

EGU PS4.1 Comets, Asteroids, and Dust

Paradigms and Paradoxes: Dawn at Vesta

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While confirming the popular paradigm of Vesta as the parent body of the HED meteorites, Dawn measurements have discovered many unexpected aspects of the vestan surface. First, an olivine layer was not found in the bottom of the large basin near the south pole of Vesta. In fact, while patches of olivine have been found in the north, it is rare on the surface. Secondly, while Vesta has little gravity and appears to have completely differentiated, it is not completely dry evidence for transient flows and pits resulting from devolatilization have been found, implying a substantial amount of accessible water. Thirdly, transport of material to the surface of Vesta from elsewhere in the asteroid belt appears as dark material buried near the top of the crust to Vesta. This may have arrived in a single large impact and been spread around the surface and buried, later to be re-excavated. However, it is not certain that this is the only scenario possible for the source of this material. In short, Dawn's observations of Vesta have been both reassuring but unsettling at the same time.