Geophysical Research Abstracts, Vol. 9, 01594, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-01594

Wave shaping of small saturnian satellites and wavy granulation of saturnian rings

G. Kochemasov
IGEM of the Russian Academy of Sciences, Moscow, Russia (kochem@igem.ru)

Before arrival of the Cassini spacecraft at Saturn we have predicted that the wave planetology (a rather new branch of the classical traditional planetology) will gain a strong support to its theorems [1]. After more than two years of very successful performance in orbits around Saturn Cassini presented a wealth of data in support of main statements of the wave planetology. "Orbits make structures". This fundamental statement can be divided in 4 theorems: 1. Celestial bodies are dichotomic; 2. Celestial bodies are sectoral; 3. Celestial bodies are granular; 4. Angular momenta of different level blocks tend to be equal [2 & others]. Keplerian non-round orbits implying periodically changing accelerations lead to inertia-gravity waves warping any celestial body. Having in rotating bodies 4 ortho- and diagonal directions these waves interfere and give risen and fallen blocks size of which depends on the warping wavelengths: segments (2πR-structure), sectors (πR-structure), granules. One rather important and significant scientific conclusion drawn from previous works is that forms and structures induced by planetary waves are better preserved and thus visible in small bodies less than 400-500 km in diameter [3]. The larger bodies with enhanced gravity obliterate typical convexo-concave shapes due to warping action of the fundamental wave and show preferentially spherical shapes. Nevertheless, celestial globes often show dichotomy and sectoring by colors (black & white) as subsided (concave) areas must be filled with somewhat denser, normally darker material than uplifted (convex) areas (Theorem 4). In literature geometrization of cosmic bodies, in particular of Earth, was often discussed but a wave cause of it usually is not mentioned. Signs of cube, octahedron, dodecahedron structures are seen in many occasions but the simplest Platon's figure –tetrahedron is now rarely referred (L. Green, tetrahedron theory). Actually, this 4-faced form represents the fundamental wave warping making dichotomy (2πR-structure): one hemisphere rises and expands, the opposite one falls and contracts. A tetrahedron cut into two pieces amidst any of its 4 axes always gives uneven halves: one with a vertex, another with a face. Three faces narrow, converge at a vertex (contraction) and diverge at a face (expansion). Thus, a tetrahedron is an essence and a symbol of the ubiquitous dichotomy in nature (from an atom to the Universe) [3]. An octahedron is a figure made by the wave 2 – sectoral or πR-structure. A cube is made by the wave 4 – πR/2-structure. Several small saturnian satellites orbiting planet mainly in the vicinity of rings or in the ring gaps show more or less clear convexo-concave shape -2πR-structure. Narrowing at one direction and widening in the opposite one they give in images a triangle outlines. This is especially evident for Telesto (PIA07546), Hyperion (PIA06608). Examples of an octahedron shape give Yanus (PIA08192), Prometheus (PIA07549), Phoebe (190-200-1.jpg). Remind that a classical "diamond" (octahedron) shape has jovian Amalthea (PIA01074) A cubic form has Epimetheus (PIA 07531), a square outline – Helene (PIA07547), less clear but a polyhedron form has Pandora (PIA07530). Of course, not at all angles of approaches these geometric shapes are evident, partly because of superimpositions of shapes caused by different wave modes (the fundamental wave 1- 2πR-structure and its overtones). Ongoing imaging certainly will bring new pictures with the wave woven geometric shapes. Unexpected earlier wave forms in rings now become evident. The radial waving is supplemented by tangential (azimuthal or circumferential) one that produces grainy texture in rings (PIA08836 –the outer B ring) or periodic widening and narrowing of some regions (PIA08241 – the inner A ring). **References:** **[1]** Kochemasov G.G. (2004) Cassini experiment: what gains from new knowledge of the Saturnian system the wave planetology? //35th COSPAR Scientific Assembly, Paris, France, 18-25 July 2004, Abstr. COSPAR-A-00909; **[2]** Kochemasov G. G. (1999) Theorems of wave planetary tectonics // Geophys. Res. Abstr., v.1, #3, 700; **[3]** Kochemasov G.G. (2006) The wave planetology illustrated – I: dichotomy, sectoring // Vernadsky-Brown Microsymposium 44 "Topics in comparative planetology", Oct. 9-11, 2006, Vernadsky Inst., Moscow, Russia, Abstr. M44_39, CD-ROM.