



## **Optimization of NO<sub>x</sub> emissions in Yangtze Delta Region using in-situ observations**

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Well quantified NO<sub>x</sub> emissions are essential for air quality forecasting and air pollution mitigation. The traditional “bottom-up” estimates of NO<sub>x</sub> 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<sub>x</sub> emission inventory. The rapid expansion of air quality monitoring network in China offers an opportunity to constrain NO<sub>x</sub> emissions using in-situ ground measurements. We explore the potential of using NO<sub>2</sub> observations from the air quality monitoring network to improve NO<sub>x</sub> 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<sub>x</sub> emissions in Yangtze Delta Region at 12 km resolution. The optimized NO<sub>x</sub> emissions are presented. The uncertainly reduction of estimates is analyzed and discussed.