

COMPARATIVE ANALYSING COLOR CHARACTERISTICS OF VESTA'S AREAS AND VESTA-LIKE ASTEROIDS. L.F. Golubeva¹, L.O. Hasanova¹, D.I. Shestopalov¹, L. A. McFadden². ¹Shemakha Astrophysical Observatory, Shemakha, Azerbaijan, AZ-3243 (land@azdata.net), ²Department of Astronomy, University of Maryland, College Park, MD 20742-2421 (mcfadden@astro.umd.edu).

With a view to compare the colors of surface features on Vesta with the colors of smaller asteroids with spectral signatures similar to Vesta's (hereafter called vestoids) we used the color – color diagram derived in [1] for regions with measureable topographic relief on Vesta. The same color ratios, that is $R(0.673\mu\text{m})/R(0.953\mu\text{m})$ and $R(0.673\mu\text{m})/R(1.042\mu\text{m})$, were calculated from spectral reflectance of vestoids observed in the visible [2 – 4] and near-infrared ranges [5, 6].

As can be seen from Figure 1, only 6 vestoids from 30 examined fall into the color regime occupied by regions with measureable topographic relief on Vesta. Four of these vestoids belonging to the Vesta dynamical family show colors to be similar to those of a 160 km wide feature (20N, 70W) on Vesta's northern hemisphere (the group of filled triangles on the top of Figure 1). Two more asteroids, a member and non member of the Vesta family, have colors that are similar to those of the large impact-excavated region near Vesta's south pole (filled circles in the middle of Figure 1). As evident from Figure 2 vestoids prefer "to avoid" regions of topographic relief, if they are Vesta family members or not.

The color differences between vestoids and impacted regions of Vesta are probably caused by the differences in surface composition of these asteroids and Vesta itself. Authors [1] noted that colors $R(0.673\mu\text{m})/R(0.953\mu\text{m})$ and $R(0.673\mu\text{m})/R(1.042\mu\text{m})$ correlate with the depth and width, respectively, of the mafic silicate absorption band present in Vesta's spectrum near 1 μm . Since the same band is present in vestoid spectra we can expect that non members of the Vesta family, in accordance with their position in Figure 2, have more calcium-rich pyroxenes and/or higher olivine/pyroxene ratio than the Vesta areas examined.

One might expect the colors of vestoids belonging to the Vesta family to be close to those of the Vesta southern impact basin, from which vestoids are believed to have been ejected. One can assume the differences in the colors of the Vesta family vestoids and Vesta itself are due to the differences in the surface particle sizes and level of optical maturation of the surfaces of these asteroids.

References: [1] Thomas P. C. et al. (1997) *Science*, 277, 1492–1495. [2] Xu Sh. et al. (1995) *Icarus*, 115, 1–35. [3] Bus S.J., Binzel R.P. (2002) *Icarus*, 158, 106–145. [4] Lazzaro D. et al. (2004) *Icarus*, 172, 179–200. [5] Burbine H.T., Binzel R.P. (2002) *Icarus*,

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