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MAE/EnE Collaborative *Seminar Series*

Friday, January 30th, 2015
McDonnell Douglas Auditorium (MDEA)
10:30AM-11:20AM

Using Modern Data Networks to Improve Air Quality Models for Policymaking in the South Coast Air Basin

The South Coast Air Basin (SCAB) is an area of 10,743 square miles that encompasses Orange County and major portions of Los Angeles, Riverside, and San Bernardino counties. Topographical barriers to pollutant transport outside of the Basin along with intense photochemistry, emissions from a strong industrial presence and a transportation infrastructure reliant on fuel combustion lead to significant pollution problems. Major portions of the SCAB are in federal non-attainment of 8-hr ozone and $PM_{2.5}$ standards. $PM_{2.5}$ and ozone concentrations are a function of complex chemistry, spatial and temporally resolved emissions, and meteorological conditions. We employ a chemical transport model (The Community Multiscale Air Quality Modeling System), mesoscale meteorological model (Weather-Research-Forecast), and an emission processing model.

In order to facilitate more accurate modeling, we have implemented regional spatial and temporally dependent measurements from several modern data sets. **A)** Improvements in model performance resulting from the incorporation of hourly automobile and truck traffic patterns measured across the SCAB will be examined. This extensive data-set captures changes in emission patterns due to day-specific weather conditions, special events, and holidays. **B)** The boundary layer depth is one of the most important meteorological parameters governing pollutant concentrations. Continuous measurements with five wind profilers and a radiometer positioned within the SCAB allow for a comparison between model-predicted and measured boundary layer heights during 2012. **C)** The Ozone Monitoring Instrument (OMI) aboard the Aura satellite has been continuously collecting world-wide height-resolved ozone measurements since 2004. After validating the tropospheric ozone measurements with a network of ozonesondes, we have used these daily measurements to rescale the model-predicted background ozone concentrations entering the SCAB. In addition, the decadal trend of these data can be used to investigate the multi-year changes in ozone background concentrations and evaluate the implications of rising background levels.