Geophysical Research Abstracts
Vol. 20, EGU2018-13375, 2018
EGU General Assembly 2018

The anisotropic component in P-wave tomography images of the Eastern Mediterranean and Anatolia

Judith M. Confal (1), Max Bezada (2), Tuna Eken (1), Manuele Faccenda (3), Erdinc Saygin (4), and Tuncay Taymaz (1)

(1) Department of Geophysical Engineering, The Faculty of Mines, Istanbul Technical University, Istanbul, Turkey (judithconfal@gmail.com, eken@itu.edu.tr, ttaymaz@gmail.com/taymaz@itu.edu.tr), (2) Department of Earth Sciences, University of Minnesota-Twin Cities, Minneapolis, Minnesota, USA (mbezada@umn.edu), (3) Department of Geosciences, Universita di Padova, Padova, Italy (manuele.faccenda@gmail.com), (4) School of Physics and Astrophysics of Western Australia, Perth, Australia (erdinc.saygin@uwa.edu.au)

Global compilation of seismic anisotropy measurements and models (e.g. from SKS splitting, surface waves tomography, receiver functions analyses, etc.) suggest that it is present in most subduction zones. Despite this fact, seismic tomography studies usually assume an isotropic upper mantle. In the present work, we gather seismological and 3D numerical geodynamic models on seismic anisotropy from, i.e. shear wave splitting measurements and mantle flow patterns and include them into P-wave velocity models. The complicated behaviour of convergent plate tectonics in the eastern Mediterranean such as the African subduction beneath Anatolia involves the strong roll-back effect of the subducting plate along the Hellenic Trench and a tear in the slab in western Turkey. Further east, a slab detachment in relation to the collisional tectonics in eastern Anatolia has been suggested in earlier teleseismic studies. Resulting mantle convection-driven LPO of olivine in the upper mantle that is developed due to a strong slab-mantle interaction in the entire region results in over 1s of time delays between fast and slow shear wave components raising questions about the reliability of tomographic images obtained under the assumption of isotropy. To investigate the influence of seismic anisotropy we follow the method tested using some synthetic cases in Bezada et al. (2016, G-cube). Our study will deal with both synthetic and real data inversions in which realistic seismic anisotropy model derived from the mantle convection simulation is taken as the starting model for a region covering eastern Mediterranean and Anatolia. Directional variation of the teleseismic events and high density of events per station potentially allow better resolution for isotropic (thermal) anomalies and seismic anisotropy components of tomographic images compared to previous tomography studies.