R004-03
C 会場 ：9/26　AM1 （9:00-10:30）
9:30〜9:45

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Attempts to produce candidate models for the IGRF-14 (1)

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The International Geomagnetic Reference Field (IGRF) updated every five years is a standard mathematical description in terms of spherical harmonic coefficients, known as the Gauss coefficients, for the Earth's main magnetic field and its secular variation. In the last IGRF revision, the 13th generation of IGRF (IGRF-13), we submitted a candidate model of the Secular Variation (SV) from 2020 to 2025 (SV-2020-2025) only, in which geodynamo numerical simulations, data assimilation, and core surface flow modeling were adopted to produce the model (Minami et al., 2020). In the next IGRF revision, the 14th generation of IGRF (IGRF-14), we plan to submit all kinds of released models of the Definitive Geomagnetic Reference Field for 2020 (DGRF-2020), the IGRF for 2025 (IGRF-2025), and the Secular Variation (SV) from 2025 to 2030 (SV-2025-2030). At the present, we are focusing on determination of a model for DGRF 2020, simply because the definitive geomagnetic data are available for epoch 2020 both at the geomagnetic field observatories on the Earth and by Low-Earth-Orbit satellites, such as Swarm by the European Space Agency.

In this presentation, we show tentative results in relation to DGRF 2020. To do so, we have obtained the vector geomagnetic data every one minute at the Earth-based observatories and those measured by the Swarm satellites. For the purpose of this study, the satellite data were subsampled every 10 seconds, which corresponds to an along-track spacing of about 75 km. We have found that it is impossible to determine the Gauss coefficients up to the degree 13 of spherical harmonics only by the Earth-based observatories, due not to the number of observatories, but to the ill distribution of the observatories. This suggests that the geomagnetic data measured by satellites are absolutely necessary to produce a geomagnetic field model precisely. Furthermore, we have noticed that we need to select the geomagnetic field data with respect to the local time to avoid the effect of ionosphere as well as the geomagnetic latitudes to avoid field aligned currents. These procedures may also be effective to produce the IGRF 2025 field model in the future.