TRITON CRESCENT IMAGING REVISITED: CARTOGRAPHY AND GEOLOGY. T. Stryk[1] and P. J. Stooke[2], [1]Humanities Division, Roane State Community College, Harriman, Tennessee, United States 37849 (strykt@roanestate.edu). [2]Department of Geography, University of Western Ontario, London, Ontario, Canada N6A 5C2 (pjstooke@uwo.ca).

Introduction: Voyager 2 obtained images of Triton during approach and departure. The best crescent images taken after departure show surface and atmospheric features clearly [1], but areas seen in these images have not been added to USGS or other maps, and no geological assessment of this region has been made. Here, newly processed images are presented, mapped and interpreted.

Data and Processing: The Voyager images were converted to 16 bits, calibrated, de-striped and desmeared where necessary. The highest resolution (~2km/pixel) outbound image (FDS 1140138) was merged with a version that was averaged 2x2 in order to compensate for the image being severly underexposed while preserving high contrast features at full resolution. All suitable images were stacked and deconvolved, weighted based on their sharpness. After merging the stack, additional processing enhanced surface details across the entire disk, limb to terminator. High pass filtering was used to reduce the effects of varying illumination. Processing is described more fully in the accompanying poster.

Mapping: The processed crescent image (Figure 1) was incorporated into a global map by locating common features in the image and in pre-existing maps. The starting point was a global cylindrical projection compiled by Steve Albers [2]. Its southern hemisphere was reprojected into a south pole centered equidistant azimuthal projection to form a base for reprojection. Additional control was provided by a previous reprojection of part of the crescent image (Fig. 24 in [3]) and by a map of surface streaks [1]. In the process it was observed that the outline of the area covered by the crescent image in [1] is incorrect, but the streak locations appear to be accurate. These sources were reprojected to match the base map. Common features in the newly processed crescent image and the base materials were used to control the reprojection until a reasonable consistency between all images was obtained. Because there is no formal geometric control, positional uncertainties of several degrees may occur. The number of common features seen in the crescent image and pre-existing images suggests that the formal Triton control network could be extended into this area. The reprojected image is shown added to Albers' cylindrical map (Figure 2).

Atmospheric Streaks: A group of six streaks, between 80 and 250 km long, were previously described [1]. They were interpreted as clouds about 3 km high. Each appears to have a well defined point source, like the 8 km high plumes Hili and Mahilani [4], but they extend in the opposite direction. This suggests a 180° shift in wind direction with increasing altitude [5], or possibly a night side to day side wind regime. The most prominent streaks were also seen on approach, indicating a longevity of at least 50 hours. The longevity of the plumes [4] is unknown.

Surface Geology: The region seen in the new images is deep within the southern polar cap, but also near the terminator, a combination not well seen elsewhere on Triton. The resolution of 4 km/pixel is not adequate for a detailed geological analysis, but some observations can be made. No obvious impact craters can be seen, which is not unexpected given the paucity of larger craters on Triton. A region of small light and dark spots near 30° S, 240° W appears to be a hilly terrain unit, and by analogy with areas seen more clearly on approach it is interpreted as an extension of the 'cantaloup terrain' of [3]. A broad, smooth region at 50° S, 210° W, with sharp edges suggestive of scarps, is interpreted as a scarp-bounded plain similar to Tuonela and Ruach Planitiae in the northern hemisphere. Other plains are nearby. A group of prominent bright and dark markings near 20° S, 270° W look like rugged uplands at the low resolution and oblique viewing of the crescent image, but given the lack of such features elsewhere they may instead be high contrast flow-like features like Akupara and Zin Maculae [3].

From the above considerations, we suggest that geologic features in this newly mapped area are similar to those seen elsewhere on Triton at higher resolution. The south polar terrain is not noticeably different from other regions in its underlying geology, a conclusion which is not obvious from approach views showing the polar region only at low phase angles.

References:

[1] Hansen C. A. et al. (1990) *Science, 250,* 421–424. [2] http://laps.noaa.gov/albers/sos/sos.html.
[3] Croft S. K. et al. (1995), Geology of Triton, in Cruikshank, D. P. (ed), *Triton*, U. Arizona Press, 1995, 879–947. [4] Kirk R. L. et al. (1995), Triton's Plumes, in Cruikshank, D. P. (ed), *Triton*, U. Arizona Press, 1995, 949–989. [5] Yelle R. V. et al. (1995), Lower Atmosphere, in Cruikshank, D. P. (ed), *Triton*, U. Arizona Press, 1995, 1031–1105.

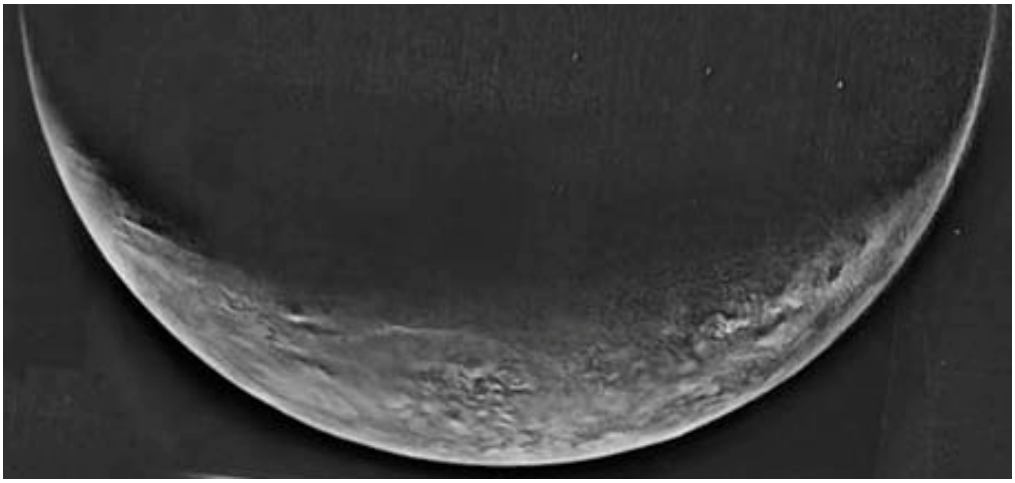

Figure 1: Triton crescent image (T. Stryk)

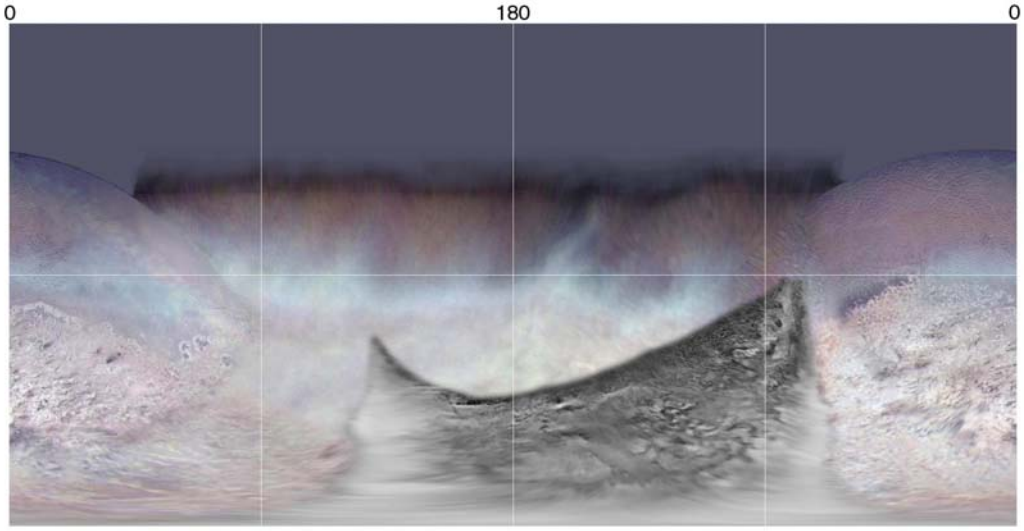

Figure 2: Global photomosaic map

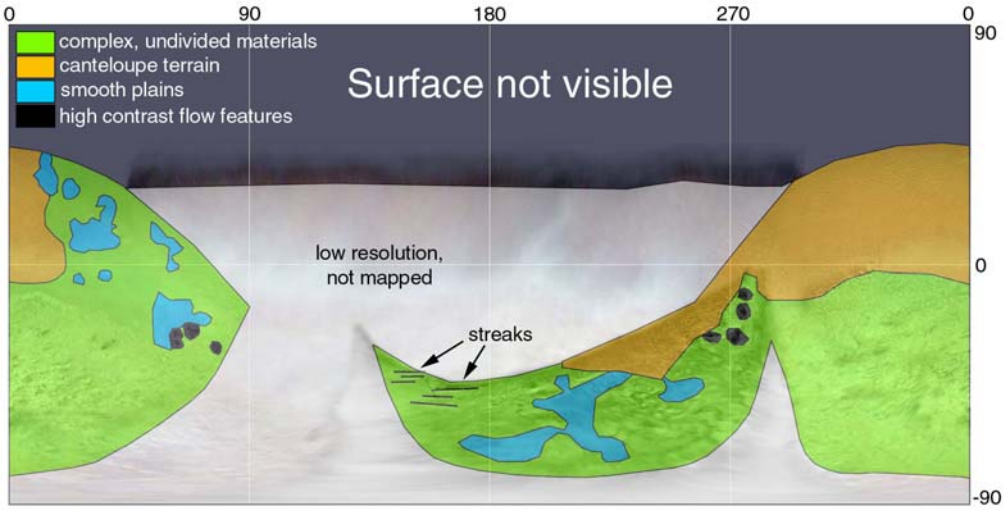

Figure 3: Global geologic sketch map (P. Stooke)