



Comparison of NO₂ and SO₂ from OMI with ground-based measurements and CMAQ

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The evaluation of regional air quality model is needed to assess model's ability to simulate concentrations and long-term variability of atmospheric constituents. The use of satellite data in air quality application has been increasing and has contributed in improving air quality model. In this study, satellite data obtained from Ozone Monitoring Instrument (OMI) are compared with ground-based measurements and simulation results from Community Multiscale Air Quality (CMAQ) modeling system for nitrogen oxides (NO₂) and sulfur dioxides (SO₂) over the East Asia and Korean peninsula. Monthly and seasonal variations of column amounts from surface measurements and CMAQ simulation are compared with those from OMI measurements. Also, long range transboundary air pollution over the East Asia was analyzed both from model and satellite measurements. Air quality model results showed similar temporal and seasonal variations with satellite data. Both model result and satellite measurement for NO₂ and SO₂ showed higher concentration in winter than in summer and NO₂ had higher correlation between model results and satellite data than SO₂. Also, the results showed that satellite measurements of SO₂ was higher than modeling results in both urban (Seoul) and background (Taean) region. Concentration from model was very low in summer compared to that from satellite due to the excessive washout by rain in the model. However, it needs more analysis to better understand model processes and the effectiveness of satellite measurement. The temporal and spatial analysis for O₃, NO₂, and SO₂ using satellite data made it possible to monitor distribution, emission source, and long-range transport of pollutants over wide area.