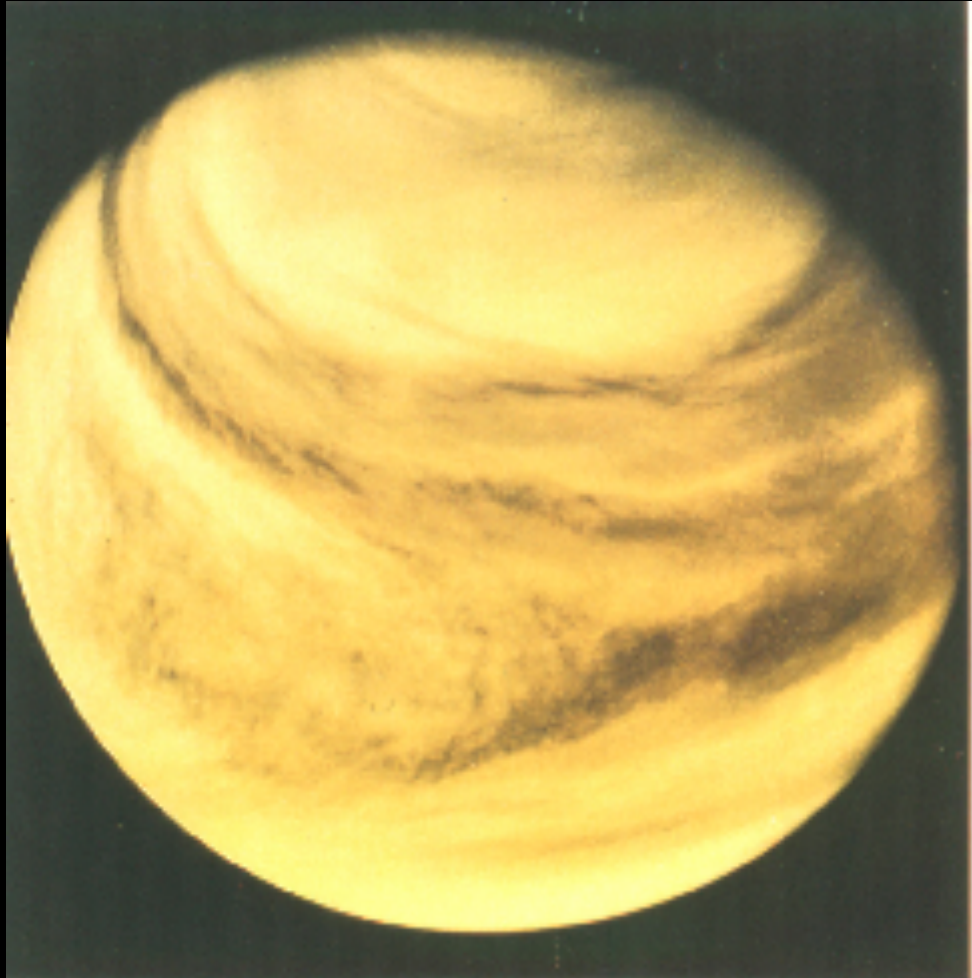


COMPARATIVE TECTONICS OF VENUS AND EARTH

Donna M. Jurdy

*Department of Earth & Planetary Sciences
Northwestern University*

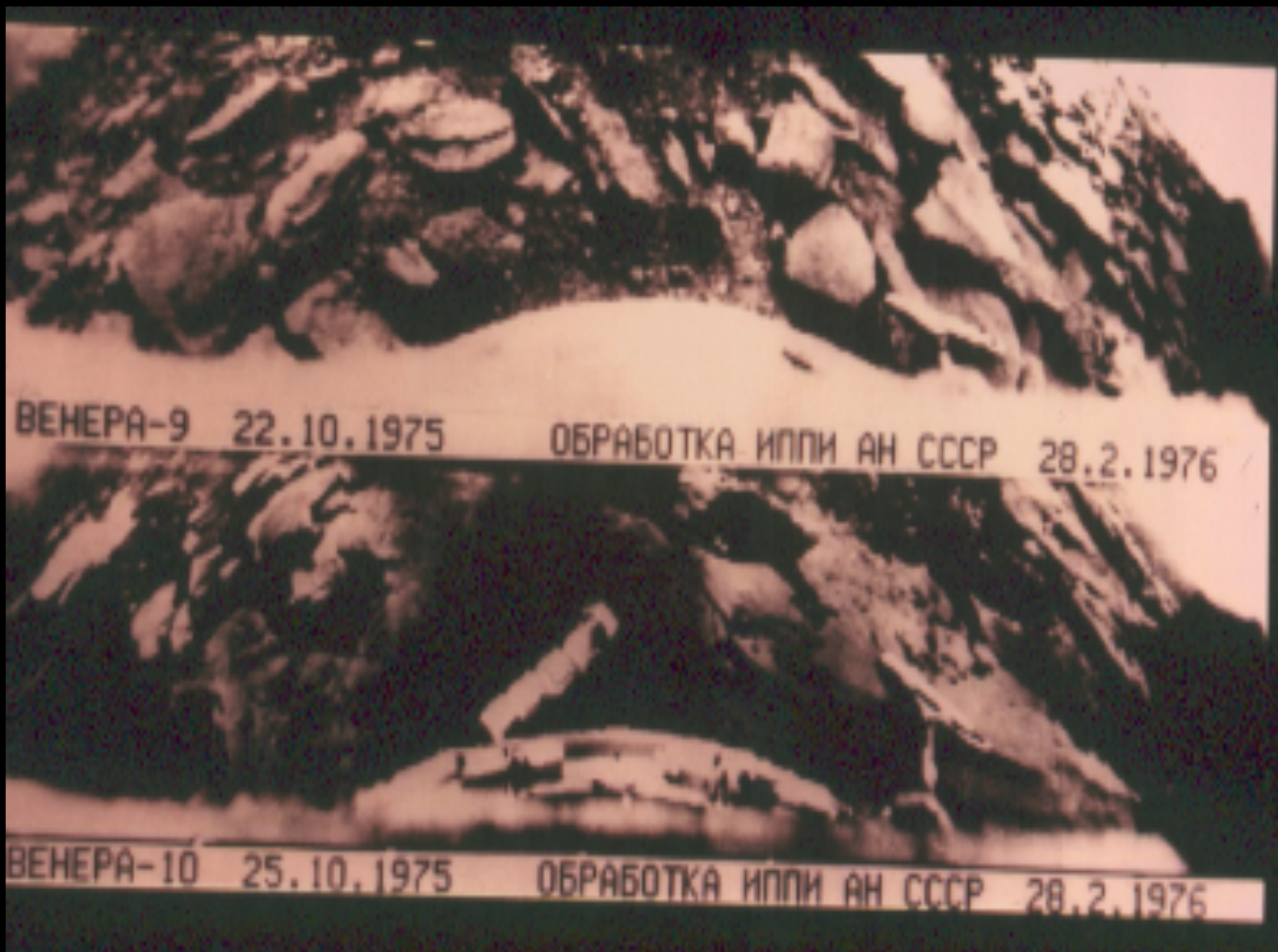
Pioneer image of Venus



50's sci-fi view of Venus



Venera 9 - 1975



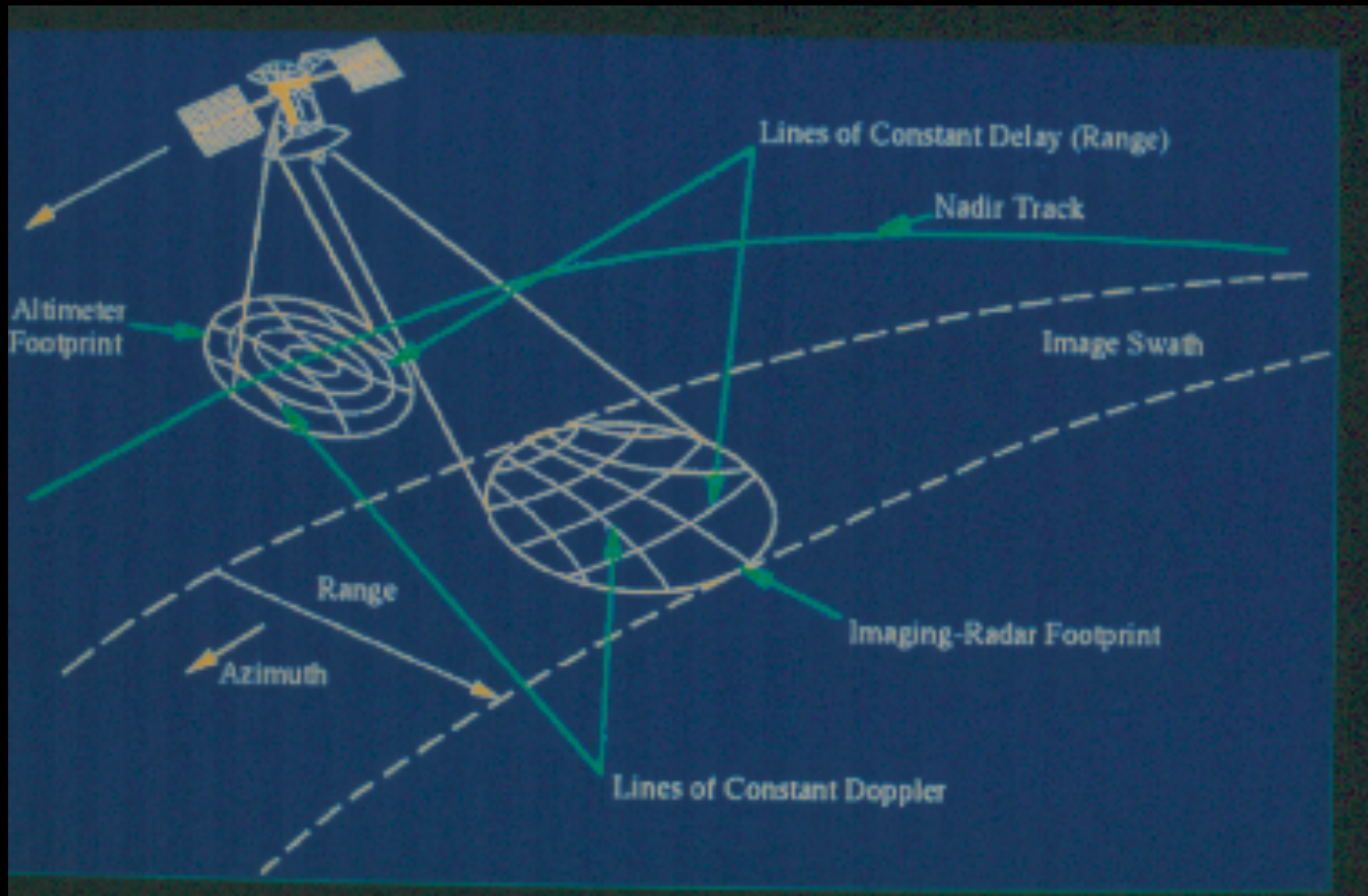
Venus Magellan Mission



Magellan Antenna



Magellan Radar Imaging



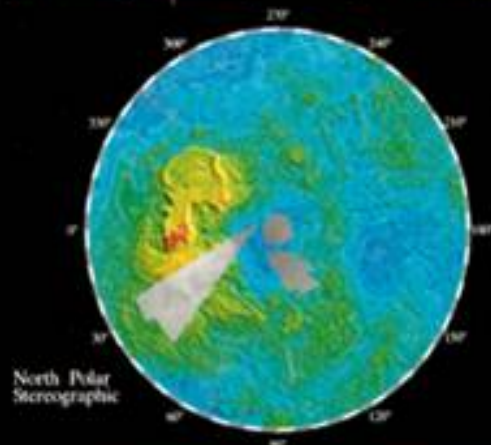
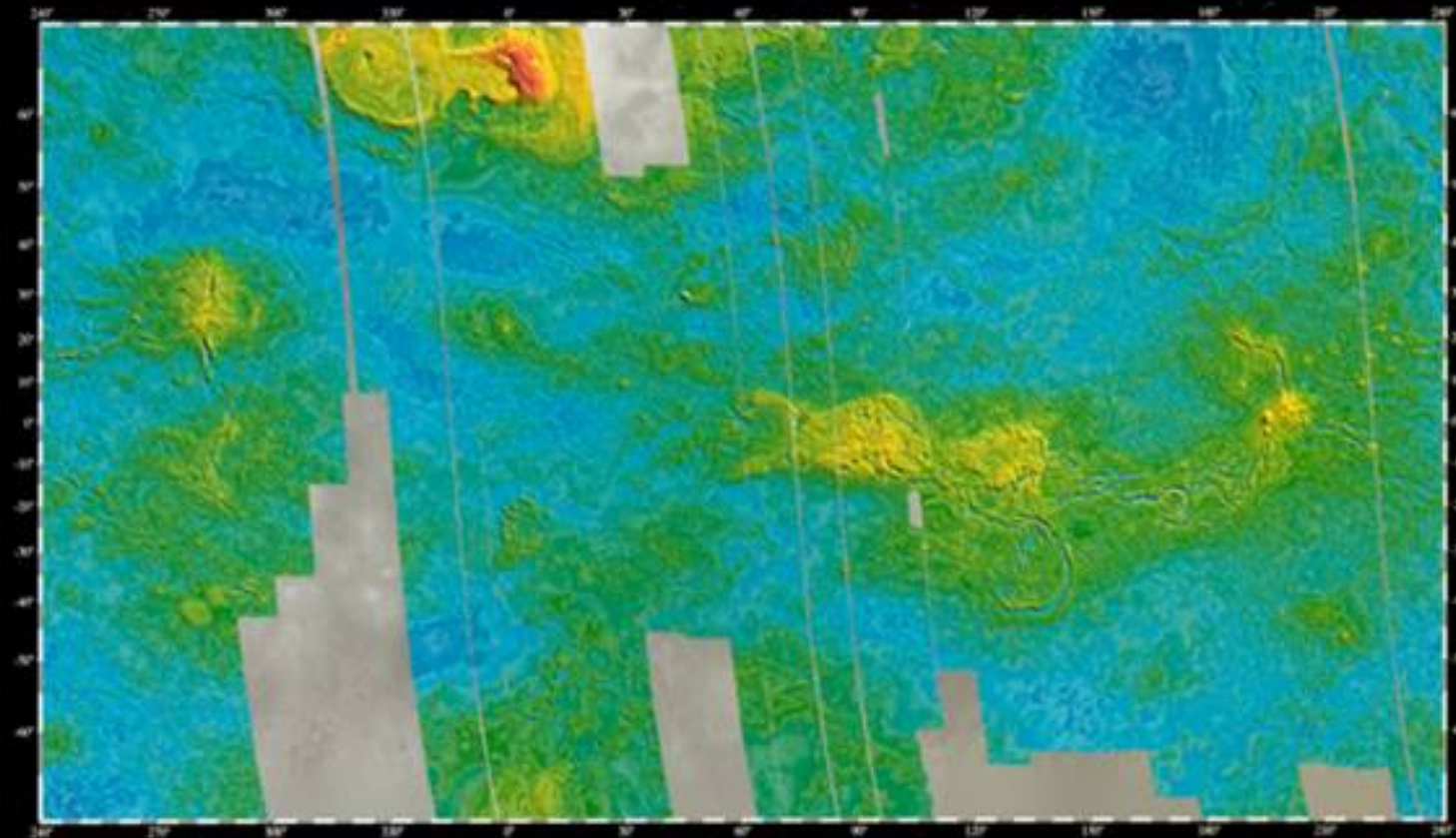
Venus- radar mosaic



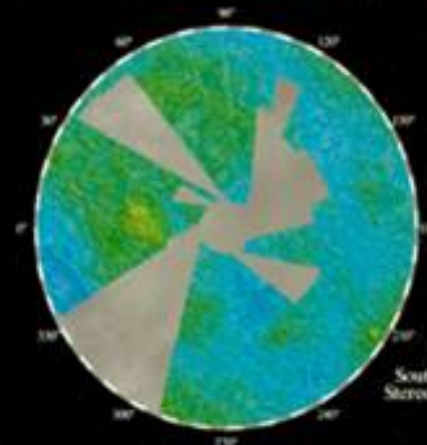
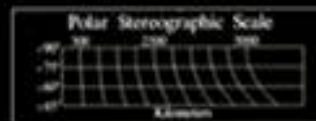
MAGELLAN

VENUS TOPOGRAPHY

GTDRP.1:3



North Polar Stereographic

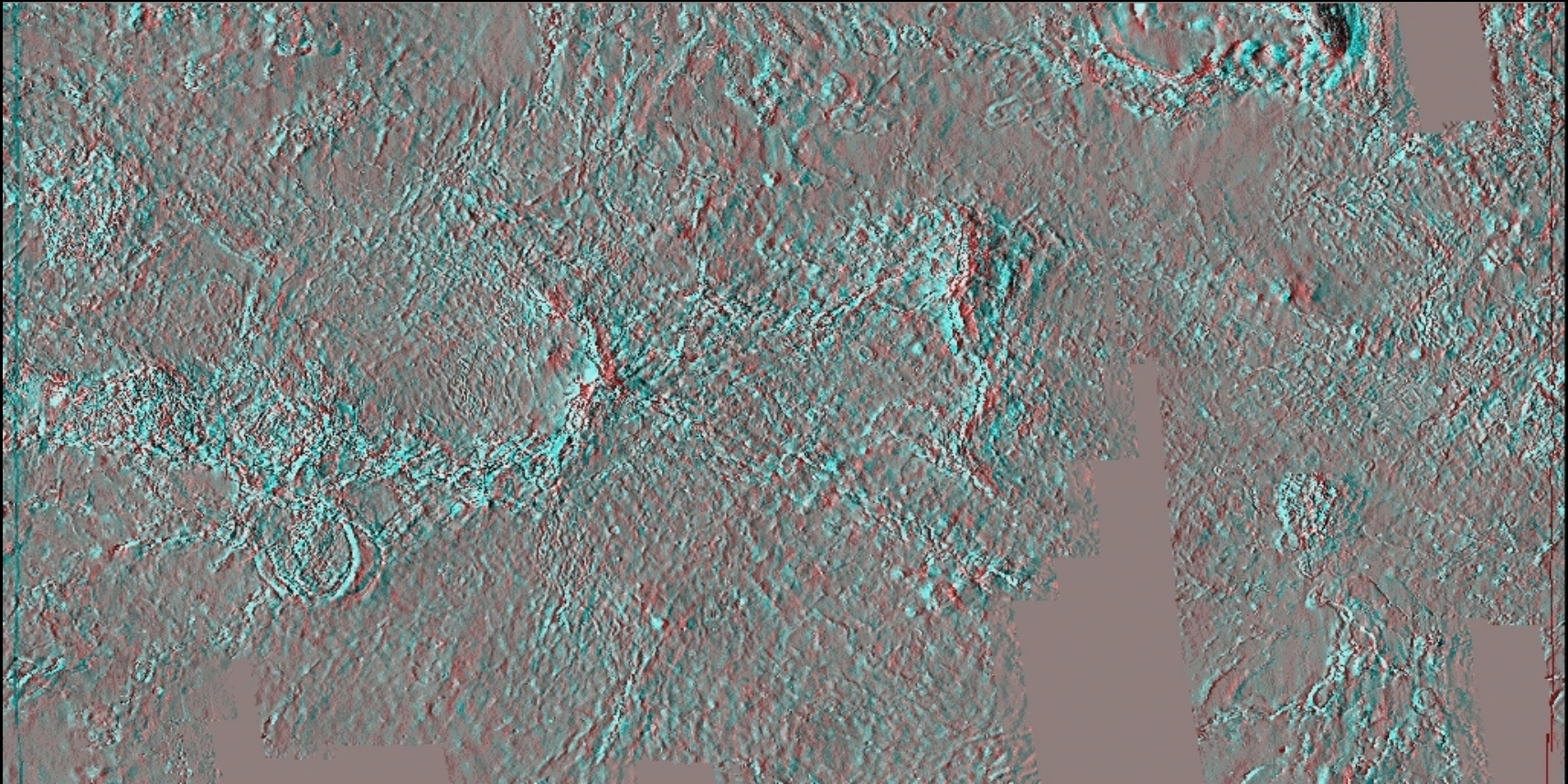


South Polar Stereographic

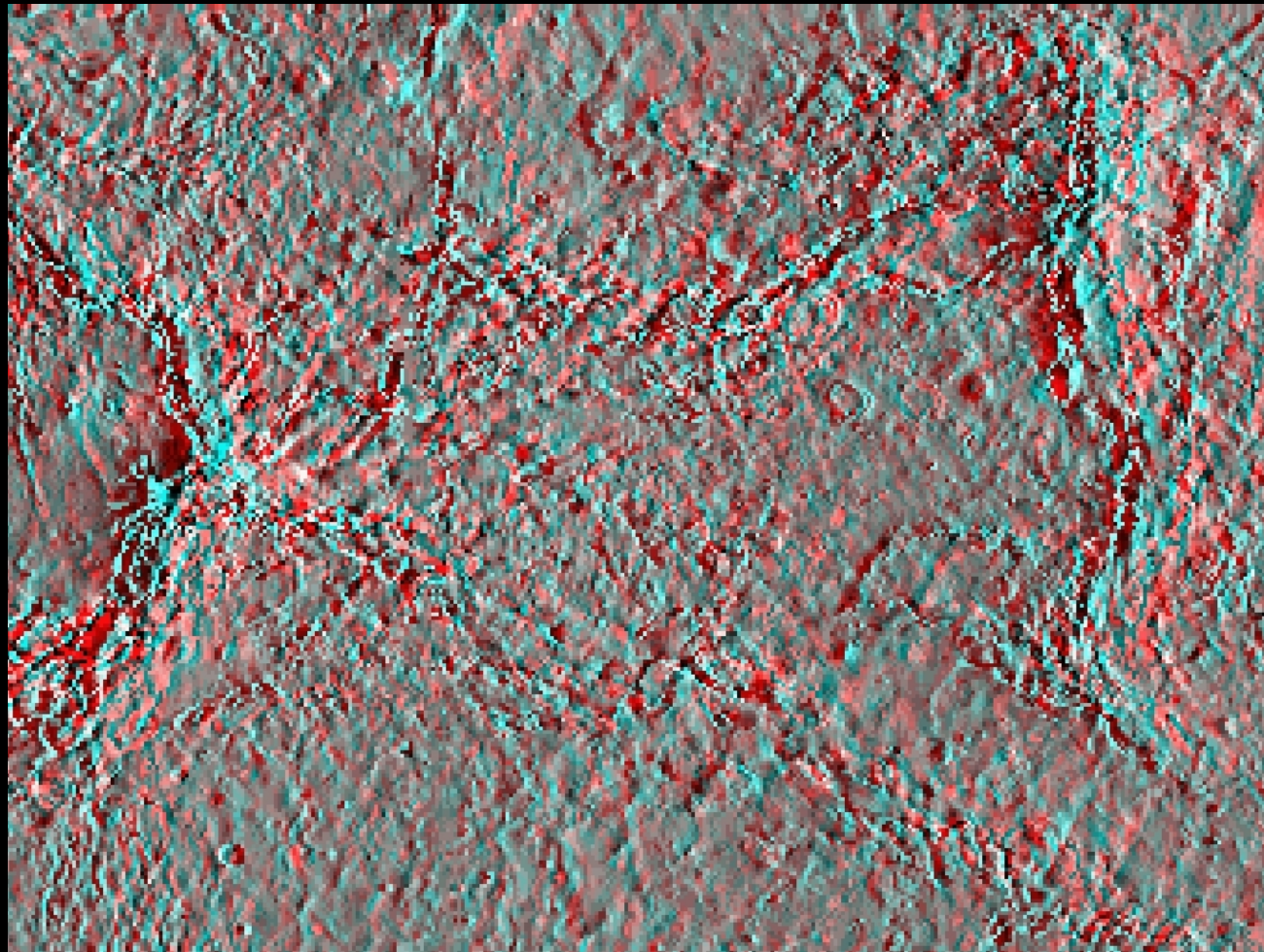


PRODUCT ID:	GTDRP.1:3	PRODUCTION DATE:	11/02/91
STARTING ORBIT:	376	PRODUCTION TIME:	13:19:13
ENDING ORBIT:	2586	HARDWARE VERSION:	01
PIXEL SIZE:	5x5 km	SOFTWARE VERSION:	02

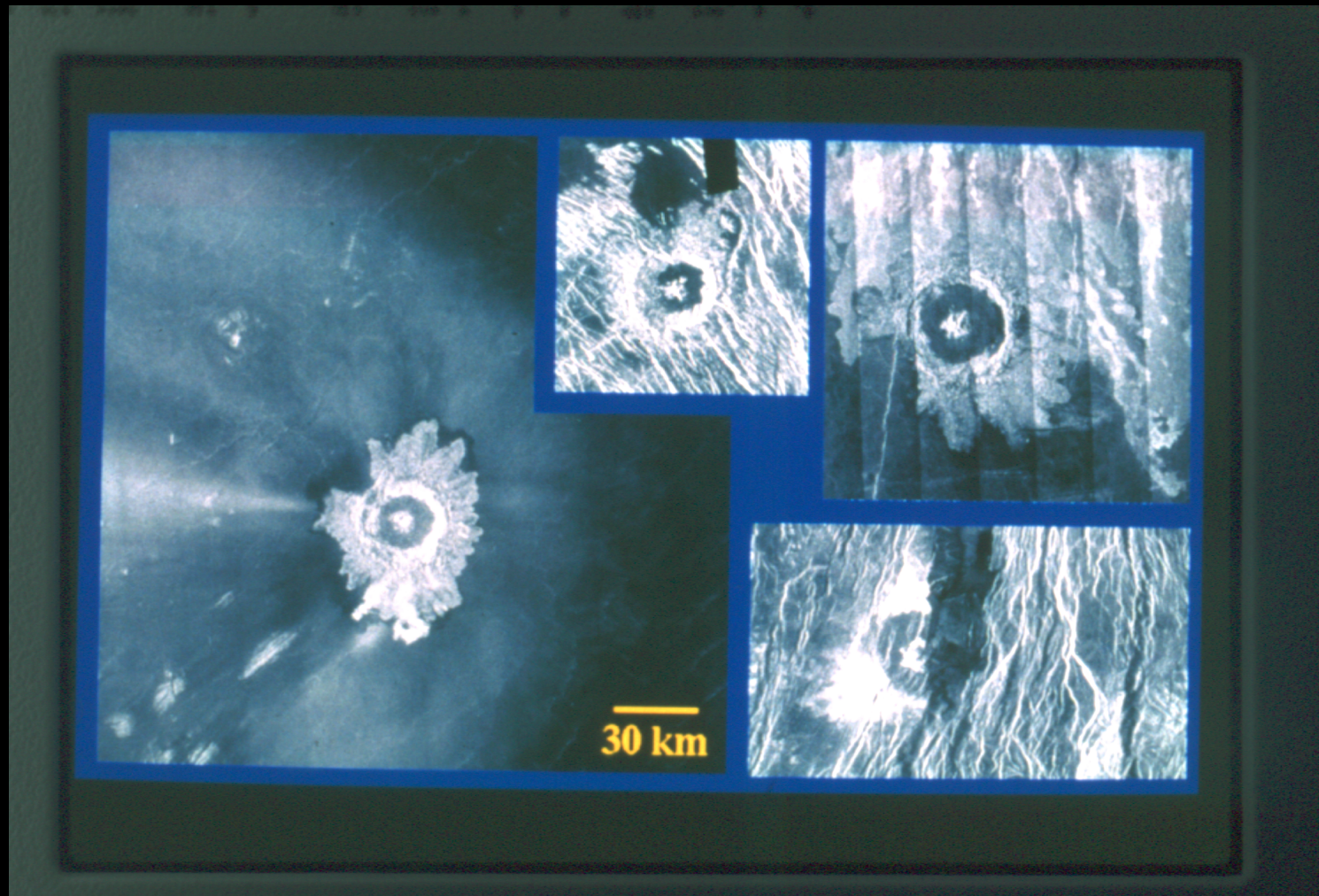
Venus 3D Topo



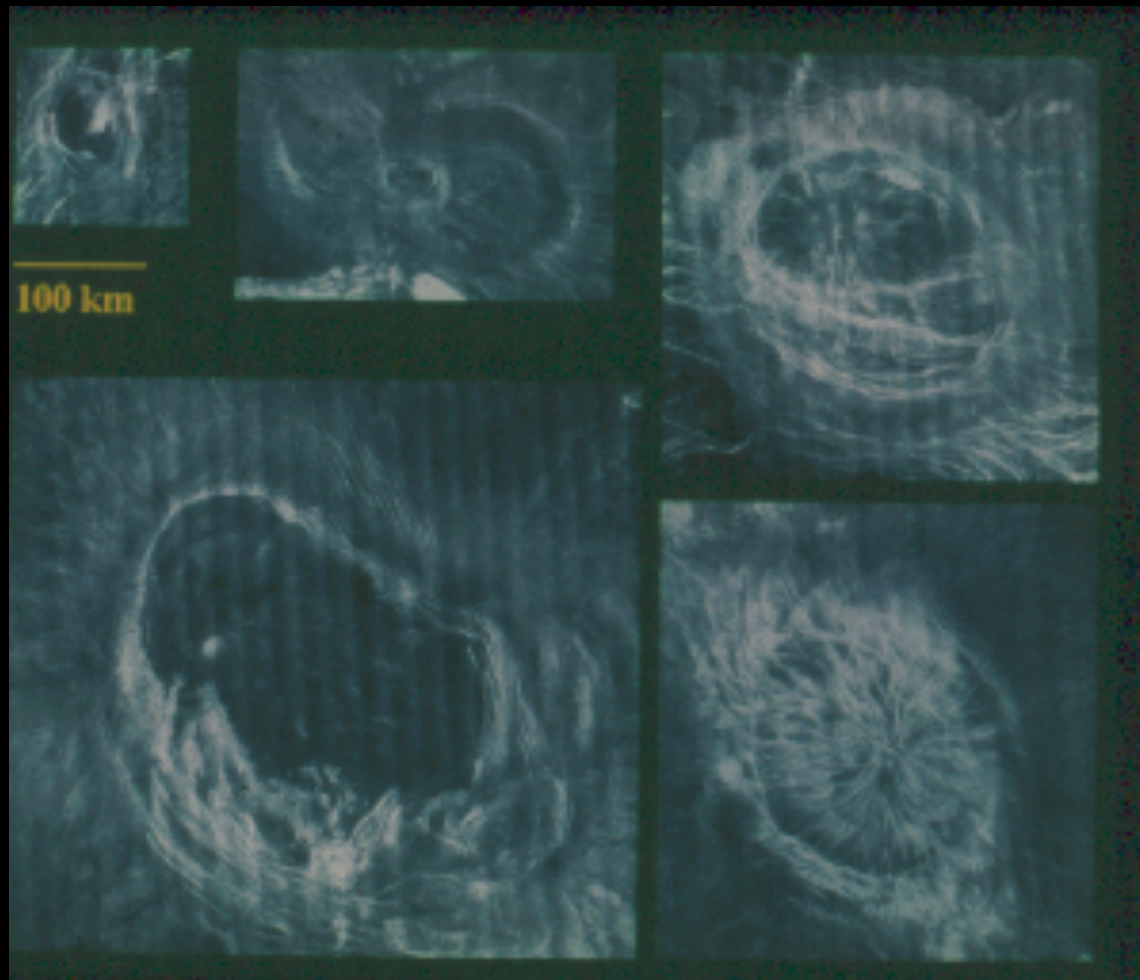
BAT 3D Topo



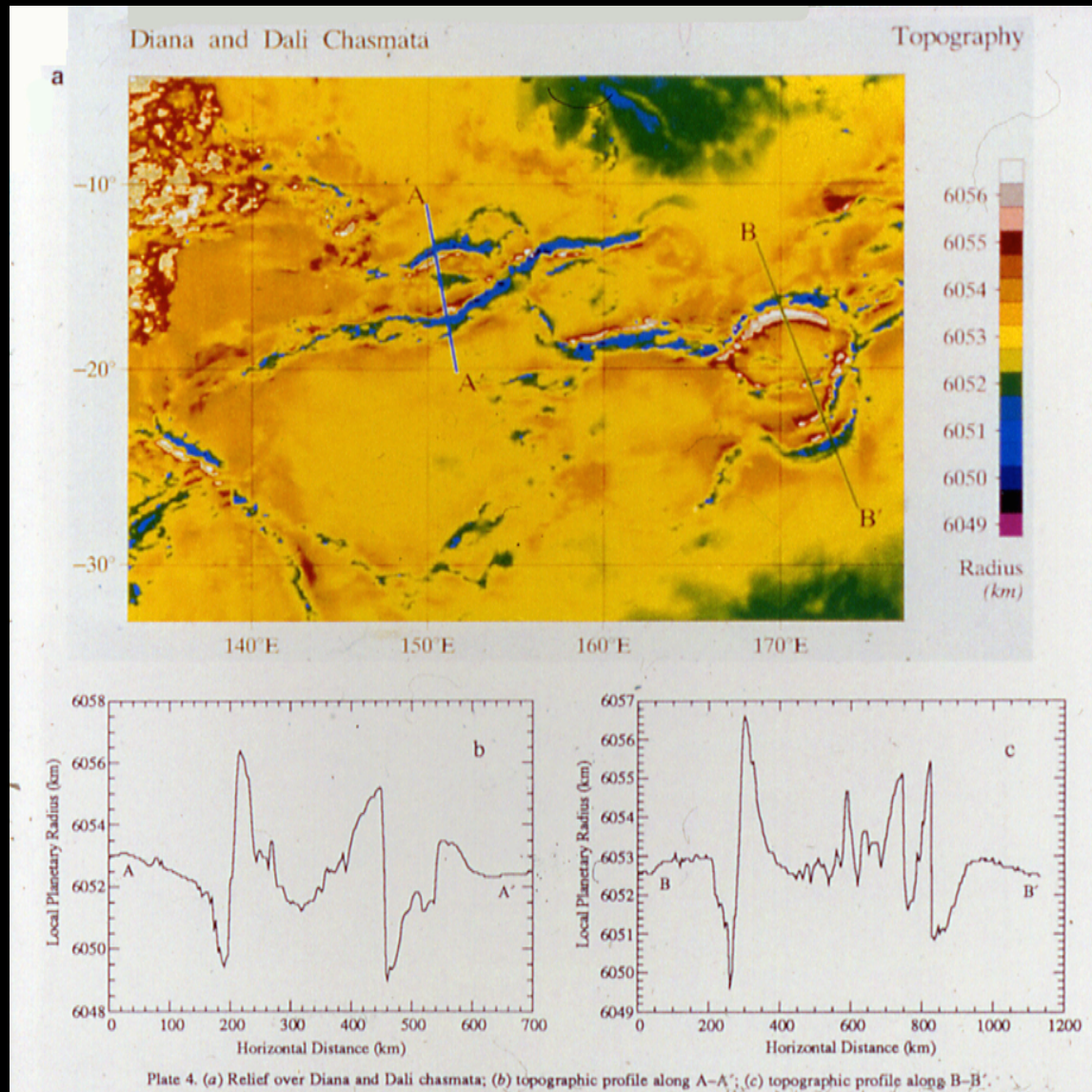
Venus Craters



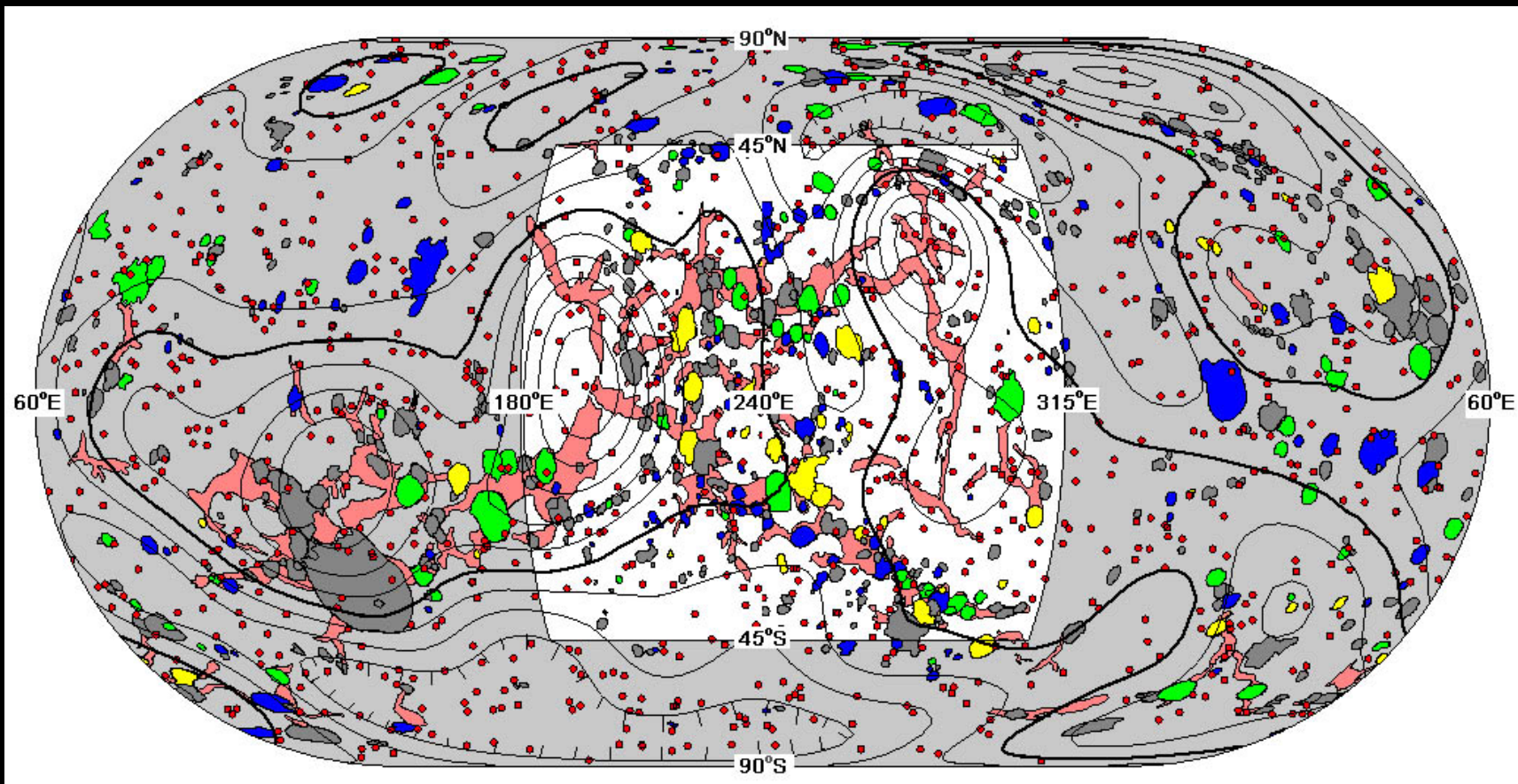
Venus Coronae



Venus Chasmata

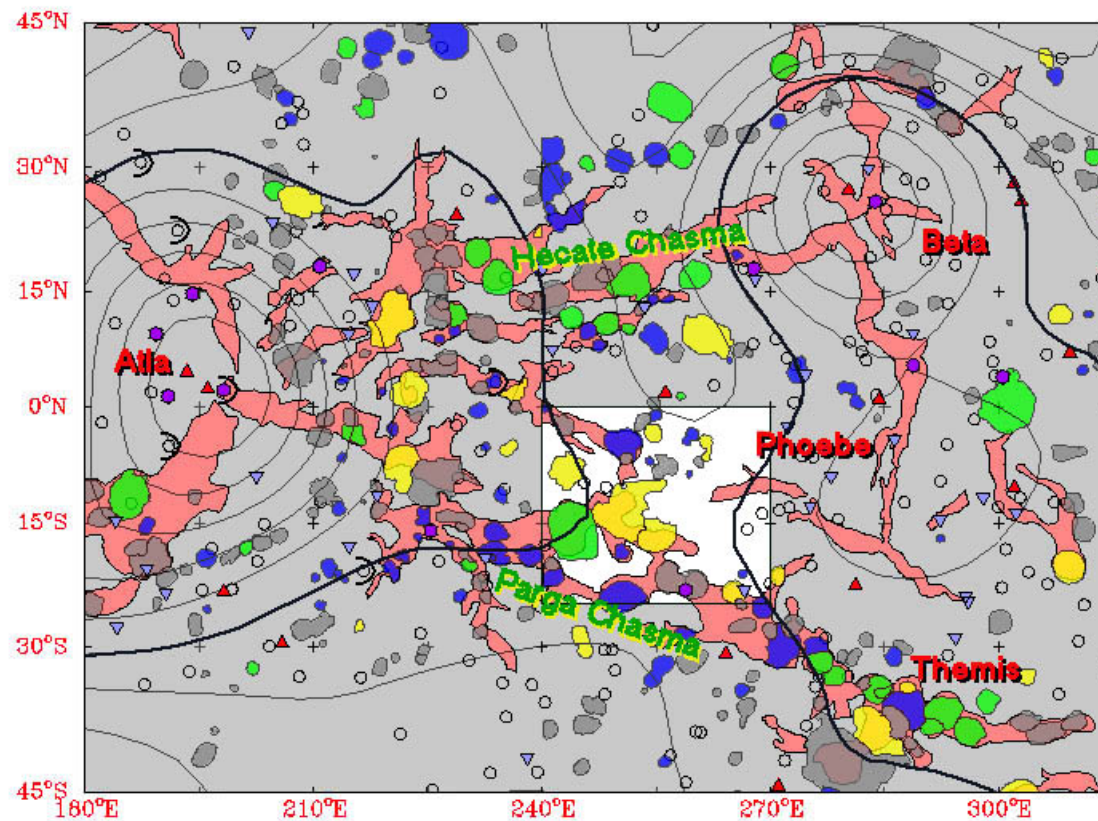


Venus Chasmata, Coronae, Craters & Geoid



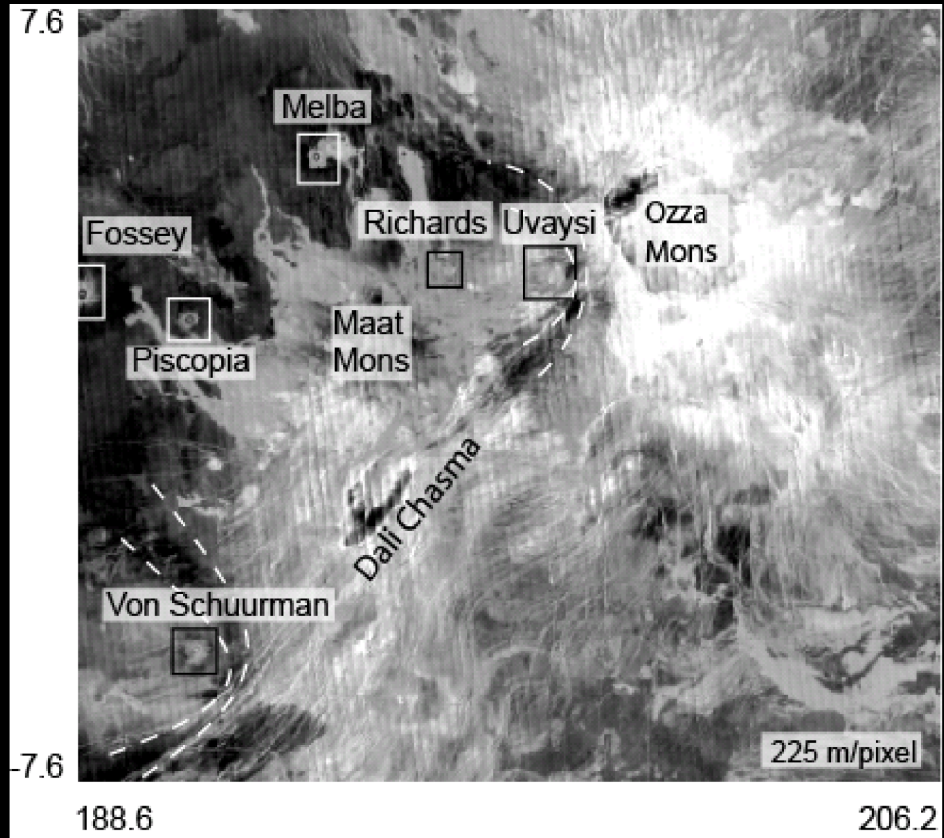
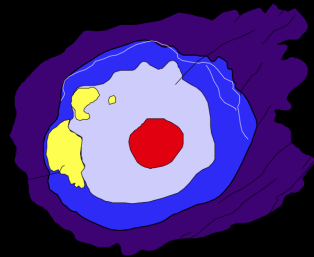
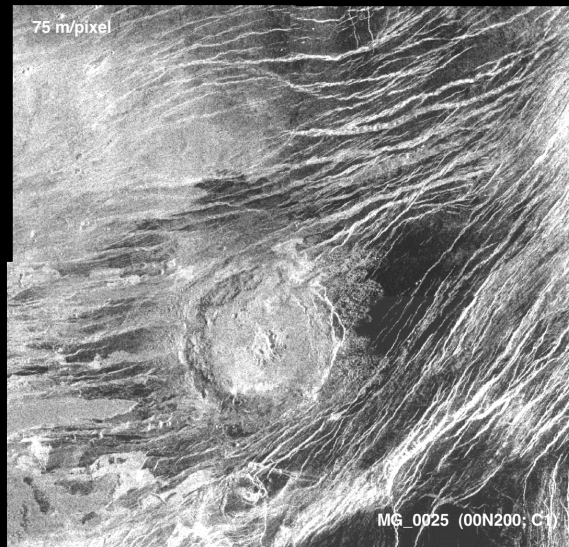
Venus BAT Region

Chasmata, Craters, Coronae & Geoid

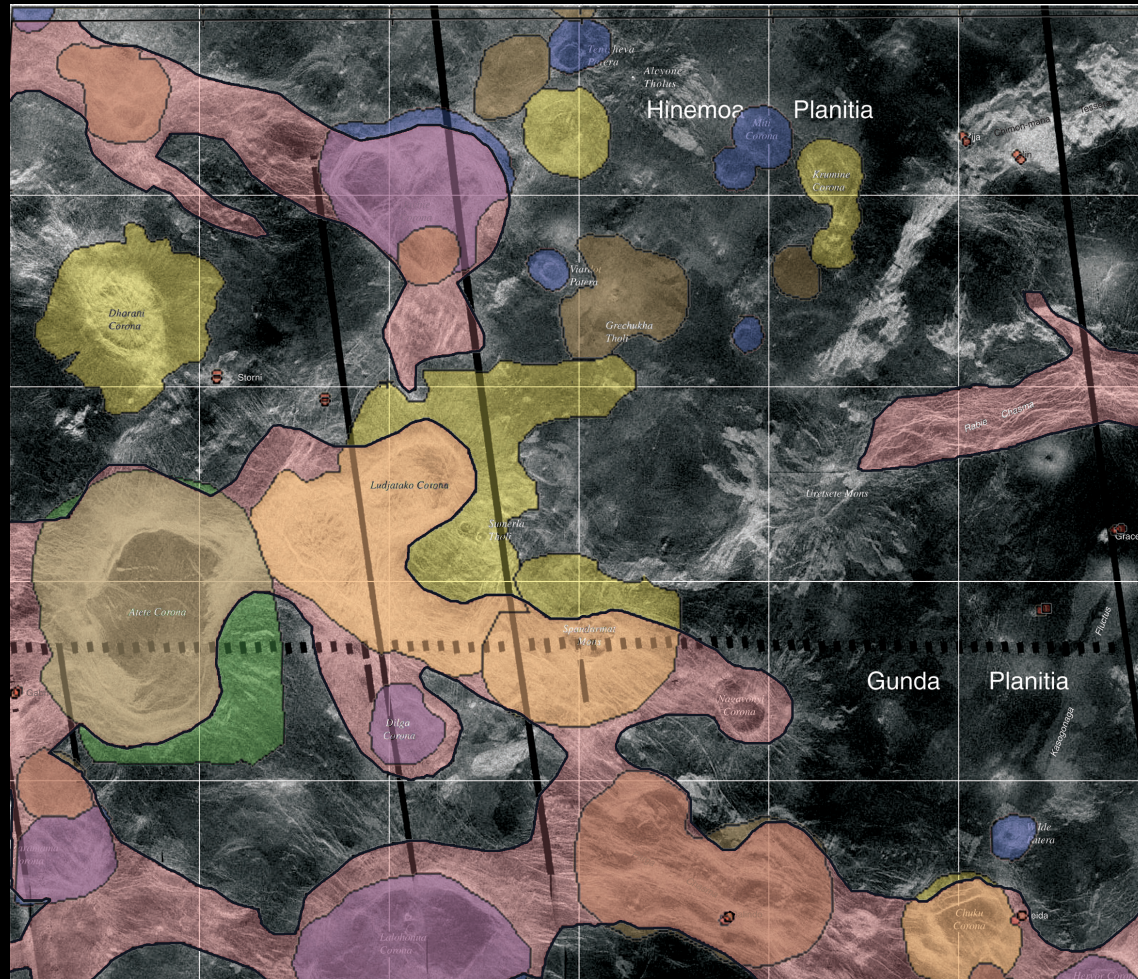


Crater Uvaysi

Uvaysi (2.3 N, 198.2 E, 38.0 km)

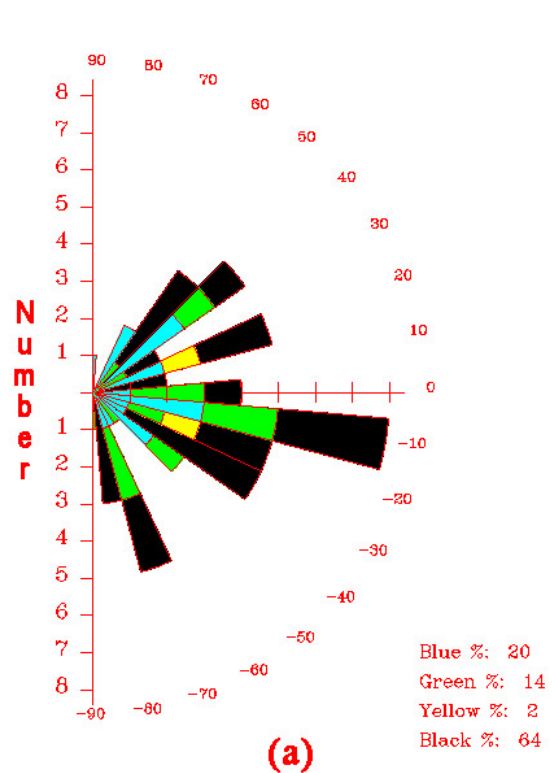


Parga Chasm with coronae

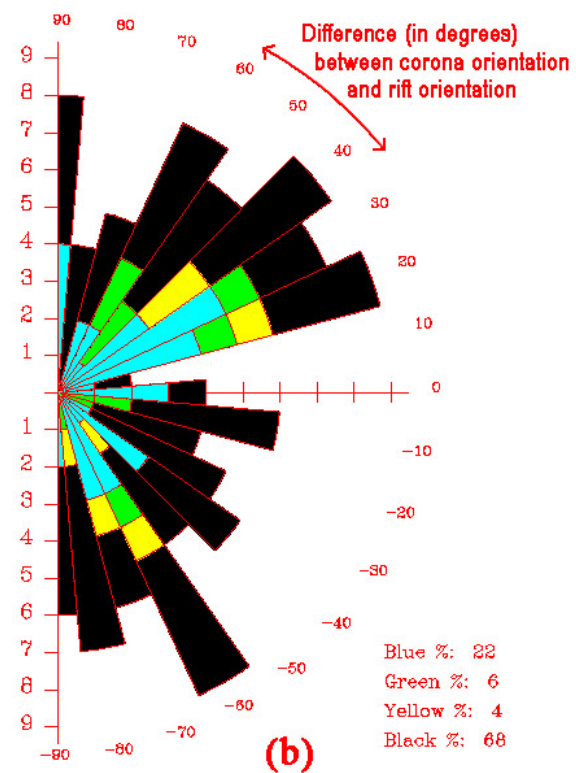


Coronae orientation

Coronae in rifts

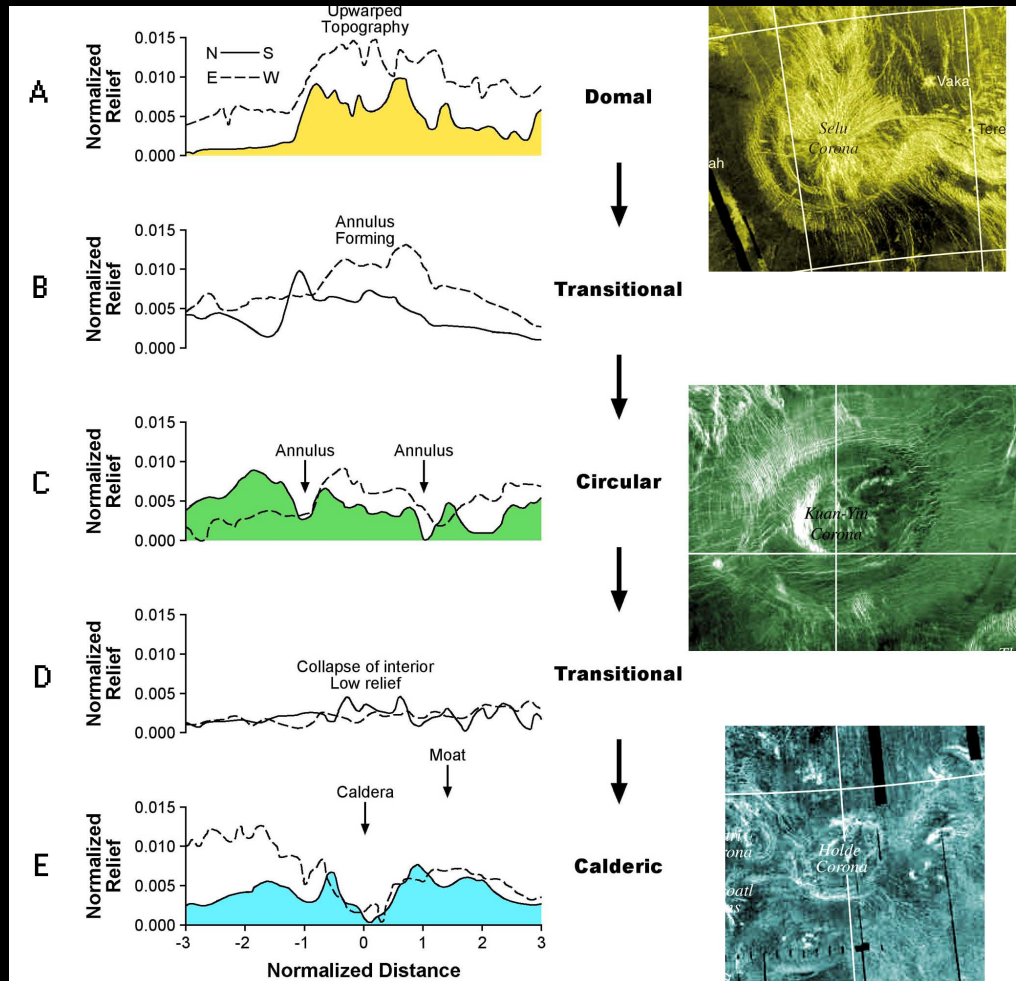


Coronae near rifts

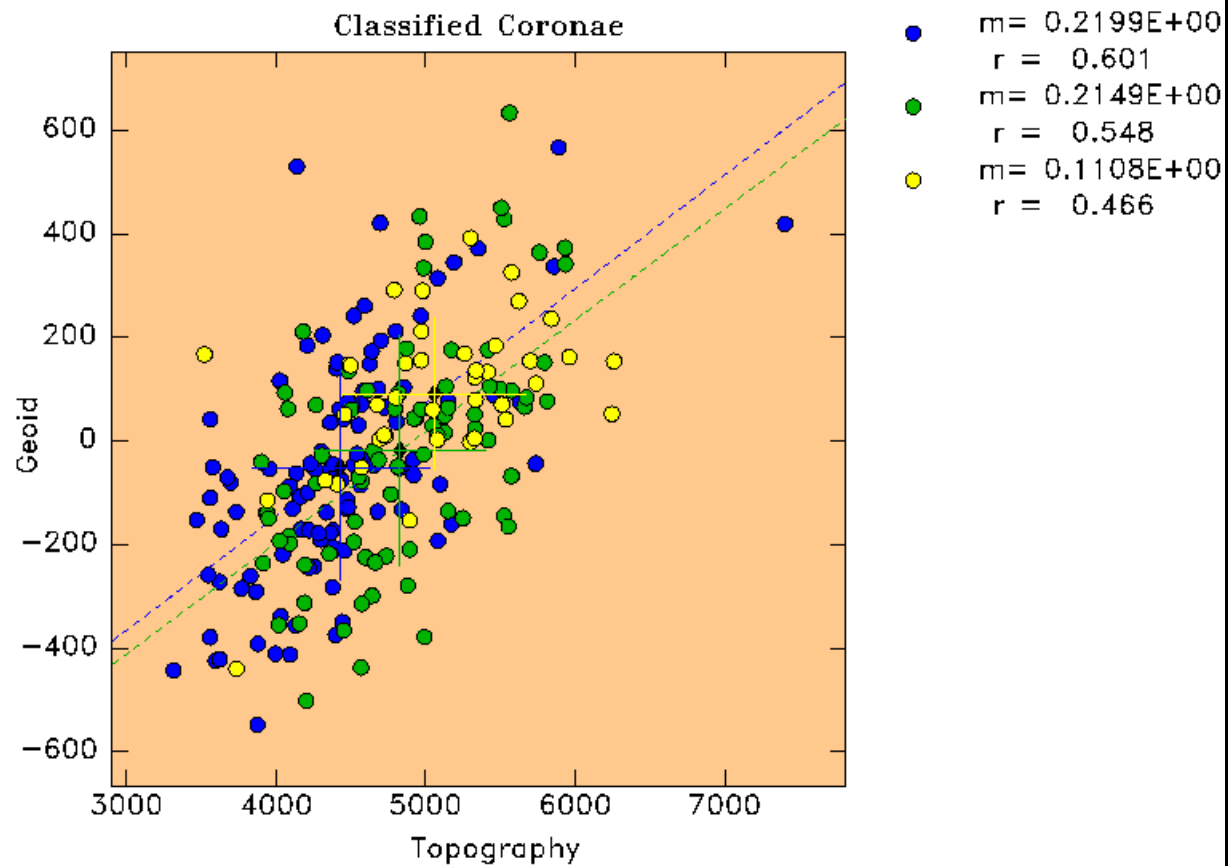


All Rifts

Coronae Classification



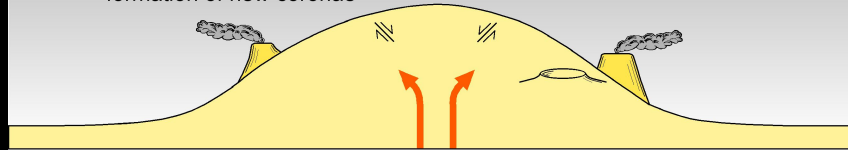
Coronae by type



Regio Stages

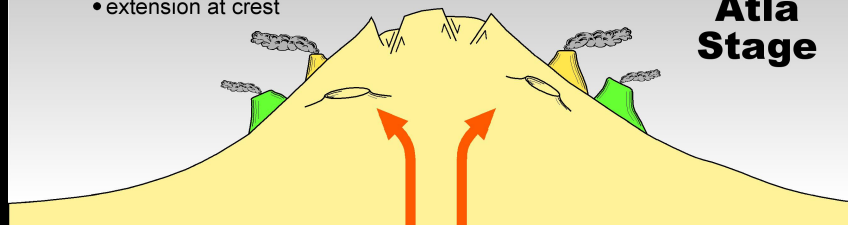
t₁: Initiation of plume activity

- uplift begins
- formation of new coronae



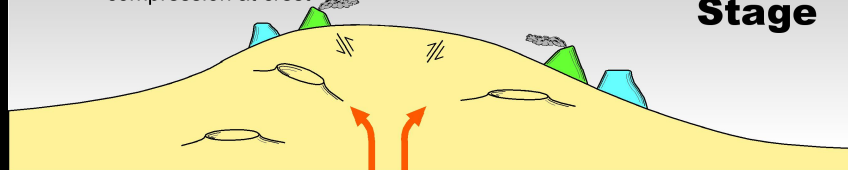
t₂: Peak plume activity

- continued uplift
- formation of new coronae
- outward tilting of pre-existing features
- extension at crest



t₃: Plume activity waning

- regio slumps
- no new coronae
- inward tilting of pre-existing features
- compression at crest



\$2.50



The ORIGIN of CONTINENTS and OCEANS

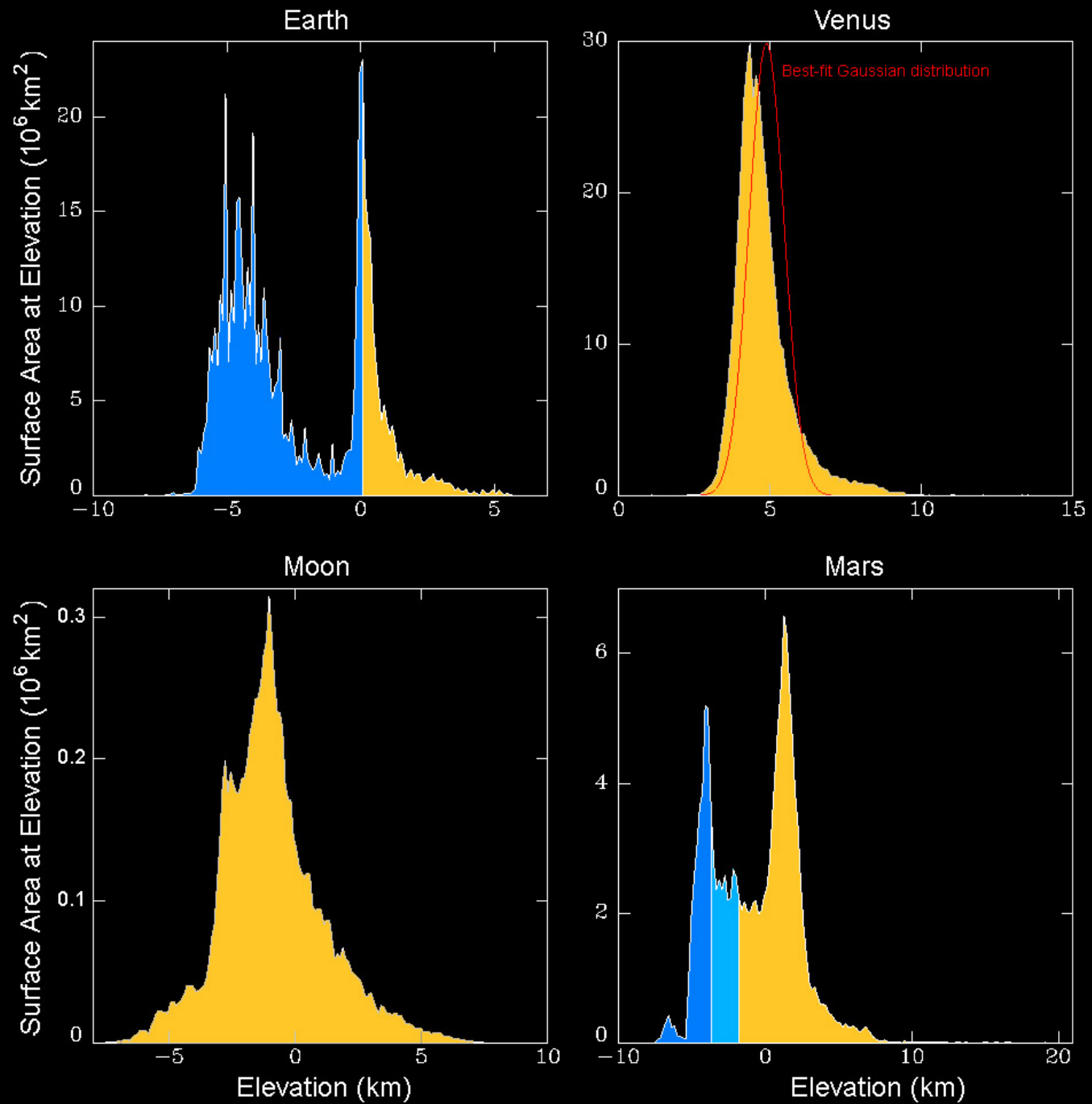
ALFRED WEGENER

Translated by
JOHN BIRAM

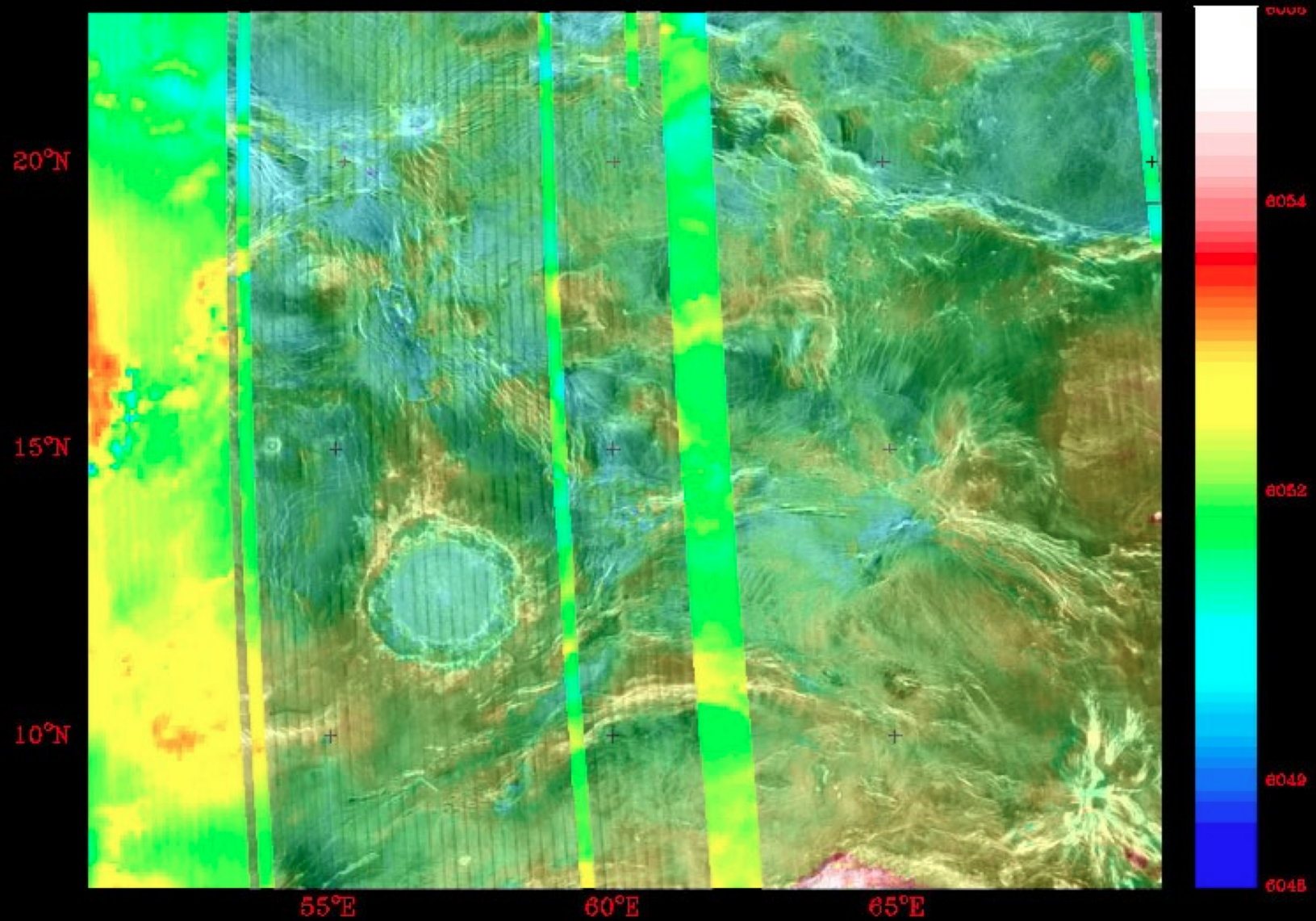
“In the whole of geophysics there is hardly another law of such clarity and reliability as this - that there are two preferential levels for the world's surface which occur in alternation side by side, and are represented by the continents and ocean floors, respectively. It is therefore very surprising that scarcely anyone has tried to explain this law, which has, after all, been well known for some time... In this way we have achieved for the first time a plausible explanation...”

- Alfred Wegener

Comparative Hypsometry

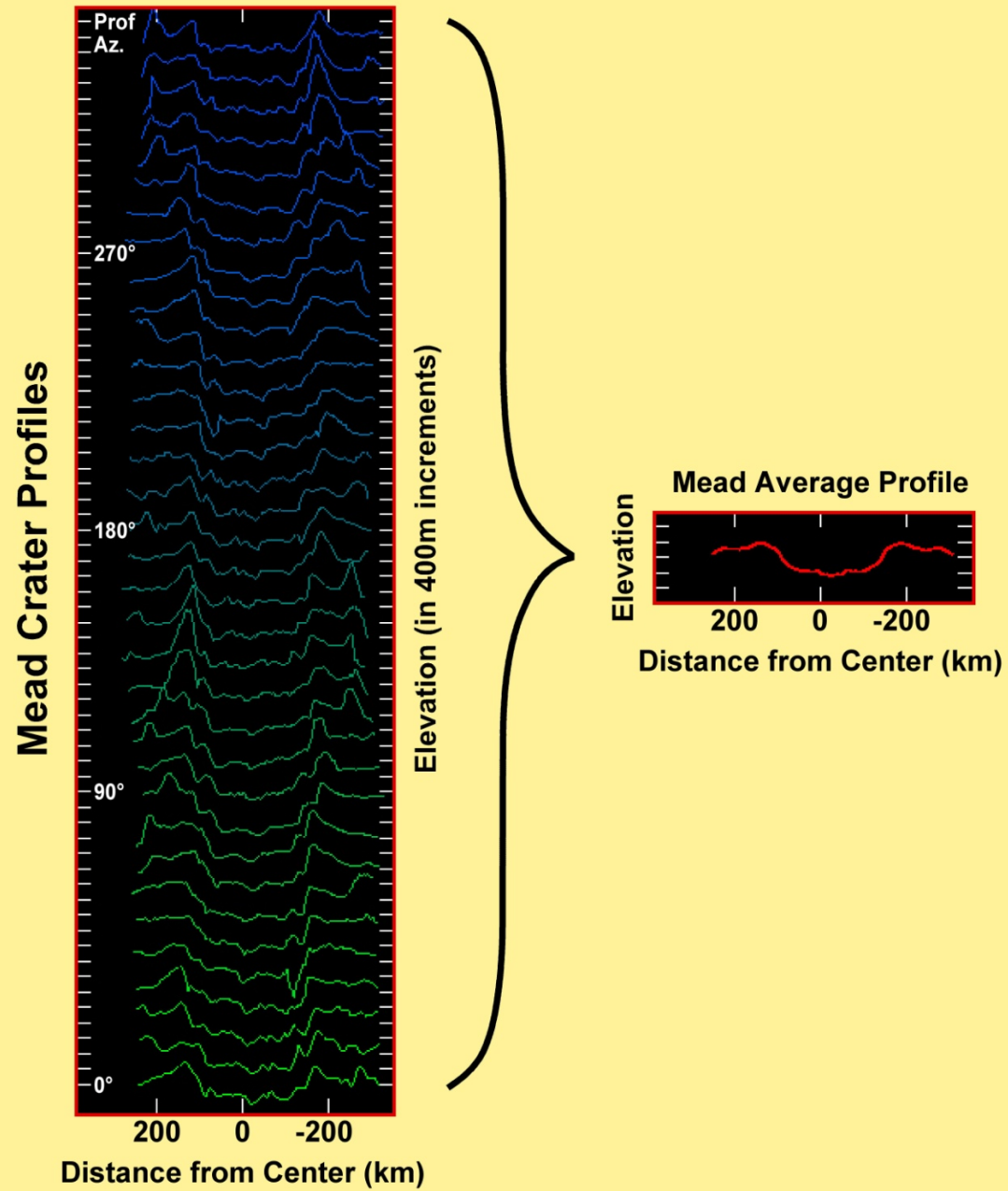


Mead Crater – Radar & Topography

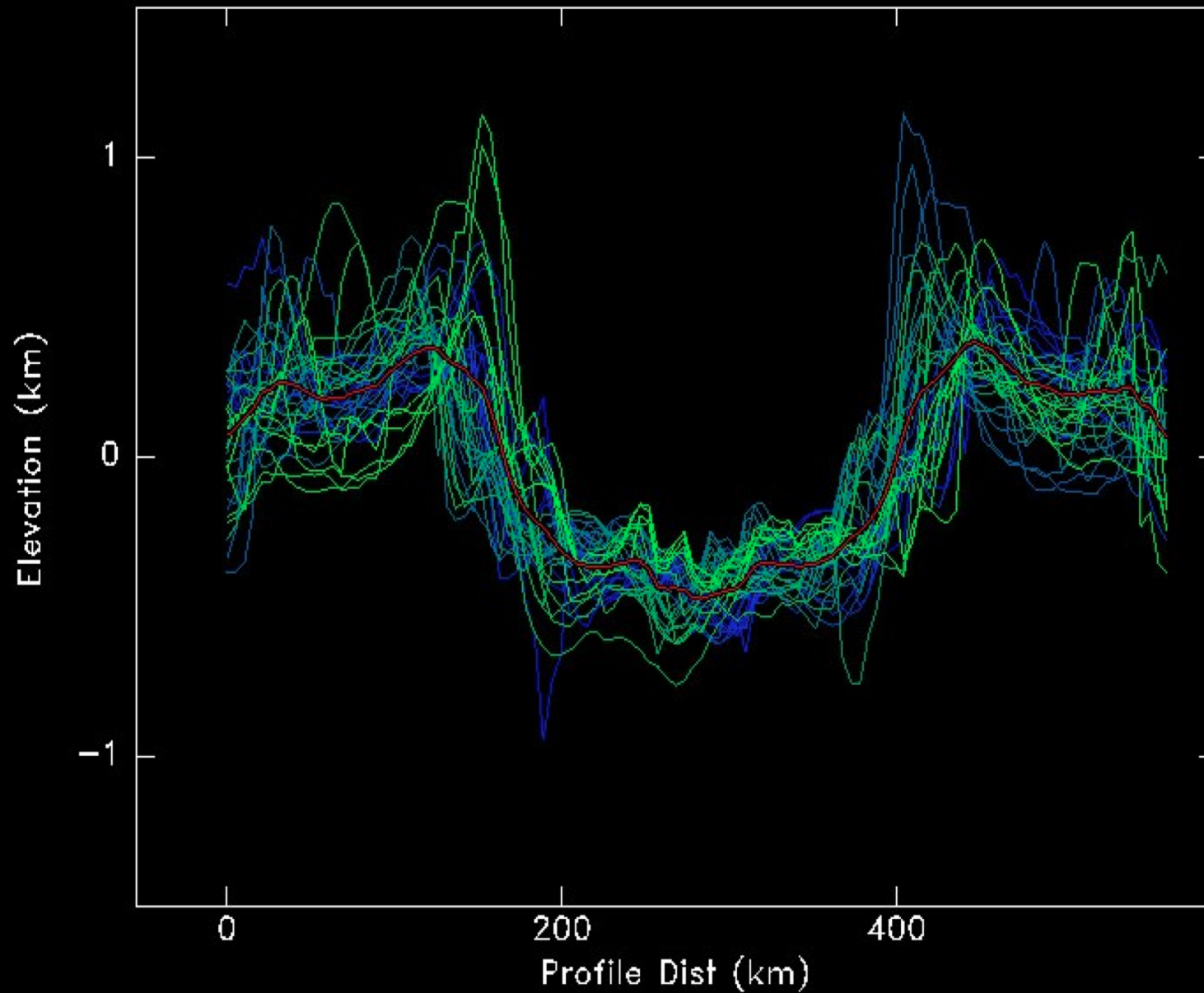


Average Profiling

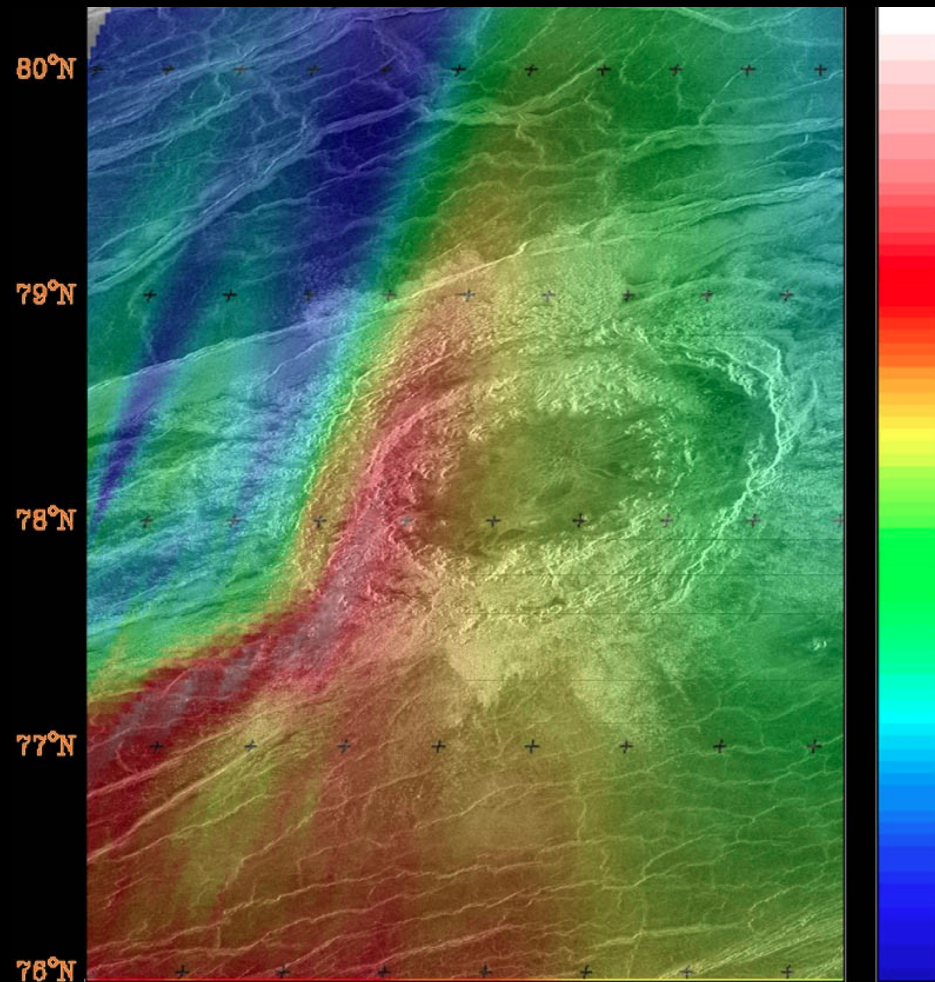
Approach



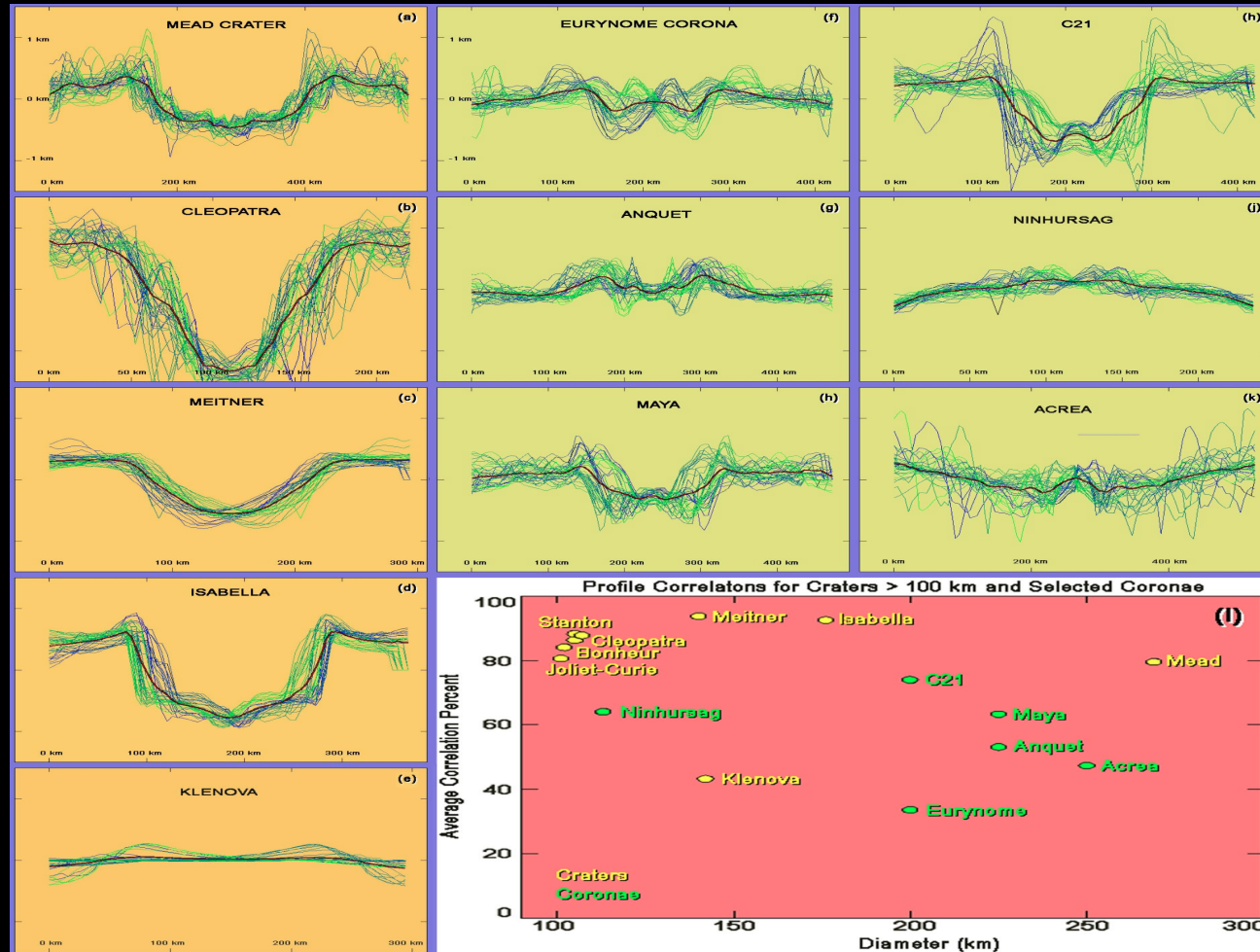
Mead Crater – Topographic profiles



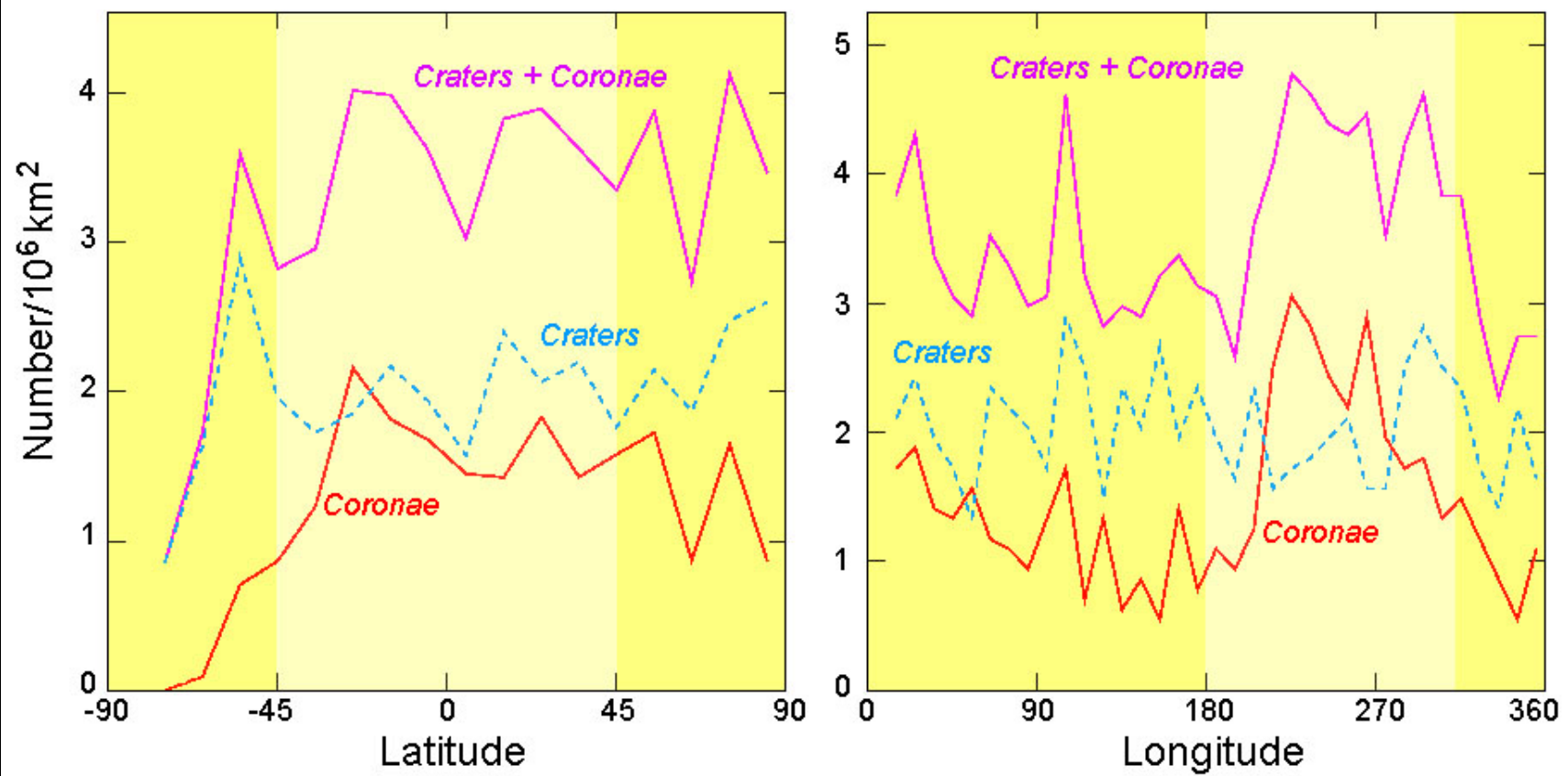
Klenova – crater or corona?



Topography Correlation Craters and Coronae



Feature Densities



Plumes- a controversial topic!

Editor

Plates and Plumes

1. The "plate" model for the growth of mid-ocean ridges
D.R. Foulger
2. Origins of the plate hypothesis and some of its implications
W. H. Ryan
3. The Pacific Factor: Chemical geodynamics as a Pacific Determinant
H.L. Anderson
4. Phase relations in the hotspot reference frame
D.R. Foulger and J. Thompson
5. Implications of lower mantle structural heterogeneity for structure and nature of mantle plumes
D.J. Chernoff, J. Garbarino, and M. Manga
6. The signature of the mantle plume as a geophysical observation
S.H. King and D.L. Anderson
7. Kinematic observations of transient time discontinuities beneath Pacific hotspots
A. Stein
8. Lower mantle material properties and convection models of mantle plumes
A. Stein and D.L. Anderson
9. Global mantle and asthenosphere flow: II. Motivation and model development
M. Yamanishi, W.J. Morgan, and J. Plafin-Wojcik
10. Global mantle flow and asthenosphere flow: II. Application to the geochronological evolution of mid-ocean ridges
M. Yamanishi, W.J. Morgan, and J. Plafin-Wojcik
11. The Hawaiian SW-NE axis extension: Evidence for lithosphere retraction from ocean bottom surface wave data
D.J. Carter, J. Thompson, and A. Stein
12. Heat and Transport
D.L. Anderson
13. Circulation temperatures of shallow perovskite layers: Implications for the existence of thermally driven mantle plumes
D. Chernoff, D.J. Chernoff, and D.L. Anderson
14. Potential effects of lithospheric rheology and magmatism on heat flow at hotspots
C.A. Johnson and J. Thompson
15. Crustal growth in southern Pacific Basin Province, India: The Moho is not an effective barrier
P.B. Koushi, B. Minnie, and G.R. Foulger
16. Geochronology, Hotspot History, and Reference Frames
D.R. Foulger
17. A new method for detecting anomalies in sedimented rocks and minerals: I. Application to oceanic spreading and asthenospheric upwelling
S.H. King
18. A quantitative tool for detecting anomalies in sedimented rocks and minerals: II. Application to oceanic spreading and asthenospheric upwelling
S.H. King
19. Divergence between paleomagnetic and hotspot model predicted plate rotation for the Pacific plate with implications for hotspot activity
D.W. Sims
20. Global kinematics in the deep-sea: shallow hotspot reference frames
M. Yamanishi and J. Plafin-Wojcik
21. Progressing toward a new chapter: a new chapter approach
D. Chernoff and D.L. Anderson
22. Global mantle and asthenosphere flow: II. Motivation and model development
M. Yamanishi, W.J. Morgan, and J. Plafin-Wojcik
23. The SW Pacific
D.L. Anderson
24. The role of the mantle wedge in the Pacific Basin and the Pacific
D.L. Anderson
25. Geochronology and Crustal growth: history of the Southwest Pacific and a review of the Pacific Basin
D.L. Anderson
26. A new model for the Pacific Basin: history of the Pacific Basin
D.L. Anderson



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G.R. Foulger
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D.M. Jurdy

Plates, Plumes, and Planetary Processes



Special
Paper
430



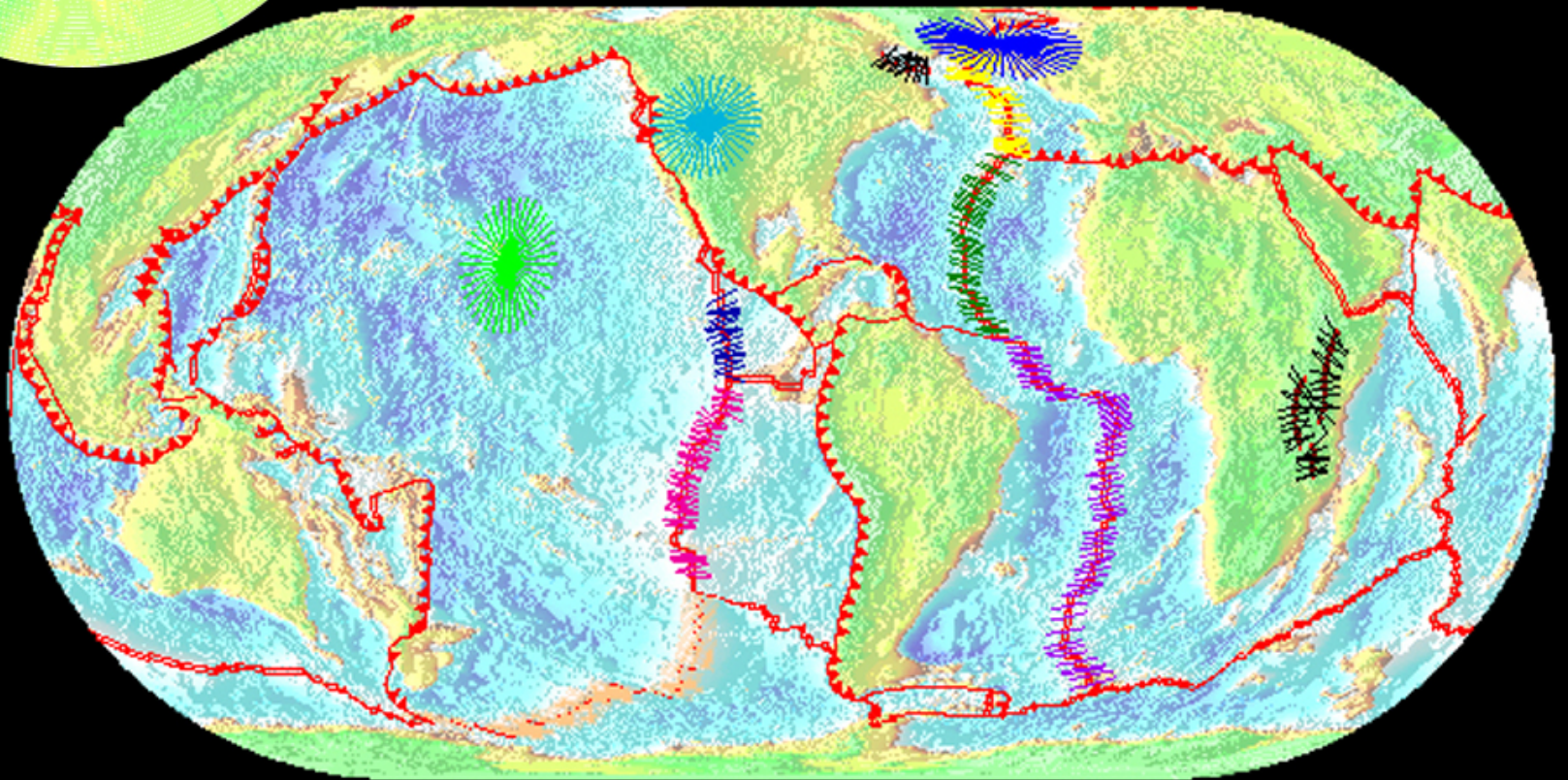
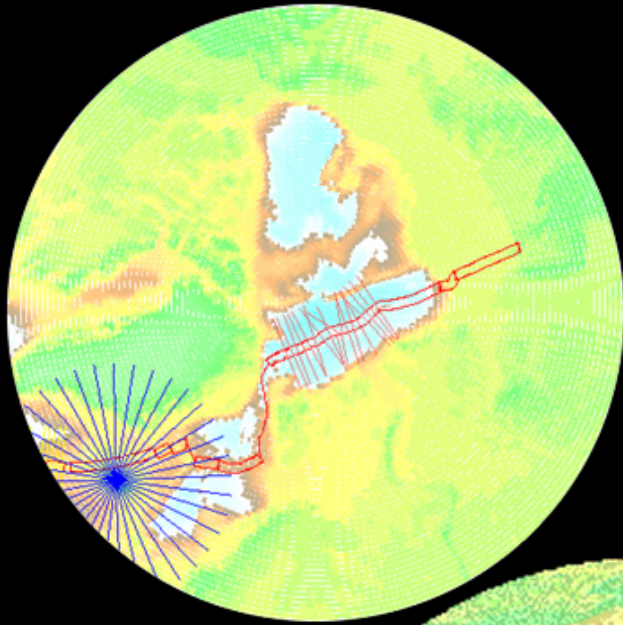
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Plates, Plumes, and Planetary Processes

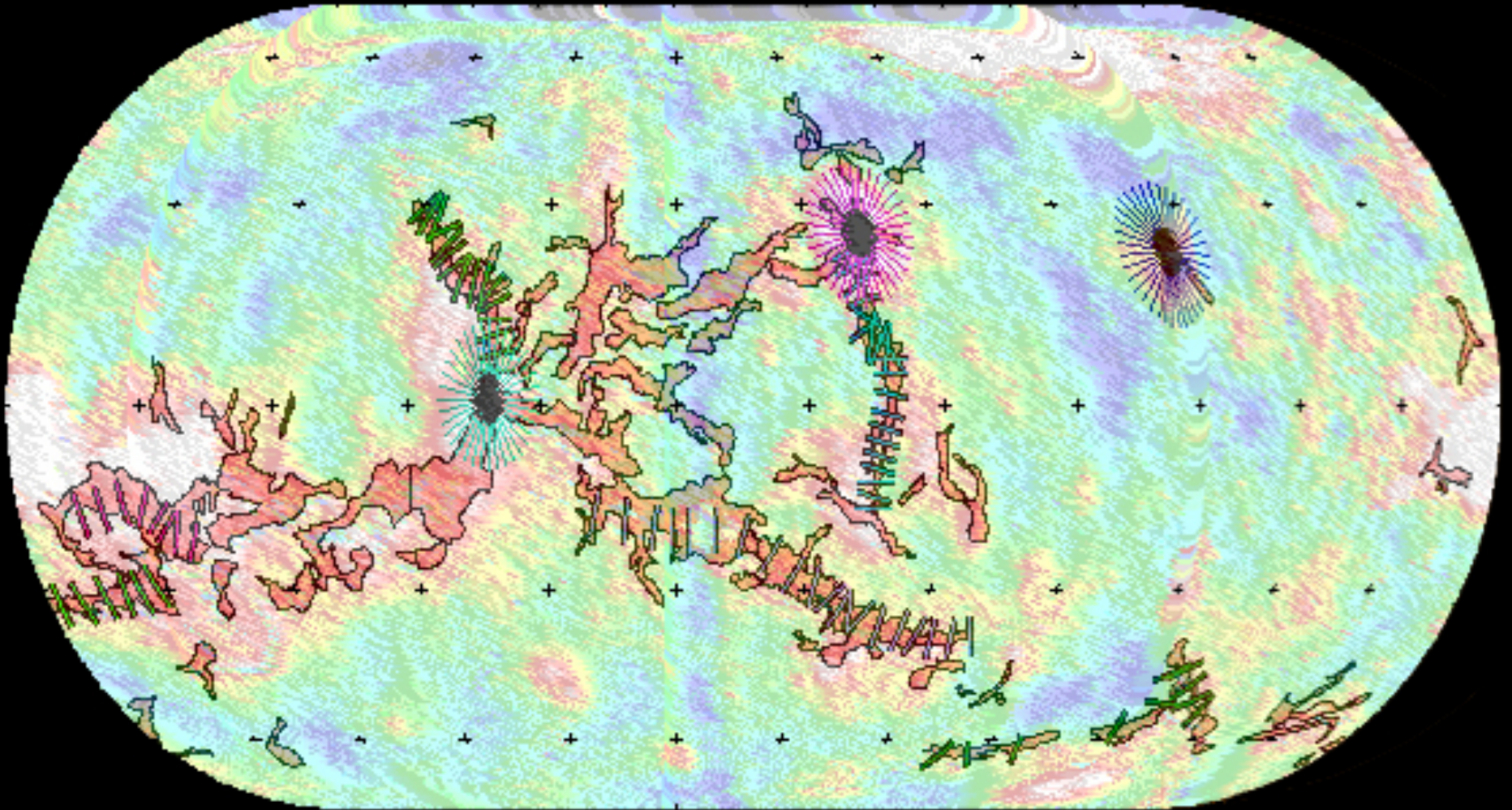


edited by Gillian R. Foulger and Donna M. Jurdy

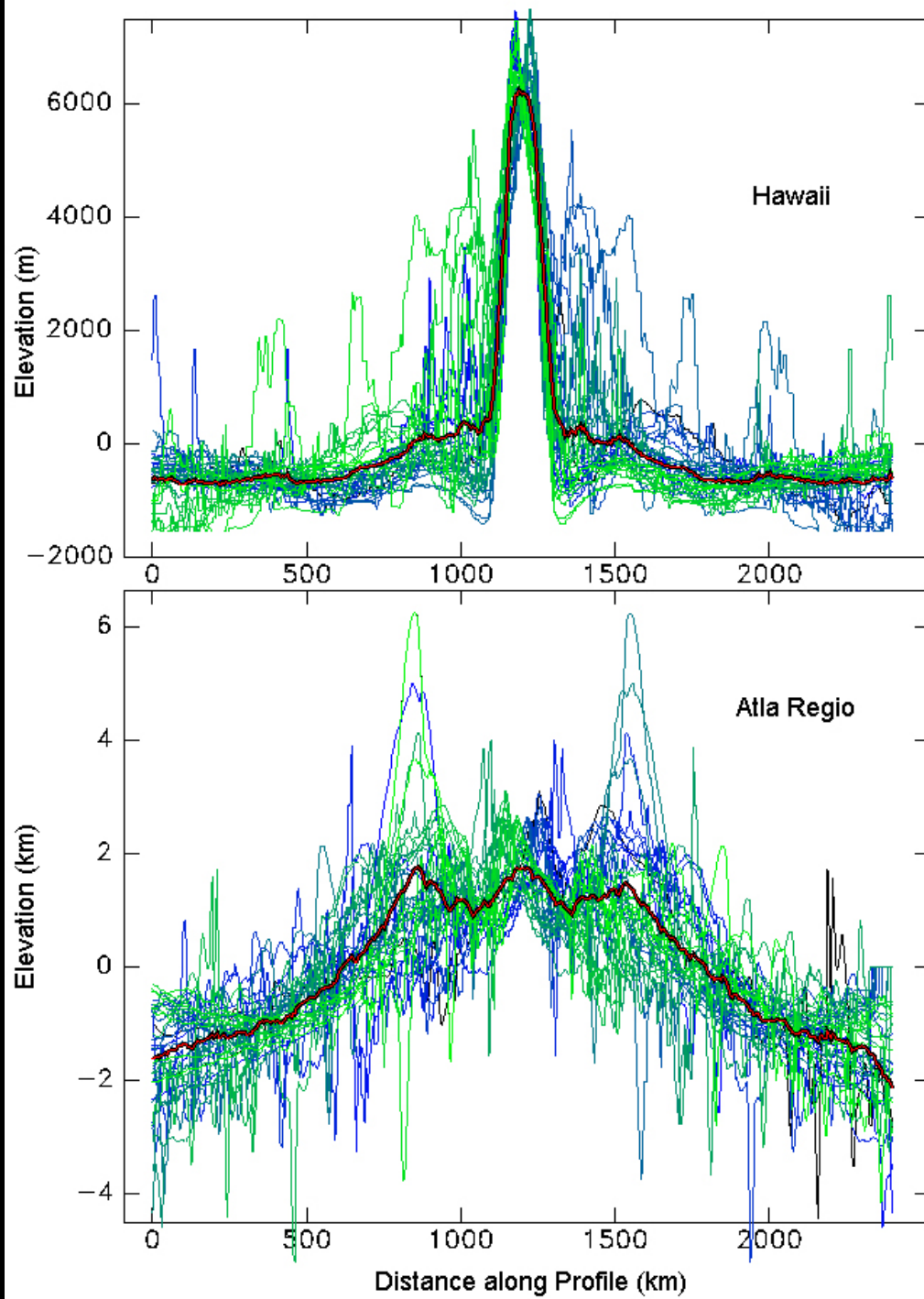
Earth's Topography and Profiles



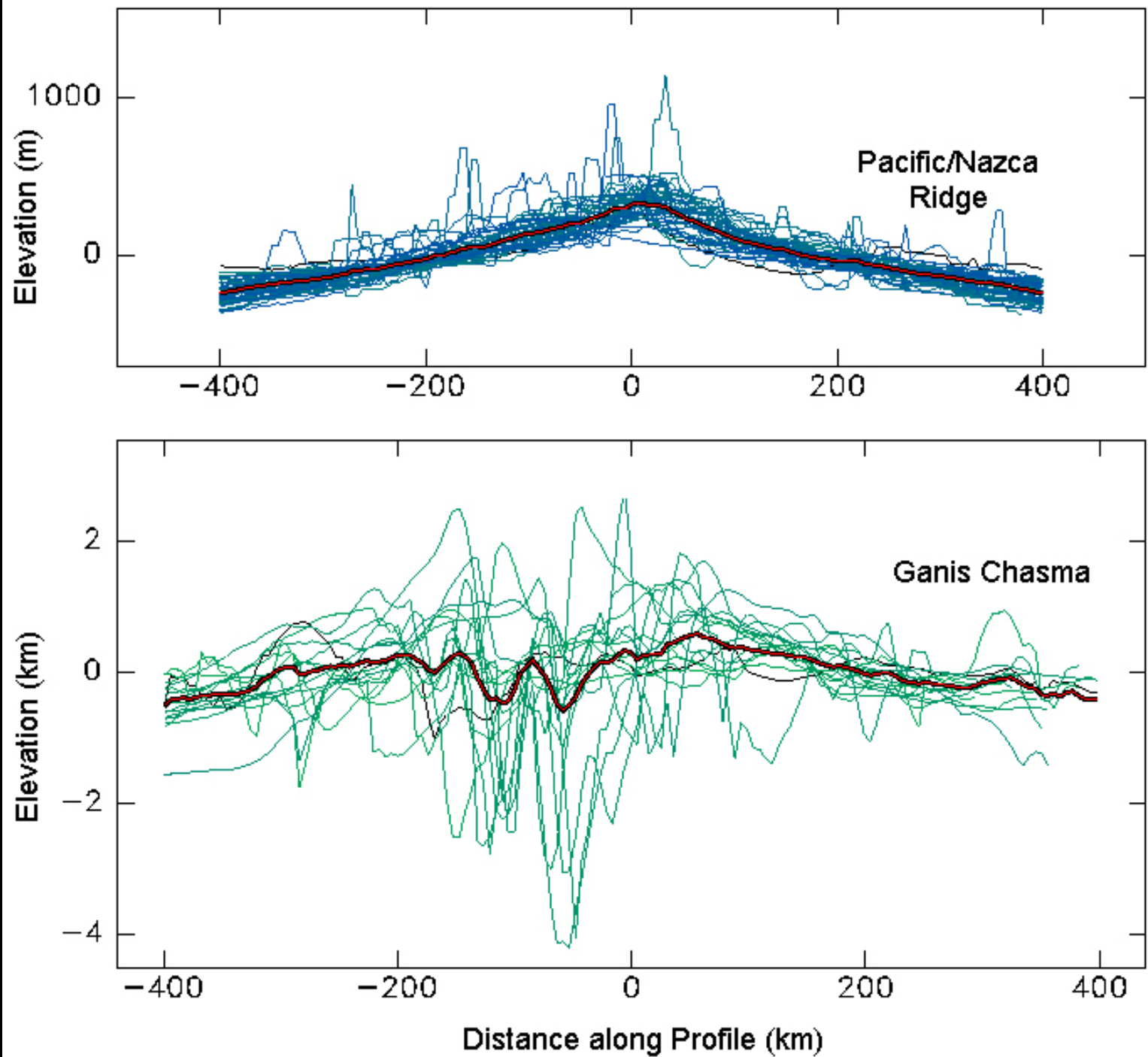
Venus Topography and Profiles



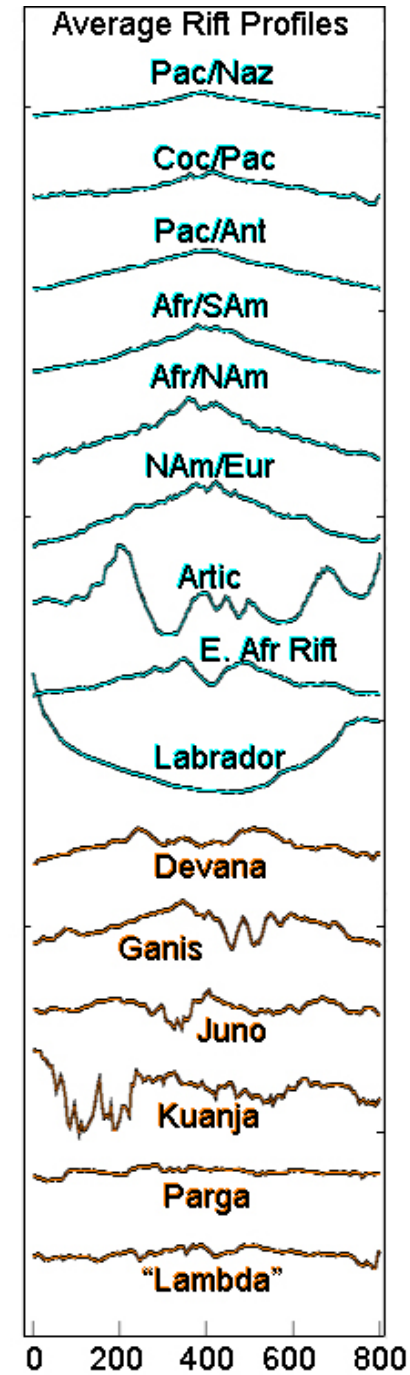
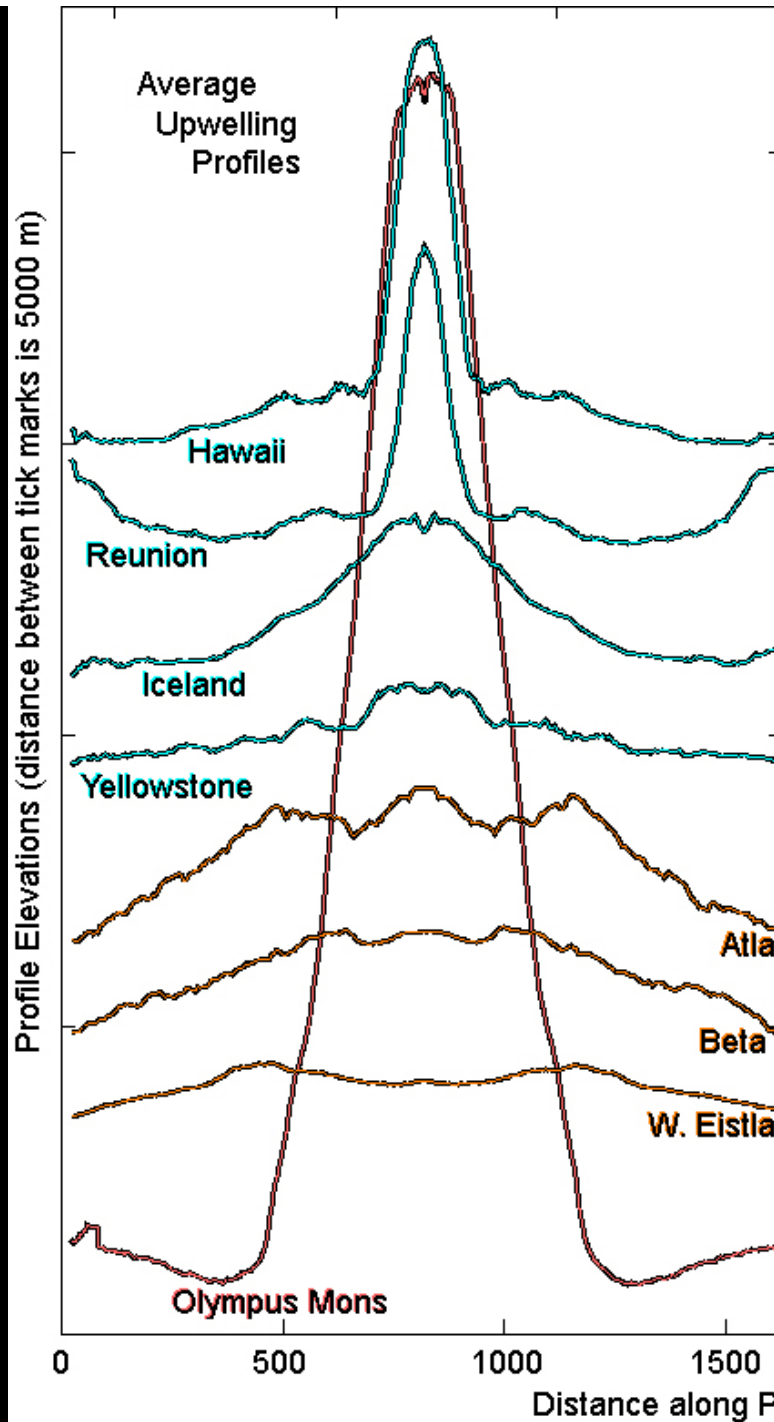
Earth/Venus Comparison: Uplifts



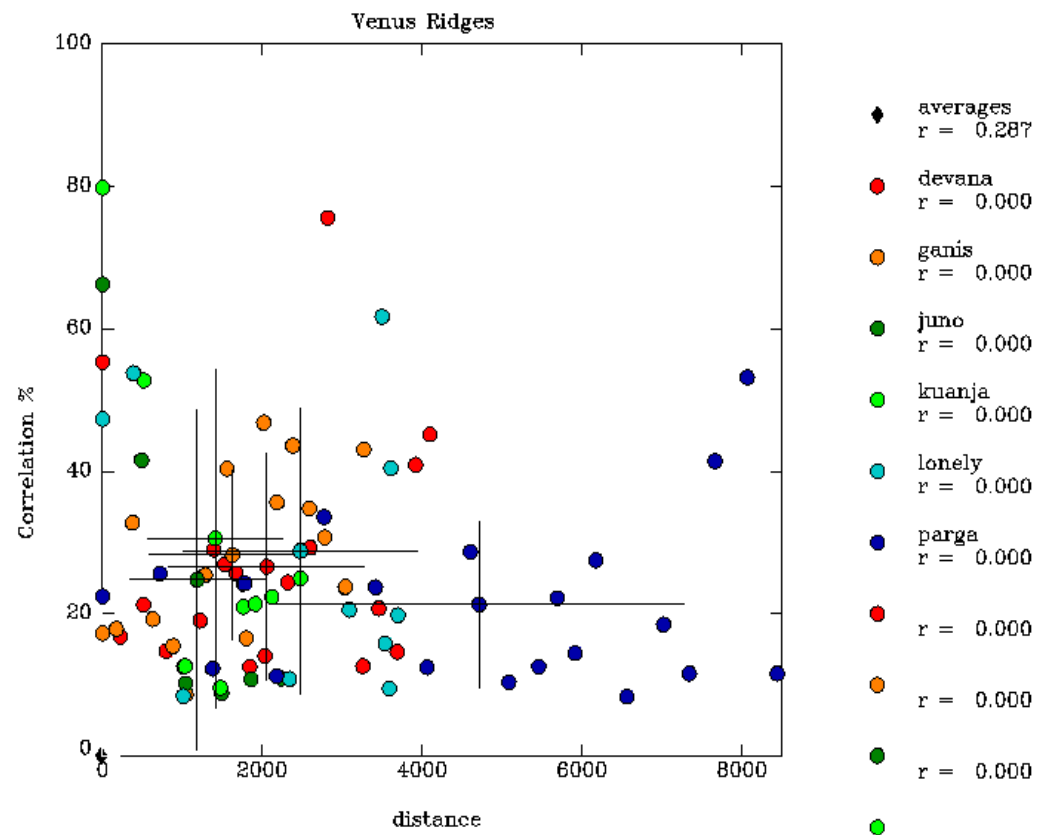
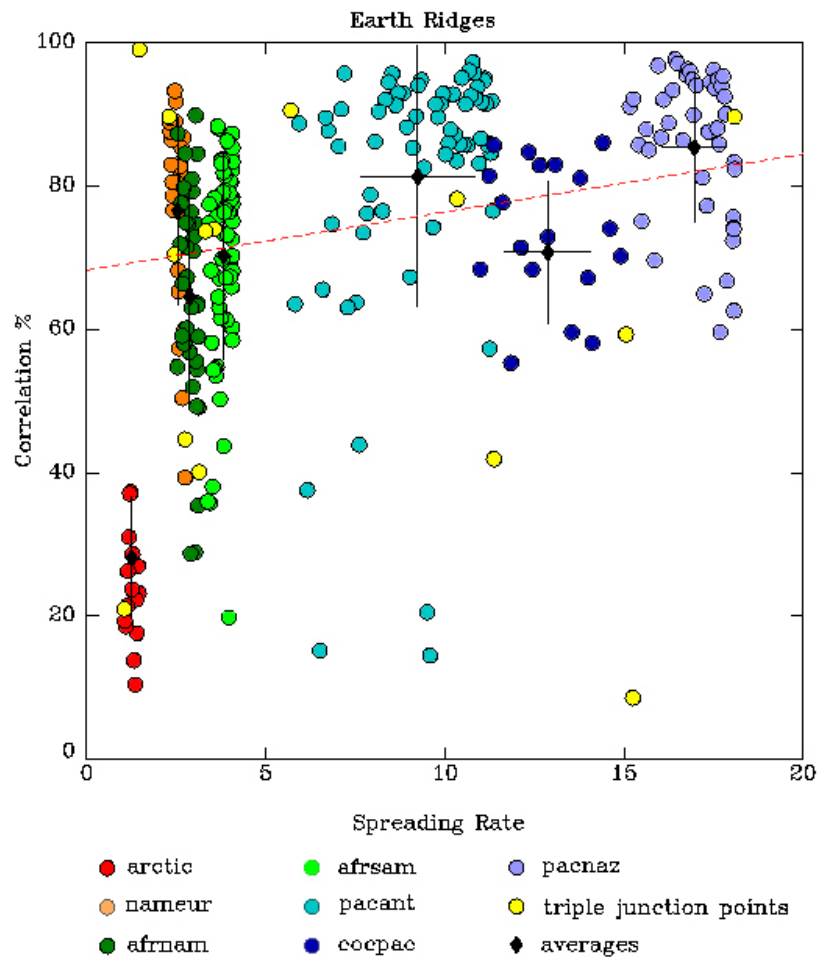
Earth/Venus Comparison: Rifts



Average Profiles: Earth and Venus



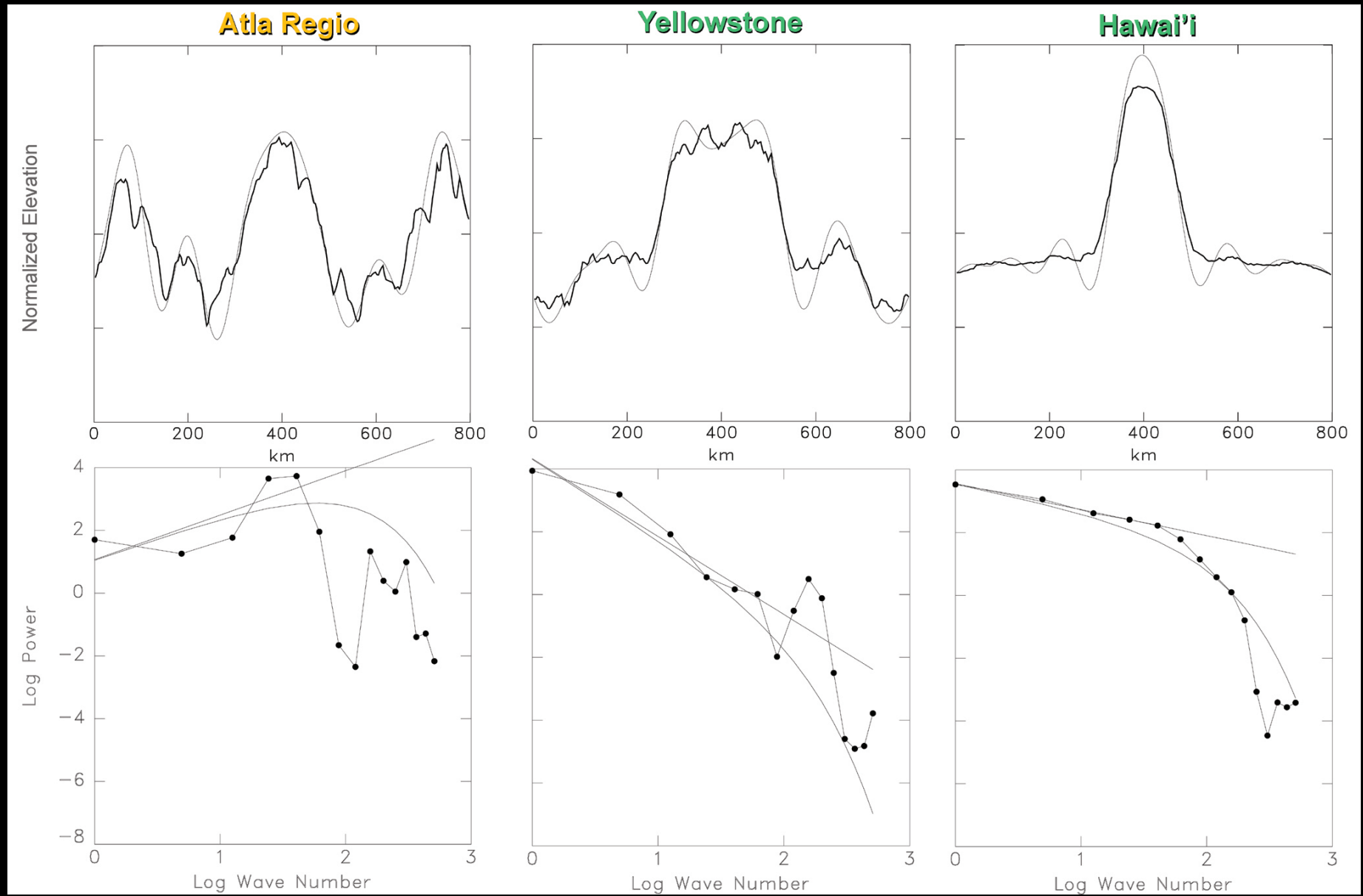
Correlation Comparisons



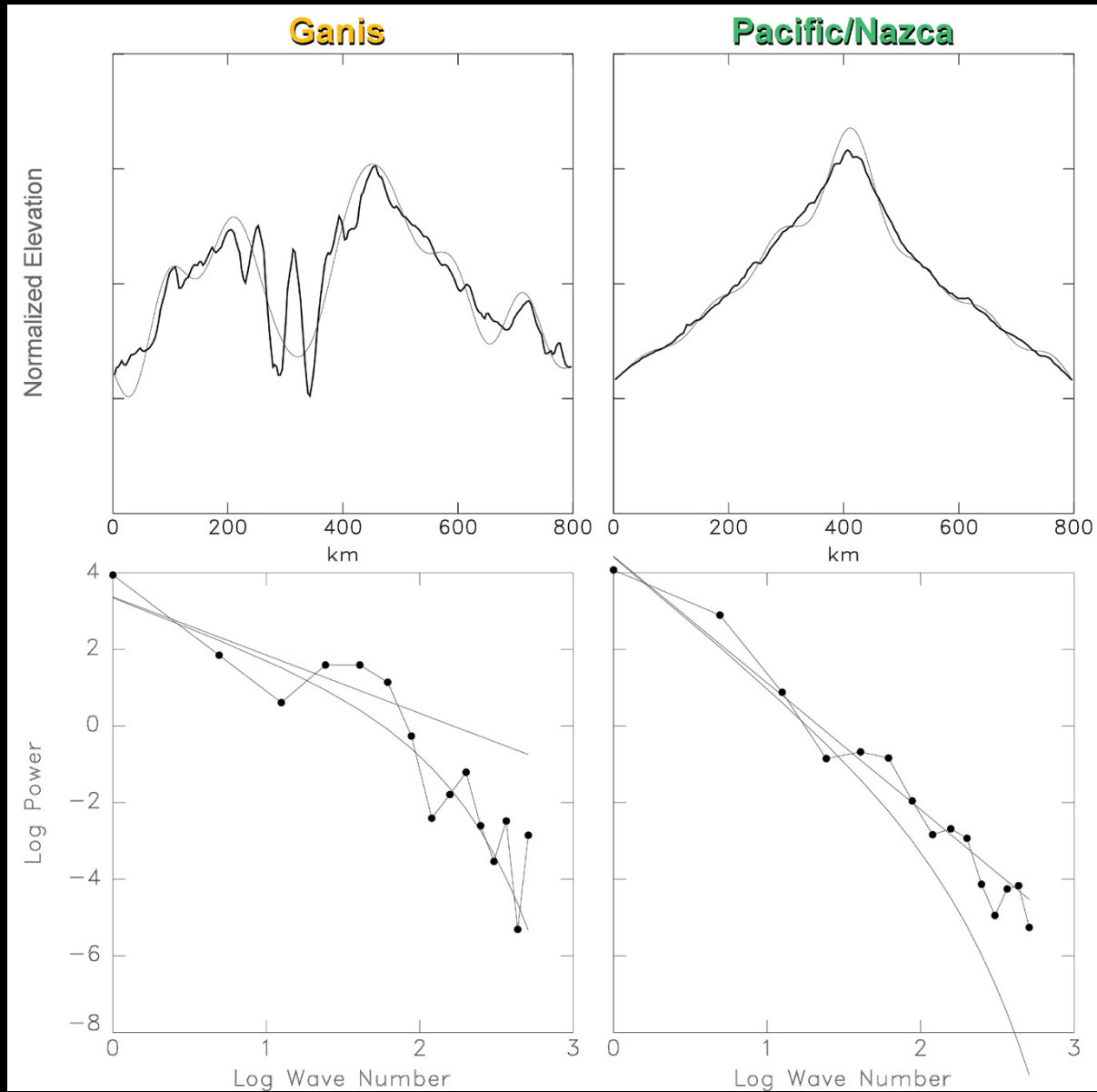
Uplift Correlations

	hawaii	reunio	icelan	yellow	atla	beta	w.eist	olymon	
Hawaii	1.000	0.592	0.765	0.727	0.567	0.525	0.352	0.851	hawaii
Reunion	0.592	1.000	0.412	-0.034	-0.278	-0.339	-0.507	0.403	reunion
Iceland	0.765	0.412	1.000	0.693	0.578	0.530	0.295	0.936	iceland
Yellowstone	0.727	-0.034	0.693	1.000	0.884	0.900	0.801	0.809	y'stone
Atla	0.567	-0.278	0.578	0.891	1.000	0.968	0.938	0.600	atla
Beta	0.525	-0.340	0.530	0.907	0.968	1.000	0.952	0.609	beta
W. Eistla	0.352	-0.508	0.295	0.808	0.938	0.952	1.000	0.372	w.eistla
Oly. Mons	0.851	0.403	0.936	0.809	0.600	0.608	0.372	1.000	olymons
	hawaii	reunio	icelan	yellow	atla	beta	w.eist	olymon	

Fourier Analyses (Uplifts)



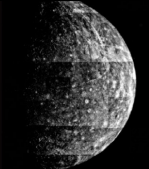
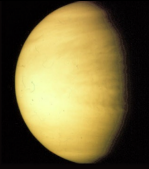


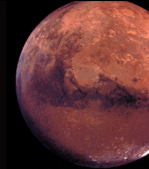
Fourier Analyses (Rifts)



Conclusions

- ▣ Cross -correlation of like features from Earth yields closest matches
- ▣ Between Earth and Venus, rift features provide closest match. Of terrestrial hotspots, Yellowstone most closely matches Venus' regiones.
- ▣ Topography of local constructs of the regiones is dominated by rifting, but the longer-wavelength profiles reflect the larger-area upwelling processes.
- ▣ If Venus' chasmata are analogous to terrestrial spreading centers, spreading on Venus is very slow.

Inner Solar System

					
Radius (km)	2439	6052	6378	1738	3398
Mass (kg)	3.30×10^{23}	4.87×10^{24}	5.98×10^{24}	7.35×10^{22}	6.42×10^{23}
Density (kg/m ³)	5420	5250	5520	3340	3940
Distance from the Sun (A.U)	0.387	0.723	1.000	---	1.524

Venus- radar mosaic

