

Ancient Martian Conditions Could Have Supported Life



The space agency says rocks like these are evidence that Mars could have supported life.

From VOA Learning English, this is EXPLORATIONS, in Special English. I'm Kelly Jean Kelly.

And I'm Christopher Cruise. Today we report on recent scientific findings about the planet Mars. We tell about tests of Martian rock gathered by the American space agency's rover vehicle "Curiosity." We tell about plans to send another spacecraft and possibly human beings to the red planet. We also explain what scientists have learned from a Martian rock that was found in the Sahara Desert.

The American space agency recently reported that the planet Mars once could have supported micro-organisms, extremely small life forms. The announcement came two weeks ago, after the agency's Curiosity rover examined a rock on Mars. It was the first sample of rock powder ever collected and tested on the red planet.

Last month, space agency engineers received pictures from the rover, formerly called the Mars Science Laboratory. The images showed Curiosity

carrying rock particles.

Curiosity used a drill on its two-meter long robotic arms to cut into the rock and collect about ten grams of powder. Space agency officials called the drilling, the biggest success for the Curiosity team since the rover landed on Mars last August.

Joel Hurowitz works for the Jet Propulsion Laboratory in California. He told reporters that the Curiosity team was excited to see that the material was gray, not red -- the color normally linked to the Martian surface.

“It’s pretty exciting to us that you just sort of brush beneath this surface veneer and the rocks are a completely different color. So, we’re sort of seeing a new coloration for Mars here, and it’s an exciting one to us.”

The color orange is often a sign of oxidized iron. American scientists say oxidation destroys organic material. They say the gray coloring of the powdered rock could mean organic compounds are better-protected.

That is the sound of Curiosity’s test double, cutting a rock here on Earth. The test double is an exact copy of the vehicle on Mars.

Louise Jandura is the sample system chief engineer for Curiosity. She has been working on the project for nearly eight years. She spoke to reporters last month. She described the successes of Curiosity as historic -- both for the space program and the United States.

“This is the first time any robot, fixed or mobile, has drilled into a rock to collect a sample on Mars. In fact, this is the first time any rover has drilled into a rock to collect a sample anywhere but on Earth.”

Louise Jandura described Curiosity’s drilling equipment as a major step forward.

“It allows us to go beyond the surface layer of the rock, unlocking a kind of ‘time capsule of evidence’ about the state of Mars, going back three or four billion years.”

After the drilling was done and the powder collected, the small laboratory on Curiosity began a series of tests. Then, earlier this month, came the surprising announcement: American scientists said the test results led them to believe there was once life on Mars.

The rock sample came from an area on Mars called Yellowknife Bay. The area had some of the chemicals required to support life as we know it. They include oxygen, hydrogen, nitrogen and carbon.

Scientists believe Mars was once a warmer, wetter environment before turning into a freezing dry desert. Michael Meyer is the lead scientist of the Mars Exploration Program. He spoke at the space agency’s headquarters in Washington.

“This was an ancient environment with the right elements, minerals indicating a near-neutral environment and slightly salty liquid water, all the pre-requisites to support life -- a habitable environment.”

Researchers say the Martian bedrock showed evidence of many periods of wet conditions. And they say there are clay minerals in the rock sample. These minerals are evidence of water.

John Grotzinger is a Curiosity project scientist at the California Institute of Technology.

“Landing there and then almost right off the bat we do find evidence of water and we see an ancient river bed. We’re now finding an environment in the near subsurface, you know not too far beneath the oxidized layer, sort of a neutral rock. All the things that we were really hoping for, to find a place that could have been habitable in its past.”

He also says the water that was once on Mars would have been safe enough to drink.

“We have found a habitable environment that is so benign and supportive of life that probably if this water was around and you had been on the planet, you would have been able to drink it.”

It is important not to overstate the discovery. As the Associated Press noted, “despite the excitement over achieving one of the mission’s main goals, it has yet to find complex organic molecules considered the chemical building blocks of life.”

The six-wheeled, nuclear-powered Curiosity has been exploring within a deep, 150-kilometer-wide area called Gale Crater. Now, it will move to a place called Mount Sharp.

The project is expected to last two years and cost \$2.5 billion. Curiosity is

not designed to look for microbes that may be alive on Mars today or inspect remains of life forms that no longer exist.

Curiosity is the first Mars rover, but not the only one. The American space agency says it plans to send another rover, called Opportunity, to the red planet in 2020. Opportunity would be part of NASA's plan to explore the Martian surface and atmosphere. The agency hopes to send humans to Mars in about 20 years.

NASA has announced plans for other projects between now and 2020. They include an orbiter to study the Martian atmosphere and a probe that would take a first look at what lies under the planet's surface.

NASA's chief, Charles Bolden, says these projects ensure the United States will be the world leader in exploring Mars. He wants the space agency to take major steps in preparation for sending astronauts to the planet in 20 years.

Curiosity has been studying the atmosphere, making maps of wind and radiation patterns, and measuring changes in air pressure on Mars.

Ashwin Vasavada is the deputy project scientist for the Curiosity mission. He says the mission is mainly concerned about ancient Mars. But he says researchers also want to learn about the planet's current environment.

"And it's a pretty dynamic environment. If you were standing next to Curiosity, you'd realize you're on a planet with an atmosphere -- an atmosphere that is thick enough that when the sun heats the ground every day, gusty winds rush up and down the slopes of Gale Crater and Mount Sharp and spawn whirlwinds that sweep across the landscape. But the atmosphere isn't thick enough to shield you from the harsh ultraviolet light and the natural high-energy radiation coming in from space."

Learning about that radiation is important. So scientists placed a Radiation Assessment Detector, or RAD, on Curiosity. Don Hassler is watching the radiation levels.

"The radiation is a life-limiting factor to habitability, so we need to understand what the radiation is doing if we want to understand the prospects for both current, present, and past habitability, but we also need to understand the radiation environment. When we send astronauts to Mars in the future, we need to be able to fully-understand what the radiation is doing so that we can help plan a safe mission for those astronauts."

He adds that NASA has established a career radiation-dose limit for astronauts.

"I think it's never really been a question of if we can go to Mars. It's a matter of when we go, how do we best-protect our astronauts, and so characterizing the radiation environment in terms of the types of radiation that we observe and when it's the worst and when we'd need to take precautionary measures, I think, is one of the things that we're, we're learning from RAD."

Researchers say Curiosity is providing measurements that will help scientists design a trip by astronauts to Mars. President Obama has challenged NASA to send humans to the red planet by the 2030s.

Finally, a rock that fell to Earth from Mars has provided surprising new details about the planet. Scientists call the rock -- which weighs 320 grams - - "Black Beauty." It was discovered two years ago in the Sahara Desert.

American researchers believe the rock came either from Mars' crust or surface. They think it was formed more than two billion years ago. That would make it one of the oldest Mars meteorites ever found.

The rock contains more water than any of the other 100 meteorites known to have come from the Red Planet. The presence of water increases the possibility that life could have existed on Mars.

The researchers say the rock has given them an idea of ancient surface and environmental conditions on Mars that no other meteorite has ever offered.

The rock is composed mainly of two minerals: feldspar and pyroxene. The researchers say this suggests it was sent into space by a volcanic explosion. The chemistry is similar to what has been found on Mars by the American space agency's vehicle "Curiosity" and by orbiting satellites during recent explorations of the Martian surface.