Martian dust storm threatens rovers' survival

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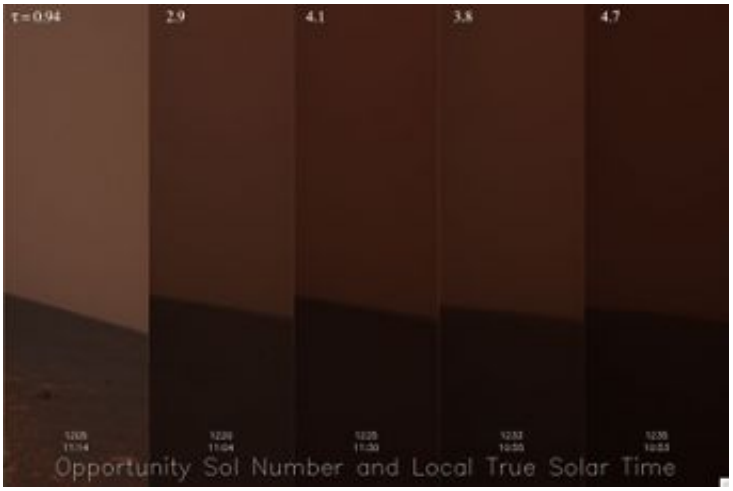

This photo, taken by the rover Opportunity, shows the Martian sky darkening over the first 30 Martian days of the storm. The number at the top of each frame is the opacity measurement (higher numbers mean dustier skies), and the numbers at the bottom are the mission sol (Martian day) number and local time on Mars. Credit: NASA/JPL/Cornell

In the three-and-a-half years that they've been on Mars, the NASA rovers Spirit and Opportunity have never seen anything like this: a large-scale dust storm that has darkened the skies and put the rovers in the gravest danger they have yet faced.

Severe winds started brewing across Mars almost a month ago, kicking up dust that prevents light from reaching the rovers' solar panels. While the dust in the atmosphere coats the planet with about the same thickness

as a human hair, it has blocked 99 percent of direct sunlight to Opportunity. The rover now relies mostly on light scattered from the dust in the atmosphere to power it, and it's getting less than 25 percent of the power from its solar panels than before the storm.

Spirit, which is on the other side of the planet, has fared slightly better. For the past week, though, both rovers have had to stop driving and limit their science observations to conserve power. If the skies continue to darken over an extended period, they may not be able to generate enough power to stay warm and operate at all.

"It's fair to say this is the most dangerous situation we've faced with either rover since the beginning of the mission," said Jim Bell, Cornell associate professor of astronomy and Pancam lead scientist. "No one really knows how long the vehicles can survive with such little power," he said.

There is no storm activity directly over the rover sites right now, but Martian weather is variable and unpredictable, and Mars could remain shrouded in dust for a long time.

"Dust activity is now taking place over much of the planet, and chances are good that it will do so for weeks to come ... maybe even as long as a few months," said Steve Squyres, Cornell's Goldwin Smith Professor of Astronomy and principal investigator of the Mars Exploration Rover mission. "So there's a chance that we are looking at a significant period of low activity for both vehicles. The good news is that both rovers are very clean and in good health, and poised to do good science when there's enough power to do so."

The storm hit at an extremely inopportune time -- right when both rovers were positioned to study some of the most intriguing targets they have seen to date. Opportunity has been perched at the rim of Victoria Crater,

waiting to descend its steep slopes and study the rocks exposed in the crater walls. To get to Victoria, the rover spent years driving the five miles from its landing site. Spirit has been in the vicinity of the Home Plate feature, planning to study its layered outcrops, which may reveal evidence of past volcanic activity.

When the storm clears, engineers at NASA's Jet Propulsion Laboratory will assess how much of the planned science each rover can perform.

In the meantime, Sprit and Opportunity have to, well, wait for the dust to settle.

Source: Cornell University