

Observation of geometric albedo of the C-type asteroid by the laser altimeter on Hayabusa-2 spacecraft

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The Japanese asteroid explorer 'Hayabusa2' will be launched at end of 2014, and it will probe the near-Earth C-type asteroid '1999JU3'. In this mission, we have a plan to utilize the laser altimeter (LIDAR) to investigate the distribution of geometric albedo of 1999JU3 at laser wavelength (1064 nm). The LIDAR on-board Hayabusa2 has functions to measure the intensities of sending laser pulse and receiving laser pulse reflected from the asteroid surface in addition to measurement of distance between the spacecraft and the asteroid. We can evaluate the geometric albedo of the 1999JU3 using the measured intensities of sending and receiving pulses.

In this presentation, we will indicate results of the performance tests of the LIDAR and expected accuracy of the albedo evaluated from the results of the tests. We will also describe not only effect of characteristic of the LIDAR but also effects of inclination and roughness of the asteroid surface on estimation of the albedo.

In our study, three types of scientific topics using information of the albedo on asteroid surface estimated from the LIDAR data with other equipment data are considered; they are (1) rock and mineral category of 1999JU3, (2) degree of water content on asteroid surface and (3) variation of asteroid surface caused from space weathering and/or exterior material. We will report prospects to obtain information about these science topics applying the LIDAR which has our evaluated performance.

Keywords: Albedo of Asteroid, C-type asteroid, 1999JU3, Hayabusa-2, Laser Altimeter