[EJ] Evening Poster | P (Space and Planetary Sciences) | P-PS Planetary Sciences

[P-PS05]Lunar science and exploration

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Wed. May 23, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)
Scientific data sets acquired by not only Japanese lunar mission SELENE (Kaguya), but also other countries' missions, have become new standard for 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 including SLIM, and theoretical and experimental studies for lunar science.

[PPS05-P11]Characterization of Lunar Surface Environment at APPROACH Landing-site Candidate

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APPROACH (Advanced Penetrator Probe for a Challenge of Hard-landing) is a future lunar science mission which aims to investigate the internal structure of the Moon [1]. In this mission, a penetrator will be deployed on the Moon and observe seismic activities and heat flow. Generally, it is essential for almost all landing-missions to understand the surface environment of their landing-sites for successful touchdown. As for the Moon, recent missions (e.g. KAGUYA and LRO) obtained high-resolution imagery of lunar surface, and these data enabled us to evaluate the surface conditions.

To meet the science objectives of APPROACH [1], we selected a landing-site candidate using LROC Narrow Angle Camera (NAC) data, rock abundance map deduced from Diviner [2][3], Th map [4] and elevation map [5]. After the selection, we counted the boulders at the landing-site candidate to measure rock size-frequency distribution (RSFD).

We also simulated the deployment of a penetrator and estimated the probability of success (i. e. how many penetrators can successfully penetrate into subsurface). In the simulation, about 1 million rocks were randomly located within the error circle of the deployment. The size distribution of the rocks was given based on the RSFD we measured. Them, a penetrator was installed 1000 times. We carried out this operation 100 times and calculated the average and standard deviation of the probability of success. As a result, more than 99 % success was shown through the simulation.

In the presentation, we’ll show how the landing-site candidate was selected and what kind of analyses were demonstrated to evaluate the probability of success.

References
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