[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-P02]Observation of multipathing at the western edge of the Pacific Large Low-Shear-Velocity Province

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The waveforms of five deep earthquakes from the Fiji-Tonga subduction zone recorded by a seismic array in India reveal a secondary pulse just after the Sdiff phase. We obtained 51 observations for this pulse, in the distance range of 102.0° to 115.1°. The pulse is sharper on the northern part compared to the southern part of the array, with a azimuthal variation. The relative arrival time of the second pulse varies from 3.0 to 9.9 s with respect to the first pulse, with its arrival getting delayed from north to the south along the seismic array, albeit the south array being closer to the earthquake sources. At present, we choose to interpret the first pulse in terms of the Sdiff phase whose ray path reaches the CMB inside the Pacific Large Low-Shear-Velocity Province (LLSVP) and then passes along the vertical side of the LLSVP. The second pulse is probably the direct S and its diffracted at the top of the LLSVP. The ray path goes into the LLSVP but bottoms above the CMB. It appears that the second wave seems to have stronger amplitudes when the ray bottoms inside the LLSVP and the sharp vertical boundary lies after the bottoming point. We attempt to model the relative timing of the first and secondary pulses as well as the absolute arrival times of the first pulse by incorporating varying thickness and shear wave velocity on either sides of the boundary. At the time of the presentation, we plan to show our velocity model including azimuthal variability, to explain the observed data.