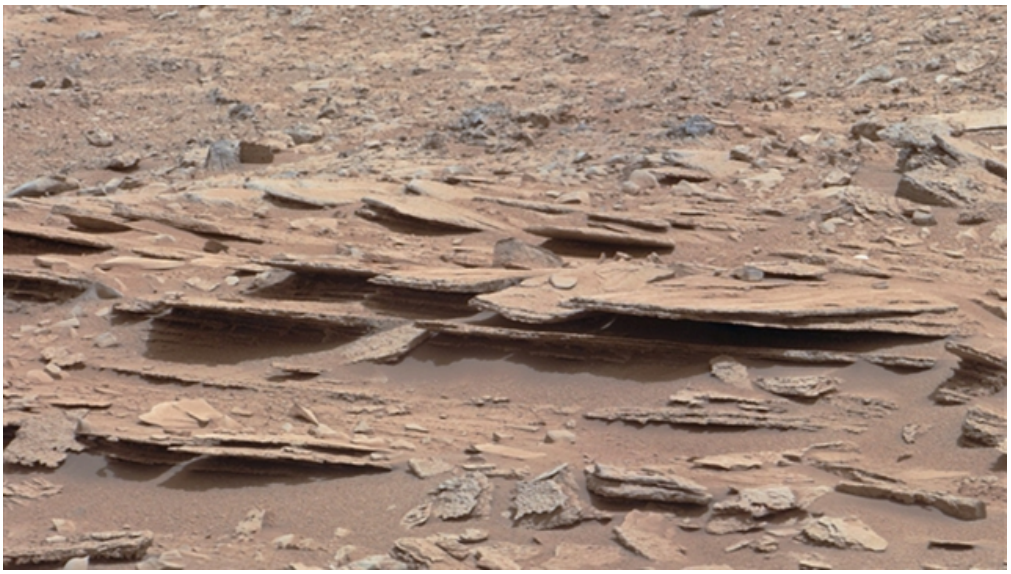
Curiosity probes Red Planet's missing atmosphere



Curiosity's view of a rock outcrop informally named 'Shaler'. Credit: NASA/JPL-Caltech/MSSS

By Elizabeth Howell 11 April 2013

(Sen) - Atmosphere bled off of Mars during its history, leaving the planet with a much thinner version today, according to new results released by the Mars Curiosity rover on the Red Planet.

The rover's Sample Analysis at Mars (SAM) instrument compared isotopes, or chemical variations, of the element argon. While the atmosphere of Mars is about 95% carbon dioxide, argon is one of the next most abunc elements, at about 2%.

SAM discovered that there is about four times as much argon-36 as a heavier version of the element, argon-38. This proportion differs from what is found on the sun and Jupiter, making scientists believe that Mars today ha different ratio of argon than the Solar System's "original ratio."

"We found arguably the clearest and most robust signature of atmospheric loss on Mars," stated Sushil Atreya, SAM co-investigator at the University of Michigan.

NASA corroborated its results with those taken during a previous set of Mars landing missions in the 1970s, Viking, as well as meteorites that fell on Earth but originated on Mars. The result from Curiosity's SAM instrument at the lower edge of the uncertainty produced in Viking's argon results, but similar to what has been found in meteorites, NASA added.

NASA will further examine the atmosphere of Mars with the Mars Atmosphere and Volatile Evolution Mission (MAVEN), a new orbiting spacecraft scheduled to launch to the Red Planet in 2013.

How Mars lost its atmosphere is still unclear, but some scientists believe that high-energy particles from the sun may have stripped electrons from atmospheric atoms and turned the atoms into charged ions. These ions wo then have been more susceptible to the attraction of magnetic fields outside of the Red Planet's atmosphere, leading to loss and potential collisions with other atmospheric particles as well. Over billions of years, this su process could have drastically changed Mars' climate.

The results play well into NASA's aim of searching for conditions of habitability on Mars, whether now or in the past, with the Curiosity mission. While the rover is not designed to search for life, it is capable of examining rocks and the atmosphere for any sorts of clues about Mars' climactic conditions in the past.

Curiosity arrived on Mars in August to begin a two-year prime mission. In September, after roving just a few metres from its landing site at Gale Crater, the rover stumbled across compelling evidence of an ancient streambed. When examining two rocky outcrops (nicknamed Link and Hottah), the rover found that many of the stones are rounded, similar to what happens when water flows over rocks during long periods of time.

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"From the size of gravels it carried, we can interpret the water was moving about 3 feet per second, with a depth somewhere between ankle and hip deep," said William Dietrich, Curiosity science co-investigator, in September.

Curiosity will take a break from science activities for the next few weeks due to interference from the sun. The planet Mars is passing nearby the sun from the perspective of Earth, which interferes with communications.

HIGHLIGHTS

Mars Curiosity discovered strong evidence of atmospheric loss on the Red Planet.

The rover discovered an imbalance in argon ratios compared to other locations in the solar system.

NASA will further probe the mystery of Mars' missing atmosphere with the forthcoming MAVEN spacecraft.

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