

Minor body exploration in the post-Hayabusa era

H. Yano (1), M. Abe (1), A. Fujiwara (1), T. Iwata (1), J. Kawaguchi (1), Y. Kawakatsu (1), O. Mori (1), S. Tanaka (1), M. Yoshikawa (1), T. Yoshimitsu (1), H. Demura (2), H. Miyamoto (3), T. Noguchi (4), Y. Takagi (5) and the JAXA/ISAS Minor Body Exploration Working Group

(1) Institute of Space and Astronautical Science/ Japan Aerospace Exploration Agency, Japan, (2) University of Aizu, Japan, (3) University of Tokyo, Japan, (4) Ibaraki University, Japan, (5) Toho Gakuen University, Japan (yano@isas.jaxa.jp / Fax:+81-42-759-8457 / Phone: +81-42-759-8197)

After successful rendezvous observation and landing for surface sampling from the near Earth asteroid (25148) Itokawa by the Hayabusa (MUSES-C) mission, Japan is preparing for follow-up minor body missions in the post-Hayabusa era.

According to Japan's minor body exploration roadmap as well as on-going discussion within the JAXA/ISAS Minor Body Exploration Working Group, which is consisted of planetary scientists and astronautical engineers from all over Japan, the most recommended candidate at this point is a sample return mission from known spectra NEOs with a C-type asteroid as the top priority target after Hayabusa's sample return from the S-type Itokawa in 2010. By best utilizing space technologies Hayabusa successfully demonstrated and upgrading lessons learned from the Hayabusa operation in the interplanetary space and in the vicinity of the asteroid, the next minor body mission will be more scientifically demanding but less technologically challenging than Hayabusa.

New challenges include touch-and-go sampling for preserving depth profile and hydrated minerals and organic compounds underground. Also determining and characterizing sampling sites by both spacecraft remote sensing and micro rovers carrying the surface science package become more important for gaining scientific values of returned samples.

Once we have actual samples from known S-type and C-type asteroids in ground laboratories in the next decade, we should be able to bridge taxonomy of asteroids by spectral observation and meteoritic classifications in the two most major primitive categories of asteroids. Then we should be able to reconstruct a large picture of the composition map of the inner solar system, together with other missions including fast fly-bys of other major taxonomic types like M-type and D-type asteroids. Such endeavors welcome international coordination among the minor body science community in a similar scheme of the successful International Halley Watch in 1980's.