Ubiquity of quasi-aerosol layers in the free troposphere and its regional climate response

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Vertical profile of aerosols and their composition in the lower troposphere is critically important for assessing the earth radiation budget and their impact on monsoon circulation. In this context, for the last decade, tremendous efforts have been made by different national and international researchers to explore the elevated aerosol layers over Indian subcontinent and surrounding oceanic regions well above the rainy cloud layers using aircraft, balloon-borne and Lidar platforms. However, these studies were conducted on campaign mode basis, individual observations over specific season and sites. However, none of the these studies provided the synthesized picture of general prevalence of these elevated layers and also their source mechanism (local sources vs transport processes). Here we combine the results obtained from balloon-borne, Lidar along with aircraft measurements and satellite (CALIPSO) observations to provide unprecedented climatological overview of the ubiquity of quasi-aerosol layers, source origin throughout its annual life cycle in the free troposphere and its role in monsoon development over Indian region.

Key words: Balloon-borne, aircraft Quasi-aerosol layers, Monsoon, Troposphere