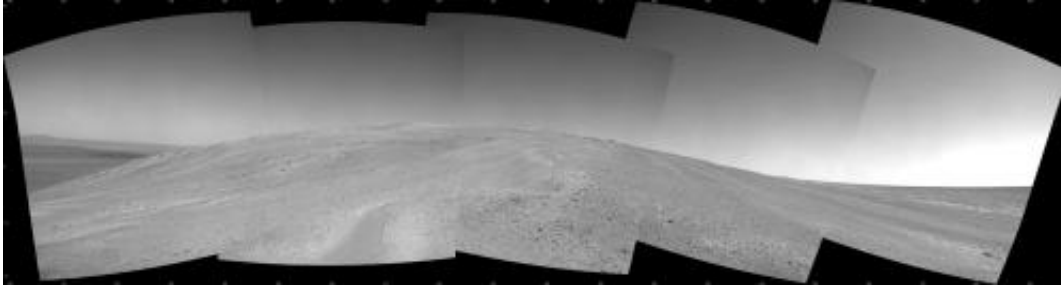


# Mars rover Opportunity heads uphill

October 24 2013

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NASA's Mars Exploration Rover Opportunity captured this southward uphill view after beginning to ascend the northwestern slope of "Solander Point" on the western rim of Endeavour Crater. Credit: NASA/JPL-Caltech

(Phys.org) —NASA's Mars Exploration Rover has begun climbing "Solander Point," the northern tip of the tallest hill it has encountered in the mission's nearly 10 Earth years on Mars.

Guided by mineral mapping from orbit, the rover is exploring outcrops on the northwestern slopes of Solander Point, making its way up the hill much as a field geologist would do. The outcrops are exposed from several feet (about 2 meters) to about 20 feet (6 meters) above the surrounding plains, on slopes as steep as 15 to 20 degrees. The rover may later drive south and ascend farther up the hill, which peaks at about 130 feet (40 meters) above the plains.

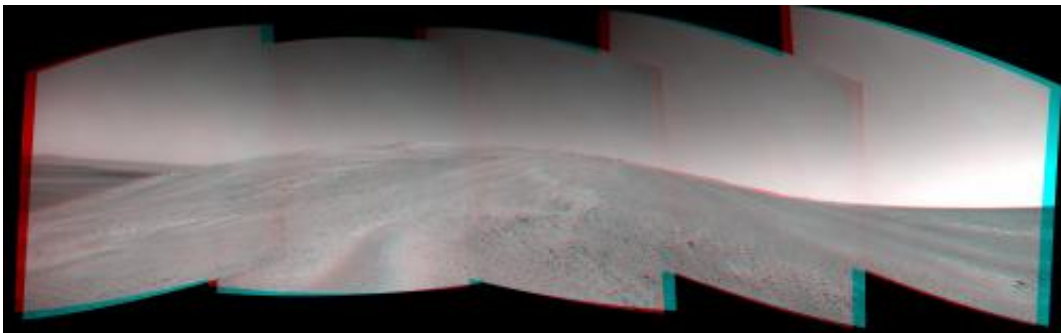
"This is our first real Martian mountaineering with Opportunity," said the principal investigator for the rover, Steve Squyres of Cornell

University, Ithaca, N.Y. "We expect we will reach some of the oldest rocks we have seen with this rover—a glimpse back into the ancient past of Mars."

The hill rises southward as a ridge from Solander Point, forming an elevated portion of the western rim of Endeavour Crater. The crater spans 14 miles (22 kilometers) in diameter. The ridge materials were uplifted by the great impact that excavated the crater billions of years ago, reversing the common geological pattern of older materials lying lower than younger ones.

Key targets on the ridge include clay-bearing rocks identified from observations by the Compact Reconnaissance Imaging Spectrometer for Mars, which is on NASA's Mars Reconnaissance Orbiter. The observations were specially designed to yield mineral maps with enhanced spatial resolution.

This segment of the [crater](#)'s rim stands much higher than "Cape York," a segment to the north that Opportunity investigated for 20 months beginning in mid-2011.



NASA's Mars Exploration Rover Opportunity captured this stereo view after beginning to ascend the northwestern slope of "Solander Point" on the western rim of Endeavour Crater. The image appears three-dimensional when viewed through red-blue glasses with the red lens on left. Credit: NASA/JPL-Caltech

"At Cape York, we found fantastic things," Squyres said. "Gypsum veins, clay-rich terrain, the spherules we call newberries. We know there are even larger exposures of clay-rich materials where we're headed. They might look like what we found at Cape York or they might be completely different."

Opportunity reached Solander Point in August after months of driving from Cape York. Researchers then used the rover to investigate a transition zone around the base of the ridge. The area reveals contact between a sulfate-rich geological formation and an older formation. The sulfate-rich rocks record an ancient environment that was wet, but very acidic. The contact with older rocks may tell researchers about a time when environmental conditions changed.

Opportunity first explored the eastern side of Solander Point, then drove back north and around the point to explore the western side. "We took the time to find the best place to start the ascent," said Opportunity's project manager, John Callas of NASA's Jet Propulsion Laboratory, Pasadena, Calif. "Now we've begun that climb."

The rover began the climb on Oct. 8 and has advanced farther uphill with three subsequent drives.

"We're in the right place at the right time, on a north-facing slope," Callas said. In Mars' southern hemisphere, a north-facing slope tilts the rover's solar panels toward the sun during the Martian winter, providing an important boost in available power.

During the most recent of the five winters that Opportunity has worked on Mars, the rover spent several months without driving, safe on a small, north-facing patch of northern Cape York. The area where the rover is

now climbing, however, offers a much larger north-facing area, with plenty of energy-safe ground for the rover to remain mobile. Opportunity is currently at a northward tilt of about 17 degrees.

In the coming Martian winter, daily sunshine will reach a minimum in February 2014. The rover team plans a "lily pad" strategy to make use of patches of ground with especially favorable slopes as places to recharge the rover's batteries between drives.

Opportunity landed on Mars on Jan. 25, 2004 (Universal Time and EST; Jan. 24, PST), three weeks after its twin, Spirit. Spirit was the first Martian mountaineer, summiting a 269-foot (82-meter) hill in 2005. Spirit ceased operations in 2010. NASA's newest Mars [rover](#), Curiosity, landed in 2012 and is currently driving toward a 3-mile-high (5-kilometer-high) mountain.

Recent drives by Opportunity and Curiosity have taken the total distance driven by NASA's four Mars rovers (including Sojourner in 1997) past 50 kilometers. The total on Oct. 21 was 31.13 miles (50.10 kilometers), including 23.89 miles (38.45 kilometers) by Opportunity.

Provided by NASA

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