

NEOWISE: The Distribution of the Large Primitive Asteroids. T. Grav¹, A. Mainzer², J. M. Bauer², J. R. Masiero², C. R. Nugent², R. Stevenson² and S. Sonnett², ¹Planetary Science Institute (1700 E. Fort Lowell, Suite 106, Tucson, AZ 85719-2395, tgrav@psi.edu), ²Jet Propulsion Laboratory, California Institute of Technology.

Introduction: WISE is a NASA Medium-class Explorer mission that surveyed the entire sky in four infrared wavelengths, 3.4, 4.6, 12 and 22 microns (denoted W1, W2, W3 and W4, respectively) [1,2]. The solar-system-specific portion of the WISE project, known as NEOWISE, collected observations of more than 158,000 asteroids, including near-Earth objects, main belt asteroids, comets, Hildas, Jovian Trojans, Centaurs and scattered disk objects [3].

The method used for data extraction and thermal modeling has been extensively detailed in [3-6]. The resulting physical properties have been reported in a series of papers [3-13].

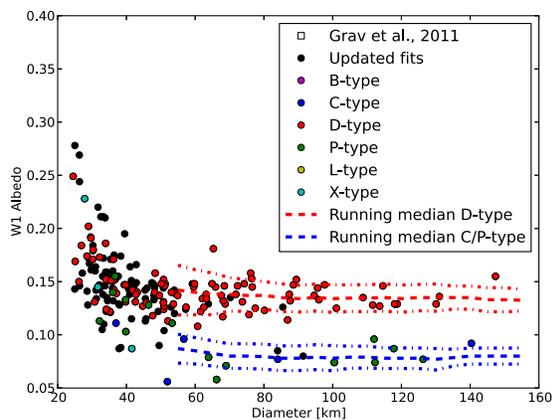


Figure 1. Diameter vs W1 band albedo for the thermal fits of the observed Jupiter Trojan population. A distinct separation between the red-sloped D-types and the flatter or blue-sloped C-/P-types is apparent among the objects larger than ~50km (the part of the sample believed to be complete with W1 observations).

Taxonomic Classification: In [6] and [9] we showed that the visible albedo in the V band and the near-infrared albedo in the W1 and W2 bands can be used to taxonomically classify a significant number of the largest members of the Hilda and Jovian Trojan populations (see Figure 1).

This allows for the study of the distribution of primitive asteroids in the region between the main belt and the giant planets of the Solar System, down to sizes where the populations are completely sampled. Figure 2 shows that for the Hilda population, the C-/P-

types dominate the larger sizes, but as smaller sizes are included the D-types become the more numerous. For the Jovian Trojan population the D-types are slightly more numerous at the largest sizes, and become more dominant at smaller sizes [6]. Neither of the two populations have any significant number of potential interlopers among the objects studied.

Current & Future Research: We have now extended the study to include thermal fits and taxonomic classification of the Cybele asteroids, the irregular satellites of Jupiter and Saturn, and the Centaur population [13] and will present the results of this work. The distribution of the primitive asteroids in the different populations from the outer main belt outwards to the region of the giant planets is key in understanding and tests current theories of the on the formation and evolution of the giant planets in our early solar system.

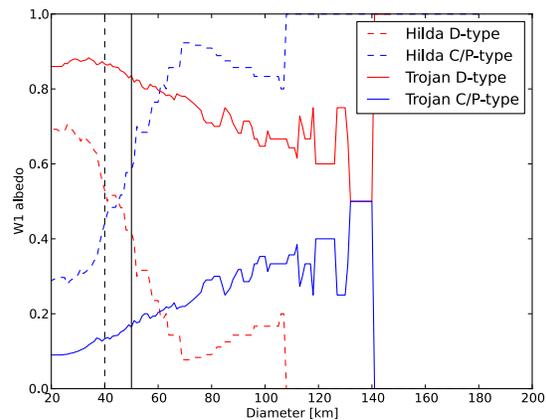


Figure 2. Fraction of C/P-types vs. D-types for objects larger than a diameter for both the Hilda and Jovian Trojan populations. The dashed and solid vertical lines show the diameter for which the taxonomic classification of the Hilda and Jovian Trojan populations, respectively, are thought to be complete. Below these sizes the populations may be influenced by observational biases.

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