

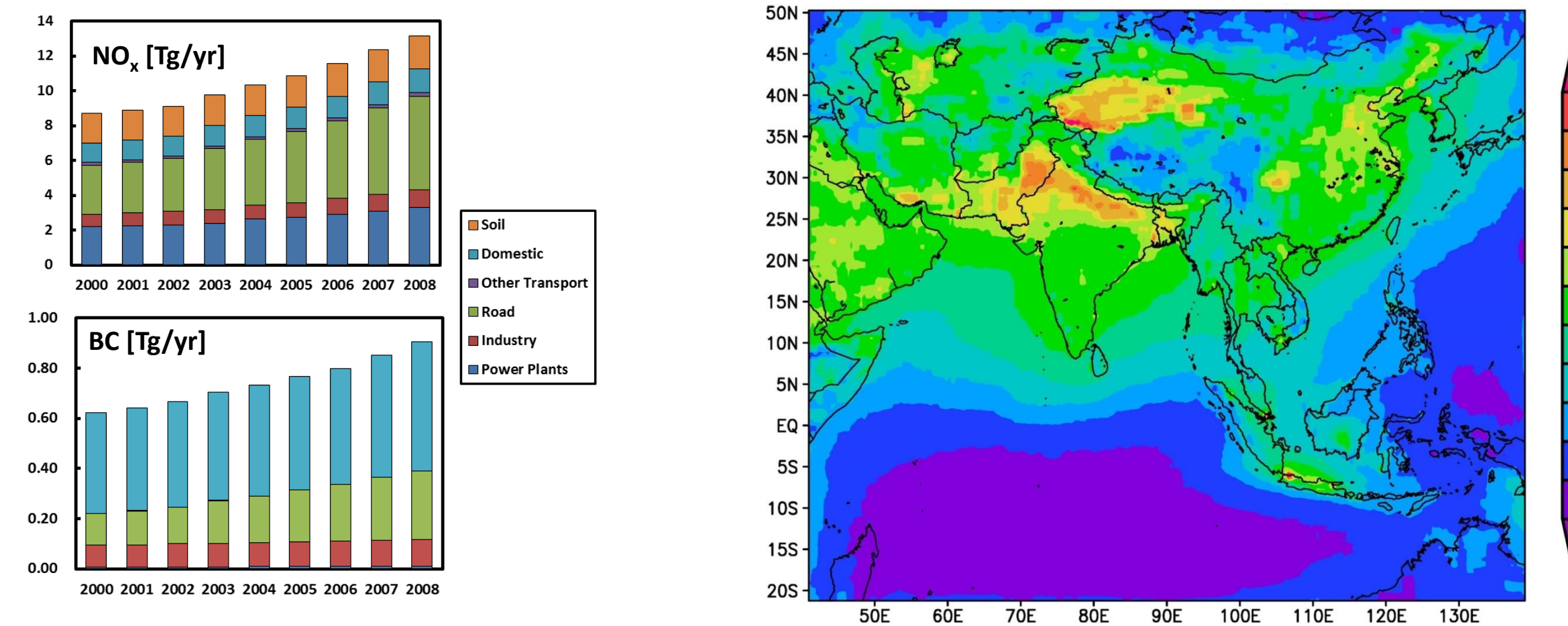
Laura Pan (co-lead), Jim Crawford (co-lead), Mary Barth (IGAC Liaison), Michelle Santee (SPARC Liaison), Hiroshi Tanimoto (IGAC-Asia Liaison), Arnico Panday (ICIMOD Liaison), Sachiko Hayashida, (2nd Workshop Local Organizing Committee)
Working Group Leads: Vinayak Sinha, Gabriele Stiller, Jessica Neu, Chiara Cagnazzo, Hans Schlager, Jianchun Bian, Mary Barth, and Ritesh Gautam

Background

As a weather pattern, the Asian monsoon impacts the lives of more than a billion people. Regions affected by the monsoon have experienced rapid population and economic growth in the recent decade; thus, the coupling between the monsoon convection and changing surface emissions is of broad interest to the Atmospheric Composition community. This interest extends to possible feedbacks on the monsoon circulation through enhanced aerosol–cloud interactions. Satellites have further demonstrated the effectiveness of the monsoon circulation for transporting pollutants to the stratosphere. The monsoon system is therefore relevant to scales and processes bridging regional air quality, climate change, and global chemistry-climate interaction. Accurate representation of this system in global chemistry-climate models is critical to predicting how this evolving region may contribute to future change.

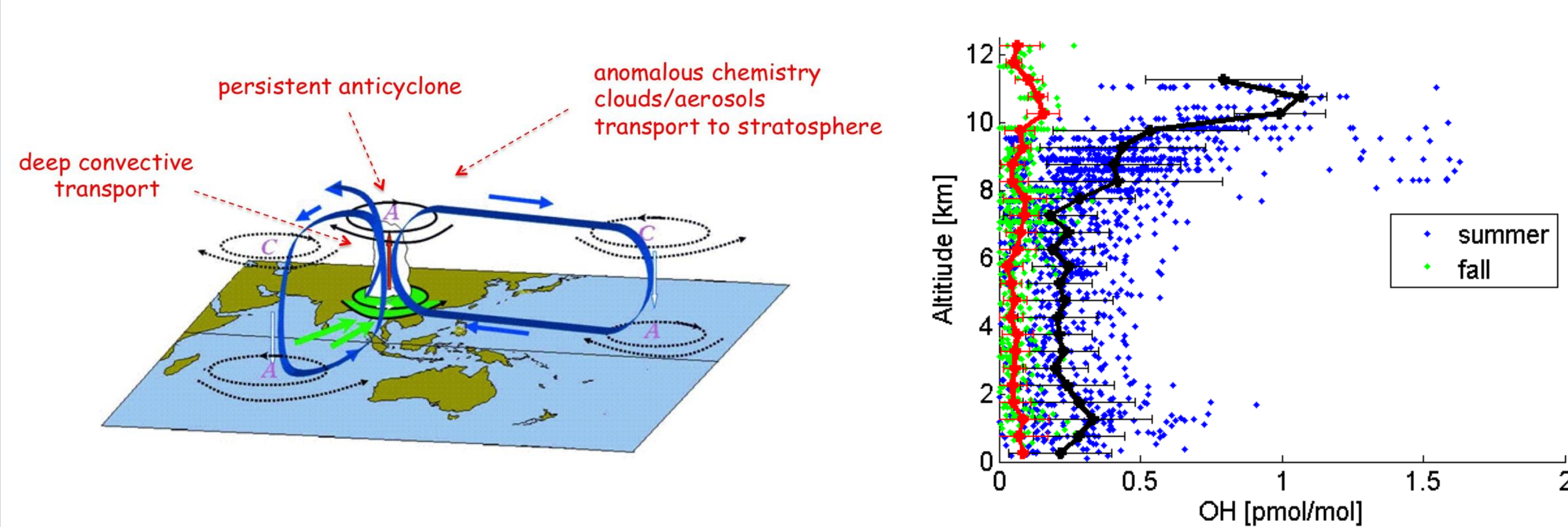
Scientifically, the initiative focuses on four themes, each representing a key aspect of the connection between atmospheric composition and Asian monsoon dynamics. The first ACAM Workshop convened June 2013 in Katmandu, Nepal and was organized around these four themes. While the depth of material presented at the workshop cannot be shared here, the figures below have been taken from the workshop presentations and serve to introduce each theme.

Theme 1: Emissions and air quality in the Asian monsoon region



Left: Example of increasing emissions in South Asia from the Regional Emissions Inventory in Asia (REAS) version 2.1 (Kurokawa et al., 2013). Growth in road emissions are becoming a dominant source for NO₂ and increasingly contribute to black carbon which continues to be dominated by domestic use of biofuels. (From ACAM Workshop presentation by Jun-Ichi Kurokawa)
Right: Four-year mean surface PM_{2.5} concentrations in Asia based on a regional model with assimilation of MODIS AOD (Carmichael et al., 2009). PM_{2.5} concentrations are high throughout monsoon Asia, with contributions from dust, biomass burning and anthropogenic activities. Concentrations and composition vary by season and regions. (From ACAM workshop presentation by Greg Carmichael)

Theme 3: Impact of monsoon convection on chemistry



Left: Summer broad-scale circulations demonstrating the transport pathways from the surface to the upper atmosphere (From ACAM Workshop presentation by Bill Randel)
Right: Seasonal change in the vertical distribution of OH radicals related to convective influence. The relative importance of lightning NO_x versus convective transport of precursors and their influence on oxidation rates and ozone needs to be better understood. (From ACAM Workshop presentation by Hartwig Harder)

Next Steps

ACAM is an emerging SPARC/IGAC activity that will be developed more fully over the next two years. The ACAM initiative seeks to provide a forum for interested scientists to collaborate and organize their efforts. Discussions during the first ACAM Workshop identified four areas of effort that would build a stronger community of scientists. These are represented by the recently established working groups described below.

Working Group 1 – Data Sharing

Co-Leads: Vinayak Sinha (Indian Institute of Science Education and Research, Mohali)
Gabriele Stiller (Karlsruhe Institute of Technology)

Purpose: Identify ACAM-relevant datasets and organize data sharing

Working Group 2 – CCMI (Chemistry-Climate Model Initiative)

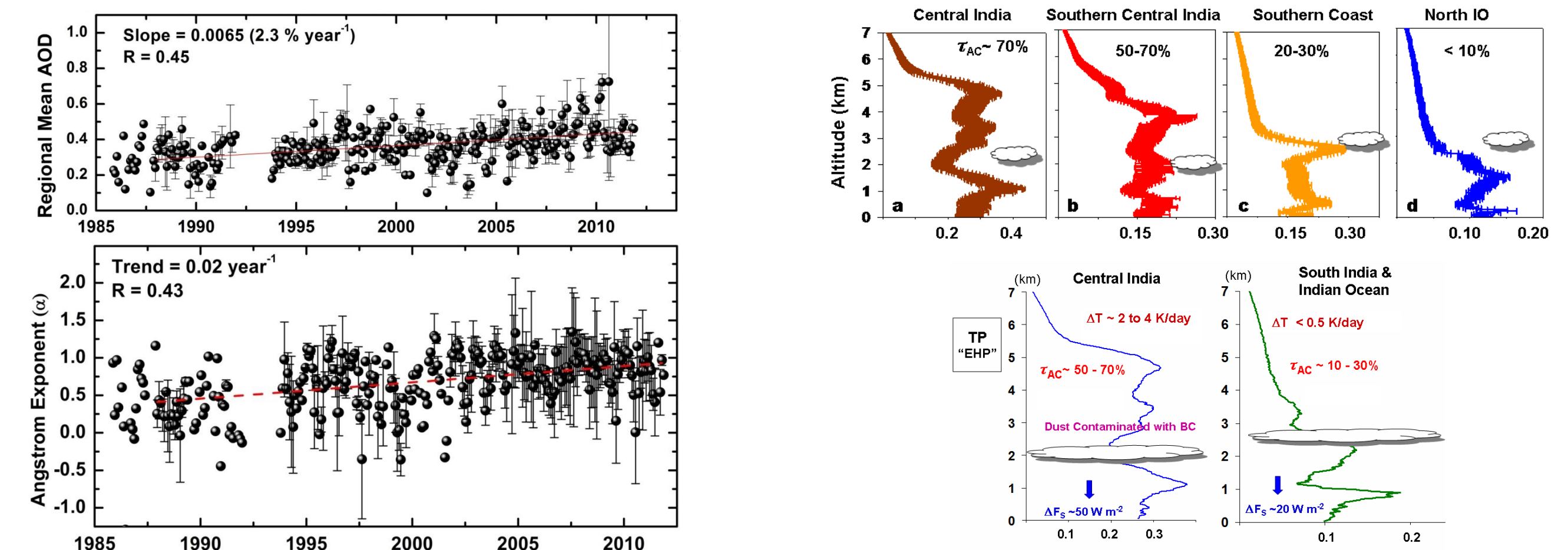
Co-Leads: Chiara Cagnazzo (Institute for Atmospheric Sciences and Climate)
Jessica Neu (NASA Jet Propulsion Laboratory)

Purpose: Form a partnership with CCMI to focus on the representation of ACAM impacts in global climate models

Second ACAM Workshop, 8-10 June 2015, Bangkok, Thailand

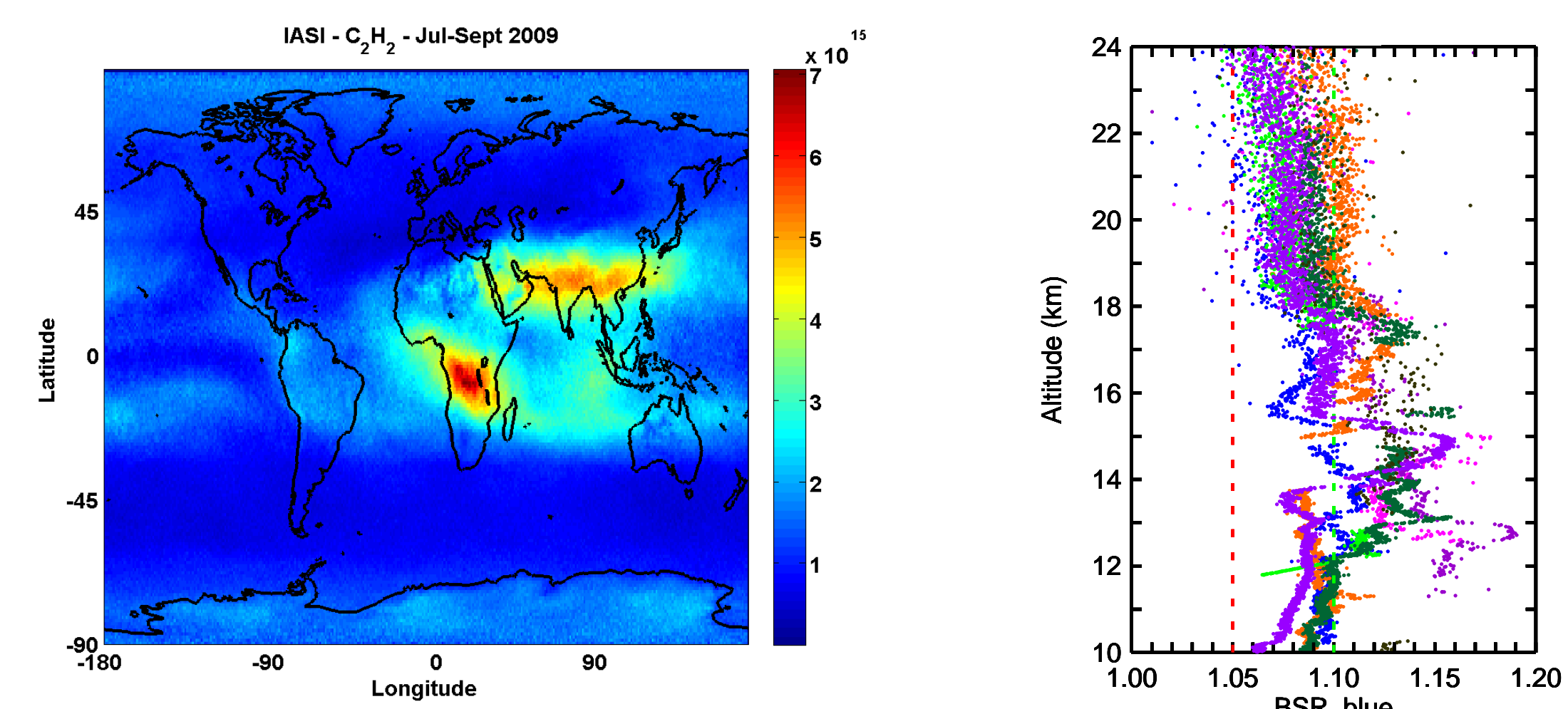
Planning is underway for the workshop. The local organizing committee and scientific program committee will be providing details on the venue and agenda in the coming months. Details will be disseminated through the website (<https://www2.acd.ucar.edu/acam>) and the mailing list (subscribe to acam-owner@acd.ucar.edu).

Theme 2: Aerosols, clouds, and their interactions with the Asian monsoon



Left: Increasing trends in aerosol optical depth and angstrom exponent across the ARFINET sites demonstrate the role of anthropogenic influence (From ACAM Workshop presentation by Suresh Babu; also taken from K. K. Moorthy et al. 2013, Geophysical Research Letters)
Right: Vertical distribution of aerosol over India. Absorbing aerosol layers above clouds can have a profound influence on atmospheric temperature structure and radiation budget. (From ACAM Workshop presentation by Suresh Babu; also taken from Satheesh et al. 2008, Geophysical Research Letters)

Theme 4: UTLS Response to the Asian Monsoon



Left: Enhanced acetylene observed by IASI over South Asia during the monsoon season demonstrates the interaction between monsoon dynamics and emissions and is a reminder that in situ observations from aircraft are sorely needed. (From presentation by Cathy Clerbaux) IASI acetylene retrieval sensitivity maximizes in the UTLS region. IASI builds on previous observations by the MLS and ACE satellites.
Right: Profiles of the 455 nm backscatter ratio from the 18 COBALD (Compact Optical Backscatter Aerosol Detector) sondes launched from Kunming, China in August 2012. These soundings provide the first in situ corroboration of the Asian tropopause aerosol layer. (From presentation by Jianchun Bian)

How to Become Involved:

Subscribe to the ACAM email group by sending a message to acam-owner@acd.ucar.edu

Join a Working Group (group leads are listed on the website listed below and can be contacted directly)

Attend the ACAM Side Meeting (Tuesday, 6:15 pm) to discuss plans for the next year regarding Working Group activities and the Second ACAM Workshop