

Surface morphology of the asteroid Itokawa: survey for impact structure

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Craters on the asteroid 25143 Itokawa were surveyed with images taken by the HAYABUSA spacecraft. Circular depressions, circular features with flat floors or convex floors, and circular features with smooth and flat surfaces were identified as crater candidates. About 40 crater candidates are identified through the survey. Their morphologies show a wide variation, including a saddle-shaped floor plan, lack of uplifting rim, both rough and smooth floor, exposure of un-weathered materials and lineaments. The depth-diameter ratios of fresh crater candidates are 0.09, very small as compared with other asteroids. Contributing causes probably include lack of uplifted rims and Itokawa's peculiar mechanical properties against impacts. Both factors must be the boulder rich surface and rubble-pile interior of Itokawa. The average depth of boulder layer inferred from the crater morphology is about 5 m.