Sub-surface structure of lunar multi-ring basin

Noriyuki Namiki[1]; Hideo Hanada[2]; Koji Matsumoto[3]; Hiroshi Araki[4]; Yuji Harada[5]; Koji Wada[6]; Yasuhiro Yokota[7]; Naru Hirata[8]; Hirohide Demura[8]; Noriaki Asada[8]

[1] Earth and Planetary Sci., Kyushu Univ.; [2] RISE. NAOJ; [3] NAOJ; [4] NAO, RISE; [5] DEM, ERI, Univ. Tokyo; [6] ILTS, Hokkaido Univ.; [7] ISAS/JAXA; [8] Univ. of Aizu

The Japanese lunar explorer, SELENE, is scheduled to be launched in this summer by JAXA. The purposes of the SELENE project are sciences of the Moon, on the Moon, and from the Moon. To achieve these purposes, the SELENE project is developing a strategic plan to integrate different data sets into coherent models of origin and evolution of the Moon. We call this strategy *the integrated science of SELENE* and set four topics to promote joint studies among experimental groups of the SELENE project; (1) tectonic history of maria, (2) crustal formation from ancient lunar mantle, (3) explorations of polar region, and (4) subsurface structure of multi-ring basins. In this talk, we introduce our recent advancement of the joint study regarding the fourth topic.

There are 18 lunar multi-ring basins that have been recognized up to date. Among these basins, we focus on the Orientale basin because the Orinetale basin is so-called *archetype* of multi-ring basins. Another reason is new gravity experiment of the SELENE project. Differential VLBI measurement of two sub-satellites of the SELENE project is sensitive to the motion perpendicular to line of sight unlike conventional range and range rate measurements. Therefore a gravity anomaly map is anticipated to improve significantly at the rim after the SELENE project. Besides, new lunar radar sounder experiment by the SELENE project will reveal internal structure up to a few km beneath the surface. Taking advantages of these new observations, we aim to study fundamental issues about subsurface structures and formation of the multi-ring basins that include recognition and origin of multi-ring system, excavation depth of basin-forming impact, and an extent of ejecta distribution from the basin. These issues are keys to understand physical processes of crater formation, lateral and vertical transport of crustal materials, dichotomy of the Moon, and provenance of Apollo and Luna samples.