ENIGMATIC CIRCULAR FEATURES IN THE CANTALOUPE TERRAIN ON TRITON.

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Cantaloupe terrain on Triton (1) has a complex rugged surface. Two clear morphologic elements are visible there: chaotically sparced rimmed dimple cells and linear multiple ridges. Boundaries of the cantaloupe with the adjacent plains are not sharp but rather gradual. In order to outline the cantaloupe boundaries and to study its structure the computer processing was applyied to the images. We processed the images by the running window 3*3 and 5*5 pihels. The difference between the maximum and minimum brightnes was calculated at each position of the window. If the difference was below a certain level the surface covered by window at this position was considered as smooth and mapped as black pixel. As a result we have received maps of relatively smooth (black) and rough (white) areas which then analysed from geological point of view.

In Fig.1 is shown a part of Voyager-2 frame 11395.21 and its computer map. The frame covers a part of Triton surface where cantaloupe terrain is merged with plains named as laminated in (2) or terrased in (3). At the image a transition between the two types of the terrains is questionable but the map shows the boundary position more clear. The boundary is apparentely between dark and light parts of the produced map and coincides with the NW trending feature which resembles a relict of multiple ridge. Within the cantaloupe part of the map circular features of two types are seen. The first ones are represented by small dotted circular and semicircular features typically about 30-40 km across. They are concentrated at the west part of the area. A comparison with real image shows that these features correspond to the individual cells of cantaloupe.

Features of the second type are represented here by two large circular ones (at the central part of the area). In contrast to the cantaloupe cells the big rings become to be visible only after the processing and obscure on the real image where there are only slight hints of their presence. These situation rises a question: are the big rings real features or they are artefacts ? In order to examine this we have processed by our tecnique the "white noise" image and as a result the similar "white noise" was obtained. But if the noise have been previously smoothed our processing revealed some circular features which size was comparable with the smoothing window size. Features found due to processing of tritonian images are much larger than the running window so we inclined to consider the big rings as actual structures.

Among the considered big features the larger one looks at the map having dark interior surrounded by wide light zone which in turn is bordered by the next dark circular zone. Diameter of the outermost dark zone is about 130-140 km. As it is seen at the real image the central part of the feature is occupied by smooth depression encircled by relatively elevated rugged complex rim consisting of narrow ridges alternating with small relatively flat areas. Outside the rim the surface is getting lower and becomes more smooth. In contrast to this another feature has light interior which is bordered by dark and light concentric arcs. Apparent diamer of the second feature is 100-120 km. Its central part is a depression with elongated central dome. The depression is bordered by gentle rim capped by small knobs. Outward the rim the surface is getting lower and becomes much more complex consisting of chaotically dispersed knobs, short rides and small depression. The second big ring is recognized much worse than the first one. Nevertheless this circular feature is apparentely actual. At the next processed frame, 11393.50, (Fig.2) a feature similar to the described ones is revealed. It is placed near the terminator and detected because of circular arrangement of the mapping elements. Its apparent diameter is 160-180 km. At the real image the feature is not recognized reliably. The area which is occupied with the feature consist of crowded bulbous cantaloupe cells and bordering in places by patches of relatively smooth surface. Because of the feature locality its internal structure is unclear. However the feature seems to be actual too.

If the reality of the big rings is more or less no doubt, their origin is enigma. If they are of endogenic nature then the big rings associate with processes leading to the formation of circular structures - volcanism or diapirism. The only exogenic process leading to the formation of circular features on the surface is impact cratering. If the big rings are of exogenic nature than they may represent a tritonian variant of palimpsests known on other icy satellite (4). Boyce pointed out the possible presence of such features on Triton (5).

REFERENCES: 1)B.A.Smith et al.,1989,Science,V.246,1422-49. 2)S.K.Croft,1990,LPSC XXI (Abstr.),248-9. 3)A.T.Basilevsky et al.,1990,Advances in space research (in press). 4)Satellites of Jupiter,1982,D.Morrison ed., 972,The Univ. of Arizona Press. 5)J.M.Bboyce,1990,LPSC XXI (Abstr.),121-2.

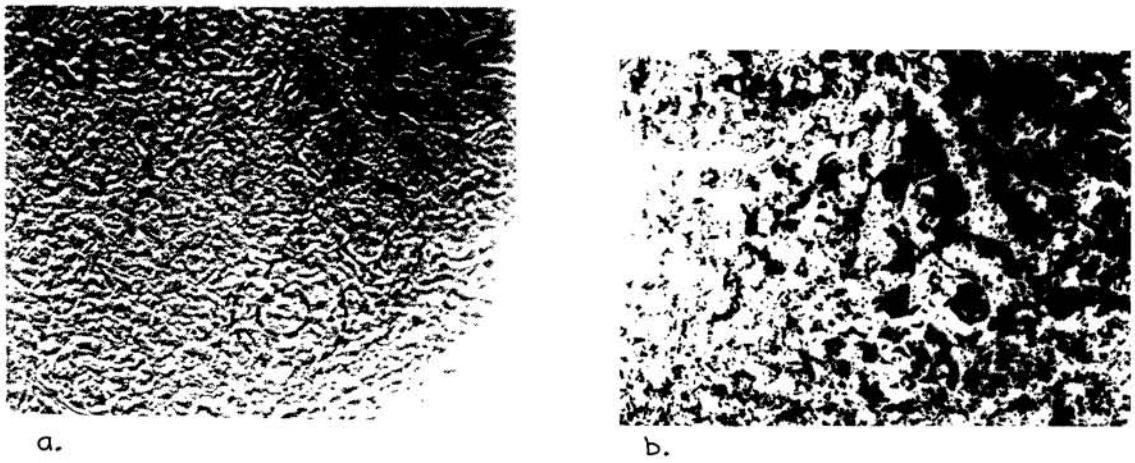

Fig.1 Part of Voyager-2 frame 11395.21 (a) and its computer map (b). At the image the big rings revealed by computer mapping are shown by dotted lines. Inside lines show the central parts of the features. Light lineament at the indicates a relic of multiple ridge which is considered as the boundary between the cantaloupe and the adjacent terrain.

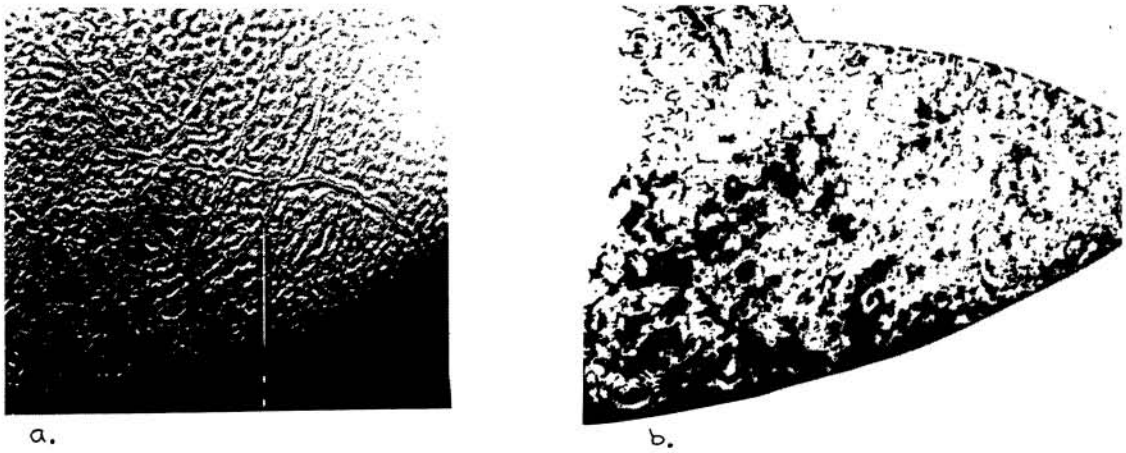

Fig.2 Part of Voyager-2 frame 11393.50 (a) and its computer map (b).Dotted line shows probable boundary of the third big ring revealed by computer mapping. The feature consist of closed cantaloupe cells. Dark and light lineaments at the map indicates the multiple ridges.