EPA's 8th Conference on Air Quality Modeling

Comments on Model Evaluation

By

Bob Paine, ENSR

(Peer reviewed by the A&WMA AB-3 Committee)

Comment Areas

- A new approach for model evaluations (ASTM guide 6589)
- Other approaches that should also be considered

Comments on ASTM guide 6589

- ASTM Guide 6589 applies to tracer field studies having intensive surface networks of receptors
- It provides best fit to arc of observed concentrations rather than picking the peak value
- It conducts resampling of predicted and observed concentrations to give confidence intervals to results

Consideration of Non-tracer Databases

- Entire class of databases consisting of long-term (e.g., 1 year), but spatially sparse networks of monitors not addressed by this guide
- Does this new standard exclude other techniques, or simply augment them?
- Does it imply that other procedures (e.g., by Cox and Tikvart) are sufficiently well-developed to deal with such databases?

Advantages of Long-Term Databases

- More extensive set of databases is available for long-term studies than tracer studies, due to extremely high cost of short-term studies
- EPA has conducted studies involving such databases (i.e., for rural, urban, and complex terrain models)
- EPA has developed software (Model Evaluation Methodology, or MEM) for such databases

Advantages of Long-Term Databases, cont.

- Regulatory standards in the US (e.g., number of peak concentrations above threshold value during a year) are best addressed by long-term studies
- Annual averages, especially important for risk assessment studies, can only be assessed with long-term databases
- Large range of meteorological conditions expected at a given site over all times of day and seasons can only be accomplished with long-term databases
- Statistics that rely upon pairing in space (but unpaired in time) work quite well with such databases

Disadvantages of Long-Term Datasets

- For any given time period, it is difficult to determine where the plume centerline is
- These databases do not work well for statistics that rely upon events paired in time (not necessarily paired in space)
- These databases do not lend themselves well to intensive analyses of given short-term events
- *It is evident that both types of evaluation databases (long-term, spatially sparse and short-term, spatially dense) have their useful features.*

Recommendations

- EPA can incorporate ASTM Guide 6589 for short-term tracer databases
- EPA should also provide a mechanism for evaluating long-term databases and having common statistical measures for an overall model performance assessment