Apatite fission track thermochronology: implications for Brazil-Africa correlations

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In an attempt to reconstruct the tectono-thermal history in the Southeast continental margin of Brazil and Soth-Southwest margin of Africa, apatite fission track thermochronology was applied in an outcrop samples. In Brazil, the sampling was accomplished along N-S profiles through Florianópolis Batholith, in the Dom Feliciano Belt, with stratigraphic ages ranging from Neoproterozoic to Early Paleozoic. In the Namibian passive margin the sampling was carried out in Proterozoic granites and gneisses through two coast-perpendicular profiles cross cutting the main structural trend of Kaoko Belt while in the South Africa the sampling was accomplished along an Orange River profile, in Namaqua Belt. The fission track analysis has been carried out at the Isotope Geology Laboratory of the Universidade Federal do Rio Grande do Sul, Brazil. To the Brazilian margin the fission track ages vary from 68±4 to 46±2 Ma and the track lengths ranged from 13.3±0.1 to 10.8±0.3 micras. The Brazilian ages distribution when analyzed with the altitude presents two different groups of samples: i) one with a positive correlation between ages and altitude, and ii) the other is constituted by samples collected in the current coastal plain with ages in the same interval of the previous group; however there is no correlation with the altitude. To the African margin the fission track ages vary from 297±26 to 47±4 Ma and from 124±8 to 49±4 Ma to Nabibian and South African margin, respectively and the fission track lengths vary between 13.2±0.2 and 10.0±0.9 micras. In the Namibian margin the ages decrease towards the Purros Mylonitic Zone. Based on thermal history modeling, one abrupt regional event has been recognized in each margin. The African event occurred from Late Cretaceous to Tertiary, was responsible for the development of uplifts in the Great Escarpment regions, associated with the South Atlantic opening. The Late Cretaceous cooling pattern observed in Brazilian margin is interpreted as a geomorphic response to the reactivation of NNE-SSW and WNW-ESE basement structures caused by a change in the spreading geometry of the South Atlantic Ocean.