

Study of meteorite samples is evidence that Mars has water

The abundance and origin of water on Mars underpins a number of planetary science hypotheses including crust and mantle dynamics, and even the existence of life. Researchers at Tokyo Institute of Technology, NASA, the Lunar Planetary Institute(LPI), and the Carnegie Institute of Washington analyse the geochemical and isotopic composition of two different meteorites and conclude definitively that the mantle is dry and provide the first evidence of assimilation of old Martian crust into the mantle.

Despite its crucial role in biological and geological processes, information about water on Mars is still controversial. In addition previous geochemical studies of Martian basalts (shergottites) have raised unsettled questions over the sources of the parental magmas.

Different samples of meteorites

The researchers studied two meteorites that provide different samples from the Martian mantle and crust. "There are several competing theories that account for the diverse isotopic and geochemical compositions of Martian meteorites," said Tomohiro Usui, a former NASA/LPI post-doctoral fellow who led the research. "Until this investigation there was no direct evidence that primitive Martian lavas contained material from the surface of Mars."

The researchers also report direct evidence that the dry Martian mantle retains a primordial ratio of hydrogen and its heavier isotope deuterium that is similar to the ratio in water on earth. This further implies that terrestrial planets including earth have similar water sources, which are chondritic meteorites, and not comets.

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