[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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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-P34]Paleomagnetic and rock magnetic results from 17-22 ka sediment of Jeju Island, Korea: Excursional behavior of the geomagnetic field or rock magnetic anomalies?

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Paleomagnetic and rock magnetic investigations were performed on a 64-cm-thick section of nonmarine unconsolidated muddy sediment from the so-called Gosan Formation in Jeju Island, Korea. This sediment was recently dated to have been deposited between 22 and 17 kyr BP calibrated, with a sedimentation rate of 13-25 cm/kyr, based on many radiocarbon ages. From 30 out of 33 horizons characteristic directions of natural remanent magnetization are successfully determined by the stepwise alternating field demagnetization method: Of these, six horizons (5, 11, 29, 43, 65, and 69 cm depth from the top) shows marked deviations in virtual geomagnetic pole (VGP) position, more than 45 ° away from the North Pole. A suite of rock magnetic analyses suggest that the sediment mainly could be characterized by the dominance of low-coercivity magnetic particles of a range of sizes up to pseudo-single domains, which are magnetite plus (occasionally maghemitized?) titanomagnetite with an unblocking temperature of ~300 °C. These also seem to exclude the possibility that the unusual directions might be caused by self-reversal or gyroremanent magnetization. On one hand, it is found that there are some peaks, for

instance, in saturated isothermal remanence for 7-9, 17, 29, 39, and 65 cm depths. This kind of the rock magnetic anomalies may allow us to suspect an adverse influence on the directions. Nevertheless, the anomalous VGP deviations, at least, for 5, 11, 43, and 65 cm depths seem not to be associated with the rock magnetic anomalies, thereby giving a possibility of recording the geomagnetic excursional behavior. Excursion-like or high-amplitude secular variation records in the direction and/or the intensity have been observed around the world including Tianchi of NE China, Lake Baikal of Siberia, Bay of Bengal of India, Hawaii, western USA, western North Atlantic Ocean, Arctic Ocean, and some in mid- to high-latitudes of the South Hemisphere, but the occurrence of geomagnetic excursions around the 17-22 ka period is not yet well accepted by the paleomagnetic community. Our current results seem to advocate a possibility of the geomagnetic instability at the time, which might be manifested by multiple short-lived excursions.