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PRESS RELEASE（2019/01/23）

Mystery of the Mercury's anomalous magnetic field solved

Like the Earth, planet Mercury has its own magnetic field generated by the dynamo action in the core. Comparison of the Mercury's magnetic field with the geomagnetic field using the magnetic dipole reveals that the Mercury's dipole is offset northward from the planet's center, while the Earth's magnetic dipole is at the geocenter (Fig. 1). This is discovered by the MESSENGER spacecraft in 2011. However, it is still unresolved why Mercury has such an anomalous magnetic field unlike the geomagnetic field.

The research group consisting of Drs. Futoshi Takahashi from Faculty of Science, Kyushu University, Hisayoshi Shimizu from Earthquake Research Institute, University of Tokyo, and Hideo Tsunakawa from School of Science, Tokyo Institute of Technology, clearly addressed the big question using numerical dynamo modeling mimicking the thermochemical structure of Mercury's interior. The Mercury's offset magnetic field is spontaneously generated and stably maintained by core convection, which is governed by the self-regulating effect of the dynamo-generated magnetic field (Fig. 2).

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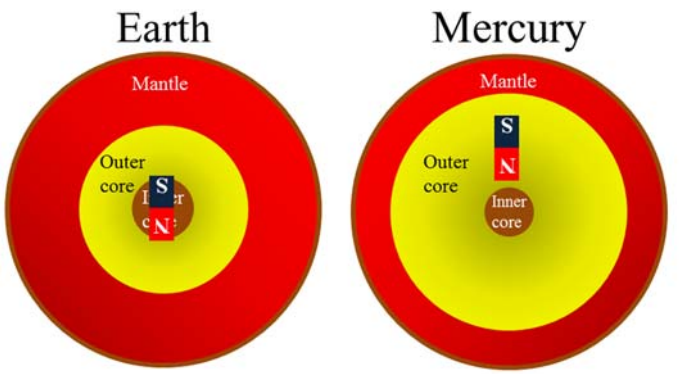
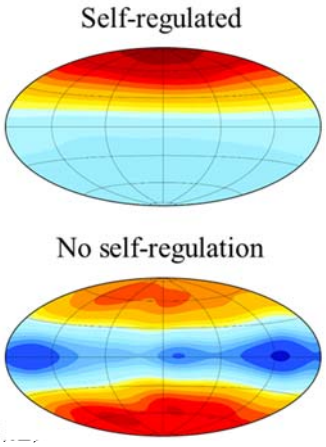


Fig. 1. Positions of the magnetic dipoles inside cores of the Earth and Mercury. Mercury's dipole needs to be offset northward from the center by 500 km (0.2 planetary radius) to explain observations.



（参考図）

Fig. 2. Self-regulation of the magnetic field. Shown are the radial magnetic field on the Mercury's surface. Morphology becomes completely different between cases with/without self-regulation.

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