



Measurements of HONO emission fluxes in agricultural fields in the NCP

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A dual dynamic chamber system combined with incoherent broadband cavity enhanced absorption spectroscopy (IBBCEAS) was first developed to measure nitrous acid (HONO) emission fluxes from agricultural fields in the North China Plain. The concentrations of HONO were measured with two IBBCEAS instruments in the sample and blank chambers, respectively. Within a week after fertilization, the observed HONO flux exhibited a pronounced diurnal variation profile with a maximum of $20.25 \text{ ng N m}^{-2} \text{ s}^{-1}$ at noontime and a minimum of $-0.86 \text{ ng N m}^{-2} \text{ s}^{-1}$ in the early morning, one order of magnitude higher than the flux observed in previously reported literature from fields. During this period, the concentration of HONO in blank chamber reached the maximum of 18.88 ppbv at noon on the 5th day after fertilization, the concentration of HONO in blank chamber can basically represent the concentration of HONO near the ground. HONO and NO_2 in the sample chambers showed opposite diurnal profiles. The field observation results suggested that the high HONO flux is mainly from the direct emission of soil rather than from the heterogeneous reaction of NO_2 , this is the first field controlled studies that is able to distinguish soil emissions from other kind of sources. The results show that the N-fertilized soil has very strong HONO emission potential, which will affect the balance of the HONO budget, and then affect the atmospheric oxidation in the North China Plain.

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