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Modeling the variability of Martian O+ ion escape due to Solar Wind forcing

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During the last decade, MAVEN space mission have emphasized a widespread spatial distribution of escaping O+ ions (Brain et al., 2015; Dong et al., 2015; Curry et al., 2015). Statistical studies have demonstrated that such structure is constant and present an asymmetry with respect to the solar wind convective electric field direction. In the Mars Solar Ecliptic coordinate system, continuous large O+ ion fluxes have been observed from the Martian wake to the Northward hemisphere. Global hybrid models have been developed since more than fiffteen years (Modolo et al., 2005, 2016; Brecht and Ledvina, 2006; Kallio et al., 2006) predicting and reproducing successfully the main characteristics of these escaping ion signatures. To further characterize this heavy-ion escape and its variability due to the solar wind forcing, global hybrid simulations have been performed with different set of upstream solar wind parameters. The impact of the solar wind drivers on the dynamics of O+ ion fluxes are reported and compared to the statistical ion fluxes maps derived from MAVEN/STATIC observations (Dong et al., 2015).

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