

Origin of the Changbai intraplate volcanism in Northeast Asia

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The origin of intraplate volcanoes in NE Asia is considered to be associated with upwelling of hot and wet asthenospheric materials in the big mantle wedge above the stagnant Pacific slab in the mantle transition zone. Among these intraplate volcanoes, Changbai is the largest and most active one, and very deep earthquakes (500–650 km depths) in the Pacific slab under East Asia occur ~300 km to the east of the Changbai volcano. Integrating the findings of geophysical, geochemical and petrologic studies so far, we suggest a link between the Changbai volcanism and the deep earthquakes in the Pacific slab. Many large shallow earthquakes occurred in the Pacific Plate in the outer-rise areas close to the oceanic trench, and sea water may enter down to a deep portion of the oceanic lithosphere through the active normal faults which generated the large outer-rise earthquakes. Sea water or fluids may be preserved in the active faults even after the Pacific Plate subducts into the mantle. Many large deep earthquakes are observed that took place in the subducting Pacific slab under the Japan Sea and the East Asian margin. At least some of the large deep earthquakes are caused by reactivation of the faults preserved in the subducting slab, and the fluids preserved in the faults within the slab may cause the observed non-double-couple components of the deep earthquake faulting. Fluids preserved in the slab may be released to the overlying mantle wedge through large deep earthquakes. Because large deep earthquakes occur frequently in the vicinity of the Changbai volcano, many more fluids could be supplied to this volcano than in other areas in NE Asia, making Changbai the largest and most active intraplate volcano in the region. For details, see:

[1] Zhao, D. (2015) *Multiscale Seismic Tomography*. Springer, 304 pp. [2] Zhao, D., Y. Tian (2013) Changbai intraplate volcanism and deep earthquakes in East Asia: A possible link? *Geophys. J. Int.* 195, 706-724.