

# AERMIC Update

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# Outline

- History of AERMIC
- Reconstituted AERMIC
- Summary of AERMIC Activities
- Future plans for AERMOD – Overview

# History of AERMIC

- AMS/EPA Regulatory Model Improvement Committee initially formed in 1991; charged to develop replacement for ISCST based on state-of-the-science
  - AERMOD promulgated Dec. 2006
  - Membership of “new” AERMIC committee:
    - Roger Brode, EPA/OAQPS, Co-chair
    - Jeff Weil, CIRES-NCAR, Co-chair
    - Akula Venkatram, UC-Riverside
    - Al Cimorelli, EPA Region 3
    - Bret Anderson, EPA/OAQPS
    - Steve Perry, EPA/ORD/AMD
    - Vlad Isakov, EPA/ORD/AMD

# Summary of AERMIC Activities

- New AERMIC committee has held several meetings in RTP since being reconstituted in 2008
- AERMIC reviewed status of AERMOD modeling system and activities of AIWG at initial meeting
- Key priority for AERMIC has been the Urban formulation in AERMOD
- However, AERMIC recognized significant overlap among many issues, including Urban, Surface Characteristics and Met Data
- AERMIC also recognized opportunities to address many implementation issues by utilizing newly available data

# AERMIC - Future Plans for AERMOD

- Building on plans to enhance AERSURFACE by combining land cover and elevation data, AERMIC is developing an approach to address a wide range of issues by utilizing this data directly in the model
- Land cover and elevation data (SRTM-NED) would be fed directly to AERMOD to develop source-specific meteorology accounting for land cover and obstacle heights around source and met tower
- Meteorology adjustments would also account for effect of urban canopy on wind profiles

# Future Plans for AERMOD (cont.)

- This approach could eliminate many implementation issues, especially related to urban applications
  - No distinction between “rural” and “urban” sources
  - No requirement to estimate “effective” population as surrogate for urban influences
  - Spatial and temporal variability of urban heat island influence could be accounted for
  - Representativeness of met data will always be an issue, but influence of surface characteristic variability on that determination should be mitigated
- Considerable work will be required to implement this plan, including performance evaluations

# Future Plans for AERMOD (cont.)

- Incorporating fuller range of data directly into AERMOD could eliminate need for preprocessors, including AERMAP, AERMET, and AERSURFACE (as well as BPIPPRM)
- Access to “raw” input data in AERMOD may allow additional enhancements, such as direction-specific “hill height scales” for terrain influences, currently not practical to implement
- New AERMOD structure will better accommodate future enhancements as new data sources emerge
- Downside is that this plan is not likely to speed up AERMOD!

# Other AERMIC Recommendations

- AERMIC discussed issues associated with building downwash in AERMOD
  - Recommended incorporating building processing function within AERMOD, which eliminates need for separate BPIP/PRM processor
  - Facilitates assessment of additional options for processing building information for PRIME, including alternative criteria for determining controlling structure; possibility of combining influences from multiple structures; and option for looping through all influencing structures to determine worst-case
  - More recently, AERMIC has developed an approach based on a revised method for “blending” AERMOD and PRIME that could mitigate many of the issues with BPIP and PRIME. This also includes a modified approach to estimating direction-specific building dimensions for input to AERMOD that may address issues with long narrow buildings

# Other AERMIC Recommendations

- AERMIC has been involved in efforts to assess and enhance AERMOD's capabilities to estimate impacts from mobile source emissions
  - Several field studies and wind tunnel studies have been conducted, are underway, or planned to address near-roadway exposure issues
  - Inconsistency in AERMOD's treatment of horizontal meander for volume sources (does) vs. area sources (doesn't) is a factor in these applications
  - Important to understand the complexity of evaluating the modeling system performance for such applications
    - Uncertainties in quantifying temporally and spatially varying non-stationary emissions from sources
    - Uncertainties in characterizing "release" parameters for those emissions
    - Complex influences from roadway design and local land cover characteristics
    - Many important generic issues, such as low wind speeds and surface characteristics variability, play significant role in these applications
  - Practical issue of model runtime for large-scale application of AERMOD for this purpose is also recognized

# Other AERMIC Recommendations

- AERMIC has discussed the use of gridded prognostic meteorological with AERMOD and will provide science support for the development and evaluation of options related to this effort
  - Recommends implementing and testing approach of processing gridded met data as pseudo-observations through AERMET, in addition to approach currently implemented in MM5-AERMOD Tool
  - Recommendation to invite experts in gridded meteorological modeling community to next (or future) AERMIC meeting
  - Consideration of options to incorporate some non-steady-state characteristics in AERMOD modeling system, possibly driven by gridded meteorological model inputs

# Questions?

