



POLAR MESOSPHERE SUMMER ECHOES DURING JULY 2000 SOLAR PROTON EVENT

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The influence of the solar proton event (SPE) 14-16 July 2000 on Polar Mesosphere Summer Echoes (PMSE) is examined. PMSE were observed by the Esrangle VHF MST Radar (ESRAD) at 67°53'N, 21°06'E. The PMSE reveal two distinguishing features: a substantial decrease in height for the PMSE lower limit in the early morning hours, and decrease of the radar echoes above 86 km at the time of the greatest ionospheric disturbances 15 July. The results of numerical simulations demonstrate an increase of electrons and ions number densities throughout the event. The electric field calculated on the basis of magnetometer measurements and modelled conductivities gains its maximum of 133 mV/m during the most intensive period of geomagnetic disturbances. The electric field is expected to produce upward/downward transport of the ions, thus, possibly decreasing the amount of charged aerosols in the vicinity of PMSE. The Joule heating generated by the geomagnetic storm might be responsible for the ion redistribution as well, through the generation of vertical winds.

The temperature increase due to Joule and particle heating was calculated taking into account radiative cooling. The temperature increase at PMSE heights was found to be very small. So, it is rather the transport effects due to intensified electric field at the most disturbed time, which can be responsible for the reduction of PMSE above 86 km. The decrease in height of the PMSE lower limit at the time of the enhanced ionisation is in rather good agreement with the previous model predictions. We have also suggested that, a possible source for those low height aerosols might be a meteoric dust.