GEOLOGY OF THE OVDA REGIO QUADRANGLE (V35), VENUS. L. F. Bleamaster III and V. L. Hansen, Dept. of Geological Sciences, Southern Methodist University, Dallas, TX 75275-0395 (lbleamas@mail.smu.edu).

Introduction: The Ovda Regio quadrangle, located at 0°N - 25°S latitude and 090°E - 120°E longitude, comprises 8.4 million square kilometers of some of the most complex geology on Venus. The region is host to portions of two crustal plateaus consisting of tessera terrain (eastern Ovda and western Thetis), Inari (and other) coronae, numerous small volcanic edifices (~1500), sixteen impact craters, and an intricate rift system including the Kuanja and Vir-Ava chasmata complexes (Fig 1). We have identified over forty material units and numerous structural suites using Magellan synthetic aperture radar (SAR) images. The relative temporal associations of these units have been constrained by the use of local embayment and cross-cutting relationships. Unfortunately, these relationships only represent local processes and cannot be used to make broad regional or global conclusions because they lack spatial continuity and/or temporal dependence. The Ovda Regio location provides the opportunity to investigate 1) crustal plateau evolution (in Ovda and Thetis), 2) chasmata formation and evolution (Kuanja and Vir-Ava), and 3) the importance of coronae volcanism as a resurfacing agent (Inari).

Crustal Plateaus: Eastern Ovda Regio and western Thetis Regio are small portions of two much larger crustal plateaus (high standing, steep-sided, flat-topped, quasi-circular regions of thickened crust) [1,2,3]. The surface of these crustal plateaus manifests as an intricate pattern of intersecting lineaments first defined as tessera by Barsukov [4] and Basilevsky [5] using Soviet Venera radar data. Tessera within the V35 quadrangle represents the oldest deformed crust and owes its longevity to its high standing nature (~2-4 km above MPR). Modification of tessera terrain is observed in localized areas. Both tectonic (predominately at the plateau margins) and volcanic processes serve to destroy the crustal plateau edifice. Fragmented pieces of tessera terrain located just south of Ovda Regio proper represent blocks, once part of Ovda, that have been dissected by late stage rifting associated with the Kuanja Chasmata. Volcanism also serves to modify the crustal plateau. Flows emanating from various sources (large volcanic domes, shields, and fissures) within the crustal plateau embay structural depressions. Near the margins of the plateaus, flows originating from within the crustal plateau spill over the plateau margin and supply marginal depressions. Tahmina Planitia, located to the south of eastern Ovda, is one such basin that has been flooded, via LoShen Valles, by lavas originating from sources within the crustal plateau (Ovda). Magmatism is recognized to be an important process for crustal plateau construction [1,6] and destruction.

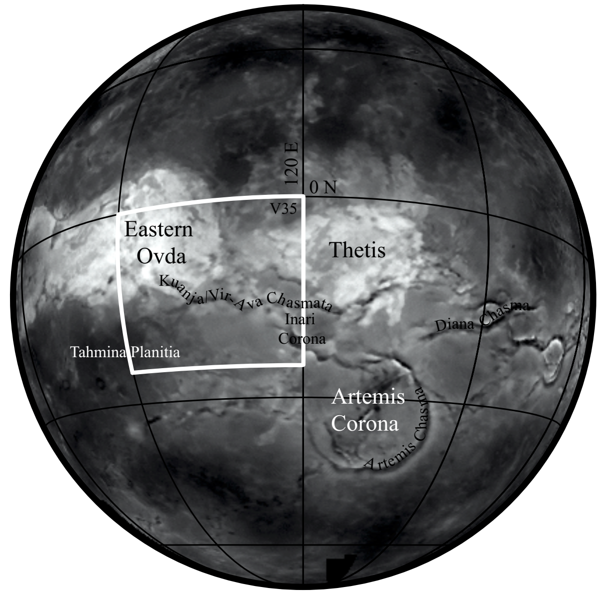

Figure 1. Perspective view of Venus topography (centered at 15S, 120E) with names of prominent features. Bright areas are high standing regions whereas dark areas are low standing. V35 is outlined in white.

Kuanja/Vir-Ava Chasmata: The Kuanja/Vir-Ava Chasmata complex is a band of intense deformation 150-400 kilometers in width that stretches in an east-west direction across the entire V35 quadrangle. A penetrative fabric of lineaments identified as pit chains, troughs, normal faults and fractures comprise the structural suite. To the east, Vir-Ava connects to the same system that includes Inari Corona, Artemis Corona, Artemis Chasma, and Diana Chasma. Kuanja, the western portion of the complex, intersects the southern margin of eastern Ovda Regio and tapers to a termination within central Ovda. The tapering toward the west and the volcanic/tectonic relationships to the east suggest that deformation has migrated from the east to the west through time (essentially, the rift is unzipping to the west). The Kuanja/Vir-Ava system also branches to the north at the boundary between eastern Ovda and western Thetis. We interpret this bifurcation of the chasmata as the result of strain partitioning occurring when the chasmata encounters stronger, thicker crust at the Ovda margin. Heterogeneities in the lower crust between eastern Ovda and western Thetis provide a weak zone for deformation to follow. This, coupled with the strong structural/topographical dependence on crustal plateaus [1,7] and the distinctly independent surface structure patterns observed at Ovda and Thetis [7,8], strongly supports the idea that crustal plateaus (characterized by tessera terrain) record independent deformational events rather than planet-wide, contemporaneous tesserization.

Coronae Volcanism: Coronae volcanism and deformation play an important role in the geologic history of the southern portion of V35. Inari Corona, located in the southeast corner, is responsible for large outpourings of lava and large-scale deformation. The interfingering of volcanism and tectonism through time can be seen throughout the evolution of Inari Corona. Large radial sheet flows dominate the early stages of Inari activity. These flows are then uplifted and dissected by circumferential and radial fractures. Some of these fractures serve as outlets for secondary, localized, lava flows. Further deformation is then recorded as interior stepping, circumferential normal faults associated with deflation of the corona's internal support.

A large coronae cluster, located near the south central portion of V35, is host to 3 moderately-sized and 2-5 small deformation centers. Flows emanating both internally and externally to these centers mask much of their individual tectonic relationships which make relative time estimates difficult. The coronae cluster is easily lumped together as one large dynamic mass containing multiple sites of isolated volcanic and tectonic activity interspersed through a reasonably limited period of time.

The coronae within V35 (Inari and the cluster), like many coronae on Venus, show a strong spatial correlation with chasmata features [9,10]. Structural trends from most coronae in V35 merge with those associated with the Kuanja/Vir-Ava Chasmata, commonly becoming indiscernable. Their strong spatial correlation has led to speculation that the two are the result of the same process. Evidence presented in abstract #1316 (Chasmata, A Coherent Intrusion Complex) supports present coronae formation models that attributes them to Rayleigh-Taylor instabililities [11], or mantle diapirs [12,13,14] originating above the apexes of cylindrical mantle convection cells [9,15]. Coincident formation of coronae, spawned diapirs (thermal or compositional) from within broad mantle upwellings, and chasmata, intensely intruded linear zones serving as underground plumbing systems, may be responsible for significant mantle heat loss.

References: [1] Hansen, V.L., Banks, B.K., and Ghent, R.R. (1999) *Geology*, 27, 1071-1074 [2] Smrekar, S.E. and Phillips, R.J. (1991) *EPSL*, 107, 582-597 [3] Herrick, R.R. and Phillips, R.J. (1992) *JGR*, 97, 16017-16034 [4] Barsukov, V.L. and 29 others (1986) *JGR*, 91, D378-D398 [5] Basilevsky, A.T. and 5 others (1986) *JGR*, 91, D399-D411 [6] Banks, B.K. and Hansen, V.L. (2000) *JGR*, 105, 17655-17668 [7] Ghent, R.R. and Hansen, V.L. (1999) *Icarus*, 139, 116-136 [8] Bleamaster, L.F. and Hansen, V.L. (2000) *LPSC XXXI*, 1788 [9] Hamilton, V.E. and Stofan, E.R. (1996) *Icarus*, 121, 171-194 [10] Stofan, E.R., Smrekar, S.E. and Martin, P (2000) *LPSC XXXI*, 1578 [11] Tackey, P.J. and Stevenson, D.J. (1991) *Eos Trans.*, 72, 287 [12] Stofan, E.R. and Head, J.W. (1990) *Icarus*, 83, 216-243 [13] Squyers, S.W. and 6 others (1992) *JGR*,97, 13611-13634 [14] Stofan, E.R. and 6 others (1992) *JGR*, 97, 13347-13378 [15] Stofan, E.R. and 3 others (1997) in *Venus II*, 931-965.