Suppression of Onset of Precipitation by Haze Layer Over Rain Shadow Regions in India

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Aircraft observations of cloud and aerosol were conducted during the Cloud Aerosol Interaction and Precipitation Enhancement Experiment (CAIPEEX) over the Indian subcontinent during the period of May-September 2009. Existence of haze layer extended up to 4 to 5 km was observed over the rain shadow areas. The extension of haze layer to such high altitude may blocks some of the solar radiation from reaching and heating the surface and hence suppress the convective clouds to grow. Larger concentrations of cloud drop condensation nuclei (CCN) ≥1000 cm^{-3} were observed even at height of ~4 km. The cloud microphysical properties over these regions were super continental, with little initiation of precipitation up to 7 km above sea level. The precipitations were initiated as graupel particles at -14 °C. This means that haze probably suppresses precipitation at the time when it is needed most, when the monsoon flow is weak and haze is heavy.

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