(s) using only Hf signatures can be challenging especially if magma mixing and hybrid sources participated of the genesis of these granite plutons. A combination of isotope data and geochemical modelling should be explored in order to get more reliable information on the nature of the source(s).

PALAVRAS-CHAVE: GRANITE MAGMATISM; NORTHERN BORBOREMA PROVINCE; Hf ISOTOPES