

Feasibility study on imagery of the Mars- solar wind interaction

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Near-Mars space is quite different from near-Earth space because of the absence of a substantial intrinsic magnetic field of Mars. Without the magnetic cavity of a magnetosphere, the upper atmosphere is directly interaction with the solar wind, and the atmospheric particles escape to interplanetary space. It is almost certain that a large amount of liquid water existed on Mars from the analysis of recent observations. The liquid 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.

Because the temporal and spatial structure of the atmospheric escape is unclarified, the estimate of the present CO₂ escape rate has an ambiguity of one or two orders. So we study the feasibility of the imagery of C, CO, CO⁺, and CO₂⁺ to measure the total amount of the escaping Carbon. We think that the imaging technique is a powerful method to identify of the main escape mechanisms. The observation leads to the understanding of plasma and atmospheric environment, and expects to estimate the amount change and the evolution of CO₂ in the ancient Martian atmosphere.