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Traces of warping subsided tectonic blocks on Miranda, Enceladus, Titan

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Icy satellites of the outer Solar system have very large range of sizes – from kilometers to thousands of kilometers. Bodies less than 400-500 km across have normally irregular shapes , often presenting simple Plato's polyhedrons woven by standing inertia-gravity waves (see an accompanying abstract of Kochemasov). Larger bodies with enhanced gravity normally are rounded off and have globular shapes but far from ideal spheres. This is due to warping action of inertia-gravity waves of various wavelengths origin of which is related to body movements in elliptical keplerian orbits with periodically changing accelerations (alternating accelerations cause periodically changing forces acting upon a body what means oscillations of its spheres in form of standing warping waves). The fundamental wave 1 and its first overtone wave 2 produce ubiquitous tectonic dichotomy – two segmental structure and tectonic sectoring superimposed on this dichotomy. Two kinds of tectonic blocks (segments and sectors) are formed: uplifted (+) and subsided (-). Uplifting means increasing planetary radius of blocks, subsiding - decreasing radius (as a sequence subsiding blocks diminishing their surfaces must be warped, folded, wrinkled; uplifting blocks increasing their surfaces tend to be deeply cracked, fallen apart). To level changing angular momenta of blocks subsided areas are filled with denser material than uplifted ones (one of the best examples is Earth with its oceanic basins filled with dense basalts and uplifted continents built of less dense on average andesitic material). Icy satellites follow the same rule. Their warped surfaces show differing chemistries or structures of constructive materials. Uplifted blocks are normally built with light (by color and density) water ice. Subsided blocks – depressions, "seas', "lakes", coronas – by somewhat denser material differing in color from water ice (very sharply – Iapetus, moderately – Europa, slightly – many saturnian satellites). A very sharp difference between uplifted

and subsided blocks presents Miranda having very sharp relief range. Subsided areas (coronas) are strongly folded, uplifted areas strongly degassed what was witnessed by numerous craters of various sizes (not all craters are of impact origin!). Coronas on Miranda present subsided segment and sectors. Typical is a very sharp boundary between risen (+) and fallen (-) blocks. On Enceladus the subsided (squeezed) southern pole area is characterized by "tiger stripes" – traces of contraction, young ice deposits and famous ejections of water vapor and ice. The squeezed area expels 'molten" material from interior – compare with periodically active Hawaiian volcano expelling basalts from constantly under contraction Pacific basin interior. As to the subsided Pacific basin, it is antepodean to uplifted deeply cracked and degassing Africa. On Enceladus to contracted south is opposed expanded north where past degassing is witnessed by numerous craters (not all of them are impacts!). Contraction traces are very impressive on subsided Titan's surfaces – methane filled thinly folded huge areas mainly in near equatorial regions (some scientists think that these folds are eolian dunes but they are parallel, not perpendicular to presumed winds and, besides, winds below $\sim$60 km in Titan's atmosphere are not detected by "Huygens") [1, 2]. This methane rich area of intensive folding is antepodean to the uplifted and mainly composed of water ice region Xanadu cut by numerous tectonically controlled dry "valleys". So, in spite of many varieties of surface features on icy satellites of the outer Solar system a common main tectonic tendency exists: opposition of subsided contracted and uplifted expanded blocks. **References: [1]** Kochemasov G.G. (2006)Titan's radar images: cross-cutting ripples are dunes or warping surface waves?// Berlin, 22-26 Sept. 2006, EUROPLANET Sci. Conf. 1, EPSC2006-A-00045. **[2]** Kochemasov G.G. (2006)Planetary plains: subsidence and warping // Ibid., EPSC2006-A-00018.