CRATER BASIN REBOUND ABOVE PLASTIC LAYERS: MODEL BASED ON EUROPA. Akos Kereszturi (Department of Physical and Historical Geology, Eötvös Loránd University of Sciences, H-1083 Budapest, Ludovika tér 2., Hungary, E-mail: krub@freemail.hu)

Introduction: Isostatic rebound and megaslumpings are important processes in the modification of large craters. Beside the exmaples for these on Mercury, Moon, Earth, Callisto (possibly Venus and Mars) we have good images from Europa. Analysis of internal rings and benches of great (usually greater than 100 km) craters and palimpsests help in the reconstruction of formation. The its young, pristine and tectonically homogene surfaced Europa can improve our knowledge in the reconstruction of crater basin formation.

The modell: Based on our up to date knowledge, the origin of the circular – and not central – ring structures are the follows (Fig. 1.) [1]: 1. Outcrops of isostatically uplifted internally layered matter [2],

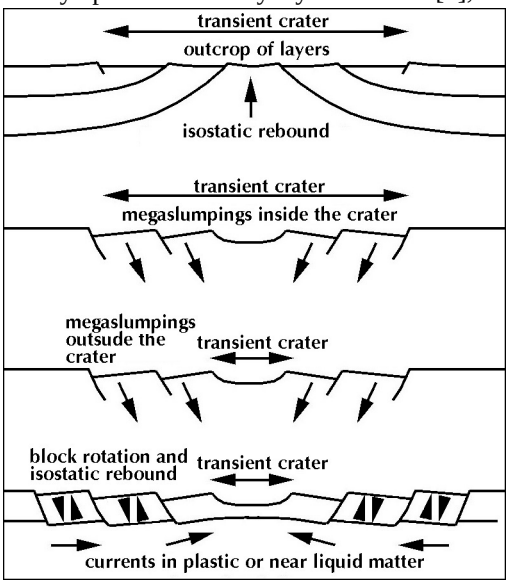

Fig. 1. Possible theories for the origin

2. Mega-slumpings inside the crater. 3. Megaslumpings outside the crater. 4. Block rotation and isostatic lifting [3]. With the analysis of the great craters of Europa we can nearly rule out the internal layering and slumping theories in the formation. Because of the thin ice crust Europa can serve as a unique modell for the crater formation on terrains with small lithospheric thickness, and it gives the possibility for the analysis of ancient craters on the Earth and current craters on Venus with relative thin litospheres.

Results: We analysed 32 relative great craters on icy moons, the best examples of them are on Europa (Fig. 2.). We make a somewhat similar analysis for the greatest basins on rocky bodies (eg. Caloris, Orientale, Argyre). We measured the diameters of the structures, the topography, the distribution of certain structures according to the crater diameter/the possible thickness of the lithosphere/cryosphere, distance from the center. The greatest problem is the definition of the original crater rim or the transient crater and to devide the internal rings from the outer narrow tectonic structures. We suggests: 1. Structures are originated by isostatic re- bound and not by megaslumpings or outcrops of layered matter. 2. Circular faults ouside the original craters form in great number on icy bodies. In the future we will extend the analysis: 1. Relation between possible transient crater diameter and outer rings. 2. To make „evolutionary sequence" for giant craters with rebounded floors accourding to the reaction of the lithosphere and gravity [5,6], which can be useful in the analysis of ancient rheologic conditions in rocky bodies.

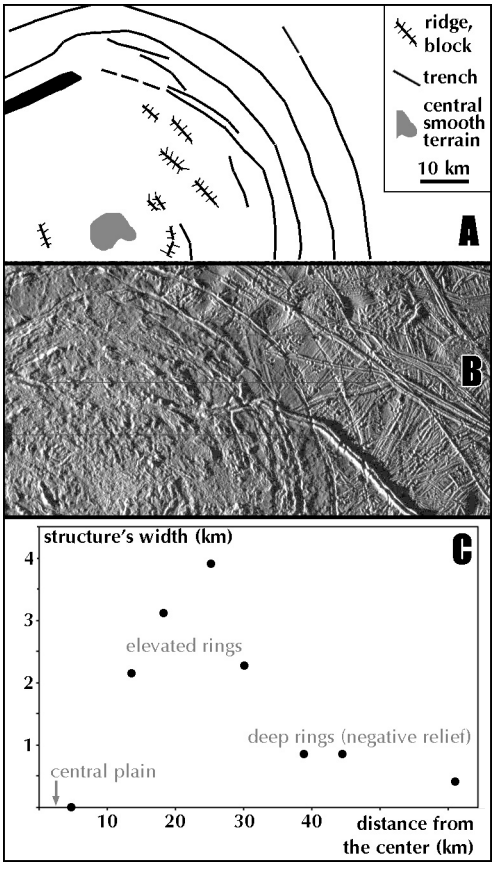

Fig. 2. Example structures

References: [1] Dence, M.R. et al. (1977) Terrestrial impact structures, Perrgamon Press, 1977. [2] Milton, D.J. et al. (1972) Displacement with impact craters, Proc. 24th Int. Geol. Congr. [3] Roddy, D.J. (1977), Large-scale impact and explosion craters, Pergamon Press, 1977. [5] Melosh H.J. (1989) Impact Cratering, Oxford Univ. Press. [6] Baldwin R.B. (1981) in Multiring Basins, LPI.