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The Lunar Electrical Conductivity Structure using Magnetic Data Set of KAGUYA

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The lunar electrical conductivity structure is important to understand the origin and evolution of the Moon. However, the conductivity estimated from simultaneous Apollo 12 surface and Explorer 35 orbital magnetometer records contains the uncertainty up to two orders of magnitude at shallow and deep parts of the Moon (Dyal et al., 1976; Hood et al., 1982). The object of this study is to remove this uncertainty to some extent and to improve the precision of the lunar conductivity estimation.

The external magnetic field fluctuations induce the electrical eddy currents in the Moon. The amplitude of the magnetic field resulting from these currents depends on the lunar electrical conductivity structure. Thus, the lunar electrical conductivity estimation can be achieved by analyzing the electromagnetic response of the Moon. But it is difficult to separate inducing magnetic field and induced magnetic field from data set observed by the magnetometer onboard KAGUYA, LMAG, because simultaneous magnetic observation at different point was not done. We analyze the time variation of the magnetic field when the Moon is in the geomagnetic tail lobe and goes into/out it, and then decide the lunar electrical conductivity.