MAPPING NEPTUNE'S MOON TRITON. E. S. Martin[1], D. A. Patthoff[2], M. T. Bland[3], T. R. Watters[1], G. C. Collins[4], T. Becker[3], [1] Smithsonian Institution, National Air and Space Museum, Center for Earth and Planetary Studies (martines@si.edu), [2]Planetary Science Institute (appatthoff@psi.edu), [3]U. S. Geological Survey, [4]Wheaton College.

Introduction: Neptune's moon Triton (Fig. 1) was imaged with high resolution in 1989 during the Voyager 2 encounter. Triton was revealed to be a geologically active moon [1], and its very young surface has been linked to its dynamical history as a captured Kuiper Belt Object (KBO) [e.g., 2] as well as a potential ocean world.

Triton is a unique world that bridges a gap between KBOs and icy satellites as well as member of an ice giant system rather than the more well characterized gas giant systems. As a likely KBO captured into Neptune's orbit [e.g., 2] Triton contributes to the diverse population of icy satellites, but its origin is unique relative to those of the icy satellites and likely contributes to its young surface and exotic terrains (Fig. 1) [3]. The capture of Triton by Neptune likely resulted in a massive heating event that resulted in resurfacing [4, 5], possibly by cryovolcanism [6, 7]. Crater counts for both Triton [8] and portions of Pluto [9] suggest that both surfaces are exceptionally young, which may indicate that neither Triton nor Pluto retain their original surfaces.

Mapping of Pluto and Charon is in progress [10, 11, 12], but as no comparable geologic map of Triton exists, a direct comparison between these two KBOs cannot be performed at a fundamental level. Furthermore, as Triton serves as a bridge between KBOs and icy satellites, characterization of its terrains is important for advancing comparative planetological studies. To-date, no peer-reviewed, broad-scale, detailed geologic map of Triton exists to characterize, classify, and identify geologic surface units and features on Triton.

We are in the process of creating a digtial Triton data archive that will recover and restore original data products and provide context for future investigations by creating a geologic map across Triton's Neptune-facing hemisphere. This effort entails using the 43 images of Triton that are better than 2 km/pixel and creating a new mosaic of the southern portion of the moon. This new mosaic will use the most up to date image pointing data to improve the locations of each of the images. See Bland et al, (this meeting for additional details on the new mosaic.

Previous geologic mapping efforts on Triton (Fig. 2) did not include a Scientific Investigations Map (SIM) by the U. S. Geological Survey (USGS), nor is it available in a digital format for distribution and use by the community. Detailed descriptions of geologic units are further illustrated with Voyager images of terrains and structures; however, poor printing quality makes it impossible to verify these geologic units. It is necessary for an accessible, digitized, USGS SIM be created to firmly establish the geology of Triton's surface.

Mapping Triton's Geology: Understanding Triton's geologic history is essential to unraveling its origin and evolution. Geological mapping of Triton will allow for identification of geologic units and structures that are recently formed, and those that are ancient, revealing more about Triton's evolution. Our mapping of Triton is supported by existing maps of Triton [e.g., 13].

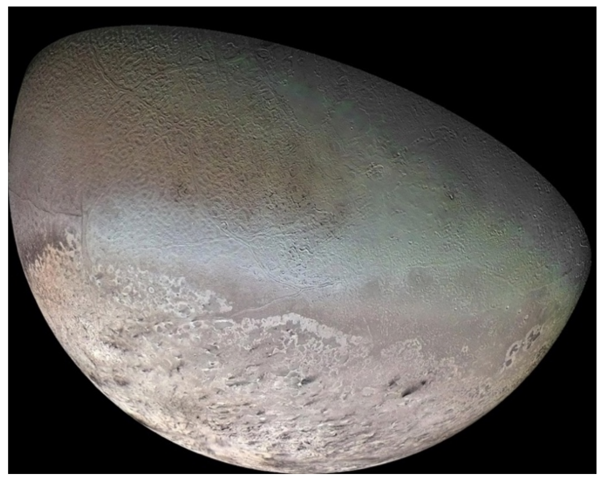

Figure 1: Orthographic projection of Triton's Neptune-facing hemisphere. Image No PIA00317

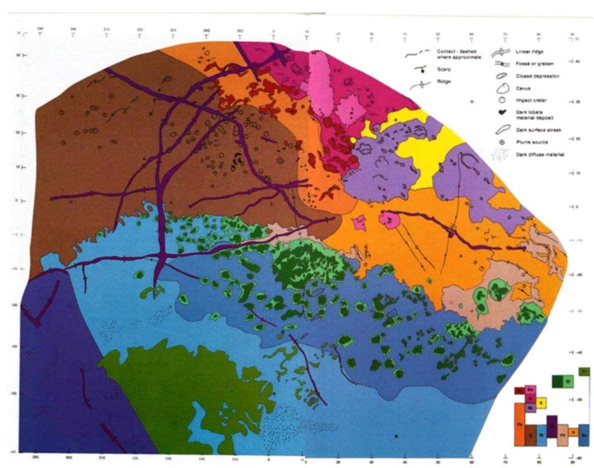

Figure 2: Geologic map of Triton from [13].

We will present preliminary mapping results of the Neptune-facing side of Triton at a scale of 1:5,000,000. The printed map product will be produced at 1:5M, however the digital product that will be published by the USGS will be 1:2.5M, higher than any Triton map product to date.

Mapping will occur on the USGS Voyager 2 orthographic color mosaic with a resolution of 600 m/pixel (Fig. 3); however, for the purposes of mapping the color will be removed to create a gray-scale mosaic. This mosaic covers approximately 1/3 of Triton's surface from 45° to -60°N latitude and -75° to 90°E longitude. This map will provide a framework for future Triton research, future KBO research, and preparation for future missions.

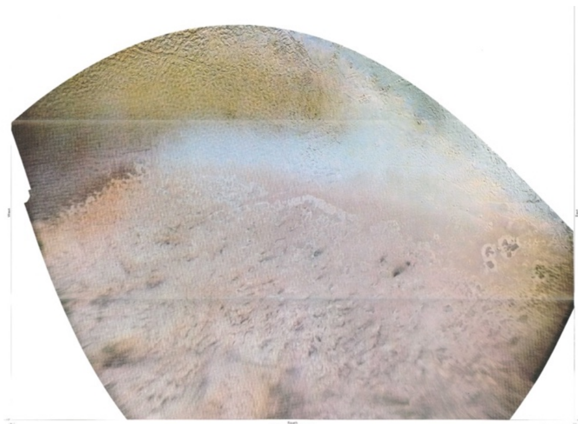

Figure 3: Triton controlled photomosaic from Voyager 2 with exaggerated color.

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