In Situ Measurements of High Aerosol Concentrations Near the Foot Hills of Himalayas – A Case Study from CAIPEEX

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Aerosol measurements, particularly their vertical distributions, are important to understand the role of aerosols in cloud microphysics, radiation budget and so on. In order to understand the background aerosols and cloud properties Cloud Aerosol Interactions and Precipitation Enhancement Experiment (CAIPEEX) has been conducted by the Indian Institute of Tropical Meteorology (IITM), Pune, during May to September 2009. It is a unique program conducted for the first time in India. Under this program an instrumented aircraft has been used for the measurements of aerosols and cloud parameters. PCASP (Passive Cavity Aerosol Spectro Photometer) is used to measure aerosol concentrations and size distribution in the diameter range of 0.1 to 3.0 μm. This study pertain to the experiment carried out during May 2009 in the northern part of India from the base Pathankot (32.2° N, 75.63° E), which is near to the foot hills of Himalayas. Preliminary analysis showed aerosol vertical distribution up to a maximum height of 7.5 km, with high surface concentrations and enhanced layers at higher altitudes. The spatial distribution of aerosols along the flight track showed aerosol gradient and the presence of thick haze near the foot hills of Himalayas. The concentrations in the fine mode size range of 0.1 to 0.3μm are found to be very much higher on all the days as compared to the concentrations in the middle sized range of 0.5 to 3.0μm. MODIS derived fine mode aerosol fraction also showed high concentrations along the foot hills of Himalayas which is in agreement with the aircraft measurements. These observed high concentrations may be probably due to the biomass burning as inferred from MODIS fire map during the observational period. However, the contributions due to other sources like desert dust are being investigated.

Keywords: CAIPEEX, aerosol, haze, MODIS, foot hills of Himalayas