AERMOD Updates
for
Measurement and Modeling Subcommittee Meeting

Chris Owen

1/5/2021

Status of AERMOD

- AERMOD is EPA's required dispersion model for regulatory analyses (40 CFR part 51, Appendix W)
  - The last release of AERMOD was in August 2019 (version 19191)
- AERMOD continues to provide options for characterizing mobile source emissions:
  - Volume and Area sources (including LINE source option)
- In addition, two RLINE source options were added in the 2019 update:
  - "RLINE" source added as "BETA" option
    - BETA options – Peer-reviewed options that are potentially ready for consideration as alternative model(s).
    - New dispersion characterization of line source beyond the current point, volume and area source types
    - Inputs identical to the existing "LINE" source to facilitate comparison with existing model modeling scenarios
  - "RLINEXT" source added as "ALPHA" option
    - ALPHA options – "experimental", i.e., developmental options not available for regulatory use.
    - New parameterizations for solid barriers and depressed roadway treatment in RLINE, but more R&D needed
  - See *Guidance on New R-LINE Additions to AERMOD 19191 for Refined Transportation Project Analyses* (EPA guidance)
    - https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100XI3C.pdf

AERMOD White Papers

- AERMOD White Papers defining EPA priorities for science updates
  - Overview of known modeling issue
  - Status of current research and development
  - Discussion of implementation considerations in AERMOD
  - https://www.epa.gov/scram/aermod-modeling-system-development
- EPA proactively engaged with the community to identify and prioritize scientific improvements to AERMOD modeling system
  - Critical element in being transparent with community
  - Allows for pathway to gain feedback from users
  - Will be routine practice to release updates and new papers

AERMOD and Mobile Sources

- **Contributors**: EPA (OAQPS, ORD, and OTAQ) has partnered with FHWA to improve AERMOD. ORD has been leading the development of the R-LINE model. EPA is working with FHWA though an interagency agreement to continue RLINE development and testing.

- **Examples of issues:**
  - RLINE BETA option can only be used for flat terrain.
  - RLINE URBAN option is currently ALPHA.
  - RLINE solid barrier algorithm is currently ALPHA, limited to 1 barrier, does not account for edge effects, and needs performance evaluations.
  - RLINE depressed roadway algorithm is currently ALPHA and needs performance evaluations.

- **Next Steps:**
  - Evaluations of barriers algorithms (current Caltrans field study to collect data and evaluation planned by OAQPS/OTAQ/ORD with FHWA).
  - Adding barriers to both side of the road (currently under development by ORD).
  - Additional evaluation of the urban treatment (currently being completed by OAQPS/OTAQ with FHWA).
  - Accounting for terrain in the RLINE source (currently being reviewed by OAQPS/OTAQ).
  - Algorithms to account for edge effects (currently under development by ORD).

AERMOD release plans

- Next regular update scheduled for spring 2021
  - Critical updates for many research areas, including:
    - RLINE improvements and enhancements
    - New ALPHA options for low wind conditions, NO2, & downwash
    - Improvements to BOUYLINE source
  - RLINE updates include:
    - Speed improvements
    - Refinements in the single barrier algorithm
    - Fix for EMISFACT input pathway
    - Possible addition of 2-barrier algorithm

- Next regulatory update
  - Proposal in 2022/2023?
  - All BETA options likely proposed as regulatory defaults
  - Goal to have proposed options for RLINE, low wind, NO2 Tier 2&3 methods, downwash, off-shore platforms, & updated deposition algorithms