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Ancient Rock Shows Signs of Water on Mars: Study

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The Martian rock that meteorite hunters plucked from an Antarctic ice field 30 years ago shows a record of the planet's climate billions of years ago, back when water likely washed across its surface and any life that ever formed there might have emerged, researchers said.

"Minerals within the meteorite hold a snapshot of the planet's ancient chemistry, of interactions between water and atmosphere," said Robina Shaheen, a project scientist at University of California, San Diego, and the lead author of the report.

The stone, which fell to Earth 13 thousand years ago, looked a lot like a potato and has quite a history.

Designated ALH84001, it is the oldest meteorite from Mars, a chunk of solidified magma from a volcano that erupted four billion years ago.

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Since then something liquid, probably water, seeped through pores in the rock and deposited globules of carbonates and other minerals, researchers said.

Mars' atmosphere is mostly carbon dioxide but contains some ozone, said Shaheen, who investigated the process of oxygen isotope exchange as a graduate student at the University of Heidelberg in Germany.

The degree of isotopic weirdness in the carbonates reflects how much water and ozone was present when they formed.

It is a record of climate 3.9 billion years ago, locked in a stable mineral. The more water, the smaller the weird ozone signal, researchers said.

The team measured a pronounced ozone signal in the carbonates within the meteorite, suggesting that although Mars had water back then, vast oceans were unlikely. Instead, the early Martian landscape probably held smaller seas.

ALH84001 held tiny tubes of carbonate that some scientists saw as potential evidence of microbial life, though a biological origin for the structures has been discarded.

The research was published in the journal PNAS.

