Geophysical Research Abstracts
Vol. 16, EGU2014-5559, 2014
EGU General Assembly 2014

Constraining depth of anisotropy in the Amazon region (Northern Brasil)

Irene Bianchi (1), João Willy Corrêa Rosa (2), and Götz Bokelmann (1)
(1) University of Vienna, Wien, Austria (irene.bianchi@univie.ac.at), (2) Universidade de Brasilia, Brasilia, Brazil

Seismic data recorded between November 2009 and September 2013, at the permanent station PTGA of the Brazilian seismic network were used to constrain the depth of anisotropy in the lithosphere beneath the station. 90 receiver functions (RF) have been computed, covering the backazimuthal directions from 0° to 180°. Both radial (R) and transverse (T) components of the RF contain useful information about the subsurface structure. The isotropic part of the seismic velocity profile at depth mainly affects the R-RF component, while anisotropy and dipping structures produce P-to-S conversion recorded on the T-RF component (Levin and Park, 1998; Savage, 1998). The incoming (radially polarized) S waves, when passing through an anisotropic crust, splits and part of it is projected onto the transverse component. The anisotropy symmetry orientations (Φ) can be estimated by the polarity change of the observed phases. The arrival times of the phases is related to the depth of the conversion. Depth and Φ are estimated by isolating phases at certain arrival times.
SKS shear-wave splitting results from previous studies in this area (Krüger et al., 2002, Rosa et al., 2014), suggest the presence of anisotropy in the mantle with orientation of the fast splitting axis (about E-W) following major deep tectonic structures. The observed splitting orientation correlates well with the current South America plate motion (i.e. relative to mesosphere), and with observed aeromagnetic trends. This similarity leaves open the possibility of a linkage between the upper mantle fabric imaged by shear wave splitting analysis and the lower crustal structure imaged by aeromagnetometry.
In this study we unravel, from RF data, two layers in which anisotropy concentrates, i.e. the lower crust and the upper mantle. Lower crustal and upper mantle anisotropy retrieved by RFs give some new hints in order to interpret the previously observed anisotropic orientations from SKS and the aeromagnetic anomalies.