P19 Sub-kilometer mobile emissions grid and dispersion model for Medellin, Colombia.

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The dispersion of traffic emissions in a highly urbanized and narrow inter-Andean valley is examined using two dispersion model types (Lagrangian and Eulerian) with a passive tracer emulating CO. The Lagrangian model consists of a passive particle stochastic tracking system run (offline) with high-resolution WRF meteorology. The eulerian system is based on WRF-CHEM set-up to include passive tracers (online). A top-down approach was implemented to disaggregate in space (300 m) and time (hourly) mobile emissions from annual CO totals for the entire urban area. The model set-up consists of WRF-based meteorology simulations using 5 nested domains with horizontal resolutions ranging from 24.3 km to 300 m. The performance of the WRF model output was evaluated using surface observation data and boundary layer remote sensing systems. We use the models to address the following questions:
1. How are mobile emissions distributed in the valley?
2. Which areas are the most critical sinks of pollutants?
We show the value of each dispersion model type, their strengths and weaknesses. This methodology and results provide insights for improving air quality management in the city.