

Life on Mars hopes fade after methane findings (Update)

September 19 2013, by Jean-Louis Santini

Hopes of finding life on Mars suffered a setback after new findings from NASA's Curiosity rover detected only trace amounts of methane gas in the Red Planet's atmosphere, a study said Thursday.

In the past decade, scientists have reported large "plumes" of methane in the Martian atmosphere, findings that have remained controversial because they were made on the basis of observations from Earth or an orbiting satellite.

Researchers said in March 2003 that they had found a cloud near the Martian equator containing some 19,000 tons of methane, considered a key indicator of microbial life.

However, analysis of data from Curiosity's onboard instruments shows only trace amounts of methane in Mars's atmosphere.

Scientists said Curiosity's findings indicated that the maximum level of methane was 1.3 parts per billion by volume—about six times lower than previous estimates.

The low atmospheric methane level greatly reduces chances that Martian soil contains living microbes or organic fossil materials that would produce the gas, scientists said.

Michael Meyer, NASA's lead scientist for Mars exploration, did not definitively rule out the possibility of finding life in the planet's soil

following the methane findings.

"This important result will help direct our efforts to examine the possibility of life on Mars," he said.

"It reduces the probability of current methane-producing Martian microbes, but this addresses only one type of microbial metabolism. As we know, there are many types of terrestrial microbes that don't generate methane."

The findings also reduce the likelihood of significant levels of methane being produced geologically or from meteorites, according to California Institute of Technology researcher Christopher Webster, co-author of the study published in the journal *Science*.

"It would have been exciting to find methane, but we have high confidence in our measurements, and the progress in expanding knowledge is what's really important," said Webster of NASA's Jet Propulsion Laboratory in Pasadena, California.

"We measured repeatedly from Martian spring to late summer, but with no detection of methane."

Previously identified methane plumes may have been the result of misinterpretation of observations, including those made from Earth-based telescopes, according to the researchers.

One of the study's co-authors, Sushil Atreya of the University of Michigan, said the fact that so little methane was found in the atmosphere strongly suggested very little was being produced.

"There's no known way for methane to disappear quickly from the atmosphere," Atreya said.

"Methane is persistent. It would last for hundreds of years in the Martian atmosphere.

"Without a way to take it out of the atmosphere quicker, our measurements indicate there cannot be much methane being put into the atmosphere by any mechanism, whether biology, geology or by ultraviolet degradation of organics delivered by the fall of meteorites or interplanetary dust particles."

Curiosity, which touched down on the Martian equator in August 2012, has already established that Mars may have been hospitable to microbial life in the distant past.

In recent weeks, the robot has begun trundling on a five-mile (eight-kilometer) journey toward Mount Sharp, the two-year mission's main target for exploration.

The journey is expected to take several months, with Curiosity stopping along the way to analyze geological formations.

The foot of Mount Sharp is of particular interest because sedimentary layers may reveal when Mars was suitable for life, according to NASA.

More information: "Low Upper Limit to Methane Abundance on Mars," by C.R. Webster et al *Science*, 2013.

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