Disk-Resolved Photometry Analysis of the Asteroid Ryugu Images Obtained by Hayabusa2 Visible Camera ONC

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Since June 2018, the Optical Navigation Camera (ONC) onboard Hayabusa2, has observed the C-type asteroid 162173 Ryugu at a distance below 20 km. ONC-T and ONC-W1 are used for surface imaging operations, and their images allow us to investigate the disk-resolved photometric properties of the surface. A narrow-angle camera ONC-T has 7 broad-band filters ranging in wavelength from 0.39–0.95 μm. ONC-W1 is a wide-angle (> 65˚) pan-chromatic camera mainly used for optical navigation during cruise and low-altitude (< 20km) operations. We are proceeding the analysis of both dataset, ONC-T and ONC-W1.

Since Hayabusa2’s position is nominally fixed on the line connecting Ryugu and the Earth, the available solar phase angle range by ONC-T changes seasonally with the orbits of Earth and Ryugu around the sun. Therefore, we are collecting a large number of ONC-T images over a long period of time to cover a wide phase angle range.

ONC-W1 data has a strong point that it covers a wide phase angle range within a single frame during the descent operations, because of its wide field of view. One of our current challenges is deriving a precise viewing geometries (incidence angle, emission angle, and phase angle) at each pixel. Additionally, comparison of the absolute brightness value (radiance factor) with ONC-T is an ongoing issue.

Keywords: Asteroid, Photometry, Ryugu, Hayabusa2

