Geophysical Research Abstracts
Vol. 16, EGU2014-5166, 2014
EGU General Assembly 2014

Anisotropic structure of the Pannonian basin: Reprocessing SKS splitting data for the CBP project stations

Ehsan Qorbani (1), Götz Bokelmann (1), Istvan Kovács (2), and György Falus (2)

(1) University of Vienna, Department of Meteorology and Geophysics(IMGW), Vienna, Austria (ehsan.qorbani@univie.ac.at), (2) Geological and Geophysical Institute of Hungary, Hungary

The Carpathian-Pannonian region (CPR) is the northeastern end of the Alpine mountain belt. In the western Alps, available results of anisotropy investigations (shear wave splitting) show clear belt-parallel anisotropy (fast orientation). In the eastern Alps this pattern not only is broken but also does not follow the strike of Carpathians and Dinarides. This study is aimed at evaluating the seismic anisotropy of the upper mantle beneath the CPR concentrating on the eastward elongation of the fast anisotropic pattern of the eastern Alps. We use data recorded by the temporary stations, set up for the Carpathian Basin Project (CBP), extending from the Vienna basin through Hungary into Serbia. Initial results from the CBP project (Stuart et al., 2007; Kovács et al., 2012) presented the average fast anisotropy directions for the Carpathian-Pannonian region including a subset of permanent broadband stations in the eastern Alps. While some of the results agree with another recently published anisotropy analysis of the Eastern Alps (Bokelmann et al., 2013), some don‘t. For this reason, the study at hand was primarily concerned with understanding observed differences in fast orientations and also with possible geodynamic interpretations. With this intention, we reprocess data from 45 temporary CBP stations consisting recorded waveform of teleseismic events with magnitude greater than 6.0 that have occurred in the distance range from 90° to 130° between 2005 and 2007. We utilize the minimum energy method (Silver and Chan, 1991) to measure the splitting delay time and fast axis polarization direction, and show the individual measurements of anisotropic parameters at single stations. The dominant fast polarization orientation is NW-SE for the Hungarian part of the stations as well as at the stations located in the easternmost of the Pannonian Basin. This orientation turns more into WNW-ESE at the stations situated in Austria, mostly NW of the Vienna basin. Apart from predominately NW-SE fast orientation, there are a few measurements showing NE-SW and almost E-W trend. Delay time measurements in the middle Hungarian latitudes, indicate weaker anisotropy than those observed either to the north in the Austrian part or to the south in the Hungarian part. The newly obtained seismic anisotropy directions in the CPR may perhaps originate from the combined effect of the present day stress field and an earlier E-W oriented asthenospheric flow of which plausibility will be tested on data from upper mantle xenoliths from the CPR.