

Feasibility study of imagery of the Martian atmosphere

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It is almost certain that a large amount of liquid water existed on Mars from the recent observation and analysis of Mars explorers. The water existed stably in the warm environment and the high atmospheric pressure preserved by CO₂ and was considerable for the beginning of life.

However, the present Mars has a dry atmosphere with a little amount of CO₂. In order to account for the difference the escape of CO₂ from ancient Martian atmosphere, which is unsolved problem, is needed.

The dismiss of CO₂ in the atmosphere is where the CO₂ seep into the planetary body by interaction of the surface or escape to space. According to observations of Mars Express, in the ice of Martian Antarctica CO₂ existed less than the expectation. The measurements of Carbon isotope lead to an escape of the CO₂ of 40-70% to space, and the numerical simulation indicates that CO₂ over 0.1 to 1 atm escapes to space.

Because the present escaping rate is not measured, and because a mechanism of the escape is unidentified, these estimate of CO₂ escape has an ambiguity of one order. So we propose the imagery of C, CO, CO⁺, and CO₂⁺ to clarify the escape mechanisms. We think that the imaging technique is a powerful method to identify of the main escape mechanisms. The observation leads to the understanding of escape mechanisms (plasma environment), and expect to clarify the amount change and the evolution of CO₂ in the ancient Martian atmosphere.