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Space

Expanding vent is a sign that Venus is volcanically active

Alex Wilkins

A VOLCANIC vent on Venus that changed shape over a period of eight months is the first direct evidence that our neighbouring planet is volcanically active.

Venus has many prominent volcanic features, such as vents and the dry beds of lava lakes, but it was unclear whether these were remnants of a distant volcanic past or signs of current activity.

Between 1990 and 1994, NASA's Magellan satellite used radar to map Venus's surface in detail, including its volcanic features. But researchers have only recently had computers powerful enough to properly analyse the vast amount of data this work generated.

Even then, they had to look through the images by eye, because the way in which Magellan mapped Venus – by taking photos every eight months at different viewing angles – made it impossible to automatically search for changes in surface features.

"The daunting aspect of this is it's a needle-in-a-haystack search, where there's no guarantee that the needle exists," says Robert Herrick at the University of Alaska Fairbanks, who, along with Scott Hensley at NASA's Jet Propulsion Laboratory in California, presented the findings at the Lunar and Planetary Science Conference in Houston, Texas, on 15 March.

By combing through areas of Venus's surface in which they thought volcanic activity was more likely, the pair found the vent, which is in the Maat Mons volcano system, home to the planet's highest volcano.

Between February and October 1991, the vent changed from being a circular, 2-square-kilometre hole to a more shallow, irregular hole with an area almost twice as big. In the later images, there were also features downhill from the vent that looked like active lava flows, but the images weren't clear enough to fully make them out (*Science*, doi.org/j26d).

8km
Height of the Maat Mons volcano peak on Venus

"A reasonable interpretation is that a lava lake formed over those eight months, and that volcanism occurred downhill," says Herrick.

While the finding validates many predictions and hypotheses about active volcanism on Venus, it tells us little about the frequency of volcanic eruptions on the planet because it is the only sample we have. But the fact that we saw it at all could tell us something.

"There's the possibility that we observed the only thing that's happened on Venus in the last 1000 years and got incredibly lucky, but the odds are that if we saw something change over a short, eight-month period, then at least volcanic eruptions occur on Venus at a similar sort of level to the intraplate volcanism on Earth, in the every-few-months time frame," says Herrick.

"We know Venus must be active, but demonstrating it from Magellan data has, until now, proven elusive," says Philippa Mason at Imperial College London.

Confirming that Venus is volcanically active is especially useful given upcoming missions to Venus, says Mason, such as the European Space Agency's EnVision and NASA's VERITAS satellites. These missions will use radar – like Magellan did, but in a more advanced form – to map the planet's surface and interior, as well as spectroscopy to analyse gases in its atmosphere. ▮

DAVID P. ANDERSON, SMU/NASA SCIENCE PHOTO LIBRARY

A 3D view of the Maat Mons volcano system on Venus

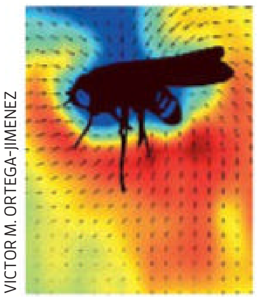
Life

Jumping parasitic worms use static to hit their targets

Karmela Padavic-Callaghan

TINY parasitic worms may be exceptionally good at jumping onto their prey because they are electrically attracted to them.

Roundworms (*Steinernema carpocapsae*) attach to insects like bees or fruit flies to feed on them, and are among nature's most powerful jumpers despite being only a millimetre long. They launch into the air, then spin in a series of flips until they land headfirst.



VICTOR M. ORTEGA-JIMENEZ

A map of the electric field around a charged fruit fly

Researchers have previously studied how the structure of the worms' muscles helps them jump so well, but Víctor Ortega Jiménez at the University of Maine and his team now think that electric attraction between the worms and their prey might play a role as well.

The researchers used a high-speed camera to record worms jumping onto a fruit fly that was held in place a few millimetres above them. When the team applied a small electric voltage to the insect, the worm's trajectory would take a sharp, mid-air turn towards the fly, no matter where it started its jump. In experiments where the researchers made the fly electrically neutral, worms that didn't start their jump close to the fly never successfully hit their target.

In nature, flying insects build a static electric charge as they flap their wings against particles of air, so the experiment imitated natural conditions by charging the fly, says Jiménez, who presented the work at a meeting of the American Physical Society in Las Vegas, Nevada, on 6 March. ▮