P-wave anisotropic tomography of the Alps

*Dapeng Zhao[1], Yuanyuan Hua[1], Yixian Xu[1]

1. Department of Geophysics, Tohoku University

The first tomographic images of P-wave azimuthal and radial anisotropies in the crust and upper mantle beneath the Alps are determined by joint inversions of arrival-time data of local earthquakes and teleseismic events. Our results show the south-dipping European plate with a high-velocity (high-V) anomaly beneath the Western-Central Alps and the north-dipping Adriatic plate with a high-V anomaly beneath the Eastern Alps, indicating that the subduction polarity changes along the strike of the Alps. The P-wave azimuthal anisotropy is characterized by mountain chain-parallel fast velocity directions (FVDs) in the Western-Central Alps and NE-SW FVDs in the Eastern Alps, which may be caused by mantle flow induced by the slab subductions. Our results reveal a negative radial anisotropy (i.e.,) existing within the subducting slabs and a positive radial anisotropy (i.e.,) in the low-velocity mantle wedge, which may reflect the subvertical plate subduction and its induced mantle flow. The results of anisotropic tomography provide important new information on the complex mantle structure and dynamics of the Alps and adjacent regions.

References

Hua, Y., D. Zhao, Y. Xu (2017) P wave anisotropic tomography of the Alps. *J. Geophys. Res.* 122, 4509-4528.

Keywords: Alps, P-wave anisotropy, tomography, velocity structure, plate subduction

