NASA images, White Sands features support a wetter Mars

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NASA's announcement yesterday of evidence that water still flows on Mars, at least in brief spurts, demonstrates that the view of Mars as a very dry planet should be reevaluated, says Dawn Sumner, professor of geology at UC Davis. Recent work from by Sumner and graduate student Greg Chavdarian also supports the presence of liquid water near the surface.

Chavdarian and Sumner have studied cracks and fins in the sulfate-rich sands at White Sands National Monument in New Mexico. These features look remarkably similar to features seen by the Opportunity Mars Rover. Working at White Sands and in the lab, Chavdarian found that these features only form in sulfate sand when it is damp. The work was published earlier this year in the journal *Geology*.

The presence of flowing liquid water at the surface demonstrates that Mars has an active hydrologic cycle that includes significant water exchange between the subsurface and the surface, Sumner said.

"Even though liquid water is only transiently at the surface, it probably provided some water vapor to the atmosphere through evaporation and may have produced hydrous salts in surface sediments. Such hydrous sulfate salts have been inferred to be present at both MER rover sites, with the sedimentary rocks observed by Opportunity at Meridiani Planum containing more than 50% sulfates. Graduate student Greg Chavdarian and I proposed that some of the fracturing in rocks observed by Opportunity might be due to water cycling between these hydrous

minerals and the atmosphere based on similar features in sulfate dunes at White Sands," she said.

Sumner and Chavdarian have been testing their hypothesis by monitoring water cycling in the dunes at White Sands, but it has been difficult to extend their observations to match Martian conditions because of the view that the planet is so dry. But this new work suggests that a much wetter view of the planet will emerge, Sumner said.

The presence of flowing water on the surface of Mars raises many exciting possibilities for looking for life on Mars, Sumner said.

"Life does not persist in the absence of liquid water, so many astrobiologists interested in evaluating whether or not life ever existed on Mars have focused on looking for evidence of life in ancient rocks (fossil life) or have worked towards being able to drill into the subsurface of Mars to depths where liquid water may be present. Before today, we have had scant evidence that liquid water was present at depth. Now we do. And not only do we know that liquid water exists, we know that it flows to the surface, at least locally.

"The transient presence of liquid water at the surface suggests that we may not have to go into the subsurface to look for life; evidence of life or life itself might be carried to the surface by this flowing water. The water evaporates or infiltrates rapidly enough that life is unlikely to persist on the surface, but these gullies provide us with a signal from an environment within the planet that is more likely to host life than the surface.

"The presence of liquid water does not mean that life exists on Mars, but liquid water is essential for life," Sumner said.

Source: University of California - Davis