



## Structure and dynamics of the 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. However, the interaction between ionospheric particles and the solar wind dynamic and magnetic pressure creates a pseudo-magnetosphere which directs the solar wind flow around the planet. 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 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. These data are used to investigate the plasma environment of Venus in detail. In contrast to the earlier PVO measurements which were conducted during solar maximum, the solar activity is currently very low. This allows for a comparison of ionospheric properties under different solar wind and EUV radiation conditions. Observations of MAG and ASPERA have been analyzed to determine the positions of the ionopause and magnetic barrier and their dependence on the solar zenith angle. It is of particular interest to explore the different magnetic states of the ionosphere, since these influence the local plasma conductivity, currents and ultimately the escape of electrons and ions. The penetration of magnetic fields into the ionosphere depends on the external conditions as well as on the ionospheric properties. We found that the average magnetic field inside the ionosphere corresponds well to the magnetic field in the region directly above the ionopause.