

## Mantle transition zone, stagnant slab and intraplate volcanism in Northeast Asia

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Three-dimensional P and S wave velocity structures of the mantle down to a depth of 800 km beneath NE Asia are investigated using ~981,000 high-quality arrival-time data of local earthquakes and teleseismic events recorded at 2388 stations of permanent and portable seismic networks deployed in NE China, Japan and South Korea. Our results do not support the existence of a gap (or a hole) in the stagnant slab under the Changbai volcano, which was proposed by a previous study of teleseismic tomography. In this work we conducted joint inversions of both local-earthquake arrival times and teleseismic relative travel-time residuals, leading to a robust tomography of the upper mantle and the mantle transition zone (MTZ) beneath NE Asia. Our joint inversion results reveal clearly the subducting Pacific slab beneath the Japan Islands and the Japan Sea, as well as the stagnant slab in the MTZ beneath the Korean Peninsula and NE China. A big mantle wedge (BMW) has formed in the upper mantle and the upper part of the MTZ above the stagnant slab. Localized low-velocity anomalies are revealed clearly in the crust and the BMW directly beneath the active Changbai and Ulleung volcanoes, indicating that the intraplate volcanism is caused by hot and wet upwelling in the BMW associated with corner flows in the BMW and deep slab dehydration as well.

### Reference

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