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CMAS Quarterly

The Quarterly Newsletter of the Community Modeling and Analysis System

Mark Your Calendars!

The 5th annual CMAS conference is scheduled for October 16-18, 2006, at UNC. Watch the CMAS web site for further details.

Upcoming Training Events for 2006

(All are at UNC unless otherwise indicated)

SMOKE Training:
- January 23-24
- April 27-28
- July (dates TBD)
- October 19-20

CMAQ Training:
- January 25-27
- April 24-26
- July (dates TBD)
- October 11-13

Can't come to us for training? Have the same courses taught on-site at your location by the same experienced trainers. Visit http://www.cmascenter.org/cmastraining or contact cmas@unc.edu for more information.

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Credits:

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Please come visit us on the Web!

www.cmascenter.org

Highlights of the 4th Annual CMAS Conference

On September 26-28, CMAS held its 4th annual conference in the Friday Center at the University of North Carolina at Chapel Hill. More than 200 participants attended, including 25 foreign scientists from 13 countries. UNC Provost, Dr. Robert Shelton, gave the welcoming address. The keynote speech was delivered by Mr. William G. Ross, Jr., Secretary, North Carolina Department of Environment and Natural Resources.

Adel Hanna, CMAS Director, discussed the status of the CMAS Center, and then presented awards to two attendees who made significant contributions to the air quality community during 2005: Dr. Krish Vijayaraghavan (AER) and Dr. Tanya Otte (EPA-ORD). Krish was recognized for his work developing and deploying CMAQ-MADRID, while Tanya was recognized for her work on the new version of the meteorology processor MCIP.

The conference included seven sessions (72 papers) plus a poster session (35 papers). Parallel sessions were conducted on the second day. Papers presented in the "Model Development" session will be considered for a special issue of the *Journal of Applied Meteorology*.

The conference also included two panel discussions led by subject matter experts: "Current Status of Air Quality: Trends and Health Effects" and "The Future of Air Quality Modeling: Addressing Current Shortcomings of the Models." Papers and panel presentations are posted on the CMAS web site (www.cmascenter.org).

Special note regarding the 2003 CMAS conference: The journal *Atmospheric Environment* is about to publish the "Model Evaluation" special issue that is based on papers given at the 2003 3rd annual CMAS conference. About 25 papers have passed the peer review process and are ready for publication.

CMAQ Developers Convened

As part of the CMAS conference, CMAS Applications and Training Coordinator Zac Adelman conducted two special lunch meetings that involved primary CMAQ developers at EPA/NOAA and active development groups from within the modeling community. Attendees discussed issues related to current and upcoming CMAQ releases, supporting the user community, and scheduling semi-annual meetings/conference calls of this group to discuss outstanding CMAQ technical issues. Examples of topics discussed:

- Developers' roles in providing technical support of the models
- Streamlining interactions between developers and the CMAS Center
- Technical support staff
- Reviewing/assimilating third-party bug fixes
- Expanding the CMAQ development and code submission protocols
- Targeted future release dates
- Future meetings of the CMAQ developers group

The developers decided to assemble ad hoc working groups for specific topics. They will communicate at least twice per year by conference call in addition to their meeting during the annual conference. CMAS will create a web page for developers to use in sharing new developments and discussing active topics. Also, a new listserv, M3dev, will be used as a forum for discussions and exchanging information.

The CMAS Center's Fifth Year: What Lies Ahead for Users?

The University of North Carolina at Chapel Hill has been awarded a new EPA contract to continue the operation of the CMAS Center. Looking forward, users may expect progress along multiple avenues.

CMAS will be working with the community to develop advanced training courses to complement the very successful basic training on CMAQ, SMOKE, and MIMS, which will continue to be held quarterly. Possible topics for advanced training include process analysis, and analysis and model evaluation methodologies.

A user information web page will be developed as a query tool to help people locate other model users who are close to their geographic locations. Users will also be able to find specific applications that match a search topic of interest (such as scale, PM, visibility, health impacts).

We will also continue developing the SMOKE emissions processing system as well as the Spatial Allocator analysis tool.

Following a proposal to the CMAS External Advisory Committee by Director Adel Hanna, CMAS is discussing with UNC a curriculum for a nondegree, one-month course on air quality modeling (basic theoretical and numerical concepts, hands-on training, and analysis). Graduating students would receive a certificate of course completion. This is part of CMAS's efforts to help the new generation of scientists establish careers in environmental modeling. ***Would you be interested in taking such a course? Do you have ideas on course content? Please mail cmas@unc.edu.***

A Canadian Study on the Impact of GEM and MM5 Meteorology on SMOKE and CMAQ Results

by Weimin Jiang, Ph.D., National Research Council of Canada

(Editor's note: When this article was printed in the previous *CMAS Quarterly*, some of the author's text was accidentally omitted. Below is the complete article. We extend our apologies to Dr. Jiang for the omission.)

In a collaborative project between the National Research Council of Canada (NRCC) and the Canadian Meteorological Centre (CMC) of Environment Canada, the air quality modeling team at NRCC recently studied the impact of using different meteorological models on pollutant emissions output by SMOKE and on CMAQ air quality modeling results. Results from a Canadian meteorological model, GEM, and a U.S. meteorological model, MM5, were used to drive both SMOKE and CMAQ. The original GEM and MM5 results were obtained from CMC and from the Ontario Ministry of Environment, respectively. Two separate SMOKE and CMAQ runs, differing only in meteorology inputs and in meteorology-dependent emissions, were conducted for a July 1999 episode in an Eastern Canada and Northeastern United States domain.

To use GEM output to drive CMAQ, NRCC developed a meteorology processor named GEM-MCIP to process and convert GEM results to CMAQ-ready format. GEM-MCIP is an extension of the U.S. EPA's Meteorology-Chemistry Interface Processor (MCIP) with the capability to read and process meteorological fields generated by either GEM or MM5.

The surface pressure, temperature, wind speed, and water vapor mixing ratio generated by GEM and MM5, as well as calculated relative humidity, were comparatively analyzed. The comparison was also conducted for vertical profiles of pressure, temperature, wind speed, and wind direction. The two sets of modeled meteorology were also compared against measurement data for meteorological model evaluation purposes.

The differences in modeled meteorology, although minor in some cases, affected modeled and processed emissions obtained through SMOKE. Analysis was performed to reveal the differences between on-road mobile source, point source, and biogenic source emissions of various pollutants caused by the differences in the modeled meteorology. The CMAQ outputs of O_3, $PM_{2.5}$, speciated $PM_{2.5}$, and PM_{10} based on the two different sets of meteorology were compared, with attention paid both to averaged concentrations over the domain and to concentrations in particular grid cells and locations. The two sets of CMAQ results were also compared with field measurement data, and various performance statistics for the model runs were calculated. Furthermore, efforts were made to uncover the underlying causes that contributed to the modeled differences.

Results of the study will be published shortly.