

R004-04

Zoom meeting A : 11/4 AM1 (9:00-10:30)

9:45~10:00

A preliminary study of the Hadean geodynamo based on a Basal-Magma-Ocean-Dynamo hypothesis

#Futoshi Takahashi¹⁾

¹⁾Kyushu Univ.

From Paleomagnetic studies, it is suggested that the geodynamo has been active for ca. 4.2 billion years (Tarduno et al., 2020). During such a long lifetime of the geodynamo it is often argued that the geomagnetic field is maintained without the solid inner core in the Hadean and Archean eons. Moreover, a younger age of the inner core formation is preferred based on high electrical conductivity of the core material (e.g., Ohta et al., 2016). However, there is a debate regarding energy source maintaining thermally-driven convection and also a dynamo for such a long time interval without the inner core. We consider a hypothesis that the early geodynamo was maintained by a dynamo action in the lowermost part of the melted mantle, i.e. Basal Magma Ocean (BMO) dynamo. Thermal history calculations suggest that the BMO dynamo is likely in terms of core energetics (Ziegler and Stegman, 2013), whereas any geodynamo simulations have not yet been carried out. Here we show a result of our pilot study to see whether the BMO could really be a dynamo. In our model, it is assumed that the core is perfectly conducting and the BMO layer is very thick, which should be much thinner compared with the core size in the ancient Earth. Keeping these assumptions in mind, our preliminary survey of the BMO dynamo is reported.