Volunteers find 'spiders' on mars - but not where they expected

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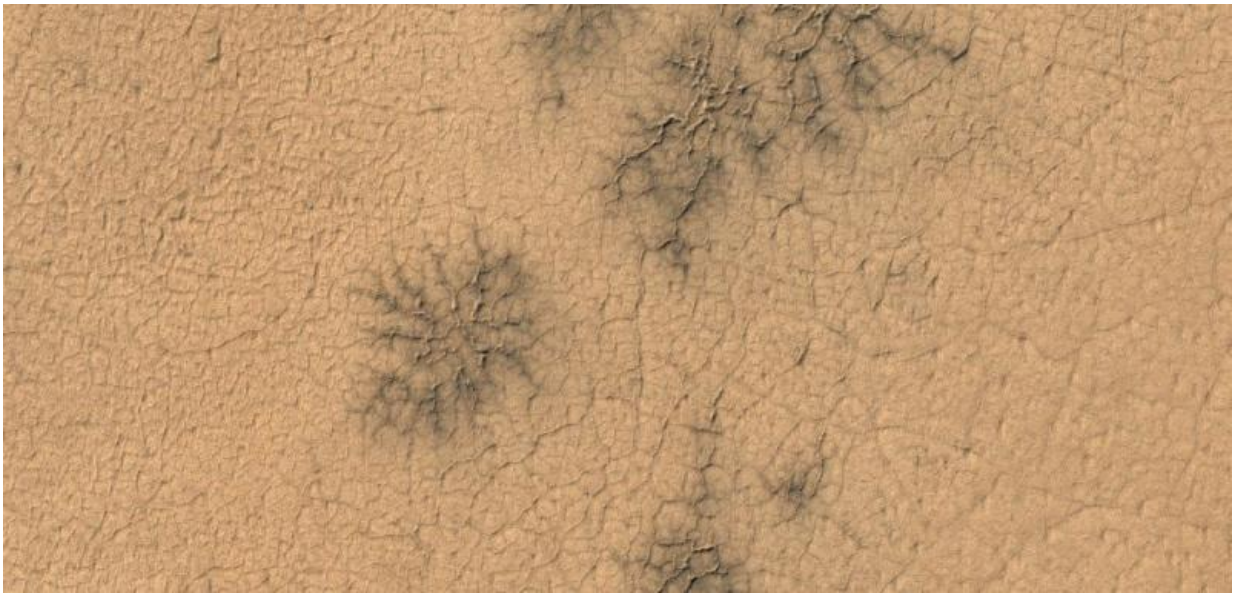

A high resolution image from the HiRISE camera onboard NASA's Mars Reconnaissance Orbiter of one of the new Martian araneiform (or "spider") locales outside of the South Polar Layered Deposits discovered by the Planet Four: Terrains volunteers. Credit: NASA/JPL/University of Arizona

Armchair astronomers have helped Oxford University scientists discover landforms known as 'spiders' on parts of Mars where they were previously thought not to exist.

The 'spiders' are named for their arachnid-like appearance and are a type

of land erosion where networks of cracks form on Martian soil, completely different to anything on Earth. The discovery was made by volunteers working on behalf of Planet Four: Terrains, an online project hosted by Zooniverse, the world's largest and most popular people-powered research platform.

Araneiforms - the scientific name for these features - occur at the planet's South Pole and form when carbon dioxide turns to ice during the Martian winter. As the seasons change, direct sunlight penetrates the translucent ice, warming the land beneath. The land surface then gets eroded as the gas races out and rips off little bits of dirt, forming spindly branches which resemble spider legs.

The features were previously thought only to exist in a region known as the South Polar Layered Deposits (SPLD), banded layers of dust and water ice. However, in a recent publication, citizen-science volunteers spotted the 'spider' formations in other areas of the Martian polar surface. The sightings were later confirmed using high resolution imaging from HiRISE (High Resolution Imaging Experiment) camera aboard NASA's Mars Reconnaissance Orbiter.

Planet Four: Terrains started in June 2015, and was one of the first citizen science projects to launch using the Zooniverse's Project Builder platform.

Led by Professor Chris Lintott of the Department of Astrophysics at Oxford University, the Zooniverse now hosts over 100 projects. The online platform runs on support from volunteers, of whom there are now over 1.6 million worldwide. The volunteers act as armchair scientists, helping the team with their online research from their own homes.

10,000 citizen scientists contributed to the 'spider' research, viewing and classifying over 20,000 images derived from observations made by the

Context Camera (CTX), aboard the Mars Reconnaissance Orbiter. These images contained many spiders as well as other land forms known as 'Swiss cheese terrain', and craters.

Dr Meg Schwamb, from the Gemini Observatory and lead author of the paper, said: 'This was a totally unexpected find. By having so many eyes scouring the images, we know now that the SPLD is not the only place where spiders form. This will help us better understand the carbon dioxide jet formation process.

'The carbon dioxide jet process that forms 'spiders' is a completely un-Earthly phenomenon. The only other body suspected of having these jets is Neptune's moon Triton. By studying these spiders and jets we're learning more about how Mars differs from Earth. The jet process is linked to the Martian seasons and is returning carbon dioxide to the atmosphere, studying these new locales will give new insights into the Martian atmosphere.

'We'll be able to use the HiRISE images to get wind measurements and see if the outgassing is similar or different than on the SPLD.'

Professor Chris Lintott, Founder of Zooniverse and Professor of Astrophysics at Oxford University, added: 'To have a satellite in orbit around Mars take follow-up observations of features identified by our volunteers is thrilling - I'm really impressed with their work.'

Based on these exciting new results, the hunt for Martian spiders continues. 'We have added new CTX images of Mars' South Polar region to the Planet Four: Terrains website in need of review to see how far north these features may extend,' Dr Schwamb added.

More information: Megan E. Schwamb et al. Planet Four: Terrains – Discovery of araneiforms outside of the South Polar layered deposits,

Icarus (2017). DOI: 10.1016/j.icarus.2017.06.017