*Supplementary of*

# Production of $N_2O_5$ and $ClNO_2$ in summer in urban Beijing, China

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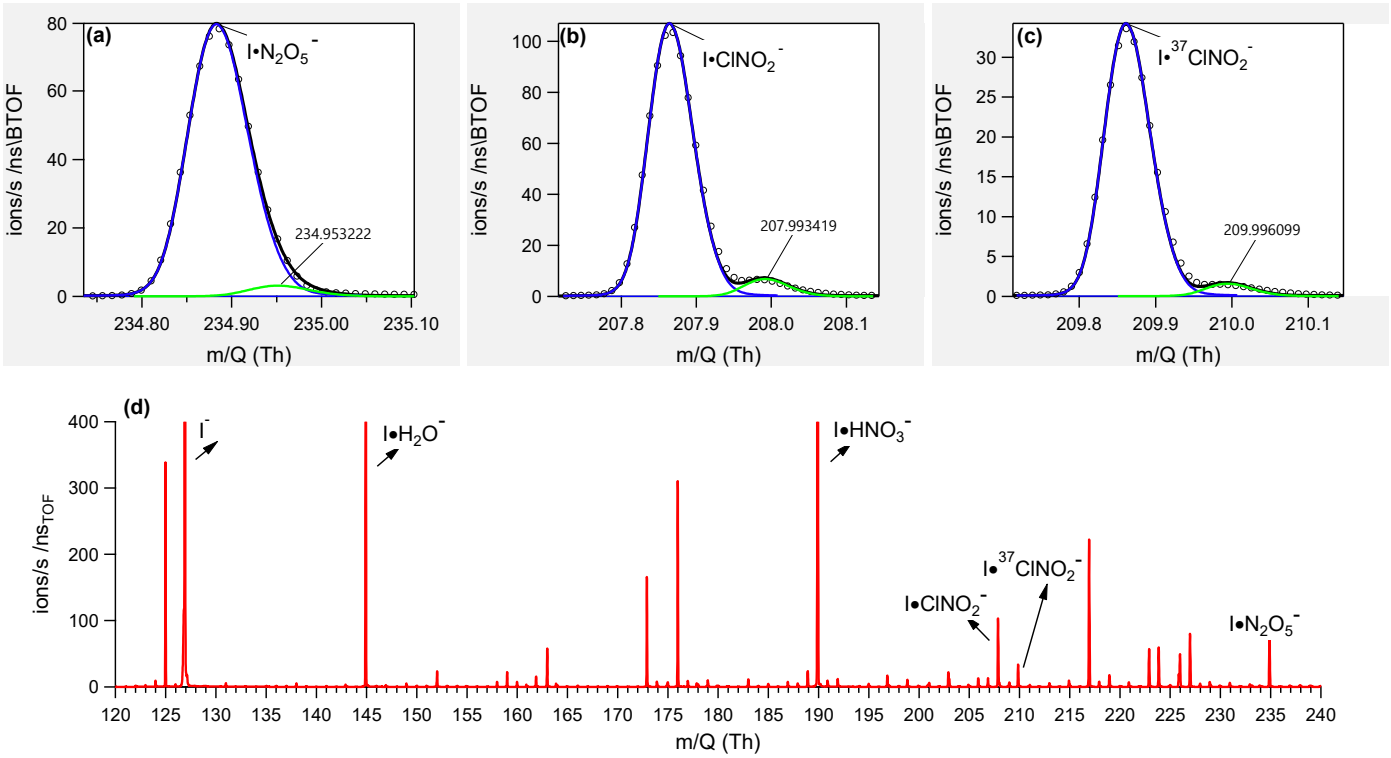


**Figure S1.** High resolution peak fitting for (a) *m/z* 235 as $I•N_2O_5^-$, (b) *m/z* 208 as $I•ClNO_2^-$, (c) *m/z* 210 as $I•^{37}ClNO_2^-$, and (d) average high-resolution mass spectrum for one night from the IAP-CIMS measurement.

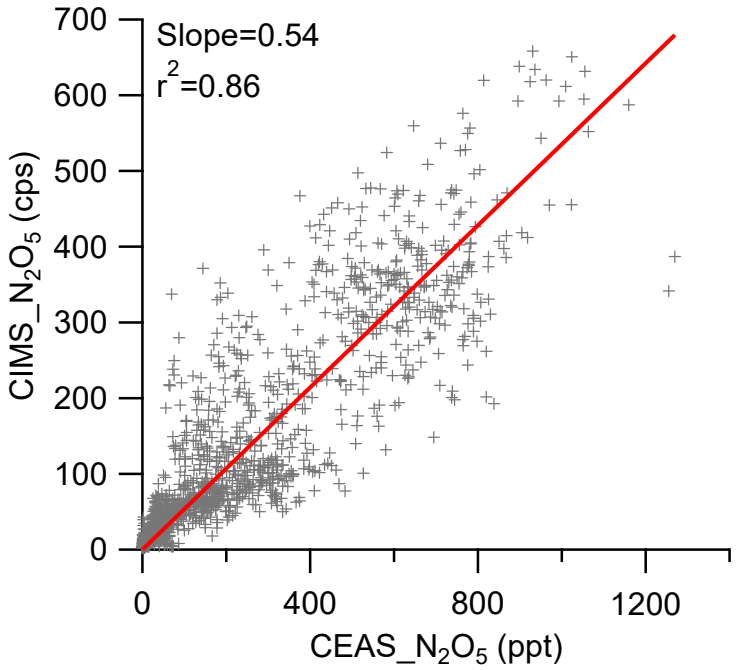


**Figure S2.** Comparison of IAP-CIMS raw signals of $N_2O_5$ with those measured by the Cambridge Broadband Cavity Enhanced Absorption Spectrometer (BBCEAS). The derived sensitivity of IAP-CIMS $N_2O_5$ is 0.54 cps $pptv^{-1}$.

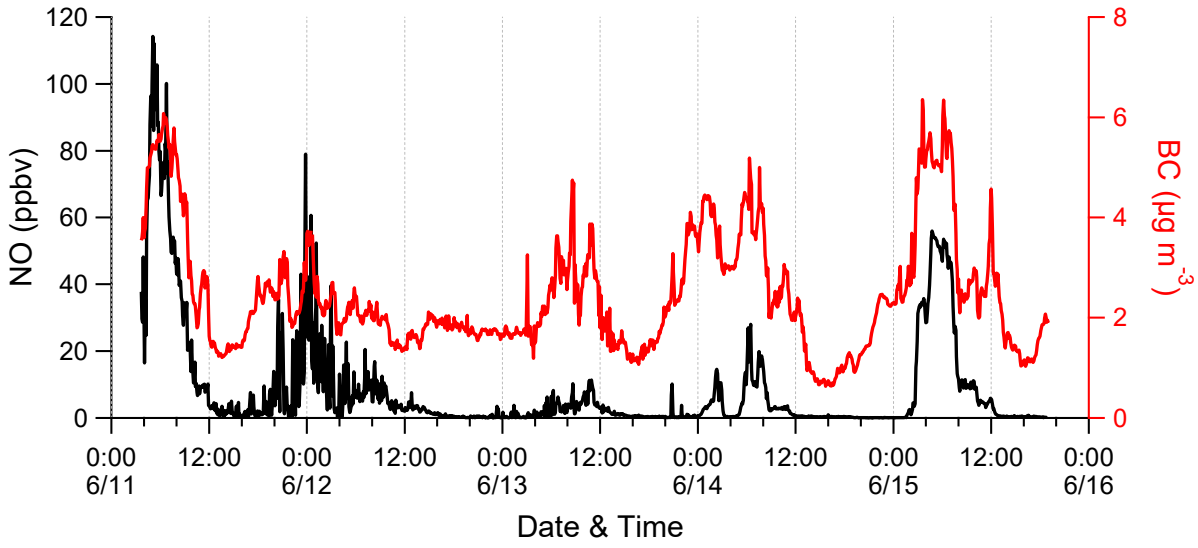


**Figure S3.** Time series of NO and BC during the campaign.

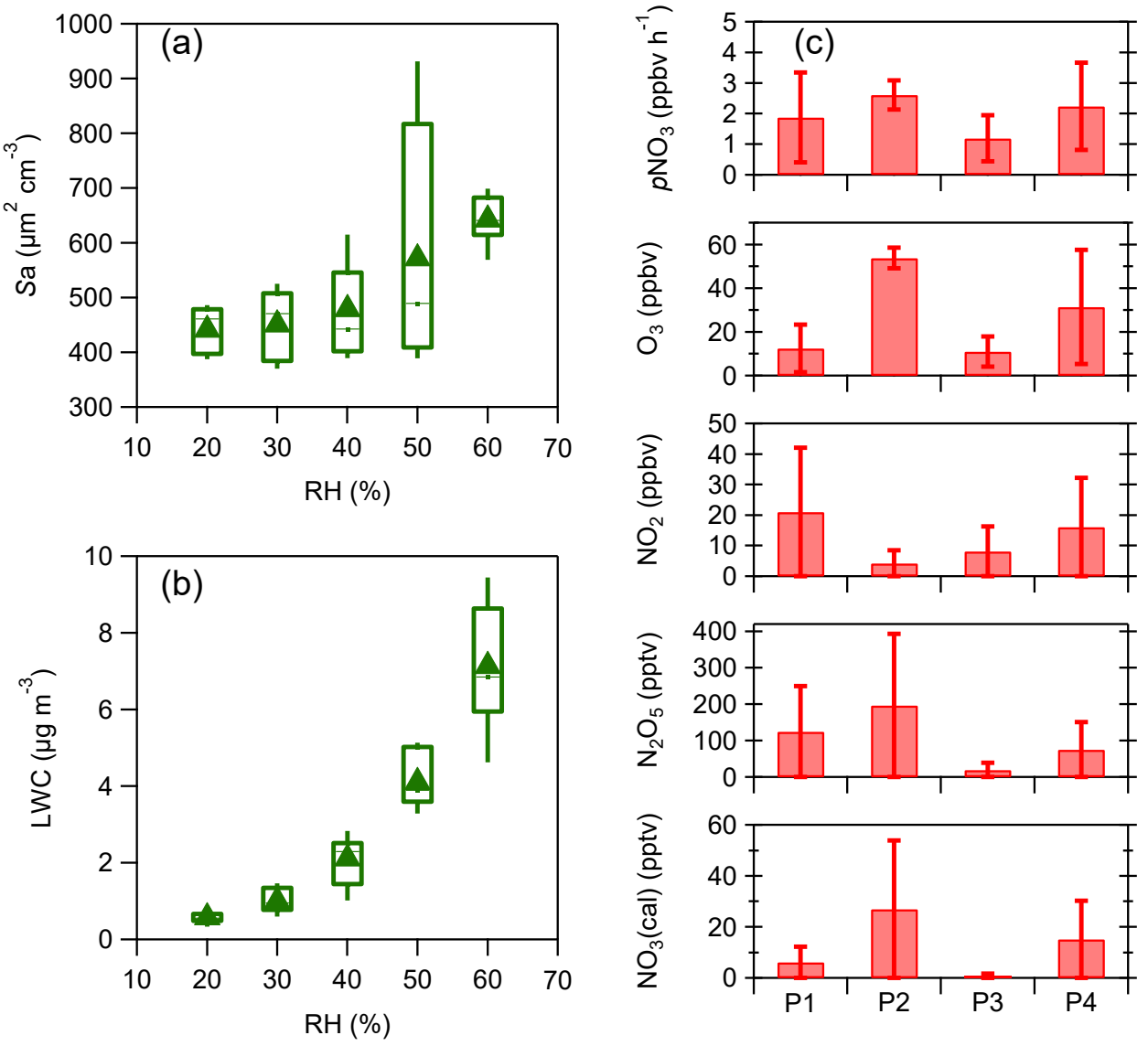


**Figure S4.** Variations of (a) aerosol surface area ($S_a$), and (b) aerosol liquid water content (LWC) as a function of RH. (c) The average mixing ratios of and $NO_3$, $N_2O_5$, $NO_2$, $O_3$ and the nitrate radical production rate $p(NO_3)$ for four different nights (i.e., P1, P2, P3 and P4).

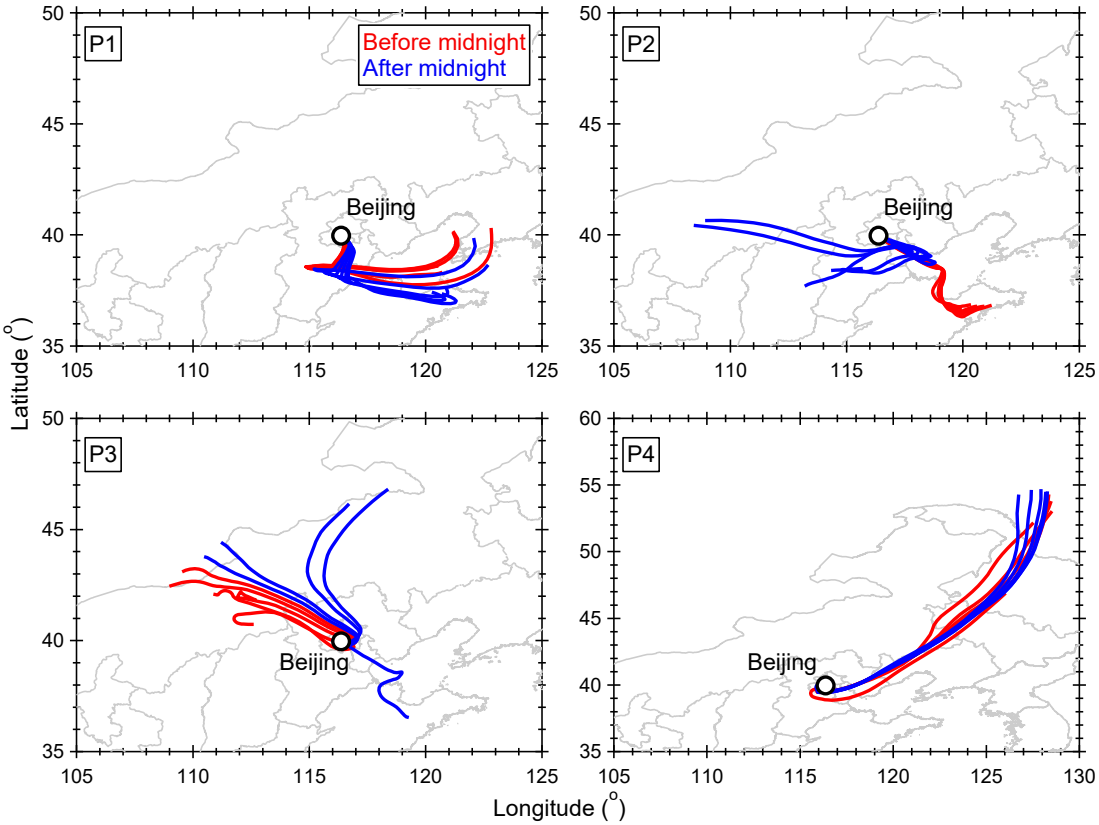


**Figure S5.** The 48-h back trajectories arrived at the sampling site during four different nights (i.e., P1, P2, P3 and P4). Note that the trajectories at each night are divided into two periods,i.e., before and after midnight.

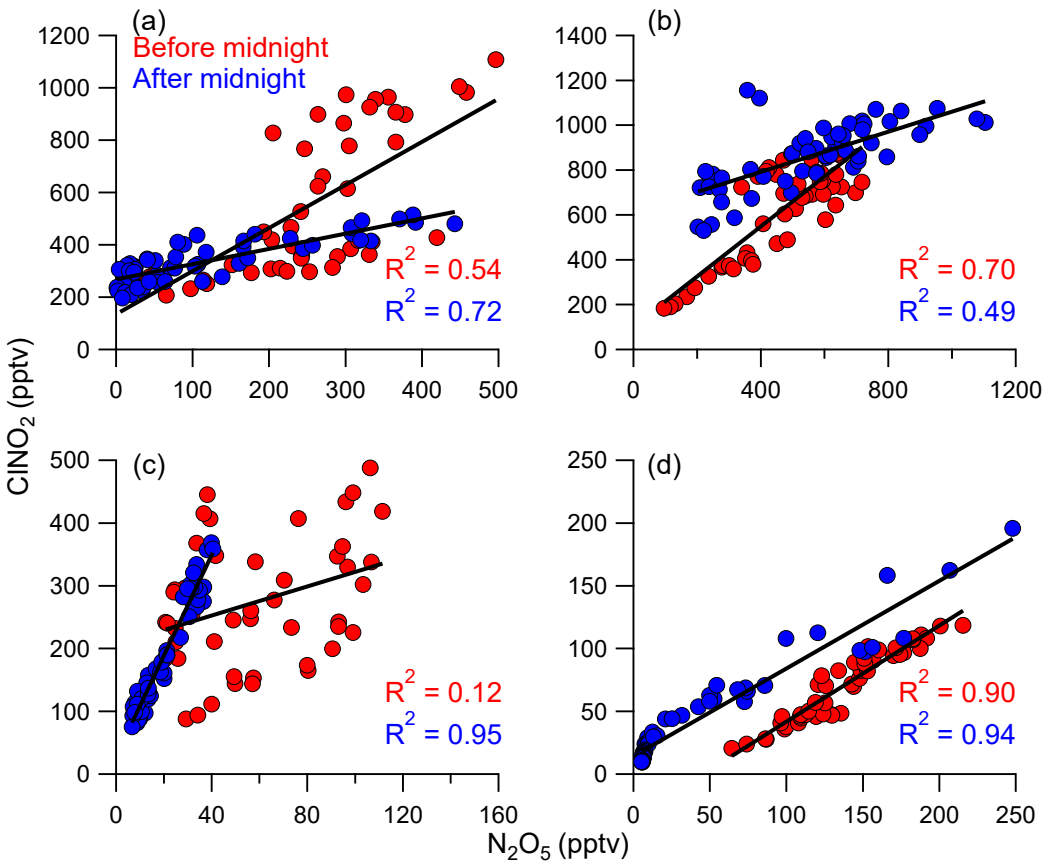


**Figure S6.** The correlations between $ClNO_2$ and $N_2O_5$ for four different nights (i.e., P1, P2, P3 and P4). All the correlations are divided into two periods, i.e., before midnight and after midnight.