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3D Model of the Martian Ionosphere

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For planets without intrinsic magnetic field like Mars and Venus, the ionosphere is the main obstacle decelerating and deviating the solar wind flow. Therefore, the ionosphere plays an important part in erosion processes associated to Mars-solar wind interaction. Below 180 km, the Martian ionosphere is well described by the photochemical equilibrium. Above 180 km, the transport processes become important. To describe the Martian upper ionosphere, we develop a 3D multi-fluid dynamical core in the LMD Martian general circulation model (GCM) (Forget et al. 1999, Gonzalez-Galindo et al. 2009). This core solves the horizontal and vertical dynamics of the main ionospheric species and their coupling and retroaction on the neutral atmosphere at different seasons. This model will be later coupled to a magnetospheric model in order to describe the Martian ionospheric erosion by the solar wind.