The thermal properties structure of Iokawa's surface presumed from the ground based observation(2)

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The space craft HAYABUSA succeeded in taking some pictures of (25143)Itokawa in excellent resolution. The purpose of this study is to presume the surface thermal property from the value acquired in the ground based observation and the pictures taken by HAYABUSA.

The thermal inertia of regolith, which is commonly considered to be covered by the solid planets, is about 100 IU (IU=J/m^2/s^0.5/K) , on the other hand, the value of rocks is about 3000 IU. The hermal inertia of Itokawa from the ground observation was estimated to be about 1000 IU, which is in between both materials (Muler et al.,2005). In order to interpret this value, we assumed two-layer model, which is uniformly covered with a thin regolith layer on the base rock. If the thickness of the regolith layer was assumed to be about 1mm, we could show that the value of thermal inertia was consistent with that of the observation (Saito et al. ,2005). However, the surface pictures of the Itokawa revealed the inhomogeneous structure which consists of the mixture of the regolith and boulders. Another modeling must be constructed to be satisfied with both the observation data.

In this study, we calculated bulk moment inertia when we presumed two different material were revealed on the surface. We also assumed that the bulk surface temperature was changed proportional to the ratio of area between the regolith and the rocks.

As a result, we concluded that the surface ratio of rocks and the regolith was 1 to 3 so as to be satisfied with the observation data. The ratio speculated in this study is also consistent with the result estimated from the photographs of the Itokawa.