CHARACTERIZATION AND POSSIBLE ORIGIN OF SUB-CIRCULAR DEPRESSIONS IN RUACH PLANITIA REGION, TRITON. Alvaro Martin-Herrero[1], Javier Ruiz[1], Ignacio Romeo[1], [1]Departamento de Geodinamica, Universidad Complutense de Madrid, 28040 Madrid, Spain. e-mail: amartinherrero@geo.ucm.es

Introduction: Works mapping and studying the forms and characteristics of the surface of Triton have been quite scarce, consisting mainly of the merely descriptive categorization of the different landforms and geologic units on a global scale, leaving the known surface of this moon divided into several large morphological units [1,2].

Present work aims to study and characterize several specific areas on Triton's surface, where the surface of this moon shows structures of circular or quasi-circular appearance, sometimes with high external borders, and an inner sunken area covered with materials of smooth appearance. In most cases, outer edges presents various states of alteration or degradation, distorting the circular appearance. On rare occasions, it can be observed outer edge sections that resemble circumference arcs. As mentioned, the interior of these basins is usually filled by materials of smooth appearance, whereas central mounds exist in some of them (reminding central peaks of impact craters), in others it can be appreciated that the central zone shows some elevation giving a dome appearance (in whose upper part it could be observed features that suggested material collapse; Figure 1).

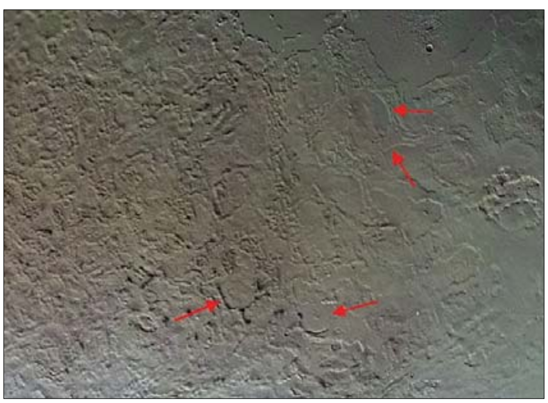

Figure 1. Study area, centered SW of Ruach Planitia, framing the transition area between cantaloupe terrain and terraced materials. Arrows indicate some of the identified sub-circular depressions.

Many of these structures are seen nearby of *Ruach Planitia*, mainly towards S-SW. In the area south of *Ruach*, according with Croft et al. [2], we can find the so called terraced materials, consisting of different irregular areas of smooth materials with different elevation levels separated by scarps several hundred of meters high. SW of Ruach Planitia, the surface has a much more chaotic appearance due the transition between terraced smooth materials and cantaloupe terrain, which is characterized by a rather chaotic orography plenty of hills and depressions, called cavi, which reach up to 25-30 km wide, with intersecting longitudinal ridges similar to those observed in other satellites like Europa [3].

Metodology: In order to characterize these structures we performed the cartography of this area using 360 m per pixel Voyager 2 spacecraft images (Figure 2). We have mapped different terrains that have been identified based on their appearance: rugged terrains, smooth terraced terrains, undulating terrains, smooth inner basin terrains and collapsed inner basin. On the other hand, we have mapped the different geological features in the study area. Numerous different scarps and tectonic lineations can be seen in the mapped area, mainly oriented towards NE-SW and NW-SE.

Preliminary conclusions: Many of the analyzed structures present a high modification or degradation level of both, its outer limits, which may become deleted or largely eliminated, and the internal smooth materials. This modification makes complicated to define the processes that have generated these structures, although we shuffled three possibilities: 1) Due the proximity of cantaloupe terrain, plently of hills and depressions, they could be features formed in a similar way, perhaps through diapirism, although varying in the exact mode or the time of formation, given the chaotic aspect of the transition zone between the two types of terrain. 2) They could be collapse structures filled with cryomagmatic materials coming from the moon's interior. 3) Due to the sharpness that some of these structures shows at their outer edges, they could be ancient impact basins subsequently altered and filled by cryomagmatic activity.

Finally, the conducted mapping revealed a great complexity from the tectonic point of view, as well as of the geological history, not only in the study area but for the entire imaged surface of Triton.

References: [1] B. A. Smith, et. al. (1989). Voyager 2 at Neptune: Imaging Science Results. Science 246, pp.1422-1449. [2] Croft, S. K. et al. (1995). The Geology of Triton. In Neptune & Triton, ed. D. Cruikshank (Tucson, Univ. of Arizona Press), pp.879-947. [3] L. M. Prockter, F. Nimmo, R. T. Pappalardo. (2005). A shear heating origin for ridges on Triton. Geophysical Research Letters, Vol. 32, L14202.

Figure 2.
Left, Voyager 2 spacecraf high resolution image (360 m/pixel)
Right, geological map of Raz Fossae region.
Image and map centered at 18ºN 22ºE.