RENEWED MAPPING OF THE NEPTHYS MONS QUADRANGLE (V-54), VENUS. N.T. Bridges, Jet Propulsion Laboratory, California Institute of Technology (MS 183-501, 4800 Oak Grove Dr., Pasadena, CA 91109; nathan.bridges@jpl.nasa.gov).

Introduction: After a long hiatus due to competing tasks with the PI, mapping of Venus' Nepthys Mons Quadrangle (V-54, 300-330°E, 25-50°S) has been resumed, with planned submission late in 2008 or early 2009. Major goals are to determine the style of volcanism and tectonism over time, the evolution of shield volcanoes, the evolution of coronae, the characteristics of plains volcanism, and what these observations tell us about the general geologic history of Venus. This abstract largely repeats earlier progress reports, with some updates to show GEMS that the PI intends to complete this task in the near future.

Methods: Geologic units and structures have been mapped onto hardcopy FMAPs and then transferred to the 1:5 million-scale map base (Figure 1). Pseudostereo anaglyphs have proved an indispensable tool and have resulted in a virtual complete revision of previously mapped areas [1,2]. At FMAP scale, structural trends and inferred ages are broken out using different symbols and colors. These are in the process of being transferred to a 1:5 million-scale structure map separate from the geologic map. The geologic units, structures, impact craters, coronae, and volcanoes are being arranged in time-stratigraphic sequences as the mapping progresses.

General Stratigraphy and Structure: Using basic geologic mapping principles [3], 33 units are broken out, consisting of flow materials (11 units), volcanic construct materials (5 units), plains materials (12 units), tessera material (1 unit, with considerable structural variability), and impact crater materials (4 units). Tesserae, distributed as scattered inliers, appears to be the oldest unit and is truncated by tectonized plains and other plains units. Stratigraphically above these regional plains units are scattered fields of shields and associated flows. Polygonal flows are common and appear to show a range of ages. Flows associated with coronae and shield volcanoes are intermediate to young in age. In all cases, craters appear to be younger than adjacent units, consistent with other areas on Venus [4]. No craters have been found on the large shields.

Interesting Results and Observations:

Tesserae: To better understand the complex structural relationships within tesserae, I have mapped out individual structural trends and attempted to estimate the history of activation for these mapped sets, following in many respects efforts of previous workers [5].

Polygonal and Shield Plains: Polygonal plains are now mapped as a single unit of intermediate age (as opposed to three previously [1,2]) but several members with locally-distinct stratigraphic positions are apparent. Shield-rich plains are intermediate to young, consistent with observations in some quadrangles [6,7] and inconsistent with others [8,9] (i.e., small shields form throughout the geologic history of Venus). The polygonal plains are commonly associated with and, in many cases, difficult to distinguish from, shield plains (Figure 1). This suggests that the polygons are lava flow cooling structures, as opposed to the manifestation of cooling stresses from planet-wide global change [10-12]. However, the polygons are enigmatic features that are still poorly understood and we are open to other interpretations as the mapping progresses.

Large shield volcanoes and coronae: One of the original goals of this mapping effort was to find stratigraphic relationships among coronae, large shield volcanoes, and intermediate structures. Many of the relationships are quite complex, requiring detailed structural mapping such as that described for the tesserae, above. Many "shields" (e.g., Tefnut Mons) have corona-like radial structures and there is commonly no obvious distinction between “corona,” “mons,” and “patera.” The flows from these features can be mapped out and in some cases stratigraphic relationships determined; in other examples, this is more difficult. Large flows from shields/coronae commonly post-date regional plains and many local structures.

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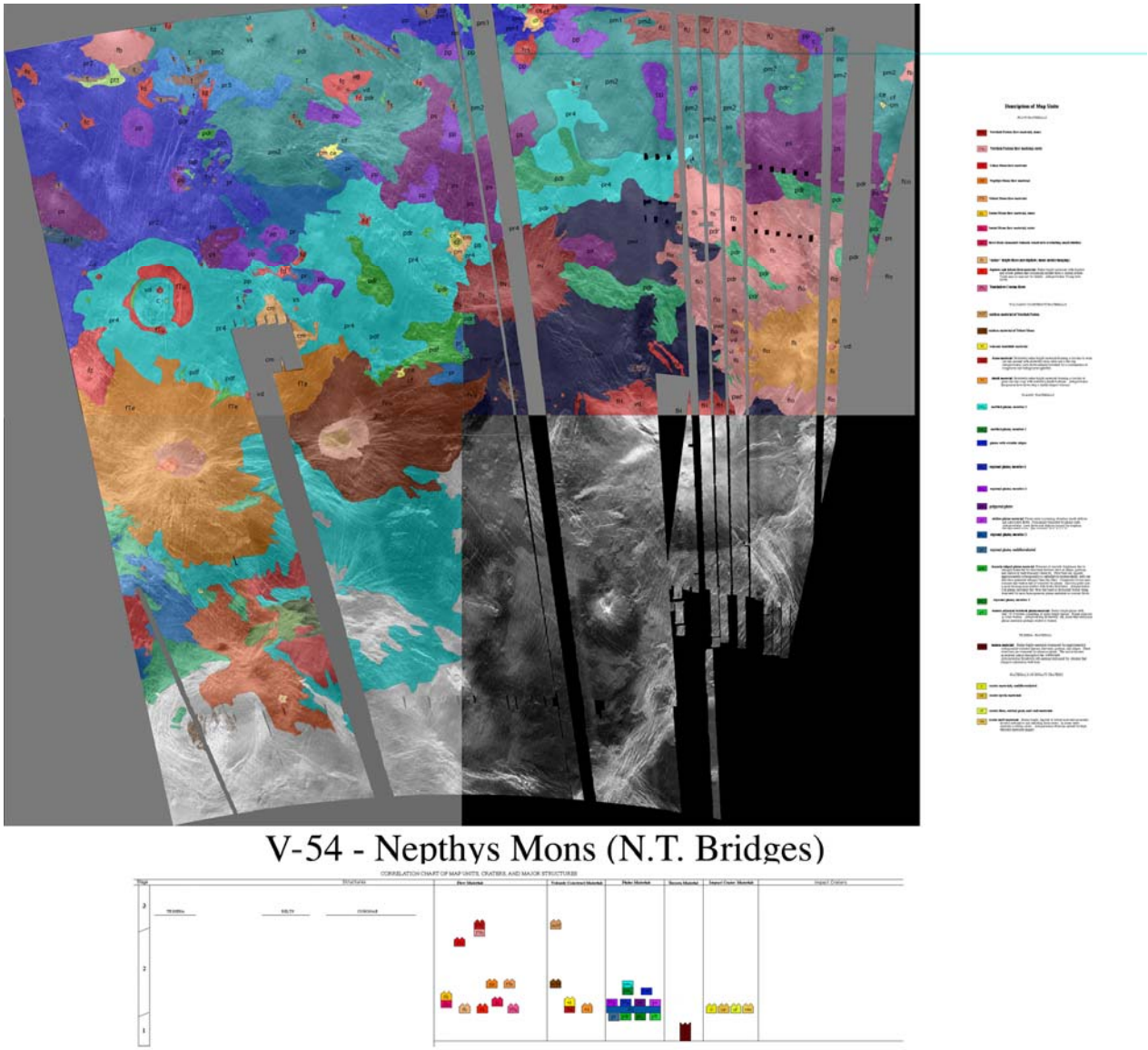

Figure 1: Preliminary geologic map of V-54. The SE corner has been mapped at FMAP scale but is not yet transferred to the basemap.