

VENUS AND EARTH COMPARED

Venus, the second planet from the Sun, lies, on average, 108 million km from the Sun, about 30% closer than the Earth. Venus is often referred to as our sister planet because of similarities in size, mass, density and volume. It is believed that both planets share a common origin forming at the same time out of a condensing nebulosity around 4.5 billion years ago.

There the similarities end. Venus has no surface water, a toxic, heavy atmosphere made up almost entirely of carbon dioxide with clouds of sulphuric acid and at the surface the atmospheric pressure is over 90 times that of the Earth at sea-level.

The surface of Venus is the hottest in the solar system at a searing 750 K (477 °C). This high temperature has been caused by a catastrophic greenhouse effect due to the carbon dioxide rich atmosphere. Incident sunlight is trapped by the atmosphere and cannot radiate out into space with a resulting boost to the surface temperature by over 475 K.

The final anomaly between the two worlds is the rotation of Venus. Firstly its axis of rotation is inclined at 177.36 degrees (compared to 23.5 degrees on Earth). This means that Venus rotates in a retrograde direction from east to west, making the Sun rise in the west and set in the east. Further to this the rotation is very slow: a sidereal day on Venus lasts 243 Earth days. This is even longer than a Venusian year which is only 224.7 Earth days.

Despite several missions to Venus there is still much that is unknown about our celestial neighbour. The Russian Venera landers touched down in the 1980s and survived the hostile environment for about 60 minutes during which time images were taken revealing a barren world. Other missions to Venus, both Russian Venera orbiters, and NASA's Magellan spacecraft have concentrated on radar mapping the surface.

From the data returned by these missions scientist believe that the surface of Venus is relatively young - it appears to have undergone resurfacing around 400 million years ago. The topography consists of vast plains (covered by lava flows) and mountainous regions.

Impact craters cover the surface. Unlike other worlds, however, there are virtually no craters less than 2 km in size. The impactors that would cause them simply burn up in the thick atmosphere. Those that do exist are believed to be caused by the fragmentation of a large meteorite just before impact with the surface.

Parameter	Venus	Earth
Orbital Distance (km)	108 200 000	149 600 000
Diameter (km)	12 103.6	12 756.3
Mass (kg)	4.869 x 10 ²⁴	5.972 x 10 ²⁴
Density (kgm ⁻³)	5.24	5.52
1 Day	243 Earth days	23h 56m
1 Year	224.7 Earth days	365.25 days
Atmosphere	96% CO ₂ 3% N	77% N 21% O
Escape Velocity (kms ⁻¹)	10.36	11.18
Surface Gravity (ms ⁻²)	8.87	9.81
Axial Tilt (°)	177.36	23.5
Orbit Inclination (°)	3.39	0.00
Eccentricity of orbit	0.007	0.017

Table comparing various parameters for the two planets.

Quelle: <http://sci.esa.int/venus-express/34067-venus-vs-earth/>