AOGS 2006

Eros and Itokawa: Two of a Kind, or No?

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The Near Earth Asteroid Rendezvous (NEAR) mission visited one of the largest NEAs, the typical S-asteroid 433 Eros. NEAR showed that Eros is undifferentiated and primitive, but could not definitely relate Eros material to any known meteorite type. NEAR also showed that Eros is not a strengthless rubble pile, but a heavily fractured collisional shard. NEAR yielded some surprises – giant craters on Mathilde and Eros, erasure of small craters and ponds on Eros – and these have revealed new aspects of asteroid evolution. But NEAR has left important questions still to be answered, notably, are the most common asteroids (S-types) related to the most common meteorites (ordinary chondrites), and if so, how? We may hope to answer this question because another mission has been sent to study an S-type asteroid, but this time to return samples from it to Earth. This is the Japanese MUSES-C mission, which arrived at the small NEA 25143 Itokawa in June, 2005. Itokawa, another S-type asteroid with a spectrum similar to that of Eros, nevertheless appears to be a fundamentally different type of object. I will present a NEAR update and discuss initial results from Itokawa in the light of what was learned from NEAR at Eros.