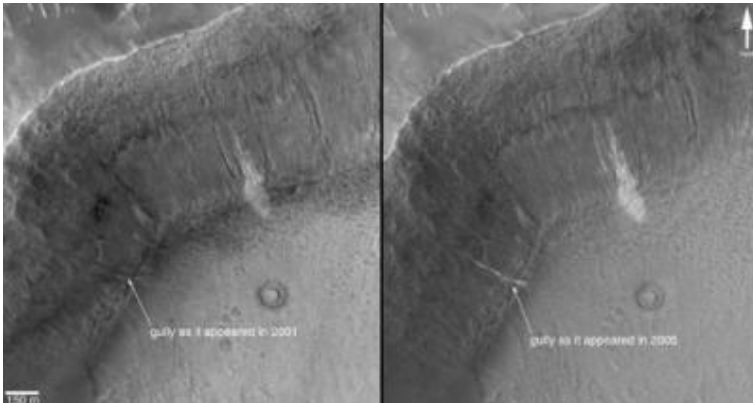


Possible Signs of Liquid Water Flowing on Mars



A new gully deposit in a crater in Terra Sirenum.
Image credit: NASA/JPL/Malin Space Science Systems

NASA photographs have revealed bright new deposits seen in two gullies on Mars that suggest water carried sediment through them sometime during the past seven years.



A new gully deposit in a crater in the Centauri Montes Region. This figure is a colorized view of the light-toned gully deposit as viewed from an oblique perspective, draped over topography derived from Mars Global Surveyor's Mars Orbiter Laser Altimeter data. The color comes from a table derived from the colors of Mars as seen by the Mars Reconnaissance Orbiter camera. The new light-toned flow, by itself, does not prove that liquid water was involved in its genesis. However, this observation and the similar light-toned flow in Terra Sirenum together show that some gully sites are indeed changing today, providing tantalizing evidence there might be sources of liquid water beneath the surface of Mars right now. In both cases, these new flows may be indicating the locations of aquifers (subsurface rocks saturated with water) that could be detected by orbiting, ground-penetrating radar systems such as the Mars Express Mars Advanced Radar for Subsurface and Ionosphere Sounding or the Mars Reconnaissance Orbiter's Mars Shallow Subsurface Radar. Image credit: NASA/JPL/Malin Space Science Systems

"These observations give the strongest evidence to date that water still flows occasionally on the surface of Mars," said Michael Meyer, lead scientist for NASA's Mars Exploration Program, Washington.

Liquid water, as opposed to the water ice and water vapor known to exist at Mars, is considered necessary for life. The new findings heighten intrigue about the potential for microbial life on Mars. The Mars Orbiter Camera on NASA's Mars Global Surveyor provided the new evidence of the deposits in images taken in 2004 and 2005.

"The shapes of these deposits are what you would expect to see if the material were carried by flowing water," said Michael Malin of Malin Space Science Systems, San Diego. "They have finger-like branches at the downhill end and easily diverted around small obstacles." Malin is principal investigator for the camera

and lead author of a report about the findings published in the journal Science.

The atmosphere of Mars is so thin and the temperature so cold that liquid water cannot persist at the surface. It would rapidly evaporate or freeze. Researchers propose that water could remain liquid long enough, after breaking out from an underground source, to carry debris downslope before totally freezing. The two fresh deposits are each several hundred meters or yards long.

The light tone of the deposits could be from surface frost continuously replenished by ice within the body of the deposit. Another possibility is a salty crust, which would be a sign of water's effects in concentrating the salts. If the deposits had resulted from dry dust slipping down the slope, they would likely be dark, based on the dark tones of dust freshly disturbed by rover tracks, dust devils and fresh craters on Mars.

Mars Global Surveyor has discovered tens of thousands of gullies on slopes inside craters and other depressions on Mars. Most gullies are at latitudes of 30 degrees or higher. Malin and his team first reported the discovery of the gullies in 2000. To look for changes that might indicate present-day flow of water, his camera team repeatedly imaged hundreds of the sites. One pair of images showed a gully that appeared after mid-2002. That site was on a sand dune, and the gully-cutting process was interpreted as a dry flow of sand.

Today's announcement is the first to reveal newly deposited material apparently carried by fluids after earlier imaging of the same gullies. The two sites are inside craters in the Terra Sirenum and the Centauri Montes regions of southern Mars.

"These fresh deposits suggest that at some places and times on present-day Mars, liquid water is emerging from beneath the ground and briefly flowing down the slopes. This possibility raises questions about how the water would stay melted below ground, how widespread it might be, and whether there's a below-ground wet habitat conducive to life. Future missions may provide the answers," said Malin.

Besides looking for changes in gullies, the orbiter's camera team assessed the rate at which new impact craters appear. The camera photographed approximately 98 percent of Mars in 1999 and approximately 30 percent of the planet was photographed again in 2006. The newer images show 20 fresh impact craters, ranging in diameter from 7 feet (2 meters) to 486 feet (148 meters) that were not present approximately seven years earlier. These results have important implications for determining the ages of features on the surface of Mars. These results also approximately match predictions and imply that Martian terrain with few craters is truly young.

Mars Global Surveyor began orbiting Mars in 1997. The spacecraft is responsible for many important discoveries. NASA has not heard from the spacecraft since early November. Attempts to contact it continue. Its unprecedented longevity has allowed monitoring Mars for over several years past its projected lifetime.

Source: NASA

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