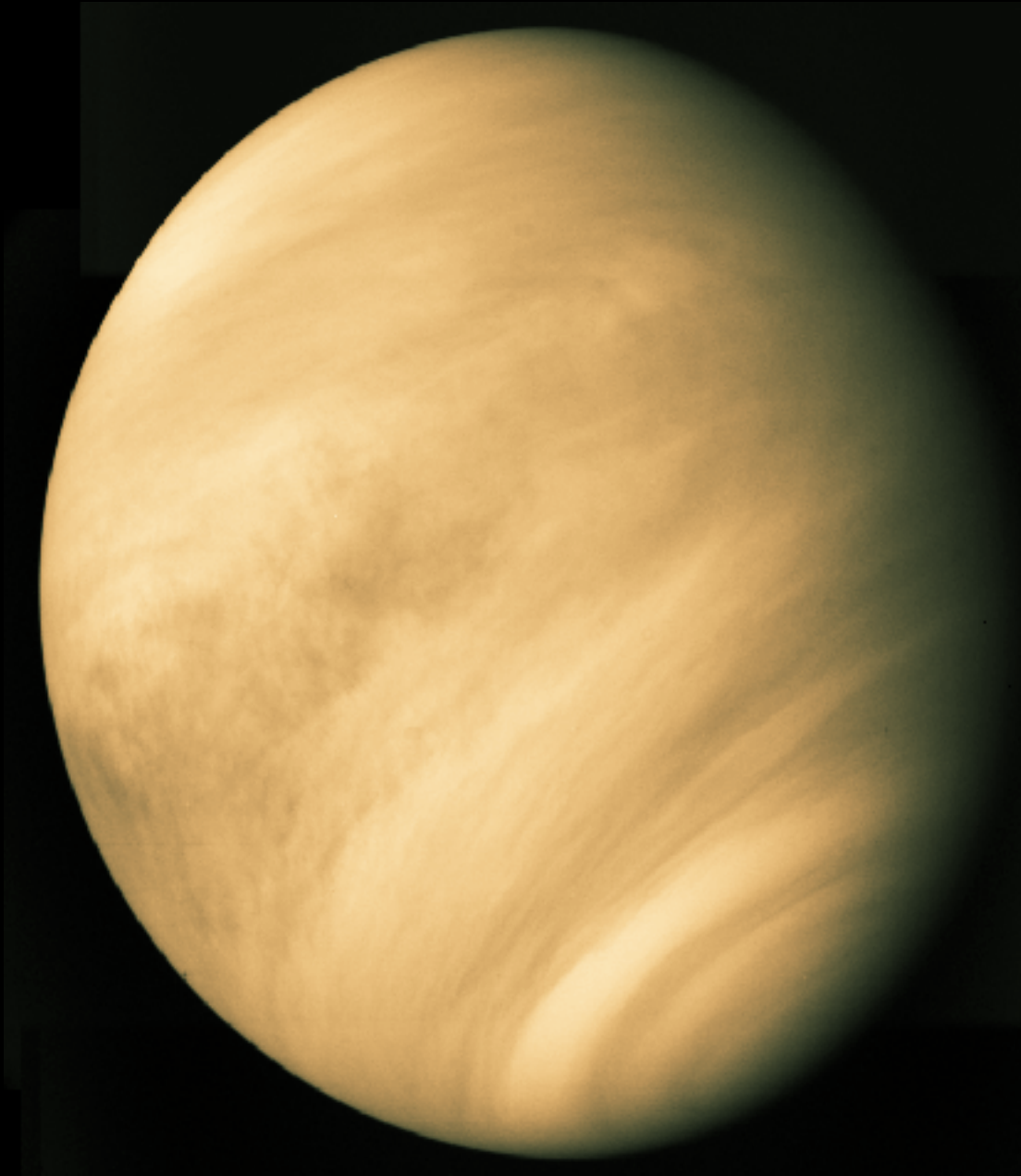
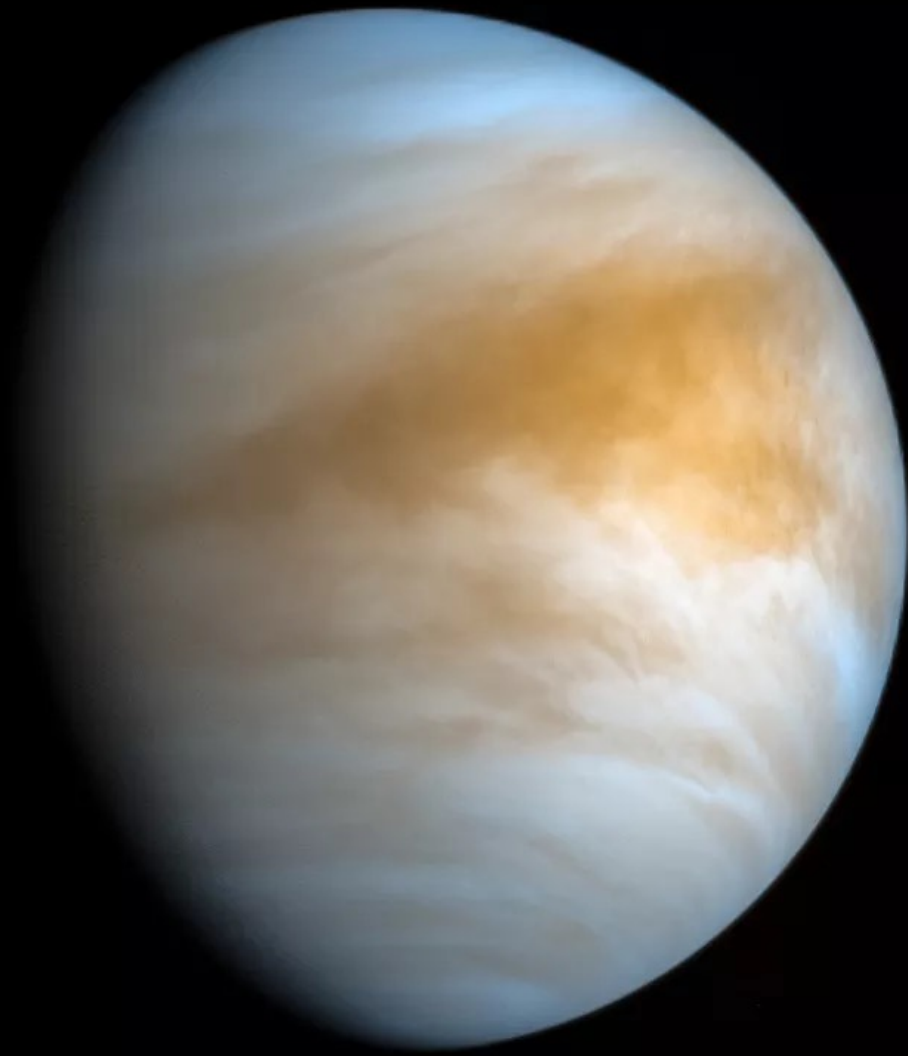
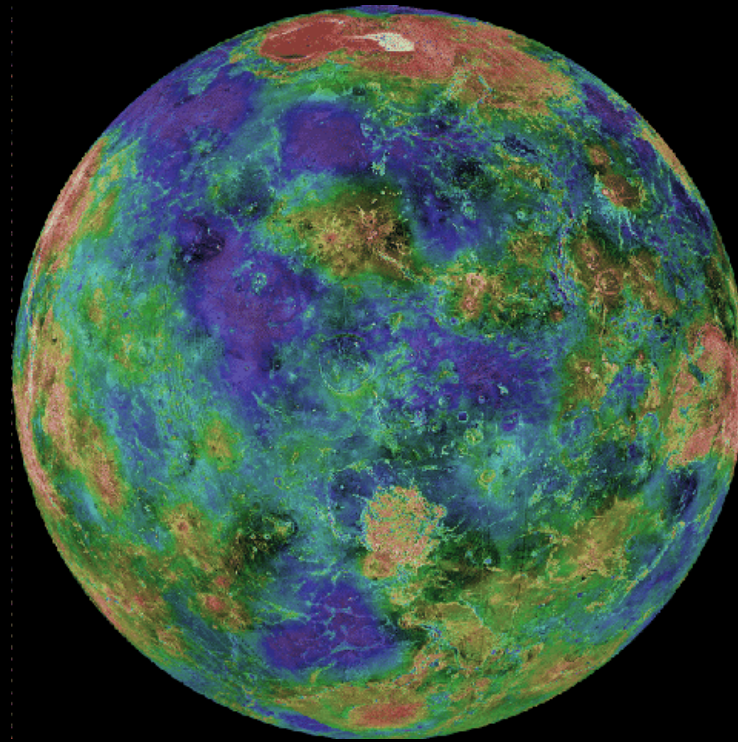




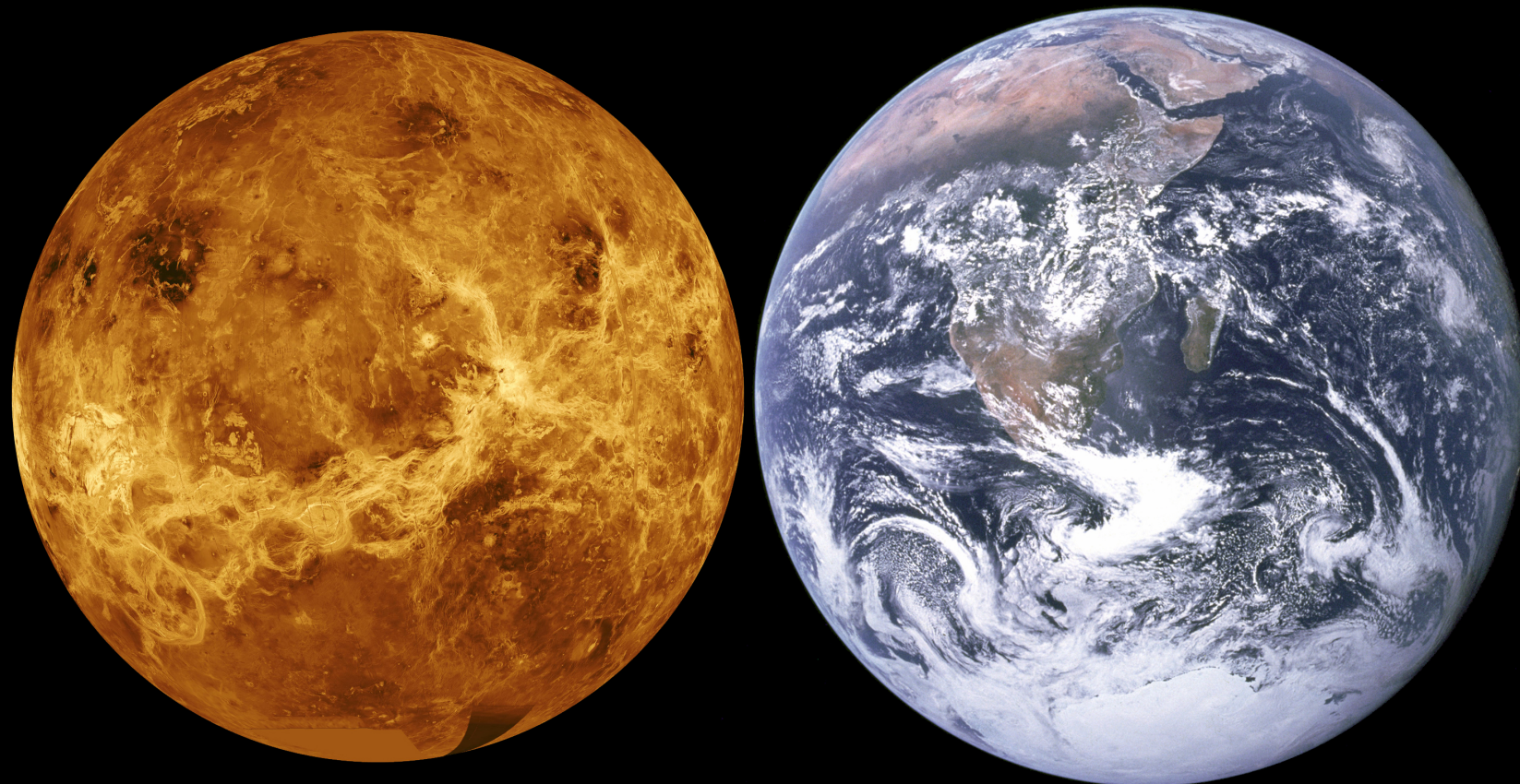
Venus is often called the twin planet to Earth because 1) it has a similar radius/size, 2) it has a similar mass, 3) it has a similar density and 4) it has an atmosphere. However, the environment of Venus is very different from the Earth, its ground temperature is over 800 degrees F and its atmosphere is carbon dioxide and sulfuric acid.

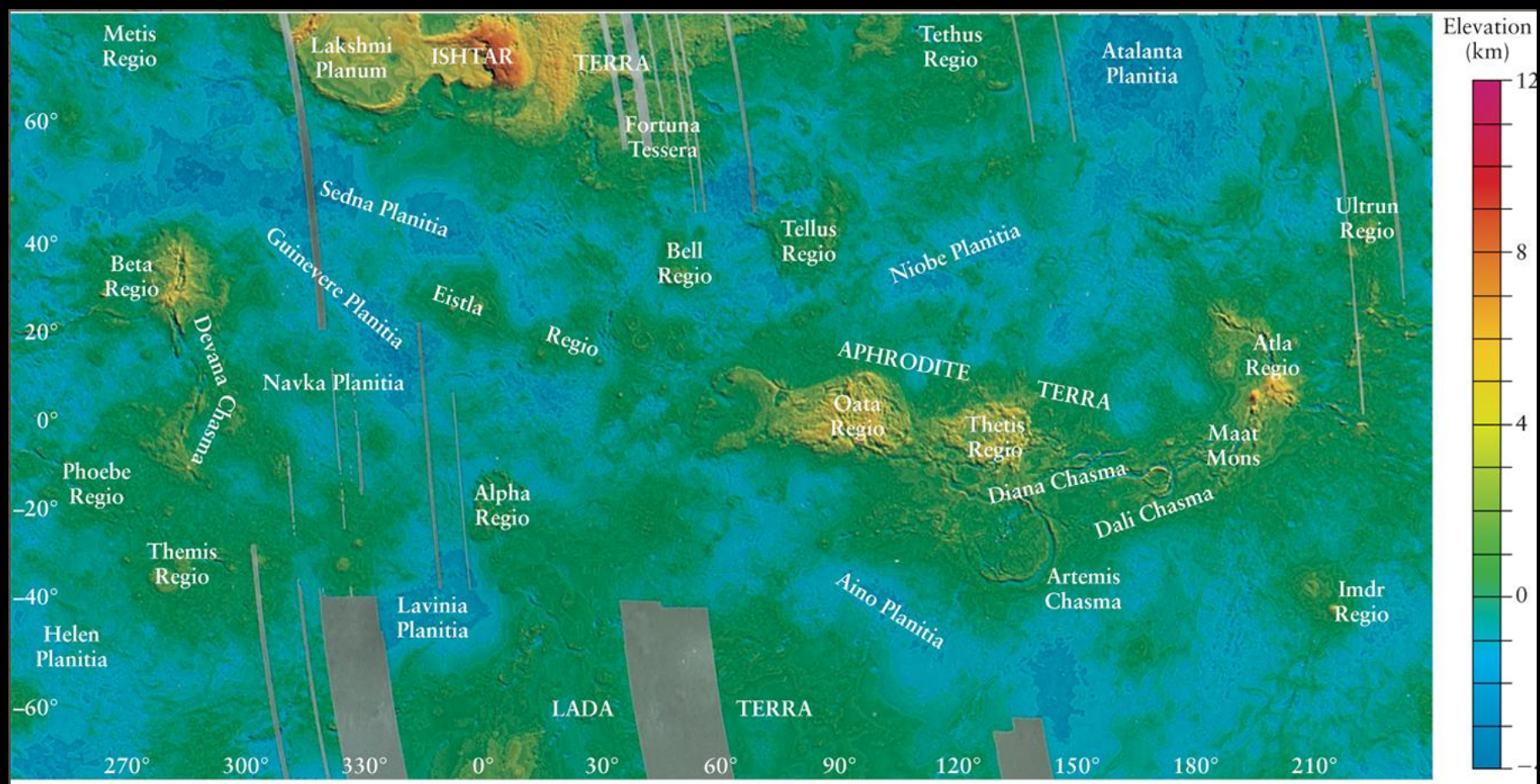


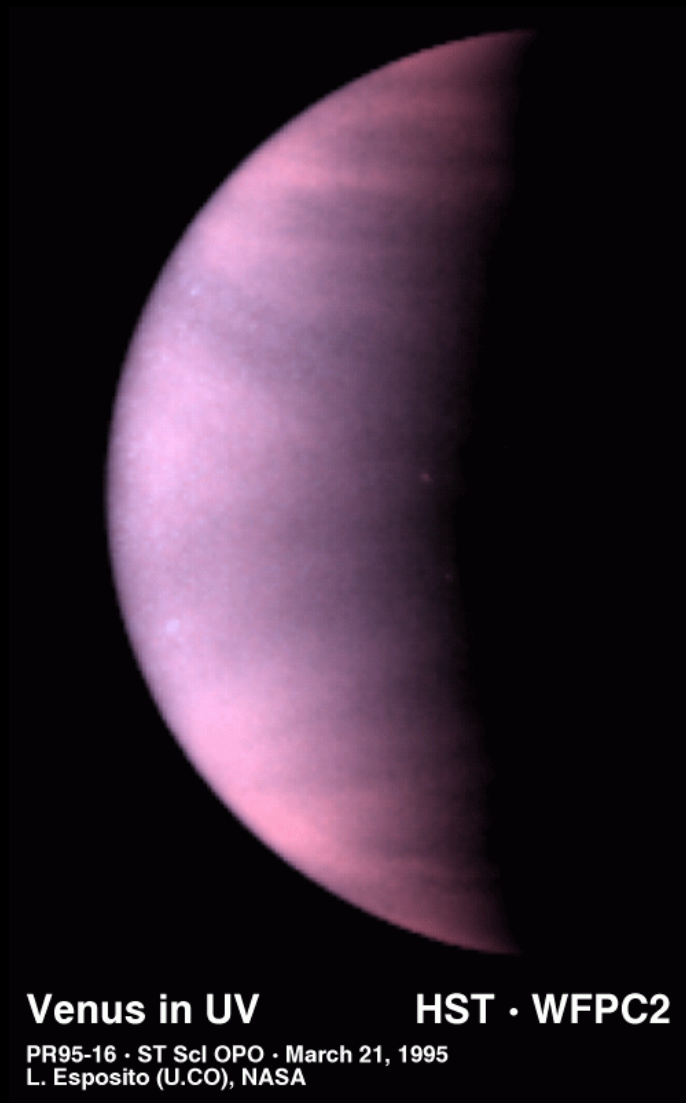
Venus is shrouded by an opaque layer of highly reflective clouds of sulfuric acid, preventing its surface from being seen from space in visible light. It may have had water oceans in the past, but these would have vaporized as the temperature rose due to a runaway greenhouse effect. The water has probably photodissociated, and the free hydrogen has been swept into interplanetary space by the solar wind because of the lack of a planetary magnetic field. Venus's surface is a dry desertscape interspersed with slab-like rocks and is periodically resurfaced by volcanism.



Radar imaging shows that a Venusian day is 243 Earth days and is longer than its year of 225 days. Oddly, Venus rotates from east to west. To an observer on Venus, the Sun would rise in the west and set in the east.







Venus in UV **HST · WFPC2**
PR95-16 · ST ScI OPO · March 21, 1995
L. Esposito (U.CO), NASA

Venus has an extremely dense atmosphere composed of 96.5% carbon dioxide, 3.5% nitrogen, and less than 1% of O₂, H₂O and CH₄ (methane) and traces of other gases, most notably sulfur dioxide. The mass of its atmosphere is 93 times that of Earth's, whereas the pressure at its surface is about 92 times that at Earth's, a pressure equivalent to that at a depth of nearly 1 kilometre (0.62 mi) under Earth's oceans. The density at the surface is 65 kg/m³, 6.5% that of water or 50 times as dense as Earth's atmosphere at 293K (20C; 68F) at sea level. The CO₂-rich atmosphere generates the strongest greenhouse effect in the Solar System, creating surface temperatures of at least 735 K (462 C; 864 F).

Greenhouse effect

sunlight (energy) enters upper atmosphere

particular molecules (e.g. ozone) block gamma-rays, x-rays, UV

IR blocked by greenhouse gases = CO_2 , H_2O and CH_4

remaining sunlight enters lower atmosphere and surface

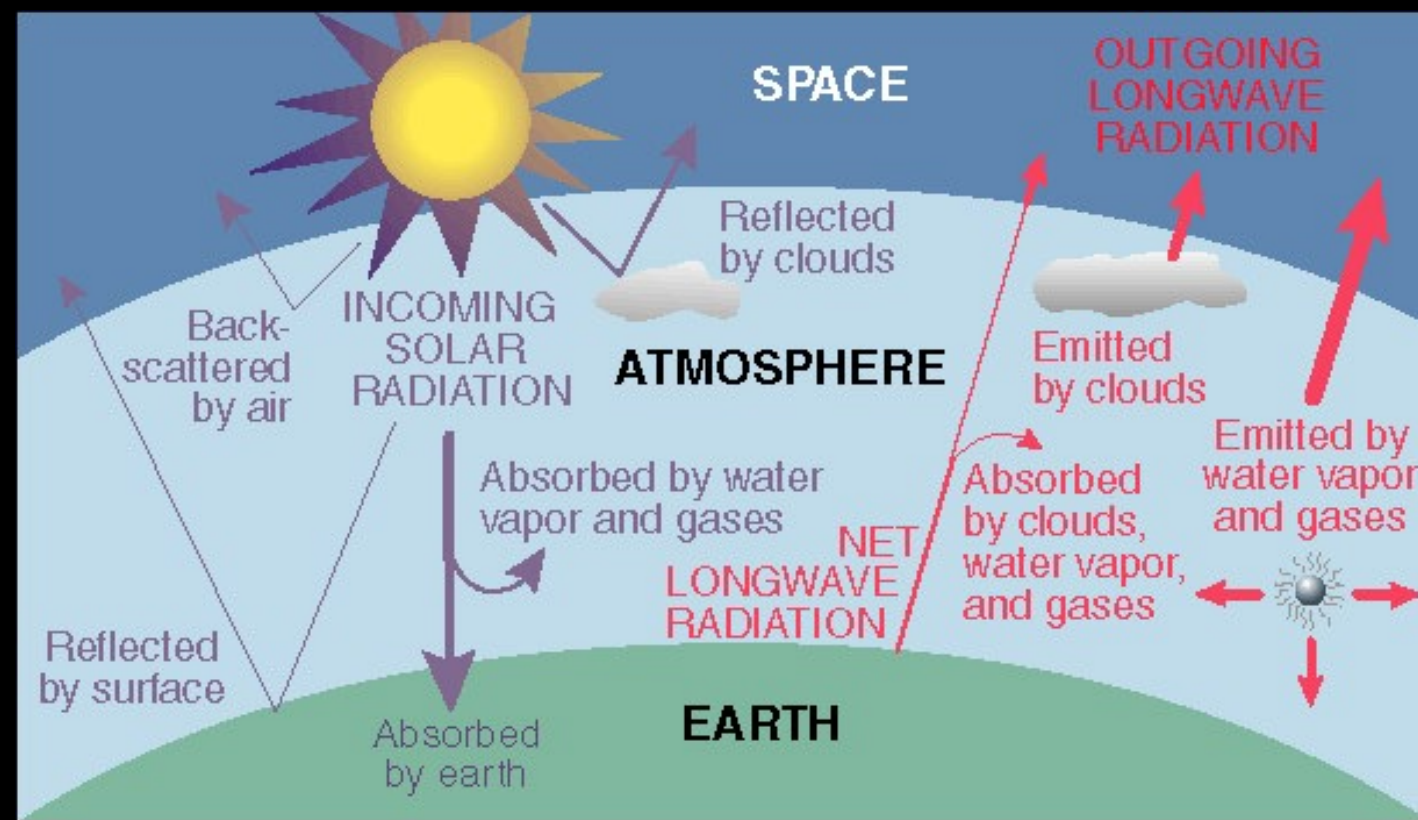
rocks and air warmed by sunlight

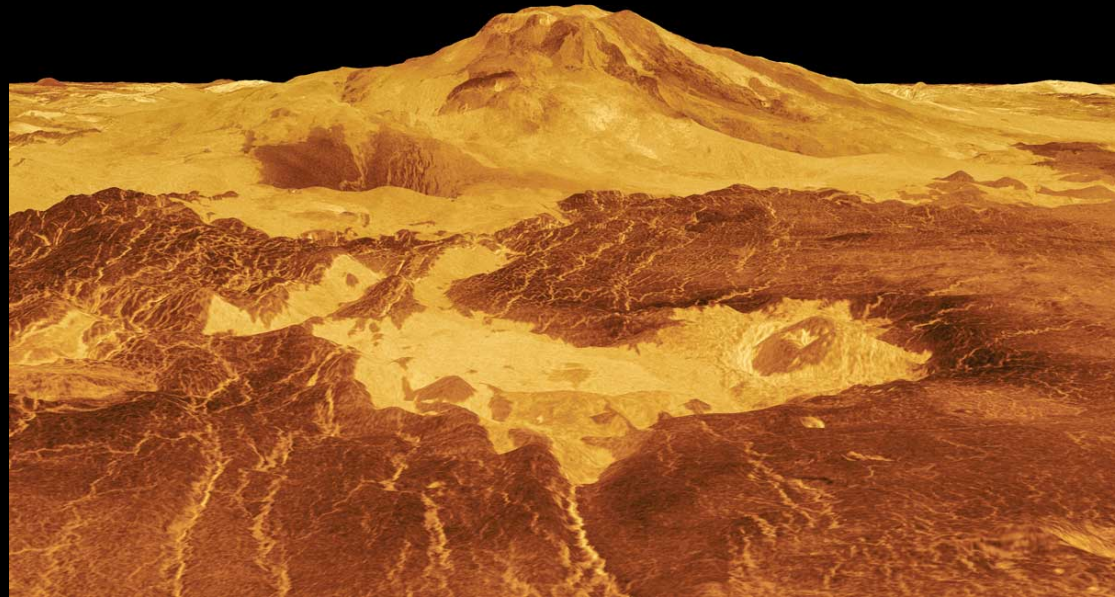
energy reradiated as IR

but IR blocked from escaping back to space by greenhouse gases

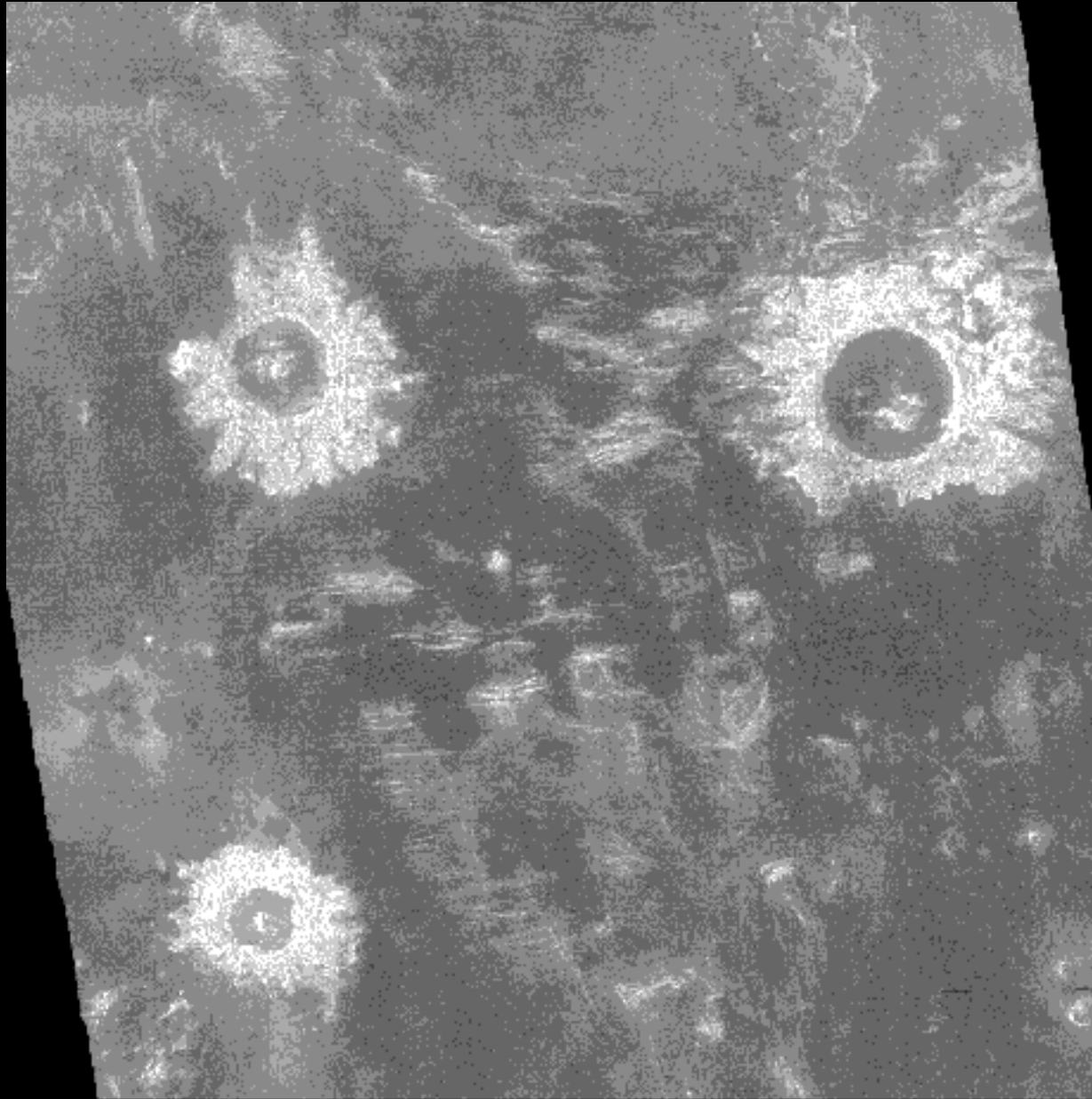
greenhouse rate controlled by :

- 1) distance from Sun (surface temperature) and
- 2) the amount of greenhouse gases in the atmosphere

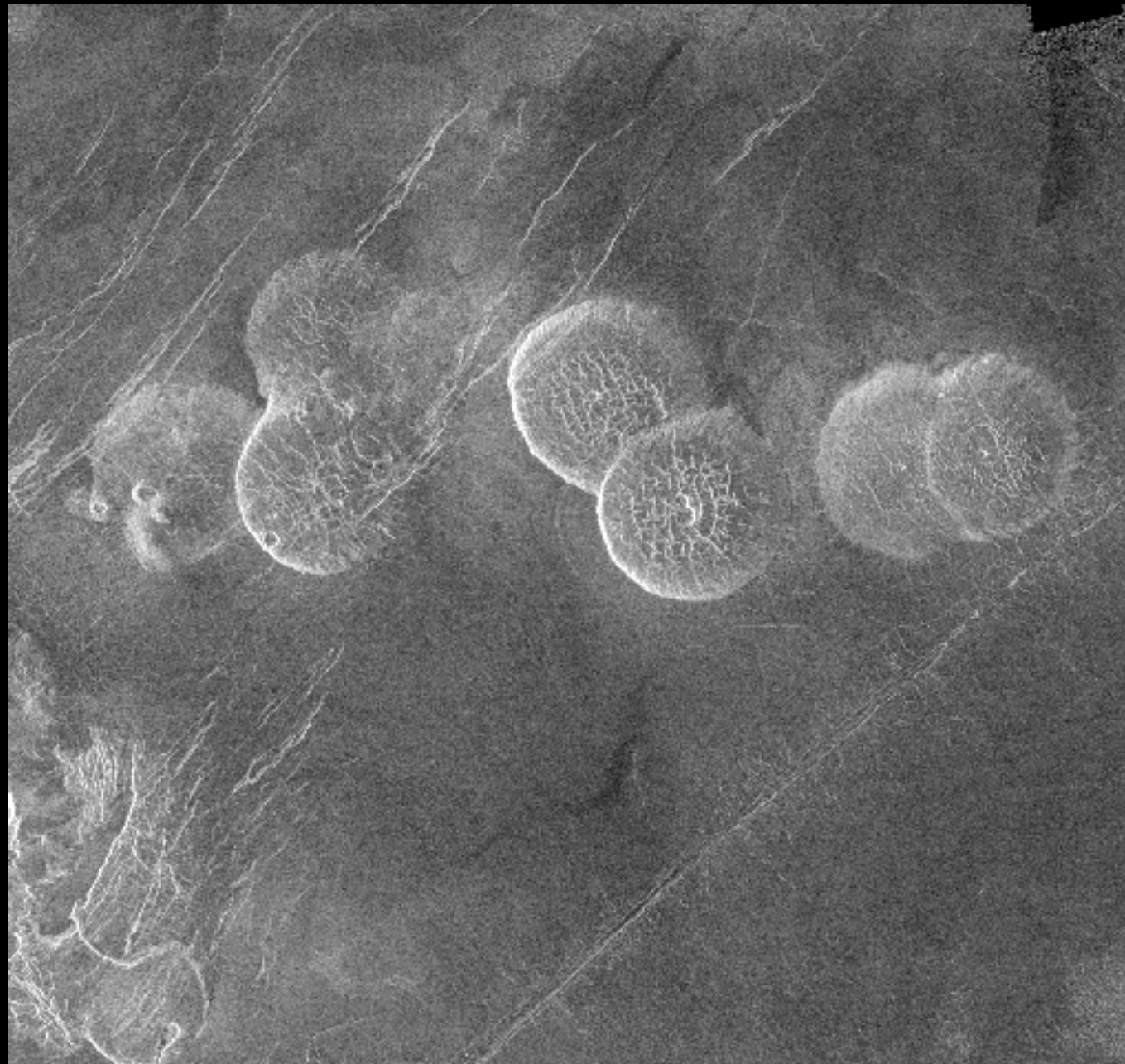




Due to an optically thick atmosphere, the surface features on Venus are known only through radar mapping. Venus' surface is relatively young geologically speaking. It appears to have been completely resurfaced 300 to 500 million years ago. It's not clear how and why this occurred. About 80% of the Venusian surface is covered by smooth, volcanic plains, consisting of 70% plains with wrinkle ridges and 10% smooth plains. Two highland "continents" make up the rest of its surface area, one lying in the planet's northern hemisphere and the other just south of the equator. The northern continent is called Ishtar Terra after Ishtar, the Babylonian goddess of love, and is about the size of Australia. Maxwell Montes, the highest mountain on Venus, lies on Ishtar Terra. Its peak is 11 km (7 mi) above the Venusian average surface elevation. The southern continent is called Aphrodite Terra, after the Greek goddess of love, and is the larger of the two highland regions at roughly the size of South America. A network of fractures and faults covers much of this area.



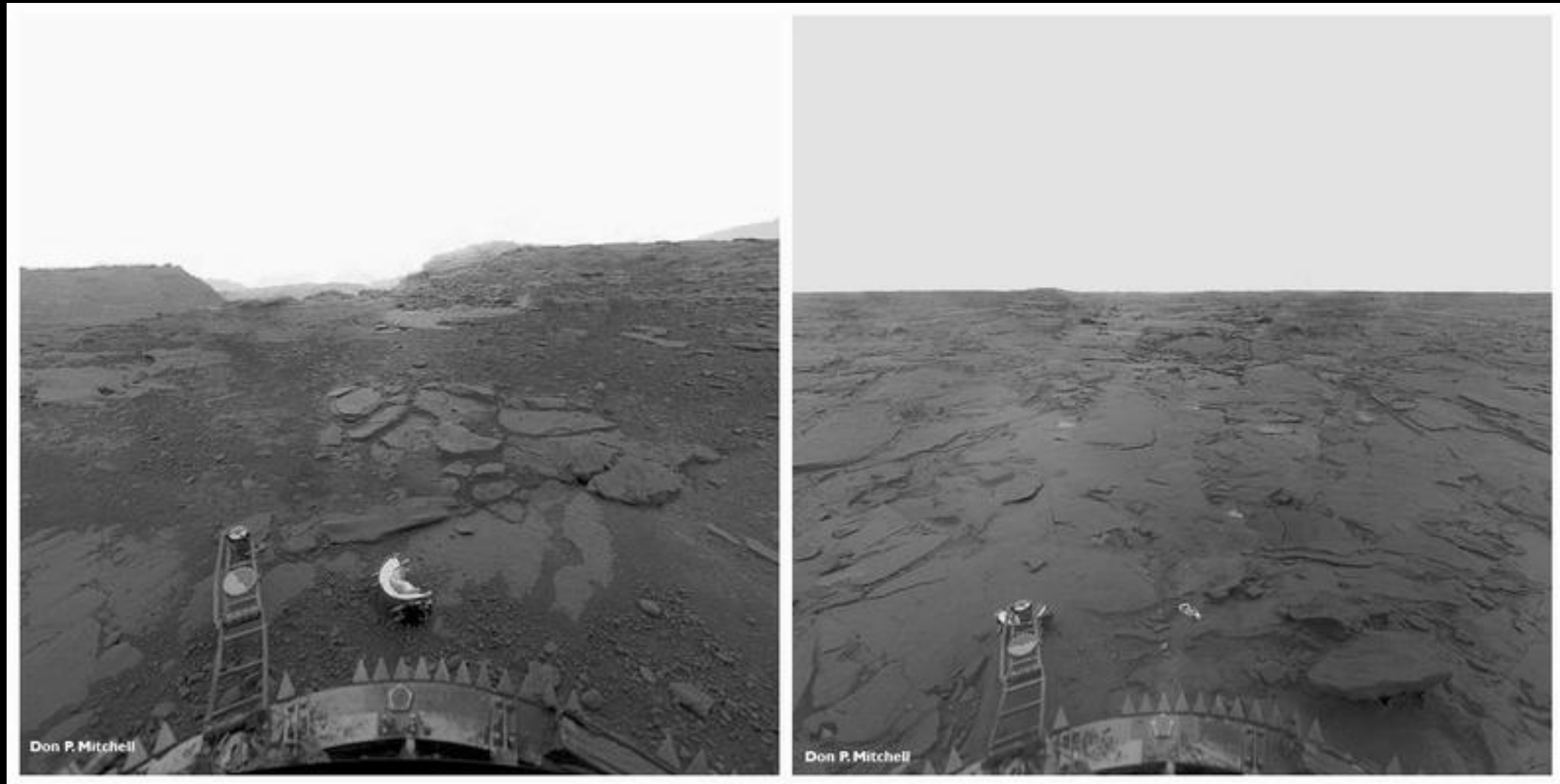
Impact craters, Venus is scarred by numerous impact craters distributed randomly over its surface. Small craters less than 2 kilometers are almost non-existent due to the heavy Venusian atmosphere. The exception occurs when large meteorites shatter just before impact, creating crater clusters. Note the lava flows around the rims.



MAGELLAN IMAGE
7 PANCAKE
VOLCANOES
ALPHA REGIO
VENUS
NOV 7, 1990

GIF CONVERSION
BY RON BAALKE
JPL

Volcanic features are common on Venus with at least 85% of the Venusian surface is covered with volcanic rock. Huge lava flows, extending for hundreds of kilometers, have flooded the lowlands creating vast plains. More than 100,000 small shield volcanoes dot the surface along with hundreds of large volcanoes.



Due to the intense heat and pressure, a mission to the surface of Venus was challenging. The Venera missions were a series of unmanned Soviet planetary probes. Venera 9 and 10 (1975) sent back the first closeup photographs of the planet's surface; these images showed that certain parts of Venus were covered with sizable sharp-edged rocks and others with fine-grain dust.