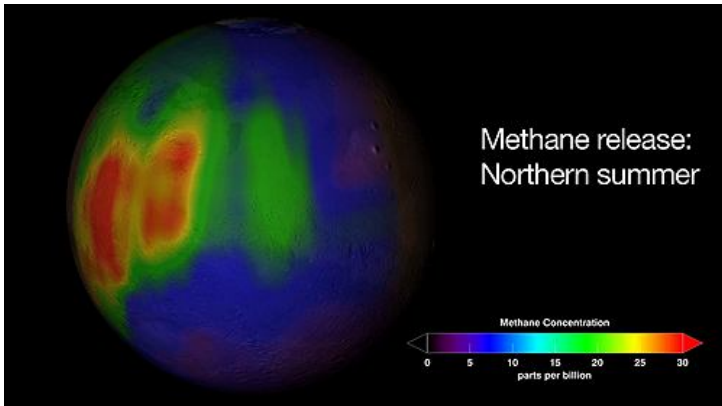


# Plumes of methane gas found on Mars

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This undated handout visualization provided by NASA shows a methane plume found in Mars' atmosphere during the northern summer season. A surprising and mysterious belch of methane gas on Mars hints at possible microbial life underground, but also could come from changes in rocks, a new NASA study found.

in a briefing at NASA headquarters in Washington. But its existence proves that Mars is not the dead desert planet that many scientists thought it was.

"Mars is active," said Michael Meyer of NASA's Mars program. "Whether it's geology or biology, we don't yet know."

On Earth, the natural gas that heats our homes is mostly methane. About 90% of the methane released into our atmosphere is produced by biological processes, the largest contributors being bacteria in wetlands and the burping of cattle. The methane is released as a waste product by microbes reacting to hydrogen.

But methane is not a surefire indicator of life. Geological processes such as the interaction of water and molten rock in volcanoes can produce methane. On Titan, Saturn's largest moon, liquid methane is so plentiful it flows in rivers. Titan is so cold that it is extremely unlikely that living organisms are producing the methane.

Although they cautioned that more work is needed, the scientists said the absence of other gases that would be expected if volcanic activity was producing the methane is one indicator that organisms could be at work.

"This is exciting to think about in terms of life on Mars," said Lisa Pratt, a geologist at the University of Indiana. "Given the lack of compelling evidence of heating and faulting, it's prudent for us to begin to explore Mars looking for life-forms that are exhaling methane."

Getting to the source may be difficult. Pratt said that if the gas is biologically produced, the source must be underground, perhaps several miles deep, away from surface oxidants that would destroy the methane.

According to Pratt, the Martians that humans have imagined for centuries may wind up being nothing more than a thin film of bacteria clinging to life in some underground caverns where there is just enough heat from the planet's core to melt the surrounding ice.

Along with the ground-based telescopes, Europe's Mars Express spacecraft tracked three methane plumes, beginning in 2003. Over the next few years, Mumma said, they were able to pinpoint several possible emission sources in both the northern and southern hemispheres. Plumes were located near the Martian regions known as Arabia Terra, Nili Fossae and Syrtis Major.

Since the production of methane requires water, scientists said there must be some source in those areas.

Ancient Mars is known to have been a wet place, with rivers and shallow seas. But most scientists believe the surface has been dry and inhospitable to life as we know it for billions of years.

Between 2003 and 2006, the size of the methane plumes decreased, raising the possibility that the release in 2003 was a one-time event that persisted through 2006.

One theory is that a comet deposited the methane when it collided with Mars. That's considered unlikely because the amount of methane measured on Mars would require a comet several miles across, an event that astronomers probably would have noticed.

Similarly, the winds on Mars, which can produce planetwide dust storms, would have dispersed the methane over the entire planet between 2003 and 2006 if the gas release was a single explosive event.

Scientists think the methane could be released on a seasonal basis from certain discrete locations on the planet, presumably where cracks in the surface allow venting from the planet's interior.

If the source of the methane is biological, it might be analogous to permafrost on Earth, the scientists say. Each summer microorganisms frozen in the arctic tundra thaw just enough to release significant amounts of methane.

The same process could be responsible for methane releases on Mars. But the amount released would be a thousand times less than the quantity released on Earth each summer, the scientists said.

If the methane is being produced by living organisms, there should be evidence of other complex organic molecules in the atmosphere, Pratt said.

Mumma said research was continuing, using the adaptive optics technology at the European Southern Observatory, to get a better fix on Mars' chemistry.