Geophysical Research Abstracts, Vol. 9, 05455, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-05455

Results on asteroid Itokawa from the Hayabusha mission

M. Yoshikawa, A. Fujiwara, J. Kawaguchi, Hayabusa mission & science team

Japan Aerospace Exploration Agency, Institute of Space and Astronautical Science, 3-1-1 Yoshinodai, Sagamihara, Kanagawa 229-8510, JAPAN, (makoto@isas.jaxa.jp, TEL&FAX:+81-42-759-8341)

The Hayabusa spacecraft, which was launched on 9 May 2003, arrived at Asteroid Itokawa on 12 September 2005. The size of Itokawa is about 540 m in length, so it is the smallest celestial object that manmade spacecraft has ever visited. The view of Itokawa was totally unexpected. The surface of Itokawa is covered with numerous boulders and at a glance we could see only a few craters on it.

Hayabusa carried out scientific observations of Itokawa in detail for about two months. The surface of Itokawa is basically divided into two parts, smooth terrain and rough terrain, and we found many geographical and geological features with the resolution of less than 1 cm at the most. Also we found that the surface material of Itokawa is similar to LL-chondrite of ordinary chondrite. The mass of Itokawa was estimated by the orbit analysis of Hayabusa and the bulk density was calculated as 1.9 g per cubic centimeter. This low density indicates the macroporosity of about 40%. From these results, we concluded that Itokawa was a rubble-pile asteroid and the evolution scenario of Itokawa was also studied.

Itokawa is a common small S-type asteroid, and we have known many features of Itokawa by the observations of Hayabusa. Hayabusa is now on the way to go back to the earth and it will come to the earth in June 2010. We hope that some materials from the surface of Itokawa were captured in the capsule of Hayabusa. We are now planning the post-Hayabusa mission, which will be a sample return mission form a C-type asteroid. If we can carry out this new mission, then we will know much more information about asteroids.