

1.081 Evaluation of performance of simulated secondary pollutants by using air quality models for urban areas in Japan.

Presenting Author:

Kazuyo Yamaji, Kobe University, Kobe, Japan, kazuyo@maritime.kobe-u.ac.jp

Co-Authors:

Hirokazu Uede, Kobe University, Kobe, Japan

Satoru Chatani, National Institute for Environmental Studies, Tsukuba, Japan

Hiroshi Hayami, Central Research Institute of Electric Power Industry, Abiko, Japan

Hikari Shimadera, Osaka University, Osaka, Japan

Abstract:

Emissions and concentrations of primary atmospheric pollutants (eg. NO_x and VOCs) have been decreased on urban areas in Japan owing to conduct their emission regulations. Nevertheless, PM_{2.5} and photochemical oxidants (O_x) have still remained high concentration levels and their air quality standards of Japan have not been attained at most monitoring stations (Ministry of the Environment of Japan (MOE), 2015). For forming effective air pollution control strategies, currently, we raise expectations for applying air quality models reproducing complicated physical and chemical processes of both of primary and secondary pollutants.

The urban air quality model inter comparison study in Japan (UMICS) was started to improve performances of air quality models (eg. Chatani et al., 2014). UMICS showed some critical problems immanent in the air quality models. For example, the models tended to overestimate NO₃⁻ but to underestimate OA, although simulated PM_{2.5} concentrations were reasonable with comparing to observations at Kanto area (Shimadera et al., 2014). In terms of O₃, the models reproduced well the diurnal and inter-diurnal variations in the O₃ concentrations at most observational stations in Kanto area but tended to overestimate nighttime O₃ and to underestimate daytime O₃ at several observational stations (Morino et al., 2010).

In order to find the causes of discrepancies between the simulated and observed concentrations of PM_{2.5} and O₃, in this study, air quality simulations were performed under different model settings by using the Weather Research and Forecasting (WRF) model and the Community Multi-scale Air Quality (CMAQ) model system. Performances of simulated secondary pollutants using these model settings were evaluated by comparing with observed concentrations of secondary pollutants (O₃, PM_{2.5}, and constituents of PM_{2.5}) on urban areas in Japan, which were provided by UMICS and MOE.