

### 3.8

#### **MODELING AT NEIGHBORHOOD SCALE**

Sylvain Dupont, Jason Ching and Tanya Otte  
U.S. EPA/UCAR, NERL/AMD, RTP, NC  
e-mail: [dupont@hpcc.epa.gov](mailto:dupont@hpcc.epa.gov)  
Voice (919) 541-0363 Fax (919) 541-1379

#### **ABSTRACT**

Air quality (AQ) simulation models provide a means of implementing the National Ambient Air Quality Standards (NAAQS) and are tools for performing risk-based assessments for airborne toxic pollutants and for developing and testing environmental management strategies. Our conceptual design basis for air quality modeling for estimating human exposure to air pollution, especially in urban population centers, will require both grid modeling at neighborhood scales (NS) and an estimate of sub-grid-scale variability in the pollutant concentration fields in each grid cell and for each model time. This modeling approach is meant to enhance and complement the more limited data from monitoring networks to provide pollutant concentration fields at high temporal and spatial resolution.

To address the first requirement, an urban canopy parameterization (UCP) is implemented inside the Penn State/NCAR Mesoscale Model (MM5), which provides meteorological fields to the U.S. EPA's Models-3 Community Multiscale Air Quality (CMAQ). The UCP uses the drag-force approach and the soil model SM2-U (considering in detail both rural and urban surfaces) to simulate meteorological fields inside the urban roughness sub-layer. CMAQ is then run at fine scales to generate gridded fields of pollutant concentrations.

The impact of the UCP on meteorological and pollutant fields for a simulation centered on the Philadelphia urban area will be shown during the presentation.