IMPACT OF PHOTOMETRIC VARIABILITY ON SPECTRAL INTERPRETATIONS OVER THE SURFACE OF ITOKAWA. D. L. Domingue[1], F. Vilas[2], and Teck Choo[1]. [1]Johns Hopkins University/Applied Physics Laboratory, 11100 Johns Hopkins Road, Laurel MD, 20723 (deborah.domingue@jhuapl.edu; teck.choo@jhuapl.edu), [2]MMT Observatory, P.O. Box 210065, University of Arizona, Tucson AZ, 85721 (fvilas@mmto.org).

Introduction: Domingue and Vilas [1] examined the spectral variations that can be created by changes in viewing geometry (photometric variations) across a crater profile using lunar reflectance properties. The purpose of their study was to examine changes that can occur in such spectral properties as spectral slope, band center, and band depth if photometric corrections have not been applied.

Using a shape model for the asteroid Itokawa [4], we conducted a similar examination of spectral variability due solely to photometric variations. This provides an initial evaluation of the percent of spectral variability across Itokawa's surface that can be ascribed to photometric variability, and may impact interpretations of spectra of Itokawa's surface.

Figure 1. Snapshot of Itokawa shape model from a selected vantage point.

Methodology: We have created viewing software that allows the user to injest an object shape model, select a viewing vantage point (figure 1), and collect viewing angles (incidence, emission, and phase angle) for each plate in the model (figures 2 and 3) as the object rotates (a rotation sampling rate is also selectable). The position of the Sun is fixed, thus the viewing angles are a function of the vantage point and rotation. As vantage points are varied, and a full rotation is sampled, a large viewing angle data base is accumulated.

Broadband UBVRI disk-integrated observations of Itokawa [2,3] were made in 2004. These spectral observations cover a sufficient range of viewing geometry to allow Hapke modeling of the observations [3]. Using the Hapke model parameters, synthetic spectra were created using the viewing angle data base. This is similar to the method used by Domingue and Vilas. Based on the photometry obtained as part of the Hayabusa mission [5], this assumes that the surface properties are uniform over the asteroid, and thus accentuates spectral variations that are solely due to photometry.

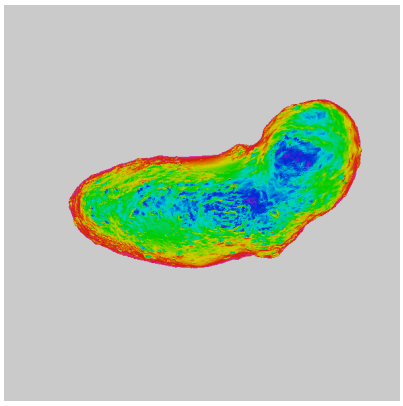

Figure 2. Incidence angles for view shown in Figure 1.

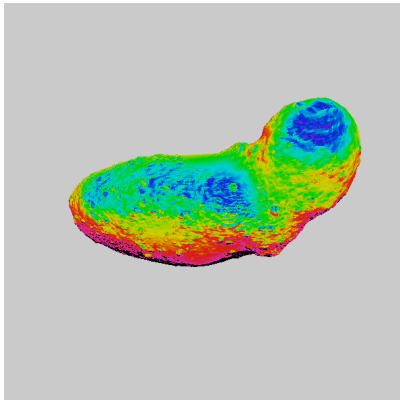

Figure 3. Emission angles for view shown in Figure 1.

References: [1] Domingue, D. L. and Vilas, F. (2007) *Meteoritics & Planet. Sci., 42,* 1801-1816. [2] Thomas-Osip *et al.* (2008) *Earth, Planets, and Space., 60,* 39-48. [3] Lederer et al. (2008) *Earth, Planets, and Space., 60,* 49-59, [4] Gaskell et al. (2006) *AAS Bulletin*, 59.01, 592. [5] Kitazato *et al.* (2008) *Icarus, 194*, 137-145.