EPA United States Environmental Protection Agency

Support Center for Regulatory Atmospheric Modeling (SCRAM)

10th Modeling Conference

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The 10th Conference on Air Quality Modeling, mandated by Section 320 of the Clean Air Act, was held on the EPA RTP Campus from March 13th through 15th, 2012. Approximately 250 to 300 people attended each of the three days of the Conference. The comment period with respect to the Conference is open through the end of April. A memorandum concerning the extension of the formal comment period from April 16th to Aptil 30th will be added to the Docket prior to the start of April.

Conference Information:

- Federal Register Notice for the 10th Modeling Conference (PDF, 168KB)
- Docket for the 10th Modeling Conference
- Second Memorandum Extending Public Comment Period to June 15, 2012 (PDF, 297KB)
- Memorandum Extending Public Comment Period to April 30, 2012 (PDF, 195KB)

- 10th Modeling Conference - Final Agenda (PDF, 82KB)
- 10th Modeling Conference - Presentations
- 10th Modeling Conference - Attendee List (PDF, 127KB)

- 10th Modeling Conference - Day 1 Transcripts - 03/13/2012 (PDF, 2.1MB)
- 10th Modeling Conference - Day 2 Transcripts - 03/14/2012 (PDF, 2.1MB)
- 10th Modeling Conference - Day 3 Transcripts - 03/15/2012 (PDF, 1.6MB)

- 10th Modeling Conference - Summary of Comments (PDF, 903KB)

Conference Related Emails Shared with the Modeling Community:

- February 2012 - Update Concerning the Federal Register Notice for the 10th Conference on Air Quality Modeling (PDF, 30KB)
- September 2011 - Update Regarding the 10th Conference on Air Quality Modeling (PDF, 32KB)

Material for Review and Presentation at the 10th Modeling Conference:

Haul Road Workgroup Final Report

The USEPA is releasing the Haul Road Workgroup Final Report. This final report is being shared with the entire dispersion modeling community prior to the 10th Conference on Air Quality Modeling to promote broader consideration and facilitate further comment.

Documentation

Haul Road Workgroup Final Report (855KB,PDF) - 03-02-2012

Disclaimer: The recommendations presented are not an endorsement by the USEPA as the definitive methodology for characterizing and addressing fugitive dust emissions from haul roads but should be considered a best practice approach based on the broad involvement of the co-regulating community in the development of this recommendation.

$PM_{2.5}$ Permit Modeling Guidance

The USEPA will release a Draft Version of the $PM_{2.5}$ Permit Modeling Guidance for review and comment by the dispersion modeling community. There will be a presentation on the draft guidance document on Wednesday morning followed by group discussion paneled by representatives from a USEPA Regional Office, a state agency, and an industrial trade group. Comments on the presentation and subsequent group discussion of the Draft Version of the $PM_{2.5}$ Permit Modeling Guidance can be made to the 10th Modeling Conference Docket or directly to the USEPA via an email to George Bridgers. We are also providing supporting NSR/PSD regulatory material, recommendations, and additional guidance documentation for reference below.

Documentation

Draft Guidance for $PM_{2.5}$ Permit Modeling (PDF, 4.6MB) - 03-06-2013

Supporting NSR/PSD Regulatory Material

$PM_{2.5}$ SILs/SMC Court Decision Question and Answer Document (PDF, 99KB) - 03-06-2013

Modeling Procedures for Demonstrating Compliance with $PM_{2.5}$ NAAQS (PDF, 1.1MB) - 03-23-2010

Implementation of the New Source Review (NSR) Program for Particulate Matter Less Than 2.5 Micrometers ($PM_{2.5}$) (PDF, 215KB) - 05-16-2008

Prevention of Significant Deterioration (PSD) for Particulate Matter Less Than 2.5 Micrometers ($PM_{2.5}$)—Increments, Significant Impact Levels (SILs) and Significant

Monitoring Concentration (SMC) (PDF, 355KB) - 10-20-2010

Implementation of the New Source Review (NSR) Program for Particulate Matter Less Than 2.5 Micrometers ($PM_{2.5}$); Final Rule To Repeal Grandfather Provision PM10 Grandfathering Rule Making (PDF, 271KB) - 05-18-2011

Revised Policy to Address Reconsideration of Interpollutant Trading Provisions for Fine Particles ($PM_{2.5}$) (PDF, 373KB) - 07-21-2011

Additional Guidance
USEPA-OTAQ Transportation Conformity Guidance for Quantitative Hot-spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas

Recommendations
NACAA $PM_{2.5}$ Modeling Implementation Workgroup - Report and Recommendations (PDF, 7.6MB) - 01-07-2011

Challenges of Modeling for New 1-hour NO2 and SO2 NAAQS

UPDATED - Summary of AERMOD Implementation Workgroup (AIWG) Case Studies for 1-hour NO2 and SO2 NAAQS (PDF, 21.9MB) - 04-16-2012

Summary of AERMOD Implementation Workgroup (AIWG) Case Studies for 1-hour NO2 and SO2 NAAQS (PDF, 5.8MB) - 03-09-2012
Disclaimer: The work preformed through the AIWG and presented in this summary was for illustrative purposes to provide insight into the potential challenges in modeling compliance with regards to the recently revised 1-hour NO2 and SO2 NAAQS. The methodology and modeling results presented in this summary was not intended to be of an actual permitted facility but of "real world" examples to inform EPA and state/local/tribal agencies as we work under existing guidance and consider updates to that guidance.

Applicability of Appendix W Modeling Guidance for the 1-hour NO2 NAAQS (PDF, 398KB) - 06-28-2010

Applicability of Appendix W Modeling Guidance for the 1-hour SO2 NAAQS (PDF, 369KB) - 08-23-2010

Additional Clarification Regarding Applicability of Appendix W Modeling Guidance for the 1-hour NO2 NAAQS (PDF, 538KB) - 03-01-2011

Area Designations for the 2010 Revised Primary Sulfur Dioxide National Ambient Air Quality Standards (PDF, 12.0MB) - 03-24-2011

Guidance for 1-hour SO2 NAAQS SIP Submissions (PDF, 1.0MB) - 09-22-2011

New Jersey Section 126 Petition - Final Rule (PDF, 1.4MB) - 11-07-2011
New Jersey Section 126 Petition - Final Rule - Air Quality Modeling Technical Support Document (PDF, 4.2MB) - 12-14-2011
New Jersey Section 126 Petition - Final Rule - Response to Comments Document (PDF, 1.7MB) - 11-07-2011

Emerging Models / Techniques

Long Range Transport Dispersion Model Evaluation Report

The USEPA is releasing the Documentation of the Evaluation of CALPUFF and Other Long Range Transport Models using Tracer Field Experiment Data (EPA Contract No: EP-D-07-102, Work Assignment No: 4-06). This EPA report documents the evaluation of various Long Range Transport (LRT) dispersion models using several inert tracer study field experiment data. The tracer studies used include:

1) 1980 Great Plains Field Experiment (GP80),
2) 1975 Savannah River Laboratory Field Experiment (SRL75),
3) Cross Appalachian Tracer Experiment (CAPTEX), and
4) European Tracer Experiment (ETEX).

The LRT dispersion modeling was performed primarily by the U.S. Environmental Protection Agency (EPA) during 2008 to 2010 and builds off several previous LRT dispersion modeling studies that evaluated models using tracer study field experiments.

Documentation
Documentation of the Evaluation of CALPUFF and Other Long Range Transport Models using Tracer Field Experiment Data (8.0MB,PDF)

Disclaimer: Although this work was reviewed by EPA and approved for publication, it may not necessarily reflect official Agency policy.

Additional Model Assessment and Evaluation Reports

US EPA is providing summaries and final documentation of the two model assessments and evaluations below that were presented on Day 2 of the 10th Modeling Conference. The final reports of these studies were not immediately available after the 10th Modeling Conference and were posted to the SCRAM website in late November 2012.

Comparison of Single-Source Air Quality Assessment Techniques for Ozone, $PM_{2.5}$, other Criteria Pollutants and AQRVs

The USEPA is releasing the Comparison of Single-Source Air Quality Assessment Techniques for Ozone, $PM_{2.5}$, other Criteria Pollutants and AQRVs (Prepared by the ENVIRON International Corporation, EPA Contract No: EP-D-07-102, Work Assignment No: 4-06 and 5-08). The purpose of this study was to test the feasibility of using photochemical grid models (PGMs) for single-source assessments of concentration, visibility and deposition at farther downwind distances and compare the results with CALPUFF. The study also examined the CALPUFF concentrations/AQRV assessments using meteorological inputs from the CALMET diagnostic wind model and the new Mesoscale Model Interface tool that performs a direct "pass through" of the MM5/WRF meteorological output to generate CALPUFF meteorological inputs.

The CAMx and CALPUFF models were run using 2 different modeling databases to obtain the single-source incremental concentration and deposition impacts for the selected test sources. The same types of air quality metrics were analyzed as used in a PSD/NSR far-field or NEPA EIS type analyses. These air quality and air quality related value (AQRV) metrics were extracted from the models at Class I and sensitive Class II areas and compared. These included maximum SO2, NO2 and PM10 concentrations at various averaging times, maximum daily visibility impacts and maximum annual sulfur and nitrogen deposition amounts.

Evaluation of Chemical Dispersion Models using Atmospheric Plume Measurements from Field Experiments

The USEPA is releasing the Evaluation of Chemical Dispersion Models using Atmospheric Plume Measurements from Field Experiments (Prepared by the ENVIRON International Corporation, EPA Contract No: EP-D-07-102, Work Assignment No: 4-06 and 5-08). The purpose of this study was to evaluate chemistry dispersion models using atmospheric plume chemistry measurements. Three different plume chemistry models were evaluated using within plume concentration measurements from two field experiments.

Data from two field experiments that included aircraft measurements of power plant plumes were used in evaluating the models. The first field experiment was the Nashville Field Intensive component of the Southern Oxidant Study in 1999 (SOS 99). As part of this study, daytime plumes from the Tennessee Valley Authority (TVA) Cumberland Power Plant, located in north-central Tennessee, were sampled by the TVA Bell 205 helicopter for selected days in July 2009. The other field experiment was the second Texas Air Quality Study (TexAQS II) in 2006. As part of this study, the National Oceanic and Atmospheric Administration's (NOAA) P-3 aircraft measured a wide suite of atmospheric species at high temporal resolution during a series of nighttime flights, including flights downwind of the Oklaunion power plant in north Texas, near the Oklahoma border and the city of Wichita Falls, TX.

Three models were evaluated using the aircraft plume measurements from the two field experiments. Two of these models (CALPUFF and SCICHEM) are puff models, while the third model, CAMx, was a grid model. Two versions of CALPUFF were evaluated in the study – the regulatory version (Version 5.8), and a newer version (Version 6.4) that incorporates several improvements, including improvements in the treatment of PM chemistry in CALPUFF.

Documentation

Comparison of Single-Source Air Quality Assessment Techniques for Ozone, $PM_{2.5}$, other Criteria Pollutants and AQRVs (18.2MB,PDF)

Evaluation of Chemical Dispersion Models using Atmospheric Plume Measurements from Field Experiments (2.7MB,PDF)

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Relevant Guidance, Memorandum and Material

January 4, 2012 Gina McCarthy - Sierra Club Petition Grant (PDF, 352KB)

USEPA-USDOI-USDA Memorandum of Understanding Regarding NEPA (PDF, 1.77MB)

Additional Presentation Material

A Screening Method for Ozone Impacts of New Sources Based on High-order Sensitivity Analysis of CAMx Simulations for Sydney, Greg Yarwood, 10th Annual CMAS Conference (PDF, 469KB)

MMIF-*Beta* / MMIFstat-*Beta* / CALMET2NCF-*Beta* Modeling Utilities

*EPA is providing **"beta"** releases of various programs to facilitate the processing and evaluation of inputs and outputs for dispersion models. These draft programs support non-regulatory use and evaluation of dispersion models by the modeling community. We will be providing an overview of these beta programs as part of the 10th Modeling Conference in mid-March and welcome comments on these tools. Beta users should send comments and any issues they find to Chris Misenis of EPA/AQMG. Users can email questions, comments, suggestions, or improvements to misenis.chris@epa.gov.*

As necessary, we may provide updates for certain programs when necessary, but we are not currently supporting or maintaining these programs for regulatory applications. Based on input from the modeling community and our own assessment of these tools, we will determine if they should be considered for regulatory use and, if so, would need to undertake the necessary efforts to provide appropriate guidance and other supports for such use.

MMIF - *Beta*

The Mesoscale Model Interface Program (MMIF) converts prognostic meteorological model output fields to the parameters and formats required for direct input into dispersion models. Supported dispersion models include AERMOD, SCICHEM, and CALPUFF. This beta release of MMIF specifically processes geophysical and meteorological output fields from the Fifth Generation Mesoscale Model (MM5, version 3) and the Weather Research and Forecasting (WRF) model (Advanced Research WRF [ARW] core, versions 2 and 3). The program diagnoses certain required parameters that are not directly available from various versions of MM5 or WRF. It also offers the option to directly pass through planetary boundary layer (PBL) heights from the meteorological models, or to independently diagnose them from other variables. The MMIF user's manual documents MMIF v2.2 and includes descriptions of the algorithms, the program code, user input, and runtime instructions. The remainder of this section provides background information.

Model Code

Source Code (1.8MB,ZIP) - Updated 08-30-2012
Test Problems (3.2GB,GZ) - Updated 08-30-2012

Model Documentation

Users Manual (218KB,PDF) - Updated 08-30-2012

MMIFstat - *Beta*

The MMIFSTAT program generates time series data and estimates model performance metrics by comparing user supplied observation data with CALMET formatted meteorological data. This beta release of MMIFSTAT was developed through funding from the National Park Service, Fish & Wildlife Service, U.S. Forest Service, and U.S.EPA Region 10.

Model Code
Source Code (296KB,ZIP)
MMIF Macro Spreadsheet (149KB,XLS)

Model Documentation
Users Guide (93KB,PDF)

CALMET2NCF - *Beta*

The CALMET2NCF program allows users to convert multivariate gridded environmental datasets created by the CALMET meteorological model into netCDF format. This beta release of this program is written in Fortran 90 (f90) and C. These new files can then be visualized using the Visualization Environment for Rich Data Interpretation (VERDI). The CALMET2NCF users' guide documents the program functionality, installation instructions, and shows example illustrations of CALMET output. There are currently 2 distributions of this code, one with all third party libraries (CALMET2netCDF_Libraries.tar.gz) and one with just pre-compiled executables (CALMET2netCDF.tar.gz).

Model Code
Source Code (13MB,GZ)
Pre-compiled Executables (9MB,GZ)

Model Documentation
Users Guide (904KB,PDF)

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