

Optimization of NO_x emissions in Yangtze Delta Region using in-situ observations

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Well quantified NO_x emissions are essential for air quality forecasting and air pollution mitigation. The traditional “bottom-up” estimates of NO_x emissions, using activity data and emission factors, are subject to large uncertainties, especially in China. Inverse modelling, often referred to as “top-down” approach, using atmospheric observations made from satellites and ground stations, provides an effective means to optimize bottom-up NO_x emission inventory. The rapid expansion of air quality monitoring network in China offers an opportunity to constrain NO_x emissions using in-situ ground measurements. We explore the potential of using NO_2 observations from the air quality monitoring network to improve NO_x emissions estimates in China. The four dimensional variational data assimilation (4DVAR) scheme in the Community Multi-scale Air Quality (CMAQ) adjoint model is implemented to infer NO_x emissions in Yangtze Delta Region at 12 km resolution. The optimized NO_x emissions are presented. The uncertainty reduction of estimates is analyzed and discussed.