Venus

Planet Profile

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Mass (kg)...........................................4.87 x 10^24
Diameter (km).......................................12104
Mean density (kg/m^3) ..............................5250
Escape velocity (m/sec).............................10400

Average distance from Sun (AU)......................0.723
Rotation period (length of day in Earth days)........243.0 (retrograde)
Revolution period (length of year in Earth days).....224.7

Obliquity (tilt of axis degrees)....................178
Orbit inclination (degrees).........................3.39
Orbit eccentricity (deviation from circular).........0.007

Mean surface temperature (K)........................726

Visual geometric albedo (reflectivity)...............0.59
Highest point on surface............................Maxwell Montes
                                (17 km above mean planetary radius)
Atmospheric components..............................96% carbon dioxide,
                                                     3% nitrogen,
                                                     0.1% water vapor
Surface materials...................................basaltic rock and
                                                    altered materials
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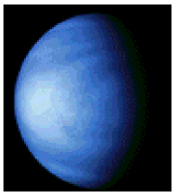


Venus in Color

The bluish hue of Venus is an effect of the colorization technique used to enhance subtle contrasts in cloud patterns and indicates that this image was taken through a violet filter. Features in the sulfuric acid clouds near the top of the planet's atmosphere are most prominent in violet and ultraviolet light. This image shows the east to west cloud banding and the brighter polar hoods . The features are embedded in winds that flow from east to west at about 370 kph (230 mph).

Impact Craters

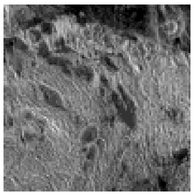
Three large impact craters with diameters ranging from 37 km (23 mi) to 65 km (40 mi) are visible in the fractured plains. Features typical of meteorite impact craters are also visible. Rough radar-bright ejecta surrounds the perimeter of the craters; terraced inner walls and large central peaks can be seen. Crater floors appear dark because they are smooth and have been flooded by lava. Domes of probable volcanic origin can be seen in the southeastern corner. The domes range in diameter from 1-12 km (0.6-7 mi); some have central pits typical of volcanic shields or cones.

Bright Plains

Located along the left central edge of the image is a cluster of volcanic domes that ranges from 1.5 km (1 mi) to 7.5 km in diameter (5 mi). The domes and their deposits are located at the convergence of radar-bright lineaments that are interpreted to be faults and troughs. In some places the domes overlie the faults. The faults and troughs extend into the lower part of the image where they terminate against dark plains deposits and are crosscut at right angles by additional faults. The relationship between these features indicates that multiple episodes of faulting and volcanism have occurred.

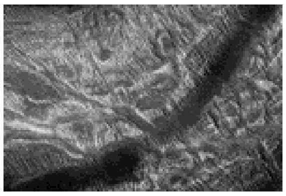
Ovda Regio

The tectonic fabric of this region of Ovda Regio trends predominantly east-west. The large radar-dark areas are probably tectonically formed basins that have been filled in by fluid lava flows, thus presenting a smooth surface to the Magellan radar system.



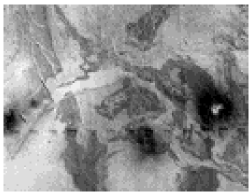
Ridges and Troughs

On this bright, lineated terrain Alpha Regio is a series of troughs, ridges, and faults running in every direction. The lengths of these features range from 10 km (6.3 mi) to 60 km (37 mi). The elevation of Alpha Regio varies over a range of 4 km (2.5 mi). Low-lying areas appear dark in the radar images and may be filled with lava. Volcanoes appear as bright spots on the smooth plains. Notice the large volcano in the upper right. At the center of this 35 km (22 mi) volcano is a caldera; its western edge appears to be either a debris flow or a lava flow. The black square represents missing data.



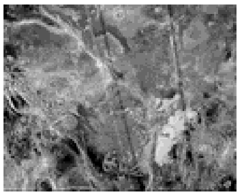
Highlands

Several tectonic events formed this complex terrain, which is part of the interior of Ovda Regio. An underlying fabric of ridges and valleys lies NE-SW. These ridges are spaced 10-20 km (6-12 mi) apart and may have been caused by compression of the crust at right angles to the ridge. The ridges are cut by bright features extending NW-SE. The largest valleys, particularly the 20 km (12 mi) wide valley extending across the image, were filled with dark material, probably lava. The complexity of Ovda Regio attests to a long history of tectonic deformation.



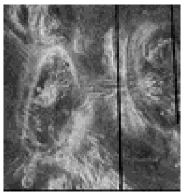
Eastern Lakshmi

Lava flows blanket the flat plains region of eastern Lakshmi. The dark flows most likely represent smooth flows similar to pahoehoe flows on Earth, while the brighter areas are rougher flows resembling Earth’s aa flows. Three dark splotches mark the tops of these lava flows. Because of the thick atmosphere surrounding Venus, small impactors break up before they hit the surface. The fragments are deposited over the surface and produce the dark splotches seen here. Notice the splotch on the far right has a crater at its center, indicating that the impactor was not completely destroyed.



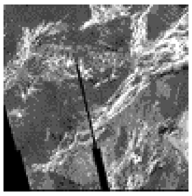
Lava Flows

This mosaic highlights a system of east-trending, radar-bright and dark lava flows that collide with and breach a north-trending ridge belt (left of center). Upon breaching the ridge belt, the lava pooled, forming a radar-bright deposit approximately 100,000 square km (right side of image). The source of the lava is the Corona Derceto, which lies about 300 km (186 mi) west of the scene. The bright and dark bars extending from top to bottom are artifacts of image processing.



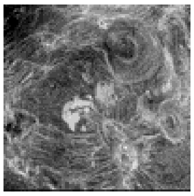
Coronas in Fortuna

Two large oval features can be seen in this image of Fortuna. On the left is Ba'het Patera, 230 km (138 mi) long and 150 km (90 mi) across. A portion of Onatah Corona, over 350 km (210 mi) in diameter, is visible on the right. Both features are surrounded by a ring of ridges and troughs. The central areas of the coronae contain radial fractures as well as volcanic domes and flows. Coronae may form due to the upwelling of hot material from deep in the interior of Venus. These two coronae may have formed at the same time over a single upwelling. The black strip represents missing data.



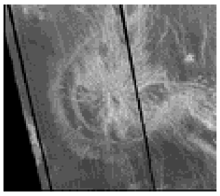
Lavinia Region

The bright area running from the upper right to the lower left may be part of a belt of ridges formed by compression and thickening of the upper layers of the planet. The area between the ridges suggests flooding by lava flows. The varied textures of the lava can be seen in the mottled appearance of the plains, which have been cut by the ridges; brighter, rougher flows are also quite common. The lighter area in the lower right corner is the northern extension of Mylitta Fluctus. The black strip represents missing data.



Arachnoids

Named by the Soviets for their spider and cobweb-like appearance, arachnoids are one of the more remarkable features found on Venus. They are 50 to 230 km (30 to 138 mi) diameter circular structures, with a central volcanic feature surrounded by a complex network of fractures. Arachnoids are similar in form but generally smaller than coronae. The radar- bright lines extending for many kilometers beyond the arachnoids may have been caused by an upwelling of magma from the interior of Venus, which pushed up the surface to form cracks.

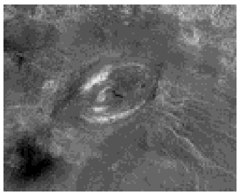


Selu Corona

Located in Lada Terra, Selu Corona measures 350 km (210 mi) in diameter. Coronae are circular to elliptical features marked by a ring of concentric ridges, and are thought to result from the flow of heat in the planet's interior. As hot material rises, it weakens the upper layers of the crust, causing the surface to dome upwards. Then as the region cools, the dome begins to subside. As the upper layers rise and fall, they are subjected to stresses that crack the surface, creating both circular and radial fractures. The black strips represent missing data.

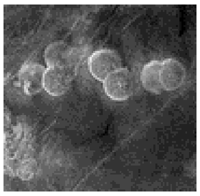
Corona

This region, roughly 100 km (60 mi) on a side, shows a gigantic structure known as a corona. Such features are thought to be the result of hot rising bodies of magma that reach the crust, and cause it to partially melt and collapse, generating volcanic flows and fault patterns that radiate from the central structure. Magellan acquired this view of Venus during its first mapping cycle around the planet in 1990 and 1991.



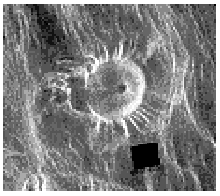
Sacajawea Patera

Sacajawea Patera is a huge caldera located in western Ishtar Terra. It measures approximately 233 km (140 mi) wide at its base, 1-2 km (0.6 -1.2 mi) deep and 120 by 215 km (74 by 133 mi) in diameter. The caldera is bounded by a zone of graben and fault scarps. Extending up to 140 km (87 mi) in length from the southeast of Sacajawea is a system of linear structures thought to be a flanking rift zone along which the lateral injection and eruption of magma may have occurred.



Domical Hills

Seven circular domes can be seen on the eastern edge of Alpha Regio. They average 25 km (15 mi) in diameter with maximum heights of 750 m (2475 ft). Some scientists believe they are the result of eruptions of thick lava that flowed from a vent on level ground, resulting in an even lateral pattern of lava. The concentric and radial fracture pattern on the surface of the domes suggests that lava welled up inside the domes, causing the surface to stretch.



Ticks

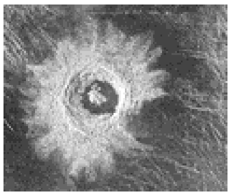
Scientists nicknamed this type of volcano a tick. About 66 km (41 mi) across at the base, this volcano has a flat, concave summit 35 km (22 mi) in diameter. The sides of the volcano are characterized by radiating ridges and valleys. To the west, the rim of the volcano appears to have been breached by dark lava flows that emanated from a shallow summit pit (5.4 km/3.3 mi in diameter) and traveled west along a channel. The black square represents missing data.

Danu Mountains

The Danu Mountains bound Lakshmi Planum to the south. Because of the steep slopes, the local relief in the area (2-3 km/1-2 mi), and the effects of radar geometry, the fault- bounded troughs appear to zigzag through the area when in reality, they are likely straight when viewed from above. The large volcanic dome is 20 km (12 mi) in diameter and was deformed when the Danu Mountains were created.

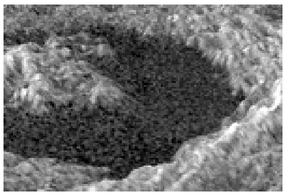
Gula Mons

Towering 4 km (3 mi) above the surface in NW Eistla Regio is the shield volcano Gula Mons. This type of volcano is similar to those found on the Hawaiian Islands; possibly resulting from hot material rising from the interior and heating the crust. Shield volcanoes form when hot, fluid lava erupts non-explosively. The radar-bright area in Eistla Regio consists of both the summit and radial troughs and scarps extending to the northeast down the slope of Gula Mons. Regional expansion of the crust is obvious in this area because of the presence of graben.



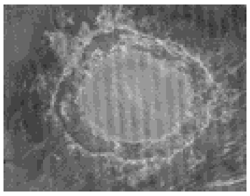
Golubkina

This is a Magellan image of Crater Golubkina. The 30 km- (18 mi-) diameter crater is characterized by terraced inner walls and a central peak, typical of large impact craters on the Earth, Moon and Mars. The terraced inner walls take shape late in the formation of an impact crater, due to the collapse of the initial cavity created by the meteorite impact. The central peak forms due to the rebound of the inner crater floor. This crater is named after the Russian sculptor Anna Golubkina.



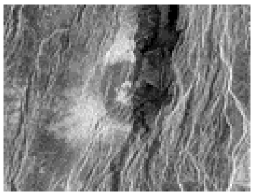
Crater Perspective

This is a computer generated, perspective view of Crater Golubkina. Vertical exaggeration in this image is about 20 times.



Largest Crater

Crater Mead is the largest known crater on Venus. Named after Margaret Mead, the American anthropologist, it measures 280 km (168 mi) in diameter and is located north of Aphrodite Terra and east of Eistla Regio. Classified as a multi-ring crater, Mead's innermost ring is thought to be the rim of the original crater cavity. The presence of irregular, radar-bright crater ejecta crossing the radar-dark floor terrace and adjacent outer radar-bright ring suggests that the terrace floor region is likely down-dropped and tilted outward, forming a concentric ring-fault.

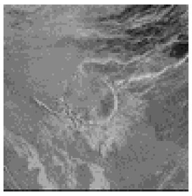


Half Crater

This remarkable half crater called Balch is located in the rift between Rhea and Theia Montes in Beta Regio. (Radar illumination is from the left.) About 37 km (23 mi) in diameter, Balch has been cut by many fractures or faults since it was formed by the impact of a large meteorite. The eastern portion was partially destroyed during the formation of a fault-valley, which measures up to 20 km (12 mi) wide. A north-south profile through the center of this crater resulted from the downdropping and removal of most of the eastern half of the crater.

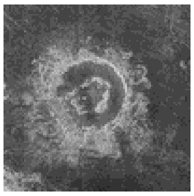
Akna Mountains

The Akna Mountains form the western edge of Lakshmi Planum. Wanda, the giant crater on the upper right, has a diameter of 18 km (11 mi). While Wanda doesn’t appear to have been deformed by tectonics, material from the Akna Mountains appears to have collapsed into it. The area represented by this image is about 200 km (124 mi) long by 125 km (78 mi) wide.



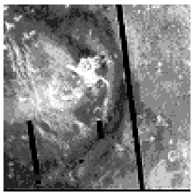
Craters in Transition

Magellan’s radar system detected few impact craters in the process of being resurfaced by volcanism. Alcott is the largest of these craters in transition, with a diameter of 63 km (39 mi). The trough-like depression (lower left) is a rille through which lava once flowed. A remnant of rough radial ejecta is preserved outside the crater’s southeast rim. The presence of partially lava-flooded craters such as this is important to our understanding of the rate of resurfacing on Venus by volcanism.



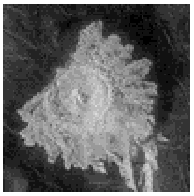
Peak-ring Crater

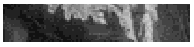
This 54-km (32-mi) diameter crater is the size at which craters on Venus begin to possess peak-rings instead of a single central peak. The floor of Barton crater is flat and radar-dark, indicating possible infilling by lava flows sometime following the impact. Barton’s central peak-ring is discontinuous and appears to have been disrupted or separated during or following the cratering process. The name Barton has been proposed by the Magellan Science Team, after Clara Barton, founder of the U. S. Red Cross; the name is tentative pending approval by the IAU.



Dark Halos

Impact craters such as Crater Carson shown here are frequently surrounded by radar-dark halos. Several of these special craters have halos that are parabolic in shape and are very long, extending hundreds of kilometers to the west. The darkness of the emissivity data indicates a smooth surface, leading scientists to believe that halos may be thick, smooth sediment deposits formed when incoming projectiles crashed into the surface. The black strips represent missing data.



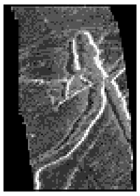


Large Impact Crater

A large impact crater about 30 km (19 mi) in diameter is surrounded by a fresh ejecta blanket. The extreme brightness of the blanket is due to its roughness and its ability to scatter the radar signals that are used to collect these images. Scientists believe that the missing section of the ejecta blanket is due to an atmospheric blast that followed the impactor as it crashed through the Venusian atmosphere.

Long Channel

This long open channel in Vires-Akka Chasma ranges in width from under 1 km (3300 ft) to 4 km (2 mi). The portion of the channel visible here is over 120 km (72 mi) long. Scour lines are visible along the length of the channel, particularly where it makes abrupt turns. The channel may have been carved by very fluid lava that remained liquid as it flowed over great distances due to the extreme surface temperatures. Because the lava remained fluid it eroded preexisting terrain along its path.

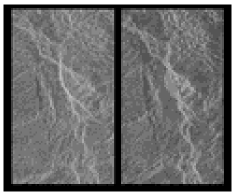


Fault-Bounded Troughs

The large fault-bounded trough in the center of the image was nicknamed Gumby (after an animated cartoon figure) by Magellan scientists. Located in the Lavinia region at the intersection of two tectonic trends, Gumby measures 5 km (3 mi) wide and 100-200 m (.06 - .1 mi) deep. An example of one of the trends is the bright lines running E-W through Gumby’s head. A second example is the bright lines running SW to NE through Gumby’s legs and hips. The line of pits (by Gumby’s elbow) suggests some igneous or volcanic activity may have accompanied the faulting.

Tributary-Like Branches

In a region near Hestia Rupes on the NW corner of Aphrodite Terra lies a complex network of narrow (<1 km) bright channels. This network exhibits tributary-like branches similar to those observed in river systems on Earth. However, the angular intersections of these tributaries suggest control by faulting. The tributaries may be due to drainage of lava along preexisting fractures. The main tectonic fabric of this region can be observed in the NE-SW trending ridges.



Radar Bright

This pair of images shows a region in Aphrodite Terra. The left image was taken in November 1990 and the right image in July 1991. In the center of the right image lies a bright, flow-like area extending to the left of a bright fracture. When the bright rough area appeared, the fracture seemed to change position from when the image on the left was taken. Some scientists thought a "Venusquake" had occurred, causing a landslide (the bright area) to form. Later analyses indicated that the apparent changes in the surface were due to differences in radar illumination.

Ash on Lava

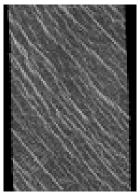
In northern Navka, radar-dark wind streaks have been blown across radar-dark lava flows, indicating a SE-NW wind direction. The darkness of the streaks indicates they are composed of small, fine-grained material that is too smooth to return a strong radar signal. The radar-dark lava flows beneath the streaks are dark because they are smoother than the rougher, radar-bright lava flows to the left. Because the streaks are associated with lava flows, they may be composed of fine ash from the volcanic eruption that produced the flows.

Wind Streaks

Spectacular wind streaks were found NE of Crater Mead. The powerful impact that created Mead spread debris 500 km (310 mi) onto the surrounding plains. The radar-bright streaks in this image most likely represent debris from the impact that have been modified by surface winds blowing from northwest to southeast. The radar-bright material is on top of an older, darker terrain.

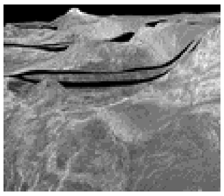
Crater with Streak

The comet-like tail lying northeast of this volcano is a relatively radar-bright deposit. The streak is 35 km (22 mi) long and 10 km (6 mi) wide. The volcano, whose diameter is 5 km (3 mi), blocks the wind so that particles in the atmosphere settle downwind from it.



Parallel Lines

Two groups of parallel features that intersect almost at right angles are visible. The regularity of this terrain caused scientists to nickname it "graph paper" terrain. The fainter lineations are spaced at intervals of about 1 km (.6 mi) and extend beyond the boundaries of the image. The brighter, more dominant lineations are less regular and often appear to begin and end where they intersect the fainter lineations. It is not yet clear whether the two sets of lineations represent faults or fractures, but in areas outside the image, the bright lineations are associated with pit craters and other volcanic features.

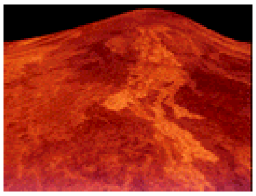


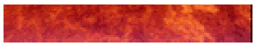
Lakshmi Planum

The southern scarp and basin province of western Ishtar Terra are portrayed in this vertically exaggerated 3-dimensional perspective view. Western Ishtar Terra is about the size of Australia and is a major focus of Magellan investigations. The highland terrain is centered on a 2.5 km to 4 km-high (1.5 mi to 2.5 mi-high) plateau, Lakshmi Planum, which can be seen in the distance at the right. Here, the surface of the plateau drops precipitously into the bounding lowlands. Vertical exaggeration in this image is about 20 times.

Sif Mons

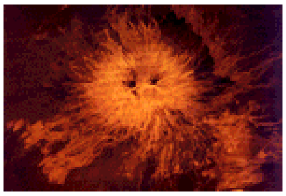
Located on the slopes of Sif Mons, this area displays a simple sequence of events. The small shield volcanoes, features commonly found on Earth, are no more than 5 km (3 mi) in diameter. The dark background plains and the shield volcanoes both formed from the eruption of very fluid lava. Over time, several layers of lava flows covered each other, each one successively brighter, indicating that they became blockier in texture over time. The summits of the shield volcanoes protrude from the flows. Once the lava flows were in place, fractures formed as the new surface expanded.





Recent Volcanism

This false-color view of the volcano Sif Mons was generated from Magellan SAR data and existing altimetry data. The image shows a region of the volcano just below the summit of the peak. A series of bright and dark lava flows is visible in the foreground. The brightest flows, which are relatively rough, are associated with the most recent volcanism in the region. The flows overlay older lava flows which are smoother and hence appear darker to the Magellan radar system. The volcano is 2 km (1.2 mi) high and 200 km (120 mi) in diameter. Vertical exaggeration in this image is about 20 times.



Twin Summit

Located in the Atla Regio region of Venus is Sapas Mons. The sides of the volcano are covered with numerous overlapping lava flows, many of which appear to have originated along the sides of the volcano rather than from its double summit. This type of eruption is common of large shield volcanoes on Earth, such as those found in Hawaii. Color was artificially added to this image and is based on the colors that the Soviet Venera 13 and 14 spacecraft observed in the 1970s.

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