AERMOD White Papers Update

12th Modeling Conference on Air Quality Modeling

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AERMOD Development Site

- AERMOD Modeling System Development website: [https://www.epa.gov/scram/aermod-modeling-system-development](https://www.epa.gov/scram/aermod-modeling-system-development)
- Original AERMOD White Papers from 2017
- Current AERMOD White Papers
- Can be updated anytime
  - New NO₂ White Paper added
  - New deposition White Paper under development
- Open to submissions from the community
  - White Paper template available
    - Statement of issue with the model
    - Review of current scientific development
    - Considerations for implementation in the model
    - Must be a potential update to AERMOD, within the context of Appendix W requirements
- Penetrated Plume White Paper submitted in August, under review
AERMOD White Papers

• AERMOD near-term system updates
  • Low wind conditions
    • LOW_WIND keyword (Minimum $\sigma_v$ value, Minimum wind speed, FRANMAX)
    • Considering additional options for minimum Monin–Obukhov length and associated parameterizations of vertical temperature gradient scale ($\theta^*$)
  • Downwash
    • ORD and PRIME2 alpha options added to 19191
    • EPA planning additional evaluations
    • ORD conducting additional development work to address other downwash issues
  • NO$_2$ enhancements
    • New field studies (API, BLM, PRCI, ERM, AECOM, EPA, City of Denver, other O&G industry groups)
    • New Tier 3 method, based on ADMS approach (API collaboration)
    • New Tier 2 method, based on NO/O3 reaction rate limitations, released by (EPA)
  • Mobile sources
    • RLINE added to 19191 (FHWA Collaboration)
• Overwater
  • IWAQM agreement with the Dept. of Interior’s Bureau of Ocean and Energy Management (BOEM)
  • Downwash effects that are unique to offshore platforms which are raised, often open lattice structures
    • BLM planning additional wind tunnel studies to inform algorithm development
    • OCD has platform downwash algorithms, EPA/BOEM discussing integration into AERMOD
• Shoreline/Coastal Fumigation
  • Evaluation of screening algorithms in AERSCREEN, Shoreline Dispersion Model (SDM), and more recent published research.
• Marine Boundary Layer Parameterization
  • Some work in using AERCOARE preprocessor for overwater meteorological data available as a counterpart to AERMET
• Saturated plumes/Plume rise
  • PLURIS is generic plume rise model (AECOM)
  • BLP-like sources been important recently
  • Additional focus on merged plumes & industrial heat islands resulting in increased plume rise
Providing Non-Regulatory Options

- **ALPHA options** – “experimental”, i.e., developmental options not available for regulatory use
- **BETA options** – Peer-reviewed options that are potentially ready for consideration as alternative model(s)

**ALPHA Option**

Section 3.2.2 of Appendix W
- e.g., Scientific peer review
- e.g., Databases available

**BETA Option**

Formal promulgation through NPRM

**Regulatory Option**

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What makes a BETA option?

- **Section 3.2.2.e – no preferred model**
  1. Technique has received a scientific peer review;
  2. Technique is applicable to the problem on a theoretical basis;
  3. Databases to perform the analysis are available and adequate;
  4. Performance evaluations have shown that the model or technique is not biased to underpredict; and
  5. A protocol on methods and procedures has been established.

- **Section 3.2.2.b.2 – there is a preferred model**
  - A statistical performance evaluation has been conducted with air quality data showing that the alternative model performs better.

- **Section 3.1.1.c – selecting a preferred model**
  1. Complete test dataset must be packaged with the model.
  2. The model must be useful to typical users.
  3. The model documentation must include a robust comparison with air quality data.
AERMOD “Top 10” Download Facts

- August 21\textsuperscript{st} through Sept 30\textsuperscript{th} (41 days)
- 1241 downloads of AERMOD (~1 year since last release)
- SCREEN3 (253) vs AEMET (233)

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