GEOLOGIC MAPPING OF THE JUNO CHASMA QUADRANGLE, VENUS: ESTABLISHING THE RELATION BETWEEN RIFTING AND VOLCANISM. D. A. Senske, Jet Propulsion Laboratory/California Institute of Technology, Pasadena, CA, 91109, dsenske@jpl.nasa.gov.

Introduction: To understand the spatial and temporal relations between tectonic and volcanic processes on Venus, the Juno Chasma region is mapped [1,2] (Fig. 1). Geologic units are used to establish regional stratigraphic relations and the timing between rifting and volcanism.

General Structure and Topography: Juno Chasma trends east to west along the crest of a 1.0 km high linear topographic rise. Located along the highest topography is a 60- to 90-km wide, 1.0- to 2.5-km deep, graben. A cluster of four coronae, Tai Shan, Gefjun, and two unnamed structures (31.8° S, 99.6° E; 29.8° S, 95.0° E) act to divide the rift into two main parts (Fig. 1). The first extends for 530 km between the 2.2-km high, 600-km diameter volcano Kunapipi Mons (outside the map area) and the cluster of coronae. The second lies between the corona cluster and an unnamed caldera-like structure centered at 30.6° S, 110.8°. To the east of the caldera-like structure, the rift branches into two arms, forming a "hub & spoke" pattern, the first segment trends N 55° E and the second S 60° E. This area corresponds to the highest topography and the rift is less well defined as a distinct graben, being made up of a series of depressions separated by local highs.

Geologic Units: Eight major units are identified (Fig. 1) based on patterns of radar backscatter and the presence of crosscutting and on-lapping relations. The units are divided into four classes: (1) those that form relatively localized systems of lava flows, (2) regional-scale plains forming materials, (3) tectonic units and (4) impact related materials. In addition to the sequence of events emplacing the geologic units, a number of episodes of tectonic activity have acted to shape the surface of this part of Venus.

Lava Flow Materials. Volcanic activity has produced a variety of structures that range from small shields (several to 10s of km in diameter), steep sided domes and channels to large constructs such as coronae, calderas, and regional-scale, greater than 100 km in diameter, edifices. The characteristics of units placed in the category of lava flow materials (*fa*,*fb*,*fc*, and *fd*) are distinguished by (1) lobate sets of deposits whose lengths exceed their widths, (2) the presence of distinct flow lobes both at the toe and along the margins of the flows and (3) a range of backscatter characteristics for different flows, producing a local mottled texture. Flow units are typically young stratigraphically and correspond to late-stage volcanism associated with coronae and calderas.

Plains Units. Regional plains (*pr, pha-b, pm, pl, pju*) make up a majority of the quadrangle. These units typically have homogeneous textures and are interpreted to be lava flood deposits. Their emplacement covers a major portion of the history of the region. The association of the oldest plains unit, lineated plains (*pl)*, with outcrops of tessera suggests that some of the tessera forming tectonic events coincided with early plains formation. The association of homogeneous plains unit b (*phb*) with the Juno rift and its subsequent deformation by rift related faulting suggests that its emplacement is related to early chasma formation.

Tectonic Units. Located on the distal flanks of the Juno rift, but still associated with the elevated topography are areally extensive, elevated outcrops of material identified as tessera (*t*), Husbishag and Sudice Tesserae. Tessera represents the stratigraphically oldest terrain in this area.

Impact Crater Materials. Impact processes have modified the surface materials throughout the region. The 73-km diameter crater, Boulanger, and its associated dark surficial deposits (dark parabolas of low emissivity material) dominate the northwestern part of Juno Chasma. The Boulanger impact is relatively recent as its associated deposits superpose all other units in the northwest part of the quadrangle.

Geologic History: The relations between the units provide insight into the major geologic events, from oldest to most recent, in the formation of the Juno Chasma region: (1) tessera formation followed by extensive regional plains (*pr)* emplacement; (2) uplift and extension forming the Juno topographic rise and early faults; (3) emplacement of widespread homogeneous plains (*pha* and *phb*) on the flanks of the rise; (4) continued extension resulting in the removal of the source vents for the flanking flows; (5) volcanic activity forming Tai Shan and Gefjun Coronae and their associated deposits. Although impacts have occurred throughout the history of the region, the crater Boulanger appears to be geologically recent.

References: [1] Senske, D. A., *et al.*, LPSC XXV, 1245-1246, 1994; [2] Senske, D. A., LPSC XXVII, 1171-1172, 1996; [3] Senske, D. A., Geologic Map of the Juno Chasma Quadrangle (V-47), Venus, in prep. for submittal to USGS, 2008.

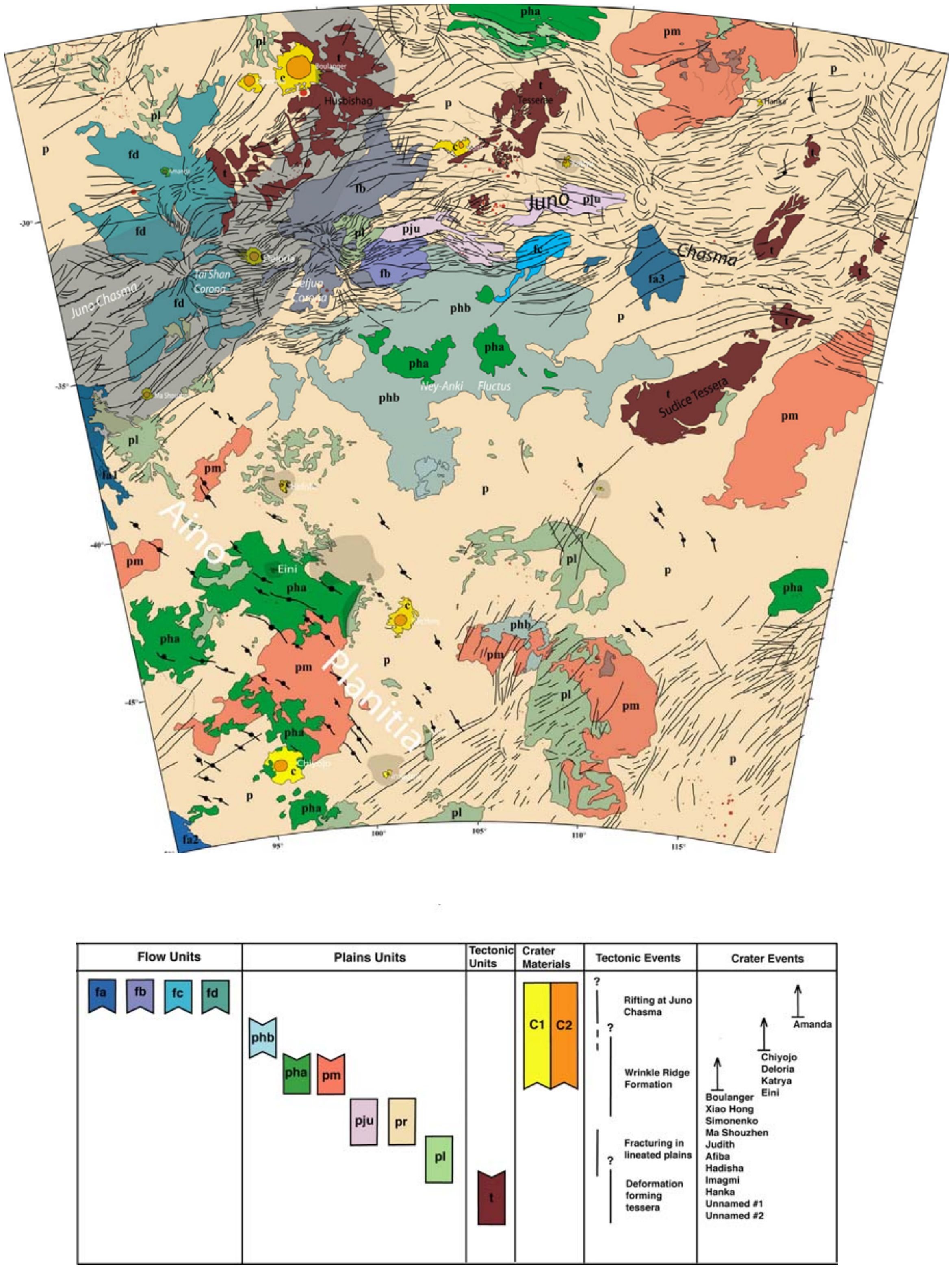

Figure 1. Regional-scale geologic map and correlation chart of the Juno Chasma Quadrangle (V-47). Units are defined on the basis of patterns in radar backscatter and cross-cutting and on-lapping relations.