Mars gullies flow with mud

Heather Catchpole for ABC Science Online, ABC November 2, 2009, 6:50 pm

Jon Clarke © **Enlarge photo**

Martian water most likely flowed as slurries of mud rather than trickling streams, according to a recent NASA report.

The report, which compared signs of recent water activity in gullies on Mars with similar deposits on Earth, has implications for searching for evidence of water on the red planet. It could also indicate whether Mars has had liquid water within the last decade.

In 2004 and 2005, images taken by NASA's Mars Global Surveyor showed evidence of what looked like fresh flows of liquid; light-toned patches on the crater walls in the Terra Sirenum and the Centauri Montes regions of southern Mars.

The features had not been seen in previous photos of the region taken in 2001.

Scientists debated whether the patches were evidence of water flows, but their origin remains controversial. This is because spectrographic images, which reveal the mineralogy of the surface, showed no hydrated minerals such as clays and no salts left behind by the water, which would have quickly evaporated in the dry Martian air.

An analysis led by Dr Jennifer Heldmann of NASA's Ames Research Center in California, and published in the journal _Icarus_, suggests the flow may have been mud.

Martian analogy

To better understand the Martian features, the team compared them to similar light-toned patches in the Atacama Desert, an extremely arid desert along the west coast of South America.

"The new light toned deposits seen in association with gullies on Mars in Terra Sirenum and Centauri Montes show striking similarities in geomorphology with the new Atacama Desert gully deposit," the researchers said.

"The deposits on Earth and Mars are both thin deposits that are more light toned than the surrounding terrain.

"By analogy to the Atacama deposit, it is possible that the Martian deposits were formed by the action of liquid water, most likely by a soil and water fluidised slurry which flowed downslope."

Size clues

The Atacama mudflows were generated by a rare rainfall event nine days before the researchers collected their data.

This data revealed the light tone was caused by the difference in the size of the particles in the mudflows compared to the coarser-grained surrounding terrain.

The researchers say this indicates the best way to look for water on Mars is not to look for differences in the composition of the sediments, but in the size of the particles.

Dr Jonathan Clarke of the Mars Society Australia has worked in the Atacama Desert, which is considered one of the best terrestrial analogs for Mars.

"Exercising all due caution you can make reasonable comparisons [between Earth and Mars] which gives a broader context to understanding Martian features," Dr Clarke said.

"Mars is a lot colder. The air pressure is a lot lower, so water would evaporate faster and the gravity is less, so fluids would flow differently. But the basic physics of fluid flow doesn't change that much."

Dr Clarke says the research shows the absence of water from spectrographic studies is not evidence for the absence of water on Mars.

"It's a question of whether there is more mud than water or more water than mud," he said.