

Investigation of Polar Atmospheric Response to the Intense Geo-Space Activities

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Abstract : The study has pointed out the relationship of energetic particle precipitation (EPP) during high speed solar wind streams (HSS) to the ionization characteristics and subsequent NO_x production in the polar atmosphere. Over the last few decades, it has been shown that production of NO_x in the mesosphere region during the precipitation of charged particles (with energy range >30 KeV to 1 MeV) is directly related to the ozone loss in the polar middle atmosphere, extending from mesosphere to upper stratosphere. This study has dealt with the analysis of the interplanetary parameters such as interplanetary magnetic field (IMF), solar wind velocity (Vs), charged particle density (Ns), convection field enhancement (Ec) during such HSS events and their link to the rate of production of NO_x in the mesosphere. Moreover, the analysis will be used to validate or, to modify the current ion-chemistry models which describe the ionization rate and NO_x production in the polar atmosphere due to EPP.

Keywords : energetic particle precipitation (EPP), NO_x, ozone depletion, polar vortex

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