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# Studies find the toxic xide of Martian dust storms

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This is an artist's concept of an electrically-charged dust storm on Mars. The "+" and "-" symbols represent positive and negative electric charges, respectively.



By Tariq Malik, SPACE.com

Dust storms raging across the surface of Mars may wield toxic chemicals that could poison any forms of life as we know it on the planet's surface, according to two NASA-sponsored studies.

Small dust devils and planet-wide storms – combined with static electricity – may lead to the formation of hydrogen peroxide and other corrosive chemicals that fall to the Martian surface as a sort of toxic snow, the reports stated.

"We are trying to look at the features that make a planet habitable or uninhabitable, whether for life that developed there or life that we bring there," said one study's lead author Gregory Delory, a University of California, Berkeley physicist, in a statement.

Delory and his colleagues found that Martian dust storms, like their Earthly counterparts, can generate electric fields that rip apart water and carbon dioxide molecules in the planet's thin atmosphere. Those molecules would then be free to form hydrogen peroxide and other toxic oxidants that could scour the Martian surface of any organic molecules crucial for the formation of life.

A second study, led by University of Michigan researcher Sushil Atreya, found that the levels of hydrogen peroxide that could coalesce from Martian dust storms would be high enough to condense into snow that could blanket the surface below.

"As a consequence, any nascent life (microorganisms, for example) or even prebiotic molecules, would find [it] hard to get a foothold on the surface of Mars, as the organic material would have been scavenged by the surface oxidants," said Atreya, a professor with the university's Department of Atmospheric, Oceanic and Space Sciences, in a statement.

Both studies – which drew on Earth dust storm observations, computer models and lab experiments – appeared in a recent issue of the journal *Astrobiology*. They were conducted for NASA's Goddard Space Flight Center and the agency's Mars Fundamental Research Program.

Planetary scientists have long known that Mars' surface presents a hostile environment for life to take root, though observations by NASA's hardy Spirit and Opportunity rovers and other probes still exploring the red planet today have found signs that water once wet the surface long ago. Some spacecraft – including Europe's Mars Express and NASA's recently arrived Mars Reconnaissance Orbiter – are using radar to probe beneath the planet's surface for caches of liquid or ice water, which scientists believe is an essential ingredient for the formation of life.

Meanwhile, the studies led by Delory and Atreya may help answer one long-lasting riddle of Mars exploration.

NASA's two Viking landers found conflicting results when they tested Martian soil for signs of life in the mid-1970s. The landers added water and nutrients to Martian dirt to see if it contained any microorganisms. One instrument watched the nutrients as something broke them down, but another recorded no signs of organic matter in the Martian material.

The presence of hydrogen peroxide or ozone in the Mars dirt could have fooled the Viking instruments by producing reactions similar to that expected from microorganisms, researchers said, adding that the substance could also break down

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methane seen in the Martian atmosphere.

"The presence of peroxide may explain the quandary we have had with Mars, but there is still a lot we don't understand about the chemistry of the atmosphere and the soils of the planet," Delory said.

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