The 49th GRC International Frontier Seminar

Title: On the properties of silicate perovskite: strength - a key to understanding deep earthquake mechanism and water solubility - how big the water reservoir can be in the lower mantle

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Venue: Meeting Room #486, Science Research Bldg 1, Ehime Univ.

Nearly 70% of Earth's lower mantle in volume is composed of magnesium silicate perovskite (pyrolite model). Therefore, properties of the lower mantle are likely dominated by the perovskite. While peroperties of many other mantle dominant minerals such as olivine, wadsleyite and ringwoodite have been extensively studied, knowledge about lower mantle perovskite is much less comprehensive. This talk will present some results of accumulated studies of strengths of the mantle dominant minerals and their implications to the mechanism of deep earthquakes. The analysis of these data indicates that characteristic of provskite's strength may play a critical role in illustrating the profile of deep earthquake occurrence as a function of depth. Second part of the talk will present very recent experimental result about the influence of pressure on water solubility in aluminous magnesium silicate perovskite. Preliminary experiments demonstrate that the perovskite may take more water in its structure as depth goes deeper in lower mantle. Based on this result, the lower mantle is expected to be a large water reservoir up to 10 oceans of water in the Earth's interior.

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