

### Offered Title: Venus – Earth's Evil Twin?

If you haven't noticed, Venus has been in our south-southwestern sky for months. It is on its way out, heading to the western horizon so catch it at dusk while it's still catchable. Venus is simply brilliant!

Venus has been among four bright planets populating our southeastern to southwestern sky. From southeast to southwest they are Mars, Saturn, Jupiter, and Venus. Catch this linear grouping too, while Venus still shines above the horizon.

Venus is brilliantly beautiful and early astronomers found this planet so alluring they named it Venus after the Roman goddess of love and beauty. Much early writing about Venus painted a picture of paradise, or possibly of a water world.

Then we discovered the truth.

It took major developments of technology to better understand Venus, so the truth didn't start emerging until the early 20<sup>th</sup> century. The first hints of reality came with spectroscopic observations. Venus appeared to not rotate. Ultraviolet observations by Frank E. Ross in the 1920s produced unprecedented detail in Venusian clouds but could not penetrate to the surface. In the 1950s more detailed spectroscopic studies indicated that Venus did rotate, very slowly, but in a retrograde direction, opposite that of most other planets. The only other planet in our solar system with retrograde rotation is Uranus.

After the development of radar astronomy Venus's clouds were penetrated in the 1960s and its surface revealed. This gave astronomers critical information needed to determine Venus's rotation rate. Radar studies determined a rotation rate of once every 243 Earth days. That's one long day! An interesting result of such a low rotation rate...Venus is nearly spherical. Other planets are slightly flattened or oblate, with a greater equatorial circumference vs. polar circumference.

As radar technology improved so did the images of Venus's surface. We did not find water, no tropical islands. It appeared to be barren.

NASA's Mariner 2 successfully measured cloud and surface temperatures as it flew by Venus, indicating cool clouds and a hot surface. Soviet Venera 4 successfully measured atmosphere and cloud composition, and surface temperature. Venus's true nature was emerging. Numerous additional spacecraft would provide a clear picture. Its atmosphere is 96% CO<sub>2</sub>, atmospheric pressure is 92 times Earth's, sulfuric acid clouds, and a surface temperature over 800 degrees Fahrenheit. Venus is a nasty place!

How did this happen?

Hate to say it but we're not sure. The leading hypothesis is Venus had an ocean early on but due to its proximity to the Sun it evaporated quickly. Also, intense volcanic activity spewed CO<sub>2</sub> and SO<sub>2</sub>, setting in motion a runaway greenhouse effect. Another possibility is a collision between Venus and another body as Venus was forming. We might never know.

Evil twin? Nah, that's a human thing. It just is what it is, not a nice place to picnic.

### What's in the Sky?

September 16-21: Follow the growing Moon as it moves past Saturn then Mars in the southern sky.