Japan Geoscience Union Meeting 2011
(May 22-27 2011 at Makuhari, Chiba, Japan)

SIT003-08 Room:101 Time:May 26 10:45-11:05

Inner core growth and its effect on the structure and dynamics of the core

Hisayoshi Shimizu[1*]

[1]ERI, University of Tokyo

Earth's inner core is growing due to the cooling of the Earth. Crystallization of molten iron alloy on the inner core boundary (ICB) is responsible for the structure of the inner core and for the energy supply to the geodynamo.

The small-scale features of the ICB seem to be well established theoretically and experimentally. A constitutional super cooling by the advance of the solid-liquid interface of the core iron alloy at ICB condition will almost certainly cause morphological instability of the surface, and the instability create a mushy layer at the ICB from which buoyant materials are ejected to supply a driving energy of the geodynamo.

Global inner core growth models are necessary to discuss the structure of the inner core's interior. It is widely believed that the near surface structure of the inner core has asymmetry between the eastern and western hemispheres, and the deep interior of it has a seismic anisotropy. Existence of convection in the inner core seems to play a role on determining the structure, but it is not clear whether a type of convection can explain the observed asymmetry and anisotropy at once. Also, the convection might have influence of the thermal history of the Earth and might alter the estimate of the inner core age.

In this review talk, present status of the understanding of the inner core growth is summarized and possible improvements on the inner core growth models are discussed.

Keywords: inner core