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Curiosity rover gulps Mars air, finds hint of vanished atmosphere

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NASA's Curiosity rover on Oct 31. The mosaic shows the rover at "Rocknest," the spot in Gale Crater where the mission's first scoop sampling took place. Four scoop scars can be seen in the regolith in front of the rover. (NASA/JPL-Caltech/Malin Space Science Systems / EPA / November 2, 2012)

Your Host



Jon Bardin is blogging for Science Now while finishing his doctorate in neuroscience at the Weill Cornell Graduate School of Biomedical Sciences. He covered science for The Times in the summer of 2012 as an AAAS Mass Media fellow. When not posting here or revising his dissertation, you can probably find him running 16 miles, eating northern Thai food or in his closet brewing beer. [@jon_bardin](#)

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NASA Curiosity rover wiggles toes in Mars sand (before eating it)

By Amina Khan
Los Angeles Times
November 2, 2012 | 4:29 p.m.

NASA's Curiosity rover has gulped in Martian air but failed to find methane – a gas linked to living things. But it has turned up signs that Mars may have lost much of its original atmosphere.

Since landing on the Red Planet's surface Aug. 5, the Mars Science Laboratory rover has zapped rocks with its laser, dug its toes into sand dunes at its current location, Rocknest, and even scooped up Martian soil for a little taste in its laboratory belly. Now it has breathed in the Martian atmosphere, looking for clues as to the composition of Mars' atmosphere.

Mars' atmosphere is very thin – a mere 100th the density of the Earth's – and too thin to easily support life. But planetary scientists think the atmosphere was once much thicker – and they want to find out why so much of it disappeared.

For this exercise, the rover used the Sample Analysis at Mars suite. Though it's one of the two instruments in the payload that is famous for being able to ingest dirt, it can also analyze gasses.

"SAM can take many different types of measurements," said Laurie Leshin of the Rensselaer Polytechnic Institute, a SAM co-investigator. "I think of it like a Swiss Army knife: It's a

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Curiosity bites into Mars, and it tastes like Earth

beautifully integrated set of tools that can do many jobs ... and of course it's right there in Curiosity's pocket."

SAM contains three instruments. One of them, a Quadrupole Mass Spectrometer, found that the carbon dioxide in Mars' atmosphere had a 5% increase in the share of heavier carbon isotopes than when the planet first formed. The scientists took this as a sign that upper atmospheric layers, carrying carbon dioxide with the lighter carbon isotopes, were blown off, while the lower layers containing more gas with heavier carbon isotopes stayed behind.

Though they're not sure how much of the atmosphere was lost, said Leshin, it could possibly be more than half the carbon dioxide in Mars' atmosphere and near-surface reservoirs.

That could be a pretty significant share of air, given that – as measured by SAM – the Martian atmosphere is 95.9% carbon dioxide.

Scientists had also been itching to use SAM's Tunable Laser Spectrometer to get a whiff of methane, which would indicate that living things were at some point hard at work.

"Everybody is excited about the possibility of methane on Mars because life as we know it produces methane -- and indeed 90% to 95% of all methane in the Earth's atmosphere is biologically derived," said SAM co-investigator Sushil Atreya, of the University of Michigan in Ann Arbor.

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For the moment, however, the methane measurements were a bust.

"At this time we don't have a positive detection of methane on Mars ... but that could change over time," Atreya said.

Curiosity will continue to take lungfuls of air as it makes its way on its two-year mission toward Mt. Sharp, a 3-mile-high mound in the middle of Gale Crater whose layers may hold clues revealing whether Mars was ever hospitable to life. In the meantime, scientists are looking forward to SAM taking in its first mouthful of dirt in the coming weeks.

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