



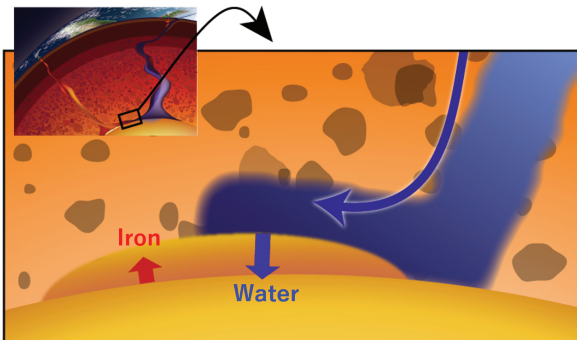
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2021.01.15 (Fri.) 16:30 ~

Venue: Zoom

A link will be sent @grc-all within 30 minutes before the beginning of the seminar.



Deep water cycle and core hydration

Water strongly influences the structure, dynamics, and evolution of the deep Earth. Recent experimental studies suggest that hydrous phases play an important role as carriers of surface water to the deep mantle via the subduction of oceanic plates. Such deep-water subduction processes may allow the surface water to reach the bottom of the mantle, where the mantle minerals are in direct contact with the iron at the core. Thus, the purpose of this study was to provide understanding regarding the behavior of water when it meets iron at the core-mantle boundary. To investigate the reaction between water and iron at high pressures and temperatures, the experiments were performed using in-situ X-ray diffraction measurements in combination with the diamond-anvil cell technique. Contrary to the results of some earlier studies, the formation of FeO instead of FeO_2H_x without intermediate phases was observed. Considering the unlimited availability of iron in the core and the limited water supply resulting from mantle downflow, the FeO-rich layers (Fe-rich minerals and liquid) may locally cumulate at the bottom of the mantle simultaneously with hydrogen incorporation into the core.

Keywords: 1. Core-mantle boundary
2. Deep water cycle
3. Hydrous phases