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## Venue: Zoom

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

## Rehydration of crustal material in the deep mantle and stability of hydrous minerals and nominally anhydrous minerals

マントル深部における地殻物質の再含水化、および含水鉱物・名目上無水鉱物の安定性

The rehydration model is a water transportation model of the subducting slab in the lower mantle proposed by Pamato et al. (2015). The reaction process for this model is as follows: dehydration of DHMSs in the peridotite, transfer of water-rich fluid to crustal material, and reaction of anhydrous minerals with water to produce hydrous minerals again. However, no direct experiment has been conducted to reproduce this rehydration. In this presentation, I will show results of 1) high-temperature and -pressure experiments conducted to reproduce rehydration and 2) in-situ X-ray observation of hydrous  $\text{SiO}_2$  stishovite.

The rehydration experiments were conducted using natural granite whose composition is close to average of the sedimentary layer at 26 GPa up to 1500 °C. As a result of the experiments, formation of Al-rich phase H and Al-rich phase D was confirmed in the granite layer above 1250 °C. This is the first experimental demonstration of rehydration proposed by Pamato. On the other hand, at 1050 °C, DHMSs were generally stable, but formation of hydrous minerals occurred in granite. At this condition, diffusive transport of water without formation of fluid may be responsible for rehydration. The results of in-situ X-ray observation of stishovite show stability of stishovite is limited to temperatures below 550 °C at 13 and 23 GPa. This is contradictory to Lin et al. (2020) who reported solubility of >3 wt% water at lower mantle pressures above 1000 °C. This means that Al-free stishovite is unstable in the lower mantle even when the sedimentary layer is rehydrated.

**Keywords:** 1. High-pressure hydrous phases  
2. Hydrous stishovite  
3. Rehydration model