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Astronomy

Martian sand dunes: blowing in the wind

First observed by a spacecraft in 1972, sand dunes are common over most of Mars. What hasn't been clear, however, is whether today's extremely thin Martian atmosphere could sculpt these features, or whether dunes could be relics from a time when the atmosphere was denser and wind could blow sand more easily.

Viewing the north polar region of Mars, an orbiting craft has found the first evidence that the appearance of sand dunes has changed over a matter of months. The snapshots, taken by Mars Global Surveyor, suggest that gusts of wind have recently blown sand across the frost-covered polar dunes, leaving streaks of freshly deposited sand over the frost.

Surveyor took the images from July through September, when its elliptical orbit brought it within 500 kilometers of the surface of the north polar region. The first images showed that the dunes had a thin coating of bright frost, a holdover from the northern winter that had ended just weeks earlier.

Some of the dunes have dark spots, with dark streaks emanating from them. Members of the Surveyor camera team, which includes Kenneth S. Edgett and Michael Malin of Malin Space Science Systems in San Diego, propose that the dark spots represent sites where gusts of wind have removed the frost and exposed dark sand beneath it. The streaks, they argue, consist of sand blown from the exposed patches. The wind gusts could reach 40 meters per second, Malin estimates.

The movement of Martian sand intrigues planetary scientists because it could be a prelude to the dust storms that sometimes engulf the planet. According to Malin, dust particles tend to stick together and hug the planet's surface too closely to be picked up by Martian winds. However, sand that

bounces along the surface could propel the dust into the atmosphere, allowing winds to carry it far and wide.

Edgett presented his team's findings on Oct. 29 in Toronto at the annual meeting of the Geological Society of America. —R.C.

Solar observatory almost fully recovered

SOHO is back in business. More than 4 months after ground controllers lost contact with the Solar and Heliospheric Observatory on June 24 and the craft spun out of control, all 12 of the satellite's instruments have been switched on and nearly all detectors are functioning.

The process of restoring power to instruments began Oct. 5, 2 weeks after controllers were able to point the craft back in its proper direction and place it in its proper orbit (SN: 8/8/98, p. 91). On Nov. 4, a device that analyzes the sun's ultraviolet light became the last of the 12 instruments to resume operation, says Bernard Fleck, the European Space Agency's SOHO project scientist, who is based at NASA's Goddard Space Flight Center in Greenbelt, Md.

Scientists had feared that some of the detectors, which were exposed to temperatures as low as -120°C and as high as 110°C during the time that the craft was without power, would not survive.

One of three detectors that image the sun's outer atmosphere, or corona, and one of two detectors that measure the solar wind are not functioning properly, says Joseph B. Gurman, NASA's SOHO project scientist at Goddard. He notes, however, that the exposure to high temperatures has improved by 60 percent the sensitivity of solid-state detectors on SOHO's extreme-ultraviolet-imaging telescope. —R.C.