



8th Conference on Air Quality Modeling – AWMA AB3 Comments on Lagrangian and Eulerian Long Range Transport/Regional Models

By

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Comment Areas

- Need for regional (Eulerian) models
- Best uses for Lagrangian vs. Eulerian models
- Where does EPA go from here?



Need for Regional Models

- Ozone and PM-2.5 are pollutants involving multiple precursors and complex chemistry and transport
- Current models mentioned in 40 CFR Part 51 do not address these needs
- These pollutants are important because of widespread and large nonattainment areas, and the scale of emission changes needed to address attainment
- EPA needs to provide procedures for modeling PM-2.5



Lagrangian Models

- These models, such as CALPUFF and SCIPUFF, compute the change of concentration following a parcel (puff) as it is advected by the wind
- They are most suitable for individual source applications, but could be run for hundreds of sources
- Chemistry is limited: ozone cannot be modeled; PM-2.5 can be modeled



Eulerian Models

- The total concentration is obtained relative to a fixed grid, pollutant concentrations and meteorological variables are defined at each grid point
- For individual sources, this approach causes instantaneous “pseudo dilution” of point source emissions into the entire grid cell volume
- This overdilution effect becomes more pronounced with increasing horizontal grid sizes
- Eulerian approaches are most suitable when complex emission and non-linear chemical conversions are involved for large distances



Approved Use of Regional Eulerian Models

- Use throughout the US: focusing upon CAMx and CMAQ
- There have been evaluation studies, but EPA should have a system to determine acceptable criteria for approving the models
- The models are very complex and resource intensive; uncertainty/sensitivity needs review
- The models' accuracy is good in some areas and poor in others. Continued work on a consistent evaluation approach is recommended, similar to short-range models.