ABSOLUTE MAGNITUDES OF ASTEROIDS AND A REVISION OF ASTEROID ALBEDO ESTIMATES FROM WISE THERMAL OBSERVATIONS. P. Pravec[1], A. W. Harris[2], P. Kušnirák[1], A. Galád[1,3], K. Hornoch[1], [1]Astronomical Institute AS CR, Fričova 1, CZ-25165 Ondřejov, Czech Republic, ppravec@asu.cas.cz, [2]MoreData! Inc., 4603 Orange Knoll Ave., La Cañada, CA 91011, USA, [3]Modra Observatory, FMFI UK, SK-84248, Slovakia.

Introduction: Asteroid diameters and albedos are most often estimated from modeling of thermal observations combined with visual absolute magnitudes (H). The most productive recent thermal infrared survey, the *Wide-field Infrared Survey Explorer (WISE)*, provided diameter and albedo estimates for more than 10^5 asteroids [1, 2, 3]. They used absolute magnitudes from the Minor Planet Center (MPC) orbit catalog (H_{MPC}). Most H_{MPC} values were derived from magnitude estimates reported by visual asteroid surveys and follow-up observers with their astrometric observations. Given the principal importance of asteroid H data for the estimation of their diameters and albedos, we investigated an accuracy and biases of the catalog H_{MPC} values by comparing them with our accurate absolute magnitude estimates.

Data: Our sample consists of absolute magnitude estimates that we derived from our photometric observations of 583 main-belt and near-Earth asteroids that we made from Ondřejov Observatory and Table Mountain Observatory from 1978 to 2011. Uncertainties of our H estimates are < 0.21 mag, with the median value of 0.09 mag.

Results on H_{MPC} values: We found that while the H_{MPC} values for large asteroids are relatively good on average, showing only little bias < 0.1 mag, there is a systematic offset of the H_{MPC} values for smaller asteroids that becomes prominent in a range of H > ~10 and is particularly big above H ~ 12. The mean (H_{MPC} - H) is negative, i.e., the H_{MPC} values are systematically too bright. This systematic negative offset of the H_{MPC} values reaches a maximum around H = 14 where the mean (H_{MPC} - H) is -0.4 to -0.5. See Fig. 1.

Revision of *WISE* albedos: With our photometric H and G data and using the method by [4], we revised the preliminary *WISE* albedo and diameter estimates [1, 3] for asteroids in our sample. The revised data are plotted in Fig. 2.

We found that the mean visual geometric albedo of Tholen/Bus/DeMeo C/G/B/F/P/D types with sizes of 25-300 km is p_V = 0.057 with the standard deviation (dispersion) of the sample of 0.013 and the mean albedo of S/A/L types with sizes 0.6 to 200 km is 0.197 with the standard deviation of the sample of 0.051. The standard errors of the mean albedos are 0.002 and 0.006, respectively; systematic observational or modeling errors can predominate over the quoted formal errors.

There is apparent only a small, marginally significant difference of 0.031 ± 0.011 between the mean albedos of sub-samples of large and small (divided at diameter 25 km) S/A/L asteroids. The apparent small difference will have to be confirmed and explained; we speculate that it may be either a real size dependence of surface properties of the differentiated asteroid types or due to small size-dependent systematic effects in their observations or thermal models. The apparent trend of mean albedo increasing with decreasing asteroid size below D ~ 30 km, seen in preliminary WISE results [2], appears to be due to the systematic bias in the MPC absolute magnitudes used in that analysis.

References: [1] Masiero J., et al. (2011) *Astrophys. J.*, 741, 68-89. [2] Mainzer A., et al. (2011). *Astrophys. J.*, 741, 90-114. [3] Mainzer A., et al. (2011). *Astrophys. J.*, 743, 156-172. [4] Harris A. W. and Harris A. W. (1997) *Icarus* 126, 450-454.

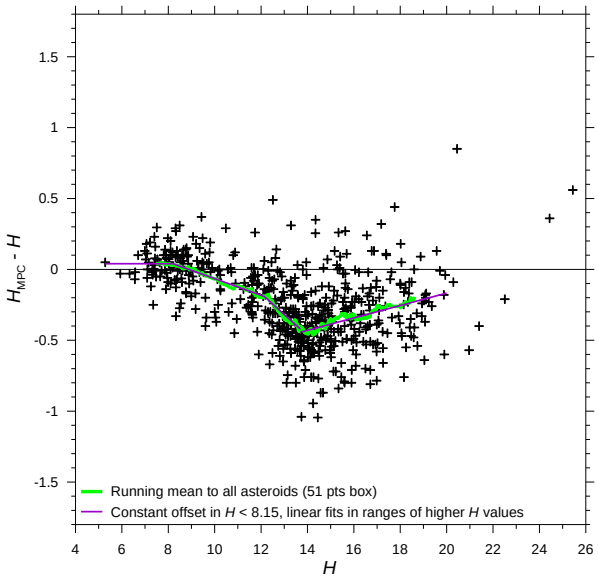

Figure 1. Differences between the MPC catalog values and our absolute magnitude estimates.

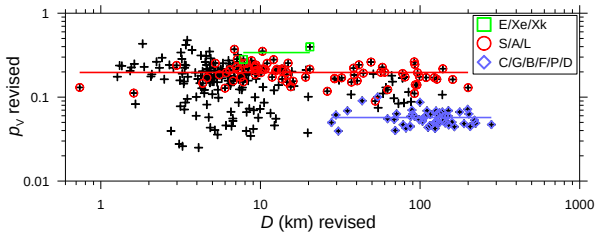

Figure 2. The *WISE* albedos and diameters revised with the unbiased absolute magnitudes.