



EPA's Model Development Plan

EPA RSL Workshop

U.S. EPA / OAQPS / Air Quality Modeling Group

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- Development and Updates to the AERMOD Modeling System
- Approach for AERMOD Improvements
 - ALPHA to BETA to Regulatory System
 - ALPHA and BETA options in AERMOD 22112
- White Paper Topics
- Development Efforts Looking Forward to Regulatory Release and Beyond



Development & Updates to AERMOD

- Model formulation updates to the AERMOD Modeling System last occurred in 2017 when EPA finalized updates to the Guideline on Air Quality Models
 - Planning to propose an update to the *Guideline* within the next year
- Formulation updates are developed and implemented through
 - Model Development
 - Model Evaluation
 - Model Review & Application
- Success of model development depends upon interactions (communication, coordination, and collaboration) with the stakeholder community

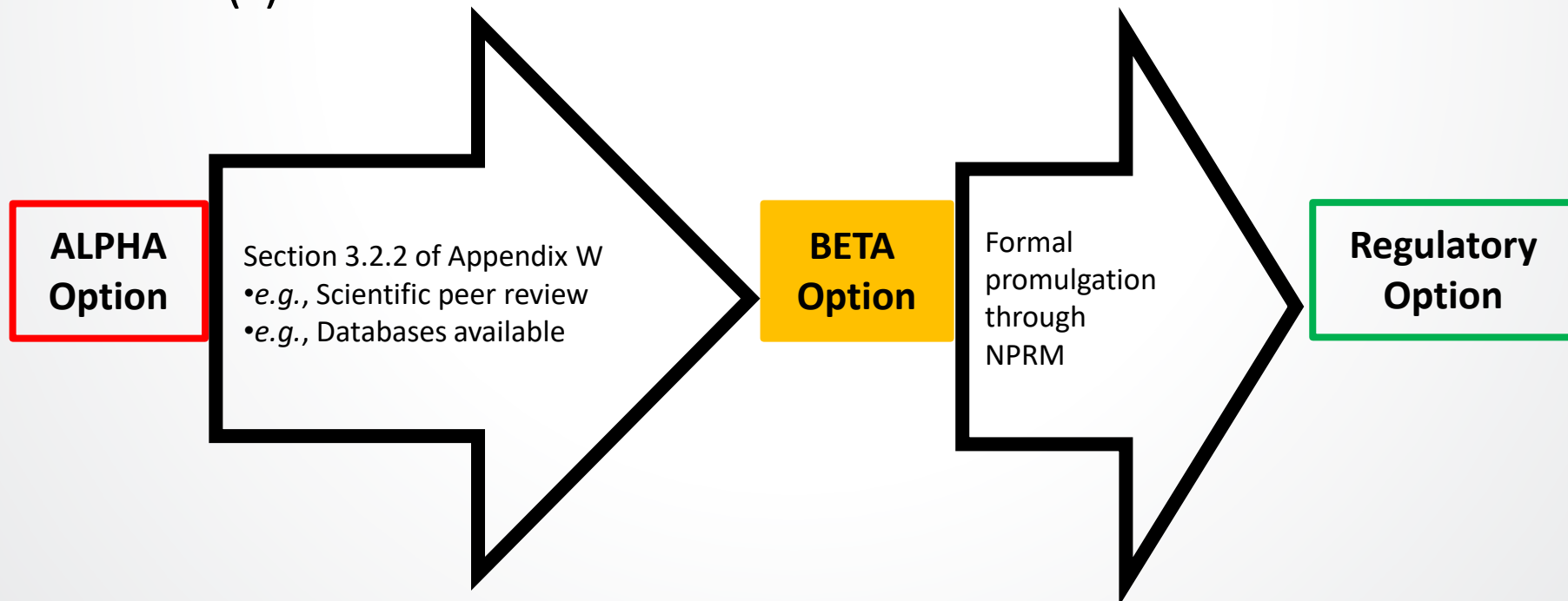


Approach for AERMOD Improvements

Improvements to the AERMOD modeling system are implemented using the following approach:

1. A model enhancement is proposed either by a stakeholder or internally within the Model Development Team
2. If there is a technical/scientific basis, a white paper is developed detailing the area of suggested improvement
 - Document should include relevant field data, modeling files, current literature, and any other key technical information
3. EPA considers the proposed model improvement along with other competing priorities
4. After sufficient technical development and evaluation, the enhancement may be added to AERMOD as an **ALPHA** or some cases **BETA** option

- ALPHA options – “experimental”, i.e., developmental options not available for regulatory use; added in AERMOD version 18081
- BETA options – Peer-reviewed options that are potentially ready for consideration as alternative model(s)





Alpha and Beta Options in AERMOD 22112

- New **ALPHA** options

- *SWPOINT downwash source type*
- *Platform Downwash*
- *Low Wind (FRANMin, PBAL)*
- *NO₂ Conversion Methods (TTRM2)*
- *RLINERDH*

- Existing **ALPHA** options

- *ORD & AWMA Downwash*
- *RLINEXT – RDEPRESS & RBARRIER*
- *PSDCREDIT*
- *METHOD_2 particle deposition*
- *Gas deposition*

- *TTRM NO₂ Conversion Method*
- *Low Wind (SWmin, WsMin, FRANmax, BigT)*

RLINE & GRSM are the current **BETA** options in AERMOD v.22112



Current AERMOD White Paper Topics

- EPA continues to rely upon our series of "White Papers" that identify our priority areas of science updates to the AERMOD Modeling System:
 - **Building Downwash Algorithms** – *improved treatment of building downwash effects*
 - **Overwater Modeling** – *replacement of OCD with AERMOD*
 - **NO₂ Modeling Techniques** – *more accurate estimates of NO₂ concentrations due to NO₂ conversion*
 - **Low Wind Options** – *improve model predictions under low wind conditions*
 - **Mobile Source Modeling** – *improved estimate of roadway impacts – treat dispersion from barriers*
 - **Saturated Plumes** – *improved treatment of plume rise of moist/saturated plumes*

For more information on AERMOD development efforts and white papers: <https://www.epa.gov/scram/aermod-modeling-system-development>



Upcoming Regulatory Release

- Propose a regulatory update to the AERMOD Modeling System within the next year
 - Aligned with the 13th Conference on Air Quality Models projected for 2023
 - Minimal additional edits / amendments to the 2017 revisions to the *Guideline*
 - Relying upon our series of “White Papers” that identify priority areas of science updates
 - Success depends upon feedback and collaboration from the modeling community to move these updates forward



AERMOD Improvement Priorities

- Current improvement priorities for the regulatory release and beyond
 - **Overwater Modeling** – *Refine / evaluate the platform downwash algorithm and add shoreline fumigation capability to AERMOD*
 - **Building Downwash Algorithms** – *Propose updates to PRIME from **ALPHA** options*
 - **NO₂ Conversion** – *Testing of GRSM and TTRM/TTRM2 as the more advanced conversion options*
 - **Mobile Source Modeling / RLINE** – *Push from **BETA** to regulatory, improve treatment of terrain, and edge effects within the barrier algorithm*
 - **Plume Rise** – *Add aircraft source type and incorporate plume rise algorithm as a **BETA** option*
 - **Low Wind** – *Evaluate current low wind options against field dataset*
 - **Urban meteorology** – *Improve inputs and processing for the URBAN option*