EPSC Abstracts,
Vol. 4, EPSC2009-194, 2009
European Planetary Science Congress,

Structure and Dynamics of the Upper Ionosphere of Venus

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Abstract

Strong ultraviolet radiation from the Sun ionizes the upper atmosphere of Venus, creating a dense ionosphere on the dayside of the planet. In contrast to Earth, the ionosphere of Venus is not protected against the solar wind by a magnetic field. The combination of changing solar radiation and solar wind intensities leads to a highly variable structure and plasma composition of the ionosphere. The instrumentation of the Venus Express spacecraft allows for the first time to measure the vertical density profiles of the ionosphere (VeRa experiment), the magnetization (MAG experiment) and the ion composition (ASPERA experiment) of the upper ionosphere and ionopause. Observations of MAG and ASPERA will be combined to determine the position of the ionopause and its dependence on solar radiation and solar wind. Furthermore, the intensity of photoelectrons will be studied at altitudes above 180 km and the dependence of photoelectron transport on the magnetic structure will be investigated.