



Imaging the mantle transition zone beneath the South American platform using P- and S-wave receiver functions

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While the Andean cordillera grab most of the seismological attention due to its active tectonics, the stable platform is of mainly importance in understanding what could be considered the normal, out of anomaly earth and, may help to understand what are the final and long term results from such a dynamic process like subduction and other types of convergent and divergent plate boundaries interaction. During the last 15 year the Brazilian Lithospheric Seismological Project (BLSP) has been operating more than 60 temporary three-component broadband seismological stations, collecting seismological data mainly in the Brazilian part of the platform. The stations are mainly distributed from 35°W to 60°W and from 10°S to 25°S, covering most of the Parana basin, Tocantins fold belt, Ribeira fold belt and the San Francisco craton. Beyond this central region, there are still some stations distributed over the northern Brazilian margin, covering parts of the Amazon craton and the Parnaiba basin. To complement our dataset we use data from the GT/CPUP station (Vila Florinda/PY FDSN/IRIS). The processing steps included event selection, rotation to LQT coordinate system using an automatic algorithm based on diagonalization of the coherence matrix (for P-wave receiver function only) and deconvolution of the Q by L component for P-wave receiver function and L by Q for S-wave receiver function. The profile images were made by stacking the resulted receiver functions by piercing points locations following pre-defined lines crossing the main tectonic units. At each profile we highlighted the desired Ps and Sp conversion phase for each of the discontinuities and its time readings and errors were estimated by bootstrapping the traces during the stacking procedure. For drawing the conclusions we compared the times each other and with theoretical times computed from the IASPEI91 model and models that presented a $\pm 5\%$ change in the P- and S-wave mantle velocities. The most important results observed are: 1) A clear cratonic signature, consisting of higher wave velocities for the mantle under the cratons and normal (410km and 660km) depths for the discontinuities 2) Strong presence of the Nazca subducted plate near 410 and 660 km discontinuities under the Southern part of the Parana basin 3) Lack of variation in the Transition Zone thickness and in the mantle velocities due to the presence of the possible plume proposed in 1995 by Vandecar at the Northern Parana basin region and 4) A possible transition zone thinning near the Matiqueira complex, at the Ribeira fold belt, near the Atlantic passive margin.