

SEASONAL VARIATION OF THE MESOSPHERIC INVERSION LAYER AND THUNDERSTORMS

S. FADNAVIS

Indian Institute of Tropical Meteorology, Dr. Homi Bhabha Road, Pashan Pune, India, 411008 Email: suvarna@tropmet.res.in

Temperature and ozone volume mixing ratio profiles obtained from the Halogen Occultation Experiment (HALOE) aboard the Upper Atmospheric Research Satellite (UARS) over India and over the open ocean to the south during the period 1991-2001 are analyzed to study the characteristic features of the Mesospheric Inversion Layer (MIL) at 70 to 85 km altitude and its relation with the ozone mixing ratio at this altitude. We have also analyzed both the number of lightning flashes measured by the Optical Transient Detector (OTD) onboard the MicroLab-1 satellite for the period April 1995 - March 2000 and ground-based thunderstorm data collected from 78 widespread Indian observatories for the same period to show that the MIL amplitude and thunderstorm activity are correlated. All the data sets examined exhibit a semiannual variation. The seasonal variation of MIL amplitude and the frequency of occurrence of the temperature inversion indicate a fairly good correlation with the seasonal variation of thunderstorms and the average ozone volume mixing ratio across the inversion layer. The observed correlation between local thunderstorm activity, MIL amplitude and mesospheric ozone volume mixing ratio are explained by the generation, upward propagation and mesospheric absorption of gravity waves produced by thunderstorms.

Mesospheric Inversion Layer, Thunderstorms, Gravity waves

S. FADNAVIS, Indian Institute of Tropical Meteorology, Dr. Homi Bhabha Road, Pashan Pune, India, 411008 Email: suvarna@tropmet.res.in Phone No: +91-020-25893600, Fax +91-020-25893825