



Aircraft measurements of vertical and spatial distribution of aerosol concentration and size over different environments in India

Padma Kumari B., Mahesh Kumar R.S, Kulkarni J. R, and Goswami B.N
Indian Institute of Tropical Meteorology, Pune, India (padma@tropmet.res.in)

It is well known that atmospheric aerosols play a major role in climate change by directly scattering and absorbing the incoming and outgoing radiation as well as through modifying cloud properties, such as droplet size distribution and cloud lifetime. However, aerosol measurements, particularly their vertical distribution, are less and unevenly distributed around the globe. Cloud Aerosol Interactions and Precipitation Enhancement Experiment (CAIPEEX) is an Indian National program conducted by the Indian Institute of Tropical Meteorology (IITM), Pune, India, during summer monsoon season May-September 2009. Under CAIPEEX program, an instrumented aircraft has been used to study background aerosol along with cloud microphysical properties and their interactions over different parts of India. This experiment has been carried out for the first time in India.

During CAIPEEX, PCASP (Passive Cavity aerosol Spectro Photometer) which measures aerosol concentrations in the size range 0.1 to 3 microns is operated in the aircraft over different parts of India viz., Pathankot (May), Hyderabad (June), Bengaluru (June-July), Bareilly (July-August), Guwahati (August- September) and Pune (September). The preliminary results suggest that aerosol vertical distribution is observed up to a maximum of 7.0 - 7.5 km, with high surface concentrations and enhanced layers at higher altitudes. During monsoon period also high concentrations are observed. The spatial distribution of aerosols along the flight track shows aerosol gradient from one place to another place. Also thick haze is observed near Himalayas during the month of May.

The results at all the locations showed high aerosol concentrations in the size range of 0.1 to 0.3 microns, steep decreasing trend from 0.3 – 0.6 microns and less concentration from 0.6 to 3 microns. In the size range of 0.1 to 0.3 microns the concentrations varied from 100-10000 particles/cc. In-depth analysis of CAIPEEX data gives a clear picture of aerosol distribution over different parts of India during monsoon season, which further helps to understand the cloud micro physics.

This paper presents a glimpse of the CAIPEEX mission and the preliminary results of aerosol measurements over different environments in India.