

JULY
2011

CMAS Quarterly

The Quarterly Newsletter of the Community Modeling and Analysis System

Upcoming Events

(All are at UNC unless otherwise indicated)

10TH ANNUAL CMAS CONFERENCE:

- Oct. 24–26, 2011

SMOKE Training:

- Oct. 19–21, 2011

CMAQ Training:

- Oct. 27–28, 2011

BenMAP Training:

- Oct. 31 – Nov. 2, 2011

Remote Sensing Data Usage in Air Quality Assessments:

- Sept. 28–30, 2011

The next SMOKE, CMAQ, and BenMAP trainings will be held in April 2012 (dates TBD)

Can't come to us for training? Have the same courses taught on-site at your location. Visit <http://www.cmascenter.org/training/classes.cfm> or e-mail cmas@unc.edu.



Credits

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Please come visit us on the Web!
www.cmascenter.org

The CMAS Center Reaches a Landmark: 10 Years of Serving the Community

A Message from the Director, Dr. Adel Hanna

As part of October's 10th Annual CMAS Conference, CMAS will celebrate 10 years of success in serving and working with the air quality community. A look at the CMAS Center's influence over the past decade reveals its positive impacts on the air quality community both nationally and internationally, in the forms of a wide variety of open-source models and analysis tools; trainings, workshops, and conferences;

hosting of national and international scientists; and visits to users' sites around the world for various support and technology transfer purposes. We at CMAS would like to thank our peers in federal, state, and municipal government, in academia, and in private industry/consulting for your support and collaboration. Without your contributions, the CMAS Center would not have reached such a high level of success.

This year's conference will include several special features: a User Forum that will be open to all participants, to be held during the afternoon of the first day of the conference; a town hall specialty discussion on CMAQ adjoint modeling; and a special session on air quality forecasting that is being held in memory of our respected colleague, Dr. Daewon Byun, who passed away in February of this year.

The 2011 Peer Review of the CMAQ System

On June 27-29, 2011, EPA's Atmospheric Modeling and Analysis Division, with the assistance of the CMAS Center, conducted an external peer review of the Community Multiscale Air Quality (CMAQ) modeling system. This was the fourth external review since CMAQ's public release over a decade ago. A seven-person panel was charged with assessing (1) the overall quality of the applied scientific research in the CMAQ Modeling Program; (2) the strengths and weaknesses of the science being used within the components of the CMAQ model development program; (3) the quality, relevance, and integration of the model development,

application, and evaluation efforts being conducted as part of the CMAQ Modeling Program relative to EPA's overall research program; and (4) the usefulness of the Program to the EPA, states, other customers, and the research community. Panel members included Professor David Allen (University of Texas), Dr. Praveen Amar (Clear Air Task Force), Dr. Nancy Brown (Lawrence Berkeley National Laboratory), Dr. George Kallos (University of Athens, Greece), Dr. Richard McNider (University of Alabama-Huntsville, retired), Dr. Armistead Russell (George Institute of Technology), and Dr. William Stockwell (Howard University).

While the formal written report is still being drafted, the panel's initial feedback was very complimentary. The CMAQ modeling system was singled out as being one of the premier chemistry-transport models for regional air quality, and the Division was commended for its efforts to use evaluations to target improvements in development. The panel's recommendations are being used to guide development of new versions of the CMAQ system—CMAQv5.0 and coupled WRF-CMAQ—which are scheduled for release by CMAS this fall. The final version of the panel's report will be released to the public when it becomes available.

Special Events at the 2011 CMAS Conference

CMAS User Forum: Bring Your Questions and Suggestions

During the afternoon of Monday, October 24, we will conduct a User Forum that will be open to all conference attendees. We want to hear your suggestions and to answer your questions. The goal is to improve the CMAS Center's user support and to address the needs of the community members. The forum will be moderated by CMAS Director Adel Hanna, and five members of the community will steer discussions. Although you can wait until the forum to present your questions/comments, we encourage you to submit them earlier; please e-mail them to Adel at ahanna@unc.edu.

The Adjoint Modeling Working Group Town Hall Meeting

This 30-minute meeting will discuss the development, current status, application, and upcoming beta release of CMAQv4.7.1 Adjoint. Because this is a community-driven effort, we are holding this town hall meeting to help broaden the CMAQ adjoint community. It will begin with a presentation of current CMAQ Adjoint capabilities, including some illustrative examples. We will also discuss the schedule for public release of CMAQv4.7.1 Adjoint and opportunities to participate in beta testing. After the meeting there will be 45 minutes for open discussion and questions from the community. Amir Hakami (Carleton University) and Rob Pinder (EPA) will lead this discussion.

US-UK Collaboration Agreement on Exposure Science

In conjunction with the 2011 CMAS Conference, US and UK scientists will meet on October 28 at EPA's facilities in Research Triangle Park, NC, regarding the US-UK Collaboration Agreement on Exposure Science. This agreement was signed in 2008 in London and was followed by meetings in North Carolina (October 2009) and in London (December 2010). The UK delegation will be led by Bernard Fisher of the UK's Environment Agency. The agenda will cover a cross section of the air quality modeling and exposure science activities of EPA's National Exposure Research Laboratory and the UK's Department of Environment, Food and Rural Affairs as well as the UK's Environment Agency. Topics will include air quality modeling research, development, evaluation, and applications; exposure science and its modeling challenges; emission inventories and emission characterization activities;

and various integrated transdisciplinary research and assessment activities. Many of these collaborations utilize the CMAQ modeling system. Several projects have been targeted for additional collaboration and research: the cooperative assessment of CMAQ applications for the US and Europe under the Air Quality Model Evaluation International Initiative (AQMEII); development and enhancement of dispersion modeling and exposure modeling tools such as AERMOD and AERLINE; and chemical mechanisms for use in air quality models. The US-UK Collaboration Agreement should provide future benefits to both countries and continents as scientific endeavors are synergized by collaboration between the air quality modeling and exposure scientists on both sides of the Atlantic Ocean. If you would like additional information, please contact David Mobley at mobley.david@epa.gov.

EPRI-A&WMA Workshop on Future Air Quality Model Development Needs

Scientific and computational advances in regional air quality models over the past decade have led to their widespread use by regulators, states, industry, and other agencies for a variety of applications, including the development of regulations, design of air quality control strategies

and implementation plans, and short-term operational air quality forecasting. Researchers have also extended their use to new applications ranging from health studies to integration with global-scale models for climate studies. The models have improved significantly over the years

in their representation of chemical and physical processes; however, many areas still remain where further improvements are needed. Although there is a great deal of air quality model development taking place at academic, government, and private institutions, there is little coordination among the various groups.

During the 2011 CMAS conference, Naresh Kumar of EPRI will present a summary of key messages from an EPRI-A&WMA workshop to be held in Washington, DC, on September 12-13, 2011. The workshop's objectives are to identify research gaps in air quality process representations and to develop a research agenda for future

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EPRI-A&WMA Workshop (cont'd.)

model development. Four areas of research will be addressed: homogeneous-phase chemistry; heterogeneous-phase chemistry (including inorganic and organic aqueous-phase chemistry); organic particulate matter: formation and aging of secondary organic aerosol; and meteorological processes affecting air quality. The focus of this workshop will be limited to

the use of atmospheric models to support regional-scale air quality applications, such as forecasting or control strategy development. It will therefore not address model development needs that pertain to interfacing regional-scale models with local- or global-scale models; future workshops may address those and other important research questions.

Air Quality Model Evaluation International Initiative (AQMEII) Workshop

October 27, 2011, Chapel Hill, NC

Recognizing the need to build international cooperation for rapidly advancing the science in regional-scale photochemical air quality modeling systems, a team of scientists from North America and the European Union embarked on a project known as the Air Quality Model Evaluation International Initiative (AQMEII) in 2009 (see <http://aqmeii.jrc.ec.europa.eu/>). The aim of AQMEII is to provide a permanent forum for constantly monitoring the state of advancement of regional-scale air quality models and model evaluation methodologies, identifying knowledge gaps in air quality science, and developing methodologies to quantify and communicate uncertainties in modeling results. Over 20 modeling groups participated in

the first phase of AQMEII, in which a variety of meso-scale air quality modeling systems were applied to continental-scale domains over North America and Europe for full-year simulations of 2006 for model intercomparisons and evaluations.

A one-day workshop is planned for October 27, 2011, following the 10th Annual CMAS Conference in Chapel Hill. Discussions at the workshop will review the status of Phase I activities, lessons learned from the model evaluations and intercomparisons performed to date, plans for continued analysis of the extensive modeling datasets generated from AQMEII Phase I, and planning for Phase II. Additional background information on the AQMEII project can be

CMAS Web Portal and Links

The CMAS web site, <http://www.cmascenter.org>, is the main web portal to the Center. This central site has links to multiple other sites that provide access to various components of the supported modeling systems, data acquisition and analysis tools, and user support. The CMAS Center also hosts e-mail listservs (e-mail forums) to facilitate communication between community members; a listserv is an electronic mailing list that uses one address to distribute e-mail to all members of a specified group. These are the web sites and listservs hosted by the CMAS Center:

- <http://www.cmascenter.org>: Central web portal to the CMAS Center
- <http://www.cmaq-model.org>: Air quality modeling
- <http://www.smoke-model.org>: Emissions processing
- <http://www.benmap-model.org>: Economic and health impact modeling
- <http://www.verdi-tool.org>: Visualization and graphics
- <http://bugz.unc.edu>: E-mail-based technical support
- <http://www.cmascenter.org/irods>: Model output data distribution
- <http://cmas.wikidot.com>: Model development wiki
- m3user@listserv.unc.edu: E-mail forum for technical support
- m3list@listserv.unc.edu: E-mail forum for announcements
- m3dev@listserv.unc.edu: E-mail forum for software development discussion
- emregional@listserv.unc.edu: E-mail forum for emissions-related announcements and discussion
- benmap-user@listserv.unc.edu: E-mail forum for BenMAP-related announcements and discussion

The CMAS web sites are regularly updated with new information, including model releases, documentation, conference announcements, and training schedules. While each product-specific site contains only information specific to that product, the main CMAS site posts information about all of the supported products.

found in the following resources:

- (1) Galmarini S., D.G. Steyn, K. Schere, and M. Moran, 2010. Advancing the evaluation of regional-scale air quality models, EUR24245, ISBN 978-92-79-15007-4.
- (2) Rao, S.T., S. Galmarini, and K. Puckett, 2011. Air quality model evaluation international Initiative

- (AQMEII): Advancing state-of-science in regional photochemical modeling and its applications. *Bull. Am. Meteor. Soc.* 92 (1), 23-30.
- (3) Galmarini, S., and S.T. Rao, 2011. The AQMEII two-continent Regional Air Quality Model evaluation study: Fueling ideas with unprecedented data. *Atmos. Environ.*, 45, 2464.