



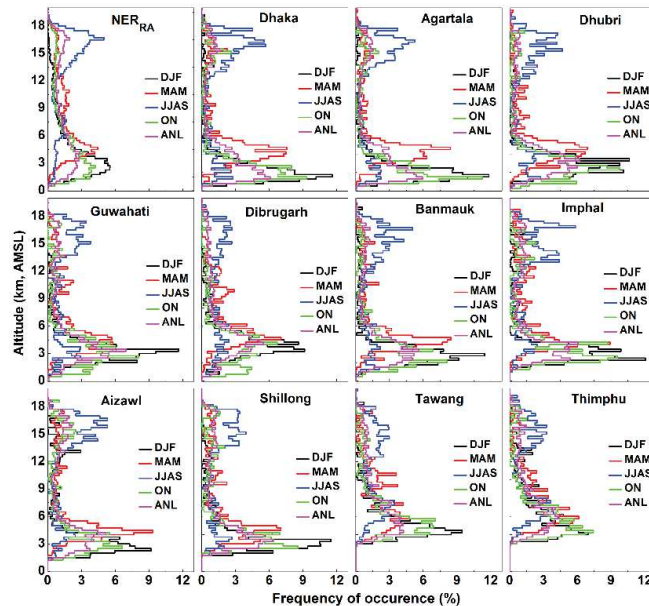
## Regional heterogeneity of aerosol vertical distribution over North-East India and adjoining South Asia

Papori Dahutia\*<sup>(1,2)</sup>, Binita Pathak<sup>(1,2)</sup>, and Pradip Kumar Bhuyan<sup>(2)</sup>

(1) Department of Physics, Dibrugarh University, Dibrugarh-786004, Assam, India; e-mail: dahutia.papori@gmail.com; binita@dibru.ac.in

(2) Centre for Atmospheric Studies, Dibrugarh University, Dibrugarh-786004, Assam, India; e-mail: bhuyan@dibru.ac.in

The North-East India and adjoining South Asia (22-30°N; 88-98°E) including Bangladesh, Bhutan and Myanmar are topographically as well as geographically unique, situated at the foothills of Himalayan range. In the present study, we have used eleven years (June, 2006 to May, 2017) of aerosol layer data from Cloud Aerosol Lidar Infrared Orthogonal Polarization (CALIOP) to investigate the vertical distribution of aerosols over this region. For that purpose we have selected eleven locations: Dhaka (23.4°N, 90.2°E, 4 m above mean sea level (AMSL)), Agartala (23.9°N, 91.2°E, 14.9 m AMSL), Dhubri (26°N, 90°E, 28 m AMSL), Guwahati (26.2°N, 91.7°E, 55 m AMSL), Dibrugarh (27.3°N, 94.6°E, 111m AMSL), Banmauk (24.24°N, 95.51°E, 279 m AMSL), Imphal (24.75°N, 93.92°E, 765 m AMSL), Aizawl (23.7°N, 92.8°E, 1001 m AMSL), Shillong (25.6°N, 91.9°E, 1496 m AMSL), Tawang (27.6°N, 91.9°E, 2668 m AMSL) and Thimphu (27.5°N, 89.6°E, 2737 m AMSL). The regional average indicated by  $NER_{RA}$  have also been studied to investigate the regional features of the aerosol vertical distribution in terms of aerosol top layer (ATL) and aerosol base layer (ABL) etc. A distinct regional features in aerosol layers with seasonal variability is observed over the study region. The ATL is prevalent at lower altitude indicating the confinement of aerosol particles up to 3500 m AMSL attributed to the lesser contribution of convective activities during winter (DJF) and post monsoon (ON) within the region. On the other hand, maximum occurrence of ATL at higher altitudes during monsoon (JJAS) (~15000 m AMSL) followed by pre-monsoon (MAM) (~5000 m AMSL) attributed to the significant contribution of convective activities along with other atmospheric phenomena. On the contrary, the major fraction of ATL during monsoon occurs at higher altitudes signifying the occurrence of upper troposphere and lower stratosphere (UTLS) interaction within this region. The present study of aerosol layer statistics and their probable source as well as mechanism provides us a deep insight in the formation of aerosol layers within the North-East India and adjoining South Asia.



**Figure 1.** The annual (ANL) and seasonal (DJF, MAM, JJAS and ON) distribution of aerosol top layer (ATL) over North-East India and adjoining South Asia (22-30°N, 88-98°E).