

Proposal For a Field Study

Rao Kotamarthi

Argonne National Laboratory

Ganges Valley Aerosol Experiment (GVAX)

- The Asian Brown Cloud is suggested as a major contributor to the alteration of regional climate and primarily effect monsoons over India
- Recent satellite data (Guillermo, UIUC) from MISR suggests the Ganges valley is shrouded by an optically thick layer of soot/smoke much of the winter and stands out as a 'dark' in the satellite data sets he is analyzing
- The effect of this soot layer on air quality and public health is mostly unknown and potentially could be serious from our understanding of similarly affected regions in the recent past.

Objectives

- Conduct an intensive field campaign to understand the meteorology and chemistry of the region observed from the satellites as having one of the highest optical thickness in the world.
- What is the chemical and physical composition of this airmass?
- What is its spatial extent, its source regions and the transport corridors into and out of India?
- What kind of mitigation strategies can be used in the future?
- What is the contribution of this region to the Asian Brown Cloud over the Indian Ocean?

Plan

- A two stage experiment
 - STAGE 1: A scoping experiment with mainly fixed ground station observations and portable laboratories such as the DOE ARM mobile facility.
 - STAGE 2: A full scaled experiment with ground based observation stations and airborne observations from an aircraft platform, balloons and surface portable laboratories
- STAGE 1 will build preliminary data sets for more detailed modeling and building capacity on the Indian side for participating in the STAGE 2 as the primary participants and leaders.
- STAGE 1 can also be used to set the stage for scientist exchanges and identifying instrument needs on the Indian side and lay the groundwork for a sustained and more vigorous field observation programs for the future in India,
- STAGE 2 could potentially involve scientists from India US and Europe

Facilities

- STAGE 1 instrumentation such as portable RASS/SODAR and Lidar for meteorological measurements can come primarily from the US.
- Aerosol/gas phase instrumentation ground site can also be managed and provided by scientists from USA.
- The Indian scientists with similar measurement capabilities can use this opportunity to cross-validate their instruments and identify future needs.
- If India has an aircraft they want to use they can try doing that at this stage with help from US.

Facilities/Time Line

- STAGE 1 will also help identify suitable ground stations for STAGE 2, identify power requirements.
- STAGE 1 can provide an opportunity for IMD to acquire and test portable meteorological instruments such as wind profilers.
- The STAGE 1 could be help winter 2006 and full experiment (STAGE 2) during the winter of 2008/2009.
- The Indian Govt has an MOU with the DOE for collaboration on the energy sector and technology help and transfer, including environment and this could be a primary sponsor for the experiment under the aegis of this forum.

Participants

- The IMD from India and PNNL/ANL from US for ground meteorological observations.
- The MRWF (Nodia?) and IITM (Pune?) as the primary Indian modeling support and ANL/NCAR in the US for the same role.
- University scientists from India, US and Europe, the DOE and NCAR scientists for Chemical and aerosol measurements.
- I will work with Greg Carmichael Jayaraman, Guillermo Streets and Jeff Gaffney and possible Mario and Louisa Molina on a plan for the project.
- If I can get Molina's interested they US establishment will be more willing to participate.
- P K Dash will be the primary POC from India for