

The Status of Japanese Lunar Exploration Projects and Objectives for the Integrated Sciences of the Moon 2

Takahiro Iwata[1]; Satoshi Tanaka[2]; Noriyuki Namiki[3]; Naru Hirata[4]; Takamitsu Sugihara[5]

[1] ISAS/JAXA; [2] ISAS; [3] Earth and Planetary Sci., Kyushu Univ.; [4] Univ. of Aizu; [5] CDEX, JAMSTEC

The Moon is a celestial body which has anomalously large mass and size relative to its mother planet, the Earth. Its surface and interior structure cannot, therefore, be explicated without the significant effect from the coexistence with the earth. Hitherto lunar exploration from Apollo to Lunar Prospector has suggested the origin by a giant impact and the evolution with a magma ocean. These hypotheses seem to be, however, still less exhaustive because the diversity of instruments and the coverage of observations on each exploration were insufficient to resolve those issues. Therefore, global mapping with multi-instruments is expected to verify lunar origin and evolution. The Moon-Earth system is, on the other hand, an important probe to understand the physics of the interplanetary space in our solar system. The Earth has so strong magnetosphere that there are interactions with solar wind. It is helpful to observe ionic and magnetic phenomena at the lunar orbit to comprehend the physics of the ionization activity around the earth. Moreover, the Moon is recently watched with keen interest as an indispensable base for the manned exploration of our solar system. It is, therefore, expected that data of lunar elements, materials, and environments will produce beneficial knowledge for future lunar utilization.

Under these backgrounds, Japan's lunar scientific explorer; SELENE is at the countdown for the launch in the summer in 2007. SELENE is a lunar explorer which will execute the global mapping of the moon, make technical demonstration, and acquire lunar data for the future exploration. 15 mission instruments are classified as six sub-groups by their purpose as; chemical elements, mineralogy, surface structure, gravity field, surface environment, and imaging for outreach.

To attain the scientific results definitely, we examined a strategy for the integrated science of the Moon as: 1) drawing two-dimensional maps to integrate various geologic units into a coherent map, 2) drawing three-dimensional maps of subsurface structures beneath maria and highlands, 3) joint studies of special topics such as mare tectonics and crustal formation, 4) joint studies of advanced topics such as dichotomy and bulk composition. Using the strategy, we will shed light on figure out the origin and evolution of the Moon.