

ANOMALOUS PARTS ON THE LUNAR CRATER SIZE – FREQUENCY CURVE, THEIR PREDICTION AND COMPARISON OF THE LUNAR AND SOLAR DISCS GRANULATION PATTERNS

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Knowing that “orbits make structures” through warping action of inertia-gravity waves arising in celestial bodies due to their movements in non-round elliptical orbits, one can use as a scale this sequence of planets with corresponding to their orbital frequencies sizes of tectonic granulation (higher frequency – finer granulation): Sun’s photosphere $\pi R/60$, Mercury $\pi R/16$, Venus $\pi R/6$, Earth $\pi R/4$, Mars $\pi R/2$, asteroids $\pi R/1$ (R -a body radius). But the planets have only one orbit in the Solar system. Not like them, satellites have 2 orbits. This increases a number of tectonic granule sizes to at least 4 as one have to consider 2 main frequencies (around planet and Sun) and 2 modulated side frequencies (division and multiplication of the higher frequency by the lower one). The best studied satellite in the Solar system is the Moon with its perfectly elaborated the crater size-frequency curve (it was presumed that all considered craters on its surface are of an impact origin). But numerous images of the Moon acquired by cosmic missions show that this curve is not a simple one as it comprises many craters of non-impact, for example, of wave interference induced origin. This is proved by calculating sizes of craters corresponding to main and side modulated orbital frequencies and plotting them on the classic crater size-frequency curve. It appears that this curve has anomalously high number of craters exactly at ranges calculated by the wave approach, namely, at 80-140 and more than 600 km in diameter (corresponding to the main orbital frequencies) and 10-30 and 300-400 km in diameter (corresponding to the modulated side frequencies). The main frequencies are 1/1year around Sun and 1/1 month around Earth, producing sizes $\pi R/4$ and $\pi R/60$; side frequencies give sizes $\pi R/240$ and $\pi R/15$. So, a further progress in lunar studies desired by the new lunar exploration initiatives can be achieved only if scientists admit that crater peppering the Moon is not a simple impact process but that a significant part of rings (craters) is of a wave origin. This necessity is backed by the ongoing exploration of “Cassini” in the Saturnian system where numerous icy satellites surely are warped by visible waves producing at intersections chains of craters and moulds with predictable (considering orbital frequencies) sizes. Two bodies in the solar system have equal orbital frequencies: the Sun’s photosphere around the center of the system and the Moon around Earth. Equal frequencies – equal granulations. Comparing lunar (gravity) and solar

(supergranulation of the photosphere) discs reduced to the same size one reveals that their granulations are really similar [1]. To check this established correspondence we found another pair in the Solar system with equal orbital frequencies. This is Earth (1/1 y.) and the Neptunian satellites Nereid, 170 km long. Unfortunately only one image of Nereid is at hand (Voyager's one) – rather blurred one. But still, comparing it with an image of Earth from 1.2 mln km (MRO, PIA04159) one can conclude about their similar granulations ($\pi R/4$).

References: [1] Kochemasov G.G. (2000) Orbiting frequency modulation in Solar system and its imprint in shapes and structures of celestial bodies // Vernadsky-Brown microsposium 32 on Comparative planetology, Oct. 9-11, 2000, Moscow, Russia, Abstracts, 88-89.