Mesohigh, Wake Low and Heat Burst Associated with Premonsoon Thunderstorms - An Observational Study Using STORM Data

D. Lohar¹, S. Dalal¹, I. Sadhukhan² and G.C. Debnath³

¹Atmospheric Science Research Group, Department of Physics, Jadavpur University, Kolkata-700 032

² IERCEM Institute of Information Technology(IIIT), Banipur College Road, P.S. Banipur, 24 Parganas(N) Pin: 743233, West Bengal, India

³ Regional Meteorological Centre, 4, Duel Avenue, Alipore, Kolkata – 700 027

Wake low (WL), Mesohigh (MH) are the usual phenomena associated with severe thunderstorms while Heat Burst (HB) is rarely observed. MH, WL and HB's are short-lived mesoscale phenomena; generally not well understood by the operational forecasting community and have been nearly impossible for the forecasters to predict. So this paper presents statistical analyses of these mesoscale phenomena along with the changes of various atmospheric parameters, which can be helpful for operational forecasters to better understand these potentially severe phenomena.

Data sets, collected through Automatic Weather Stations (AWSs) and Doppler Weather Radar as a part of a nationally co-ordinated STORM programme, have been analysed. Data analysis identifies MH, WL and HB over the semi-arid region of Gangetic West Bengal. MHs are associated with the convective line while WLs are associated with the rear of the storm. During the premonsoon period of 2008 and 2009 over the region it has been seen that out of total 104 thunderstorm events, 64 MH and WL cases and 20 HB cases are recorded by the AWSs. The maximum pressure drop, in one WL situation, is found to be 22.3 mb and the corresponding wind gust is 15.4 ms⁻¹. In comparison to events elsewhere¹, it is interesting to note that the pressure drop is more while the wind speed is less over this part of the region. Among the 20 HB cases it has been seen that the maximum rise in temperature is found to be 3.7° C while the dew point depression is -7.1° C. The wind gust associated with this event is 18.8ms^{-1} .

1. Knievel J.C. and R. H. Johnson, 1998: Pressure Transients within MCS Mesohighs and Wake Lows. Mon. Wea. Rev., **126**, 1907-1930.