Symposium on

Coupled Chemistry-Meteorology/Climate Modelling (CCMM): status and relevance for numerical weather prediction, atmospheric pollution and climate research

WMO, Geneva, Switzerland
23-25 February 2015

2nd Announcement

Motivation and aims

The development of numerical models that couple meteorology with atmospheric chemistry and aerosol dynamics within one integrated model system has undergone a rapid evolution in recent years. The motivation for this development is that meteorology has not only a strong impact on air quality, but in return atmospheric composition has a potentially strong feedback to weather and climate. Relevant questions for the broader communities are related to the impact of air constituents on both air quality and incoming radiation, the modification of weather (cloud formation and precipitation) by natural and anthropogenic aerosol particles, and the impact of climate change on the frequency and strength of such effects and air quality.

The symposium aims to review the current research status of online coupled meteorology (weather and climate) and atmospheric chemistry modelling, and to assess the processes relevant for the interactions between atmospheric physics, dynamics and composition. In addition, it will highlight scientific issues and emerging challenges that require proper consideration to improve the reliability and usability of these models for the three scientific communities: air quality, numerical weather prediction and climate modelling. It will present a synthesis of scientific progress and provides recommendations for future research directions and priorities in development, application and evaluation of online coupled models.

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World Meteorological Organization (WMO) Commission for Atmospheric Sciences (CAS) and
World Climate Research Programme (WCRP).

Key Topics

Main focus is on Aerosols and their feedbacks/forcing, with the following scopes and frameworks:

- Coupled chemistry-meteorology (weather and climate) modelling: approaches and requirements;
- Key processes of chemistry-meteorology interactions and their descriptions;
- Aerosol effects on meteorological processes and Numerical Weather Prediction (NWP);
- CCMM for air quality and atmospheric composition;
- CCMM for regional and global climate modelling;
- Model validation and evaluation;
- Data requirements, use of observations and data assimilation;
- Outlook and future challenges.

Registration and Abstract submission

Abstract submissions and registration	**1 December 2014** DEADLINE
Notification of acceptance	15 December 2014
Registration	http://eumetchem.info

Key scientific questions

- What are the advantages of integrating meteorological and chemical/aerosol processes in coupled models?
- How important are the two-way feedbacks and chains of feedbacks for meteorology, climate, and air quality simulations?
- What are the effects of climate/meteorology on the abundance and properties (chemical, microphysical, and radiative) of aerosols on urban/regional/global scales?
- What is our current understanding of cloud-aerosol interactions and how well are radiative feedbacks represented in NWP/climate models?
- What is the relative importance of the direct and indirect aerosol effects as well as of gas-aerosol interactions for different applications (e.g., for NWP, air quality, climate)?
- What are the key uncertainties associated with model predictions of feedback effects?
- How to realize chemical data assimilation in integrated models for improving NWP and air quality simulations?
- How the simulated feedbacks can be verified with available observations/datasets? What are the requirements for observations from the three modelling communities?

CCMM Possible Applications

- Chemical weather / air quality forecasting and reanalyses
- Numerical Weather Prediction (NWP) for precipitation, visibility, thunderstorms, etc.
- Integrated Urban Meteorology, Environment and Climate Services
- Sand and Dust Storm Modelling and Warning Systems
- Wild fire atmospheric pollution and effects
- Volcano ash forecasting, warning and effects
- High Impact Weather and Disaster Risk
- Effects of Short-Lived Climate Forcers
- Earth System Modelling and Projections
- Data assimilation for air quality and NWP
- Weather modification and geo-engineering

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