

## **CHARACTERIZING THE CRUSTAL ARCHITECTURE OF THE PARNAIBA BASIN WITH PASSIVE-SOURCE SEISMOLOGY**

Lithospheric-scale processes, such as the origin and evolution of large cratonic basins, can create big footprints or signatures in the subsurface that can be observed by geophysical means. With a huge potential for natural resources, the equatorial margin of NE Brazil has motivated many geophysical investigations by the oil industry. Our study area is the Parnaíba Basin, one of the largest cratonic basins of the world. The main goal of our study is to provide new images of the crust and lithosphere under the basin and highlight seismic discontinuities within, in order to improve our understanding of its architecture and help constrain models for its origin and evolution. Until now, a total of 9 broadband seismographic stations were installed by the PABIP project, a collaboration among several universities and BP Energy do Brasil, along an approximately 500 km-long within the basin, with interstation spacing of around 50 km. The receiver function technique is probably one of the most successful methodologies in broadband seismology for imaging of the crust and lithospheric mantle in continental areas, and we estimate the crustal thickness and  $V_p/V_s$  ratio in the Parnaíba Basin by developing P-wave receiver functions migration and HK-Stacking from the acquired dataset. The one-dimensional velocity models calculated by joint inversion between P-wave receiver function and Rayleigh dispersion curves were used to reinforce the results and to base the the interpretation of the crustal seismic discontinuities. HK-Stacking, receiver function migration and joint inversion indicate a slightly inclined Moho toward to the depocenter of the basin, separating out 3 different behaviors of the Moho discontinuity. A flat Moho in the depocenter of the basin, which showed the highest values of thickness ( $>42$  km) and  $V_p/V_s$  ratio value around 1,75. A thinning pattern of thickness toward eastern flank, boundary with the Borborema Province, can be observed in the migration and the  $V_p/V_s$  ratio in this side is about 1,74. The western border, boundary with Araguaia Province, shows a Moho almost flat with thickness of 40 km and  $V_p/V_s$  ratio values around 1,72. Also, we can note some mid crustal reflections, around 15-20 km, in most of seismograms, reffering a mid-crust discontinuity discussed by previous works in the basin. These results lead to consider that Moho thickness and  $V_p/V_s$  ratio is directly associated current depocenter of the basin.

### **PALAVRAS-CHAVE:**

BROADBAND SEISMOLOGY, PARNAIBA BASIN, CRUSTAL ARCHITECTURE