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Comparision of Ionopause Observations at Mars and Venus with the Radio Science Experiments MaRS on Mars Express and VeRa on Venus Express

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Abstract

The term ionopause is defined as the boundary between the planetary ionosphere and the solar wind regime. It was first described and defined for Venus where a sharp decrease in ionospheric electron density towards very small values was found at altitudes between 300 and 600 km with Pioneer Venus Orbiter. An ionopause structure in electron density profiles at Mars has not been observed until the measurements of Mars Express. One reason was that the noise of the Viking electron density profiles was relatively high and did not drop below 500 el/cc. The MGS electron density data did not reach ionopause altitudes.

The Radio Science Experiment MaRS on Mars Express is sounding the Martian atmosphere and ionosphere since April 2004. So far, more than 400 vertical profiles of the ionospheric electron density could be observed. The Radio Science Experiment VeRa on Venus Express started its observations of the Venusian atmosphere and ionosphere at December 2005. More than 140 vertical profiles of the ionospheric electron density could be derived until now.

We define the ionopause in MaRS and VeRA ionsopheric electron density data as the region, where the electron density gradient is deviating strongly towards noise levels from the typically well behaved density distribution in the diffusion region. This presentation will compare the results of ionopause observations on Mars and Venus, based on the MaRS and VeRa radio occultation data from 2005 to 2009.