Lithospheric Architecture of the Parnaiba Basin by Broadband Seismology

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RESUMO: The structure and deep dynamic of the lithosphere are keys for understanding the major processes that occurs with the geological time in a certain region. Lithosphere-scale process could create big footprints or signatures which can be observed by geophysical methods, these need resolution to retrieve such information in subsurface. Brazil's equatorial margin offers new frontier of investments and researchs, both onshore and offshore, due to recent oil discoveries along the South American Equatorial Margin. With a enormous potential, the equatorial margin has instigated many studies by the petroliferous industry. The geological context of the study area includes one of the largest intracratonic basin in the wolrd, the Parnaiba Basin. This basin is covered by Ordovician to Early Triassic sediments, mostly of marine environment, but also fluvio-deltaic and desertic. The main goal is provide new images of the crustal structures and highlight the velocity discontinuities in order to better understand the regional geological framework, and thus improve the evolution models of the basin. Understanding of lithosphere's processes is crucial to solve many problems in the geology interpretation, including origin of intracratonic basins. Total of twenty broadband temporary seismographic stations will be installed along of a profile with 1000 km approximately of lenght, with an interstation distance of approximately 50 km. This profile will be densified near the current depocenter of the basin with ten short-period temporary seismological stations to provide larger resolution to this area. Data will be deploying during 2 years, and the data collected during the experiment will be checked to allow to process the signals recorded with reliable. The receiver function technique is arguably the most successful technique in seismology for crustal and upper mantle characterisation, because of that we will map crustal structures in Parnaiba Basin by using the available seismic data for calculation of P receiver functions. On the other hand, the shallow structures of the crust can be imagging by the Ambient Noise Tomography that nowadays works with extreme efficiency in regions with less earthquakes. Rayleigh wave group velocities will be measured by crosscorrelation of ambient noise at the temporary stations and some additional ones from the Brazilian Seismological Network. With this set of processed data we will be able to infer about the lithosphere structure and make progress toward better understand of the geological history of Parnaiba Basin.

PALAVRAS-CHAVE: SEISMOLOGY, PARNAIBA BASIN, RECEIVER FUNCTION