UPPER LIMITS TO MAIN BELT COMET DISTRIBUTIONS USING THE THOUSAND ASTEROID LIGHT CURVE SURVEY.

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Introduction: Beginning in 1996 with observations of 133P/Elst-Pizarro, a new class of objects now known as main belt comets (MBCs) were identified. [1] identified two more of these objects in a targeted R-band survey of approximately 300 objects. Previously, comets were thought to originate from, and reside primarily in, the Oort Cloud and Kuiper belt. The orbits of the MBCs are confined to the main asteroid belt, yet they exhibit dust ejection (in Elst-Pizarro's case, when near perihelion in 1996 and 2002) much like comets [2]. Furthermore, MBCs are dynamically unlikely to have been scattered into stable Main Belt orbits from the Kuiper Belt and that their Tisserand parameters are indicative of asteroids [1].

The Thousand Asteroid Light Curve Surveys (TALCS I & II) conducted with CFHT's MegaCam were designed to observe an untargeted sample of asteroids in order to study their light curves [3]. We present the results of a search for main belt comets (MBCs) in TALCS I & II.

One MBC identification technique was developed by [4]. This algorithm searches for tail activity by examining flux ratios between regions outside and at the targets. Kleyna has shown that MBCs have a unique outer to inner flux ratio relative to field asteroids of roughly the same magnitude, an observation which we use as one diagnostic in distinguishing MBCs from main belt asteroids.

In addition to employing this method, we have designed other algorithms to detect both cometary comae and tails via analyses of stacked TALCS images of each object. No MBC candidates have been identified from the approximately 1850 targets in this survey. We have measured the efficiency of the survey for detecting MBCs and used it to determine 90% confidence upper limits on the number distribution of MBCs in absolute magnitude, semi-major axis, eccentricity, and inclination.

References: [1] Hsieh, H. & Jewitt, D. 2006a, *Science*, 312, 561. [2] Hsieh, H. & Jewitt, D. 2006b, IAU Symposium, 229, 425. [3] Masiero, J. R., Jedicke, R., Pravec, P., Gwun, S., Larsen, J. 2007, DPS, 39.5105M. [4] Kleyna, J., Meech, K., & Jewitt, D. 2007, AAS, 210, 9804K.