# Electrical properties of a stagnant slab from deep MT soundings

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Water is transported by subducting slabs down into the mantle. While water is a minor phase, it plays an important role in a number of processes in the mantle. Water seems to have a strong influence on mantle electrical conductivity even in very small quantity (a few 100 ppm). Conductivity models accounting for water dissolution in silicate or free water may explain the difference between conductivity obtained from induction data and conductivity measured for dry minerals. At depths larger than ˜200 km, the solubility of hydrogen in olivine and in its high pressure phases suggests that free water is unlikely. Hydrogen diffusion then could be the factor controlling the electrical conductivity in the upper mantle. As a result, the knowledge of electrical conductivity versus depth obtained from deep magneto-telluric (MT) techniques may provide insight on the amount of water released by the slab. Here we compare two deep MT sounding realized over stagnant slabs: one in the French Alps, from which mantle conductivity values down to ˜1000 km were obtained and one in China (Ichiki et al. 2001). We discuss the implications for the dynamics of the stagnant slabs.

Reference

Ichiki, M., M. Uyeshima, H. Utada, Z. Guoze, T. Ji and M. Mingzhi, Upper mantle conductivity structure of the back-arc regoin beneath northeastern China, Geophys. Res. Let.,28, 19, 3773-3776, 2001.