

Venus, Earth's twin sister gone wrong

Tape start: 10:00:00

A-Roll start: 10:01:08

10:01:38

For a long time, many imagined conditions on Venus as similar to Earth. But space probes, including the European mission Venus Express, have since confirmed that the planet considered to be Earth's twin sister is no tropical paradise.

10:01:58

Clip Håkan Svedhem, Venus Express Project Scientist, ESA

"The planet Venus got its name from the goddess of love and beauty Venus. And it's of course a very beautiful planet - just as the goddess is beautiful. But Venus can also be a hellish place."

10:02:10

At the dawn of the space age, Venus was a very popular destination. Since the early 60s, more than 20 American and Soviet space probes have been sent there, fuelled by hopes of finding similar conditions to Earth.

Unfortunately, the data collected unveiled a very hostile planet which has proved extremely difficult to study.

10:02:34

Clip Uli Christensen, Planetary Director, Max Planck Institute for Solar System Research

"You can't see its surface from the outside, because Venus is covered in a close layer of clouds - which lie at an altitude of about 60 kilometres. They are made up of sulphuric acid and cover the entire planet. You can't see through them - at least not in visible light."

10:02:54

This acid cloud blanket has long prevented Man from studying Venus's complex environment - its atmosphere, its surface, and its geology.

10:03:03

Clip Håkan Svedhem, Venus Express Project Scientist, ESA

"But now, with the help of modern technology - in infrared wavelengths - we're able to look through this cloud cover down to the surface."

10:03:11

Since arriving in orbit around Venus three years ago ESA's Venus Express has delved into the secrets of the planet's atmosphere. Thanks to its stream of data scientists have been able to explain to some extent why Venus has become so inhospitable compared to its sister Earth.

10:03:30

For example, the 'Venus Monitoring Camera', VMC, which spans near-infrared, ultraviolet and visible wavelengths, has shown that the atmosphere is even more dynamic than expected.

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Influenced by the gigantic hurricane-like vortices at its poles, the upper atmosphere rotates around the planet at a formidable speed, with wind reaching 360 kilometres an hour. They then drop to almost zero at the planet's surface.

10:04:01

Clip Håkan Svedhem, Venus Express Project Scientist, ESA

"When you get deeper into the atmosphere and down to the surface, it's really a hellish place because of the high temperature and high pressure that crushes everything that gets in there and burns it at 460 degrees Celsius."

10:04:13

With this data, scientists hope that by better understanding what's going on under Venus' clouds, they might find out why Earth and Venus' destinies differed so wildly from the very birth of our Solar System.

10:04:28

Clip Uli Christensen, Planetary Director, Max Planck Institute for Solar System Research

"It's thought Venus' entire surface was completely altered by some kind of sudden and catastrophic event around 500 million years ago, and tremendous lava flows covered the planet's surface. There's been a lot of speculation, but we don't really know what happened."

10:04:51

Astronomers of the past could be forgiven for suggesting that Venus's climate was once similar to the Earth's. Our sister planet wasn't always that different.

10:05:01

Clip Håkan Svedhem, Venus Express Project Scientist, ESA

"Likely, in the early days of the Solar system Venus may well have had as much water as the Earth had, and of course in that time the climate would have been very different, the temperature much lower. And slowly then, probably because Venus is closer to the Sun, it received more sunlight, the water slowly boiled up and out of the atmosphere."

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Venus Express has also been able to measure how Venus is losing its hydrogen and oxygen, which are stripped away by solar winds.

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Unlike Earth protected by its magnetic field, the slowly rotating Venus doesn't have such a shield and is therefore gradually losing what's left of its water.

10:05:50

Clip Dimitri Titov, Science Coordinator for the Venus Express mission
"Climate change on Venus is strongly influenced by a very powerful greenhouse effect, like the one we have on Earth on a much smaller scale - it only warms up our outside atmosphere by 30 to 40 degrees. However, we should bear in mind that by raising CO2 and water vapour levels in the atmosphere, we could one day have a climate as hostile as the one we see on Venus".

10:06:16

Although there's still a long way to go before that happens, the findings of the Venus Express mission are prompting more reflexion about the consequences of climate change on its unlikely twin, planet Earth.

10 :06 :33 End of A-Roll

B-Roll

Håkan Svedhem, Venus Express Project Scientist, ESA

10:06:49 Planet got its name from the goddess of love but it's a hellish place

10:07:03 A hellish place near the surface

10:07:14 Study of Venus as part of comparative planetology, particularly with Earth because of common aspects

10:07:41 Both planets were probably very similar in early days of solar system

10:07:58 Proximity to Sun and water content

10:08:26 Venus may have, in early days of solar system, had as much water as Earth has

10:08:58 The amounts of water on Earth and Venus

10:09:22 The dramatically high speed of the surface winds

Uli Christensen, Planetary Director, Max Planck Institute for Solar System Research

10:10:03 The whole surface of Venus was renewed 500 million years ago for reasons not yet understood (English)

10:10:26 ditto in German

10:10:52 Surface not visible because of thick acid clouds (English)

10:11:11 ditto in German

10:11:35 Better understanding with VEX of the cloud structure and air movements (English)

10:11:56 ditto in German

10:12:30 Venus Express spacecraft animations

10:13:55 End of B-Roll & end of tape