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Ionopause Features of Mars as observed by the Radio Science Experiment MaRS on Mars Express

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The ionopause of a planet is defined as the boundary between the ionosphere and the solar wind regime. It was first described for Venus when a sharp decrease in electron density towards very small values was found at certain altitudes. So far, the ionopause at Mars has not been well observed. One reason is that the noise of the Viking profiles was relatively high and did not drop below 500 el/cc. The MGS data base is inconclusive concerning the ionopause.

The highly elliptical orbit of Mars Express allows us to investigate the electron density of Mars up to an altitude of about 1500 km. We want to define the ionopause feature at Mars as an electron density gradient starting well above the topside ionospheric main peak, tending to decrease the electron density towards noisy values around zero.

The Radio Science Experiment MaRS on Mars Express sounded the Martian atmosphere and ionosphere during four occultation seasons starting from April 2004. So far, more than 400 vertical profiles of the ionospheric electron density could be derived covering all planetary latitudes and almost all local times of the northern hemisphere. This presentation will show the high variability of the ionopause structures of Mars.