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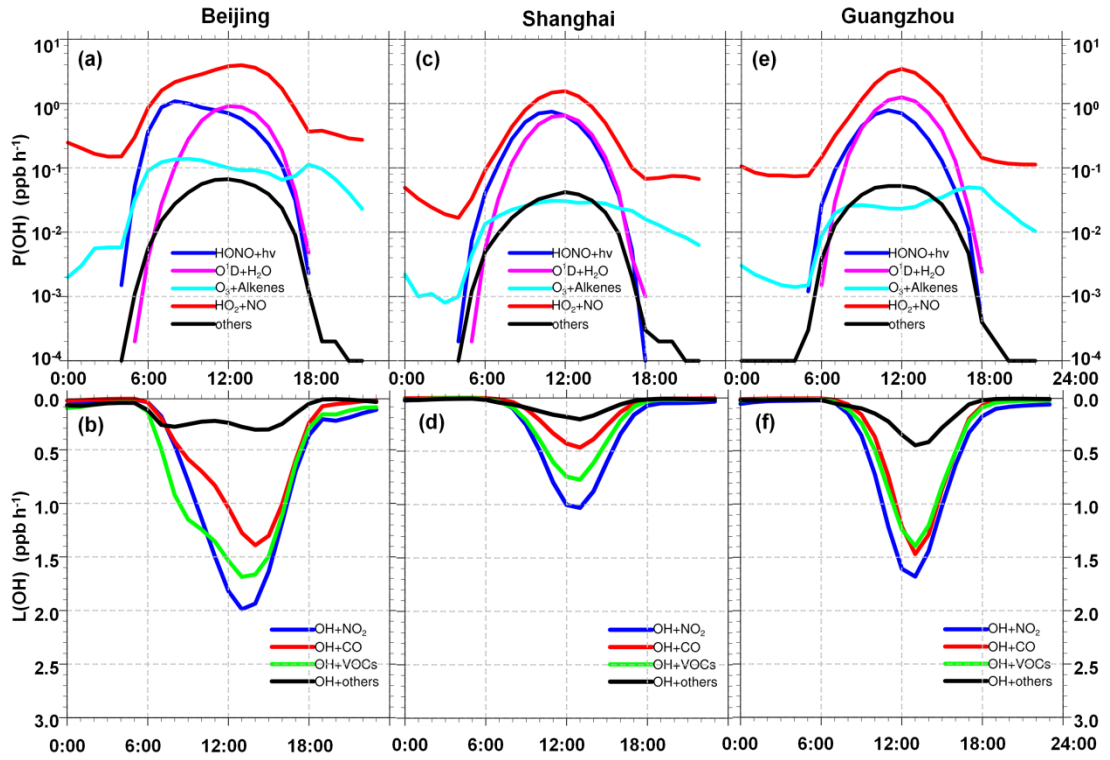


Supplement of

Impacts of an unknown daytime nitrous acid source on its daytime concentration and budget, as well as those of hydroxyl, hydroperoxyl, and organic peroxy radicals, in the coastal regions of China

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2 Fig. S1. Averaged production [P(OH)] and loss [L(OH)] rates of OH for case R in (a,

3 b) Beijing, (c, d) Shanghai, and (e, f) Guangzhou in August 2007.

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18 Table S1. Daytime (06:00–18:00 LST) HO₂ budgets in Beijing/Shanghai/Guangzhou in August 2007.

Reaction	Case R		Case R _{wop}		Case R _p	
	Rate (ppb h ⁻¹)	Contribution (%)	Rate (ppb h ⁻¹)	Contribution (%)	Rate (ppb h ⁻¹)	Contribution (%)
HO ₂ production						
OH+CO	0.785/0.203/0.576	33.42/28.27/38.26	0.932/0.227/0.637	34.63/29.12/38.73	2.573/0.506/1.001	41.34/32.93/40.82
CH₃O₂+NO	0.543/0.161/0.328	23.12/22.53/21.75	0.580/0.170/0.346	21.56/21.79/21.04	1.165/0.258/0.522	18.72/16.80/21.29
HCHO+hv	0.243/0.086/0.112	10.34/11.97/7.42	0.262/0.090/0.116	9.74//11.47/7.06	0.400/0.102/0.125	6.43/6.65/5.11
OH+HCHO	0.150/0.050/0.146	6.40/7.00/9.71	0.166/0.053/0.156	6.17/6.75/9.46	0.544/0.096/0.242	8.73/6.26/9.86
OH+OLET/OLEI	0.192/0.054/0.059	8.17/7.47/3.92	0.264/0.065/0.077	9.83/8.31/4.67	0.537/0.206/0.095	8.63/13.44/3.88
OH+H ₂	0.038/0.021/0.050	1.62/2.91/3.29	0.040/0.022/0.052	1.49/2.76/3.17	0.105/0.044/0.090	1.69/2.89/3.69
OH+H ₂	0.038/0.021/0.050	1.62/2.91/3.29	0.040/0.022/0.052	1.49/2.76/3.17	0.095/0.027/0.075	1.53/1.74/3.06
OH+SO ₂	0.054/0.030/0.035	2.30/4.20/2.33	0.064/0.034/0.041	2.37/4.34/2.48	0.172/0.116/0.072	2.77/7.53/2.95
OH+O ₃	0.028/0.006/0.035	1.18/0.88/2.31	0.029/0.006/0.036	1.08/0.82/2.20	0.072/0.005/0.046	1.15/0.30/1.88
OH+XYL	0.052/0.022/0.023	2.21/3.10/1.50	0.066/0.026/0.029	2.46/3.34/1.75	0.141/0.078/0.045	2.27/5.11/1.84
OH+H ₂ O ₂	0.015/0.008/0.027	0.63/1.14/1.77	0.016/0.008/0.029	0.59/1.08/1.78	0.040/0.010/0.043	0.65/0.66/1.74
OH+TOL	0.027/0.007/0.011	1.16/0.94/0.76	0.034/0.008/0.014	1.27/1.02/0.86	0.086/0.025/0.024	1.38/1.60/0.97
ALD2/MGLY /ANOE+hv	0.046/0.012/0.012	1.95/1.69/0.80	0.051/0.013/0.013	1.91/1.66/0.82	0.074//0.014/0.013	1.19/0.93/0.51
OH+ETH/OPEN	0.007/0.002/0.004	0.28/0.31/0.29	0.008/0.002/0.005	0.30/0.32/0.30	0.036/0.009/0.011	0.30/0.56/0.44
O ₃ +OLET/OLEI	0.036/0.009/0.009	1.55/1.21/0.59	0.035/0.009/0.009	1.28/1.11/0.52	0.030/0.008/0.009	0.48/0.50/0.38
RO ₂ +NO	0.017/0.004/0.007	0.69/0.62/0.44	0.017/0.005/0.007	0.64/0.62/0.42	0.024/0.005/0.009	0.38/0.34/0.37
others+hv	0.020/0.007/0.007	0.86/0.94/0.47	0.025/0.008/0.008	0.92/0.96/0.50	0.046/0.010/0.008	0.74/0.63/0.33
NO+ETHP	0.013/0.003/0.005	0.54/0.44/0.31	0.013/0.003/0.005	0.47/0.42/0.30	0.019/0.004/0.007	0.30/0.26/0.28
NO+ISOP	0.030/0.005/0.003	1.26/0.70/0.20	0.031/0.005/0.004	1.15/0.66/0.24	0.038/0.007/0.004	0.61/0.43/0.17

OH+CH ₃ OH /ANOL/CRES	0.002/0.001/0.002	0.09/0.09/0.11	0.002/0.001/0.002	0.09/0.09/0.11	0.007/0.002/0.003	0.11/0.11/0.12
HNO ₄ +hv	0.004/0.001/0.002	0.19/0.09/0.14	0.004/0.001/0.002	0.17/0.09/0.13	0.007/0.001/0.003	0.11/0.06/0.11
CH ₃ OOH/ET HOOH+hv	0.002/0.012/0.002	0.09/0.39/0.13	0.002/0.003/0.002	0.08/0.37/0.12	0.002/0.003/0.002	0.12/0.18/0.06
O ₃ +ETH	0.003/<0.001/0.001	0.12/0.06/0.03	0.003/<0.001/0.001	0.10/0.05/0.03	0.003/<0.001/0.001	0.04/0.02/0.02
O ₃ +ISOP	<0.001/<0.001/<0.001	<0.01/<0.01/<0.01	<0.001/<0.001/<0.001	<0.01/<0.01/<0.01	<0.001/<0.001/<0.001	<0.01/<0.01/<0.01
O ₃ +others	0.001/<0.001/<0.001	0.03/0.02/0.02	0.001/<0.001/<0.001	0.03/0.02/0.02	0.001/<0.001/<0.001	0.02/0.01/0.01
NO ₃ +HCHO	<0.001/<0.001/<0.001	<0.01/<0.01/<0.01	<0.001/<0.001/<0.001	<0.01/<0.01/<0.01	<0.001/<0.001/<0.001	<0.01/<0.01/<0.01
NO ₃ +others	<0.001/<0.001/<0.001	<0.01/<0.01/<0.01	<0.001/<0.001/<0.001	<0.01/<0.01/<0.01	<0.001/0.001/<0.001	<0.01/<0.01/<0.01
HNO ₄ dec	<0.001/<0.001/<0.001	<0.01/<0.01/<0.01	<0.001/<0.001/0.001	<0.01/<0.01/<0.01	<0.001/<0.001/<0.001	<0.01/<0.01/<0.01
Total	2.349/0.716/1.506	100/100/100	2.691/0.780/1.644	100/100/100	6.223/1.536/2.451	100/100/100
HO₂ loss						
HO₂+NO	2.778/0.732/1.748	99.34/99.61/98.29	2.829/0.793/1.608	99.38/99.63/98.37	7.101/1.402/2.553	99.15/99.55/98.04
HO ₂ +O ₃	0.009/0.001/0.014	0.30/0.08/0.70	0.008/0.001/0.011	0.28/0.08/0.67	0.026/0.001/0.019	0.36/0.08/0.74
HO ₂ +NO ₂	0.007/0.002/0.009	0.28/0.29/0.60	0.007/0.002/0.010	0.25/0.27/0.58	0.023/0.005/0.019	0.32/0.33/0.72
HO ₂ +OH	0.001/<0.001/0.004	0.06/0.02/0.30	0.002/<0.001/0.005	0.06/0.02/0.28	0.008/<0.001/0.010	0.11/0.03/0.37
HO ₂ +HO ₂	<0.001/<0.001/<0.001	<0.01/<0.01/0.02	<0.001/<0.001/<0.001	<0.01/<0.01/0.01	<0.001/<0.001/0.001	<0.01/<0.01/0.03
HO ₂ +CH ₃ O ₂	<0.001/<0.001/<0.001	0.01/<0.01/0.03	<0.001/<0.001/0.001	<0.01/<0.01/0.03	0.001/<0.001/0.001	0.01/<0.01/0.04
HO ₂ +C ₂ O ₃	<0.001/<0.001/<0.001	<0.01/<0.01/0.01	<0.001/<0.001/<0.001	<0.01/<0.01/0.01	<0.001/<0.001/<0.001	<0.01/<0.01/0.01
HO ₂ +RO ₂	<0.001/<0.001/<0.001	<0.01/<0.01/<0.01	<0.001/<0.001/<0.001	<0.01/<0.01/<0.01	<0.001/<0.001/<0.001	<0.01/<0.01/<0.01
HO ₂ +XO ₂	<0.001/<0.001/<0.001	0.02/<0.01/0.04	<0.001/<0.001/0.001	0.01/<0.01/0.04	0.002/<0.001/0.001	0.03/<0.01/0.05
HO ₂ +otherRO ₂	<0.001/<0.001/<0.001	<0.01/<0.01/0.01	<0.001/<0.001/<0.001	<0.01/<0.01/0.01	<0.001/<0.001/<0.001	<0.01/<0.01/0.01
HO ₂ +NO ₃	<0.001/<0.001/<0.001	<0.01/<0.01/<0.01	<0.001/<0.001/<0.001	<0.01/<0.01/<0.01	<0.001/<0.001/<0.001	<0.01/<0.01/<0.01
Total	2.798/0.737/1.775	100/100/100	2.846/0.795/1.635	100/100/100	7.161/1.408/2.604	100/100/100

20 Table S2. Daytime (06:00–18:00 LST) RO₂ budgets in Beijing/Shanghai/Guangzhou in August 2007.

Reaction	Case R		Case R _{wop}		Case R _p	
	Rate (ppb h ⁻¹)	Contribution (%)	Rate (ppb h ⁻¹)	Contribution (%)	Rate (ppb h ⁻¹)	Contribution (%)
RO ₂ production						
OH+OLET/OLEI	0.192/0.054/0.060	22.45/21.07/14.88	0.264/0.065/0.077	25.81/22.92/17.10	0.537/0.110/0.114	25.62/22.20/16.73
OH+ETH	0.157/0.030/0.041	18.36/11.91/10.24	0.197/0.036/0.049	19.26/12.61/11.00	0.484/0.068/0.080	21.98/13.73/11.78
OH+CH₄	0.103/0.057/0.135	12.09/22.44/33.97	0.109/0.059/0.142	10.65/20.81/31.55	0.260/0.115/0.223	11.46/23.33/32.73
OH+AONE	0.092/0.018/0.045	10.76/7.09/11.24	0.109/0.020/0.049	10.65/6.99/10.87	0.323/0.047/0.081	13.65/9.55/11.95
OH+XYL	0.052/0.022/0.023	6.06/8.74/5.69	0.066/0.026/0.029	6.45/9.21/6.42	0.141/0.046/0.044	6.63/9.32/6.52
AONE/ETH+hv(C ₂ O ₃)	0.037/0.011/0.011	4.37/4.24/2.71	0.042/0.012/0.012	4.07/4.10/2.67	0.062/0.013/0.012	2.83/2.68/1.74
O ₃ +OLET/OLEI(C ₂ O ₃)	0.031/0.007/0.008	3.63/2.90/1.89	0.029/0.007/0.007	2.87/2.61/1.62	0.025/0.007/0.008	1.33/1.32/1.15
others+hv(C ₂ O ₃)	0.020/0.007/0.007	2.29/2.58/1.67	0.024/0.007/0.008	2.35/2.59/1.75	0.045/0.010/0.008	1.98/1.92/1.11
O ₃ +OLET/OLEI(otherR O ₂)	0.018/0.004/0.004	2.05/1.66/1.07	0.017/0.004/0.004	1.63/1.49/0.91	0.014/0.004/0.004	0.75/0.76/0.65
OH+TOL	0.027/0.007/0.011	3.20/2.66/2.89	0.034/0.008/0.014	3.32/2.80/3.13	0.086/0.015/0.023	3.88/3.13/3.45
OH+ISOP	0.019/0.004/0.002	2.21/1.64/0.49	0.020/0.004/0.003	1.96/1.54/0.60	0.017/0.007/0.003	0.91/1.35/0.46
O ₃ +OLET/OLEI(XO ₂)	0.015/0.003/0.004	1.70/1.36/0.89	0.014/0.003/0.003	1.35/1.22/0.76	0.012/0.003/0.004	0.62/0.62/0.54
AONE/ETH+hv(CH ₃ O ₂)	0.014/0.003/0.004	1.68/1.10/0.92	0.016/0.003/0.004	1.54/1.00/0.83	0.019/0.002/0.003	0.87/0.49/0.49
O ₃ +OLET/OLEI(CH ₃ O ₂)	0.016/0.004/0.004	1.91/1.52/0.99	0.015/0.004/0.004	1.51/1.37/0.86	0.013/0.003/0.004	0.70/0.70/0.61
OH+PEROXID	0.010/0.011/0.014	1.18/4.37/3.40	0.011/0.004/0.014	1.08/4.13/3.23	0.022/0.020/0.022	1.02/4.04/3.28
OH+C ₂ H ₆	0.005/0.002/0.004	0.57/0.87/1.03	0.007/0.003/0.005	0.68/0.93/1.03	0.015/0.005/0.007	0.70/1.03/0.97
NO ₃ +OLET/OLEI (otherRO ₂)	0.005/0.001/0.002	0.53/0.41/0.56	0.005/0.001/0.002	0.45/0.39/0.51	0.005/0.001/0.003	0.24/0.19/0.41
O ₃ +OLET/OLEI (ETHP)	0.008/0.002/0.002	0.97/0.77/0.51	0.008/0.002/0.002	0.77/0.70/0.43	0.007/0.002/0.002	0.35/0.35/0.31

OH+C ₂ H ₆	0.002/0.001/0.002	0.29/0.27/0.48	0.003/0.001/0.002	0.29/0.27/0.48	0.008/0.002/0.004	0.35/0.33/0.54
OH+CH ₃ OH/AN OL/CRES	0.002/0.001/0.001	0.20/0.20/0.23	0.002/0.001/0.001	0.20/0.20/0.23	0.007/0.001/0.002	0.31/0.30/0.30
O ₃ +others(C ₂ O ₃)	0.001/<0.001/<0.001	0.07/0.05/0.05	0.001/<0.001/<0.001	0.06/0.04/0.04	0.001/<0.001/<0.001	0.04/0.03/0.04
others+hv(XO ₂)	<0.001/<0.001/<0.001	0.05/0.04/0.05	<0.001/<0.001/<0.001	0.04/0.03/0.04	<0.001/<0.001/<0.001	0.02/0.01/0.03
H ₂ O ₂ +hv(XO ₂)	<0.001/<0.001/<0.001	0.02/0.01/0.01	<0.001/<0.001/<0.001	0.02/0.01/0.01	<0.001/<0.001/<0.001	<0.01/<0.01/0.01
O ₃ +ISOP(C ₂ O ₃)	<0.001/<0.001/<0.001	0.02/0.01/<0.01	<0.001/<0.001/<0.001	0.01/0.01/<0.01	<0.001/<0.001/<0.001	<0.01/<0.01/<0.01
others+hv(CH ₃ O ₂)	<0.001/<0.001/<0.001	0.03/0.01/<0.01	<0.001/<0.001/<0.001	0.02/<0.01/<0.01	<0.001/<0.001/<0.001	<0.01/<0.01/<0.01
O ₃ +others(CH ₃ O ₂)	<0.001/<0.001/<0.001	0.01/<0.01/<0.01	<0.001/<0.001/<0.001	<0.01/<0.01/<0.01	<0.001/<0.001/<0.001	<0.01/<0.01/<0.01
H ₂ O ₂ +hv (ETHP)	<0.001/<0.001/<0.001	<0.01/<0.01/<0.01	<0.001/<0.001/<0.001	<0.01/<0.01/<0.01	<0.001/<0.001/<0.001	<0.01/<0.01/<0.01
others+hv (ETHP)	<0.001/<0.001/<0.001	0.01/<0.01/0.01	<0.001/<0.001/<0.001	<0.01/<0.01/0.01	<0.001/<0.001/<0.001	<0.01/<0.01/0.01
NO ₃ +AONE/ETH(C ₂ O ₃)	<0.001/<0.001/<0.001	<0.01/<0.01/<0.01	<0.001/<0.001/<0.001	<0.01/<0.01/<0.01	<0.001/<0.001/<0.001	<0.01/<0.01/<0.01
NO ₃ +others(C ₂ O ₃)	<0.001/<0.001/<0.001	<0.01/<0.01/<0.01	<0.001/<0.001/<0.001	<0.01/<0.01/<0.01	<0.001/<0.001/<0.001	<0.01/<0.01/<0.01
O ₃ +others(XO ₂)	<0.001/<0.001/<0.001	0.01/<0.01/<0.01	<0.001/<0.001/<0.001	0.01/<0.01/<0.01	<0.001/<0.001/<0.001	<0.01/<0.01/<0.01
O ₃ +ISOP(XO ₂)	<0.001/<0.001/<0.001	0.02/0.01/<0.01	<0.001/<0.001/<0.001	0.01/0.01/<0.01	<0.001/<0.001/<0.001	<0.01/<0.01/<0.01
NO ₃ +ISOP(otherRO ₂)	<0.001/<0.001/<0.001	0.01/0.01/<0.01	<0.001/<0.001/<0.001	<0.01/0.01/<0.01	<0.001/<0.001/<0.001	<0.01/<0.01/<0.01
OH+others	0.028/0.005/0.016	3.22/2.06/4.13	0.030/0.006/0.018	2.93/1.98/3.91	0.077/0.014/0.029	3.34/2.61/4.20
Total	0.854/0.254/0.397	100/100/100	0.852/0.283/0.449	100/100/100	2.183/0.494/0.680	100/100/100

RO₂ loss

CH₃O₂+NO	0.543/0.161/0.328	94.56/95.28/96.07	0.580/0.170/0.346	94.68/95.24/96.06	1.165/0.258/0.522	95.76/96.27/96.30
RO ₂ +NO	0.016/0.004/0.007	2.81/2.64/1.93	0.017/0.005/0.007	2.80/2.69/1.93	0.024/0.005/0.009	1.96/1.94/1.68
NO+ETHP	0.013/0.003/0.005	2.19/1.86/1.36	0.013/0.003/0.005	2.07/1.84/1.36	0.019/0.004/0.007	1.54/1.48/1.25
otherRO ₂ term	0.002/<0.001/0.001	0.32/0.22/0.27	0.002/<0.001/0.001	0.32/0.22/0.28	0.005/0.001/0.002	0.43/0.29/0.28
CH ₃ O ₂ term	<0.001/<0.001/0.001	0.04/<0.01/0.15	<0.001/<0.001/0.001	0.04/<0.01/0.15	0.001/<0.001/0.001	0.08/<0.01/0.20
HO ₂ +RO ₂	<0.001/<0.001/<0.001	<0.01/<0.01/<0.01	<0.001/<0.001/<0.001	<0.01/<0.01/<0.01	<0.001/<0.001/<0.001	0.01/<0.01/0.01
XO ₂ term	<0.001/<0.001/<0.001	0.07/<0.01/0.02	<0.001/<0.001/0.001	0.07/<0.01/0.19	0.002/<0.001/0.001	0.18/0.02/0.26

C ₂ O ₃ term	<0.001/<0.001/<0.001	0.01/<0.01/0.01	<0.001/<0.001/<0.001	<0.01/<0.01/0.02	0.001/<0.001/<0.001	0.05/0.01/0.03
ETHP term	<0.001/<0.001/0.001	<0.01/<0.01/0.19	<0.001/<0.001/<0.001	<0.01/<0.01/0.01	<0.001/<0.001/<0.001	<0.01/<0.01/<0.01
Total	0.574/0.169/0.341	100/100/100	0.613/0.179/0.360	100/100/100	1.216/0.268/0.542	100/100/100

21 Species in braces for reactions mean main products.

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