Ganges Valley Aerosol Experiment (GVAX):A Field Campaign to Characterize Aerosols, Regional Transport and Cloud-Aerosol Interactions

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The Ganges valley region is one of the largest and most rapidly developing sections of the Indian subcontinent. Impacts of changes in precipitation patterns, temperature, and the flow of the snow-fed rivers could be immense. Recent satellite-based measurements have indicated that the upper Ganges valley has some of the highest persistently observed aerosol optical depth values. The aerosol layer covers a vast region, extending across the Indo-Gangetic Plain to the Bay of Bengal during the winter and early spring of each year. This is one of the few regions showing a trend toward increasing surface dimming and enhanced mid-tropospheric warming. The consequences of aerosols and associated pollution for surface insolation over the Ganges valley and monsoons in particular are not well understood. Our proposed field study will provide critical data to address these hypotheses and will contribute to developing better parameterizations for tropical clouds, convection, and aerosol-cloud interactions.

The primary science questions for the mission are as follows: (a) ***What are the sources and sinks of the aerosols comprising the aerosol cloud over this region and what effects does it have on clear-sky radiation fields, as well as on cloud micro- and macrophysical properties? What effect does the diurnal PBL cycle in the Ganges valley have on the atmospheric distribution of aerosols*****?** (b) ***What effect do increasing aerosols in the Ganges Valley have on the ISM? What effect do aerosols have on shortwave radiative forcing, mid-tropospheric heating and convective activity over continental India?***

To achieve these science objectives an implementation has been devised in collaboration with scientists in India. The primary anchor facility for the project is the ARM mobile facility. A deployment starting in approximately *April 2011* and lasting to *April 2012* at the ARIES observatory located in Nainital is anticipated for AMF ground operations. During this one-year deployment of the AMF there will be *two intensive periods*, one extending from April 15th, 2011 to June 15th 2011 (*pre-monsoon intensive*) and second extending from January 15th, 2012 to March 15th 2012 (*winter intensive*).