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Upper mantle structure beneath the Anatolia-Aegean domain from high-resolution teleseismic tomography

Hayrullah Karabulut (1), Dogan Aksari (1), and Anne Paul (2)

(1) Bogazici University, Kandilli Observatory and Earthquake Research Institute, Geophysics, Istanbul, Turkey (kara@boun.edu.tr), (2) Institut des Sciences de la Terre (ISTerre) CNRS & Université Grenoble Alpes (UGA)

The deep structure of the Anatolia-Aegean domain is investigated using the teleseismic tomography with the goal of understanding active geodynamic processes. Seismic recordings from 600 seismic stations of both permanent and temporary networks operated in the region between 2000 and 2017 are used for the analysis. More than 135,000 relative P-wave arrival time residuals from 1200 teleseismic events have been extracted from the continuous records using cross correlation and adaptive stacking techniques. The residuals are mapped as 3D perturbations with respect to AK135 earth model in the upper mantle. The images extending to a depth of 600km shows the geometry of both Hellenic and Cyprus subductions in great detail. The segmentation of the slabs clearly associates with the changes in the seismicity rates and earthquake source mechanisms at depths shallower than ∼150km. The Cyprus slab clearly terminates in the east of Cyprus at shallower depths but becomes stagnant at mantle transition zone. The central Anatolia and eastern Anatolia overlays a low velocity zone. The thickness of the low velocity zone is increasing from west to east and bounded on the north by the North Anatolian Fault. No clear correlation is observed between SKS anisotropy and upper mantle velocity perturbations with the exceptions in the areas of slab tears.