Origin of a biggest boulder on asteroid Itokawa

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Close-up views of the asteroid 25143 Itokawa obtained as the HAYABUSA spacecraft approached the asteroids showed the presence of an enormous flat and huge boulder. Named 'Yoshino-dai', after tableland as well as the address of ISAS which developed Hayabusa, both the onboard Asteroid Multi-band Imaging Camera (AMICA) and the Laser Range Finder (LIDAR) show that this rock rises $\sim$ 17 m above the surface and is 22 by 50 m in width. Yoshinodai is one of many that are strewn all over the surface of Itokawa.

A large porosity of 39 % in Itokawa, a bulk density is 1.95 g/cm^3, strongly suggests a rubble pile structure for Itokawa. Our estimated GM value, calculated by LIDAR raging data, leads to a gravitational magnitude of 7 x 10^{-5} m/s^2 at the location of Yoshinodai area which corresponds to an escape velocity of $\sim$15 cm/s.

The NIRS (Near-Infrared Spectrometer), AMICA and the LIDAR sensors onboard HAYABUSA have obtained top and side view of Yoshinodai. Comparison with these NIR spectra, VIS color images, fine structure of Yoshinodai and gravitational information could provide a key of the origin and evolution of Yoshinodai from the compositional and dynamical point of view.