



## **Tectonic History of Anatolia from Adjoint Tomography**

E. Bozdag (1), H. Zhu (1), D. Peter (1), J. Tromp (1,2)

(1) Department of Geosciences, Princeton University, Princeton, NJ, USA (bozdag@princeton.edu), (2) Program in Applied & Computational Mathematics, Princeton University, Princeton, NJ, USA

The Anatolian plate consists of several continental fragments that are connected to each other along suture zones and have gone through intricate geological processes over time. Its current tectonic and geodynamic processes mainly developed under the extensional regime caused by subduction along the Hellenic Arc and the northward collision of the Arabian plate on the eastern side. However, the complex subduction history of the region (e.g., closure of the Tethys Ocean, slab roll-back along the Hellenic arc, possible slab detachments, etc.) is still debated. Higher resolution tomographic models of the crust and the upper-mantle are crucial to produce detailed images of subducted slabs and old slab remnants and for interpretation of geodynamic processes. In this study, we discuss the past and present tectonic and geodynamic settings, in particular the slab history of the Anatolian plate and the surrounding area based on adjoint tomography of the region within the broader continental scale of Europe. Initial results reveal the major features of the Hellenic and Cyprus Arcs and slab remnants of the Tethys Ocean underneath Anatolia. The inversion procedure is based on spectral-element simulations of full wave propagation in 3D background models, which facilitates the use of full three-component seismograms, resulting in better data coverage and constraints on Earth structure. The tomographic image of the area is a result of more than 25 iterations using hundreds of thousands of frequency-dependent body- and surface-wave traveltimes measurements. Broadband seismic waveforms were obtained from ORFEUS, IRIS (both from permanent and PASSCAL networks) and the Kandilli Observatory of Turkey, which we gratefully acknowledge for free data access.