

Accepted Manuscript

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PII: S1367-9120(17)30325-5

DOI: <http://dx.doi.org/10.1016/j.jseaes.2017.06.016>

Reference: JAES 3122

To appear in: *Journal of Asian Earth Sciences*

Received Date: 5 April 2017

Revised Date: 20 June 2017

Accepted Date: 21 June 2017



Please cite this article as: Zhao, D., Isozaki, Y., Maruyama, S., Seismic imaging of the Asian orogens and subduction zones, *Journal of Asian Earth Sciences* (2017), doi: <http://dx.doi.org/10.1016/j.jseaes.2017.06.016>

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Seismic imaging of the Asian orogens and subduction zones

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Abstract. In this article we make a review of recent findings on seismic imaging of the Asian orogens and subduction zones. High-resolution images of seismic tomography and receiver functions of the Asian region are obtained, revealing significant lateral heterogeneities in the crust and upper mantle, which are caused by active plate subductions and continental orogeny. A significant advance in the seismic imaging is tomographic inversions for three-dimensional distribution of seismic anisotropy in the crust and mantle, which provides important new information on the lithospheric deformation and mantle convection associated with the continental orogeny and plate subductions. The intraplate volcanism in Northeast Asia is caused by hot and wet upwelling flows in the big mantle wedge above the stagnant Pacific slab in the mantle transition zone (MTZ). The age distribution of the subducting Pacific slab beneath East Asia is estimated, shedding new light on the evolution of the Pacific slab, as well as the East Asian tectonics during the Late Mesozoic to the Cenozoic. The nucleation of great earthquakes, such as the 2008 Wenchuan earthquake (M 8.0), the 2011 Tohoku-oki earthquake (M 9.0) and the 2015 Nepal earthquake (M 7.9), is controlled by structural heterogeneities in and around the seismogenic fault zones. It is considered that fluids are

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