



Vertical gradients of nitrous acid (HONO) measured in Beijing during winter smog events.

Louisa Kramer (1), Leigh Crilley (1), Steven Thomson (1), William Bloss (1), and Shengrui Tong (2)

(1) University of Birmingham, School of Geography, Earth and Environmental Sciences, Birmingham, United Kingdom (L.Kramer@bham.ac.uk), (2) Institute of Chemistry, Chinese Academy of Sciences, Beijing, P. R. China

HONO is an important atmospheric constituent, as the photolysis of HONO leads to the formation of OH radicals in the boundary layer, with contributions of up to ~60% in urban regions. This is particularly important in mega-cities, such as Beijing, where measured HONO levels can reach parts per billion. Research has shown that direct emissions, homogeneous gas phase reactions and heterogeneous conversion of NO₂ on surfaces all contribute to HONO in urban areas. There are, however, still uncertainties regarding the magnitude of these sources, and models are still unable to account for total measured HONO mixing ratios.

To assess the sources of HONO, vertical profile measurements were performed up to an altitude of 260 m on the Institute of Atmospheric Physics (IAP) Meteorological Tower in Beijing. These measurements were performed as part of the Air Pollution and Human Health (APHH) project, during Nov/Dec 2016. Here we present HONO profile measurements using a long-path absorption photometer (LOPAP), during both clear and hazy days. HONO levels near the ground were very high during smog events with concentrations over 10 ppb observed. The data show a strong negative gradient with altitude, suggesting a source close to the surface. The largest gradients were observed overnight during smog events, with differences in HONO between the ground and the highest level up to 6 ppb.