The 12th Global-COE International Frontier Seminar

September 2nd, 2009, from 17:00, at 6F meeting room

Water Distribution Across the Mantle Transition Zone in Earth and Its Implications for the Evolution of Ocean

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The transition zone of Earth's mantle (MTZ; ~410 to ~660 km depth) can store a large amount of water up to ~ten times of the current ocean mass. Consequently, this layer may play an important role in the circulation of water in Earth. However, the role of MTZ in water circulation has been poorly understood because of the difficulties in determining the water distribution in the deep mantle. Various geochemical and geophysical observations are reviewed including the water contents in various basalts as well as electrical conductivity and seismological observations in order to infer the water distribution in the deep mantle of Earth at present. It is concluded that the MTZ has a range of water content but is ~ 0.1-0.3 wt% in the Pacific. This value is about ten times higher than the water content in the asthenosphere and is close to the critical water content for partial melting at above the 410-km discontinuity. This suggests that the water content in MTZ is self-regulated by partial melting that would in turn stabilize the ocean mass during the geological history.

2 September 2009 17:00-18:00
Meeting room, Sogo-Kenkyu-Bldg 1 6F, Ehime University

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