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SELENE-2提案ミッション：月電磁探査装置

Lunar ElectroMagnetic Sounder (LEMS): a proposed instrument in the SELENE-2 mission

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The internal structure of the Moon is important to understand the lunar origin and evolution. In the Apollo mission, a thermal structure of the lunar interior was estimated from heat-flux observation on the lunar surface, although there was a large uncertainty, about 500 K at the depth of 300 km. A seismic structure was estimated from data obtained by seismometers on the lunar surface, but the origin of its radial distribution has not been specified. The electrical conductivity structure, which is independent of the elastic structure, is therefore important to give a crucial constraint on the lunar origin and evolution. However, estimates of the electrical conductivity obtained so far contain significant ambiguity, larger than two orders of magnitude, especially for shallow and deep lunar interiors.

In the SELENE-2 mission, we propose a lunar electromagnetic sounder (LEMS) to measure the electromagnetic field on the lunar surface as well as around the Moon and to estimate the electrical conductivity structure of the Moon. We expect that the precision and accuracy are improved by the electromagnetic sounding on the basis of the magnetotelluric method with higher frequencies compared with previous magnetic field observations. We present the LEMS mission and its current status such as its development and countermeasures against possible problems.

Keywords: SELENE-2, lunar interior, electromagnetic sounding