Geophysical Research Abstracts
Vol. 15, EGU2013-1819-3, 2013
EGU General Assembly 2013

Vesta in the Light of Dawn

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Dawn completed its observation of Vesta in September 2012, after nearly 14 months in orbit. What Dawn discovered ranged from the anticipated to the totally unexpected. Vesta is an intact, almost complete, basaltic protoplanet, with the properties inferred from the study of the HED meteorites. It has a pyroxene crust consisting of an outer eucritic component and an inner diogenitic layer overlying an olivine mantle. The fact that the eucritic crust is still quite extensive places important limits on the formation of Jupiter and its role in the evolution of the main belt. The crust in the southern hemisphere has been strongly excavated by the two events that formed the Veneneia and Rheasilvia basins. Most of the northern crust is older than the southern basins and the cratering record is still in production down to about 2 km crater size on $\sim$3.8 Ga old surfaces. The cratering record is consistent with some of the models of the evolution of the asteroid belt and planetary migration theory and puts important constraints on the history evolution of the solar system. Vesta has a 100 km radius iron core and this may have aided Vesta's survival through its heavy bombardment early in its history. The biggest surprises have come from a detailed high-resolution study of the surface: the discovery of pits as opposed to craters; the different styles of gully formation; and discovery of odd crater morphologies.