

Solar system science by the Subaru Hyper Suprime-Cam survey

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Hyper Suprime-Cam (HSC) survey has been started as a Subaru Strategic Program from March 2014, which has planned to survey about 1500 square degree on the sky. This is the first large field survey using Subaru telescope. Owing to a large aperture of Subaru telescope, it is expected to detect the small solar system bodies with the magnitude range of $r' = 22-27$ mag. It is definitely deepest survey for the small solar system bodies and absolutely an excellent opportunity to determine the faint end of the size distribution of each small solar system bodies group.

This kind of observations that determine the faint end size distribution of small solar system bodies has been done by the Suprime-Cam, which is also mounted on the Subaru Telescope. However, the survey area was narrow (about <10 square degrees), it has been required to increase the determination accuracy of the size distribution with more samples.

Since the HSC survey can detect one order large samples than all of the survey done by Suprime-Cam so far, the size distribution of each main belt region (inner (mostly S-type asteroids) / center (S / C types) / outer (mostly C-types)) can be determined. From that information, we are able to reveal a relationship between the collisional evolution and asteroid's composition, therefore, aims to reveal the composition and internal structure of a whole asteroid belt. Another important expectation is the finding of main belt comet candidates by using the point spread function of object image, which is important bodies in order to clarify the water distribution in the main belt.

Some of the main belt objects are known to evolve into near Earth objects (NEOs), they might supply a significant amount of water to the Earth. Therefore, the observational results collected by the HSC survey, which is the material composition/distribution of the entire main belt, together with the theoretical studies on planetary migration and the orbital evolution of small bodies, will supply an important clue to reveal aspects of substance transportation into the Earth.

In the HSC survey, we can also detect enough samples of Jupiter trojans and TNOs. Therefore we have a plan to investigate physical and chemical differences between the L4 and L5 swarms of Trojans and the size distribution difference between the cold / hot population of TNOs.

In my presentation, I also introduce results that has done by the Suprime-Cam so far and describe what we can do more science in the HSC survey.

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