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Examination of the Mars orbiter to observe the interaction between the atmosphere and solar wind

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In Japan, the Nozomi satellite was launched in 1998 to investigate the interaction between the solar wind and Martian atmosphere. However, it could not be inserted into the orbit around Mars, and the Nozomi project was terminated in December 2003. After that we do not have any project in which the solar wind - atmosphere interaction is principally aimed to be investigated. Meanwhile, Mars has been explored by many US and European satellites in these ten years. Recent Martian missions have brought new information about the distributions of water and carbon dioxide on Mars. The scientific objectives for next Martian exploration project should be defined based on these recent results.

The next Japanese project for the Mars exploration is expected to consist of two orbiters and one lander. One of the orbiters is aimed to make in-situ observation of plasma and thin atmosphere at about 100 km altitude, and the other is for the atmospheric imaging. We are planning to make simultaneous observation of the atmospheric escape by the interaction with the solar wind by both of in-situ measurement orbiter and imaging one. The sorts and performance of scientific instruments on the orbiter for the in-situ measurement is currently examined. Meanwhile, the preferable formation with the imaging orbiter as well as the method to keep the low periapsis of the in-situ measurement orbiter should be investigated.

Keywords: Mars, plasma, solar wind, spacecraft, atmospheric escape