Geophysical Research Abstracts
Vol. 12, EGU2010-4070, 2010
EGU General Assembly 2010

Waiting for 21-Lutetia "Rosetta" images as a final proof of structurizing force of inertia-gravity waves

Gennady G. Kochemasov
IGEM, RAS, Moscow, Russian Federation (kochem.36@mail.ru, +7 095 230-2179)

The 100 km long flattened asteroid 21-Lutetia will be imaged by the “Rosetta’ spacecraft in July 2010. Knowing that heavenly bodies are effectively structurized by warping inertia-gravity waves one might expect that Lutetia will not be an exclusion out of a row of bodies subjected to an action of these waves [1-9]. The elliptical keplerian orbits with periodically changing bodies’ accelerations imply inertia-gravity forces applied to any body notwithstanding its size, mass, density, chemical composition, and physical state. These forces produce inertia-gravity waves having in rotating bodied standing character and four directions of propagation (orthogonal and diagonal). Interfering these waves produce in bodies three (five) kinds of tectonic blocks: uprising strongly and moderately (++, +), subsiding deeply and moderately (–, -), and neutral (0) where + and – are compensated. Lengths and amplitudes of warping waves form the harmonic sequence. The fundamental wave1 (long 2R) makes ubiquitous tectonic dichotomy (two antipodean segments or hemispheres: one risen, another fallen). In small bodies this structurization is expressed in their convexo-concave shape: one hemisphere is bulged, another one pressed in. Bulging hemisphere is extended, pressed in hemisphere contracted. This wave shaping tends to transform a globular body into a tetrahedron – the essentially dichotomous simplest Plato’s figure. In this polyhedron always there is an opposition of extension (a face) to contraction (a vertex). The first overtone wave2 (long R) makes tectonic sectors, also risen and fallen, and regularly disposed on (and in) a globe. This regularity is expressed in an octahedron form. The octahedron (diamond) or its parts are often observed in shapes of small bodies with small gravities. Larger bodies with rather strong gravity tend to smooth polyhedron vertices and edges but a polyhedron structurization is always present inside their globes and is shown in their tectonics, geomorphology and geophysical fields. The shorter warping waves are also present but because of their comparatively small lengths and amplitudes they are not so important in distorting globes. The presented main harmonic row is complicated by superimposed individual waves lengths of which are inversely proportional to orbital frequencies: higher frequency – smaller wave, and, vice versa, lower frequency – larger wave. In the main asteroid belt the fundamental wave of the main sequence and the individual wave (also long 2R) are in the strongest 1:1 resonance what prohibits an accretion of a real planet because of prevailing debris scattering. Thus, the Lutetia shape can support the main point of the wave planetology – «orbits make structures».

[1] Kochemasov G.G. (1999) “Diamond” and “dumb-bells”-like shapes of celestial bodies induced by inertia-gravity waves // 30th Vernadsky-Brown microsymposium on comparative planetology, Abstracts, Moscow, Vernadsky Inst., 49-50. [2] –“- (1999) On convexo-concave shape of small celestial bodies // Asteroids, Comets, Meteors. Cornell Univ., July 26-30, 1999, Abstr. # 24.22. [3] –“- (2006) The wave planetology illustrated – I: dichotomy, sectoring // 44th Vernadsky-Brown microsymposium “Topics in Comparative Planetology”, Oct. 9-11, 2006, Moscow, Vernadsky Inst., Abstr. m44_39, CD-ROM; [4] –“- (2006) Theorems of the wave planetology imprinted in small bodies // Geophys. Res. Abstracts, Vol. 8, EGU06-A-01098, CD-ROM. [5] –“- (2007) Plato’s polyhedra in space // EPSC Abstracts, Vol. 2, EPSC2007-A-00014, 2007. [6] –“-(2007) Wave shaping of small saturnian satellites and wavy granulation of saturnian rings // Geophys. Res. Abstracts, Vol. 9, EGU2007-A-01594, CD-ROM. [7] –“- (2007) Plato’s polyhedra as shapes of small satellites in the outer Solar system // New Concepts in Global Tectonics Newsletter, # 44, 43-45. [8] –“- (2008) Plato’ polyhedra as shapes of small icy satellites // Geophys. Res. Abstracts, Vol. 10, EGU2008-A-01271, CD-ROM. [9] –“- (2008) A wave geometrization of small heavenly bodies // GRA, Vol. 10, EGU2008-A-01275, CD-ROM.