May 7, 2015

Western Air Quality Planning questions - WRAP-EPA Western Modeling Workshop (Modeling Air Quality from the Global to Local Scale)

These questions were developed by members of the air quality planning community in the West, as significant economic decisions over the next several years could be made based on modeling results applied for air quality planning, and may have regional planning implications. As end users of modeling results, air quality planners want to understand where models and other tools work well, where there is room for improvement, and how to implement improvements.

The purpose of these questions is to identify technical, planning, and policy topics, to assist and focus Workshop presenters in presenting their talks and responding to questions at the Workshop. These questions will be reviewed on Wednesday May 13th with all workshop participants. These questions, and the associated answers and insights, will be also used to anchor the report prepared later to summarize the Workshop. Other meetings and the Summer 2015 EPA-State-Local Air Quality Modelers meeting are further discussion opportunities.

Modeling refers to emissions inventories and processing for model applications, meteorological modeling, and photochemical grid modeling results including source apportionment.

Conceptual Understanding

1) How is pollution from outside North America/outside the U.S. affecting background mixing ratios of oxidants, specifically ozone and NOx in urban and rural areas with elevated ozone values? Are commonly used air quality models able to adequately represent the urban-rural interface?

2) What are the relative contributions of the diverse local sources of pollution to air quality degradation and photochemical oxidant formation in the rural western U.S.? (e.g., to what degree does pollution from both local sources and long-range transport contribute to photochemical smog / ozone pollution, visibility degradation, and nitrogen deposition in the western U.S.?)

3) Is the western U.S. at or near an inflection point where we have shifted to a more/mostly NOx- limited chemical regime for controllable anthropogenic sources and what are the implications for future air quality predictions and policy decisions? Where and when are we NOx or VOC sensitive?

4) What are the impact of ozone precursor emissions from oil and gas exploration and production activities on the photochemical regime and the ozone production efficiency across the diverse western U.S. landscape?

5) Can the model(s) identify controllable sources in a state? With lower standards anticipated in the near future and significant transport from nearby states, a state needs to better understand control options for sources under their control because the CAA SIP development timeline is very compressed.

Technical Methods

6) For characterizing sources within North America, what are the necessary and practical steps to assess emissions factors and speciation factors/profiles, make improvements, reduce uncertainty, and increase representativeness?

7) What modeling work needs to be done to adequately characterize stratospheric intrusion events in modeled concentrations?

8) What technical modeling work is needed and what are the highest priority activities related to methods and sources of data for estimating and characterizing windblown dust and wildfire emissions?

9) Relative to both regional and national-scale modeling applications:

a. What modeling work needs to done to provide sufficiently detailed evaluation and guidance on the suggested methods for projecting wildfire emissions?

b. What modeling work is needed to reduce uncertainty and improve quality of biogenic emission models?

c. What needs to be done to develop and evaluate updated and improved methods for future-year projections of global transport model-estimated Boundary Conditions for western U.S. regional modeling?

d. What modeling work needs to be done to help states quantify the emissions from international sources within North America, especially critical for those states that border international sources?

Model Assessment/Evaluation

10) What advances have there been made over the last few years in regards to improvements to models? (different improved chemistry, other) Has model performance for the western U.S. improved? Are improvements expected in the next couple of years? Will improvements be significant or just minor adjustments?

11) How can ozone and PM modeling performance in the western U.S. be improved, for both the warm and cold seasons? (e.g., improved emissions inventories for ozone precursors, NOx- and VOC-limited ozone formation potentials, transport of emissions vs. ozone, how circulation affects where ozone peaks occur, routine and robust source apportionment of ozone precursor and methane emissions).

12) For planning purposes, based our understanding that ozone varies with elevation; can the models better quantify this impact and identify areas in the West have this issue? Is there any research focusing on whether ozone values observed at high elevation sites are inherently uncontrollable?

13) Is sufficient, robust, and complete guidance available and useful for selecting an appropriate modeling tool(s) for regional air pollution modeling in the western U.S.? What modeling and assessment work is needed to prepare/provide a complete examination of available evaluation tools?

14) Are robust and generally acceptable model performance standards established and routinely applied in the global and regional modeling communities? Related to this topic and the tools question below, could examples of model misapplications be provided for context?

15) What model performance evaluation tools are available to distinguish between and quantify the performance of the global versus the regional modeling platform? How can global model performance affects on regional model performance be evaluated?

16) Are clear, published, and broadly applicable scientific understandings and reasoning available to explain biases in global and regional models?

Planning and Policy

17) Is it possible to conduct a technical evaluation to exclude ozone values monitored at high elevation sites from the design value at affected monitors if it is uncontrollable?

18) What modeling work needs to be done to improve assessment data and tools related to the quality of speciation data obtained by interpolation using the recommended MATS software?

19) How can the requirements of the Exceptional Events Rule be sufficiently represented in modeling studies? What resources are available?

20) How can resources for Exceptional Events demonstrations and NAAQS attainment plans be made available for the user community, applying standardized methods and data? With limited staffing and resources available at most state agencies, could modeling tools and resources be streamlined to help states complete demonstrations and plans? How?