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Summary of the Air Quality and Exposure Modeling Workshop

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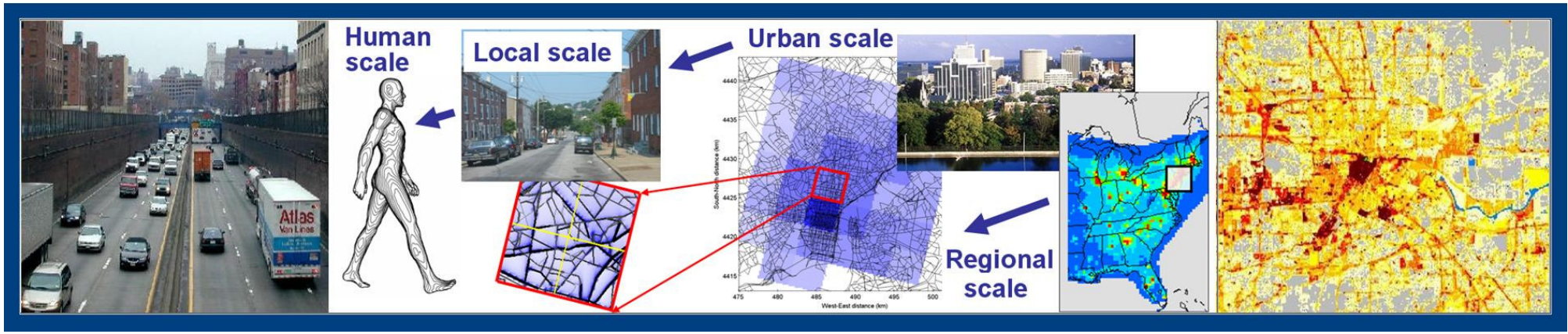

US/UK Collaboration Meeting
9 December 2010

Summary of the Air Quality and Exposure Modeling Workshop in RTP on 16-Nov-2010

Objective: Investigate approaches for using dispersion models to improve the spatial and temporal resolution as well as accuracy of pollutant estimates for use in human exposure and health studies.

Charge Questions:

- **What specific aspects of spatial/temporal representation associated with dispersion models need to be improved for exposure estimates and/or linkage with health endpoints?**
- **How can we develop practical tools/approaches for urban-scale modeling, addressing computational efficiency, meteorological variability and emissions from multiple sources?**
- **Which pollutants can we target for incorporating simplified chemistry into dispersion models for the time and space scales of concern?**
- **How do we quantify the uncertainty in model predictions, including its communication through probabilistic model output?**

Workshop Recommendations

- Follow-up workshop with epidemiologists to improve communication between modelers and health communities
- Design, develop and evaluate a dispersion modeling approach for use in human health studies with a focus on two types of applications:
  1. Urban scale--to support epidemiologic studies
  2. Community scale--to support exposure and risk assessment
- Start with existing prototypes
  - AERMOD + CMAQ in urban-scale studies (Atlanta, Baltimore)
  - AERLINE in community-scale studies (C-FERST, Detroit)
- Use iterative approach based on comprehensive model evaluation to determine need for additional enhancements or simplification

Research activities

- Within a year, develop the framework for a computationally-efficient local-scale dispersion model for use in exposure and risk assessments with a goal of a model prototype in two years.

- Specific areas of research to improve the model:
  - Effects of vehicle induced turbulence, barriers, depressed roads on near road dispersion
  - Effects of urban morphology, 3-D building geometry on flow and turbulence inside urban canopy
  - Deposition
  - Chemistry
  - Characterization of variability and uncertainty
  - Estimating regional background contribution
  - Using observations to calibrate the model
  - Computational efficiency
  - User friendly
- Develop partnerships with other agencies:
  - Participation in large urban-scale experiments for model evaluation
  - Collaborate with other US agencies in model development
  - Collaborate with UK scientists on model development and evaluation

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Next Steps

- Develop “White Paper” describing a research plan to develop a computationally-efficient local-scale dispersion model for use in exposure and risk assessments
- Develop milestones, budget requirements and schedule for the next 2 years
- Form Team: A. Venkatram, S. Hanna, J. Weil, V. Isakov, S. Perry, D. Heist, D. Kryak, V. Garcia and others (Carruthers, Hunt?)
- Meet and communicate regularly--Next team meeting in RTP in March 2011, with regular conference calls in the interim.