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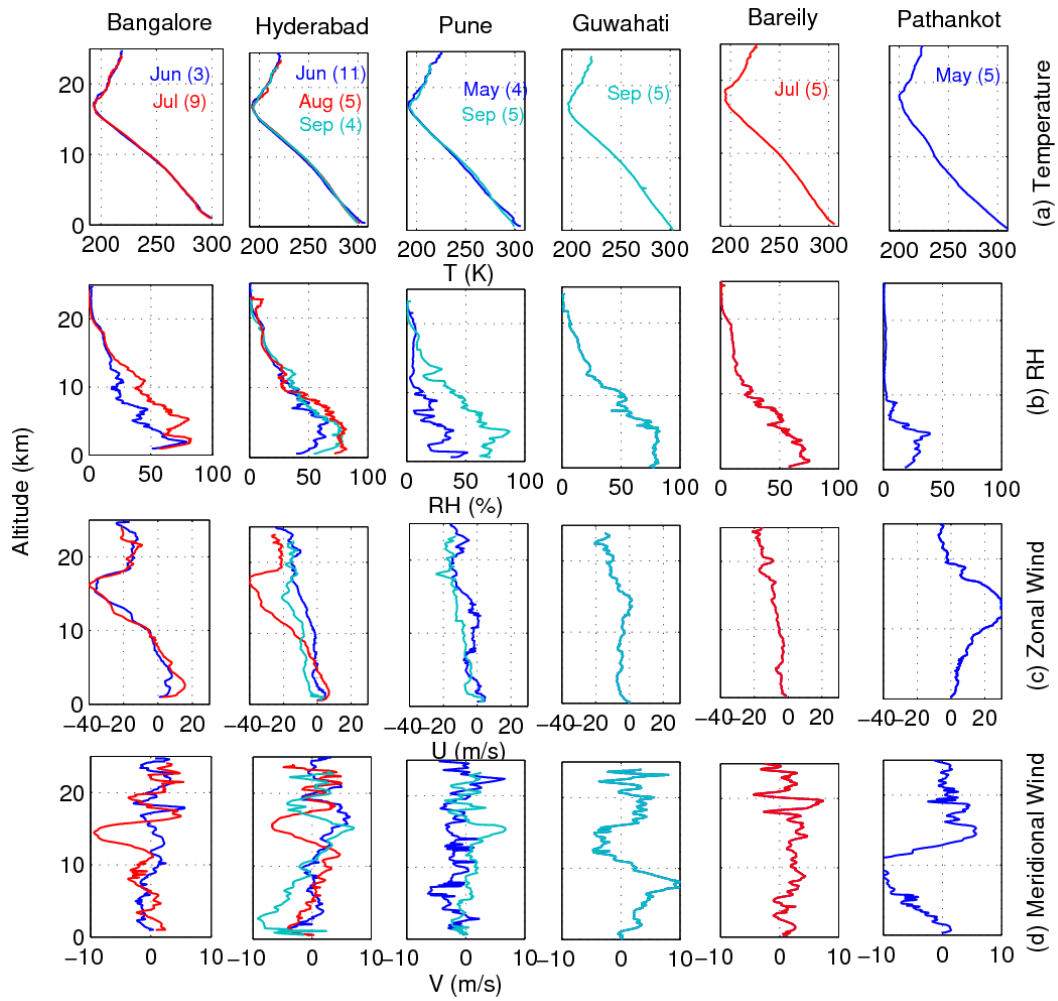
*Supplement of*

## **Thermodynamic structure of the convective boundary layer (CBL) over the Indian monsoon region during CAIPEEX campaigns**

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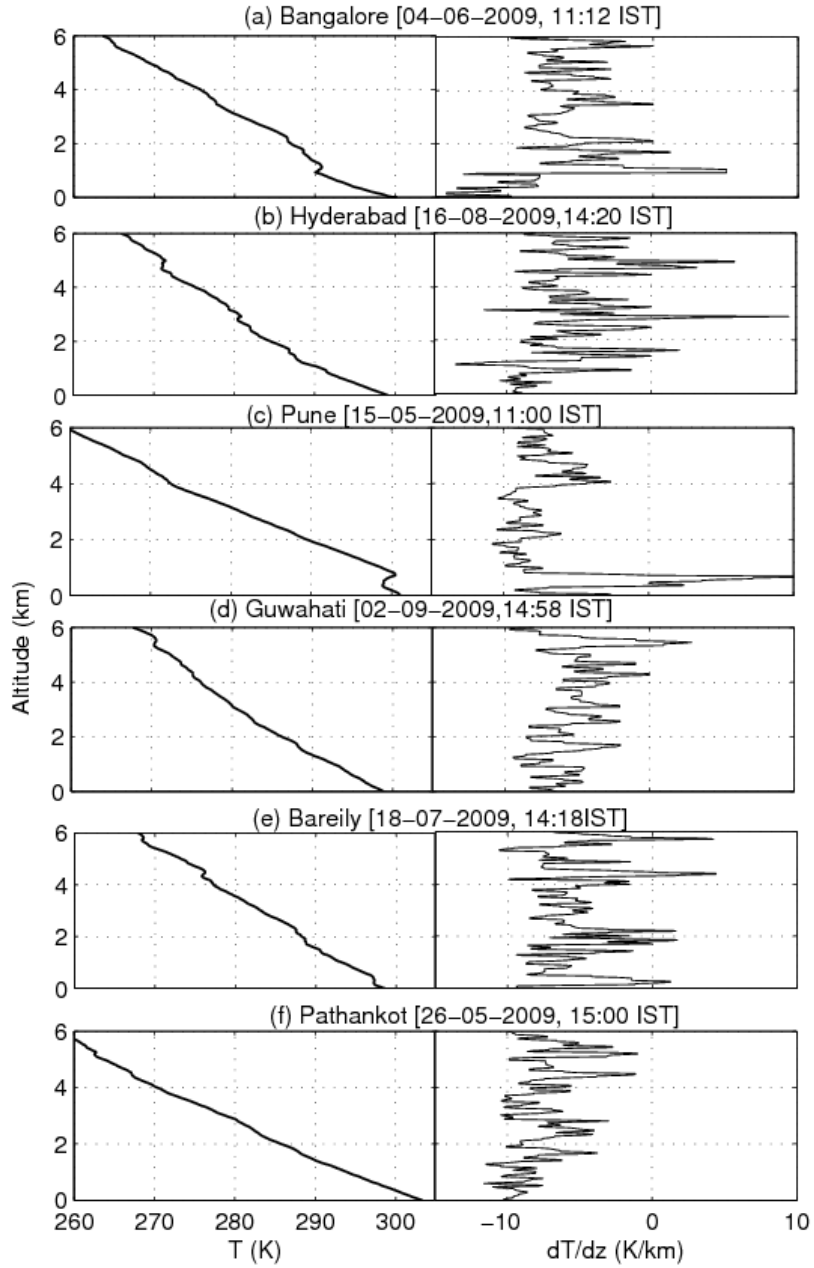
**Figure S1.** The mean profiles of the (a) temperature, (b) relative humidity (RH), (c) zonal wind, and (d) meridional wind over Bangalore, Hyderabad, Pune, Guwahati, Bareilly, and Pathankot as listed in Table 1 in the increasing latitude over the Indian monsoon region. Blue, red and cyan indicate the averaged profiles for first, second and third rounds, respectively. Number inside parenthesis of the legend (month) indicate number of profiles averaged.

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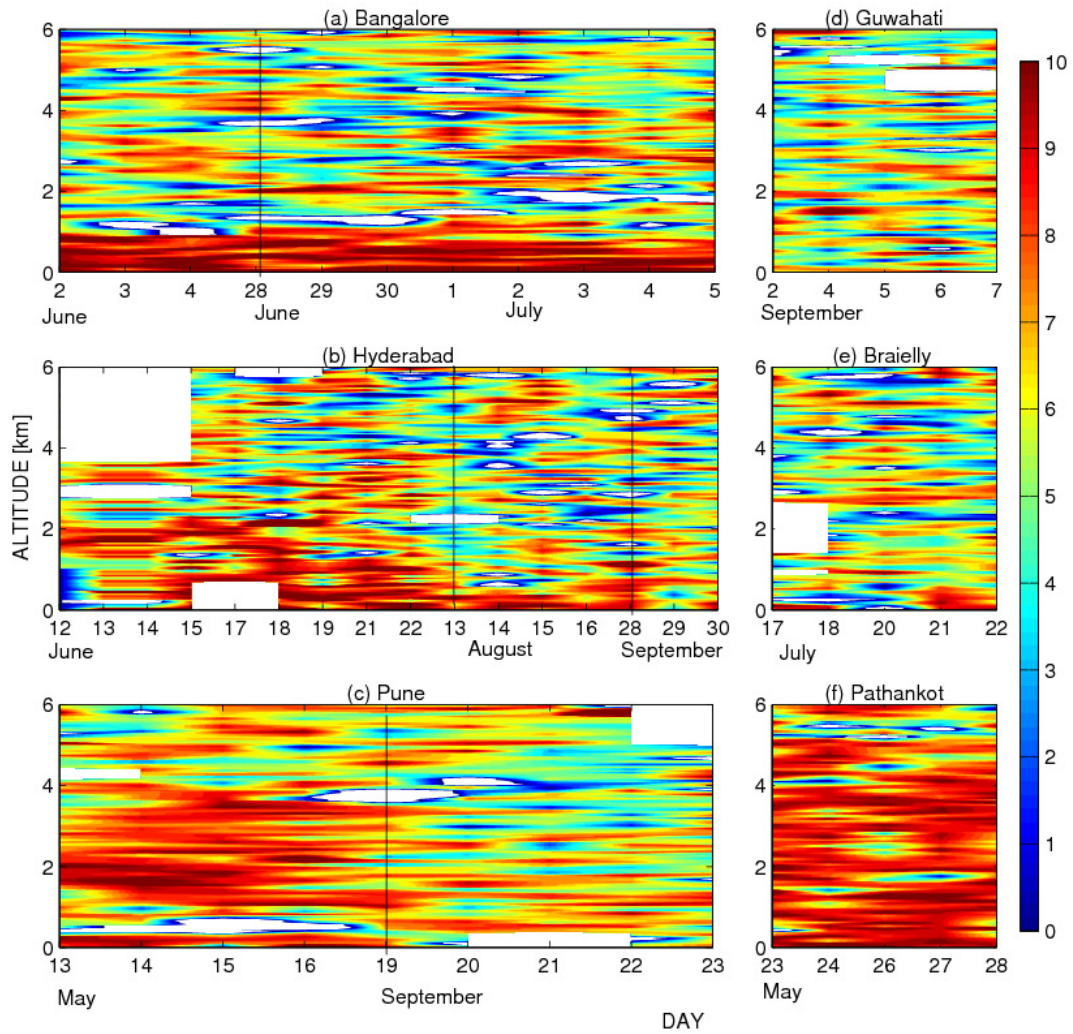
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20 We have averaged the temperature, RH, zonal wind and meridional wind observed during three different  
rounds (blue, red and cyan indicate first, second and third round, respectively) of the experiment as  
mentioned in the Table 1 and Fig.1 for each site are shown in Fig. S1. From the vertical profiles of the  
mean temperature over six stations, it is apparent that the tropopause height ranges from 17.0-17.5 km  
and the temperature about 193-200 K during Indian summer monsoon season (Fig. S1a). The RH profiles  
25 indicate that the troposphere is totally moist due to frequent deep convection events during monsoon  
season (Fig. S1b). Whereas the troposphere is moist only up to about 10 km during May in the pre-  
monsoon season (Fig. S1b). Tropical easterly jet (TEJ) streams are observed over Bangalore and  
Hyderabad with core at height about 16-17 km and speed ~40 m/s in June and August. The westerly  
wind with core at 12.5 km and speed 32 m/s observed over Pathankot are the part of the subtropical  
30 westerly jet prevails over Indian subtropical region. The meridional winds are generally weak except at  
TEJ core where northerly winds are observed over Bangalore and Hyderabad in July and August (Fig.  
S1c). The meridional wind pattern reverses before and after the monsoon period as evident from  
Guwahati (Southerly wind) and Pathankot (Northerly wind). Low level jet (LLJ) streams are also  
observed over Bangalore and Hyderabad with core at 1.5 -2.5 km and speed 7-14 m/s in June and August.  
35 The TEJ and LLJ streams are weak before and after monsoon period as evident from Pune during May  
and Guwahati during September (Fig. S1d).



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**Figure S2.** The vertical profiles of temperature (T) and their temperature gradient observed over the six stations (a) Bangalore (b) Hyderabad (c) Pune (d) Guwahati (e) Bareilly and (f) Pathankot during Indian summer monsoon season (JJAS) 2009.



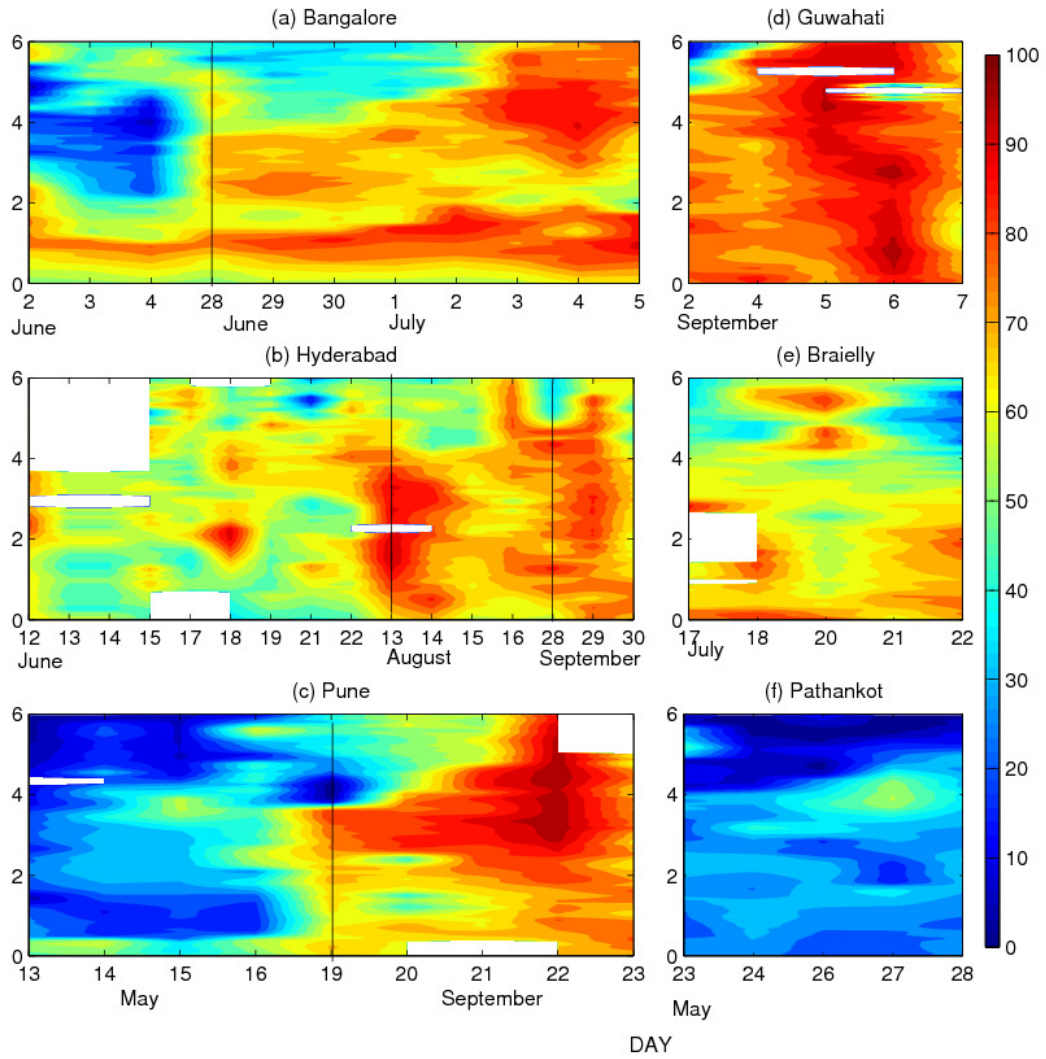
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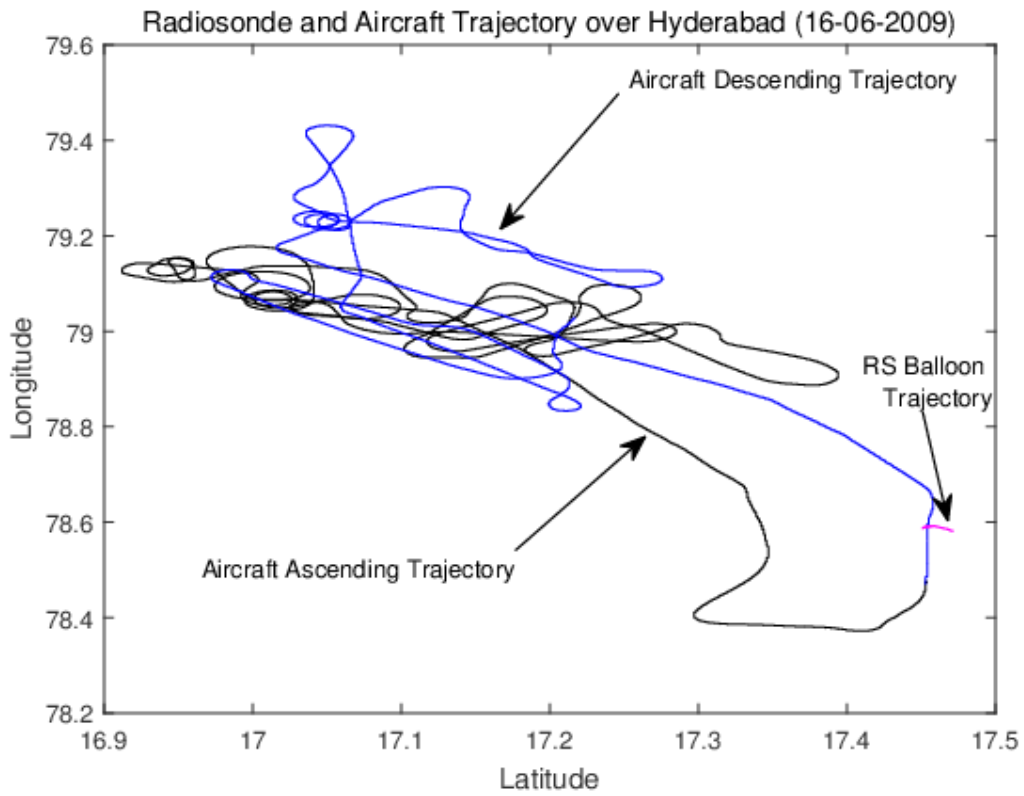
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**Figure S3.** Contour plots of the zonal wind (U) along with wind directions over (a) Bangalore, (b) Hyderabad, (c) Pune, (d) Guwahati, (e) Bareilly, and (f) Pathankot as listed in Table 1 in the increasing order of latitude over the Indian monsoon region during May to September, 2009.

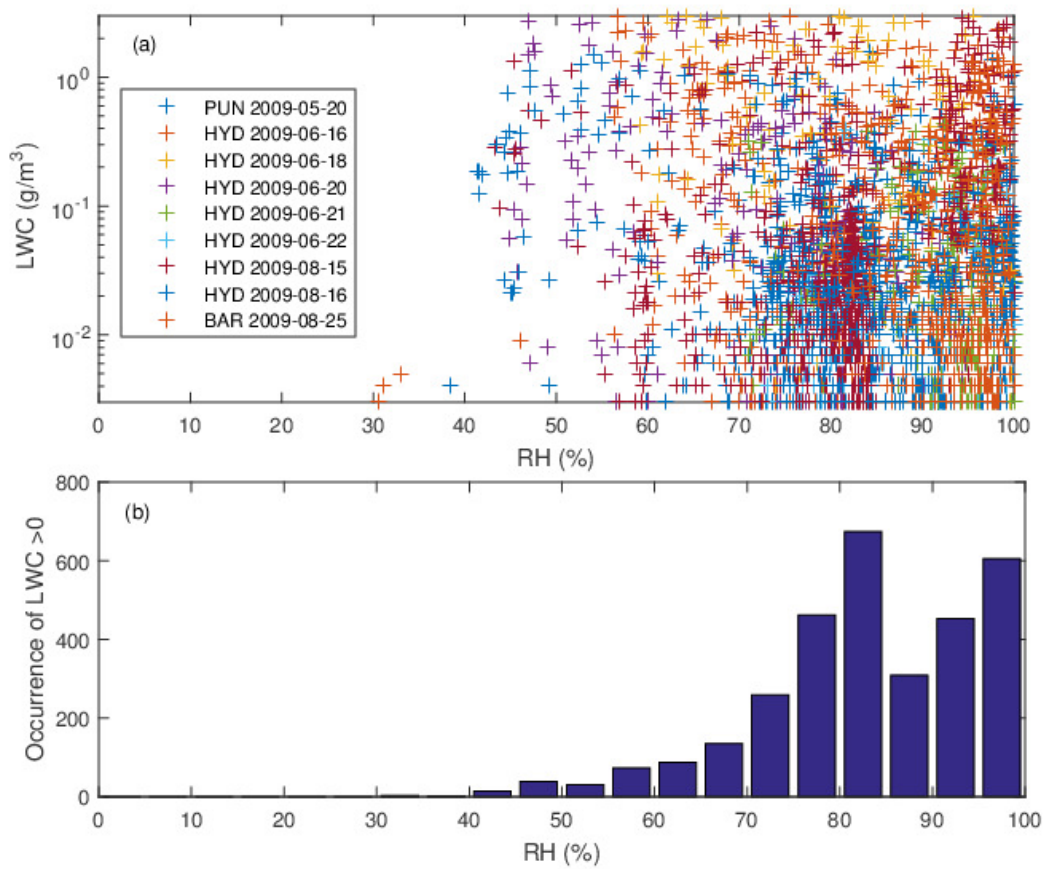


70 **Figure S4.** Contour plots of the RH over (a) Bangalore, (b) Hyderabad, (c) Pune, (d) Guwahati, (e) Bareilly, and (f) Pathankot as listed in Table 1 in the increasing order of latitude over the Indian monsoon region during May to September, 2009.



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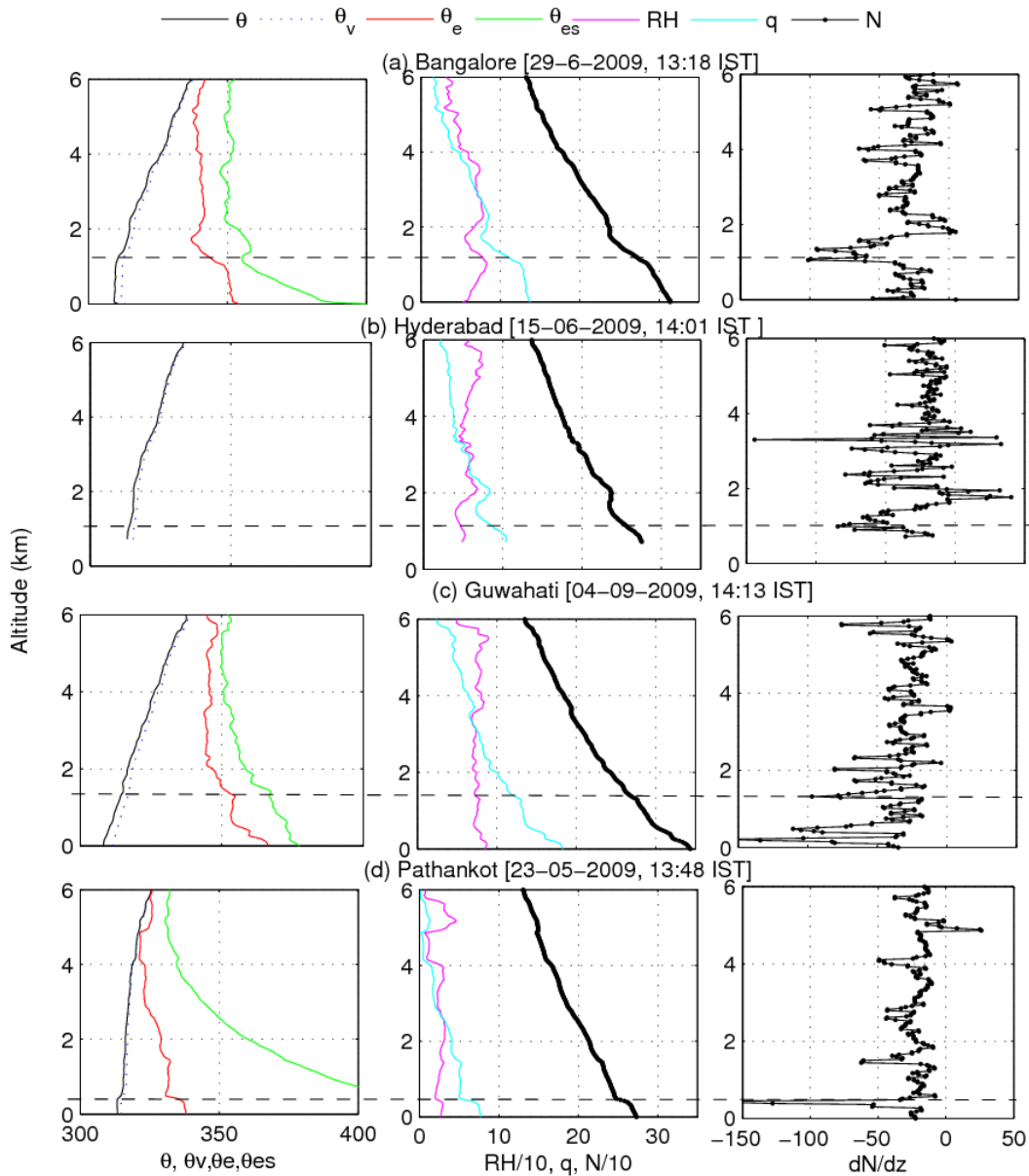
**FigureS5:** Radiosonde Balloon and flight trajectories from surface to 7.0 km observed over Hyderabad on 16 June 2009.



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**Figure S6** (a) the observation of the LWC vs. RH (b) Occurrence frequency of the LWC>0 vs. RH.





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**Figure S7.** The vertical profiles of potential temperature ( $\theta$ ), virtual potential temperature ( $\theta_v$ ), equivalent potential temperature ( $\theta_e$ ), saturated equivalent potential temperature ( $\theta_{es}$ ), relative humidity (RH), specific humidity ( $q$ ), refractivity ( $N$ ) and refractivity gradient observed over stations (a) Bangalore (b) Hyderabad (c) Guwahati and (d) Pathankot observed during CALISPSO passes.

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