



P-wave tomography sensibility test applied to the Chaco-Paraná, Paraná and Pantanal basins inversion

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Abstract

Travel time tomography proved to be an attractive tool to study the upper mantle and lithosphere. In the last decades, this technic has been applied to the whole Earth generating interesting results without any expensive computation infrastructure. We are applying it to a set of temporary stations that were deployed to study the Pantanal-Chaco basin located at southeast Brazil. Our database is composed of 66 seismic stations and 820 teleseismic events (between 30 and 95 degrees). To pick the arrivals we used a semi-automatic software marking extreme amplitudes in a window within the P-wave arrival since we are working with relative residuals. This approach is significantly faster than absolute picking and, in theory, remove the influence of structures outside of inversion region. Picking was performed in three fixed frequency bands: (1) 1.2-2.0 Hz; (2) 0.5-0.9 Hz and (3) 0.05-0.4 Hz, once the difference between the arrival time in the same seismogram for those frequencies was significant in several cases. We used a self-written code to filter events with the low correlation coefficient for different stations in one event. Inversion step was performed with two different codes and results were obtained for several depths and sections. Main, well know, features as the high-velocity anomaly under Parana basin, and the low-velocity anomaly under Pantanal basin are present in all models. Nevertheless, differences existed between the three used frequency bands. Ray covering and the synthetic test revealed better resolution deeper than 200 km since teleseismic rays arrive almost vertically generating few ray cross for shallower depths. Probably the only way to improve superficial resolution is adding local events, which we plan to do soon.

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