



Revised empirical model of the Martian dayside ionosphere

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We use more than 10 years of the Martian topside ionospheric data measured by the MARSIS radar sounder on board the Mars Express spacecraft to derive a revised version of our former empirical model. The role of various controlling parameters for the electron densities on the dayside is thoroughly discussed. An empirical formula describing typical electron densities and their scatter is derived. As compared to the former 2011 model, several significant improvements have been made: i) the amount of the used data is more than double, which considerably improves the coverage and allows for a more subtle fitting, ii) minor timing error (less than one time bin) present in former MARSIS data products was corrected, and an improved trace inversion method better suitable for high spacecraft altitudes was used to remove a possible altitudinal bias present in the former model, and iii) a better parameterization and a simpler model form were employed. Electron densities obtained by the empirical model are compared with other relevant data sets to confirm the model validity.