

Direct evidence of flow in the hydrated asthenosphere of the southern Mariana mantle wedge

Katsuyoshi Michibayashi[1]; Yasuhiko Ohara[2]; Miki Tasaka[3]; Atsushi Okamoto[4]

[1] Inst. Geosciences, Shizuoka Univ; [2] Hydrographic and Oceanographic Dept.of Japan; [3] Inst. Geosci., Shizuoka Univ; [4] Tohoku Univ.

<http://www.ipc.shizuoka.ac.jp/~sekmich/>

The peridotites dredged from the southern Mariana Trench, the deepest ocean in the world, not only preserve the contrasting microstructures from high-temperature coarse granular to low-temperature porphyroclastic and completely dynamically recrystallized mosaic textures, but they also have various olivine fabrics: (010)[001], (001)[100] and (010)[100] patterns that are named B-, E-, and A-type, respectively. This discovery supports the occurrence of B-type olivine fabric in the mantle wedge of subduction zone, but a complex flow could occur rather under heterogeneous distribution of water in the mantle wedge. It is likely that thermal erosion of the overriding dry lithosphere occurred in the Mariana mantle wedge, which is extremely shallow (≤20km), as a consequence of a complex wet asthenospheric flow due to hydration in the mantle wedge by dehydration of the subducting slab.