Most of the previous field studies of N_2O_5 uptake and $ClNO_2$ production have been conducted in the United States of America (US) and Europe (Brown et al., 2009; Chang et al., 2016). Direct field investigation of the N_2O_5 heterogeneous processes in China is very limited. Pathak et al. (2009, 2011) analyzed the aerosol composition and suggested that the accumulation of fine NO_3^- aerosol downwind of Beijing and Shanghai was due to significant N_2O_5 heterogeneous re-

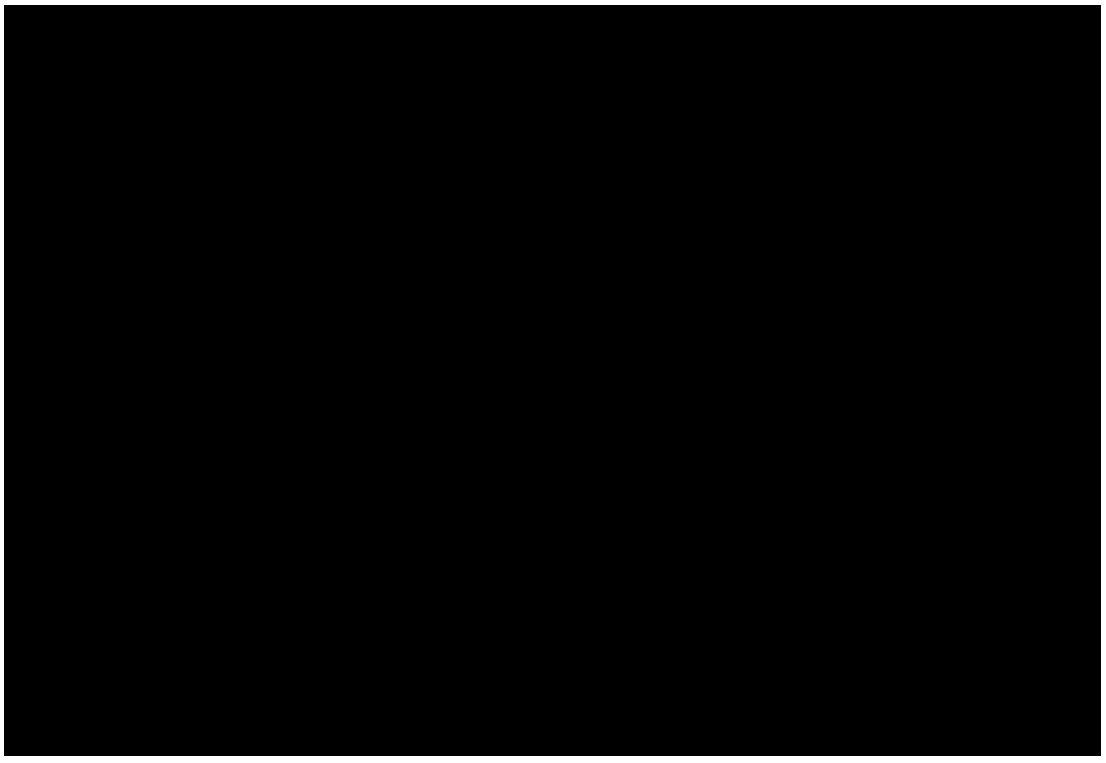

Figure 1. Time series of concentrations of N_2O_5, $ClNO_2$, NO_3 production rates, the steady-state lifetimes of N_2O_5, and related gas and aerosol data at Wangdu from 21 June to 9 July 2014. N_2O_5 and $ClNO_2$ are 1 min averaged data, whereas the NO_x, O_3, and NO_3 production rates and (N_2O_5) are given as 5 min averages. The data for S_a and fine particulate NO_3 are in 10 and 30 min time resolutions, respectively. The data gaps were caused by technical problems, calibrations, or instrument maintenance.

inant source of particulate nitrate. Moreover, the production rate of HNO_3, as calculated from the gas-phase reactions of OH C NO_2 and NO_3 C VOC, shows a decreasing trend towards the night (Fig. 3c), and the combination of these rates on average is less than one-third of the average pNO_3 , which was determined from the slope of nighttime particulate NO_3 in Fig. 3b. The increase in nighttime NO_3 6..-7.59h.n2J/F101 9.9626 Tf 6.436 0

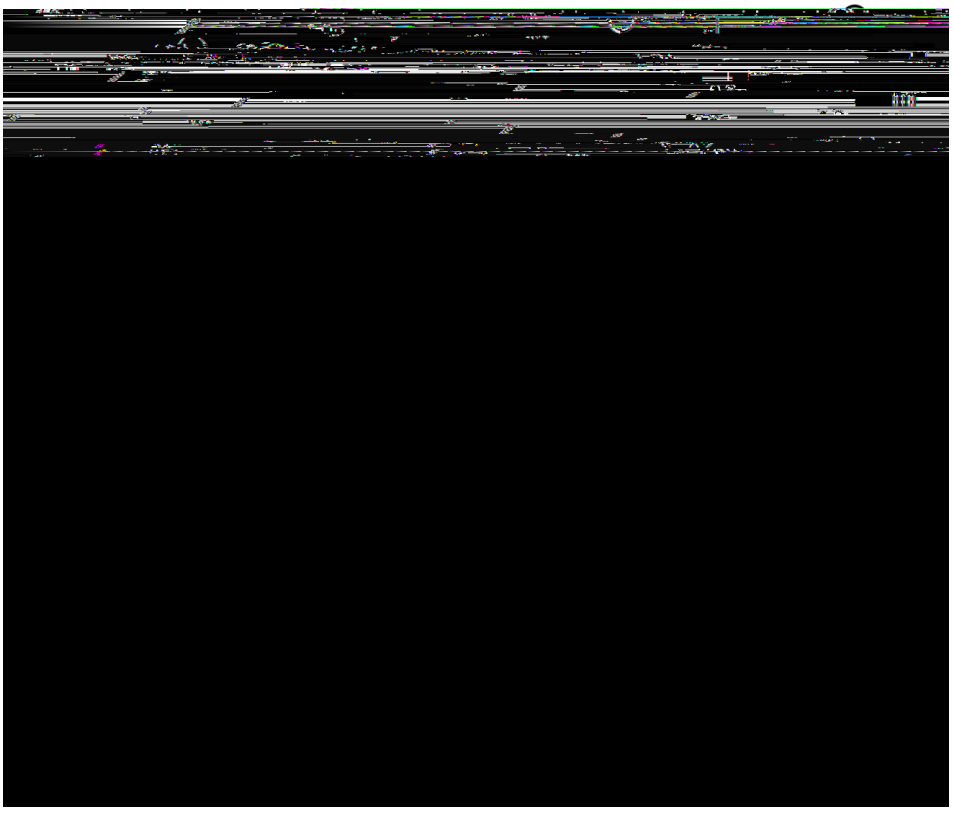

Figure 7. Scatter plots for **(a)** yield derived from the field versus yield calculated from the parameterization, using k_{R4}/k_{R3} of 483 (recommended by Bertram and Thornton, 2009; solid circle) and 836 (recommended by Behnke et al., 1997; pink open circle). Error bars represent the uncertainty in field-derived , and the black dotted line represents the 1 : 1 ratio; **(b)** field-derived yield versus aerosol water content; **(c)** field-derived yield versus chloride; and **(d)** field-derived yield versus CH_3CN=

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