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I Have No Meteorological Data For My Project, So What Now? Applicability of MM5 in AERMOD

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Thursday, August 19, 2010 - Noon to 1:00 PM

**South Coast Air Quality Management District, Conference Room CC-6
21865 Copley Drive, Diamond Bar, CA 91765**

As of December 9, 2006, U.S. EPA promulgated the American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) as a replacement for the Industrial Source Complex (ISC) Model as the recommended dispersion model. One of the challenges facing the implementation of AERMOD for regulatory permitting purposes is the availability of 5 years of representative meteorological or 1 year of site specific meteorological data for each permitted facility. Often, it is difficult to acquire the data or it is not cost effective to collect site-specific data. AERMOD requires more sophisticated meteorological input compared to its predecessor models such as Industrial Source Complex version 3. The additional variables are sensible heat flux, friction velocity, surface roughness length, albedo and Bowen ratio, which are usually unavailable through routine measurements. However, a mesoscale model provides all the required variables as well as virtually unlimited coverage over space and time. To this extent, a mesoscale numerical model, MM5 (the Penn State/National Center for Atmospheric Research Mesoscale Model 5) was employed to generate data for dispersion modeling. MM5 was simulated for the year 2005 with data assimilation techniques and the output was converted into an AERMOD compatible format.

A comparative analysis was then performed using observation based meteorological data for 2005 (Freedman et al 2009 and Chico et al 2009) and MM5 generated meteorological data for 2005 in AERMOD for twenty two meteorological sites within the South Coast Air Basin (SCAB) in Southern California. All twenty two meteorological sites had complete observed data available for 2005. Our analysis consisted of a total of eighteen source types(5 area sources, 8 point sources, and 5 volume sources) with building downwash effects included, both rural and urban dispersion characteristics, five averaging periods (i.e. 1-hour, 3-hour, 8-hour, 24-hour, and annual) which are commonly used for regulatory permitting purposes, and flat terrain. The peak concentrations predicted by AERMOD using both sets of meteorological data were found to be in relatively good agreement with each other, with some variations between the rural and urban dispersion characteristics.

Biography

Sang-Mi Lee received her M.S. and Ph.D. in Atmospheric Sciences from Seoul National University, Korea. Since then, she has worked at government agencies (U.S. EPA and CARB), national research laboratory (Los Alamos National Laboratory), and academic institutes (Arizona State University and University of California). Her research has focused on dynamic and chemical processes of atmospheric boundary layer affecting transport and dispersion of air contaminants. She has authored many peer-reviewed journal articles, text books, conference proceedings and reports. At SCAQMD, she primarily focuses on regional scale meteorology and air quality modeling using three-dimensional prognostic modeling tools. She also works with the linkage of the regional scale to a local scale dispersion modeling.

Jillian Baker received her B.S. and M.S. in Chemistry and her Ph.D. in Environmental Sciences from U.C. Riverside with an emphasis in Atmospheric Chemistry and has over 5 years of professional experience as an environmental consultant. Her experience includes the preparation of technical studies such as air quality impact studies, health risk assessments for both mobile and stationary sources, air quality monitoring plans, and exposure assessments for various development projects, railroad projects, and transportation projects, as well as providing third-party Air Quality review services. At the District, Jillian is responsible for reviewing dispersion modeling analyses and health risk assessments performed for compliance with Rules 1303, 2005, and 1401 for permitting purposes. She also performs air dispersion modeling for Rule amendments and updates and assists with air dispersion review for the CEQA group when needed.

Lunch can be brought in or purchased in the Cafeteria beforehand