GEOLOGIC MAP OF THE GUINEVERE PLANITIA QUADRANGLE OF VENUS. David A. Crown[1], Ellen R. Stofan[2], and Leslie F. Bleamaster III[1], [1]Planetary Science Institute, 1700 E. Ft. Lowell Rd., Suite 106, Tucson, AZ 85719, [2]Proxemy Research, P.O. Box 338, Rectortown, VA 20140, crown@psi.edu.

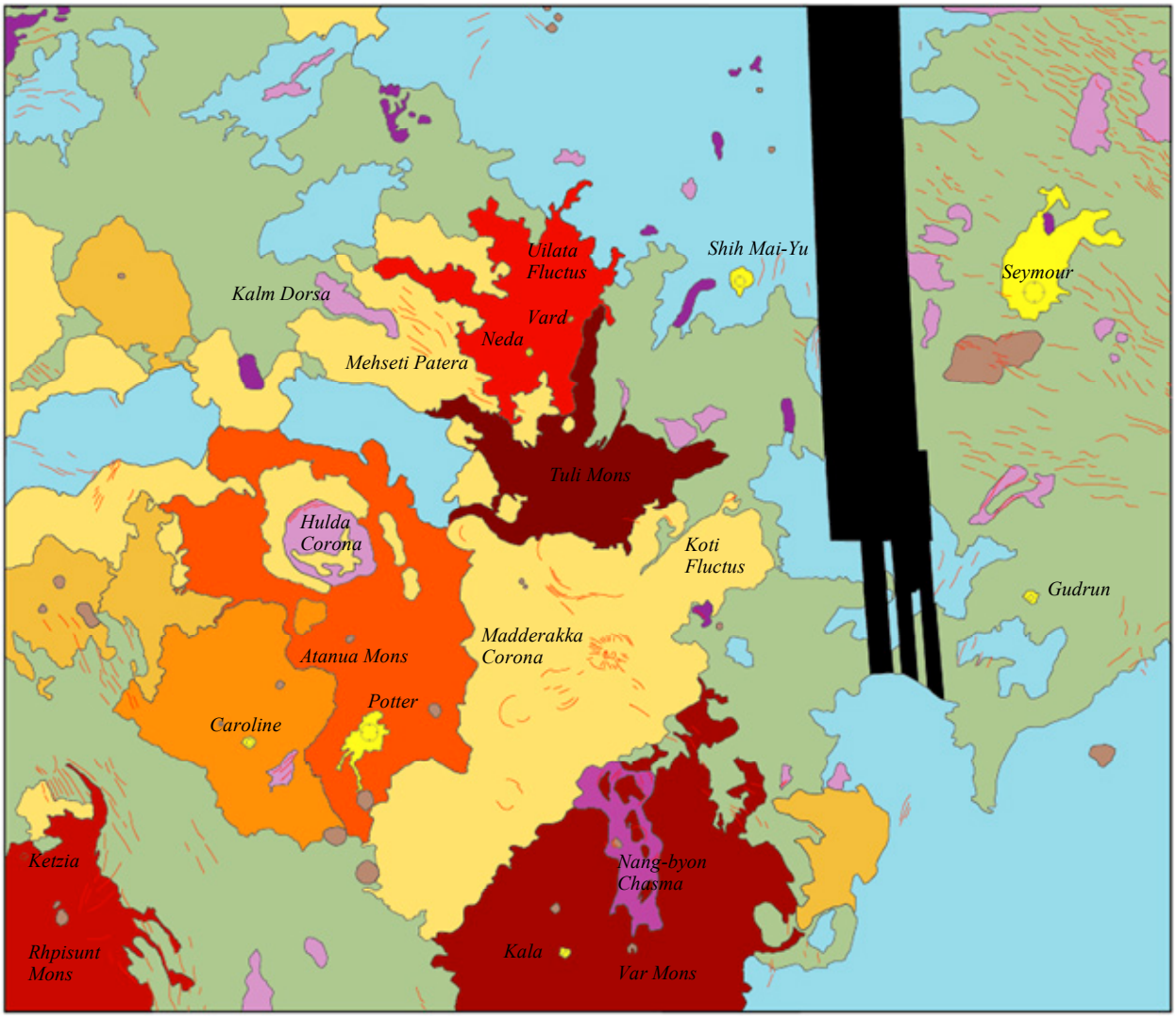
Introduction. Guinevere Planitia is an expansive lowland region on Venus, located between Sedna Planitia (north), Navka Planitia (south), Beta Regio (east), and Eistla Regio (west). The Guinevere Planitia (V-30) quadrangle (0-25°N, 300-330°E), which includes parts of Guinevere Planitia and Undine Planitia, is dominated by low-lying plains interpreted to be of volcanic origin as well as a variety of other volcanic landforms. Previous analyses using Pioneer Venus, Goldstone, and Arecibo radar data included descriptions of radar bright, dark, and mottled plains as well as the arcuate fracture zones and lineament belt segments that define the Beta-Eistla deformation zone [1-5]. Geologic investigations using Magellan SAR data, including this geologic mapping study, reveal the diversity and history of volcanic events that shaped this region of the venusian surface [6-11]. Volcanic landforms identified include shield volcanoes, widespread plains, lava flow fields, lava channels, and a variety of small, isolated and clustered domes, cones, and shields. In addition, coronae and other circular structures have associated volcanic flow deposits.

Mapping Methodology and Data Sets. Standard planetary geologic mapping techniques were used to construct the geologic map of the Guinevere Planitia quadrangle. Magellan synthetic aperture radar (SAR) data (12.6-cm radar system; 75 m/pixel) were used as the map base. Delineation and description of regional geology utilized SAR images and altimetry, as well as roughness (RMS slope), reflectivity, and emissivity data sets. Full-resolution Magellan image mosaics (FMAPs) and synthetic parallax stereo images (with 10x vertical exaggeration) are key mapping products for unit characterization and delineation as well as determination of stratigraphic and cross-cutting relationships and volcanic flow emplacement directions.

Geology of the Guinevere Planitia Quadrangle. The primary scientific objective for the geologic mapping of the Guinevere Planitia quadrangle was an examination of the styles and history of venusian volcanism as recorded in the volcanic landscape and its modification by tectonism. Specific research foci included the geologic evolution of venusian plains, the styles of volcanism represented by the observed diversity of volcanic landforms, and the geologic context for steep-sided dome formation. Research related to this geologic mapping has included morphologic and radar remote sensing analyses of venusian steep-sided domes and terrestrial silicic domes as potential analogues [12-14], as well as analyses of the morphologic and radar backscatter characteristics of lava flows associated with volcanoes in Guinevere Planitia [15].

Mapping of the Guinevere Planitia quadrangle at 1:5,000,000 scale has resulted in the division of the region into 15 geologic material units, including upland terrain units, plains units, flow materials associated with both named and unnamed eruptive centers, small volcanic edifices, and impact crater materials (Figure 1). The quadrangle is largely dominated by plains and flow materials, some of which form the flanks of the major volcanoes observed, and together surround relatively small and typically isolated occurrences of upland terrain. The Guinevere Planitia quadrangle includes four major volcanoes (Atanua Mons, Tuli Mons, and Var Mons which form an elongate topographic rise termed Laufey Regio [11] and Rhpisunt Mons), Uilata Fluctus and Koti Fluctus, and Mehseti Patera. Hulda Corona is located adjacent to Atanua Mons and Madderaka Corona lies between Var Mons and Tuli Mons. Part of Poloznitsa Corona is located in the southwestern corner of the quadrangle. Nine impact craters are found within the Guinevere Planitia quadrangle, including the crater Seymour, which is surrounded by extensive outflow deposits. Deformed terrains are found in Kalm Dorsa and Nang-byon Chasma. The types, numbers, and patterns of mapped tectonic features and small volcanic landforms provide important details for interpreting the evolution of the landscape. Geologic mapping shows a general progression from upland terrain to volcanic plains and then to shield volcanoes and flow fields but also reveals a complex interplay between volcanic and tectonic processes.

References: [1] Campbell, D.B. et al. (1989) *Science, 246*, 373-377. [2] Arvidson, R.E. et al. (1990) *Proc. LPSC, 20th*, 557-572. [3] Senske, D.A. (1990) *EMP, 50/51*, 305-327. [4] Senske, D.A. et al. (1991) *EMP, 55*, 163-214. [5] Stofan, E.R. et al. (1990) *LPSC, XXI*, 1208-1209. [6] Crown, D.A. et al. (1993) *LPSC, XXIV*, 355-356. [7] Crown, D.A. et al. (1994) *LPSC, XXV*, 301-302. [8] Crown, D.A. and E.R. Stofan (2006) *USGS OFR 2006-1263*. [9] Crown, D.A. et al. (2008) *LPSC, XXXIX*, abstract 1725. [10] Crown, D.A. et al. (2008) *NASA/CP-2008-215469*. [11] Brian, A.W. et al. (2004) *JGR, 109,* E07002, doi:10.1029/2002JE002010. [12] Anderson, S.W. et al. (1998) *GSA Bull., 110*, 1258-1267. [13] Stofan, E.R. et al. (2000) *JGR, 105,* 26,757-26,771. [114] Plaut, J.J. et al. (2004) *JGR, 109* E03001, doi:10.1029/2002JE002017. [15] Byrnes, J.M. and D.A. Crown (2002) *JGR, 107* (E10), 5079, doi:10.1029/2001JE001828.



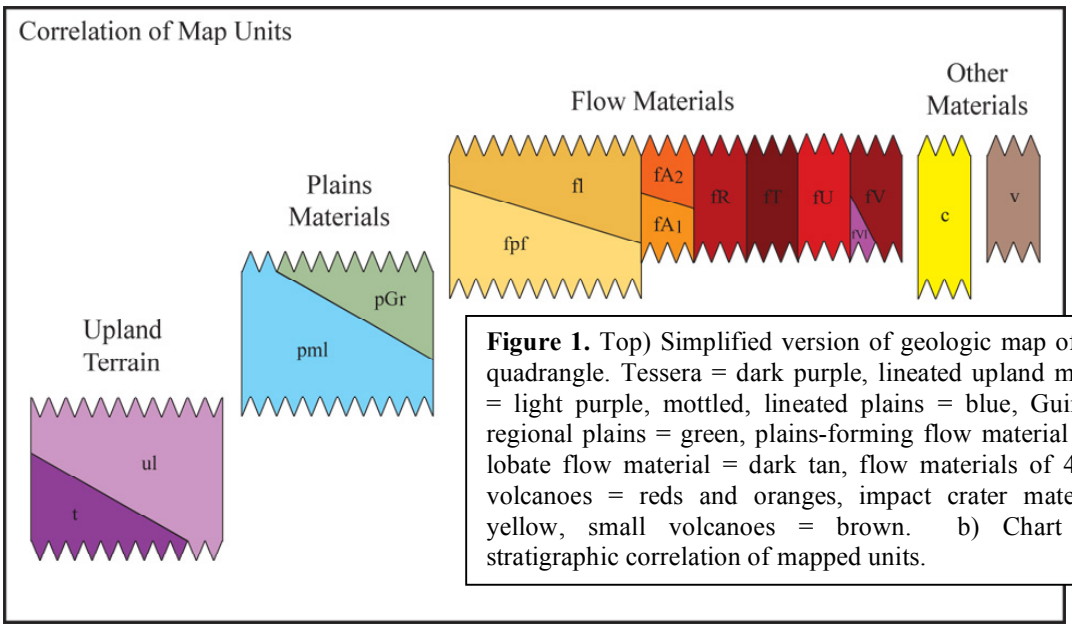


Figure 1. Top) Simplified version of geologic map of V-30 quadrangle. Tessera = dark purple, lineated upland material = light purple, mottled, lineated plains = blue, Guinevere regional plains = green, plains-forming flow material = tan, lobate flow material = dark tan, flow materials of 4 large volcanoes = reds and oranges, impact crater material = yellow, small volcanoes = brown. b) Chart show stratigraphic correlation of mapped units.