



Measurement of NO_x fluxes from a tall tower in Beijing

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Nitrogen Oxides (NO_x , the sum of nitrogen monoxide (NO) and nitrogen dioxide (NO_2)) are significant anthropogenic pollutants emitted from most combustion processes. NO_x is a precursor species to the formation of O_3 and secondary aerosols and, in high concentrations, NO_2 can have adverse effects on human health through action as a respiratory irritant. For these reasons, there has been increased focus on improving NO_x emissions inventories, typically developed using ‘bottom-up’ estimates of emissions from their sources, which are used to predict current and future air quality and to guide abatement strategy. Recent studies have shown a discrepancy between NO_x inventories and measured NO_x emissions for UK cities, highlighting the limitations of bottom-up emissions inventories and the importance of accurate measurement data to improve the estimates. Similarly, inventories in China are associated with large uncertainties and are rapidly changing with time in response to economic development and new environmental regulation.

Here, we present data collected as part of the Air Pollutants in Beijing (AIRPOLL-Beijing) campaign from an urban site located at the Institute of Atmospheric Physics, Chinese Academy of Sciences (IAP, CAS) ($39^{\circ}58'28''\text{N}$, $116^{\circ}22'16''\text{E}$) in central Beijing. NO_x concentrations were measured using a state-of-the-art chemiluminescence instrument, sampling from an inlet at 100 metres on a meteorological tower. Measurements at 5 Hz coupled with wind vector data measured by a sonic anemometer located at the same height as the inlet allowed NO_x emission fluxes to be calculated using the eddy covariance method. Measurements were made during the period 11/11/2016 – 10/12/2016 and compared to existing emission estimates from The Multi-resolution Emission Inventory for China (MEIC) inventory. It is anticipated that this work will be used to evaluate the accuracy of emissions inventories for Beijing, to develop improved emissions estimates and thus provide greater information about the sources of NO_x in the city.