

SELENE-2/Lunar ElectroMagnetic Sounder (LEMS): a test of inversion

MATSUSHIMA, Masaki^{1*} ; SHIMIZU, Hisayoshi² ; TOH, Hiroaki³ ; YOSHIMURA, Ryohei⁴ ; TAKAHASHI, Futoshi¹ ; TSUNAKAWA, Hideo¹ ; SHIBUYA, Hidetoshi⁵ ; MATSUOKA, Ayako⁶ ; ODA, Hirokuni⁷ ; OGAWA, Kazunori⁶ ; TANAKA, Satoshi⁶

¹Tokyo Institute of Technology, ²ERI, University of Tokyo, ³Kyoto University, ⁴DPRI, Kyoto University, ⁵Kumamoto University, ⁶ISAS/JAXA, ⁷AIST

Understanding of lunar origin and evolution can be advanced through investigation of the lunar interior structure. The present thermal state of the Moon can be clues to the Moon's thermal history. In the SELENE-2 mission, we propose a lunar electromagnetic sounder (LEMS) to estimate the electrical conductivity structure of the Moon, which can be used to deduce the thermal structure of the Moon.

Temporal variations in the magnetic field of lunar external origin induce eddy currents in the lunar interior depending on the electrical conductivity structure and frequencies of the temporal variations. The eddy currents, in turn, generate temporal variations in the magnetic field of lunar internal origin. Therefore electromagnetic response of the Moon is obtained from magnetic field measurements by magnetometers onboard a lunar orbiter and a lunar lander. The response function is then used to estimate the electrical conductivity structure by solving an inverse problem. Here we assume a one-dimensional structure for electrical conductivity distribution. We show some results for a test of inversion.