

On the particle escape from the planetary atmosphere -Observations in the exosphere and ionosphere from Venus Climate Orbiter-

Takumi Abe[1], Venus Exploration Working Group Koh-Ichiro Oyama

[1] ISAS

<http://www.ted.isas.ac.jp/~venus/>

Thermal and non-thermal particle escape from the planetary atmosphere has been discussed for a long time because of an interest in the particle acceleration process and the atmospheric evolution. We are exploring a possibility to make direct observations of the escaping particles with some instrument on Japanese Venus Climate Orbiter, which is in expectation of being launched in 2009. We present the instruments and methodology necessary for understanding of the particle escape process and of quantitative measurement of the escape flux. In particular, it will be noticeable that the escaping process that is very different from the Earth's case may be significant, resulting from the fact that Venus has no (or very small) intrinsic magnetic field.

Thermal and non-thermal particle escape from the planetary atmosphere has been discussed for a long time because of an interest in the atmospheric evolution. There exist no definite answers to questions why a noticeable difference between the Earth and Venus in the current atmospheric composition and amount arises assuming two planets had the same primordial atmosphere. For example, the amount of water on Venus is much smaller than on the Earth, and the ratio of deuterium and hydrogen is 100 times as great as that of Earth. The observational information is absolutely needed to discuss on a particle inflow and outflow that is possible to affect the long-term atmospheric evolution.

As for the atmospheric escape from Venus, we are exploring a possibility to make direct measurements of the escaping particle process with some instruments on Japanese Venus Climate Orbiter, which is in expectation of being launched in 2007. In particular, it will be noticeable that the escaping process from Venus is significantly different from the Earth's case, resulting from the fact that Venus has no (or very small) intrinsic magnetic field. We present the instruments and methodology necessary for understanding of the particle escape process and of quantitative measurement of the escape flux.