

Title: The Preliminary Investigation of Impact Craters on Asteroid (4) Vesta

Author: Michael Zeilinhofer

Abstract: Images from the Dawn spacecraft revealed that (4) Vesta has a heavily cratered and fractured surface. Analyzing these crater's morphological and morphometric characteristics can provide insight into the target properties of Vesta. A preliminary dataset consisting of craters found in the south polar region has been developed. These craters have crater diameters (D) ≥ 0.5 km and have been recorded over all longitudes at Vesta's south pole. This initial investigation is part of a larger study to analyze the craters over the entire surface of Vesta to help understand its target properties and compare these data with those observed for dwarf planet Ceres which was also imaged by the Dawn spacecraft. To understand the target properties of Vesta, various interior morphologies were classified such as central peaks and central pits. A range of data were collected for these impact craters consisting of the center latitude and longitude, crater diameter (km), crater preservation state (with a scale similar to the dataset for Ceres), ejecta morphologies, central peak diameter (km) and height (km), central pit diameter (km) and depth (km), if applicable, and crater depth and crater rim height (km) utilizing both topography models. Upon initial analysis, craters at the south polar region of Vesta have a range of preservation states and relatively smaller diameters (<10.0 km) than what is observed across the surface of Vesta. Further investigation into all craters across the surface is still ongoing.