COMPARATIVE TECTONICS OF VENUS AND EARTH

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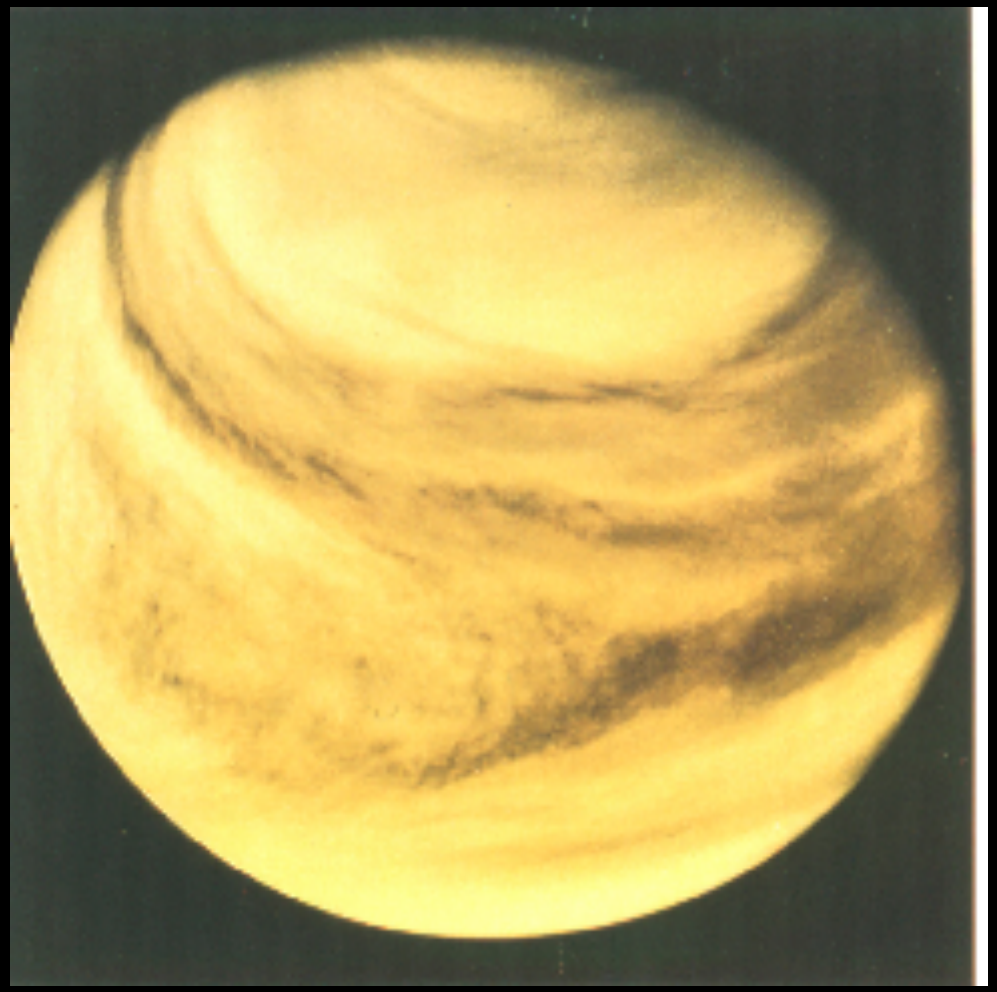
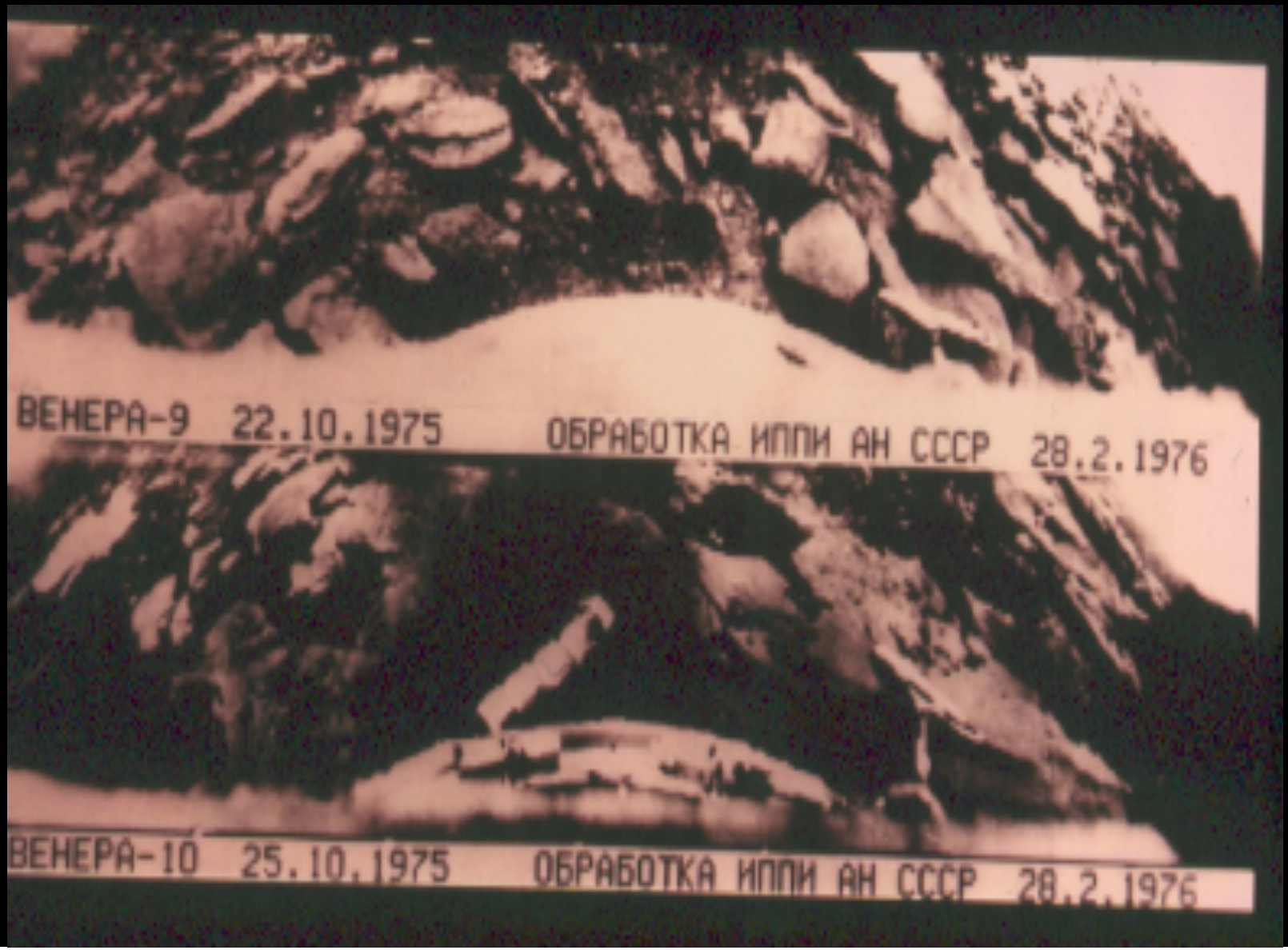
Northwestern University

Pioneer image of Venus



50's sci-fi view of Venus

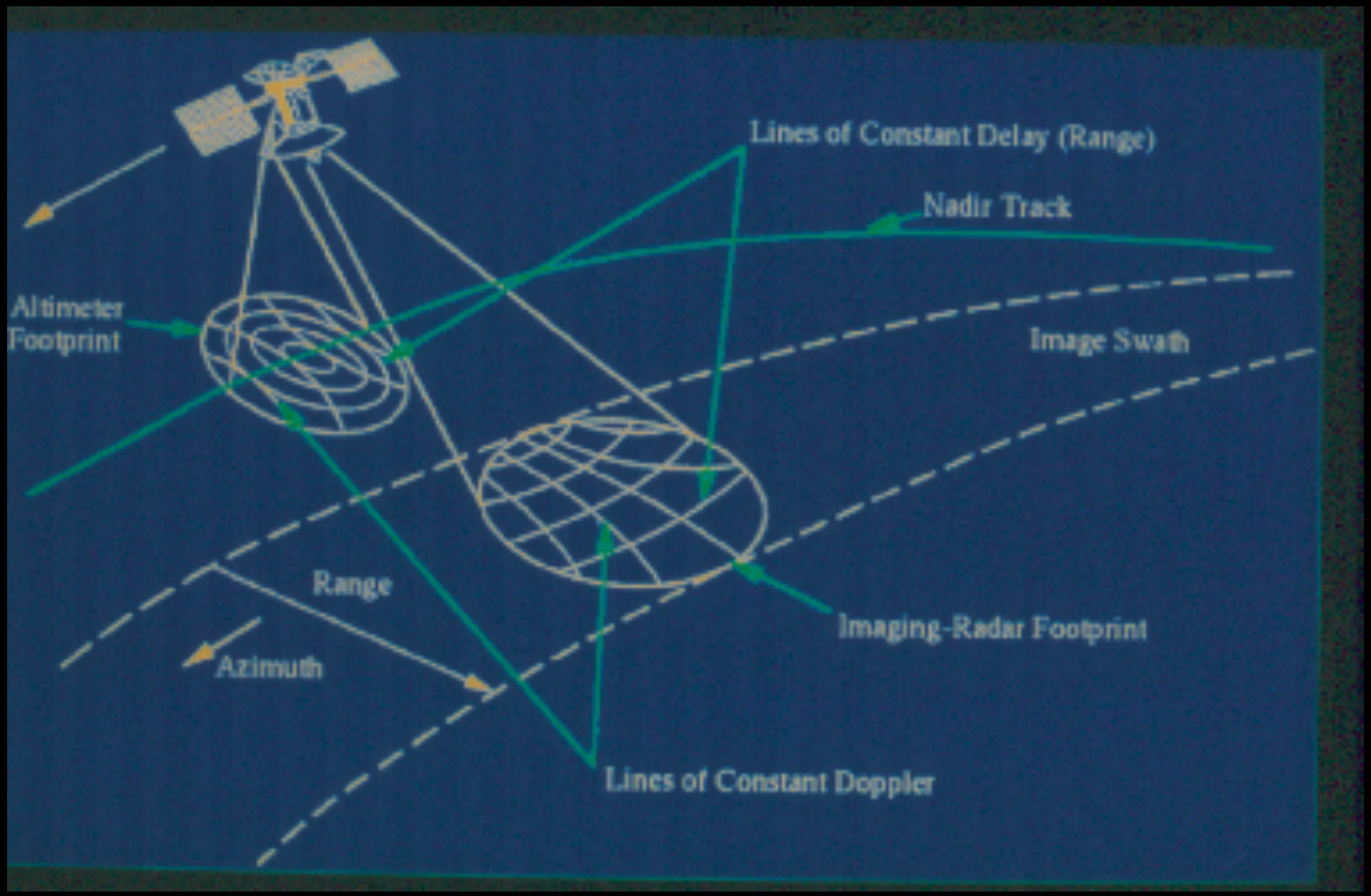
Venera 9 - 1975



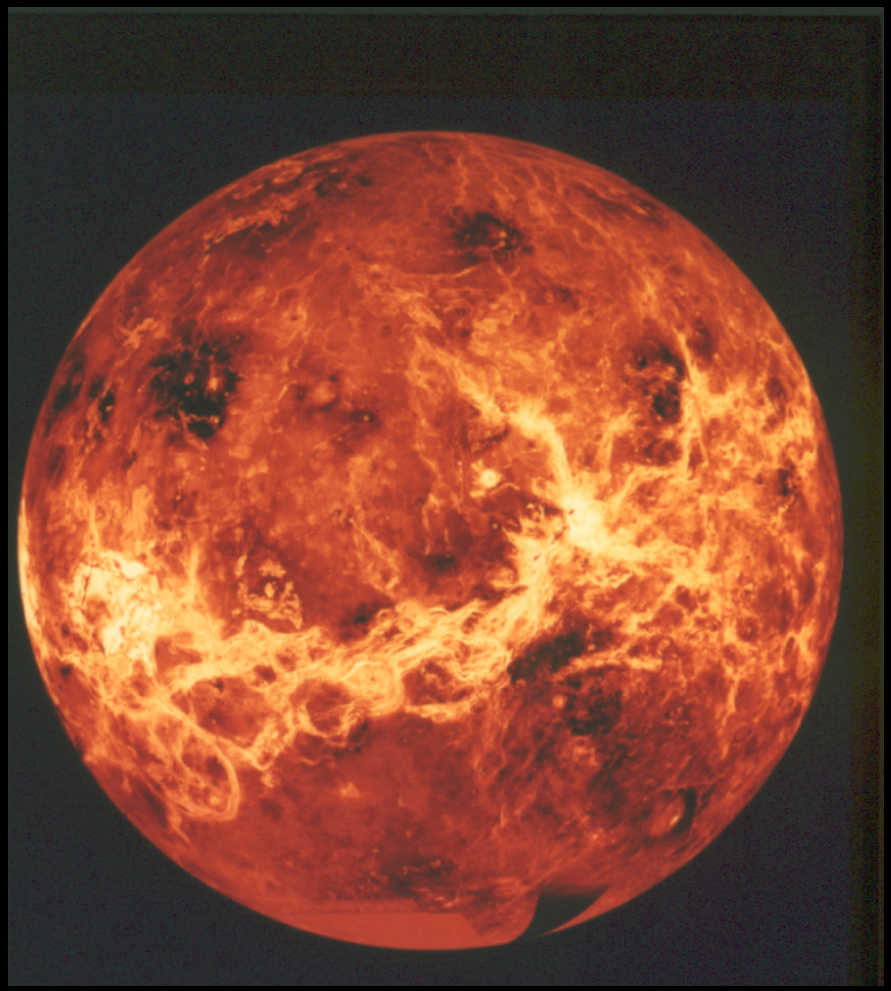
Venus Magellan Mission

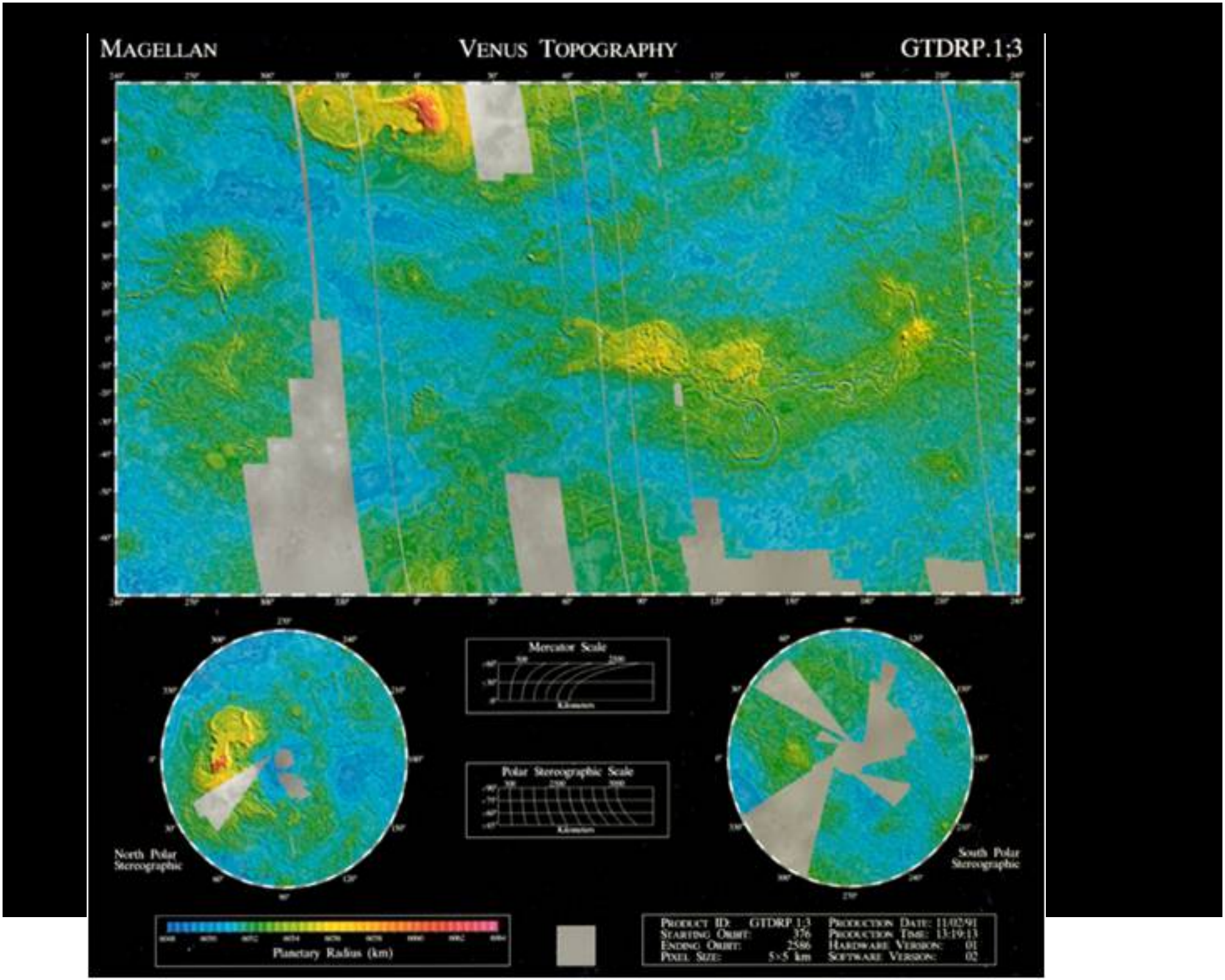
Magellan Antenna

Magellan Radar Imaging

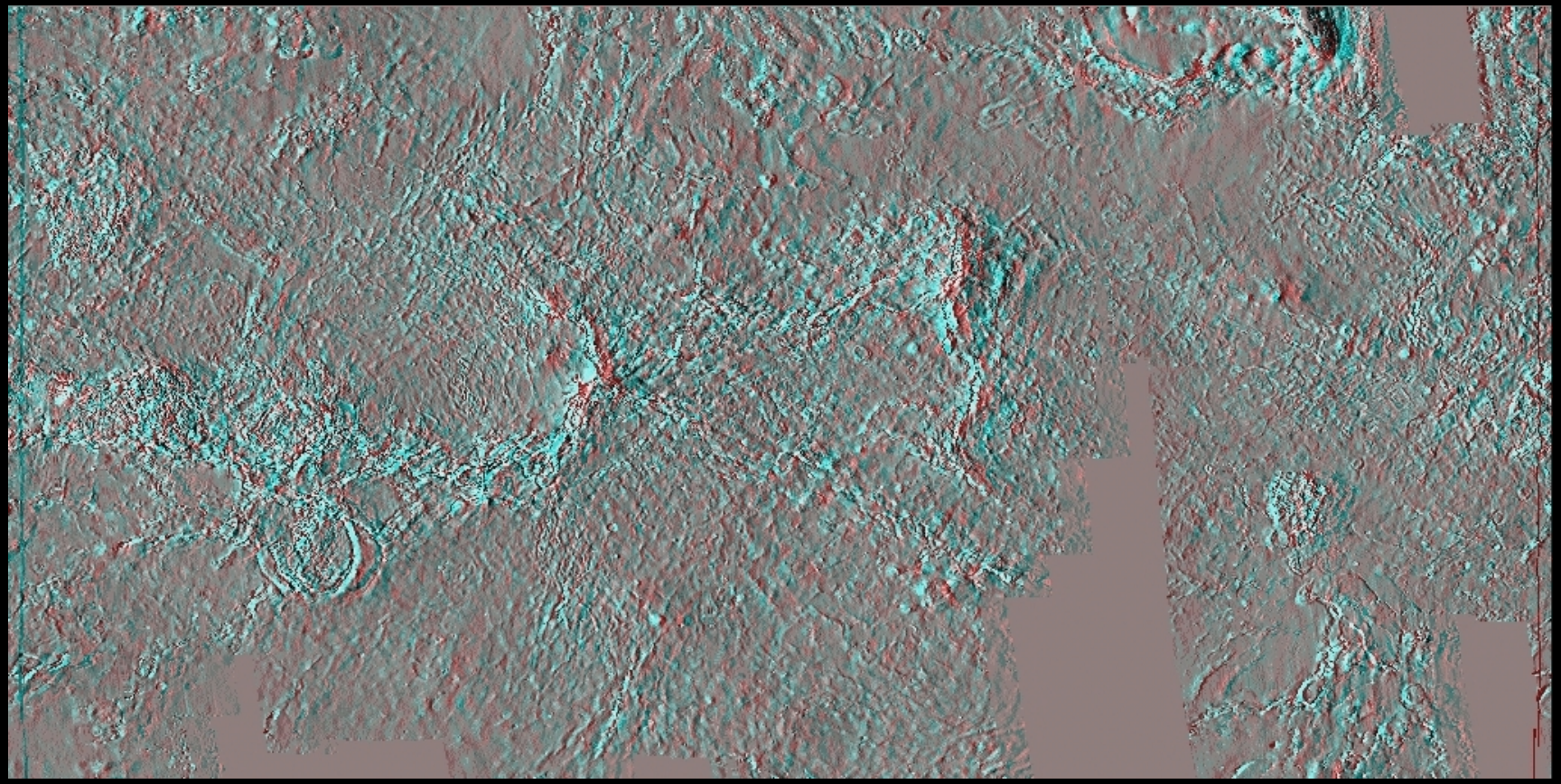


Venus- radar mosaic

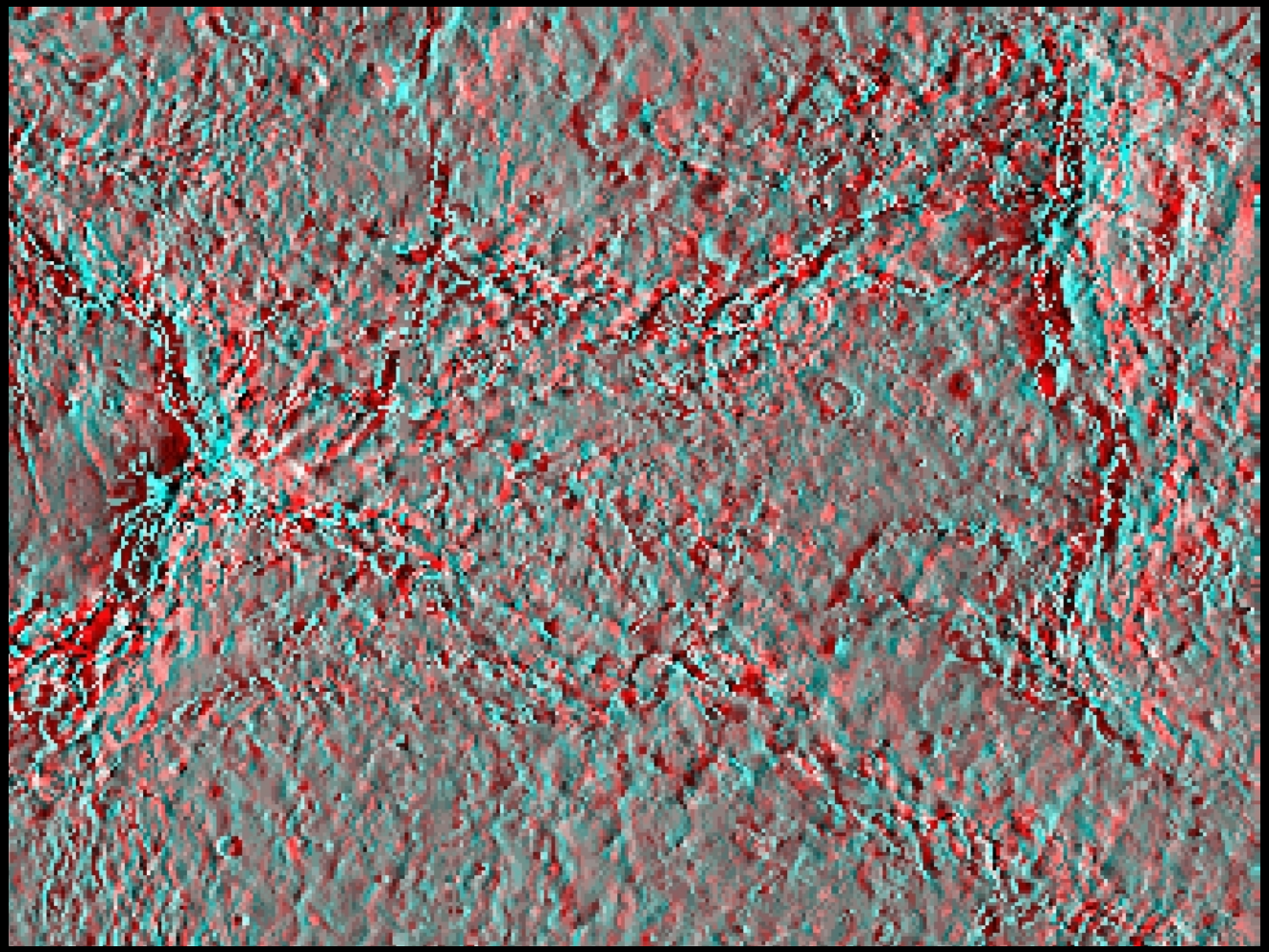



MAGELLAN
VENUS TOPOGRAPHY
GTDRP.1;3
Mercator Scale
Polar Stereographic Scale
North Polar Stereographic
South Polar Stereographic
Planetary Radius (km)
PRODUCT ID: GTDRP.1;3
STARTING ORBIT: 376
ENDING ORBIT: 2586
PIXEL SIZE: 5×5 km
PRODUCTION DATE: 11/02/91
PRODUCTION TIME: 13:19:13
HARDWARE VERSION: 01
SOFTWARE VERSION: 02

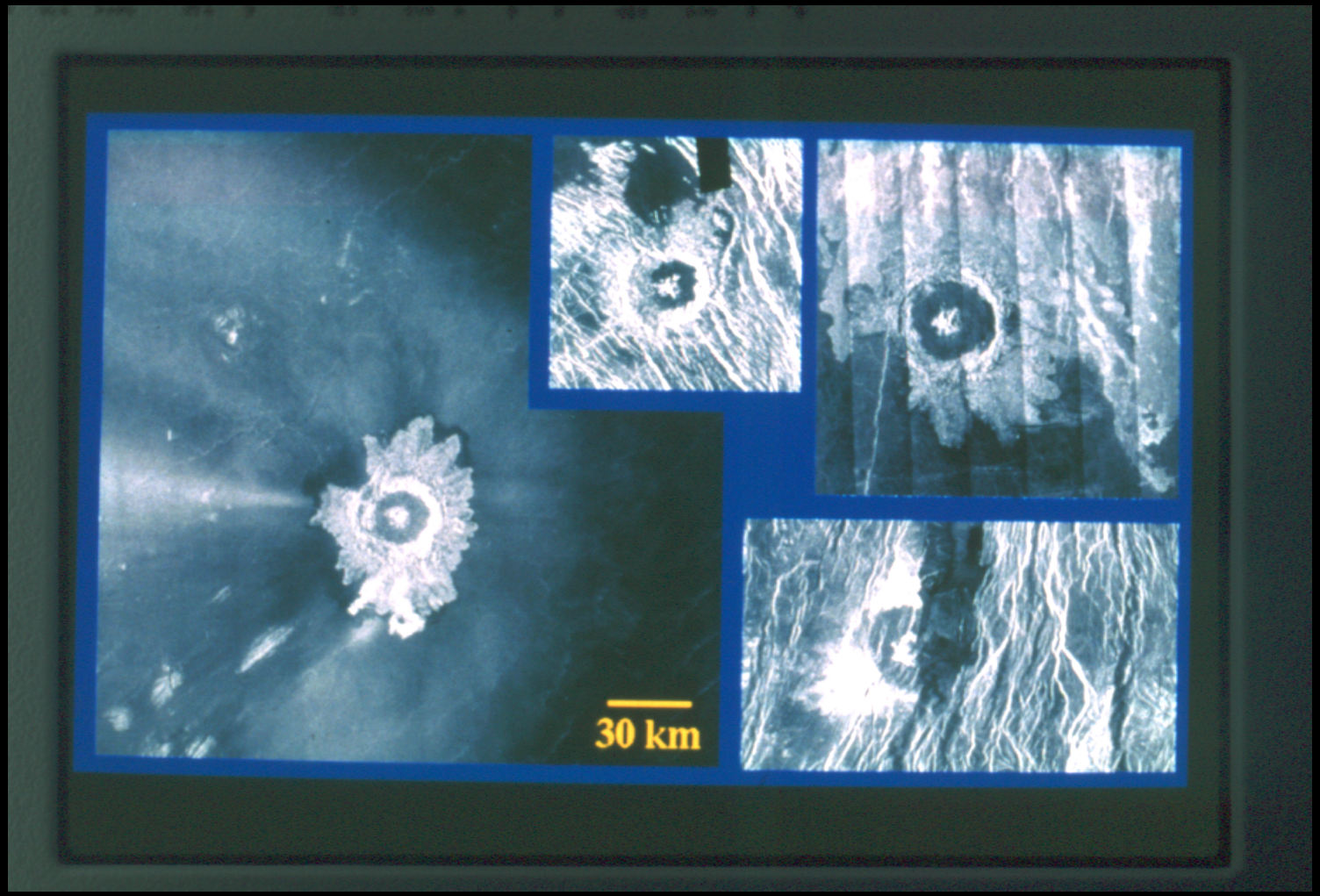
Venus 3D Topo



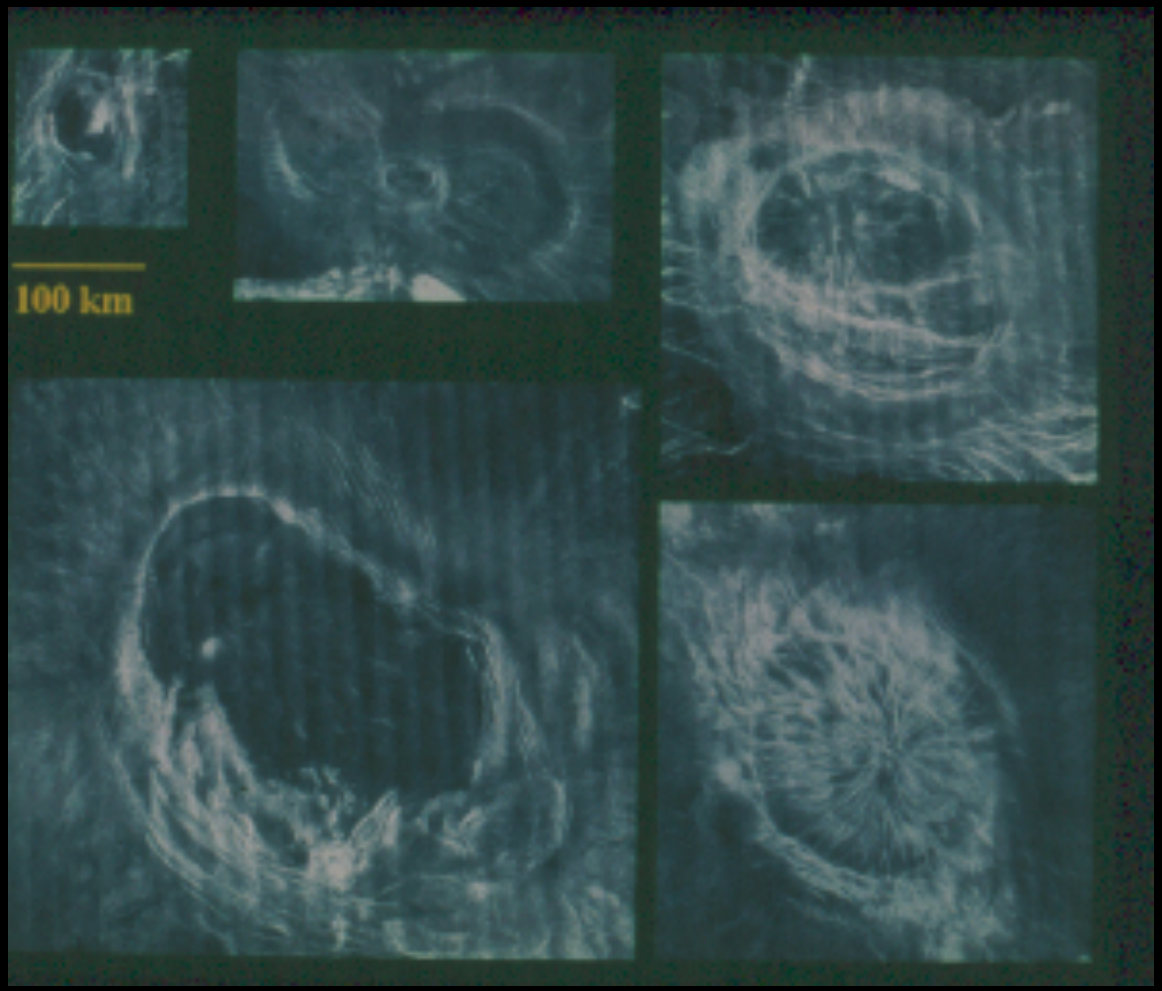
BAT 3D Topo



Venus Craters



Venus Coronae



Venus Chasmata

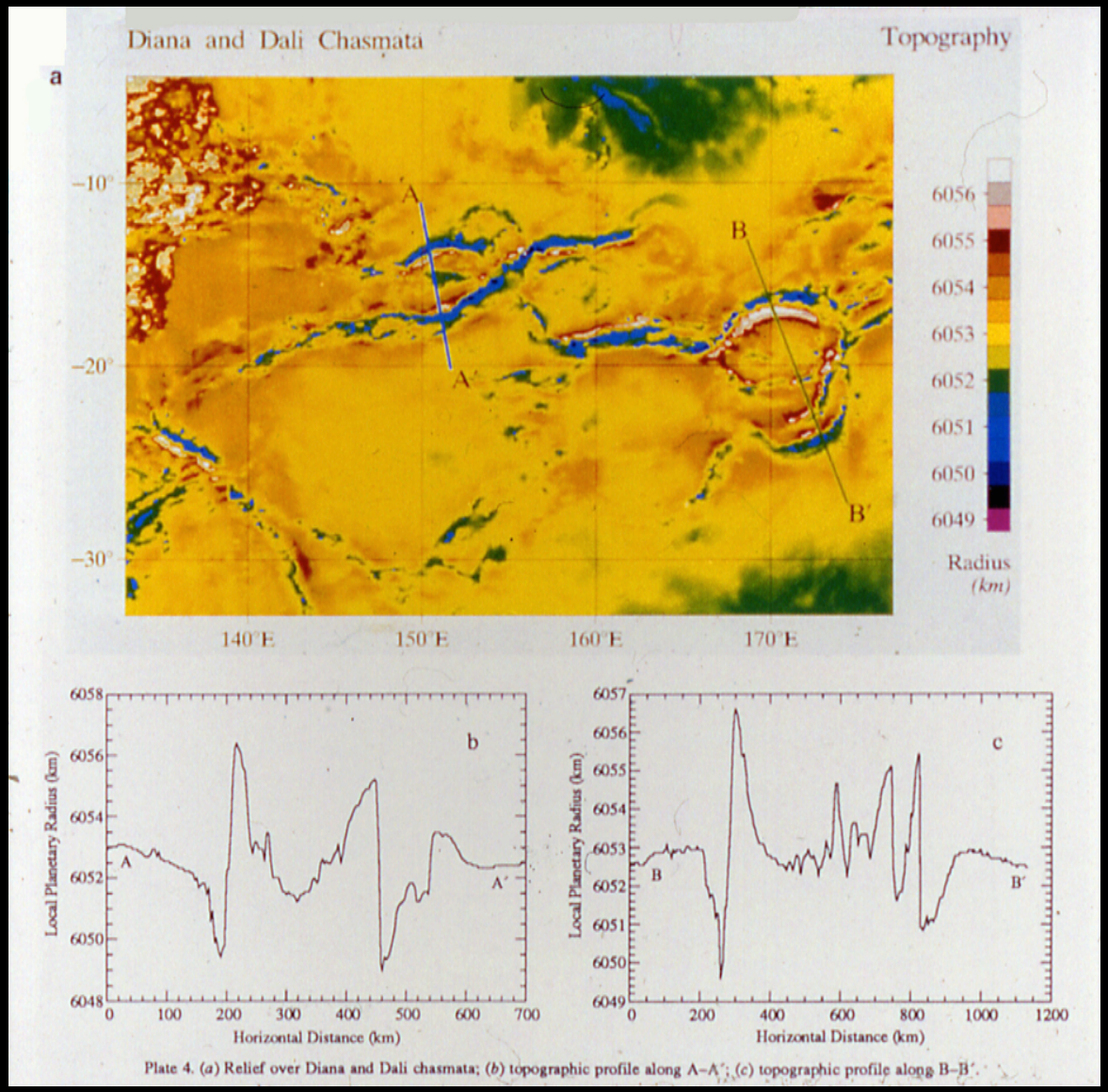
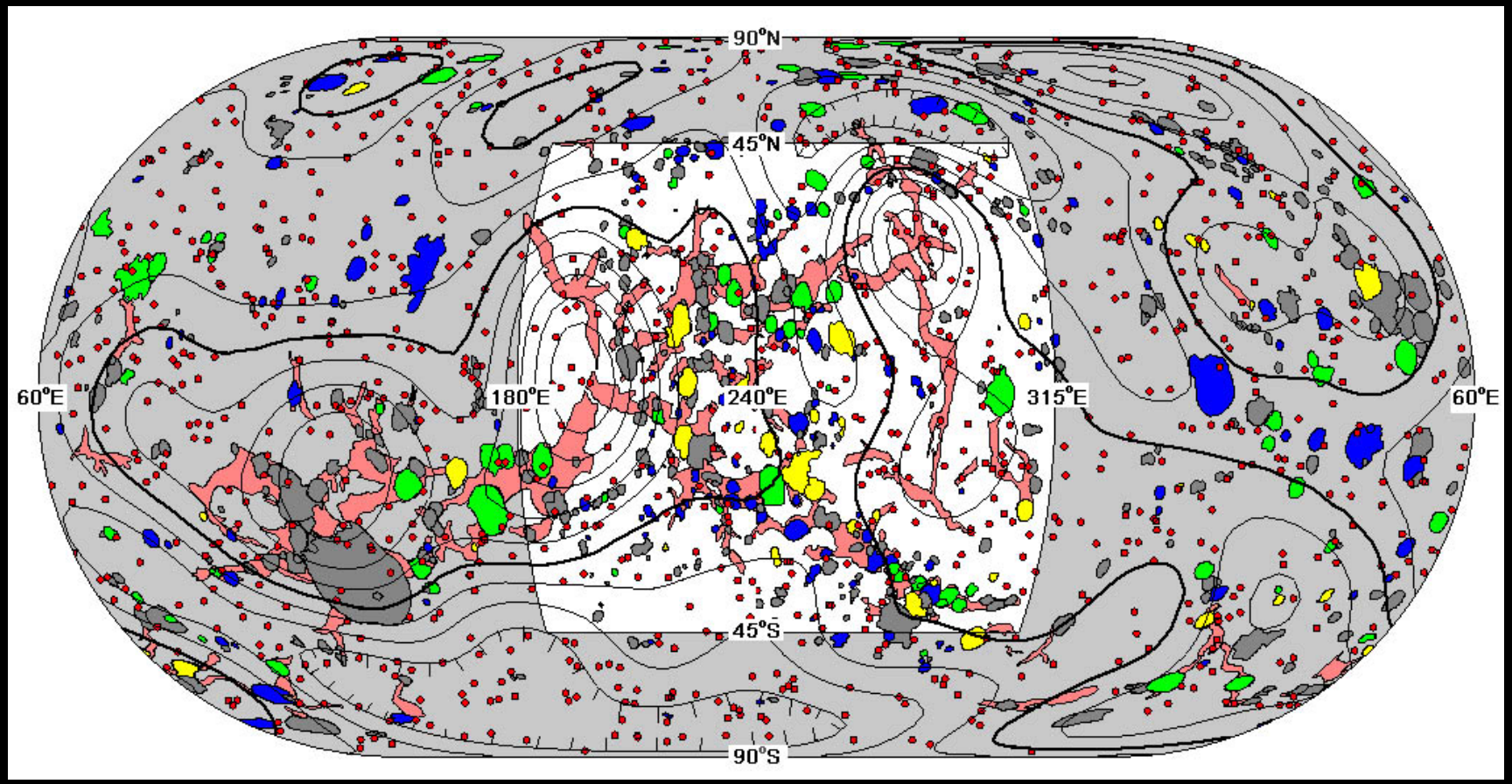
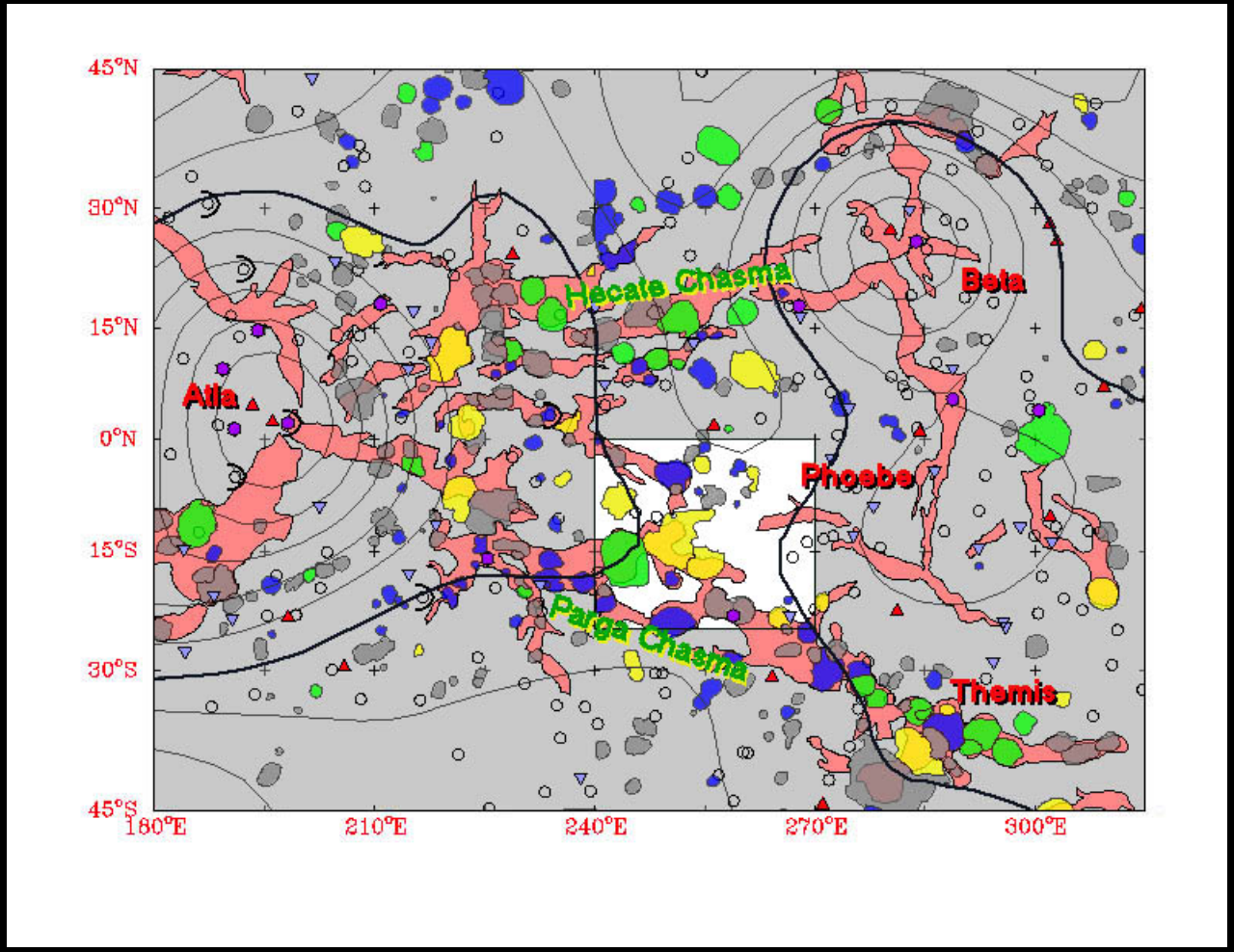


Plate 4. (*a*) Relief over Diana and Dali chasmata; (*b*) topographic profile along A–A′; (*c*) topographic profile along B–B′.

Venus Chasmata, Coronae, Craters & Geoid

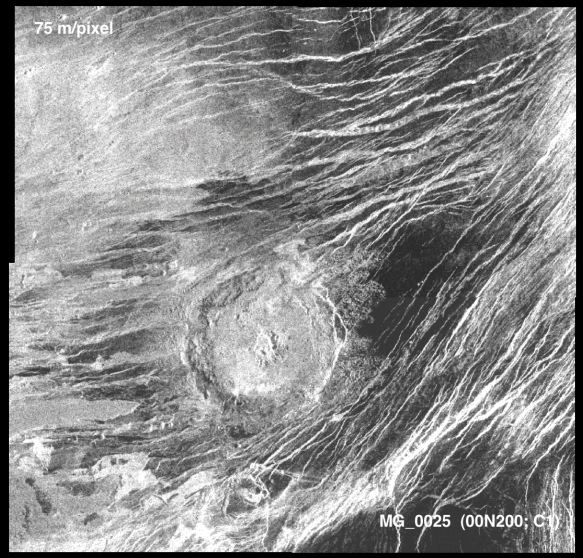


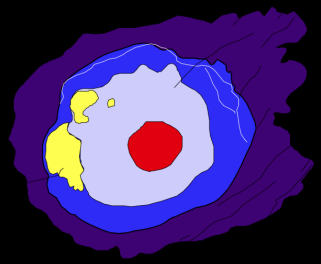
Venus BAT Region
Chasmata, Craters, Coronae & Geoid

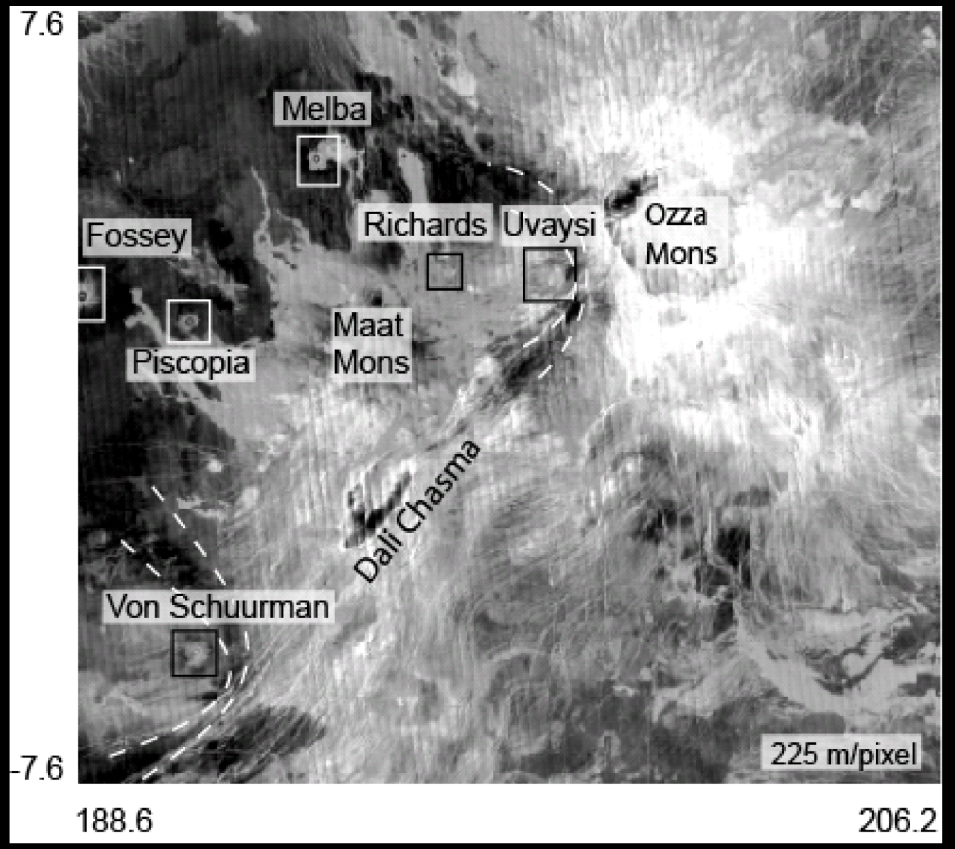


Crater Uvaysi

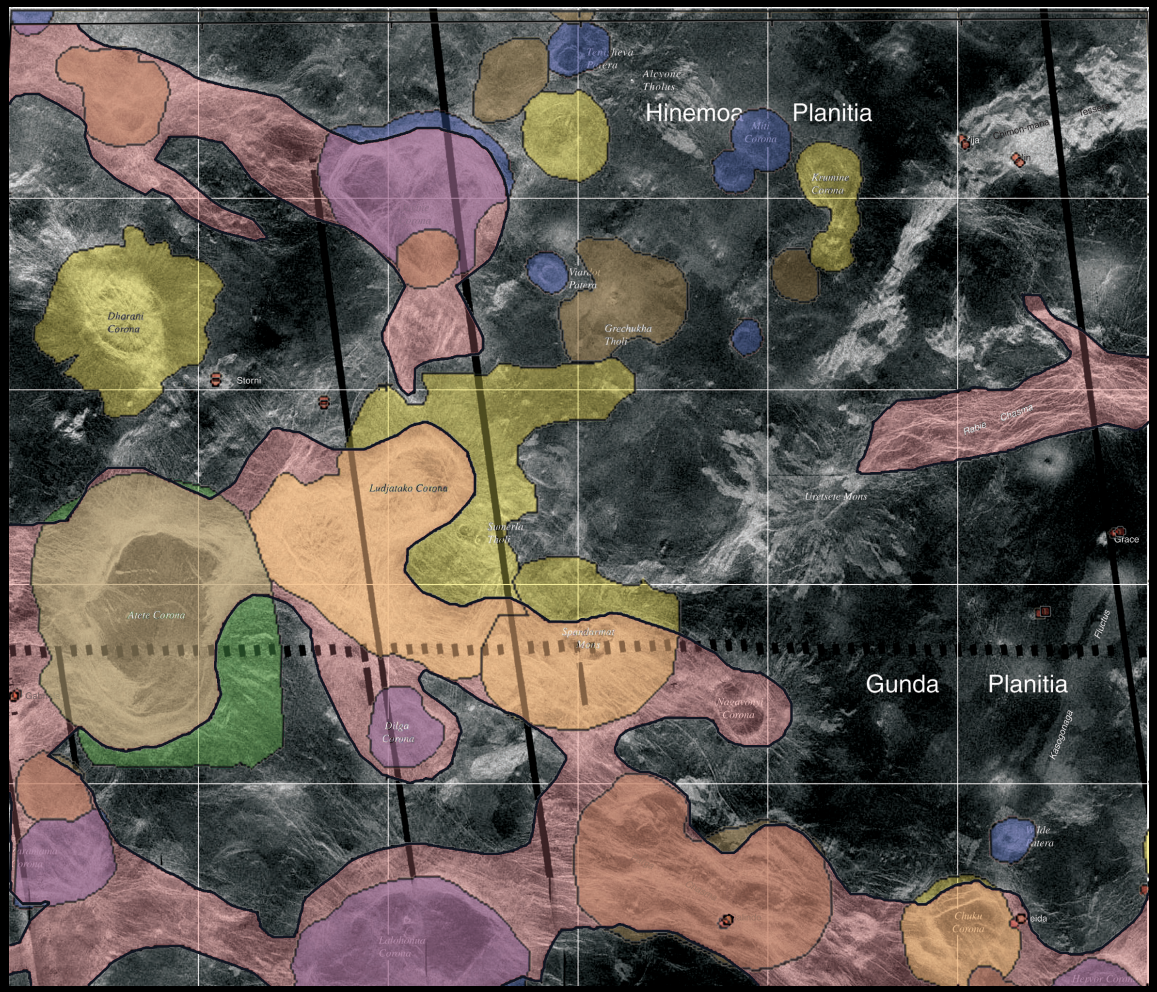
Uvaysi (2.3 N, 198.2 E, 38.0 km)



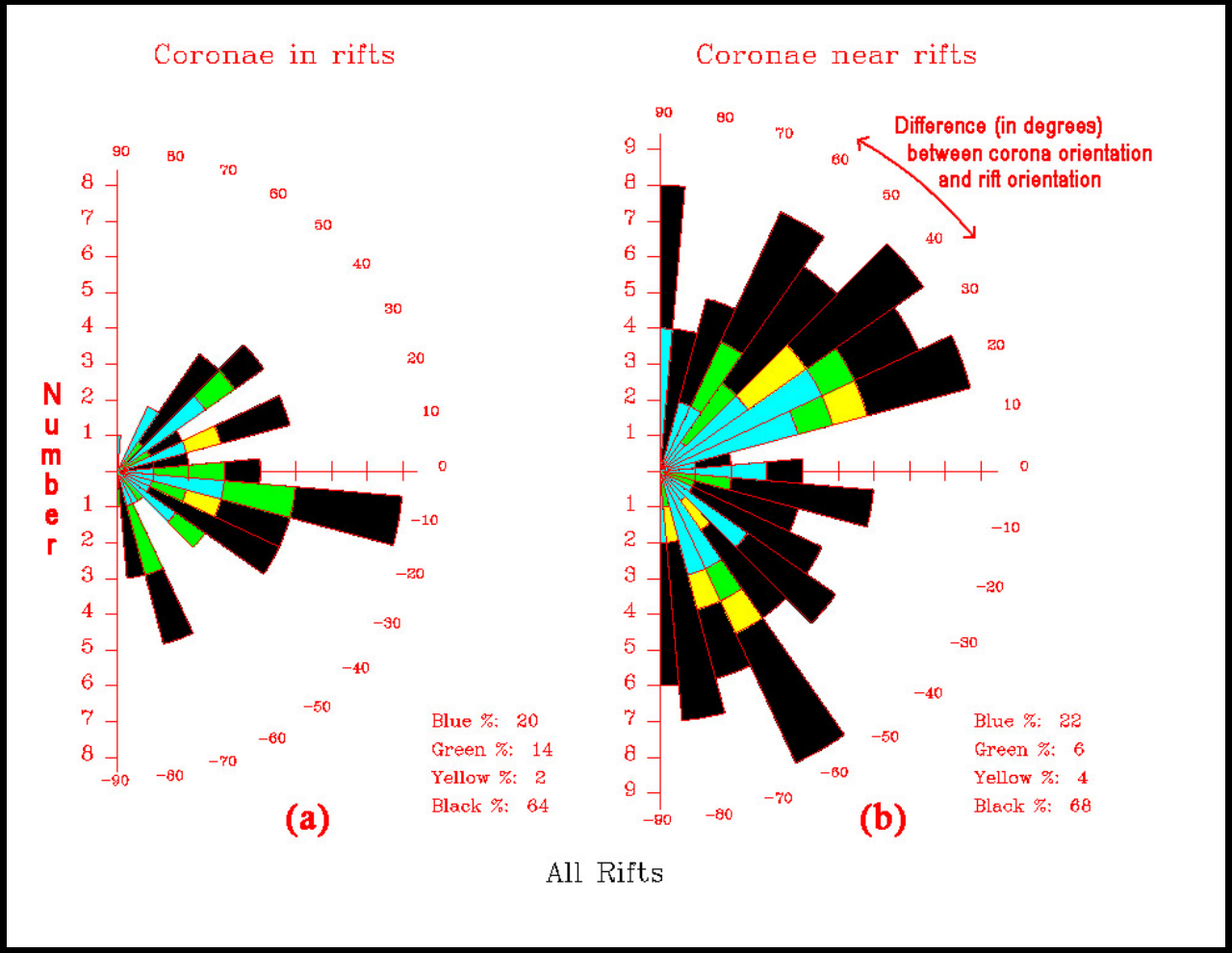




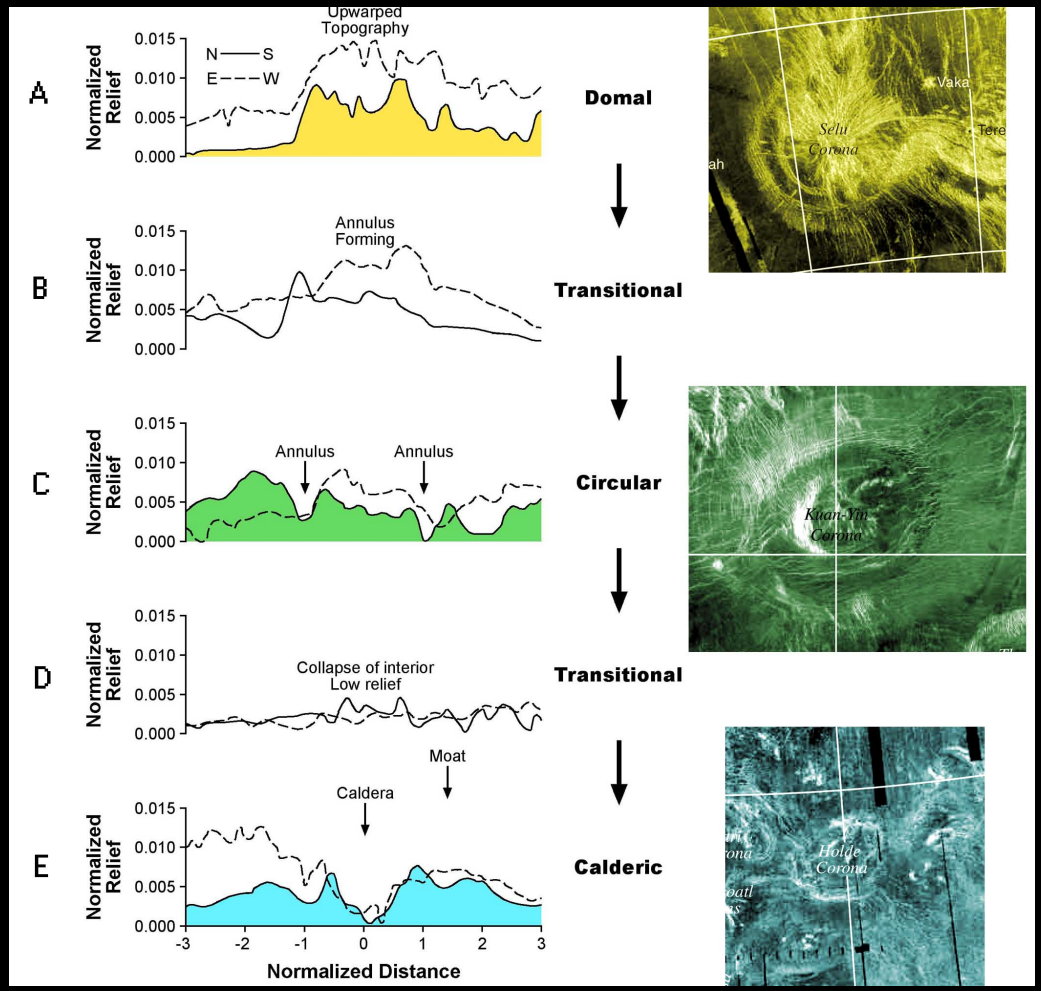
Parga Chasm with coronae



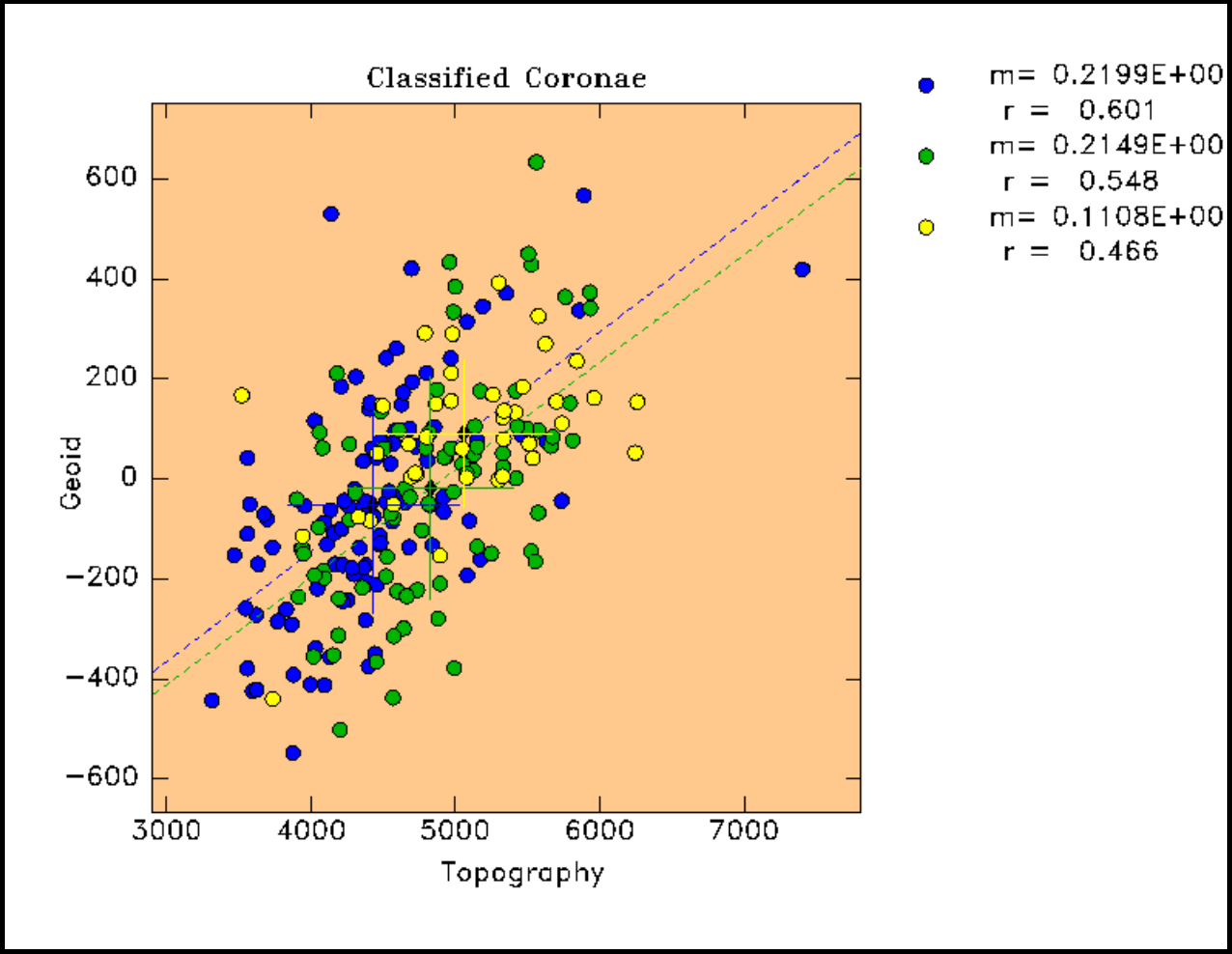
Coronae orientation



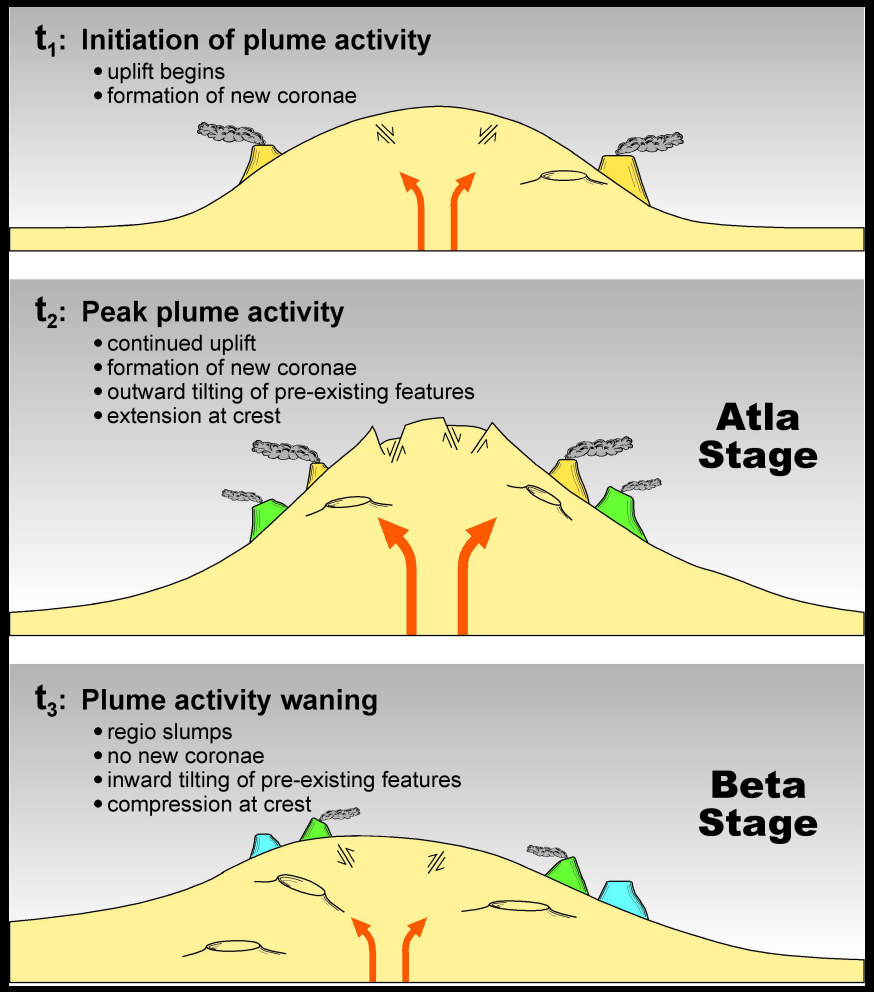
Coronae Classification

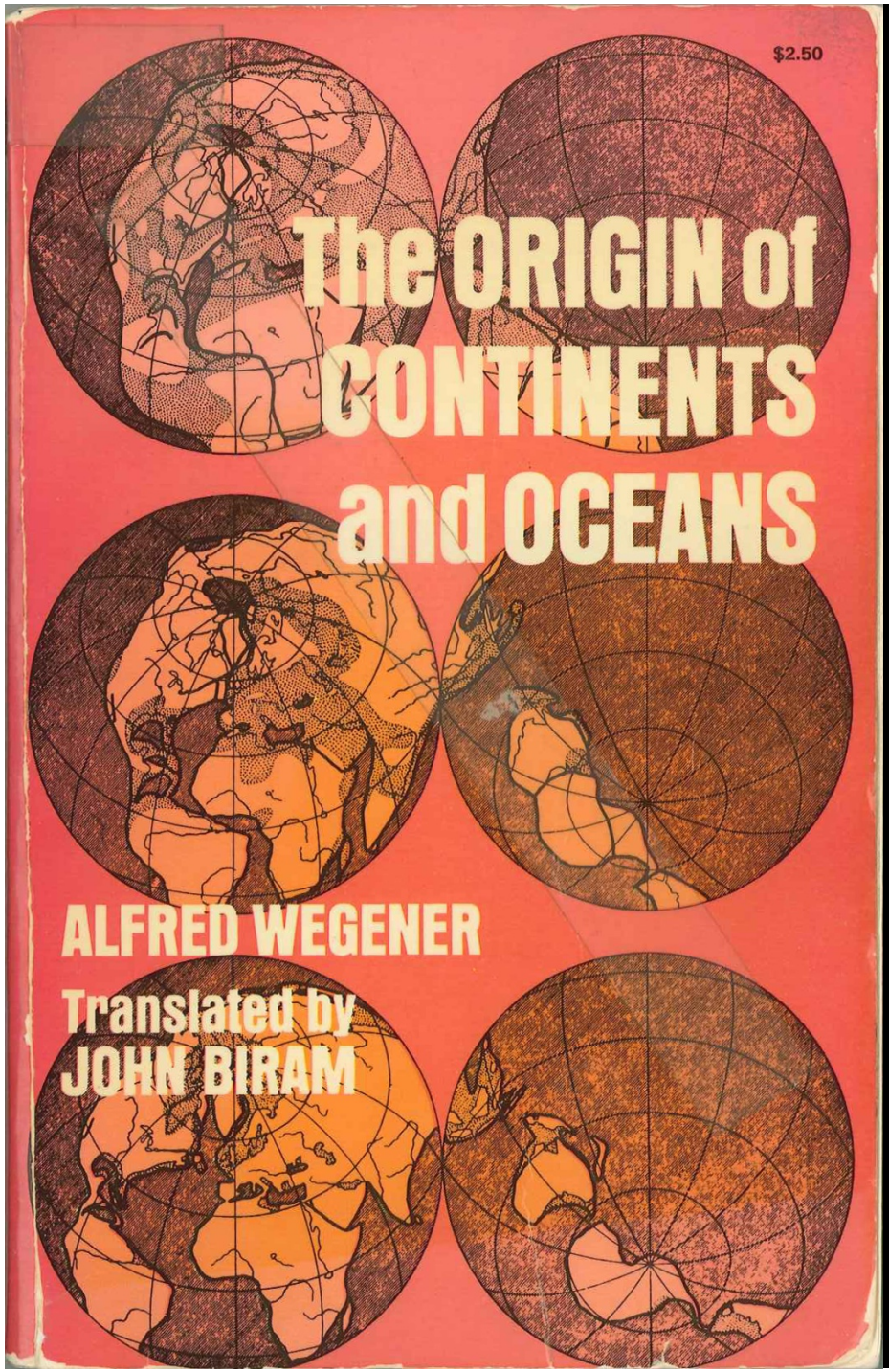


Coronae by type



Regio Stages

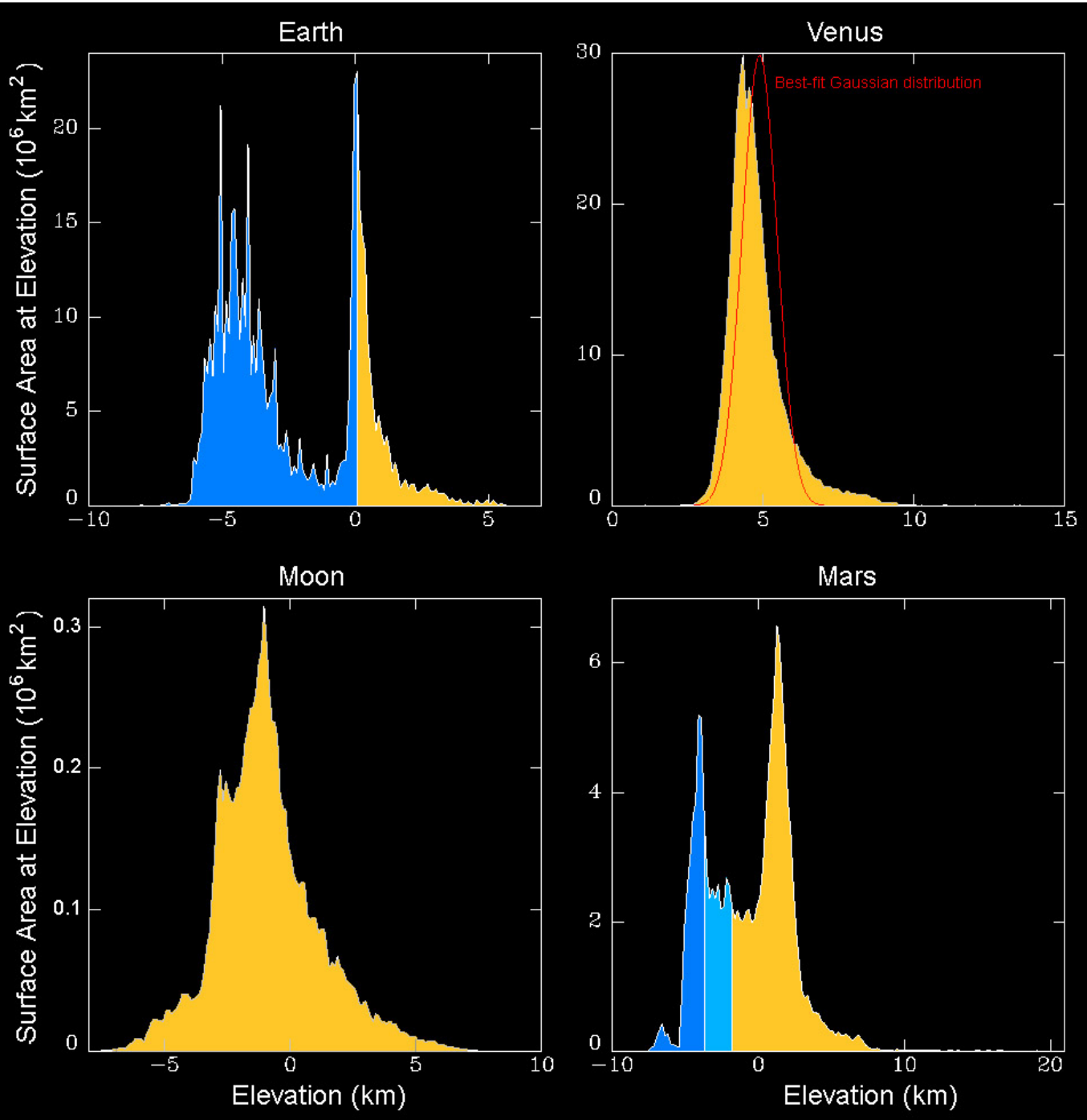




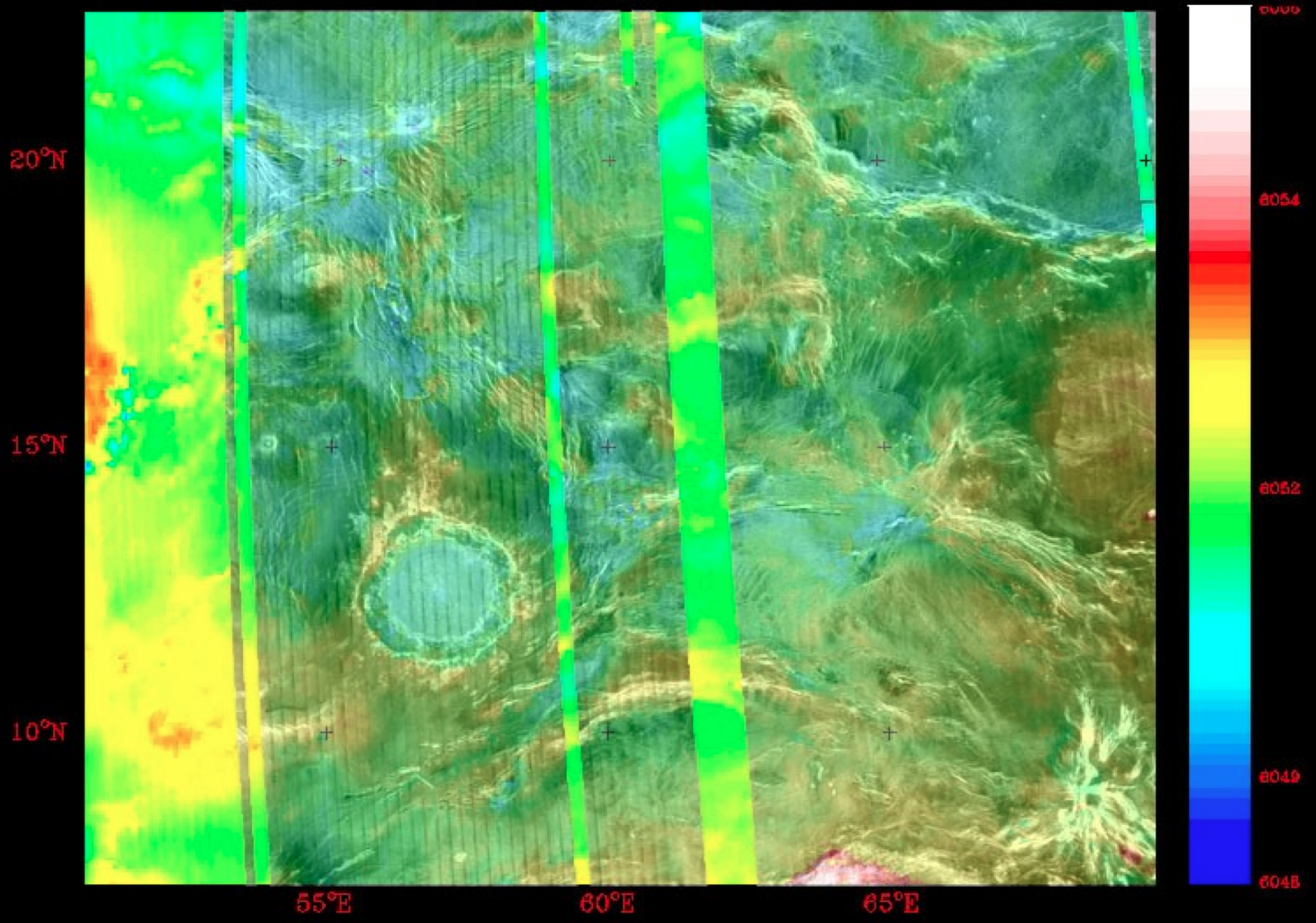
"In the whole of geophysics there is hardly another law of such clarity and reliability as this - that there are two preferential levels for the world's surface which occur in alternation side by side, and are represented by the continents and ocean floors, respectively. It is therefore very surprising 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

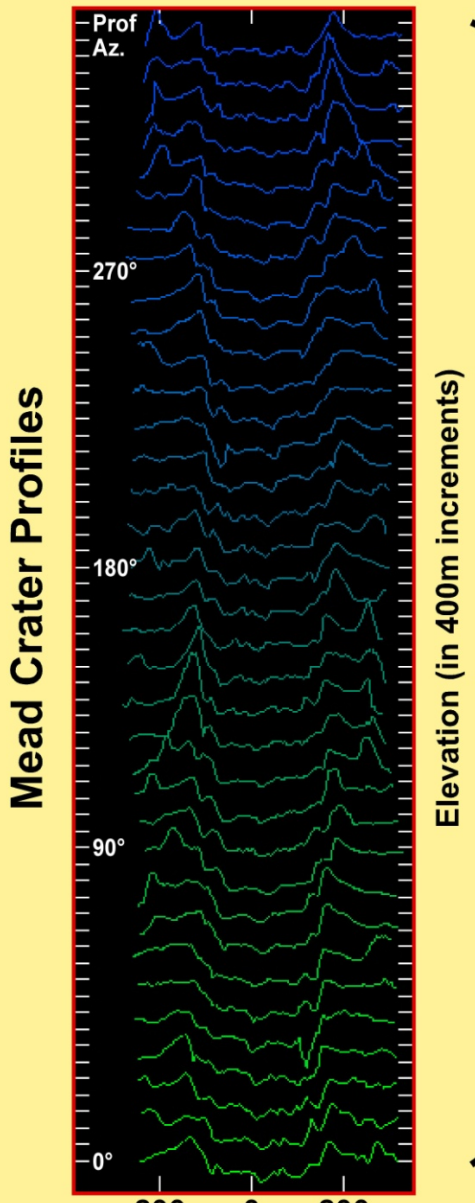


Mead Crater – Radar & Topography



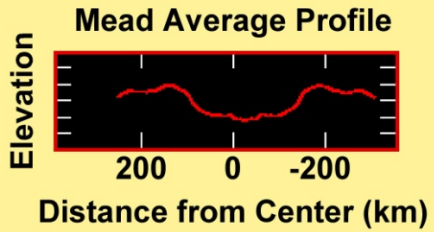
Average Profiling

Approach

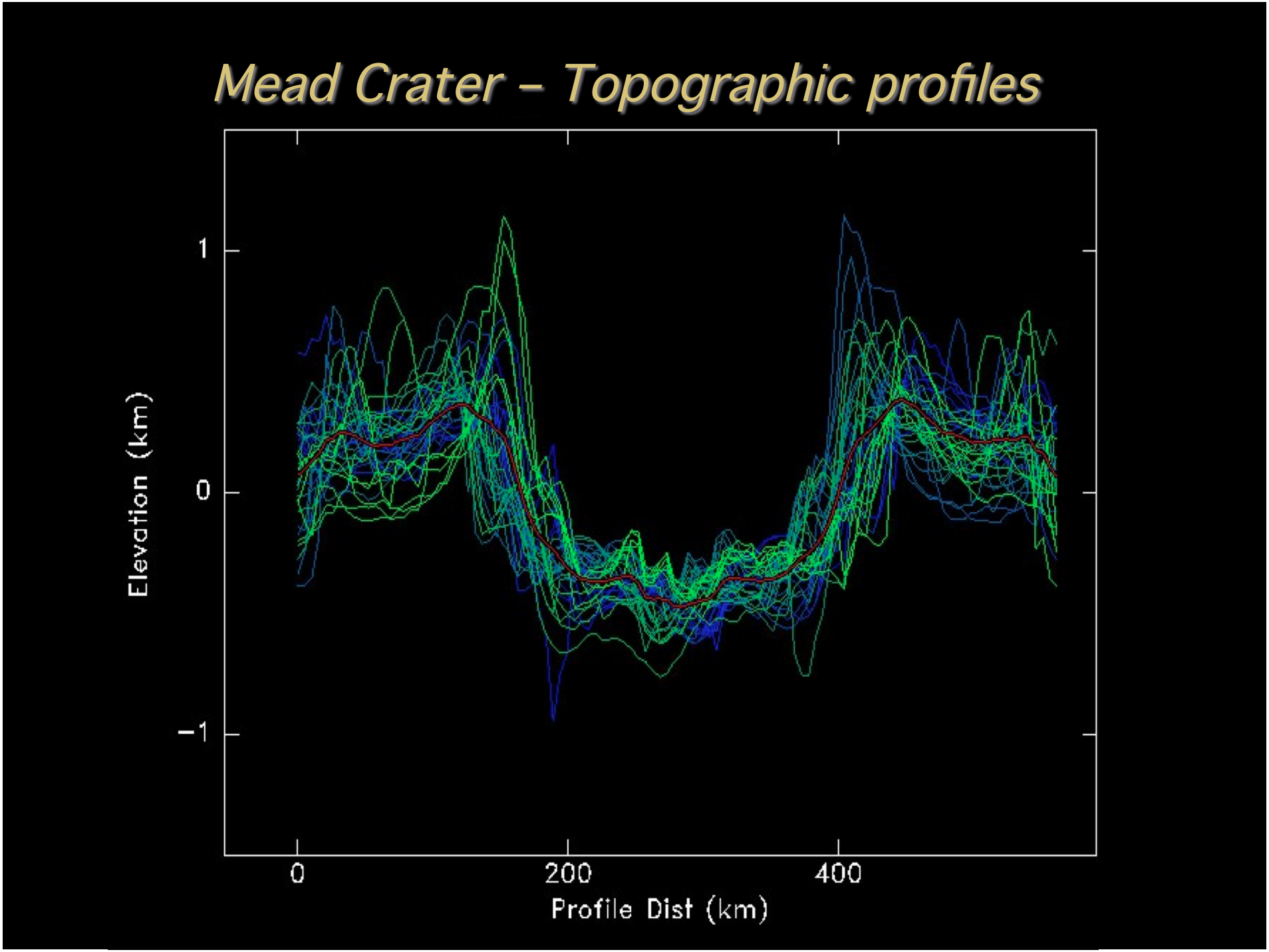


Mead Crater Profiles

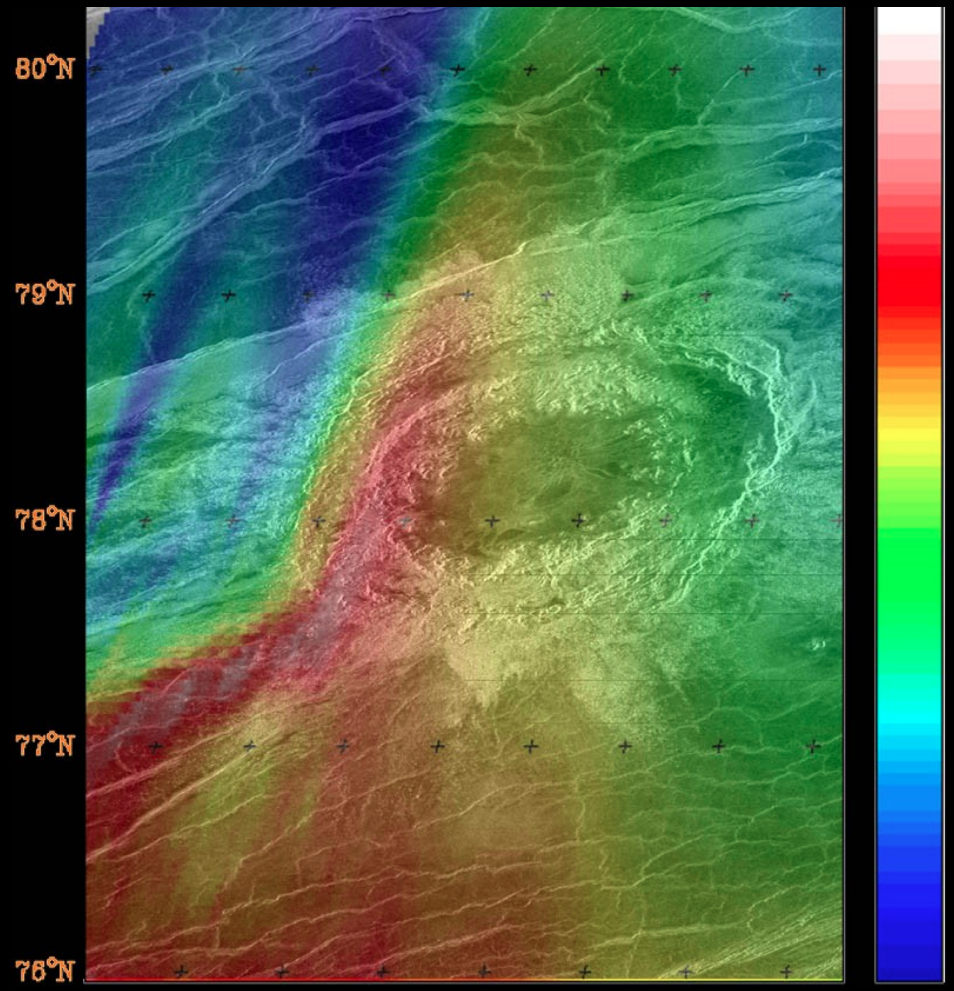
Elevation (in 400m increments)



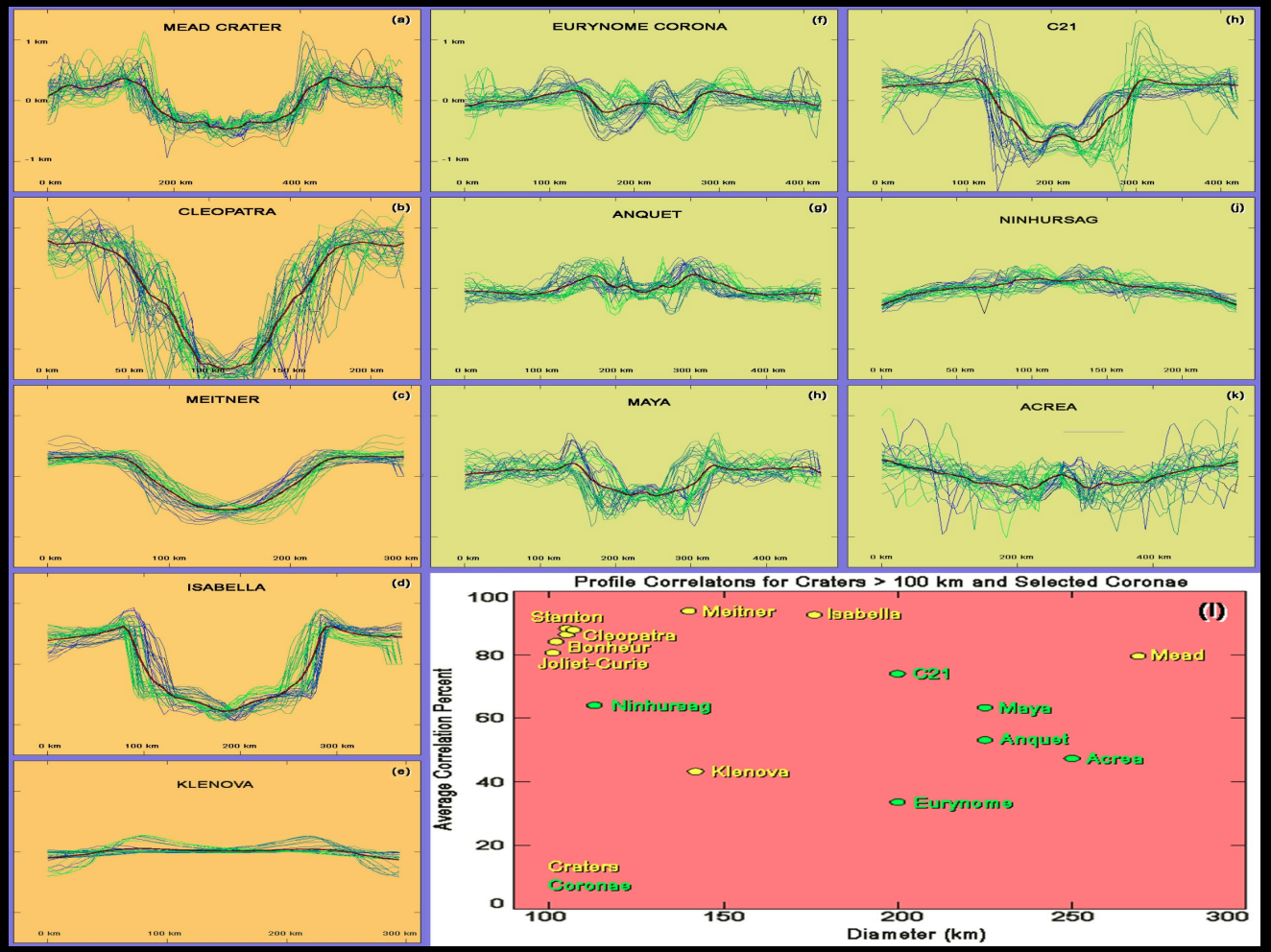
Mead Crater – Topographic profiles



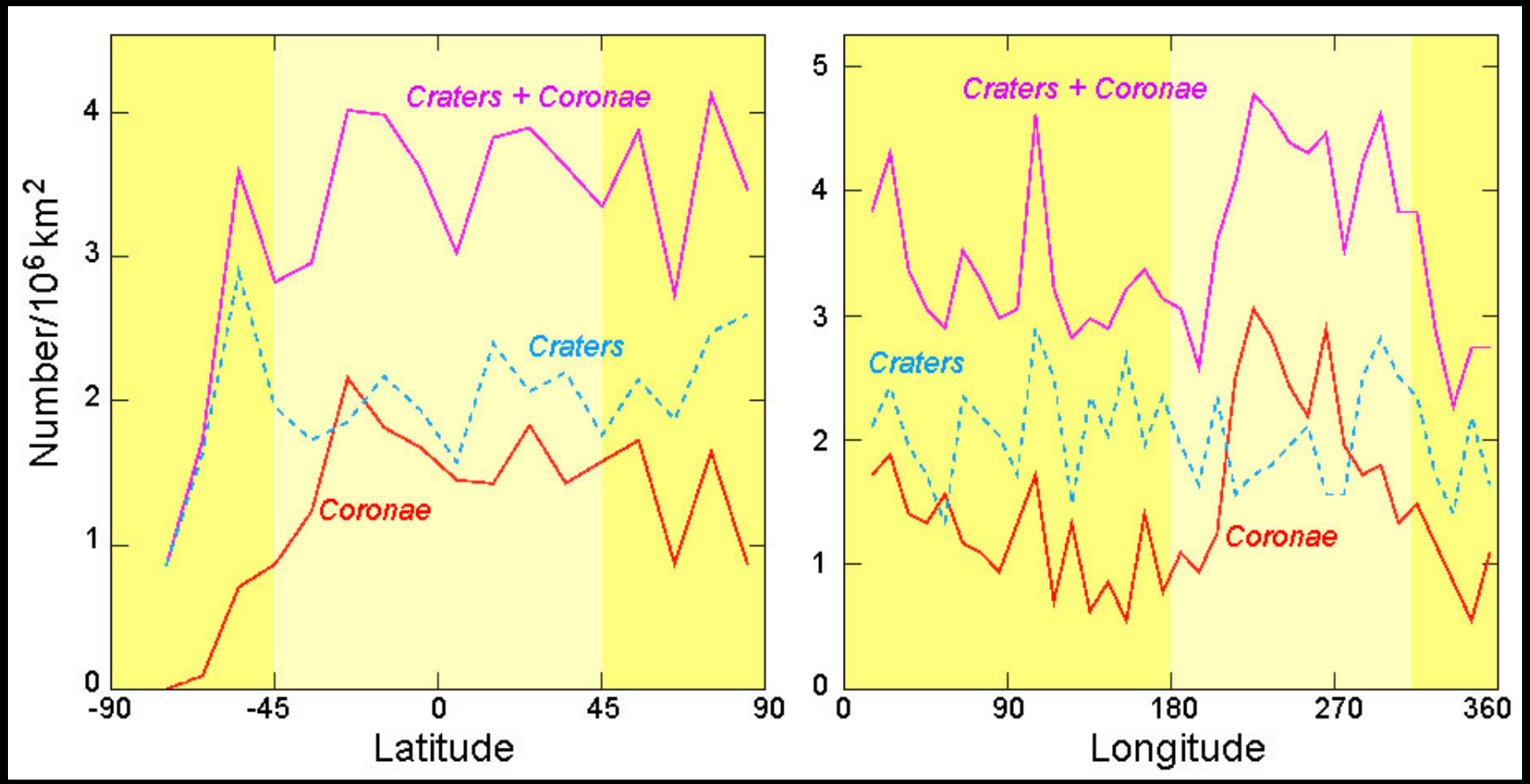
Klenova – crater or corona?



Topography Correlation Craters and Coronae



Feature Densities



Plumes- a controversial topic!

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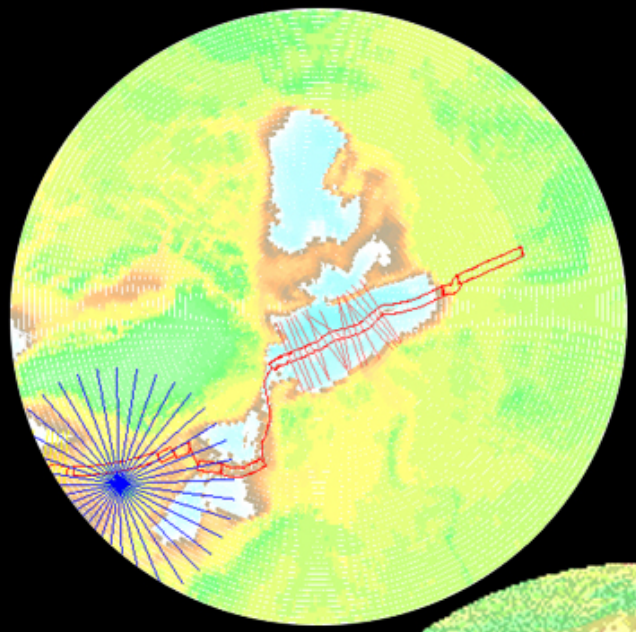
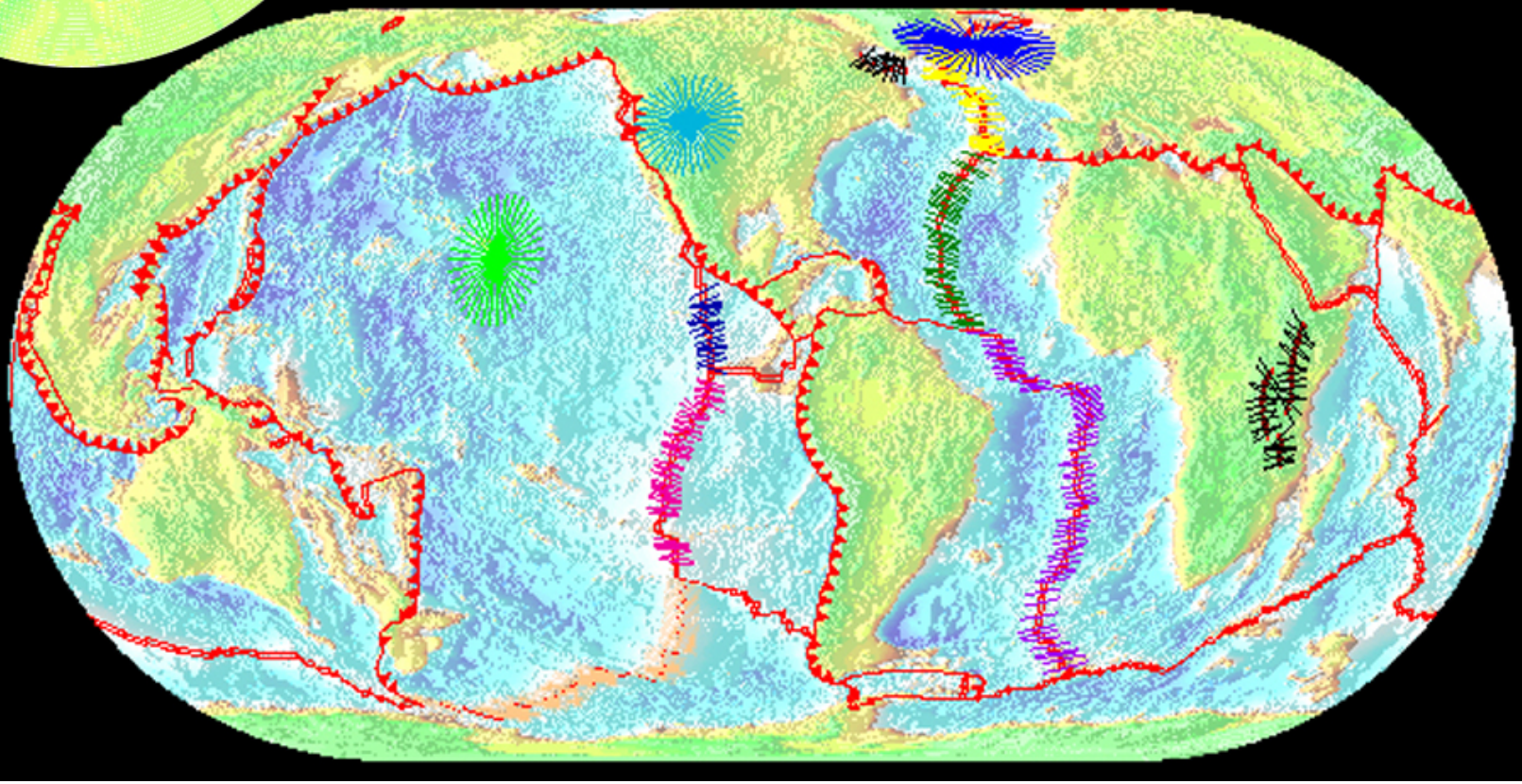
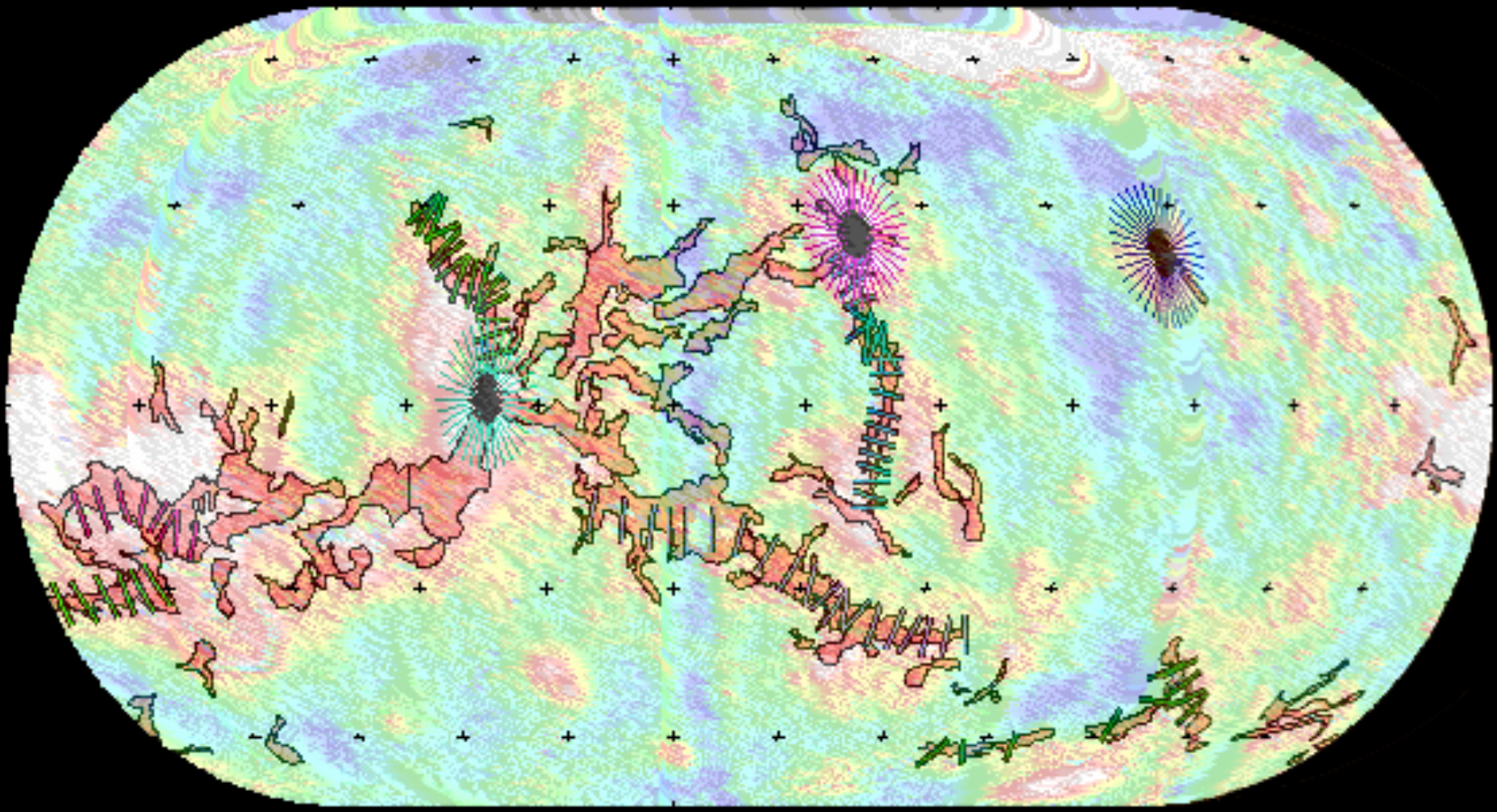
Earth's Topography and Profiles

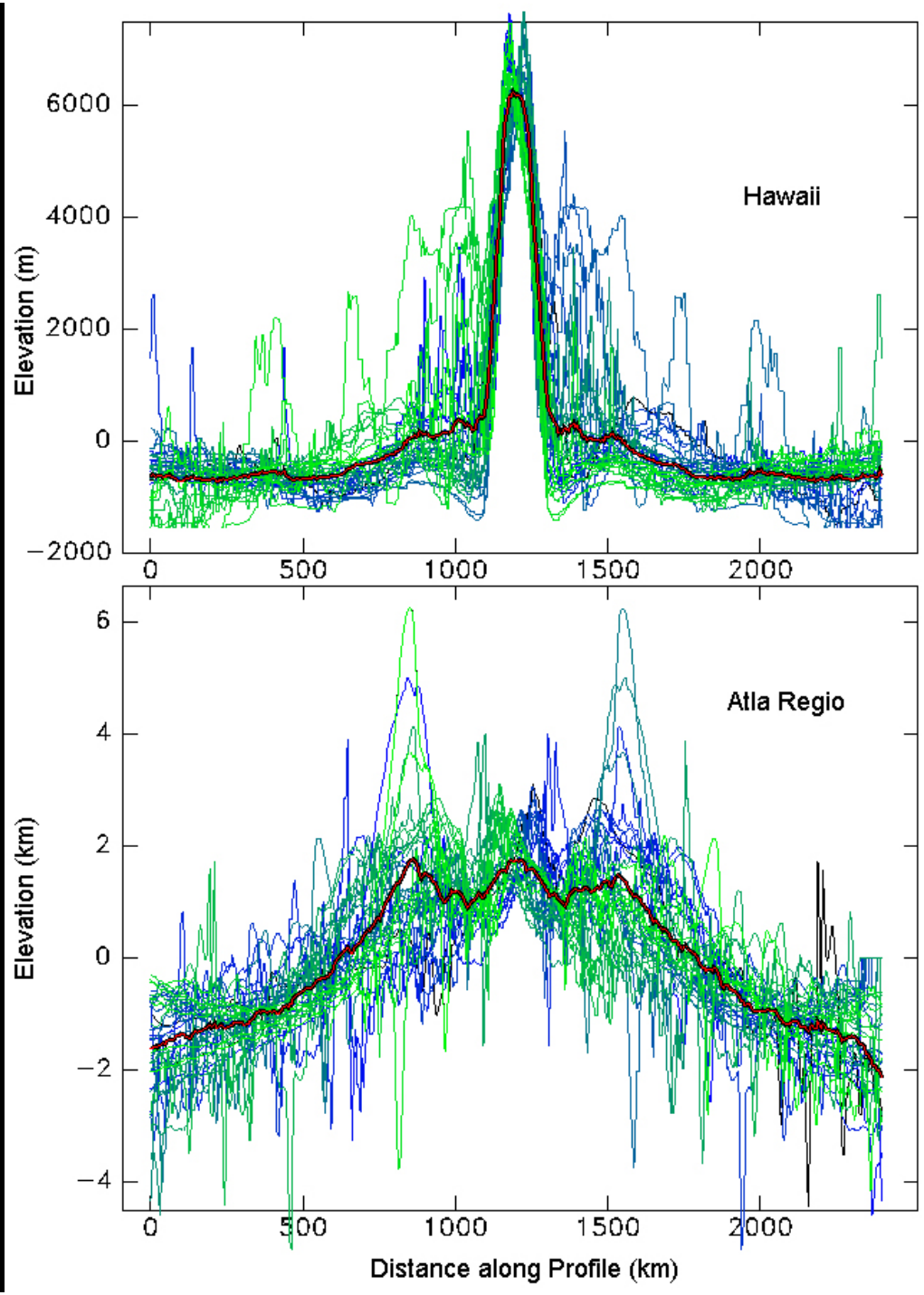




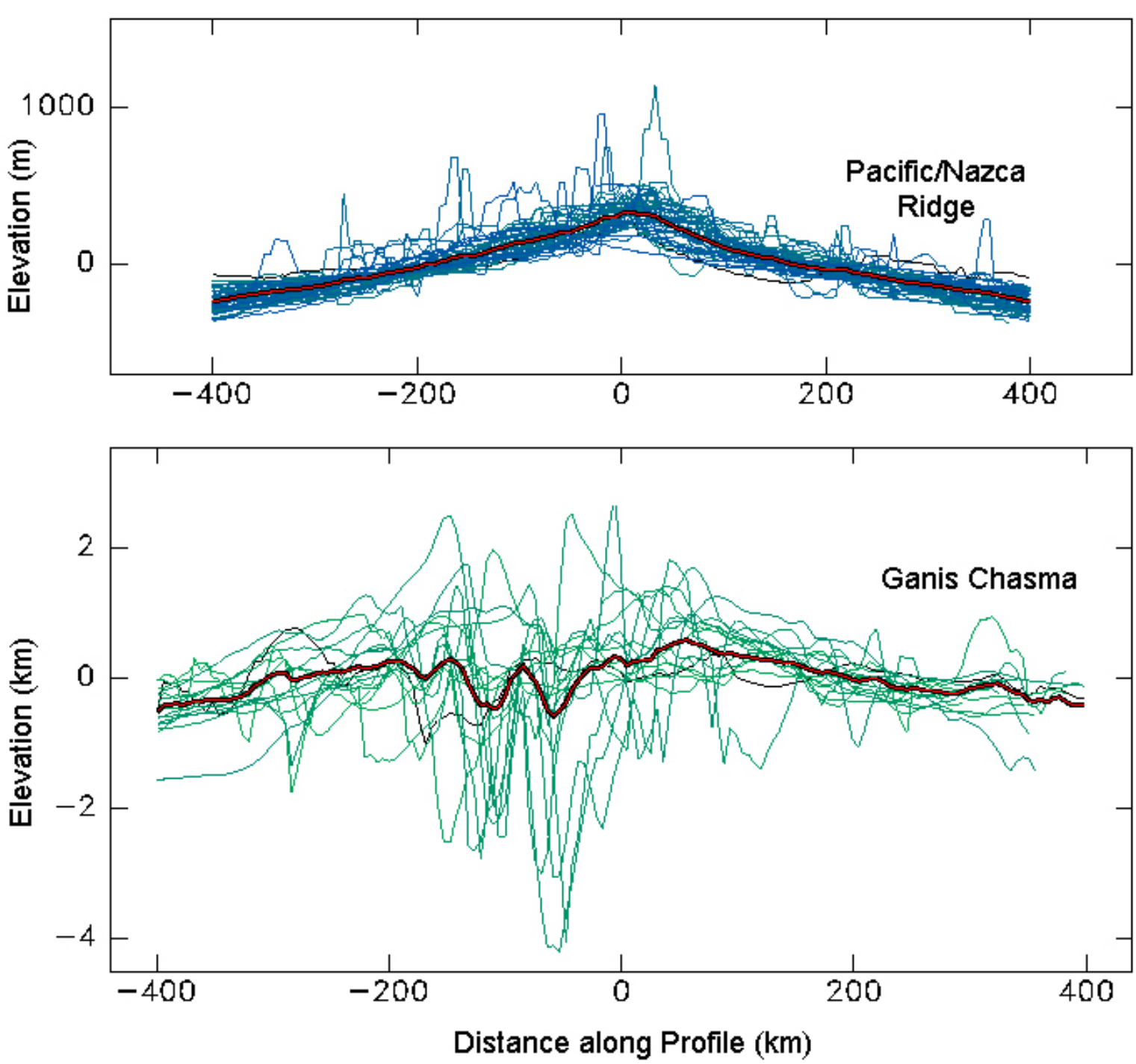
Venus Topography and Profiles



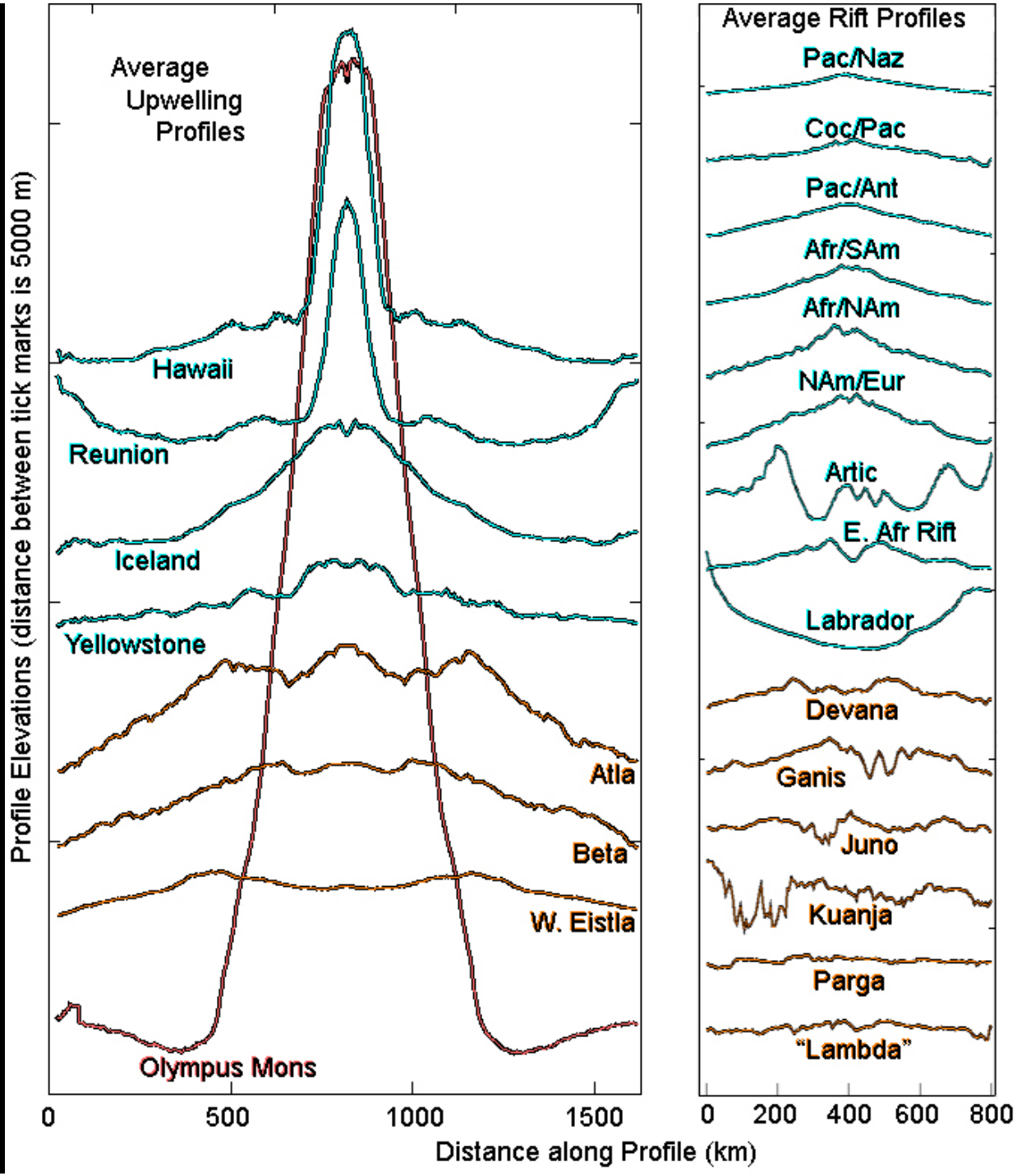
Earth/Venus Comparison: Uplifts



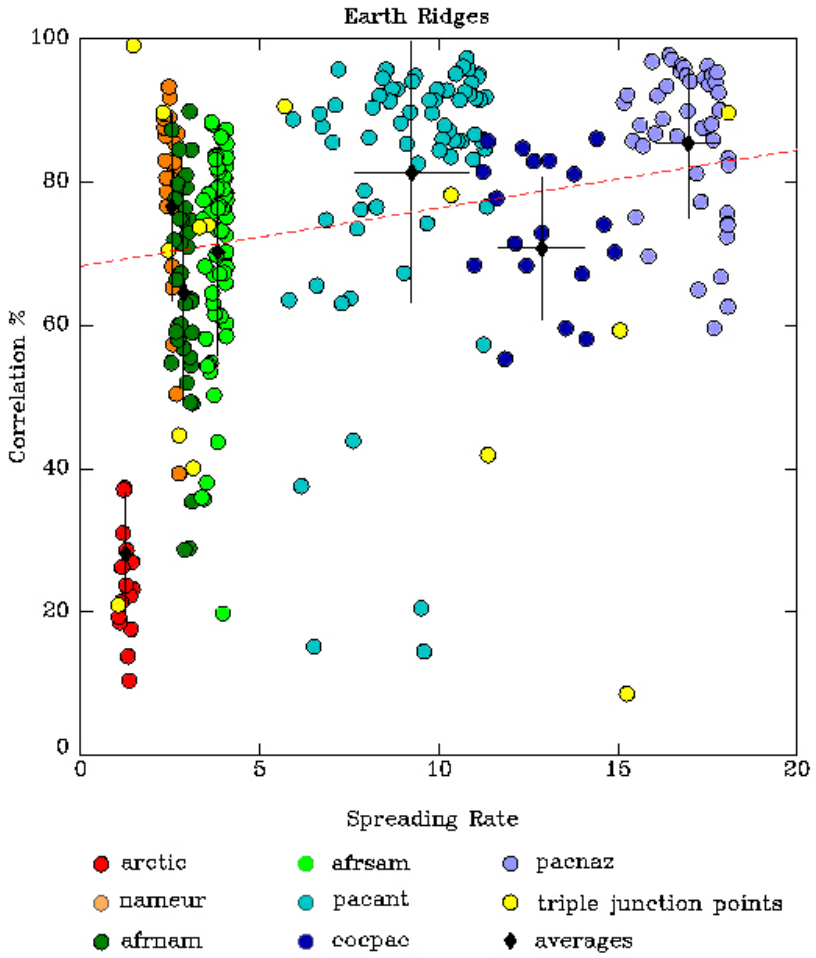
Earth/Venus Comparison: Rifts

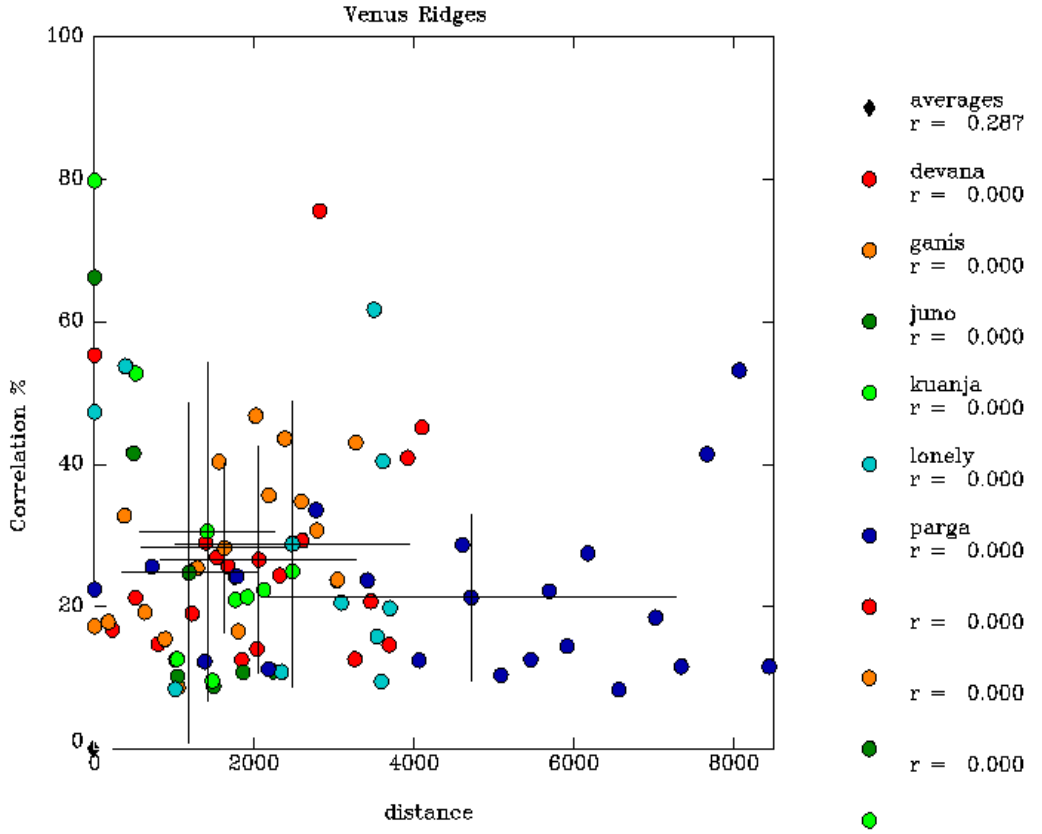


Average Profiles: Earth and Venus



Correlation Comparisons

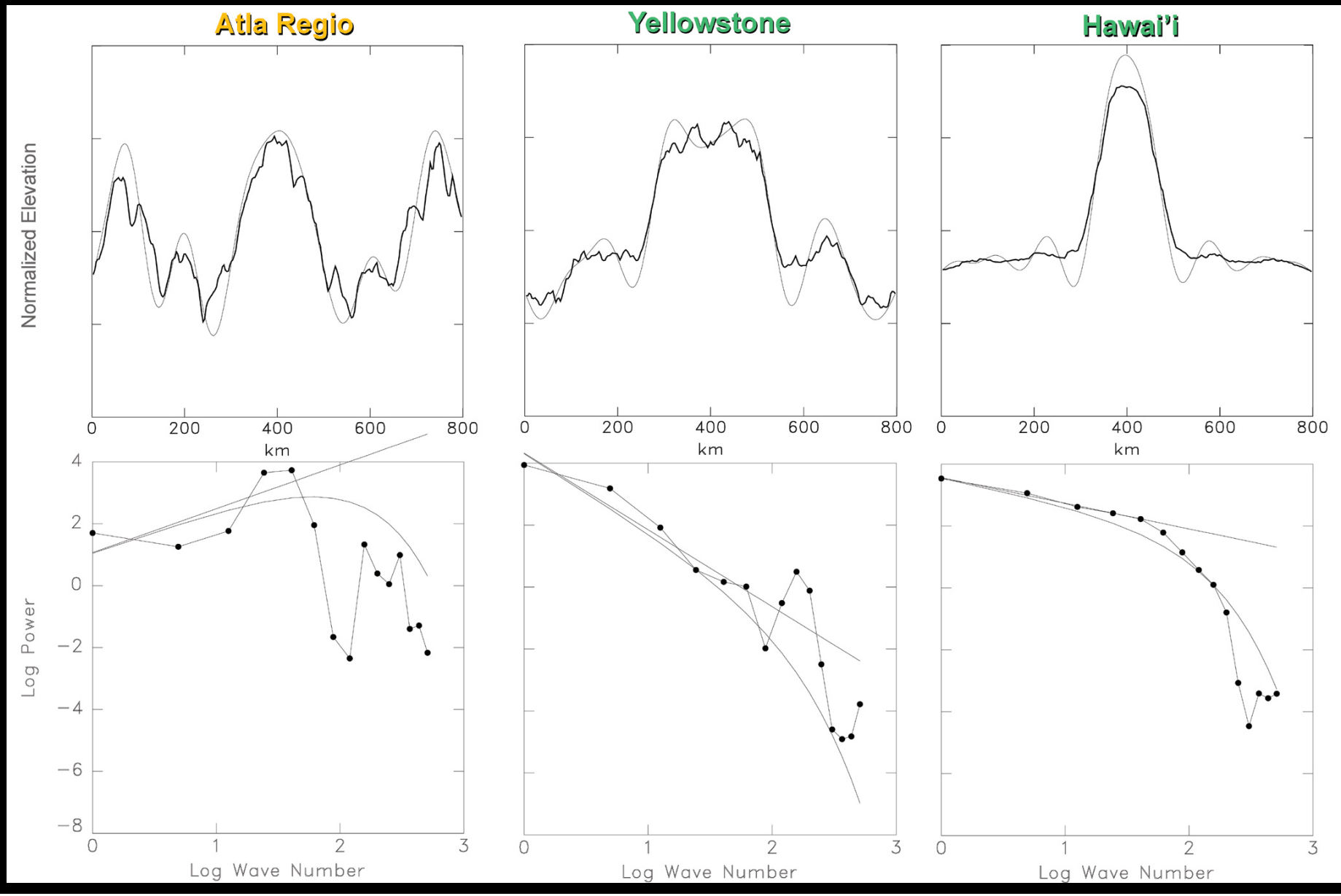




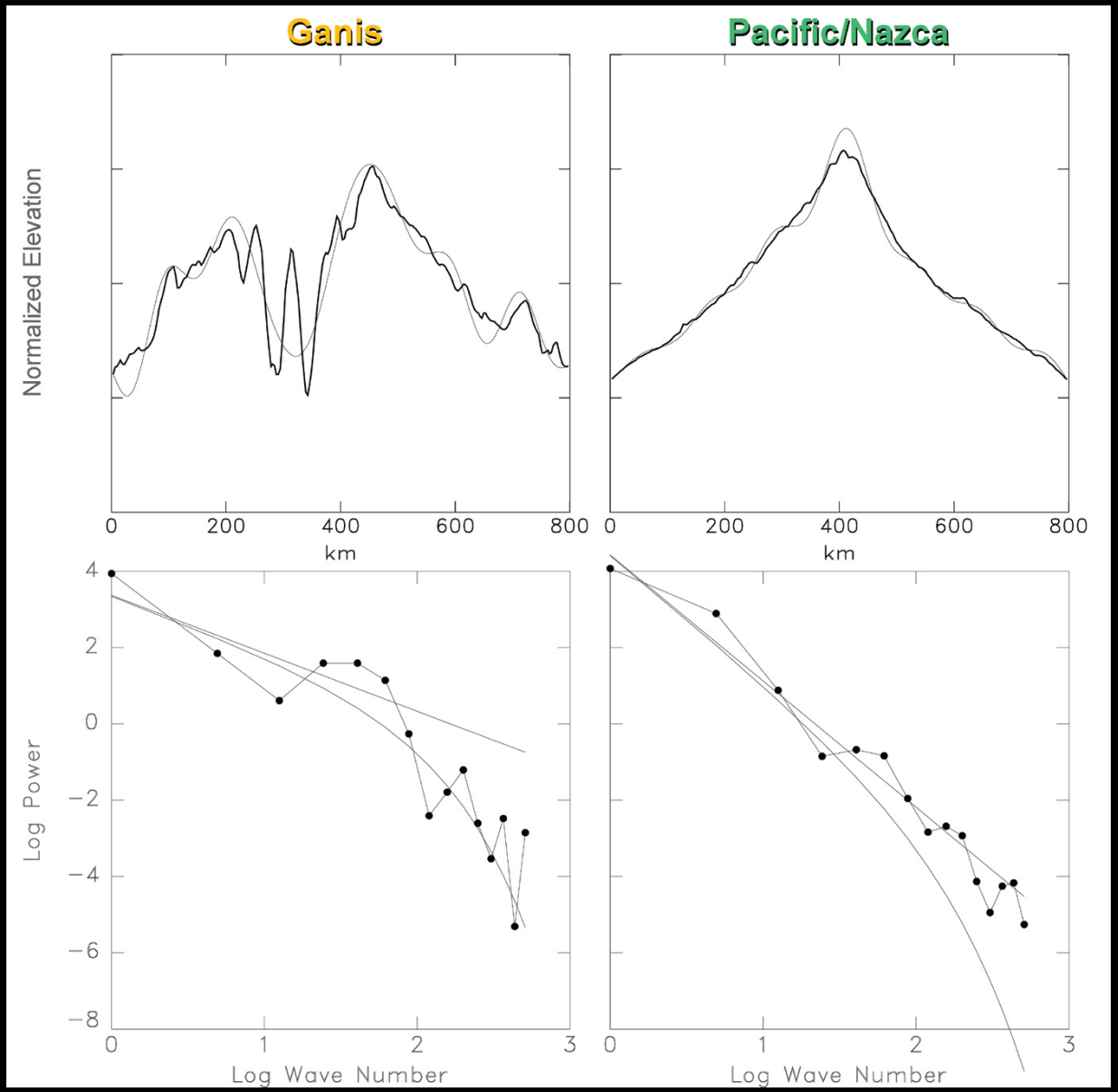
Uplift Correlations

	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)



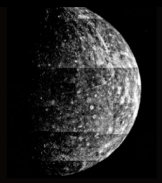
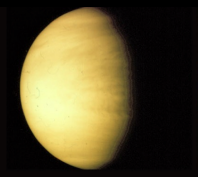
Fourier Analyses (Rifts)



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