October 2004 Field Campaign

Comparison of instruments and measurements/
Validation of regional and global aerosol models
Mission Statement

The ABC project will initiate its first field campaign by bringing together experimentalists and modelers in order to understand the fundamental issues involved with measuring and modeling the carbonaceous and inorganic components of combustion influenced aerosols in Atmospheric Brown Clouds.

Goals

Main Goal: To understand the uncertainties in critical ABC measurements and facilitate improvements in instruments, measurement techniques and protocols.

Supplementary Goal: Jump-start the ABC observational program and begin the process of collaborating across national boundaries.

Objectives

Comparison of Instruments and Measurements: To understand the range of various measurement techniques for determining critical parameters. In particular, the following parameters will be emphasized: Aerosol chemistry, aerosol optical properties, aerosol physical properties, gas measurements, rain chemistry, solar fluxes and Lidar profiles. It is our hope this comparison study will be useful for assessing the uncertainties in ABC measurements and for identifying the most superior methods and techniques.

Model Validation: Validate three-dimensional aerosol models using average and high resolution measurements of the parameters identified above. The model results will also be used to constrain expected values during instrument and measurement comparisons.

Training and Capacity Building: A one week workshop will be organized with lectures by the science team members on Brown cloud research, observational techniques and instrumentation. The participants will have a chance to assist in the observation campaign. The program will be coordinated by the super-site managers and the UNEP secretariat.

Organization

Planning Committee

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<tr>
<th>G. Carmichael</th>
<th>A. Jayaraman</th>
<th>V. Ramanathan (Chair)</th>
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<td>C. Corrigan</td>
<td>Y. Kondo</td>
<td>G.Y. Shi</td>
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<td>E. Dutton</td>
<td>T. Nakajima</td>
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<td>L. Granat</td>
<td>J. Ogren</td>
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Coordinating Teams

MALDIVES (Funded by NOAA, NSF, NASA)

Chief Scientist – V. Ramanathan
Site Manager – H. Nguyen
Site Scientists – C. Corrigan & M. Ramana

Aerosol – C. Corrigan
Radiation – E. Dutton & M. Ramana
Lidar – A. Jayaraman & M. Ramana
Gas Phase –
Rain Chemistry – L. Granat
Model Validation – G. Carmichael

GOSAN

Chief Scientist –
Site Manager –
Site Scientists –

Aerosol – Y. Kondo
Radiation –
Lidar –
Gas Phase – H. Tanimoto & T. Wang
Rain Chemistry – L. Granat
Model Validation – G. Carmichael
**Instrument and Method Comparison Strategy**

**Component 1 – Intra-instrument/method calibration**

All similar instruments (or methods) will be calibrated and compared to ensure that reliable data is being obtained from every instrument participating in the ABC network. All comparisons of this type do not need to be done at one of the Super Observatories. Comparisons may be done by different regions or countries with only a few representative instruments being sent to the Super observatories. The measurements will also give an estimate of the expected data scatter for each type of instrument.

*Example.* All K&Z pyranometers compared to establish range of data scatter and to discern any faulty pyranometers.

**Component 2 – Inter-instrument/method calibration**

All instruments (or methods) utilizing the same general method of measuring a specific parameter, but of a different model or a different manufacturer, will be compared to establish calibration and correction criteria. These corrections will be applied to standardize the actual ABC data.

*Example.* Ecotech and TSI nephelometers

*Example.* EC/OC analysis methods

**Component 3 – Comparison of Techniques**

Selected instruments using different methods to measure the same specific parameter will be compared to determine which method is most suitable for use at the ABC sites. These top instruments and methods will be emphasized as the suggested standard for future and upgraded ABC observatories.

*Example.* Filters vs. Aethalometer

*Example.* PM1, PM2.5, and PM10 filter cuts using different inlets

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**Modeling Comparison Strategy**

**Pre-Mission Activities:** In preparation of the October 2004 experiment the various modeling tools that will be used in the integration, interpretation, and evaluation will be identified, and protocols established. The tasks to be performed are outlined below:

1. Establish a modeling team by April 1 to develop detailed plans of campaign.
2. Develop preliminary tests of analysis methods using available data sets.
3. Coordinate with measurement teams
   - Data availability
   - Integration of measurement data into models
   - Determine model results influence on measurement strategy
   - What model products will be available to help understand measurements.
   - Cooperated with the on-going emission work in the region by ABC-Asia.
   - Decide whether or not to use a common emission inventories.
   - Establish emission database similarities and differences BEFORE we present results.
5. Establish a modeling web-site to coordinate and display ongoing analysis and model products.

**Intensive and Post-Mission Activities:** During the intensive period model products in support of the operations are planned. Post-mission activities will focus on the comparison of model results with observed quantities, context analysis including source identification, and the inter-comparison of the model results. Specifically,

1. Real-time modeling analysis will be performed to support the intensive operations. Information will be disseminated via a web-site
2. Comparison of model results with observations.
3. Context analysis including source identification.
4. Comparison of model results, and analysis to identify reasons for similarities and differences.
5. Workshop to discuss preliminary findings.
Approach

During the Field campaign, a training workshop will be held in the Maldives for students and scientists from South and Southeast Asia.

The training workshop will include the following:
- Lectures on Aerosols, Air Pollution, and Climate
- Demonstration of Instruments and Experimental Techniques
- Hands On Experience with experimental Techniques

Project ABC will develop several regional resources, including:
- an Asian Climate Modeling Center
- Regional Training and Instrument Calibration Centers
- an Integrated Data Center on Climate, Agriculture and Public Health

The training process and exchange of ideas will be facilitated by teleconference. During an ABC workshop in February 2002 in La Jolla, California, ABC scientists (image on left monitor) “met” with Director of UNEP Regional Resource Centre for Asia Pacific, Surendra Shrestha, who was at the Asian Institute of Technology in Bangkok, Thailand (image on right monitor).