

Detection and Modelling of Meteor Layers in the Martian Atmosphere

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The radio science experiments MaRS on Mars Express and VeRa on Venus Express revealed the sporadic appearance of additional electron density layers in the Martian and Venusian ionosphere below the common secondary layer. This feature may be a result of the interaction between meteoric particle influx and the Martian atmosphere and ionosphere.

This talk presents the actual detection status of Martian meteor layers in MaRS electron density profiles and first steps towards modeling this feature. The meteor layer modelling results demonstrate the influence of the sporadic meteoric component on the Martian ionosphere. Model input parameters are atmospheric ablation profiles of atomic Magnesium and Iron calculated from the sporadic component of the meteoric influx, altitude profiles of the neutral atmospheric composition from the Mars Climate Database and electron density profiles for an undisturbed ionosphere which are calculated by a simple photochemical model. In the meteor layer modelling process included are the effects of molecular and eddy diffusion on the metallic species and chemical reaction schemes for atomic Magnesium and Iron. The model results are altitude-density-profiles for several metallic species on the basis of Mg and Fe, calculated in chemical equilibrium by analytical solution of the reaction equations.