A Training School

on

Aerosol-Cloud Interactions and Microphysical Processes

Satur 7 March – Sun 15 March, 2009

Sponsored by

Department of Science and Technology

New Delhi

Organized at

Department of Civil Engineering
Indian Institute of Technology
Kanpur – 208 016

INTRODUCION

The Department of Science and Technology (DST) sponsors state-of-art courses in engineering and science for the benefit of faculty of engineering colleges, as well as engineers working in industry, R & D organizations and CSIR laboratories, and scientists from government departments in the country. These courses also offer an opportunity for increasing industry academia interaction.

AIMS AND SCOPE

The climatic impacts of aerosols are generally grouped into two broad categories: the so called *direct* and *indirect effects*. The latest report of Intergovernmental Panel on Climate Change (IPCC) has noted that during the last decade significant progress has been made in quantifying the direct effects of aerosols, whereas the same is not true for indirect effects. The indirect effects are due to modification of cloud properties by aerosols or in other words a manifestation of how aerosols interact with clouds and the dependence on microphysical properties of both aerosols and clouds. Thus understanding the indirect effects requires a thorough understanding of microphysics of aerosols and clouds.

The proposed training School aims to cover the fundamentals of various aerosol and cloud microphysical processes, such as nucleation (gas-to-particle and ice nucleation), condensational and depositional growth of liquid droplet and ice particles, and particle-particle interactions (collision and coalescence). The participants will be exposed to the numerical models and state-of-the art experimental tools. A few case studies (based on recent field campaigns) on the aerosol-cloud interaction will be covered. This should be useful for the participants in their teaching, and should also help them in undertaking research on challenging atmospheric problems.

COURSE CONTENTS

1. **Cloud Thermodynamics**
2. **Aerosol Microphysics-Theory**
   Gas-to-particle Conversion (Nucleation Theories)
   Condensational Growth
   Coagulation
3. **Aerosol Instrumentation**
   Optical Techniques
   Electrical Techniques, Photo Acoustic Techniques
4. **Cloud Microphysics-Theory**
   Cloud Droplet Activation (Modified Kohler Theory)
   Cloud Droplet Growth
   Droplet-Droplet Interaction (Collision and Coalescence)
6. **Ice Microphysics-Theory**
   Homogeneous Nucleation
   Heterogeneous Nucleation
   Ice Growth and Ice-Ice and Ice-Liquid Droplet Interaction
7. **Cloud Instrumentation**
   Cloud Condensation Nucleus Counter
   Cloud Droplet Probe, Cloud Imaging Probe, Liquid Water Content
8. **Case Study-ICARB and CTCZ Pilot Experiment**
   Ground Based Measurements
   Aircraft Measurements
   Ground Based Radiometers
10. **Aerosol-Cloud Interactions and Numerical Modelling**
    Aerosol Microphysical Models
    Cloud Microphysical Models
11. **Global Simulations**
    Cumulus Parameterization schemes
    GCM Simulations of Aerosol Direct Effects
    GCM Simulations of Aerosol Indirect Effects

FACULTY

Dr. S. N. Tripathi (Coordinator, IIT Kanpur)
Dr. T. Gupta (IIT Kanpur)
Prof. G. S. Bhat (Indian Institute of Science, Bangalore)
Dr. K. Krishnamoorthy (SPL, Vikram Sarabhai Space Center)
Prof. O. P. Sharma (IIT Delhi)
Dr. R. Nanjundaiah (Indian Institute of Science, Bangalore)
Dr. Pradeep Kumar (University of Pune)
Dr. Hari Singh, Director, India Meteorological Department

ACCOMMODATION

Accommodation for the duration of the course will be arranged in the Visitors' Hostel of IIT Kanpur on twin-sharing basis

FEES

PARTICIPANTS FROM ACADEMIC INSTITUTIONS

Twenty five participants from academic Institutions will be sponsored by DST. Participants will be selected on an all-India basis. Selected candidates will be paid AC-III tier railway/bus round trip fares by the shortest route from /to their place of work. Boarding and lodging (twin-sharing) expenses of these participants at the IIT Kanpur Visitors' Hostel will be borne by DST. The registration form (Photocopies can be used), duly forwarded by the head of the institution and a Demand Draft (see below) for Rs. 500/- should reach the course coordinators on or before **December 15, 2008**. This fee is non-refundable in case of cancellations and will be refunded on arrival of the participant.

PARTICIPANTS FROM ACADEMIC ORGANIZATION AND R & D ORGANIZATIONS

Twenty five participant from academic organization and 10 from R & D organization would be accommodated on a self-sponsored basis. The course fee will be Rs. 10,000 for each participant. This covers the cost of one set of course notes and attendance in the lectures. Boarding, lodging, traveling and all other expenses are to be paid by these participants, additionally. A crossed demand draft for the registration fee of Rs. 10,000/-, as well as the registration form (this can be photocopied), duly filled and forward, should reach the course coordinators on or before **December 15, 2008**.

DETAILS OF THE DEMAND DRAFT

These should be drawn in favor of "*Aerosol-Cloud Interactions and Microphysical Processes, IIT Kanpur*" and payable at Kanpur (the State Bank of India has a branch at IIT Kanpur).

IMPORTANT DATES

Last date for receiving application	**December 15, 2008**
Confirmation of participation	**December 30, 2008**

Selected candidates will be informed by e-mail, if the e-mail address is provided

COURSE COORDINATORS

Dr. S.N. Tripathi
Phone (O) 0512 259 7845
(R) 0512 259 8806
FAX 0512 259 7395
(Attn. S.N. Tripathi)
E-mail snt@iitk.ac.in

and

Dr. Tarun Gupta
Phone (O) 0512 259 7128
(R) 0512 259 5641
FAX 0512 259 7395
(Attn. Tarun Gupta)
E-mail tarun@iitk.ac.in

REGISTRATION FORM

A Training School on

Aerosol-Cloud Interactions and Microphysical Processes

07-15 March, 2009

Sponsored by Department of Science and Technology

Name:……
Date of Birth:……
Designation:……
Organization:……
Address for Correspondence:……
……
……
Phone: (O) …… (R) ……
Fax: …… E-Mail……

Degree	Year	University

Experience (Years):……
Research Interests:……
……
……

Payment Details

Draft No:……Date……
Amount: Rs…… Drawn on:……

Sponsored by

Name:……
Designation:……
Organization:……

Recommended Signature

(Head of the Institution, with seal) (Applicant)