



Onshore-offshore evidence for periodic post-rift shear reversal along the Pernambuco Fracture Zone, NE Brazil

Fabrizio Balsamo (1), Yago Nestola (1), Fabrizio Storti (1), César Nogueira (2), and Hilario F.R. Bezerra (3)

(1) NEXT – Natural and Experimental Tectonics Research Group, Department of Physics and Earth Sciences, Parma University, Parma, Campus Universitario, Parco Area delle Scienze 157A, 43124, Italy., (2) Universidade Federal de Campina Grande, Brazil, (3) Universidade Federal do Rio Grande do Norte, Brazil

Oceanic fracture zones are among the most evident bathymetric features of seafloors. They include transform faults that connect adjacent mid-ocean ridge segments and accommodate opposite spreading directions. According to the plate tectonics theory, only the latter are tectonically active. Recent onshore and offshore evidence in the Antarctic plate sector facing Australia suggest, conversely, that oceanic fracture zones can transfer shear into the plate interior. In this contribution we illustrate the results of a research project performed in the NE Brazilian passive margin, where the seismic activity is clustered along major crustal-scale, long-lived shear zones, thus resembling the Antarctic case. In particular, we performed a detailed study of the offshore pattern of seafloor age domains on both sides of the Pernambuco Fracture Zone (PFZ), which indicates non-uniform spreading rates on the two lithospheric lanes separated by the PFZ. The differential spreading rate, calculated in 8 age provinces from Upper Cretaceous to Present, varies between 1.3 and 8.8 mm/yr and periodically switched from right-lateral to left-lateral excess transform shear along the PFZ. Five major inversions were found, including a Tortonian inversion from right-lateral to left-lateral excess shear, consistently with structural data acquired in Miocene to Quaternary sediments along the PFZ. We discuss the impact of our findings in the current plate tectonic theory framework.