CONVEXO-CONCAVE SHAPE OF CELESTIAL BODIES AND NATURAL RESPONSE TO COMPRESSION AND SQUEEZING SUBSIDING HEMISPHERE IN FORM OF BULGING (VESTA, CERES, HYPERION, PLUTO); G. G. Kochemasov, IGEM of Russian Academy of Sciences, 35 Staromonetny, 119017, Moscow, RF, kochem.36@mail.ru

Introduction: The first theorem of the wave planetology [3] states that all cosmic bodies moving in keplerian non-round obits are subjected to warping action by standing waves of different lengths. They appear due to regularly changing accelerations. Among them the fundamental wave 1 is the longest and strongest (most amplitudinal). It deforms bodies in such way that one hemisphere-segment bulge up and the opposite one presses in (look at the Earth's form) – a dichotomous structure develops (Fig. 1). The most recent cosmic experiments (Dawn and New Horizons of NASA) confirm this ubiquitous regularity (Fig. 2, 3, 7, 8, 9). Two most important tectonic consequences follow. The bulging hemispheres of increased planetary radius are intensively "cracked", rifted; the subsiding ones of diminished radius are squeezed, folded that requires squeezing out some extra material (new space in a sphere of smaller radius must hold more voluminous material of previous position). Thus, various uplifts in the subsided hemisphere-segment develop (plateaus, mountains, budges, ridges, volcanoes [2, 3] (Fig. 1). Some impressive examples follow in icy and rocky bodies (Figs. 2-11).

Vestan Reasilvia Basin (obviously tectonic not impact feature) has the central mountain – the highest volcanic peak in the Solar system (Fig. 2). Now being studied by Dawn Ceres shows obvious dichotomy (Fig. 3). Its subsided hemisphere has a wide mountainous elevation in the middle emphasized by a strong negative Bouguer anomaly [1]. Convexo-concave shape is vividly presented in the Hyperion form (Fig. 4-6). And again, a prominent peak develops in the middle of the subsided hemisphere (Fig. 5-6). The southern hemisphere of Pluto, not illuminated by Sun, practically is not studied by images. Still, a belt of black subsided areas of the equatorial zone gradually passes into less black (whitish) terrains in the southern direction (Fig. 8-9) This transition probably marks beginning of elevated areas in the middle. Some hints on this elevation are in the lighter tones amidst black not illuminated terrains of the southern hemisphere (Fig.10-11).

1.

2

Fig. 1. Scheme of convexo-concave shape of cosmic body with a protruding bulge in the subsiding hemisphere. Natural examples in Fig. 2, 5, 6..

Fig. 2. Vesta. View from the southern subsided hemisphere. Enhanced-vesta-south-polar-region

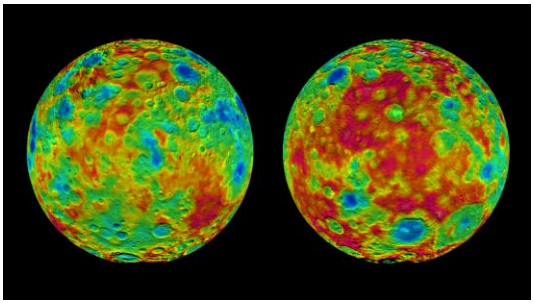
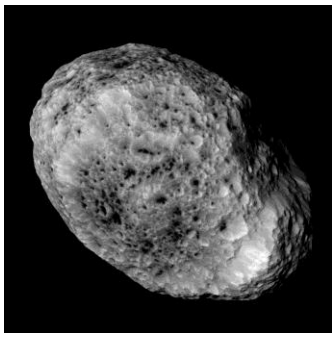


Fig. 3 Ceres-topographic-map, pia19607. Uplifted hemisphere (right) and subsided hemisphere.

4



5

Fig. 4. Hyperion, PIA06645, Convexo-concave shape

Fig. 5. Hyperion, PIA17193, Concave hemisphere with protruding bulge in the middle.

Fig. 6. Hyperion, PIA09728, protruding bulge in depression of the subsided hemisphere

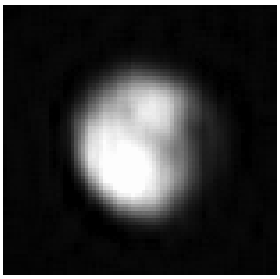


Fig. 7. Pluto, convexo-concave shape 20150609_nh_pluto_charon_4x_20150606_registax-1

Fig. 8. Pluto, 13 June 2015, one month before the closest approach of New Horizons. Bulging northern hemisphere with obvious hint on contraction of the southern half (black segment) with appearing smaller bulge in the middle of it (whitish stripe in the extreme south). .

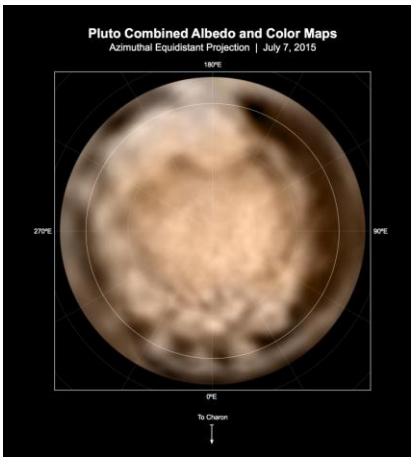


Fig. 9. Pluto, PIA19706, a view from the northern hemisphere

Fig. 10. Pluto, lor_0299231342-0x633_sci_3. View from the southern not illuminated hemisphere. In the middle of the black circle there is slightly lighter irregular area – possibly bulging terrain (Fig. 11). Bright ring – scarce atmosphere

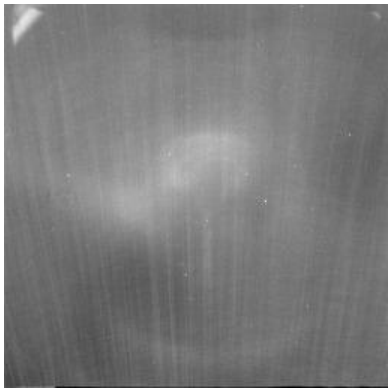


Fig. 11. Pluto, lor_0299233100_0x633_sci_3. A slightly lighter area in the middle of the black not illuminated southern hemisphere.(Fig. 10).

References:

[1] Ermakov A.I., Zuber M.T., Smith D.E. et al. Constraints on Ceres' internal structure from the Dawn shape and gravity data // The sixth Moscow solar system symposium, 5-9 October 2015, Space Research Institute, Moscow, 6MS3-SB-11

[2] Kochemasov G.G. Why four highest volcanoes of the rocky planets adorn their deepest planetary wide depressions: Earth, Mars, Vesta and Moon // NCGT Journal, v. 2, # 4, Dec. 2014, 85-88.

[3] Kochemasov G.G. Principles of the wave planetology manifesting in the Pluto-Charon system, Ceres, and the Moon // The sixth Moscow solar system symposium. 5-9 October 2015, Space Research Institute (IKI), 6MS3-SB-13.