

Research Summary

During my 4-month stay at ERI from 1 November 2022 to 28 February 2023, I mainly focused on the heat flow and thermal structure of the marginal seas in Western Pacific area, cooperated with Professor Makoto Yamano. We compiled the updated heat flow data available from in and around Japan and that from China, with the existing data for other areas from the IHFC heat flow database, to re-visit the heat flow pattern in this area. The heat flow varies much among the marginal seas (e.g., the Okhotsk Sea, Japan Sea, Okinawa Trough and South China Sea), indicating their different ages and thermal processes. While the subduction zones exhibit similar geothermal patterns, with relatively low heat flow in the fore-arc regions, extremely high but variable heat flow in the volcanic arcs, and generally high heat flow in the back-arc regions. High heat flow anomalies are observed within the marginal seas, as a result of fluid circulation and recent volcanic activities. Thermal structure analysis of the lithosphere demonstrate that high temperature and large heat flow in the back-arc regions can be attributed to the heat contributions from the mantle. The heat flow (Q) verse age (t) relation for marginal seas in Western Pacific area can be roughly expressed by $Q(t)=585.8 t^{1/2}$. It seems that this Q - t relation for marginal seas does not significantly differ from that for oceanic basins. However, given the uneven coverage in heat flow data and vagueness in crustal age, this expression needs to be confirmed in further study. The preliminary results would be presented at the IUGG meeting to be held in Berlin in this July. In addition, with the kind arrangement of Professor Yamano, I also visited some Japanese geothermal colleagues for exchanging ideas and potential collaborative research in future, including Dr. Shusaku Goto of Geological Survey of Japan (GSJ), Dr. Akiko Tanaka of National Institute of Advanced Industrial Science and Technology (AIST), and Dr. Hideki Hamamoto of the Center for Environmental Science in Saitama. Finally, I would like to thank Professor Makoto Yamano and the International Office, for their kind host and help during my visit.