[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

convener:Tsuyoshi Iizuka(University of Tokyo), Hidetoshi Shibuya(Department of Earth and Environmental Sciences, Faculty of Advanced Science and Technology, Kumamoto University), Taku Tsuchiya(愛媛大学地球深部ダイナミクス研究センター, 共同), Kenji Ohta(Department of Earth and Planetary Sciences, Tokyo Institute of Technology)

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-P25]U, Th concentration database of basement rocks of Japanese islands with accurate location coordinates for geoneutrino modeling

*Kenta Ueki[1], Satoru Haraguchi[1], Shunsuke Horiuchi[1], Mika Mohamed[1], Hikaru Iwamori[1,2] (1.Japan Agency for Marine-Earth Science and Technology, 2.4Department of Earth and Planetary Sciences, Tokyo Institute of Technology)

Keywords:Geoneutrino, Geochemical data, Arc crust, Basement rock

KamLAND is an anti-neutrino detector at the Kamioka Observatory. It can detect an antineutrino emitted in the decay of ^{232}Th and ^{238}U (geoneutrino). With the aim of determining the amount of radioactive elements contained in the earth's core and mantle with high precision, using the world's highest precision earth neutrino data obtained with KamLAND, Takeuchi et al. (in prep) conducted three dimensional lithological modeling of the crust of the Japan arc using the seismic velocity structure data. Based on the lithological map, Takeuchi et al. (in prep) constructed the 3D U-Th distribution map in the Japan arc crust. Using the 3D U-Th distribution map, Takeuchi et al. (in prep) evaluated the flux of the crustal origin geo-neutrino at Kamioka. Takeuchi et al. (in prep) showed that information regarding the spatial correlation of U-Th concentration of a rock type of interest is necessary to obtain the flux of the crustal origin geoneutrino with the higher precision. Geochemical data with precise sample locality is necessary to obtain information on such spatial correlation. For the purpose, we construct a new rock composition dataset of the basement rocks of the Japan arc crust with accurate location information using the database "DODAI" presented by Haraguchi et al. (JPGU-AGU2017). It consists of 1618 data points with geochemical data including U-Th concentration, accurate location coordinates, geological information and sample description.

We present U-Th concentrations and its geographical systematics of various rocks in the database, as well as its variations among various rock types, rocks suites.
Using the dataset, we can analyze spatial correlations of rock compositions between various rock suites or rock types in various spatial length from ~10km to the whole Japanese arc. Using the information on spatial correlations, we can obtain quantitative geoneutrino Probability density function (pdf) from Japan arc crust.
Concentrations of multi-elements are included in this dataset, although dataset presented in Takeuchi et al. (in prep) consists only SiO_2, U and Th concentration. Using K_2O concentration in this dataset, we can calculate the surface heat flux map based on the 3D compositional map. The estimated surface heat flux can be used to evaluate model accuracy.