

Review: The transport of water in subduction zones

Heehyeon Sim

Crystallography Lab.

Dept. of Earth System Science, Yonsei University

The study on the behavior of volatile components, such as H₂O and CO₂, in the Earth's interior is very important to understand the physical properties of the mantle materials and Earth dynamics. In particular, volatile cycle at subduction zones is the one of major way to carry volatile components into the Earth's interior. Water is a major research topic among various volatile components because it is estimated to be abundant in the mantle. Therefore, many studies are being conducted not only on the stability limit and breakdown mechanism of hydrous minerals but also on the solubility limit and dissolution mechanism of water in nominally anhydrous minerals.

This paper provides an overview on the mechanisms of transporting water from the subducting slab to the mantle, with emphasis on how the thermal structure of subduction zones exerts primary control on the dehydration and melting at different depths during subduction. To understand this mechanism, it also describe the physical and thermal structures of the subduction zone, the stability of hydrous or nominally anhydrous minerals and the fluid properties.

Reference

Zheng, Y., Chen, R., Xu, Z. et al. The transport of water in subduction zones. *Sci. China Earth Sci.* 59, 651–682 (2016). <https://doi.org/10.1007/s11430-015-5258-4>