

## Bright dots on the surface of Itokawa observed in high resolution images

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More than 1,500 images of Itokawa obtained by Hayabusa mission include ~10 high-resolution images, whose resolutions are about 6~22mm/pixel. Numerous boulders found in these high-resolution images show morphological characteristics. Among the most enigmatic features are high-albedo spots accompanied by some of these boulders. Those features include the high-brightness dots and scratch-like shapes, where we call the bright dots in this study. Several hypotheses are proposed for the formation of a bright dot, such as a micrometeoroid impact, a scratch due to the frictions of rocks, and a concentration of chemically different components.

As a first step to understand the origin of the bright dots, we study their special distributions in close-up images. We identify 394 bright dots in all of the close-up images, whose resolutions are lower than 22mm/pixel. During this process, we note that there might be several types of bright dots, thus, based simply on their appearances, we classify the bright dots into the following five groups; (A) a circular high-albedo dot with sharp boundary, (B) a cluster of high-albedo dots, (C) a circular high-albedo dot with somehow obscured margin, (D) a bright feature with an elongated shape, and (E) a cluster of bright dots seemed to be overlapping each other.

We found that the distribution of bright dots in each group is not uniform, which might be useful to understand their formational origin. The higher resolution images generally have larger numbers of bright dots, which indicates that there might be many bright dots below the resolution limit. This is specifically true only for groups A and C. However, interestingly, there is no correlation between the image resolutions and the numbers of bright dots of the group D and E. We also note that the distributions of bright dots depend on the surface morphologies of boulders. For example, boulders with somehow wavy surface structures, which are found in only two close-up images, show numerous bright dots of the group B. These may indicate that there are different episodes of the formations of bright dots.