

Study: Mars could have held watery underground oases for life

By Amina Khan

LOS ANGELES—If Mars once contained life, it might have existed in watery oases far beneath the surface, according to a new study analyzing a deep Martian crater holding signs of an ancient lake.

The research, published online Sunday in the journal *Nature Geoscience*, examined the 57-mile-wide McLaughlin Crater, which at 1.4 miles deep may have been low enough to allow underground water to well up into its bowl.

Although Mars looks like a dry, dusty planet, scientists believe the planet once held enough water that it left signs of streambeds on the surface. If Mars also held organic molecules like carbon, nitrogen, hydrogen and oxygen, it could have held locations suitable for life. NASA's Curiosity rover, which landed Aug. 5, is on a mission to search Mount Sharp in Gale Crater for just such habitable environments.

But perhaps a better place to look for microbial life would be beneath the surface, said study leader Joseph Michalski, a planetary scientist at the National History Museum in London.

"There are a lot of people who think up to half of life on Earth exists as microbes in the subsurface of the planet," Michalski pointed out.

Michalski's team analyzed data from the Mars Reconnaissance Orbiter, which revealed layers of rock at the crater's bottom rich in clays and carbonate – materials that form in the presence of water. The lake likely filled from the bottom, given that there doesn't appear to be channels funneling down into the crater. However, smaller channels within the crater end about 500 meters from the bottom, a sign of a past water line, a geological bathtub ring.

Many scientists think that the sulfates detected on the surface could be a sign of water welling up from beneath the ground. But Michalski's team argued that the sulfates could actually be indicative of a water-poor, highly acidic environment – hardly friendly to life as we know it.

Spots like McLaughlin Crater, on the other hand, are rich in clays and low in acidity – signs of a much more bio-friendly environment, he said. Such are the pockets where water (and perhaps life) could have existed, welling up from the beneath the dirt and leaving their mark on the surface, he said.

If there was a biosphere underneath the Martian terrain, the authors surmise, it would be in these rare spots of just-right conditions, rather than spread throughout the Red Planet's crust. Deep craters rich in clays, he added, would be the right places to start looking.

"It's perfectly reasonable," said Norman Pace, a biochemist at the University of Colorado who was not involved in the study. "The next step is getting samples."

Finding biological evidence on Mars, Michalski said, would help scientists on Earth who are trying to understand the origins of life. Earth has been through so much—tectonic turmoil, erosion, recycling by later life on Earth—that life's earliest history on our own planet is exceedingly difficult to trace.

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Amina Khan is a Science writer at the Los Angeles Times.