

A WAVE MODULATION NATURE OF THE 3D STRUCTURAL LATTICE OF THE CHURYUMOV-GERASIMENKO COMET ICY CORE; Kochemasov G.G., IGEM of the Russian Academy of Sciences, 35 Staromonetny, 119017 Moscow, kochem.36@mail.ru:

An action of the inertia-gravity forces is demonstrated in convexo-concave shape of the comet as well as in shapes of other documented small cosmic bodies [1-4]. These forces origin is due to movements of all cosmic bodies in non-circular keplerian orbits. Periodical changes of bodies accelerations cause arising inertia waves to warp bodies, and their rotations distribute these warpings into four interfering ortho- and diagonal directions [1-4]. The warping waves form a harmonic row starting from the fundamental wave 1 followed by the first overtone wave 2 and so on. Interference of the fundamental waves of four directions inevitably causes one hemisphere to upraise (bulge) and the opposite one subside (press in). Produced convexo-concave shape shows a deep cracking of the expanding convex hemisphere and compacting the squeezing opposite one. Some examples are in Fig. 1, 2. Another type of warping waves is inversely proportion in lengths and amplitudes to orbital frequencies of bodies: smaller frequency larger waves and, vice versa, larger frequency smaller waves [1-2]. An etalon may be Earth: 1/1year frequency- $\pi R/2$ waves ($\pi R/4$ or a half wave tectonic granule), or the Sun's photosphere: 1/1 month frequency – $\pi R/60$ granulation. The Ch-G comet 6.6 years – 2398 days, 57552 hours - orbiting period (1/57552 hours fr.) gives $1.65 \pi R$ tectonic granule – too large to observe directly. But modulations by this small frequency the much higher rotation frequency of the comet (1/12.5 hours) gives two side frequencies (division and multiplication of the higher fr. by the lower one): 1/4604 and 1/719400. To them correspond two granule sizes: $\pi R/4604$ & $\pi R/719400$ ($R \approx 2500$ -2000m) or 1.70-1.36 & 0.011-0.009 m. Rosetta 'images reveal penetrating comet's body geometrically regular lattice with spacing about a few meters. Its more accurate dimension can be measured at a block of ~ 5 meters across (Fig. 8, 9) where stripes width is about 1-2 meters and a granule, consequently, is about 1-2 meters across. The smaller (finer) modulated centimeter fragment size is presented in numerous "deluvial" covers in local depressions (Fig. 3-6, 8). The coarser meter size spherical (polyhedron) boulders also are ubiquitous (Fig. 3-6, 8-9). It is important that only calculated two fragment sizes prevail amidst derbies released from outcrops appeared as 3D "wafer cakes".

References: [1] Kochemasov G.G. (1998) 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. (1999) Theorems of wave planetary tectonics // Geophys. Res. Abstr., 1999. V.1, №3, p.700. [3] Kochemasov G.G. (1999) On convexo-concave shape of small celestial bodies // Asteroids, Comets, Meteors. Cornell Univ., July 26-30, 1999, Abstr. # 24.22. [4] Kochemasov G.G. (2011) Similar shapes of asteroid Eros, satellite Atlas, and comet Hartley 2 despite of different classes, orbits, sizes and compositions of these bodies // 42nd Lunar and Planetary Science Conference (2011), March 7-11, 2011, The Woodlands, Texas, abstract 1125. pdf.

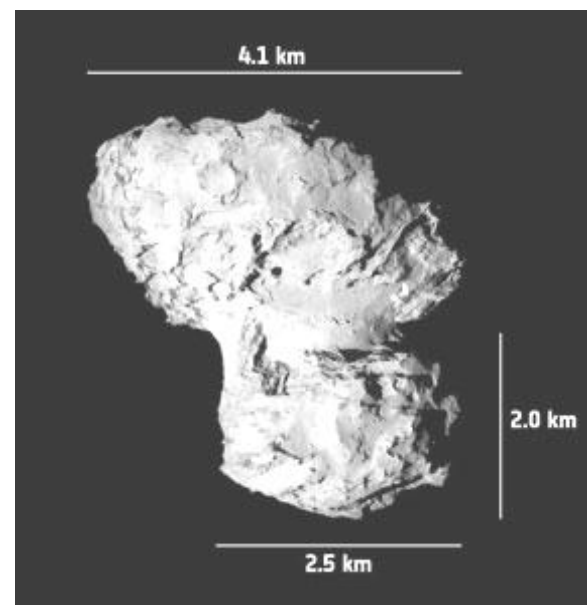


Fig. 1. Churyumov-Gerasimenko comet 78002958_comet.jpg

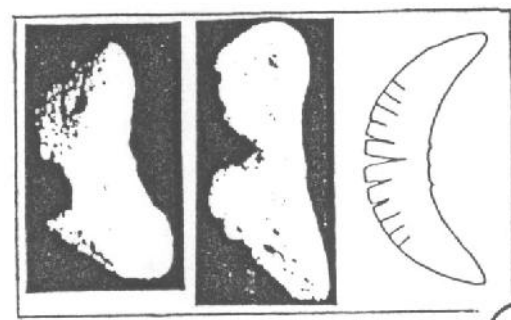


Fig. 2. Asteroid Eros, 33 km long, and a scheme of process of its destruction

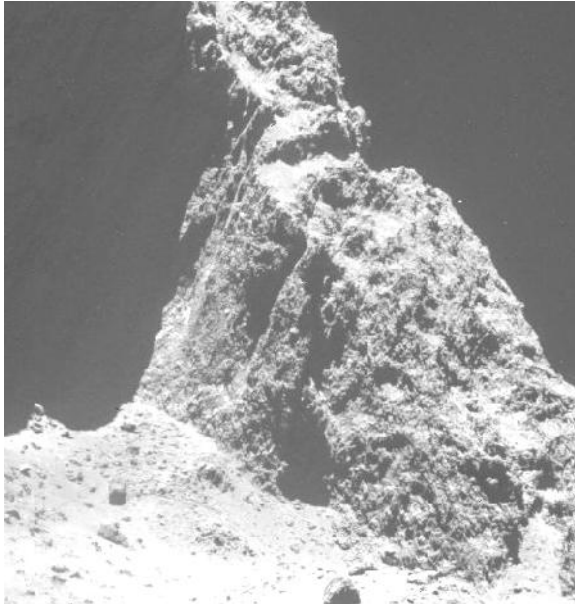


Fig.3. Outcrop at the Ch-G comet.
AP rosetta comet mission 2_jtm 141111 16x9 992.jpg



Fig.4. Spherical (polyhedron) fragments moving down slope along with finer debris
ESA Rosetta NAVCAM 141010 D.jpg

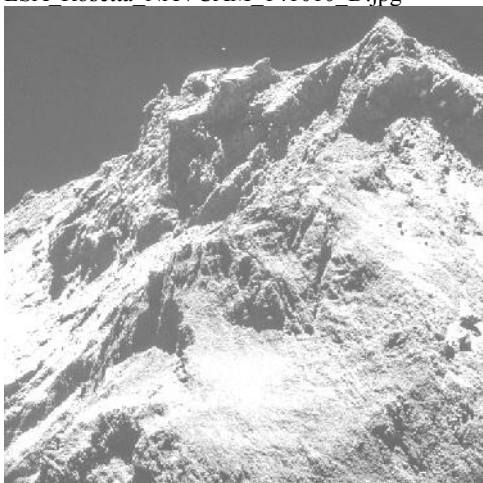


Fig. 5. Ch-G rock. NAVCAM_top_10_at_10_km_5.jpg

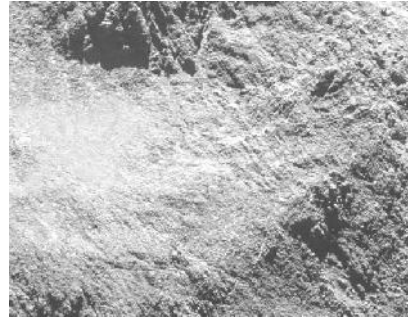


Fig. 6. Portion of Fig. 5. Crossing stripes with ready to detach meter size spherical fragments

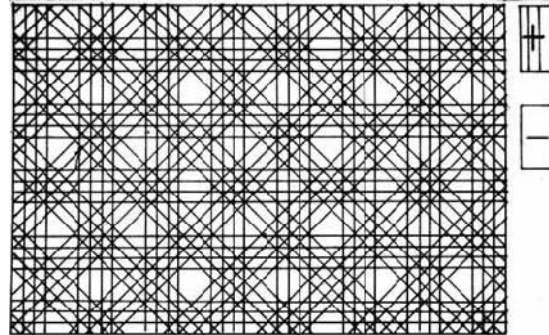


Fig. 7. Graphic representation of crossing waves producing chains and grids of round forms (better seen from some distance).



Fig. 8. Comet from 40 metres.jpg. The block is 5m in size. Credit: ESA/Rosetta/Philae/ROLIS/DLR

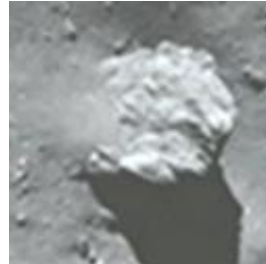


Fig. 9. The block of Fig. 8. ~5m across. Stripes & spheroids ~1m wide.