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

[P-PS03]Small Bodies in the Solar System: Current Understanding and Future Prospects

convener:Masateru Ishiguro(Department of Physics and Astronomy, Seoul National University), Taishi Nakamoto(Tokyo Institute of Technology), Masahiko Arakawa(神戸大学大学院理学研究科, 共同), Masanao Abe(Institute of Space and Astronautical Science, Japan Aerospace Exploration Agency)
Wed. May 23, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)
In this session, we welcome presentations regarding small bodies in the Solar System from a variety of approaches (i.e., laboratory experiments, observations, explorations, theoretical modeling, and sample analyses). Especially this year, the Hayabusa2 spacecraft is about to rendezvous with its mission target (Ryugu, C-type asteroid), and ready to make remote-sensing observations for acquiring detailed information of the primordial body. Taking account of the situation, we aim to organize our current understanding of these primordial bodies and further discussing future prospects in this research field.

[PPS03-P30]Effect of the surface terrain on the albedo observation by Hayabusa2 LIDAR and its correction

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Keywords:LIDAR, albedo, C-type asteroid, Hayabusa2

The Japanese asteroid explorer ‘Hayabusa2’ will arrive at the near-Earth C-type asteroid ‘Ryugu’ in this summer. In this mission, we have a plan to apply the laser altimeter (LIDAR) on-board Hayabusa2 to investigate the spatial distribution of normal albedo of Ryugu at the laser wavelength (1064nm). The LIDAR instrument for laser ranging has a function to measure the intensities of transmitted and received pulses. The intensity data can be used to estimate the normal albedo of Ryugu.

In this observation, we have to notice deformation of the returned pulse due to the surface topography. Usually, the returned pulse may be elongated in time and/or attenuated depending on inclination and shape of the reflecting surface. Then, measured intensity of the received pulse can vary with deformation of the returned pulse due to the characteristic of the measurement circuit in the LIDAR even if the normal albedo does not change. We have to correct for the effect to derive accurate albedo.

In this study, we have firstly simulated shape of the deformed returned pulse using possible asteroidal terrain model and feature of the transmitted pulse of the LIDAR. Furthermore, we have investigated the response of the receiver including the measurement circuit for the simulated pulses using LIDAR-EM (Engineering Model). In the experiment, the laser transmitter developed in Chiba Institute of Technology was applied to produce the input pulse. In this presentation, we will report the results of the numerical simulation and the experiment. Then, we discuss how we can correct for the effect of the surface terrain on the measured intensity data of the received pulse.

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