



Effects of different drivers on ion fluxes at Mars. MARS EXPRESS and MAVEN observations

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Recent observations by Mars Express and MAVEN spacecraft have shown that the Martian atmosphere/ionosphere is exposed to the impact of solar wind which results in losses of volatiles from Mars. This erosion is an important factor for the evolution of the Martian atmosphere and its water inventory. To estimate the escape forced by the solar wind during the early Solar System conditions we need to know how the ionosphere of Mars and escape fluxes depend on variations in the strength of the external drivers, in particular, of solar wind and solar EUV flux. We present multi-instrument observations of the influence of the solar wind and solar irradiance on the Martian ionosphere and escape fluxes. We use data obtained by the ASPERA-3 and MARSIS experiments on Mars Express and by the STATIC, SWIA, MAG and EUV monitor on MAVEN. Observations by Mars Express supplemented by the EUV monitoring at Earth orbit and translated to Mars orbit provide us information about this dependence over more than 10 years whereas the measurements made by MAVEN provide us for the first time the opportunity to study these processes with simultaneous monitoring of the solar wind and ionospheric variations, planetary ion fluxes and solar irradiance. It will be shown that that fluxes of planetary ions through different escape channels (trans-terminator fluxes, ion plume, plasma sheet) respond differently on the variations of the different drivers.