[EE] Evening Poster | S (Solid Earth Sciences) | S-IT Science of the Earth's Interior & Tectonophysics

[S-IT22]Interaction and Coevolution of the Core and Mantle in the Earth and Planets

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Tue. May 22, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)

Recent observational and experimental investigations have significantly advanced our understanding of the structure and constituent materials of the deep Earth. Yet, even fundamental properties intimately linked with formation and evolution of the planet, such as details of the chemical heterogeneity in the mantle and light elements dissolved in the core, remained unclear. Seismological evidence has suggested a vigorous convection in the lower mantle, whereas geochemistry has suggested the presence of stable regions there that hold ancient chemical signatures. The amounts of radioactive isotopes that act as heat sources and drive dynamic behaviors of the deep Earth are also still largely unknown. We provide an opportunity to exchange the achievements and ideas, and encourage persons who try to elucidate these unsolved issues of the core-mantle evolution using various methods, including high-pressure and high-temperature experiments, high-precision geochemical and paleomagnetic analyses, high-resolution geophysical observations, geo-neutrino observations, and large-scale numerical simulations. Since this session is co-sponsored by geomagnetism, paleomagnetism and rock magnetism division of the SGEPSS, contributions in geomagnetism and geodynamo simulation are also encouraged.

[SIT22-P33]On the geomagnetic direction changes and time constant of the core inferred from the geomagnetic secular variations

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Keywords:Geomagnetic Secular Variation, Paleomagnetism, Geodynamo, Core Dynamics

The magnetic field of the Earth is generated by the electromagnetic fluid dynamics in the Outer Core of the planet, so that the temporal periodicity seems poor. The results of the studies of the paleosecular variation form lava flows (PSVL) indicate that observation for a hundred thousand years is necessary and enough to cover the directional distribution of the geomagnetic secular variation (GSV). That time constant is longer than the magnetic diffusion time in the conductive core.

Here we show the result of the comparison between the temporal and directional coverages from the various paleomagnetic studies from PSVL, lake sediments and archaeomagnetic sites, and global GSV models. The result indicates that the time for which the geomagnetic direction changes can cover the whole GSV without excursion is less than a hundred thousand years and close to the magnetic diffusion time of the outer and inner core.