



Venus-Solar Wind Interaction under Extremely High-density Solar Wind

K. Liu (1), R. Jarvinen (1), E. Kallio (1), H. Lammer (2), H. I. M. Lichtenegger (2), Y. N. Kulikov (3), N. Terada (4,5) and P. Janhunen (1)

(1) Finnish Meteorological Institute, Helsinki, Finland, (2) Space Research Institute, Austrian Academy of Sciences, Graz, Austria, (3) Polar Geophysical Institute, Russian Academy of Sciences, Murmansk, Russian Federation, (4) National Institute of Information and Communications Technology, Tokyo, Japan, (5) CREST, Japan Science and Technology Agency, Saitama, Japan (kaijun.liu@fmi.fi)

We have studied the Venus-solar wind interaction under extremely high-density solar wind using a three-dimensional quasi-neutral hybrid simulation model (HYB-Venus). The solar wind parameters are based on the Pioneer Venus Orbiter (PVO) observations which contain interplanetary magnetic field (IMF) observations from 1978 to 1988 and plasma observations from 1978 to 1992. Our study consists of two parts. First, we present a statistical study of the interplanetary PVO data in order to find non-typical, or “extreme”, upstream solar wind parameters. Second, we present an analysis in which an extremely high solar wind density and, consequently, an extremely high solar wind dynamic pressure, has been used in the HYB-Venus model. In the analysis a special emphasis is placed to study the O⁺ escape rate and the role of the ionosphere in the model. The present results can also be generalised to other solar systems, i.e., the exoplanet-stellar wind interactions.