



Wave modulations in the Solar system bodies and their radio emissions

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The wave planetology [1, 2 & others] successfully applied to explain a number of structural peculiarities of planetary surfaces, lithospheres and atmospheres as well as shapes of planetary bodies states that “orbits make structures”. It means that all planetary bodies including asteroids and Sun (aster) moving in non-round (elliptical, parabolic) keplerian orbits are subjected to a warping action of inertia-gravity waves induced in them periodically changing accelerations. These waves having a standing character in closed spheres and 4 directions in rotating bodies interfere to produce structures in planetary spheres. Sizes of these structures depend on warping wavelengths. Thus, the fundamental wave 1 long $2\pi R$ produces ubiquitous tectonic dichotomy – an opposition of uplifted (+) and subsided (-) hemispheres (segments); the first overtone wave 2 long πR gives superimposed on the dichotomy tectonic sectoring; on these basic features are superimposed tectonic granules size of which is inversely proportional to the orbital frequencies. There is a row of planets starting from the solar photosphere arranged by increasing sizes of tectonic granules (a granule size = a half of warping wavelength): the Sun’s photosphere $\pi R/60$, Mercury $\pi R/16$, Venus $\pi R/6$, Earth $\pi R/4$, Mars $\pi R/2$, asteroids $\pi R/1$, Jupiter $3\pi R$, Saturn $7.5\pi R$, Uranus $21\pi R$, Neptune $41\pi R$, Pluto $62\pi R$. A difference between the inner and outer planets is in what that the first are warped by wavelengths shorter than their dimensions and the second by waves longer than their dimensions. Asteroids are amidst with the warping wave equal to the great circle. These heavenly bodies have only one orbit each in the Solar system. But numerous satellites have two orbits: one around their planets and another around Sun. This means that satellites of the inner planets have two populations of tectonic granules (“craters”) on their surfaces. But satellites of the outer

planets also are lavishly peppered by granules (impact craters make a part of them). Where they are from? Along with the main orbital frequencies around their planets and circumsolar frequencies (too low to make visible granules) waves and forming at their intersections granules appear due to wave modulations. In full accordance with the wave theory the lower frequency modulates the higher one with production of side frequencies at both sides of the latter. Corresponding to them tectonic granules also are formed. This modulation process was repeatedly described and applied to the Moon, satellites of Saturn, the saturnian atmosphere. But the solar system is not entirely isolated. It belongs to Galaxy and moves in it with a certain frequency, say, about 1/200 000 000 years. Orbiting frequencies of all celestial bodies in the Solar system –from 1/8 hours for Phobos to 1/248 years for Pluto – are high comparative to the Solar system orbiting in Galaxy. Dividing all possible orbiting frequencies of the Solar system bodies by the Galactic frequency one comes to a range of side frequencies from microwaves to kilometer waves. This conclusion is a very significant one because it is well known that all bodies of the Solar system are a source of often enigmatic radiowaves. Some calculations are below. A granule size is a half of a wavelength. A scale is the Earth's orbiting frequency 1/1 year and corresponding granule size $\pi R/4$.

Jupiter: (12 y. : 200 000 000 y.) $\pi R = (12 : 200 000 000) 3.14 \cdot 71400 \text{ km} = 13.4 \text{ m}$ tectonic granule or 26.8 m wavelength. Varying orbital frequencies and bodies' radii one comes to the following wavelengths. Jupiter 26.8m, Saturn 56.4m, Uranus 67m, Neptune 124m, Pluto 10.9m, Sun 1.46m, Triton 11.4m (for the circumsolar frequency), 1.84mm (circumneptunian fr.), Amalthea 4.88cm (circumsolar fr.), 0.0028mm (circumjovian fr.), the Moon 5.46 cm (circumsolar fr.), 0.46cm (circumterrestrial fr.) [3 & others]. It is interesting that an enigmatic extra heat emission of Amalthea and its pronounced red color could relate to these calculated microwave and infrared emissions. **References:** [1] Kochemasov G.G. Tectonic dichotomy, sectoring and granulation of Earth and other celestial bodies // Proceedings of the International Symposium on New Concepts in Global Tectonics, "NCGT-98 TSUKUBA", Geological Survey of Japan, Tsukuba, Nov 20-23, 1998, p. 144-147. [2] Kochemasov G.G. Theorems of wave planetary tectonics // Geophys. Res. Abstr.1999. V.1, ž3, p.700. [3] Kochemasov G.G. The Moon: radio emission and tectonic dichotomy as two related features caused by planetary wave processes // In Heather D.J. (ed.) New Views of the Moon, Europe: Future Lunar Explorations, Science Objectives, and Integration of Datasets. Sept.17-19, 2001, ESTEC RSSD, Noordwijk., DLR, Berlin.