RUSALKA COMPLETE: GEOLOGY OF A VENUSIAN PLANITIA D. A. Young and V. L. Hansen, Department of Geological Sciences, Southern Methodist University, Dallas, TX 75275 (dyoung@mail.smu.edu)

Introduction: The V25 ("Rusalka Planitia") and V37 ("Diana Chasma") quadrangles (150˚—180˚E; 25˚S—25˚N) cover nearly all of Rusalka Planitia, one of Venus's 1000-km scale, dynamically supported basins [1]. The planitia shows volcanism at all scales, from extensive corona-sourced flows though moderately sized shield volcanoes to small volcanic cones, all of which interact with tectonic elements of the planitia, such as wrinkle ridges, lineaments (presumed fractures), deformation belts and broad scale topography.

Methodology: Initial mapping was compiled digitally on a 225-meter/pixel image base derived from the FMAP dataset, to which synthetic stereo and Magellan geophysical data has been geographically referenced and linked for easy access. Additional image processing and analysis of the high-resolution FMAP images is carried out with IMAGE SXM freeware.

Mapping follows USGS guidelines, with the caveats outlined in [2].

Status: V37 [3] was submitted for review in mid-1999; V25 [4] will be submitted for review by the end of 2001.

Results: The earliest regional structural suite comprises NE to NNE trending subtle lineaments which 'fan out' from the SW corner of the quadrangle. This suite forms a useful geological marker for separating flows, although the complexities of reactivation must be considered[5]

A network of wrinkle ridges deforms most definable material units (including large coronal outflows) that lie below mean planetary radius. Some wrinkle ridge sets that occur on younger units trend parallel to the aforementioned lineaments, indicating contractional reactivation of the earlier, shallowly buried structures [6].

Three corona-associated flow assembleges dominate the quadrangles:

Southern Rusalka is dominated by flows that extend outward from the NNE-trending Seia Corona complex, and the large chasmata bound coronae Miralaidji Corona and Khabuch Corona. These flows embay a topographic moat to the north and east of the tessera inlier at the planita's southwestern corner. The eastern boundary of this flow complex is marked by the broad warp of uplifted 'basement' indicating that the NNW-trending warp existed, at least in part, prior to 'flow' emplacement. All flow units we have mapped are composite units comprising diachronous flows as indicated by detailed flow and fracture relations. Earlier flows are cut by NNE-trending Seia-related fractures, yet other flows cover these same fractures.

Northern Rusalka Planitia has been resurfaced by major flow assemblages associated with the 'stealth' coronae or archnoids of Zaryanitsa Dorsa at the heart of the basin. Nearby Llorono Planitia was filled by flows associated with Ituana Corona Both units are clearly confined by observed regional topography. However, retreating lava 'shorelines' in the Llorono Planitia group, and topographic arch development within the Rusalka Planitia group flows indicates enhancement of the region's topography at 10's of km horizontal scale occurred during and after emplacement of these units.

A 300-km wide complex of 10-km scale flows and small shield volcanoes lies near the center of the planitia.

Crater scarcity makes them useless for dating units within the context of this map [7].

Figure 1 shows a very simplified composite of geomorphic units in the Rusulka Planitia region—NO temporal correlation of units is implied.

Conclusions: Mapping in the Rusalka Planitia region indicates that coronae and corona-like features resurfaced the planitia. Tectonically, a radiating pattern of lineaments predates a topographically confined wrinkle ridge network. Medium-scale topography has been enhanced over the time period recorded by the mapped units.

References: [1] Simons.et. al (1997) *Geophysical Journal International 131* 24-44 [2] Hansen V. L., (2000) *Earth Planet. Sci. Lett. 176*, 527-542 [3] DeShon H. R. and Hansen V. L (1998) *LPSC 29*, #1438; [4] Young D. A. and Hansen V. L. (2000) *LPSC 31* #1622, [5] Young D. A. (2001) *LPSC 32* #1897; [6] DeShon et al. (2000), *JGR 105*, 6983-6995; [7] Campbell B. A. (1999) *JGR 104*, 21951-21954

Note: IMAGE SXM macros used for processing the map base data are available at: <www.geology.smu.edu/~tectonics/young/>

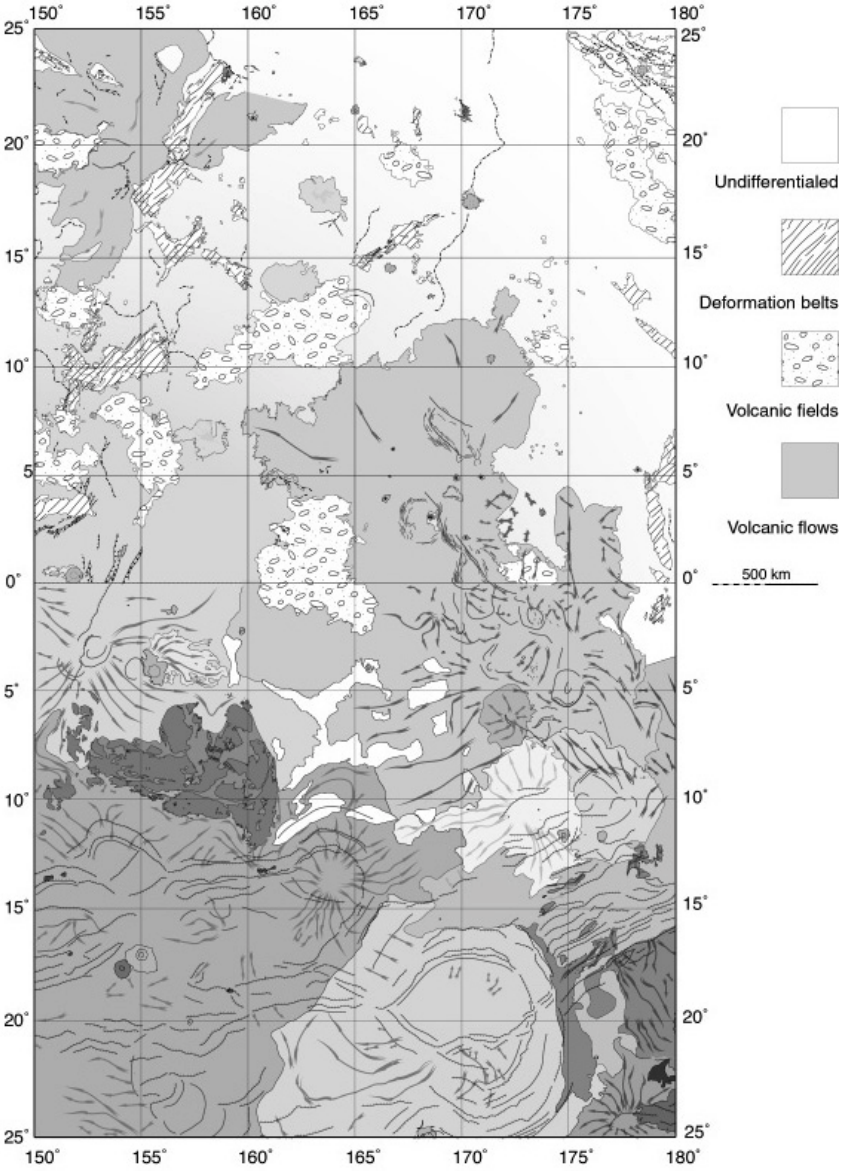

Figure 1 A simplified composite map of the Rusulka Planitia region to date. From V37 [DeShon and Hansen, in review] and V25 [Young and Hansen, in progress].