Geophysical Research Abstracts, Vol. 8, 07528, 2006
SRef-ID: 1607-7962/gra/EGU06-A-07528

Temperature observations at the topside of polar mesosphere summer echoes over Spitsbergen

J. Lautenbach, J. Höffner, M. Zecha

Leibniz Institute of Atmospheric Physics, Schloss-Str. 6, 18225 Kühlungsborn, Germany

Collocated measurements of temperatures and polar mesosphere summer echoes (PMSE) were performed at the polar cap (78° N) during summer 2001 and 2003. Temperature measurements accomplished by the potassium Lidar are available from mid February to the end of October. In summer time the mesopause region is constantly illuminated by the sun and characterized by extremely cold temperatures down to 115 K. The very cold temperatures allow the nucleation and growing of ice particles in altitudes with super-saturation. Such small ice particles with radii between 3 and 20 nm can affect the plasma leading to PMSE. PMSE with nearly continuous occurrence rates of 100 % during the summer time were observed by a VHF Radar. It is remarkable, that all the time the upper edge of PMSE doesn't exceed altitudes above 92 km. The PMSE topside is compared with potassium Lidar temperatures, with frost point temperature and with degrees of saturation using vapor mixing rations from models.

In this region are striking differences to our current understanding of PMSE and temperature. In some cases the temperature are more then 20 K lower than the frost point temperature but no PMSE is observed.