



Comparison of AERMOD
to EIAA with respect to
the Latest Tracer Field
Data

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AERMOD-10 Crete 2005

Introduction

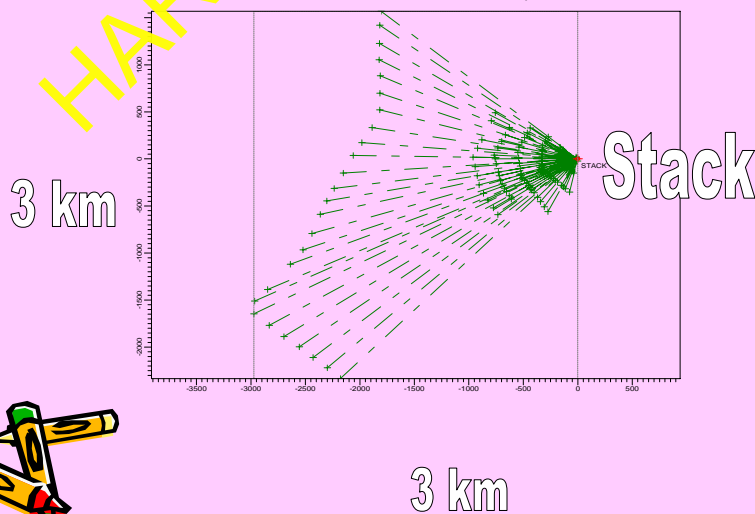
- Chinese State Environmental Protection Administration (SEPA) is revising current regulatory guidelines
- Appraisal Centre for Environment & Engineering (ACEE) evaluates the suitability of US EPA models for use in China
- Lakes Environmental, Canada, is invited for participation of the evaluation process
- This talk focuses on inter-comparison & validation of AERMOD (US) versus EIAA (China)

EIAA vs. AERMOD

- EIAA is a simple GPM. It is inferior to AERMOD which is an extended GPM with numerous features
- "Standard" comparison protocol (Model Validation Kit) with reference to Alaska tracer dataset
- Alaska tracer field expt features release of effluent near a building with significant plume rise in a very stable atmosphere
- Attention to the cause responsible for the inadequacy of EIAA

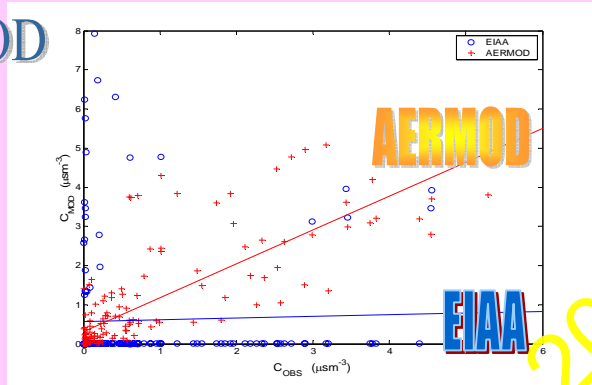


Domain and Receptors



Scattered Plot

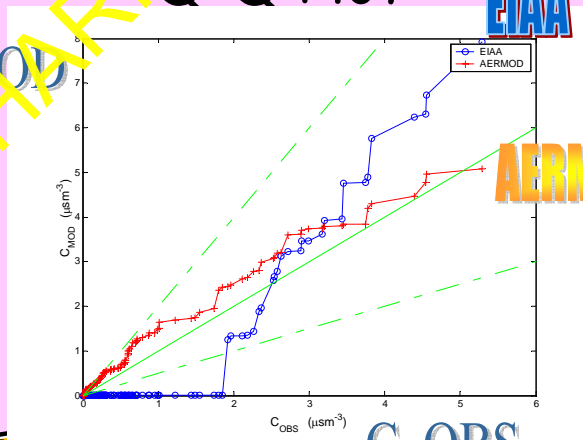
C_MOD



C_OBS

Q-Q Plot

C_MOD



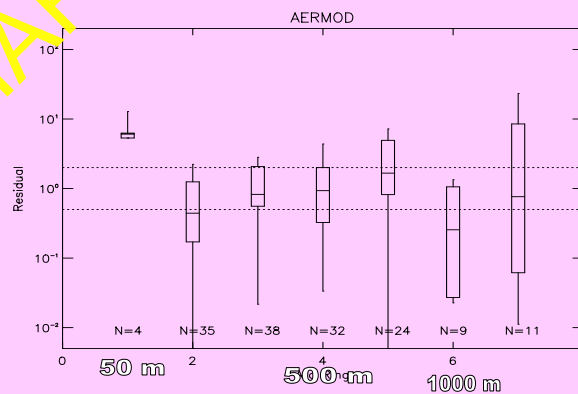
C_OBS

Comparison of Model Performance

	Normalized Correlation	Fraction of Factor 2	Root Mean Squared Error
EIAA	0.032	10.4%	1.55
AERMOD	0.772	100%	0.83



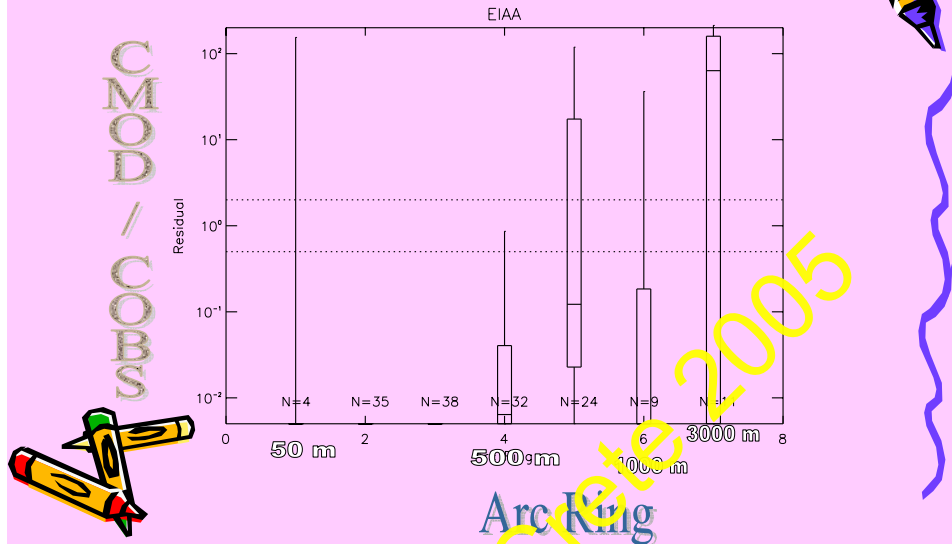
AERMOD Residue Plot



Arc Ring



EIAA Residue Plot



Discussion & Conclusions

- EIAA lacks an algorithm of building downwash. The plume rise is overestimated as it is NOT moderated by the building downwash.
- This results in near-source zero impacts and overestimation of PM_{10} at far field
- ACEE recommends inclusion of building downwash in the future guideline
- ACEE and Lakes Environmental are further investigating other technical difficulties when AERMOD is used in China
- In particular, the mixing height calculations in AERMOD rely on the morning sounding at 12Z, which is not appropriate for use in China (00Z is more appropriate)
- Suggest to modernize MVK by use of advanced mathematical packages such as MATLAB or IDL