Effect of heterogeneous chemistry in the Martian atmosphere

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Literature suggests that the HO_x (H, OH and HO_2) and O_x ($O+O_3$) are the most important species of the Martian atmosphere though found in trace amounts in the atmosphere but have consequential role in the photochemistry and stability of the CO_2 dominated atmosphere [2]. Along with these components, suspended dust particle also plays major roles in the photochemistry. There are a number of ways through which suspended dust particles affect the atmosphere. Dust particles scatter and absorb solar radiation, it also produces electric charging effect in the atmosphere and it can react with the atmospheric gases directly [1]. Dust also affects the atmospheric ions [3].

Our aim is to understand the heterogeneous processes occurring in the Martian atmosphere. A heterogeneous process in the atmosphere is resulted from the interaction between components belonging to two or more phases. In the heterogeneous processes solid or liquid particles are used as surface of sink. However heterogeneous chemistry is defined as the chemical reactions producing new compounds from the interaction between different phases. In the present work we will show a quantitative effect of heterogeneous chemistry and processes on the O_x and HO_x species of the Martian atmosphere obtained from our one dimensional chemical model. Ozone will be used as a measure of these effects. In an annual period Martian atmosphere witnesses global and local dust storm which inject significant amount of dust particles in the atmosphere. This study will also include the photochemical behavior during such dust scenarios.

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