# Methane found in desert soils bolsters theories that life could exist on Mars

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Evidence of methane-producing organisms can be found in inhospitable soil environments much like those found on the surface of Mars, according to experiments undertaken by scientists and students from the Keck School of Medicine of the University of Southern California and the University of Arkansas and published online in the journal *Icarus*.

These results, they say, provide ample impetus for similar "biodetection experiments" to be considered for future missions to Mars.

"Methane-producing organisms are the ones most likely to be found on Mars," notes Joseph Miller, Ph.D., associate professor of cell and neurobiology at the Keck School and one of the study's lead researchers. "And, in fact, methane was detected on Mars last year."

Methane is considered to be a biological signature for certain living organisms that metabolize organic matter under conditions of low or no oxygen. Terrestrial methanogens (methane-producers) are typically found in environments largely protected from atmospheric oxygen, such as peat bogs, oceanic methane ices and anoxic levels of the ocean. But they had not previously been detected in an arid desert environment.

To see if methane could be found in Mars-like soil, the investigators collected soil and vapor samples from the arid environment of the Mars Desert Research Station in Utah, and then compared them with vapor samples taken from the Idaho High Desert and soil samples from Death Valley, the Arctic and the Atacama desert in Chile. Three of five vapor

samples from the Utah site showed the presence of methane; there was no methane found in any of the vapor samples from Idaho. Similarly, while five of 40 soil samples from Utah produced methane after the addition of growth medium to the samples-indicating that the methane was being given off by a biological organism, most likely a bacterium-none of the other soil samples showed signs of methane production.

Finding methane in the Utah desert is no guarantee that methane-producers exist on Mars, admits Miller, who has previously analyzed data from the Viking Lander missions and found that soil samples taken in the 1970s from the Martian surface exhibited a circadian rhythm in what appeared to be nutrient metabolism, much like that present in terrestrial microbes. However, Miller says, this recent experiment does provide "proof of principle [in that] it improves the case that such bacteria can and might exist on the Martian surface." And that, he adds, surely warrants further investigation during future missions to Mars.

In conclusion, the researchers write, "The detection of methane, apparently of biological origin, in terrestrial desert regolith bodes well for future biodetection experiments in at least partially analogous Martian environments."

Source: University of Southern California