AQMEII Status Update

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AQMEII Overview

- Established in 2009 by researchers from NA and EU with support from EPA, Environment Canada, and the European Commission's Joint Research Center
- AQMEII's goals are to
  - Exchange expert knowledge in regional air quality modeling
  - Develop innovative methods for evaluating regional air quality models to increase the knowledge on atmospheric processes and to support the use of models for policy development
  - Prepare coordinated research projects and model inter-comparison exercises

AQMEII Activities

- Phase 1: 2010 – 2012
  - Annual regional air quality simulations over North America (NA) and Europe (EU) for 2006
  - ~20 participating groups from NA and EU
  - Results published in July 2012 special issue of Atmospheric Environment
  - Phase 1 database available for ongoing research
- Phase 2: 2012 – 2014
  - Focus on evaluating coupled meteorology/chemistry models for 2010 (primary focus) and 2006 (optional)
  - ~15 participating groups from EU and 4 from NA

Inputs for Phase 2 Simulations

- Emissions:
  - EU: 2006 and 2009 MACC-2 emissions prepared by TNO
  - NA: Based on 2008 emissions modeling platform, with 2006/2010 specific adjustments for certain sectors (mobile, CEM-equipped point sources, nonroad)
  - These regional inventories have been integrated into the HTAP global inventories
- Boundary Conditions:
  - 3-hrly MACC-2 fields obtained from ECMWF
  - MACC-2 uses MOZART and chemical data assimilation (CO, O_3, AOD)

AQMEII Phase 2 Timeline

- **May 2012**: Kick-off workshop in Utrecht
- **January 2013**: Inputs and experiment specifications available
- **Fall 2012 – Spring 2013**: collection of observational datasets and preparation of TSD at JRC
- **Spring-Fall 2013:** simulations by participating groups
- **Fall 2013**: Most simulations are completed and data have been uploaded to JRC's ENSEMBLE system
- **August/September 2013**: Workshops in Miami (in conjunction with ITM) and Ranco (in collaboration with COST 1004)
- **Fall 2013 – Spring 2014**: Joint and individual analyses, sensitivity simulations, preparation of manuscripts
- **April 2014**: Submission of manuscripts to a special issue of Atmospheric Environment (~20 tentative manuscripts to date)

AQMEII Phase 2 Regional Model Evaluation

- Common analysis using JRC's ENSEMBLE system
  - Comparisons against measurements from routine North American and European air quality, meteorological and radiation networks
  - Comparisons against MOZAIC aircraft measurements and ozonesonde observations
- Other analyses organized by participating groups (e.g. case studies on forest fires, dust events, comparisons against CALNEX field campaign data, etc.)

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Objectives for AQMEII Phase 3 – Collaboration with HTAP

- Perform model evaluation analyses on global models coordinated with the analyses of regional models under AQMEII
- Perform regional model simulations with boundary conditions derived from global simulations with perturbed emissions
- This effort is focused on the following questions:
  - How well do regional and global models simulate air quality at various space and time scales over North America and Europe?
  - How sensitive are regional model predictions to the boundary conditions chosen?
  - How sensitive are estimates of the impacts of upwind emission perturbations to grid resolution?

Potential Timeline for AQMEII Phase 3 (subject to revisions)

- December 2013: Call for participation to members of the Phase 1 (offline uncoupled) and Phase 2 (online coupled) communities as well as other interested groups
- Spring 2014: Participating groups can obtain inputs
  - Focus year: 2010
  - Boundary conditions for base case and sensitivity cases from ECMWF
  - Emissions: 2010 from AQMEII Phase 2
- Last quarter 2014: Initial modeling and analysis results become available

→ What is the latest time point regional modeling results are still of value to the HTAP effort?