Regional/Urban Air Quality Modeling Assessment over China and Taiwan Using the Models-3/CMAQ System

Joshua Fu, Carey Jang, David Streets, Zuopan Li, Binyu Wang, Jung-Hun Woo, Qiang Zhang and Litao Wang

Brief Description:

The Models-3/CMAQ modeling application that has been conducted to simulate multi-pollutants is presented. The modeling domains cover East Asia (36-kmx36-km) including Japan, South Korea, Korea DPR, Indonesia, Thailand, India and Mongolia, East China (12-kmx12-km) and Beijing/Tianjing, Shanghai and Taiwan areas (4-kmx4-km). For this study, the Asian emission inventory based on the emission estimates of the year 2000 that supported the NASA TRACE-P program is used. However, the TRACE-P emission inventory was developed for a different purpose such as global modeling. TRACE-P emission inventory may not be practical in urban area. The 8 districts of Beijing local emissions and Taiwan emission inventory are used to replace TRACE-P in 4-km domains. The meteorological data for the Models-3/CMAQ run are extracted from MM5. The model simulation is performed during the period January 1-20 and July 1-20, 2001 that presented the winter and summer time for China and Taiwan areas. The preliminary model results are shown O3 concentrations are in the range of 100 –140 ppb in the urban area. Lower urban O3 concentrations are shown in Beijing and Taiwan areas, possibly due to underestimation of urban man-made VOC emissions. High PM2.5 were simulated over metropolitan & downwind areas with significant secondary constituents. It is indicated that the impacts of transported pollutants such as O3 and PM from mainland to Taiwan are significant during winter time. More comprehensive simulations in the Beijing, Shanghai and Taiwan areas are presented with sensitivity analysis. A comparison against available ozone and PM measurement data in Beijing, Shanghai and Taiwan areas be presented.