

Three-dimensional lunar mare subsurface structures based on the SELENE radar sounding

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In order to discuss the history of the lunar volcanic activity, the lunar geological maps have been produced on the basis of the surface crater age [e.g., Hiesinger et al., 2000], surface composition [e.g., Lucey et al., 2000], and terrain morphology [e.g., Haruyama et al., 2008] of the lava flow units in the mare region [e.g., Hiesinger et al., 2000; Hackwill et al., 2006; Bugiolacchi and Guest, 2008]. These maps lack subsurface information, although the lunar mare subsurface structure was obtained from the radar sounding of the Apollo 17 mission in 1972 and the SELENE (KAGUYA) mission during 2007-2008. Subsurface information provides useful data for discussing the continuity and discontinuity of the geological strata. Thus, we will verify the lunar geological interpretation based on the lunar surface information.

The Lunar Radar Sounder (LRS) onboard the SELENE spacecraft carried out the global exploration of lunar mare subsurface structures by radiating the electromagnetic wave (4-6 MHz) and detecting the reflectors from the surface and subsurface boundary [Ono et al., 2009]. Compared to the LRS data with the preexisting geological maps, previous studies have been discussed the eruption flux of the lava flow [Oshigami et al., 2014] and geological condition (i.e., porosity and density) of the mare region [Ishiyama et al., 2013]. In order to merge the subsurface information into the geological map, we investigated the depth of the subsurface reflectors at the interval of 1 deg. in latitude and $< \sim 2$ deg. in longitude and produced the three-dimensional database of the subsurface structures. In the presentation, we will show three-dimensional mare subsurface structures found in this study.