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The Venusian magnetosphere: past, present and future

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Abstract

At Venus, the evolution of the solar wind interaction influences the structure and dynamics of the induced magnetosphere. Previous missions, such as Pioneer Venus Orbiter (PVO) and Venus Express (VEX), studied the response of the magnetospheric system on different spatial and temporal scales [1]. Both missions also observed numerous processes with the Venusian induced magnetosphere that lead to plasma energization. What is special about Venus, as opposed to Mars, is that virtually all of the significant present day atmospheric loss of heavy constituents is in the form of ions that have been energized to escape energies and beyond [2].

We will present Pioneer Venus Orbiter (PVO) and Venus Express (VEX) observations of particle and magnetic fields in Venus' induced magnetosphere. Specifically, we will compare the upstream foreshock, magnetosheath and ion loss throughout solar cycle 22, 23 and 24. We will also use the interplanetary magnetic field (IMF) and solar wind conditions during solar minimum maximum as initial inputs into a magnetohydrodynamic (MHD) to construct a global picture of the magnetosphere and global plasma environment [3].

Finally, we will compare the Parker Solar Probe (PSP) first flyby at Venus during the deep minimum of solar cycle 24 to previous observations downtail with VEX and PVO. We will discuss the future PSP Venus flyby orbits will be presented and the specific science goals for each planned flyby.

References

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