

國立中央大學大氣物理研究所書報討論

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A top-down approach to estimate East Asia emission using TROPOMI satellite

Abstract

The conventional emission estimation for air quality modeling was mainly based on the bottom-up method, which relies on the accuracy of the emission inventory. In winter and spring seasons, the northeasterly monsoonal flow, transports the air pollutants from the upstream countries to Taiwan. However, the update of emissions inventory in East Asia is slow, making it challenging to promptly capture changes in emission sources. This can induce air quality forecasting error during transboundary air pollution events.

Recently, many studies applied real-time and high-resolution satellite observations to constrain the bottom-up estimated emissions. This study aims to use TROPOMI satellite data to update the bottom-up estimated emissions in East Asia. This correction intends to address the issue of underestimated transboundary air pollutants in Taiwan. Through a mass balance adjustment of emission derived from satellite and model-retrieved NO₂ column densities, the adjusted NO_x emissions are higher than the bottom-up estimated emissions, which furthermore enhances the model performance of the transboundary air pollution event.

Keyword

Emission Estimation

TROPOMI