

Exploring the origin of Earth's water by the Hayabusa-2 near-infrared spectrometer

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NIRS3, the near-infrared spectrometer onboard the Hayabusa-2 spacecraft, is a remote-sensing instrument to obtain the reflectance spectra including 3- μm absorption features due to structural OH ions and H₂O molecules. In 2018-2019, we are planning to perform proximity observations of a near-Earth C-type asteroid 1999JU3 using NIRS3 and to reveal the distribution of hydrated minerals on the asteroid surface. Recently, the results indicating the presence of internal water ice for C-type asteroids were reported from ground-based observations. Hence, there is a possibility that the contribution of C-type asteroids to formation of Earth's ocean becomes larger than that predicted so far. It is required to understand the behavior of water in the aqueous alteration to verify the internal water ice. Thus, NIRS3 aims at obtaining information about the aqueous alteration discerning the secondary alteration effects such as thermal dehydration and space weathering from observations of the crater formed by the artificial impact experiment. In this presentation, we introduce the expected outcome of NIRS3 based on the current knowledge of C-type asteroids.

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