Venus

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Venus’ Atmosphere

- Venus’ atmosphere is 90 atmospheres at its surface, equivalent to a 3,000 feet under water.
- It’s atmosphere is mostly CO2, nitrogen 3.5%, with some layers of sulfuric acid, that make it opaque.
- At the surface is a supercritical CO2 fluid.
- The planet’s sidereal day, going around the sun, is 178 earth days.
- The solar day, rotating around once to where it faces the sun again, is 116.5 earth days.
- Venus rotates retrograde, or opposite to the direction of Venus around the sun, which is the same direction as all the other planets do.
- It is 90% reflective of the sun’s energy, so it actually gets less solar radiation at its surface than the earth.

- At about 50 km or 30 miles, its atmospheric pressure and temperature are close to earth’s. There is little sulfuric acid.

- People are proposing planet observing blimps, or even colonies.

- Getting to Venus takes 30-50% less fuel than going to Mars. You have a shielding atmosphere.

- There is a small magnetic field generated by magnetism in the solar wind piling up on its ionosphere to form its magnetosphere.

- Venus has volcanoes, and they may be active.
- The surface at 872º F is hot enough to melt lead due to the immense greenhouse effect of CO2 and water vapor.
- So landers on it only exist for a few hours.
- Maybe 4 billion years ago, Venus had a water ocean.
- But as the heat built up, it drove the CO2 out of the ocean, and there was a runaway greenhouse gas heating.
- Because there is no ocean now, there is not supposed to be plate tectonics.
- Yet, there may be volcanoes that are still active.

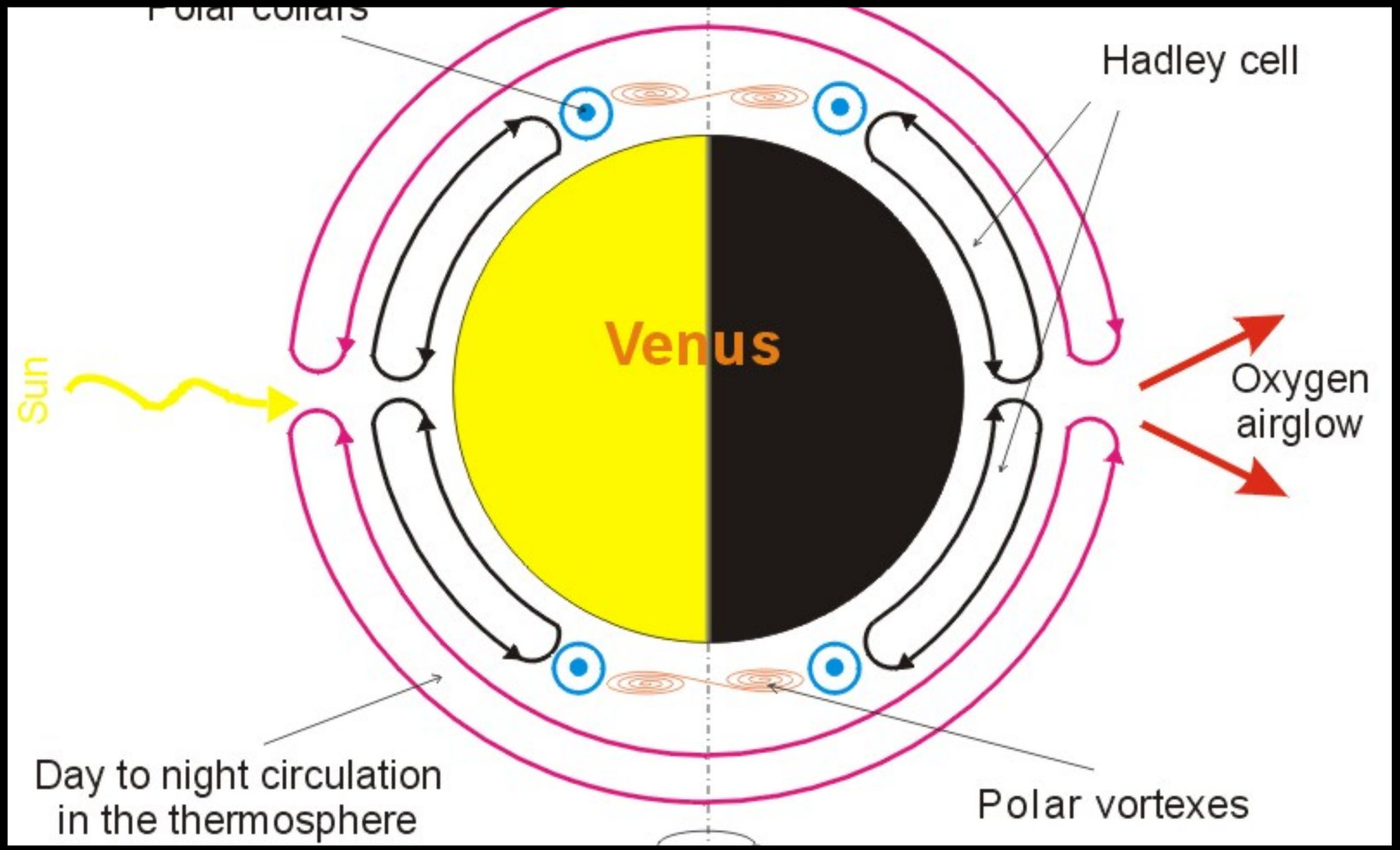
- The wind at high altitude at the equator rotates around the planet in only four days.

- On the surface there is no wind.

- Even the high altitude wind dies out at the poles.

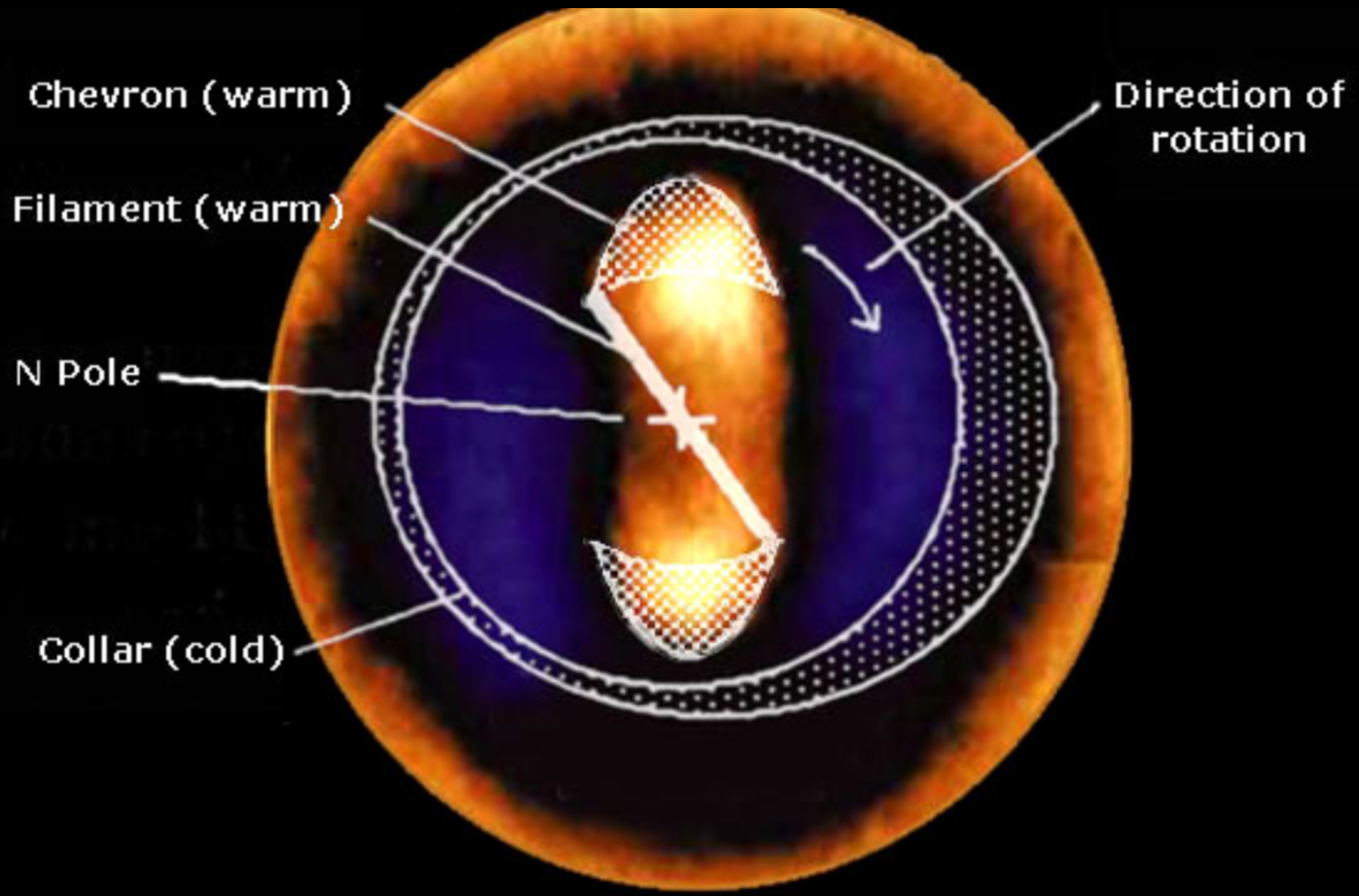
- There are Hadley cells carrying heat from the equator to the poles as on earth.

- There are also polar vortexes, and also polar collars.



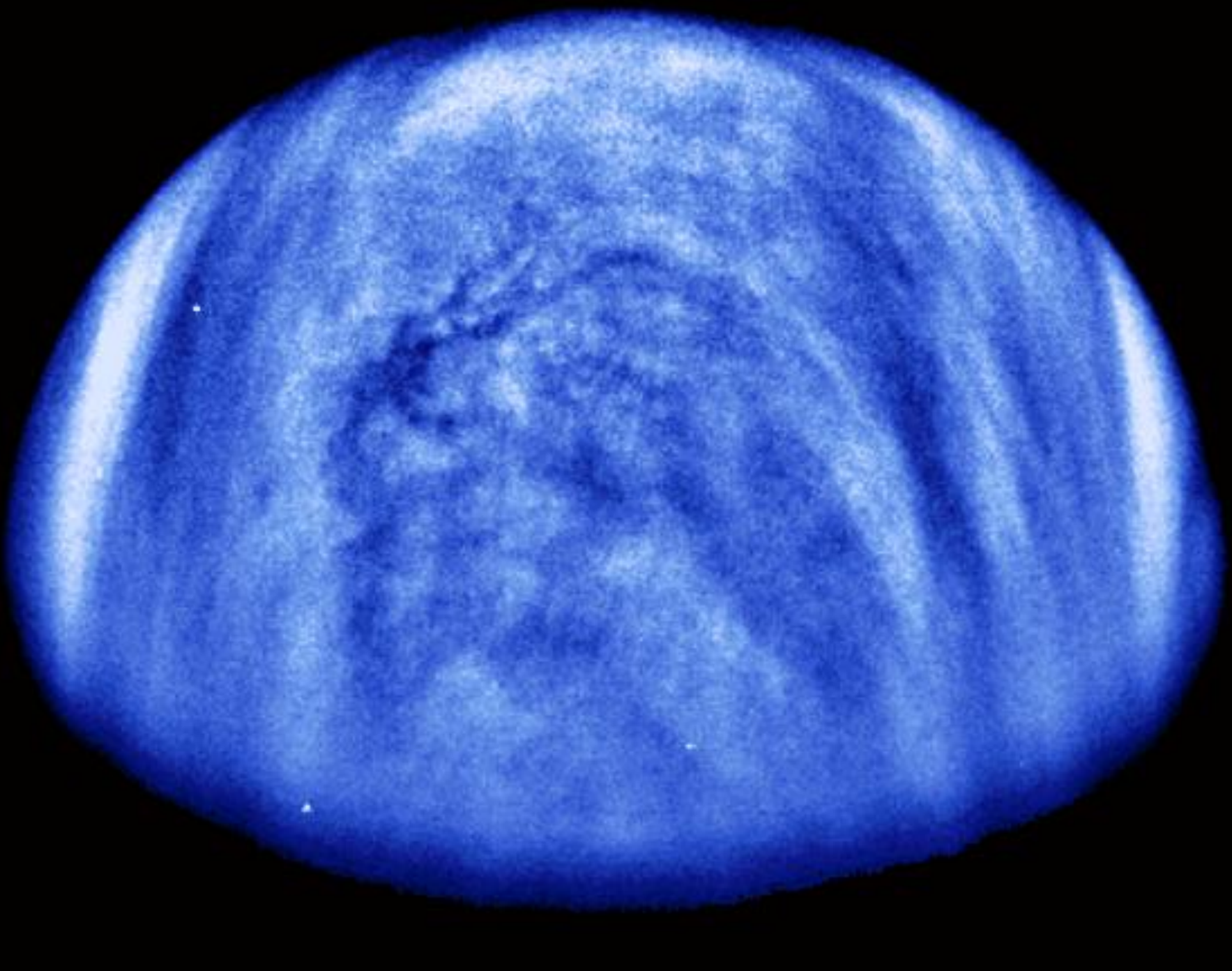
Atmospheric Motions

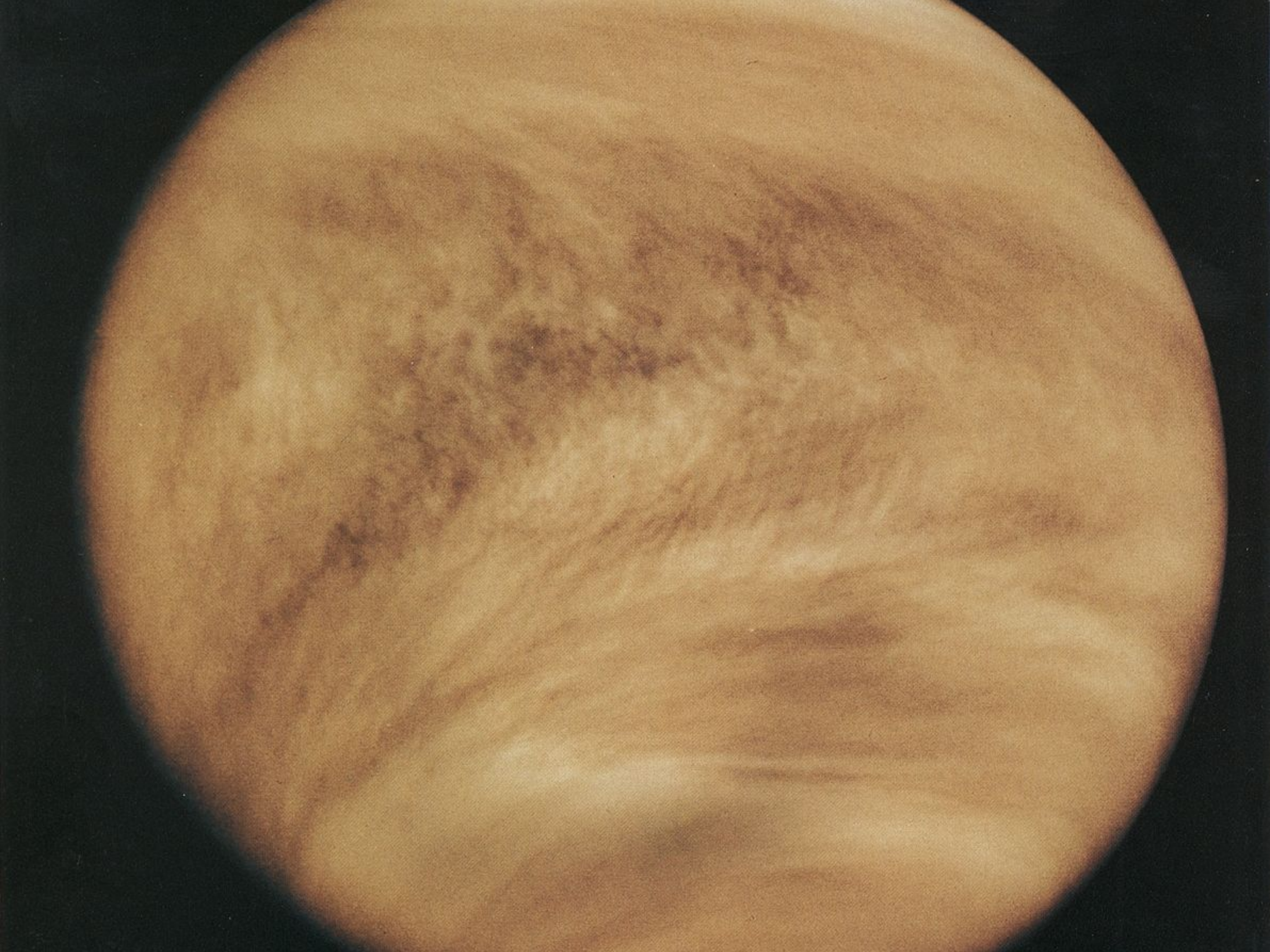
Polar Collars and Polar vortexes.
Hadley cells take heat from equator to poles.

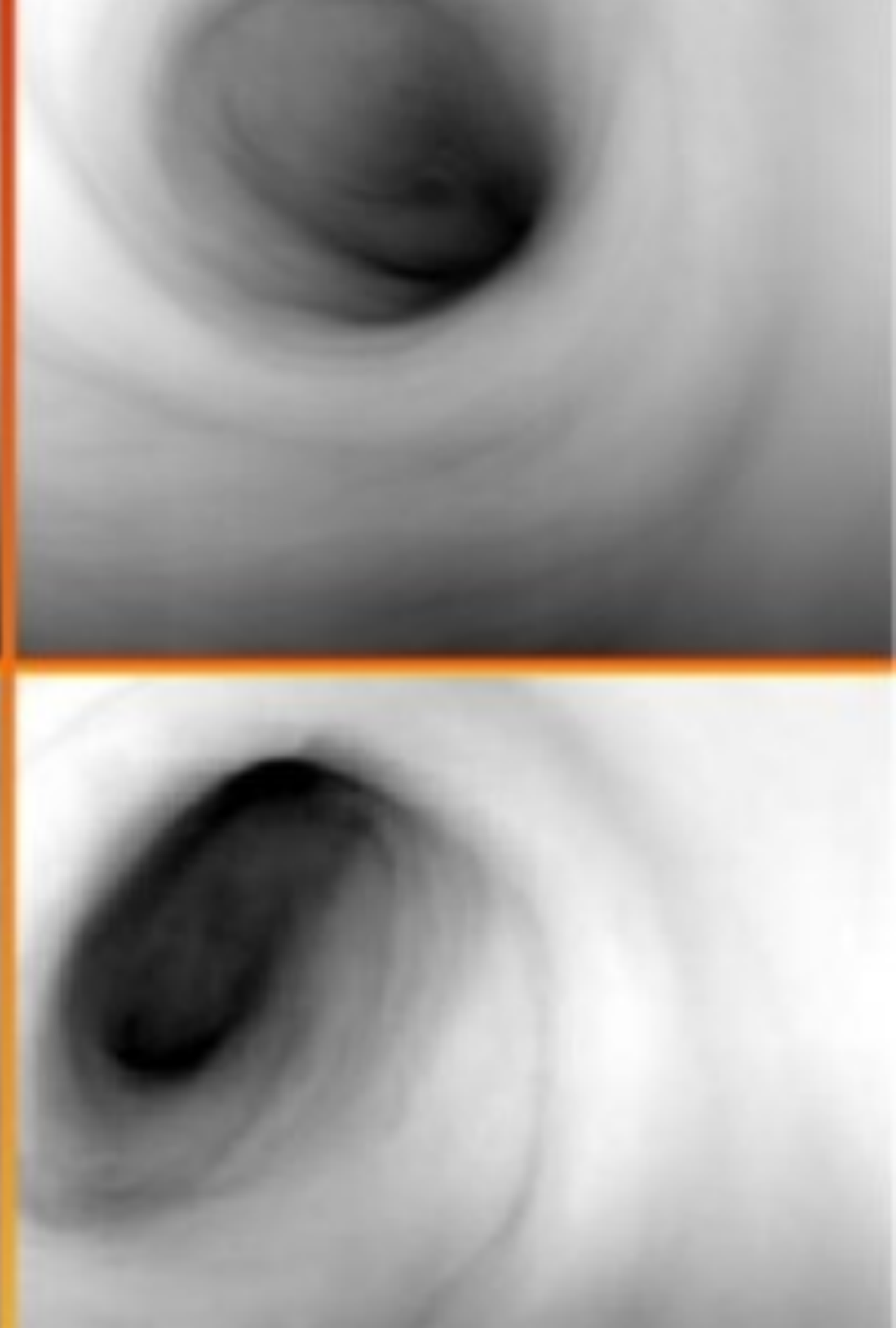


View down from the north pole

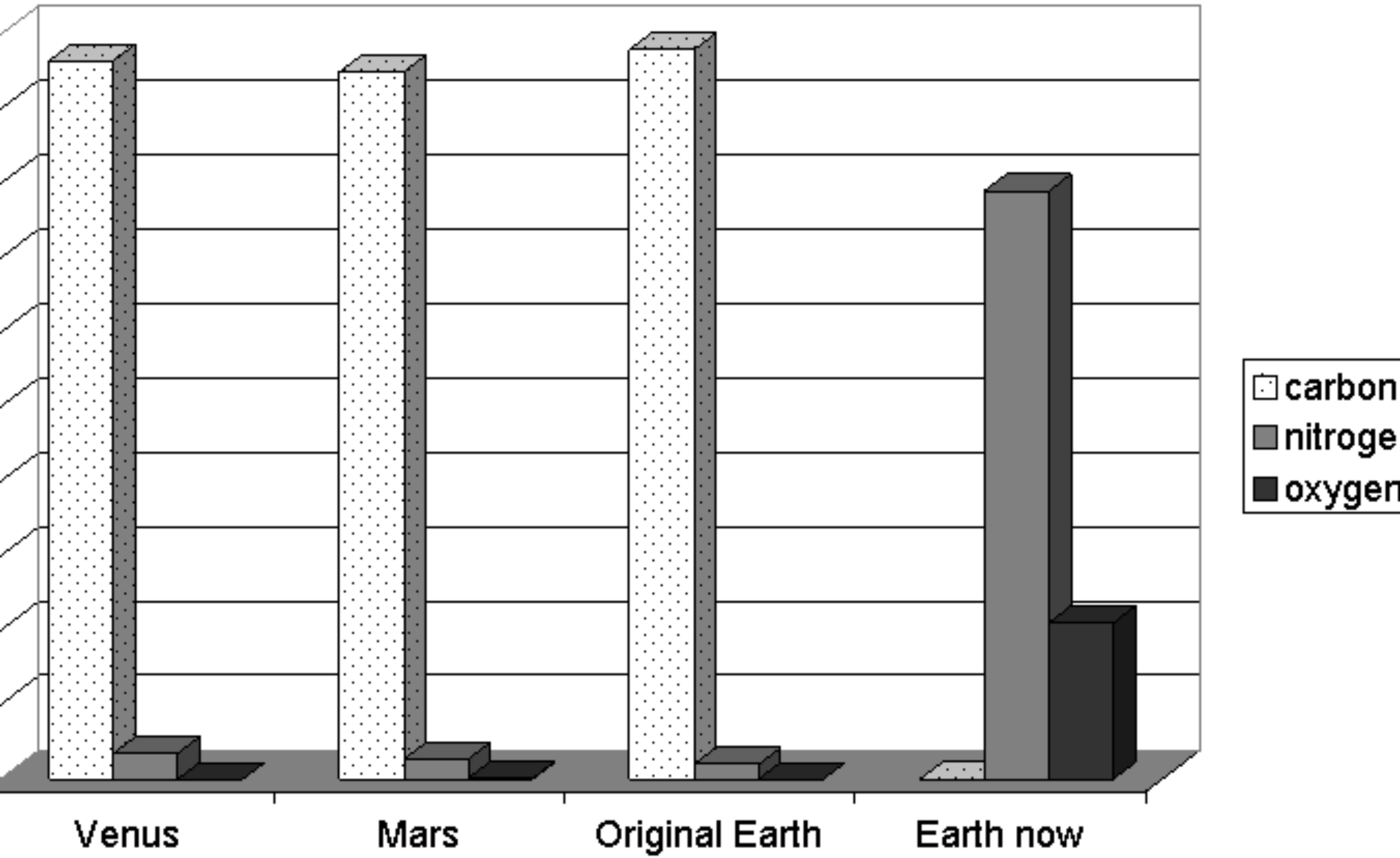
The Collar wraps around the planet

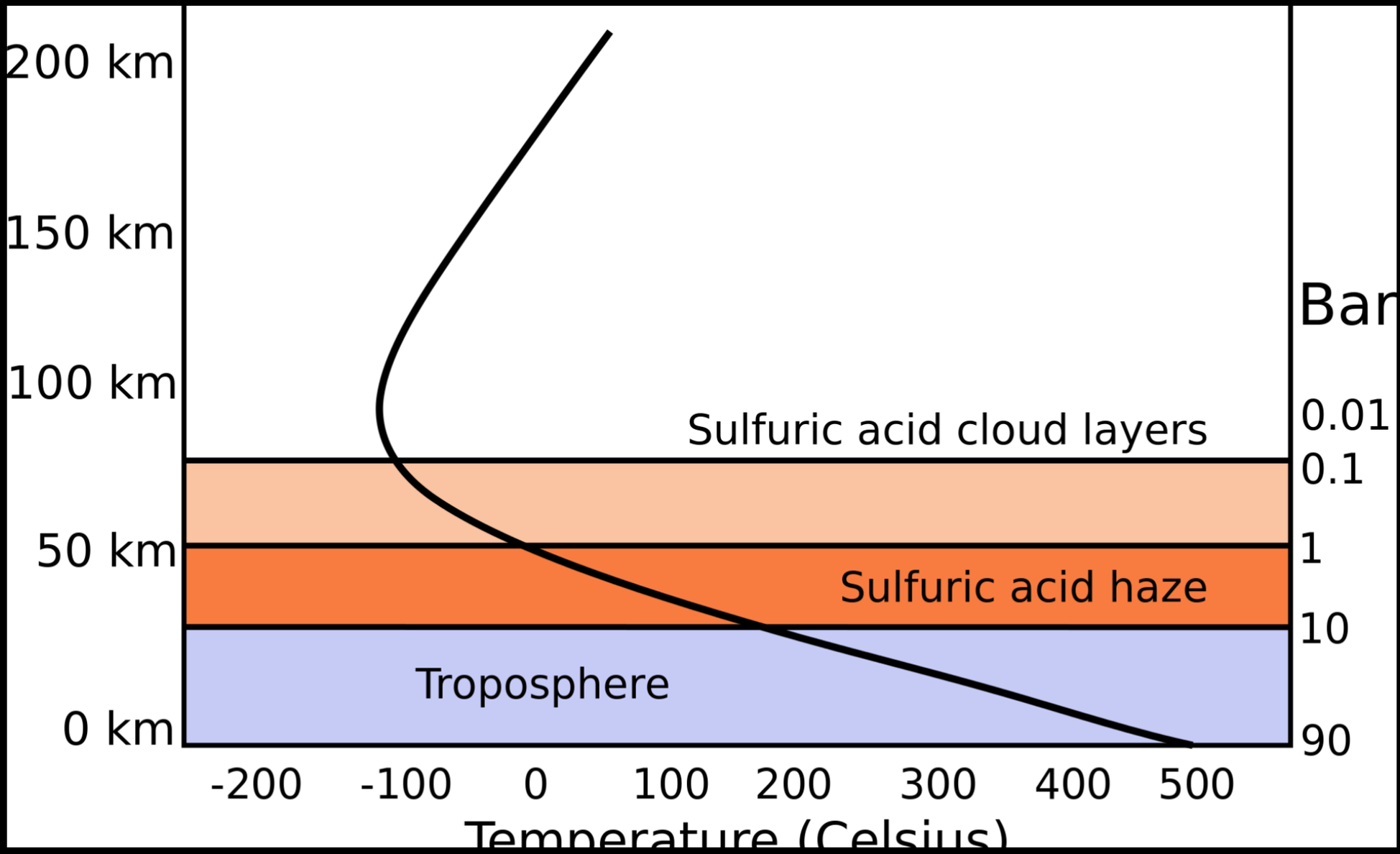






Composition of atmospheres



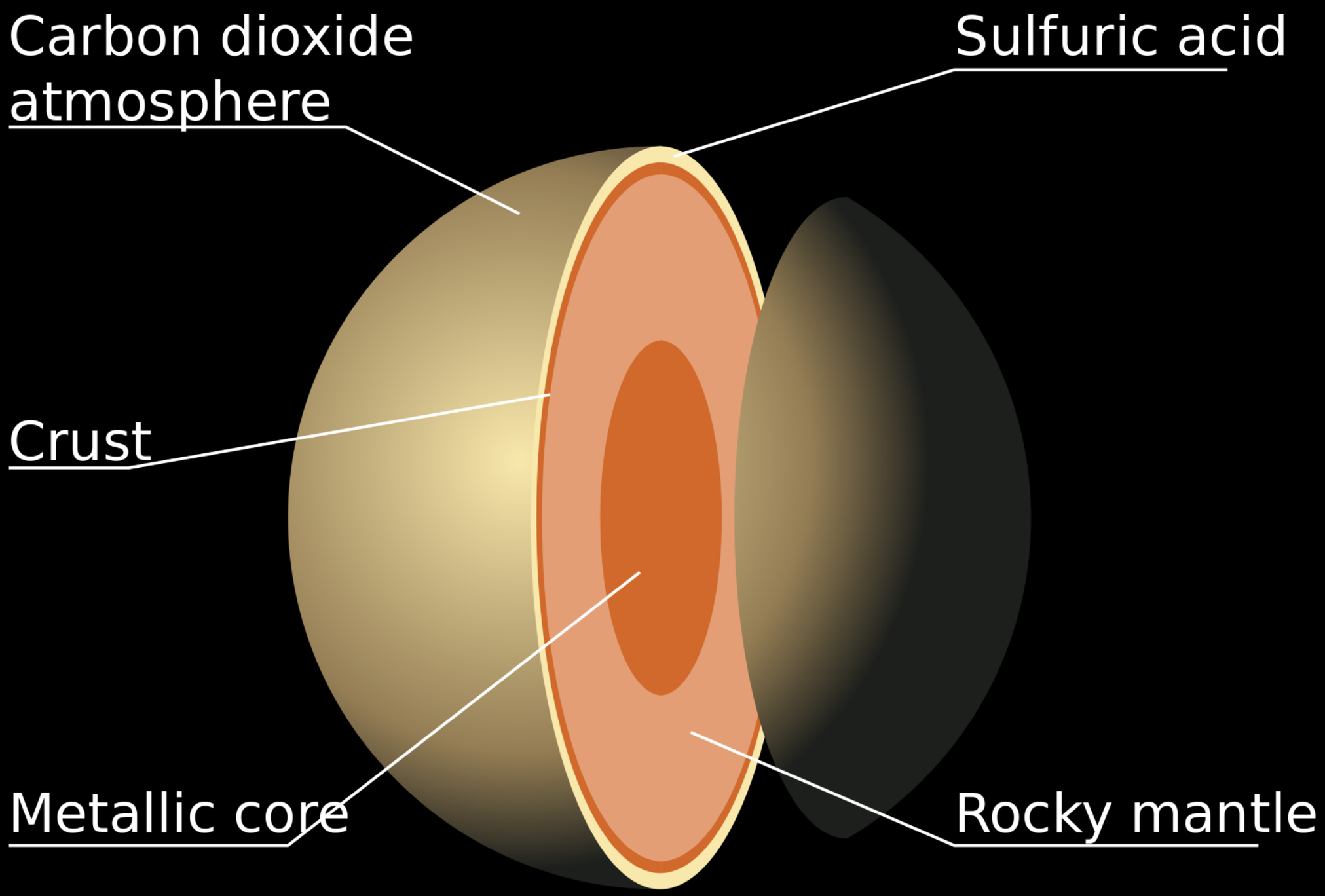


Atmospheric Layers And Temperature

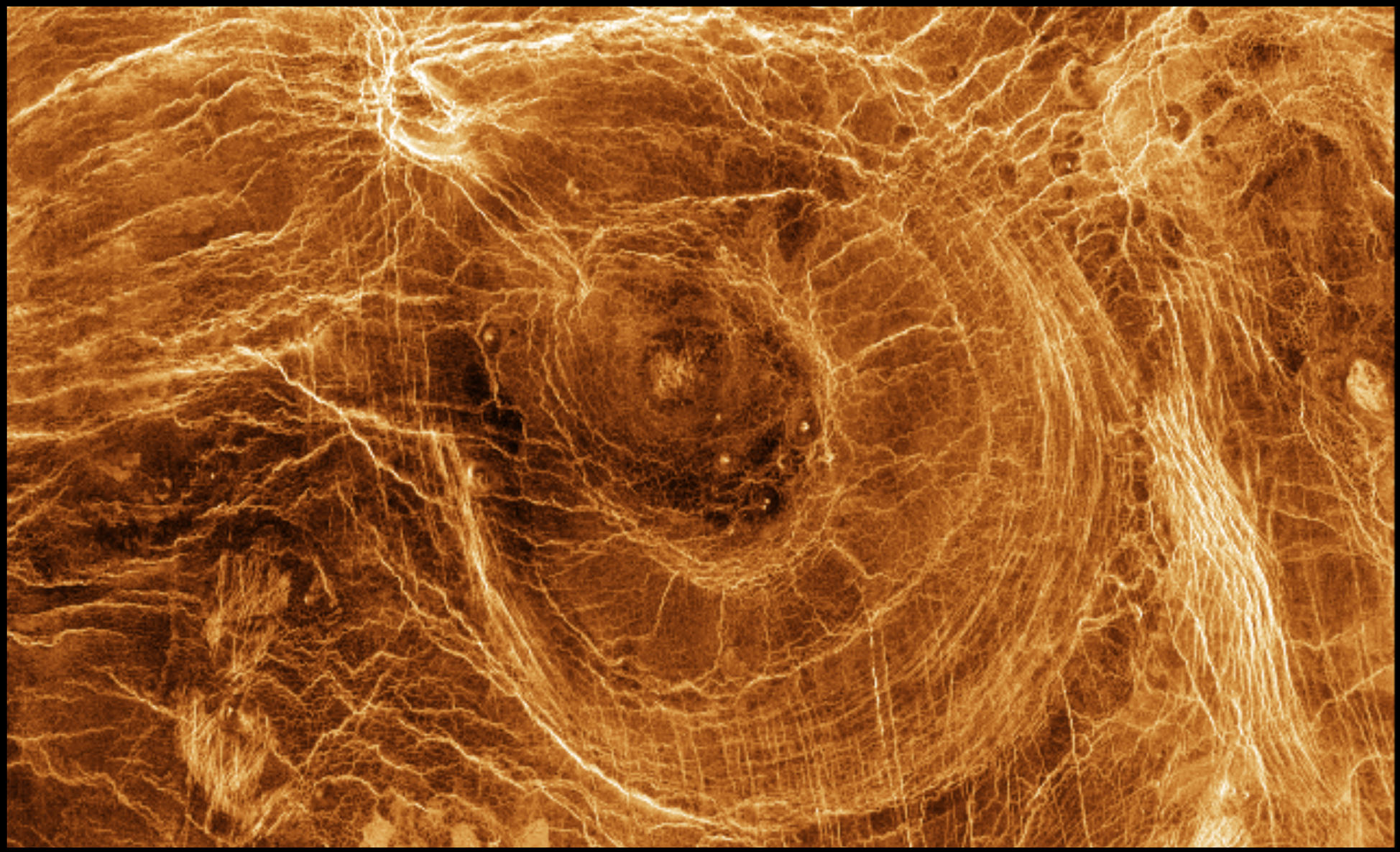
Earth’s atmospheric pressure is one Bar

- Because of the thick atmosphere there is not much difference between the day and night side.
- And the fact that the surface CO_2 acts as a superfluid.
- Length of a year is 243 days.

Venus Geology



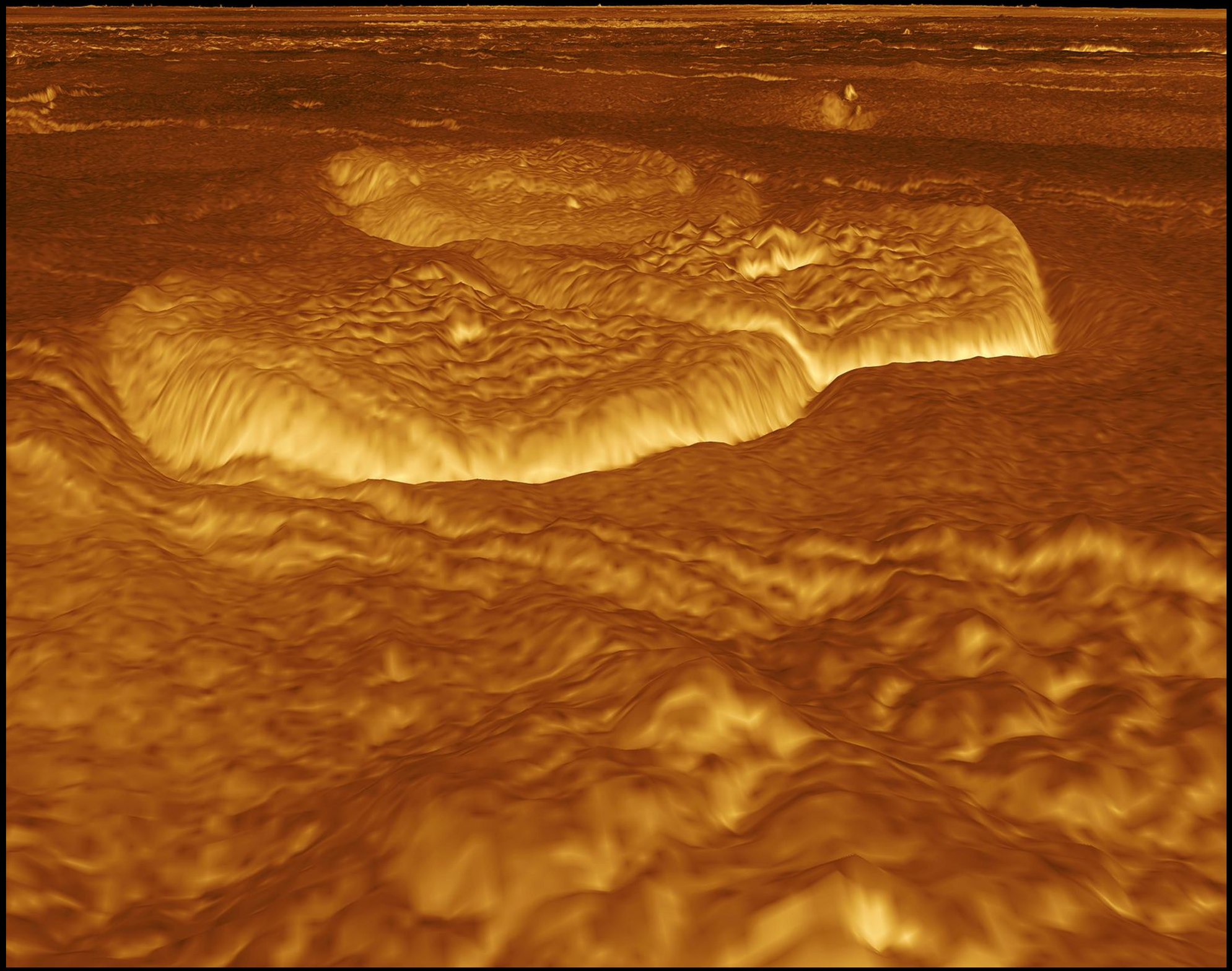
- Venus’ Crust is 43-300 miles deep
- The mantle is silicate rocks 1,700 miles thick
- The nickel and iron core is 1,900 miles in radius.
- Size and composition of earth
- No magnetic field and no plate techtonics
- Few craters because of thick atmosphere, and maybe lava covering



Arachnoid spider web

Crater

Pancake volcanic craters



- Volcanic Pancake Craters
- Height only 0.6 miles.
- Maybe because of melting temperature at the surface
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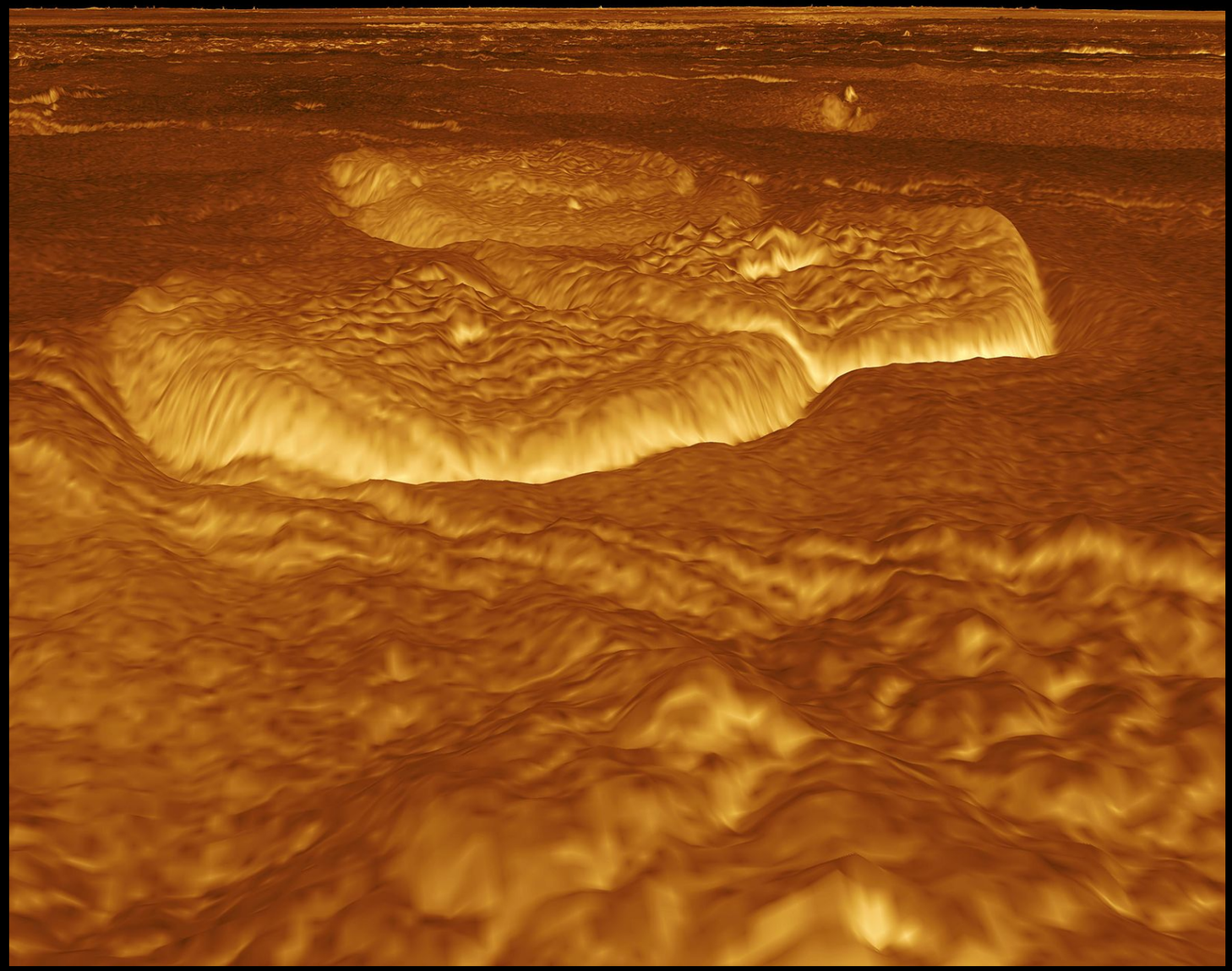

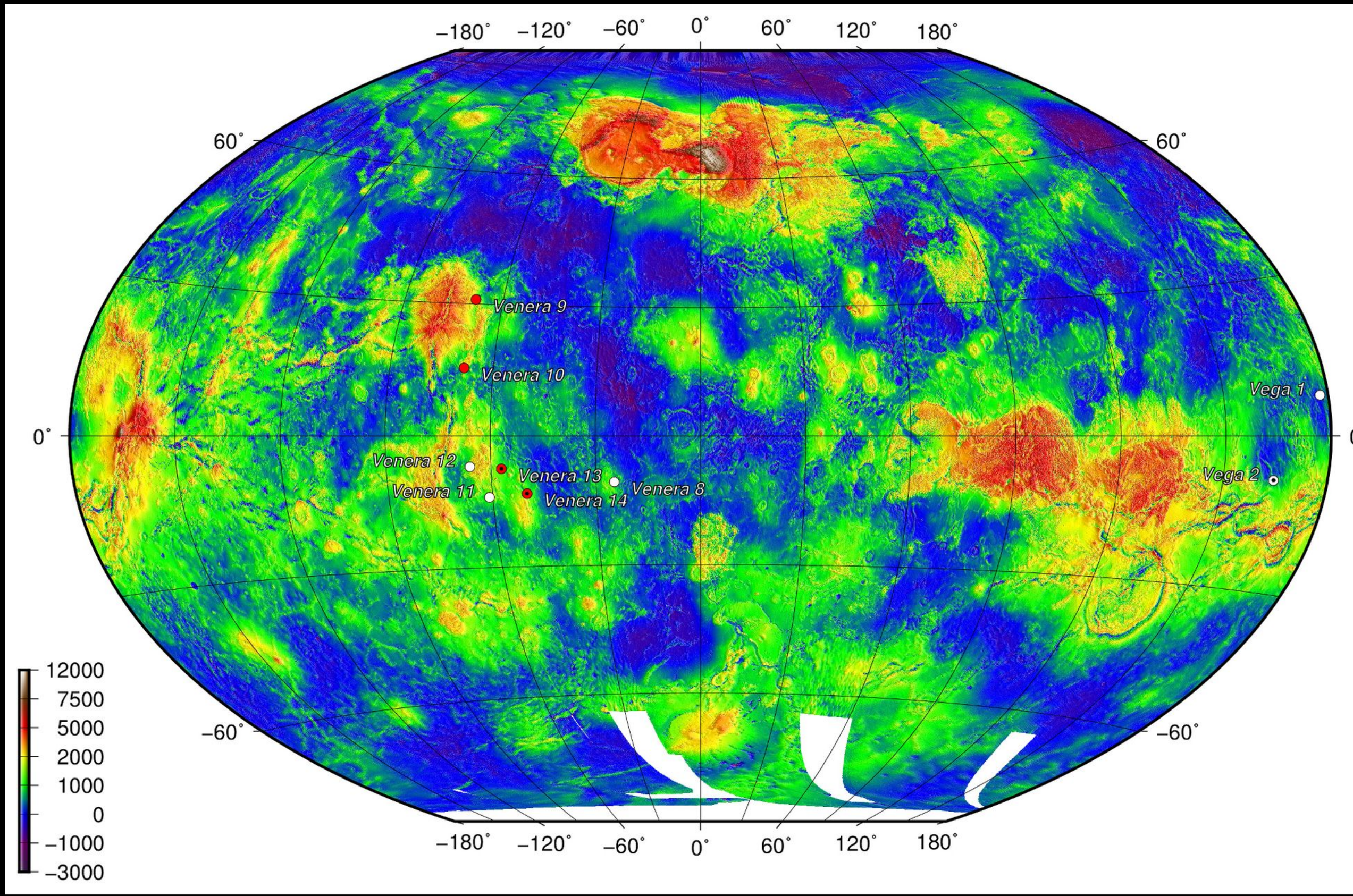
−180°
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0°
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Venera 10
Venera 12
Venera 11
Venera 13
Venera 14
Venera 8
Vega 1
Vega 2
12000
7500
5000
2000
1000
0
−1000
−3000

- Flat Surface: 51% of surface within 0.3 miles of mean radius of 3,761 miles. This is comparable to earth's radius.

- 80% of the surface is within 0.62 miles of the mean radius.

- Only 2% is greater than 1.2 miles of the mean radius.

- 75% is bare rock.

- There is evidence of volcanic resurfacing 300-500 million years ago.

Volcanic flows mapped by Magellan spacecraft