Oral | Symbol P (Space and Planetary Sciences) | P-PS Planetary Sciences

[P-PS23_2PM2]Lunar science and exploration

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Fri. May 2, 2014 4:00 PM - 4:30 PM 413 (4F)

Scientific data sets acquired by not only Japanese lunar mission SELENE (Kaguya), but also other countries' missions, have become new standardfor lunar science. Analyses of these data have been providing several new knowledge and changing some hypotheses into the truth of the Moon. In concurrence with these studies, some countries including Japan are planning future lunar missions. In this session, we will discuss scientific results based on newly acquired lunar data, strategy for future missions, and theoretical and experimental studies for lunar science.

4:00 PM - 4:15 PM

[PPS23-P13_PG]Lunar Electromagnetic responses to the stepwise changes in the IMF

3-min talk in an oral session

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The electrical conductivity structure of the lunar interior provides us very important information for investigation of the lunar origin and evolution. We attempted to estimate on the lunar electrical conductivity from magnetic field measurements by LMAG on board KAGUYA (SELENE) during the period from 21 December 2007 to 31 October 2008, when KAGUYA was in the orbit of 100-km altitude.Magnetic fields are induced in the moon by changes in the interplanetary magnetic field (IMF). In order to confirm whether the lunar electromagnetic induction signals are observed in KAGUYA data, we compared KAGUYA data and data of ACE and WIND satellites, which locate around the Lagrange point (Sun-Earth L1), when the stepwise changes are shown in each data. LMAG measured the sum of the inducing and the induced fields, while ACE and WIND measured only the inducing field. It was found that LMAG recorded the lunar electromagnetic responses to the stepwise changes in the IMF.Dyal and Parkin (1971) gave the homogeneous moon model and estimated lunar conductivity. Their estimation was carried out using the data measured by Apollo 12 magnetometer fixed on the lunar surface. In this study, we applied their method to the data of the orbiting satellite, KAGUYA. The homogeneous moon model was able to explain the electromagnetic response against the stepwise changes in the IMF well, and the estimated homogeneous lunar conductivity was 1×10^{-4} - 4×10^{-4} S/m. On the other hand, we found that LMAG data also recorded the anomalous signals in the minor components, not predicted from the above model. In order to confirm whether such signals are unique to KAGUYA data, we scrutinized the data obtained by Apollo and Lunar Prospector. As a result, we concluded that such signals are common when the stepwise changes penetrate the moon.In this presentation, we will report the new analysis results of KAGUYA, Apollo, and Lunar Prospector data, and discuss the anomalous signals in the minor component of

the responses to the stepwise changes in the IMF.