Current status of Lunar ElectroMagnetic Sounder (LEMS) as one of proposed instruments in the SELENE-2 mission

Masaki Matsushima[1]; Hisayoshi Shimizu[2]; Hiroaki Toh[3]; Ryokei Yoshimura[4]; Futoshi Takahashi[5]; Hideo Tsunakawa[6]; Hidetoshi Shibuya[7]; Ayako Matsuoka[8]; Hirokuni Oda[9]; Masaki Matsushima LEMS Team[10]
[1] Dept Earth & Planetary Sciences, Tokyo Tech; [2] ERI, University of Tokyo; [3] DACGSM, Kyoto Univ.; [4] DPRI, Kyoto Univ.; [5] JSPEC/JAXA; [6] Dept. Earth Planet. Sci., Tokyo TECH; [7] Dep't Earth & Env., Kumamoto Univ.; [8] ISAS/JAXA; [9] IGG, GSJ, AIST; [10] -

Information of the internal structure of the Moon is a key issue to understand the lunar origin and evolution. In the Apollo mission, heat-flux, seismic, and magnetic field observations enabled us to estimate a thermal structure, an elastic structure, and an electric structure of the lunar interior, respectively. It should be noted that the electrical conductivity of silicates has a strong temperature dependence, and that it is possible to estimate a thermal structure from an electrical conductivity structure in the lunar interior. Therefore the electrical conductivity structure in the lunar interior is of importance to give a crucial constraint on the lunar origin and evolution. However, there were large uncertainties in these structures above. In fact, estimates of the electrical conductivity contain significant ambiguity, larger than two orders of magnitude, for the shallow lunar interior.

In the SELENE-2 mission, we propose a lunar electromagnetic sounder (LEMS) to estimate the electrical conductivity structure of the Moon. We carry out a feasibility study on the electromagnetic sounding by measuring only the magnetic field on the lunar surface and around the Moon. We present current status of the LEMS mission, such as its development and redesign against possible problems.