EPSC Abstracts
Vol. 7 EPSC2012-43 2012
European Planetary Science Congress 2012

The Moon: why anomalously numerous evenly covering surface, about 100 km across craters are well resolved gravimetrically.

G.G. Kochemasov

IGEM of the Russian Academy of Sciences, Moscow, kochem.36@mail.ru

The NASA's GRAIL mission will produce an unprecedented detail gravity map of the lunar subsurface as measurements will include some depths of the satellite. One could say that this map will principally repeat the gravity pattern acquired earlier (Fig. 2, 3; [1]) which shows surface densely "peppered" by even-sized "craters" (rings) about 100 km in diameter. The wave planetology admits that many of them reflect features of impact origin but a bulk is due to an intersection of standing waves produced by elliptical orbits of the body (around Earth and Sun (Fig.1 gives a graphic representation of such waves). These waves of standing character and four directions (ortho- and diagonal) arise in any cosmic body due to its movement with changing accelerations in keplerian orbit. An interference of these waves brings about rising (+), falling (-), and neutral (0) tectonic blocks regular combination of which makes chains and grids of "round" (polygonal) features (Fig. 1).

The lunar community should realize that one of bases of the Moon's geology – crater size –frequency curve is of a complex nature. Impacts surely contribute to this curve but a significant part of it is due to ring structures of non-impact origin (Fig. 4). Ring structures of this kind are produced by an interference of standing inertia-gravity waves of 4 directions warping any rotating celestial body moving in an elliptical orbit [2, 3]. Many ring structures observed on solid and gaseous planetary spheres are of such profound nature. They form regular grids of shoulder-to-shoulder even ring structures (Fig. 1) (the best example from the past – Triton's cantaloup surface, from the present- outgassing crater's chains at the Hartley comet core). Their sizes depend on orbiting frequencies: the higher frequency- the smaller "rings", and vice versa. Satellites having two orbiting frequencies in the Solar system are particularly "peppered" with rings as a low frequency modulates a high one producing along with the main ring populations additional side populations [3]. The Moon reveals such populations: frequency peaks at 80-140 (an average 100 km), and more than 600 km in diameter (main rings) due to orbiting Earth and Sun., 10-30 and 300-400 km in diameter (modulated side rings)[3]. Expressed by the lunar radius they are: $\pi R/60$, $\pi R/4$, $\pi R/240$, $\pi R/15$.

An important examination of the proposed explanation of the mostly 100-km crater size "peppering" the lunar surface is a comparison it with the well-known supergranulation of the solar photosphere (30 to 40 thousand km granule diameter, $\pi R/48$-60). Both objects orbit (rotate) with the monthly period, thus their wave granulations have to be comparable.

References: [1] Konopliv A. S. et al. (2001) Icarus, v. 150, 1-18; **[2]** Kochemasov G.G. (1999) JRA, v.1, #3, 700; **[3]** Kochemasov G.G. (2001) On one condition of further progress in lunar studies // First Convention of Lunar Explorers, 8th to 10th March, 2001, Palais de la Découverte, Paris, France; Programme and Contributed Abstracts; ESTEC, eds: D. Heather and B. Foing, 58 pp (p.26).

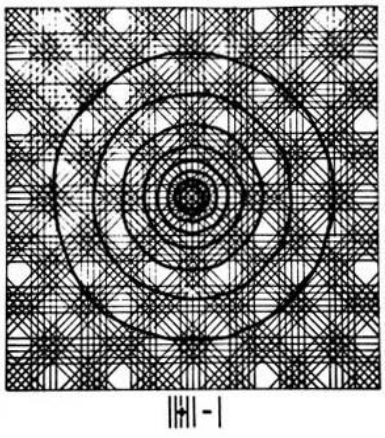

Fig. 1. Graphical representation of an interference of waves propagating in 4 directions with production of round features rows and grids (better seen from a some distance).

Fig. 2. The Moon gravity pattern [1]

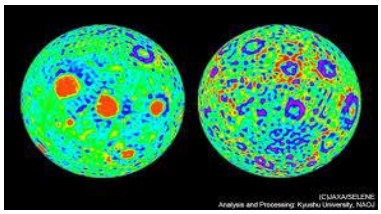

Fig. 3. The Moon: gravity anomalies, Kaguya mapping.

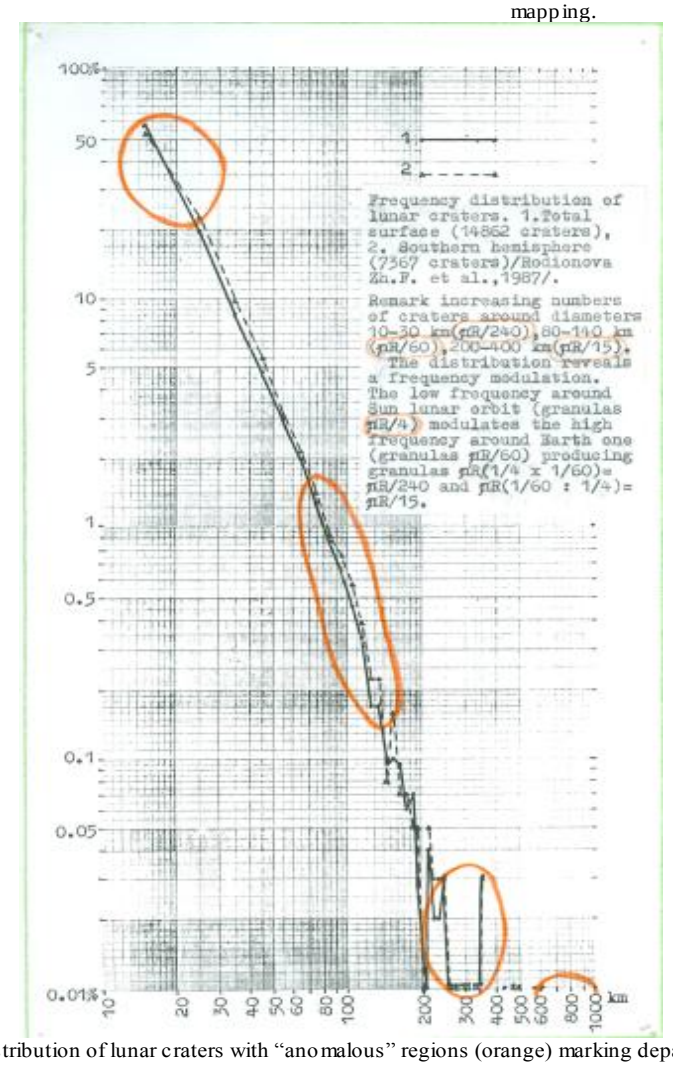

Fig. 4. Frequency distribution of lunar craters with "anomalous" regions (orange) marking departure from the classical impacts related curve.