

# Composition of Aerosols in the Upper Troposphere over Indian Subcontinent

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Upper troposphere in the tropics is the gateway for the air entering the stratosphere and therefore chemical processes in the tropical upper troposphere help to define the composition of the global stratosphere. Large uncertainties remain concerning the sources and composition of upper tropospheric aerosols, the processes controlling their evolution and also their distribution. WRF Chem version 3.8.1 has been used to study the composition of aerosols (including PM, BC, OC, sulphate etc) in the upper troposphere (8-15 Km) over the Indian Subcontinent. Due to its topographic heterogeneity and the variability of land use and land cover the Indian subcontinent has been divided into five broad sub regions for our work, viz., Indo Gangetic Plain (IGP), North East India (NEI), Central India (CI), West India (WI) and South Peninsula (SI). Aerosol dataset (Extinction coefficient, AOD) derived from CALIOP, MODIS; trace gas data set (O<sub>3</sub>, NO<sub>x</sub>, SO<sub>2</sub>, CO, etc) from TOMS, OMI, MLS instrument and for model simulations two chemistry modules; (i) MOZCART (ii) MOSAIC have been used to study upper tropospheric budget of aerosols and to quantitatively assess the removal processes of aerosols/trace gases over the study region. WRF-Chem simulated tracer is used to mark where the air is coming from. A detailed discussion of the dominant pathways of upper tropospheric aerosols /trace gases are explained in terms of dry and wet deposition, as well as transport (both horizontal and vertical) in controlling their seasonal cycle.

Key words: WRF Chem, MOZCART, MOSAIC, Extinction coefficient, AOD