Report on the fourth Workshop and third Training School of ACAM

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Date:
24-28 June 2019

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Local Organising Committee:
Mohd Talib Latif, Fatima Ahamad, Abdus Salam, Xuemei Wang, Manish Naja, Suresh Babu, Didin Agustin Permadi, Puji Lestari, Masatomo Fujiwara, Sachiko Hayashida, Prabir Patra, Chang-Keun Song, Rokjin Park, Ohnmar Tin Hliang, Maheswar Rupakheti, Muhammad Fahim Khokar, Liya Yu, Worradorn Phairuang, Kim Oanh, To Thi Hien.

Host Institution:
Universiti Kebangsaan Malaysia (UKM), Bangi, Malaysia

Number of Participants: 154

Number of countries/regions: 22

Sponsors:

Endorsements: SPARC, IGAC

Workshop Website: http://www.ukm.my/acam/

ACAM Website: https://www2.acom.ucar.edu/acam

ACAM (Atmospheric Composition and the Asian Monsoon) is a joint SPARC/IGAC activity that focuses on the connection between Asian monsoon dynamics and atmospheric composition which has important regional and global impacts. The aim is to build strong international collaborations for ACAM science, and to promote early career scientists and students in the monsoon region.

Report

The ACAM activity was initiated in 2013 and focuses on the interplay between emissions, monsoon dynamics and atmospheric composition. The objective is to understand the impacts from local to global scales including air quality, aerosol-cloud interaction, convective transport of pollutants, and effects on the composition of the upper troposphere and lower stratosphere. Integrated studies are important to quantify the impact of the monsoon system, including in-situ and remote sensing observations as well as modeling from regional to global scales. ACAM promotes the establishment of international collaborations bringing together diverse expertise and resources as well as capacity building in the monsoon region through workshops and training schools.

Following the first ACAM workshop in Kathmandu, Nepal, 2013, and the ACAM workshops and training schools in Bangkok, Thailand, 2015, and Guangzhou, China, 2017, the present workshop and training school in Bangi, Malaysia provided again an excellent opportunity for ACAM scientists to highlight and discuss their research results and for students and early career scientists to learn about ACAM related science and to get familiar with corresponding datasets in small projects conducted during the training school.

Workshop

The fourth ACAM Workshop was held on 26-28 June 2019 at the Universiti Kebangsaan Malaysia (UKM) in Bangi, Malaysia, including 154 participants from 22 countries/regions. Scientific presentations and discussions covered a broad range of topics including emissions and air quality in the monsoon region, deep convection coupled to surface emissions, transport pathways of pollutants into the stratosphere, Asian tropopause aerosol layer (ATAL), and monsoon-climate interactions. An understanding and accurate representation of the monsoon system in global chemistry-climate models is critical to predicting climate change. The workshop program was structured according to the four ACAM themes:

1) Emissions and air quality in the Asian monsoon region,
2) Aerosols, clouds, and their interactions with the Asian monsoon,
3) Impact of monsoon convection on chemistry,
4) Response of the upper troposphere and lower stratosphere to the Asian Monsoon.

The workshop included 50 oral and 90 poster presentations. About 30 percent of the oral presentations were given by early career scientists. All posters were also introduced in rounds of 1-minute oral presentations. After an introductory presentation to the workshop by Hans Schlager (DLR, Oberpfaffenhofen, Germany)), each session began with invited talks. Concerning emissions and air quality in Asia, Tao Wang (Uni. Hong Kong) presented tropospheric ozone trends in subtropical Asia, Nguyen Thi Kim Oanh (AIT, Bangkok, Thailand) described the role of crop residue burning for air quality in the monsoon region, and Maheswar Rupakheti (IASS, Potsdam, Germany) presented mitigation measures of air pollution in the Himalayan region. Aerosol-induced changes in convective cloud systems were discussed by Chandan Sarangi (PNNL, Richland, USA). Hartwig Harder (MPI-C, Mainz, Germany) presented aircraft measurements and results of simulations with a global chemistry model related to the OMO campaign in the Asian monsoon region. Pengfei Yu (NOAA, Boulder; USA and Uni. Jinan, Guangzhou, China) discussed modeling of stratospheric aerosols. Results from the recent StratoClim aircraft campaign in the center of the Asian summer monsoon anticyclone were presented by Stephan Borrmann (MPI-C, Mainz, Germany) and Michael Höpfner (KIT-IMK, Karlsruhe, Germany). Contributed presentations covered results from recent balloon campaigns (SWOP and BATAL) as well as modeling results on the coupling of local emissions with regional and global composition. Also, satellite retrievals of atmospheric composition over the Asian monsoon region were presented. In addition, plans for upcoming field campaigns related to ACAM were reported, e.g. the ACCLIP campaign in 2020. Most of the oral and poster presentations are available on the ACAM website https://www2.acom.ucar.edu/acam.

The workshop included also break-out meetings of the three ACAM working groups:

1) "Observations and Data Sharing" which aims to identify ACAM-relevant datasets, organize data sharing, and encourage future coordinated observations,
2) "Modeling and Analysis" with the objective to foster interactions between the global and regional modeling communities and to organize ACAM-related modeling,
3) "Training School" which is focusing on the development of future training opportunities for early career scientists on observations and modeling.

In the working group meetings the focus of the discussions was on the best way to promote collaborations in the field of ACAM science, e.g. partnership with other modeling communities (e.g. CCMI, AEROCAM) and sharing of data from recent ACAM-related field campaigns. Also, the discussions during the working group meetings and poster sessions allowed the scientists to initiate collaborations with international partners. Scientists and students who are interested to join the ACAM activity and working groups can send a subscription request via the ACAM website.

Training School

The third ACAM Training School took place on 24-25 June 2019 at the Universiti Kebangsaan Malaysia (UKM) preceding the ACAM Workshop. It included 37 early career scientists, postdocs, and graduate students from 15 countries. The focus of this training school was on "Satellite Observations and Analysis of Atmospheric Chemistry and Aerosols in the Asian Monsoon region" The school included lectures, computer-based tutorials, and small student projects. Latest satellite and reanalysis datasets on atmospheric composition were used with focus on the monsoon region. Lectures at the school were given by Ilse Aben (SRON, Netherlands), Bhupesh Adhikary (ICIMOD, Nepal), Silvia Bucci (LMD, France), Federico

Fierli (EUMETSAT, EU), Ritesh Gautam (EDF, USA), Laura Pan (NCAR, USA), Amit Pandit (NASA Langley, USA) and Mark Parrington (ECMWF, UK). The training school participants had also the opportunity to attend the ACAM workshop to learn more about ACAM related science.

One emphasis of the school was the live demonstration of satellite datasets and open source platforms/scripts for reading, visualization, and analysis of the data (e.g. Google Earth Engine and Python scripts). The various satellite datasets included TROPOMI (CO, NO_2 and SO_2 products), GOME (NO_2), MODIS (aerosol), CALIPSO (vertical aerosol profile). In addition the Copernicus Atmospheric Monitoring Service was introduced (CAMS trace gas products). A live webinar was conducted prior to the school providing an overview about the format of the school and the multi-sensor satellite data products to be used. Also specific information about the datasets and analysis platforms were made available to the students prior to the school on EUMETSAT's e-learning platform.

After the science lectures on the first day, the participants worked in groups to perform small projects focusing on the analysis of NO_2 pollution hotspots in the monsoon region. Urban and fire emissions were analysed using TROPOMI and GOME trace gas data, as well as MODIS and CALIPSO data on dust and smoke. Satellite data were compared with model results using the CAMS platform. The school concluded with group presentations of the participants summarizing their findings and experience with the data and tools. This was the first ACAM training school that included practical work in groups besides the science lectures. This new concept for the ACAM school was very well received by the participants.

Figure 1: Participants of the fourth ACAM Workshop in the Pusat Siwazah Lecture Hall of the Universiti Kebangsaan Malaysia
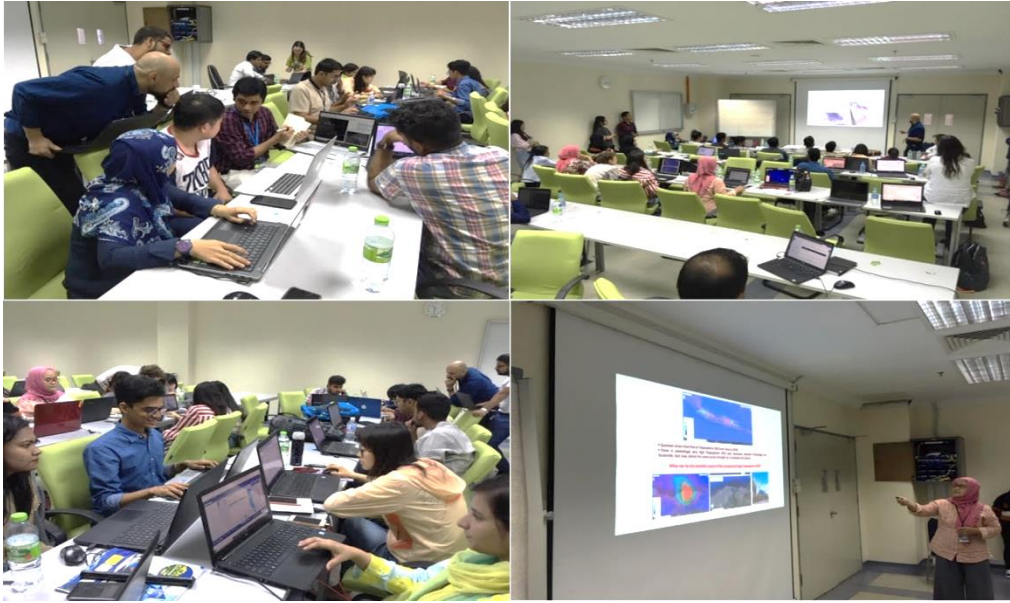
Figure 2: Students and early career scientists at the third ACAM Training School