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# MONAZITE FISSION TRACK APPLIED ON BORBOREMA PROVINCE, BRAZIL

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Fission Track Thermochronology (FT) has become one of the most valuable techniques used throughout the geological community to reconstruct the low-temperature thermal history of rocks through geological time. Thus, thermochronology is an essential tool for understanding regional cooling patterns and their changes in the sediment source region. The technique is based on the accumulation of fission tracks, originating from the spontaneous fission of 238U over the geological time scale, and on the possibility that these tracks can be revealed when a mineral is subjected to an appropriate etching. Thus, FT can date crystalline and amorphous minerals that usually contain a few ppm of uranium. Among them, therefore, a potential mineral for FT application is monazite, a phosphate-containing rare-earth element (REE) commonly found as an accessory mineral in igneous, metamorphic, and sedimentary rocks. However, despite containing significant Uranium and Thorium (Th) and being applied in the U-Th-Pb and (U-Th)/He dating systems - that is, being a promising mineral for multimethod dating, until a few years ago, only one article had been published using FT on monazite. Previous analyses of international reference samples from Japan and Australia yielded ages consistent with previously published data, demonstrating the robustness and analytical feasibility of the adopted protocol. The kinetics of trace revelation was strongly dependent on the degree of accumulated radiogenic damage, especially as a function of Th content, highlighting the superiority of the step-etch approach over fixed chemical attack times. Therefore, MFT was applied to the Borborema Province, Brazil, yielding ages of 2, 10, 12, and 15 Ma, associated with ultra-low-temperature conditions. This age range points to a cooling episode subsequent to the youngest magmatic events in the region, active since the Miocene. Thermal modeling corroborates these results, indicating progressive cooling until the Pleistocene, followed by a period of thermal stability. Taken together, the data reinforce the potential of MFT as an innovative and robust tool for investigating the recent thermal evolution of the continental crust.