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Destruction of Martian methane may be bad news for life

21:31 05 August 2009 by [Jessica Griggs](#)
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Methane gas on Mars may be destroyed 600 times faster than it is on Earth – and possibly in as little as one hour, new calculations suggest. If so, whatever process is responsible for the destruction may be wiping out other organic molecules, which are necessary for life as we know it.

In 2003, researchers [detected](#) methane on Mars. Since sunlight destroys methane on Earth in about 330 years, the discovery suggested that the gas was being replenished by geological processes or possibly even methane-producing [bacteria](#).

The mystery deepened when researchers reported that the methane is not spread evenly through the atmosphere, but is [concentrated in certain areas](#). That is a puzzle because atmospheric currents are expected to spread the gas evenly around the planet in a matter of weeks or months.

To see if these methane pockets could be explained by atmospheric chemistry, Franck Lefevre and Francois Forget of the [Pierre and Marie Curie University](#) in Paris tried to recreate the observations with a global climate model that accounted for the winds, turbulence and chemistry of all the known compounds in the Martian atmosphere.

But the model, which was based on methane's behaviour on Earth, failed to generate the pockets of methane gas observed, even though it perfectly reproduced the observed distribution of other atmospheric gases.

By introducing idealised methane molecules, or 'tracers', with lifetimes ranging from a few days to thousands of years into the model, the team found that the only way to reproduce the observations was to have an intense source of methane that is destroyed within 200 terrestrial days – 600 times faster than on Earth.

Extreme process

Methane is the simplest organic molecule, so if something is destroying it, then other, more complex organic molecules could suffer the same fate.

The nature of this destructive mechanism is still a mystery. Theories range from [electrochemical processes caused by dust storms in the atmosphere](#) to a reaction with oxidants, such as hydrogen peroxide or [perchlorates](#), in the soil.

In the latter case, the team estimated that methane would only be destroyed in the 10 metres directly above the surface. That limitation means the



Methane on Mars may be destroyed in as little as one hour, according to new calculations, but it's not clear how (Image: NASA/ESA/Hubble Heritage Team/STScI/AURA/J. Bell/Cornell University/M. Wolff/Space Science Institute)

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destruction process would have to be even more extreme – occurring in as little as one hour – to explain the observations.

"This would leave little hope that life as we know it can exist at present or that evidence of past life can be preserved in the shallow surface layer," the authors write in the new study.

Uncertain timescale

Sushil Atreya of the University of Michigan favours the soil scenario, with peroxide acting as the oxidant, since it can transform into even more reactive molecules, such as superoxides, which would destroy methane or organics even faster.

But he remains unconvinced about the calculated timescale of the destruction. "Whether the lifetime of methane is really one hour or one year is debatable," Atreya told *New Scientist*. "The quality of the [observational] data is not good enough to nail the lifetime that accurately."

Lefevre too admits that some of his results are extreme: "It's hard to imagine that methane could be destroyed in one hour without the other gases also being affected," he says. "Our first priority should be the confirmation of the methane variation."

Further observations of Mars's methane are planned for later this year. And future landers, including the Mars Science Laboratory set to launch in 2011, will study the Martian soil to find out if it contains oxidants such as hydrogen peroxide, which has been found in small amounts in the planet's atmosphere.

Journal reference: *Nature* (vol 460, p 720)

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Me

Wed Aug 05 23:22:17 BST 2009 by **Pineapple Jo**

I could supply the planet with more then enough methane... Ifthey ask nicely

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Me

Thu Aug 06 11:57:54 BST 2009 by [lord_vetinari](#)

@Jo, no thx

we don't want future mars colonizers asking "why does it smell so much here?"

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So If You Think, Like, _hard_ About It

Wed Aug 05 23:49:52 BST 2009 by [Pelotard](#)

If it's destroyed in 1/600th the time it takes on Earth, it must mean that 600 times more of it is produced than they originally thought, right? And as I recall, geological processes were struggling to churn it out at the rate originally inferred. So if you stop to think _twice_, this is _good_ news for the hypothesis that there's life on Mars

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So If You Think, Like, _hard_ About It

Thu Aug 06 00:38:14 BST 2009 by [MC_Anon](#)

Actually, there are several possibilities for interpreting this result. One could be as you postulated, another could be an organic process such as a small, localised, symbiotic eco-system of methane producers and more importantly methane consumers. Similar things happen here on earth where localised eco-systems exist around the thermal vents on the sea bed.

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So If You Think, Like, _hard_ About It

Thu Aug 06 12:08:03 BST 2009 by [JDB](#)

'Since sunlight destroys methane on Earth in about 330 years'. How much methane are we talking about exactly? surely it takes a different amount of time for say a gram than a hundred thousand tonnes?

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So If You Think, Like, _hard_ About It

Fri Aug 07 12:31:03 BST 2009 by [waqar](#)

not precisely, since this article only speaks about destruction, which means when it is produce. So when it produce it just destroyed in just 1 hr. Which is actually bad news, since it could hurt the plans of colonies at mars, and process delay for another 60 yrs or so, just to solve this problem

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not precisely, since this article only speaks about destruction, which means when it is produce. So when it produce it just destroyed in 1 hr. Which is actually bad news, since it could hurt the plans of colonies at mars, and process delay for another 60 yrs or so, just to solve this problem

[reply](#) [report this comment](#)[view thread](#)**Send A Robot**Thu Aug 06 02:00:28 BST 2009 by **michael vederman**
<http://www.deadmike.com>

Why don't they send a robot that partially runs on methane to research the methane? Imagine how much science they could get!

[reply](#) [report this comment](#)**Send A Robot**Thu Aug 06 02:30:30 BST 2009 by **W-Den**

ka-boom

I'm participating in a scientific debate.

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It would have to bring it's own supply of oxygen, either to burn the methane directly or to use it in a fuel cell.

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Yes and they'd have to carry lots of matches too.

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