U.S. Department of the Interior
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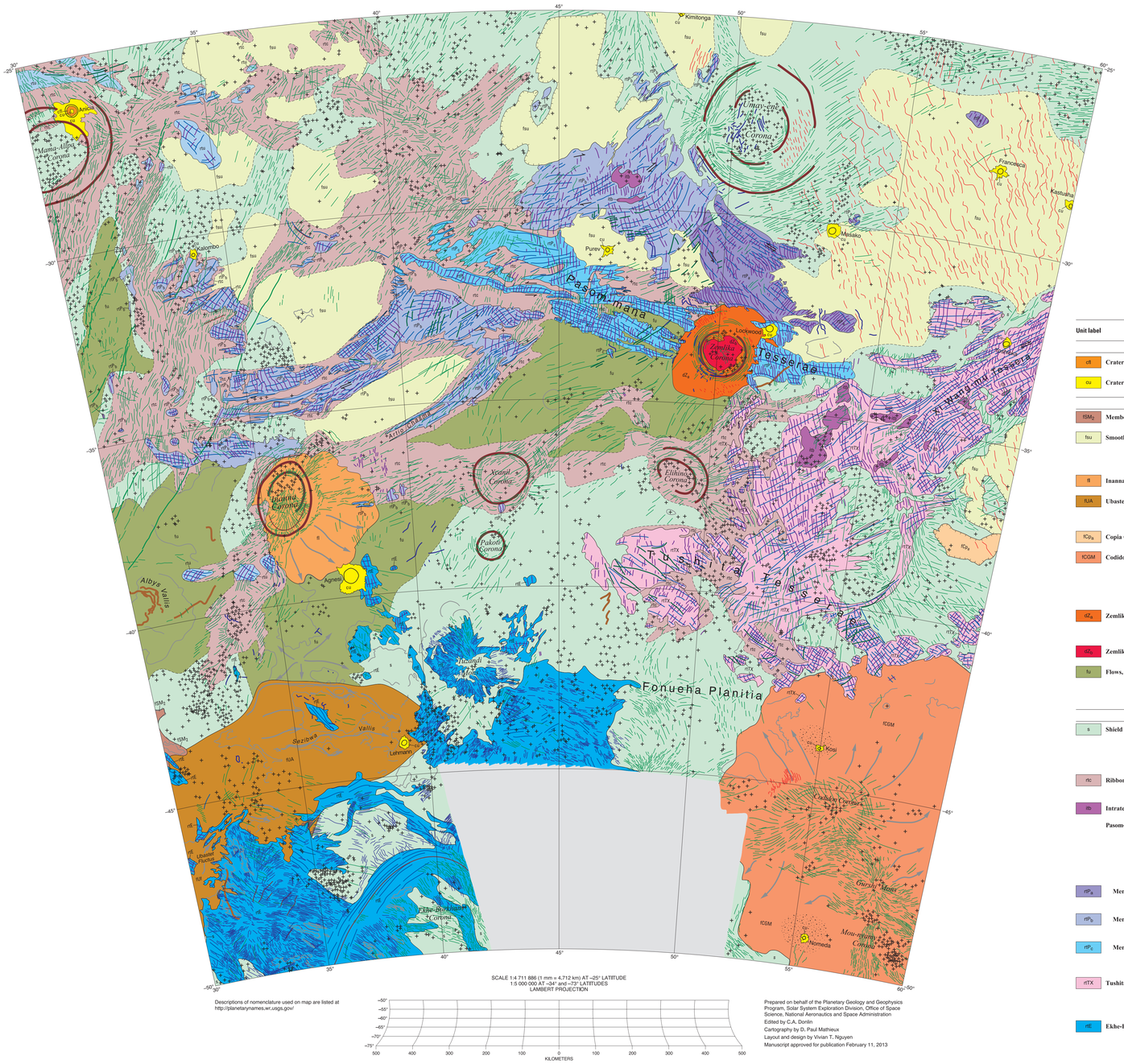
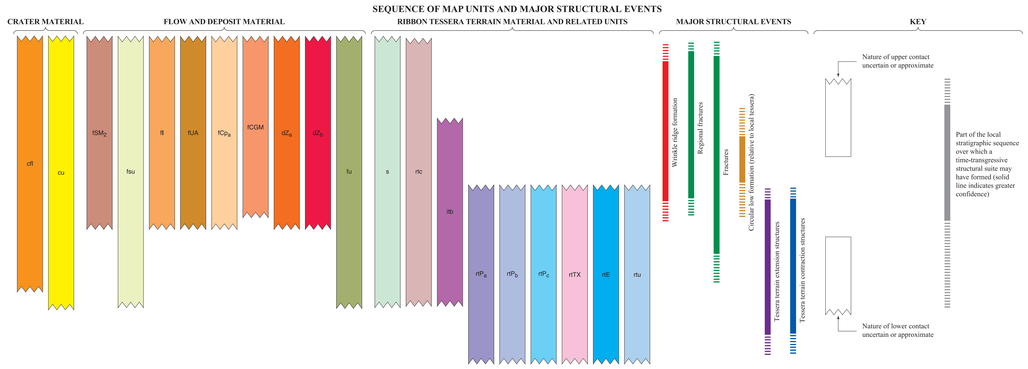
Scientific Investigations Map 3250
Pamphlet accompanies map



SEQUENCE OF MAP UNITS AND MAJOR STRUCTURAL EVENTS



DESCRIPTION OF MAP UNITS

Unit label	Unit name	Unit definition	Interpretation
		CRATER MATERIAL	
cfl	**Crater fill material**	Undifferentiated, very low backscatter, low-RMS slope material filling some impact basins	Low viscosity, gently emplaced material that locally filled craters following impact crater formation
cu	**Crater material, undivided**	Moderate- to high-backscatter, high-RMS slope material	Near-field ejecta and structurally uplifted breccia associated with bolide impact and blocky texture
		FLOW AND DEPOSIT MATERIAL	
fSM_2	**Member 2 of Sephira Mons flow material**	Digitate, radar-bright, locally lobate shaped material sourced from Sephira Mons in V–44 to the west	Assemblage of flows resulting from flank and summit eruptions in the late stage of volcanism
fsu	**Smooth flows, undivided**	Generally low backscatter material of mostly homogeneous texture. Locally may include shields, although this might be due to shield forming on unit fsu or to unit fsu locally flowing around shields. Locally correlative with portions of unit pcA (Aino composite plains material, V–46) along the eastern boundary of the map area	Low viscosity flow materials
fl	**Inanna Corona flow material**	Medium to low backscatter with faint digitate to lobate forms, indicating flow outward from Inanna Corona	Flows related to the formation of Inanna Corona
fUA	**Ubastet Fluctus and Astkhik Planum flow material**	High- to low-backscatter material with channels and digitate to lobate forms. Locally includes shields and radar boundaries. Ubastet Fluctus material emanates from Astkhik Planum in V–44. Correlative with unit fUA in V–44	Lava flows erupted from vicinity of Derceto Corona, V–44
fCp_a	**Copia Corona flow material, member a**	Medium- to low-backscatter material with lobate flow margin. Sourced from Copia Corona in V–46. Correlative with unit fCpa in V–46	Extensive flows from vents within or at the margin of Copia Corona
fCGM	**Codidon, Gurshi, Mou-nyamy Coronae flow material**	Medium- to low-backscatter material with faint lobate flows and flow margins, indicative of relative flow direction. Material sourced from Codidon and Mou-nyamy Coronae and Gurshi Mons (undivided). The relative timing and spatial extent of flows from each source are indistinguishable. Locally includes shields. Correlative with units fCd and fMn, Codidon Corona flow material and Mou-nyamy Corona flow material, respectively, in V–46 to the east	Variable viscosity flow materials from vents associated with Codidon Corona, Gushi Mons, and Mou-nyamy Corona
dZ_a	**Zemlika deposit material, member a**	Low-backscatter material. Material associated with interior apron and rim of Zemlika; locally flows into topographic lows of adjacent rtP_a, rtP_b, rtP_c. Materials are cut by concentric fractures spatially associated with Zemlika's rim and local wrinkle-ridges suites	Material related to Zemlika formation
dZ_b	**Zemlika deposit material, member b**	Low-backscatter to hummocky material. Material associated with interior Zemlika; includes shields	Material related to Zemlika formation, likely dZ_b forming during late stages of Zemlika evolution
fu	**Flows, undivided**	Generally low backscatter material of mostly homogeneous texture. Locally may include shields; locally includes radar boundaries. Contacts with units rtu and s typically gradational. Correlative with units prl (lineated regional plains material) in V–44 to the west and pcA (Aino composite plains) in V–46 to the east	Low viscosity flow materials
		RIBBON TESSERA TERRAIN MATERIAL AND RELATED UNITS	
s	**Shield terrain material**	Intermediate- to low-backscatter material of heterogeneous texture. Composed of distributed shields that cover much of the map area. Locally correlative with portions of unit prl (lineated plains material, V–44), along the western boundary of the map area, and with portions of unit pcA (Aino composite plains material, V–46) along the eastern boundary of the map area	Composite shield-related volcanic materials
rtc	**Ribbon tessera cover material**	Low backscatter. Contains shields. Locally embays ribbons and folds. Locally correlative with portions of units pr (ridged plains material) and prl (lineated regional plains material) in V–44 to the west	Thin cover material that buries Pasom-mana and Xi Wang-mu Tesserae terrain; tectonic fabric trends parallel those of subsurface tessera terrain
rtb	**Intratessera basin material**	Low backscatter. Contains shields. Locally embays ribbons and folds	Volcanic flows from localized sources within Pasom-mana and Xi Wang-mu Tesserae terrains (Banks and Hansen, 2000)
rtP_a	**Pasom-mana ribbon-tessera terrain** **Member a**	High-backscatter, moderate- to low-relief terrain deformed by different suites of tectonic structures including various wavelengths of ribbon structures, various wavelengths of folds, and complex graben. Unit is likely locally correlative with portions of unit t (tessera material, V–44) based on parallelism of structural fabric orientation. Facies a, b, and c differentiated from one another based on the orientation of fold crests and ribbon trough trends (fig. 4). Differentiated from units rtE and rtTX based on structural fabric orientation Exposed south of Umay-ene Corona and hosts northwest-trending folds and orthogonal (northeast-trending) ribbon troughs. S-C tessera fabrics record local left-lateral shear	Material of unknown genetic origin deformed by ribbon and fold tectonic fabric formed during progressive thickening of a thin mechanical layer (Hansen and Willis, 1998; Hansen, 2006)
rtP_b	**Member b**	Extends west from Umay-ene Corona to the western edge of V–45 and hosts northeast-trending fold crests and orthogonal (northwest-trending) ribbon troughs; S-C tessera fabrics record local right-lateral shear	
rtP_c	**Member c**	Lies along the west-northwest-trending high of Pasom-mana Tesserae and hosts west-northwest-trending fold crests and northeast-trending ribbon troughs and S-C tessera fabrics that record local left-lateral shear; divides member b into two major packages	
rtTX	**Tushita and Xi Wang-mu ribbon-tessera terrain**	High-backscatter, moderate- to low-relief terrain deformed by different suites of tectonic structures including various wavelengths of ribbon structures, various wavelengths of folds, and complex graben. Differentiated from units rtP_a, rtP_b, rtP_c, and rtE based on structural fabric orientation. Correlative with unit t (tessera material) in V–46	Material of unknown genetic origin deformed by ribbon and fold tectonic fabric formed during progressive thickening of a thin mechanical layer (Hansen and Willis, 1998; Hansen, 2006)
rtE	**Ekhe-Burkhan ribbon-tessera terrain**	High- to moderate-backscatter, moderate relative relief but low regional relief terrain deformed by different suites of tectonic structures including various wavelengths of ribbon structures. Differentiated from units rtP_a, rtP_b, rtP_c, and rtTX based on structural fabric orientation. Unit is likely locally correlative with portions of unit t (tessera material, V–44) based on parallelism of structural fabric orientation	Materials of unknown genetic origin deformed by ribbon and fold tectonic fabric formed during progressive thickening of a thin mechanical layer (Hansen and Willis, 1998; Hansen, 2006)
rtu	**Ribbon-tessera, undivided**	High- to moderate-backscatter, moderate relative relief but low regional relief terrain deformed by different suites of tectonic structures including various wavelengths of ribbon structures and folds that occur as inliers or kipukas in the lowland. Based on parallelism of folds and ribbon structures preserved within various outcrops, different portions of this composite (?) unit may be correlative with unit rtE (to the south) and units rtP_a, rtP_b, and rtP_c (to the north)	Materials of unknown genetic origin deformed by ribbon and fold tectonic fabric formed during progressive thickening of a thin mechanical layer (Hansen and Willis, 1998; Hansen, 2006)

EXPLANATION OF MAP SYMBOLS

Symbol, feature name	Characteristics
PRIMARY STRUCTURES	
Small shield	Diameter <10 km
Airburst spot	
Flow direction	
Pit chain	
Channel	
Radar boundary	
Crater rim crest	
Contact	Dashed where gradational or uncertain
Flow boundary	Hachures point toward flow
SECONDARY STRUCTURES	
Fracture	Typically <50 km long
Regional fracture	Typically >100 km long
Graben	
Wrinkle ridge	
Ridge crest	
Sharp break in slope	Typically <50 km long
Ribbon trend	Typically <100 km long
Fold hinge trend	
Lineament trend	
Ductile shear sense	Showing relative movement

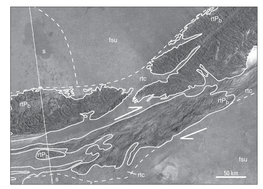


Figure 2. Inverted and stretched Magellan SAR image (center –34S/37.5E) showing examples of different types of ribbon-tessera fabrics and units associated with ribbon-tessera terrain. Unit rtP_b shows orthogonal ribbon-fold-tessera fabric with generally east-northeast-trending fold axes and orthogonal ribbon troughs and grabens in the northern tessera exposures. Unit rtP_b also shows S-C ribbon-terrain fabrics within the southern exposure shown here; the asymmetric fabric records right-lateral-shear displacement. Unit rtc (covered ribbon terrain) locally surrounds rtP_b; note parallelism of lineaments in rtc with lineament trends in rtP_b. Shield terrain (unit s) and smooth flows undivided (unit fsu) also shown; note gradational contact between these units and between units s and fsu and between units fsu and rtc. The nearly north-trending white line that transects the image along the left side is the boundary between two FMAP images.

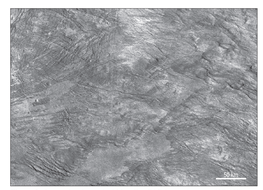


Figure 3. Inverted and stretched Magellan SAR image (center –43S/45E) showing structural fabric of unit rtE. Ekhe-Burkhan ribbon tessera. Note the orthogonal fabric in upper left corner marked by northeast-trending folds (?) and orthogonal ribbon troughs. Numerous shields occur across much of the area. Locally, shield material coalesces to form a radar smooth layer that clearly embays the delicate structural topography of the tessera fabric; however, these regions are also locally cut by later-formed lineaments. In many cases, it is not clear if lineaments represent contractional structures, such as fold axes, or extensional structures, such as ribbon troughs or graben. The character might change along trend, as documented elsewhere (Hansen, 2005).

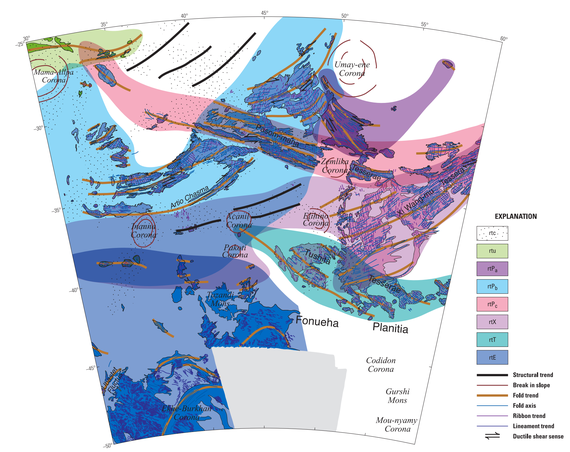


Figure 4. Generalized geologic map of ribbon-tessera terrains and structures across V–45 quadrangle, Venus, showing interpretation of subsurface extension of various ribbon-terrain units (light hues). Ribbon-terrain exposures shown in dark hues, with associated short-wavelength ribbon and fold trends; buried ribbon-terrain exposure shown in stipple pattern. Breaks in slopes mark many, but not all, area coronae. Generalized trends of ribbon terrain units highlight possible terrain correlations and crosscutting relations. Structural trends associated with unit rtc parallel general fold fabric trends. Ductile shear sense interpreted from asymmetric S-C ribbon tessera fabrics shown by black arrow pairs. Note possible crosscutting relations between various ribbon-tessera terrains or members. Orthogonal ribbon-fold fabrics and left-lateral shear fabrics of unit rtP_a are truncated by fabrics of unit rtP_b, which include right-lateral shear fabrics. Unit rtP_c, recording local left-lateral shear, appears to truncate unit rtP_b dividing it into at least two major rafts. Ribbon-fold fabrics of rtT and rtX, shown as separate members in this figure but as a single unit rtTX in the geologic map, seem to record possibly mutually crosscutting relations. Units rtP_a and rtP_c may merge into unit rtX, which might record localized right-lateral shear displacement. Unit rtE occurs mostly spatially separate from the other ribbon terrain, although possible overlapping might occur as shown. Buried structural trends could be (variably) correlative with structural trends of rtP_b, rtX, rtT, or even rtE. Note truncation of ribbon-tessera fabrics by Mama-Allpa, Umay-ene, Zemlika, Xcanil, and Elhino Coronae. Inanna, Xcanil, and Elhino Coronae lie within unit rtc. Codidon and Mou-nyamy Coronae and Gurshi Mons occur spatially distinct from ribbon tessera and related units.

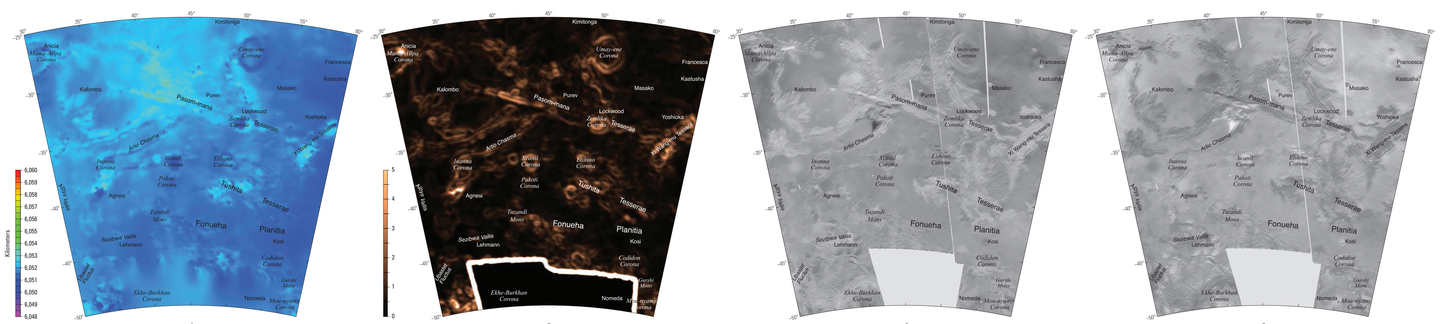
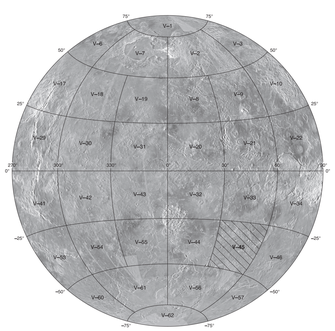


Figure 1. Magellan data for Agnesi quadrangle (V–45) of Venus with major geomorphic features labeled; each image shown in Lambert conformable projection: *A*, Altimetry data; *B*, RMS slope data; *C*, Magellan SAR data; and *D*, inverted Magellan SAR data.



Geologic Map of the Agnesi Quadrangle (V–45), Venus

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