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St. Peter and St. Paul archipelago, Equatorial Atlantic: your surface radiogenic heat flow suggest that is colder than the surroundings lithospheric Atlantic ocean

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This research presents the pioner radiogenic heat production (RHP) mapping and the radiogenic heat flow (RHF) of the Saint Peter and Saint Paul Archipelago located at 0.55°N 29°20’43”W, in the Equatorial Atlantic Ocean. Using radiogenic heat producing elements, we inferred a radiogenic heat production of these emerse mantle mylonite rocks, that vary between 0.08 to 0.68 μW/m^3, showing a Median of 0.21 μW/m^3 and Geometric mean of 0.25 μW/m^3 by whole-rock chemical analysis and by superficial Gamma radiation spectrometry vary between 0.08 to 0.48 μW/m^3 (Median: 0.19 μW/m^3; Geometric mean: 0.19 μW/m^3). The mean of radiogenic heat production (0.22 μW/m^3) of these rocks is significantly higher than predicted values for ultramafic rocks in the Word. This is due to the pervasive alteration of these rocks and the incorporation of little magma fractions during mylonitization. On the other hand, the average surface radiogenic heat flow (49.7 μW/m^2) is lower than that predicted for the oceanic lithosphere [1], suggesting that the upper mantle contribution to the heat flow is also low in the SPSPA region (Fig. 1). Based on the acquired data [2] and the peculiar tectonics of the SPSPA (Fig.2), we propose that the lithospheric mantle around the SPSPA area is colder than the surrounding Atlantic ocean.

Keywords: Radiogenic Heat Production; Radiogenic Heat Flow; Abyssal peridotite; St. Peter and St. Paul Archipelago; Equatorial Atlantic

Reference

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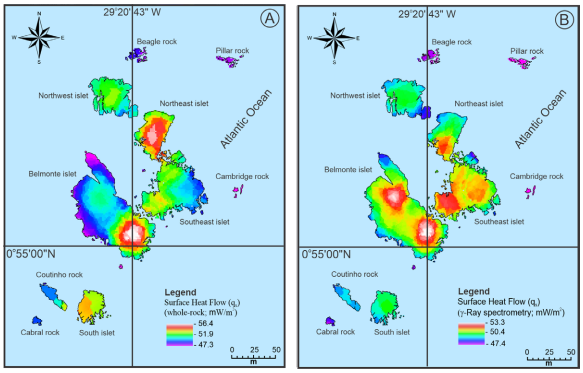

Figure 1: Kriging surface color map of surface radiogenic heat flow (q_o; mWm^{2}s) of mylonites rocks from SPSPA obtained by (A) Whole-rock chemical analysis and (B) In situ gamma ray spectrometry. White line: geological contact.

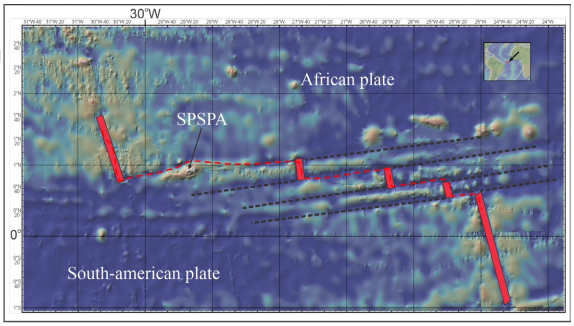

Figure 2: Saint paul Transform System. Equatorial Atlantic, Brazil. Thick red line: ridge axis; dashed red line: Active transform faults; black dashed line: inactive transform faults. Based Maia et al, 2016