THE HELIOCENTRIC AND SIZE DISTRIBUTIONS OF V-TYPES. T. H. Burbine, Department of Astronomy, Mount Holyoke College, South Hadley, MA 01075, USA (tburbine@mtholyoke.edu).

Introduction: Asteroid (4) Vesta has long been known to be spectrally similar [1,2] to the HED (howardite, eucrite, diogenite) meteorites. Both Vesta and HEDs have very distinctive 1 and 2 μm bands due to pyroxene. Asteroids with these spectral features are classified as V-types [3,4]. HEDs originated on parent bodies with basaltic surfaces that underwent igneous differentiation [5].

Vesta is also a member of the Vesta family, which contains over 16,000 known members [6]. Binzel and Xu [7] identified a number of objects with V-type visible spectra in the Vesta family and between Vesta and the 3:1 and ν_6 meteorite-supplying resonances. Near-infrared spectra of these objects [e.g.,8,9] confirm their spectral similarity to HEDs.

Vesta is located in the inner belt at ~2.36 AU. V-types have also been identified past the 3:1 resonance (~2.5 AU) and many appear dynamically difficult to originate from Vesta. The first of these objects to be identified was (1459) Magnya [10] at ~3.15 AU. HEDs with anomalous oxygen isotopes [11] also imply the formation of more than one Vesta-like differentiated body in the solar system.

This study will analyze the heliocentric (Figure 1) and size (Figure 2) distributions of V-types. These V-types have been identified using visible and/or near-infrared spectra [e.g.,7,12,13] and visible colors obtained by the Sloan Digital Sky Survey (SDSS) [14,15]. However, most of the ~3,000 identified SDSS V-types have not had their classifications confirmed with visible and/or near-infrared spectra

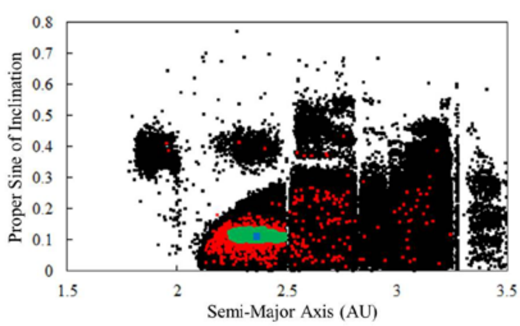

Figure 1. Plot of semi-major axis (AU) versus proper sine of inclination of ~300,000 main-belt asteroids (black points). Asteroid (4) Vesta is the blue point, the green area is the Vesta family region, and the red points are identified V-types (excluding Vesta).

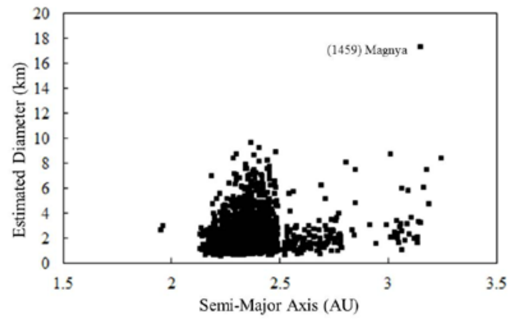

Figure 2. Estimated diameters (km) of V-types (excluding Vesta) versus semi-major axis (AU).

Results: As previously known, V-types can be found throughout the belt (Figure 1). These V-types are located dynamically near Vesta and also dynamically far from Vesta. Interestingly, except for Vesta (~525 km) [16] and Magnya (diameter of ~17 km) [17], the estimated diameters for known V-types are ~10 km or less [18] (Figure 2).

Conclusions: This ~10 km upper limit in diameter for V-types seems to imply that the original basaltic crusts of Vesta-like bodies, except for Magnya's original parent body, had similar thicknesses. More research needs to be done to determine what is physically controlling this upper limit in size.

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