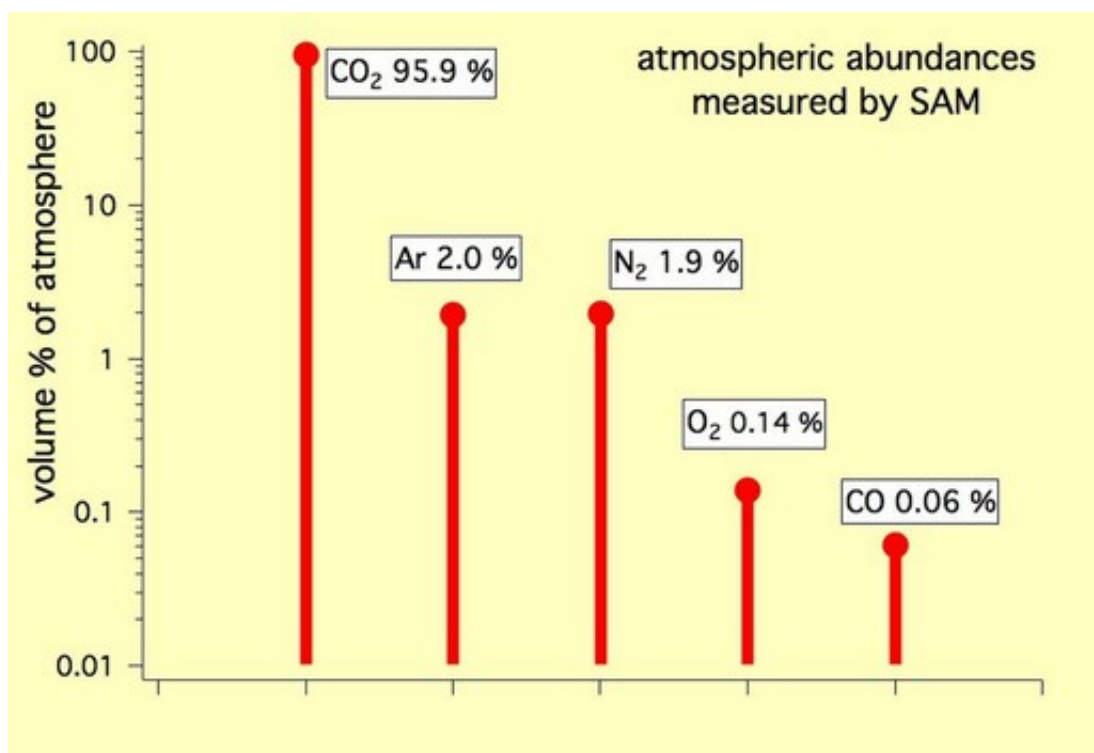


Curiosity rover raises questions about methane on Mars

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Graph showing abundances of gases in the Martian atmosphere at Gale crater.

Credits: NASA / JPL-Caltech / SAM / GSFC

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In a much-anticipated news briefing today, scientists with the Curiosity rover mission provided an update on studies done so far about the Martian atmosphere. The biggest question on many people's mind was, "has Curiosity detected methane yet?" On Earth, about 95% of the methane in the atmosphere is produced by microbes and most of the rest by active geology.

Previous detections of methane have been reported by various Earth-based observations of [Mars](http://www.examiner.com/topic/mars) (http://www.examiner.com/topic/mars) as well as from orbit. The results have been hotly debated for years, and it was hoped that Curiosity could answer the question one way or the

other, as it is able to detect the gas in very tiny amounts.

The answer today? [Well, no - not yet. \(http://mars.jpl.nasa.gov/msl/news/whatsnew/index.cfm?FuseAction=ShowNews&NewsID=1388\)](http://mars.jpl.nasa.gov/msl/news/whatsnew/index.cfm?FuseAction=ShowNews&NewsID=1388) The Tunable Laser Spectrometer (TLS) instrument on the rover, part of the Sample Analysis at Mars (SAM) set of instruments, did not detect any methane down to about 5 parts per billion.

As SAM TLS lead Chris Webster of NASA's Jet Propulsion Laboratory stated: "Methane is clearly not an abundant gas at the Gale Crater site, if it is there at all. At this point in the mission we're just excited to be searching for it. While we determine upper limits on low values, atmospheric variability in the Martian atmosphere could yet hold surprises for us."

"At this time, we don't have a positive detection of methane on Mars," said SAM co-investigator Sushil Atreya. "But that could change over time, depending on how methane is produced and how it is destroyed on Mars."

So how does this correlate with previous findings? For starters, this is only the first analysis of more to come, at different times of the year on Mars. This is important, as previous studies have suggested the amount of methane in the atmosphere varies greatly by season, with a peak during the summer. Right now at Gale crater it is the equivalent of late October or early November on Earth.

Also, the previous studies have shown the methane to be concentrated at three "hot spot" locations in the northern hemisphere. Gale crater is in the southern hemisphere near the equator and is not close to any of the methane hot spots. In these hotspots, methane has been measured in quantities as high as 40-50 parts per billion.

As noted during the press conference, any methane released into the atmosphere should get distributed globally by wind, but the amounts, especially at this distance away and time of year now, may be much, much less than at the original hot spot locations. It could easily be below the 5 parts per billion level by now.

It is also thought that any methane in the atmosphere gets destroyed by ultraviolet radiation quite quickly, so any methane present must be recent and from a replenishing source.

Curiosity will continue to do further analysis in the coming months and years, increasing the level of sensitivity as it does so, to hopefully make a detection in these smaller amounts if the methane does indeed exist.

In related atmospheric studies, it was also announced that other SAM results indicate an increase of five percent in heavier isotopes of carbon in the atmospheric carbon dioxide as compared to the isotopic ratios estimated to be present when Mars first formed. This indicates, as have earlier findings, that Mars has lost much of its original atmosphere over time.

The amounts of the most abundant gases at the Gale crater location were found to be Carbon dioxide (95.9%), Argon (2%), Nitrogen (1.9%), Oxygen (0.14%) and Carbon Monoxide (0.06%).

So the question of Martian methane still remains, but hopefully Curiosity will be able to provide further clues as

it continues its exciting mission.

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