

Background

► HONO contributes 30~80% of primary OH, yet its sources are not fully understood. ≻The default mechanism in 3-D models severely underestimated the observed HONO. SOA or PAN are mainly formed through oxidation of VOCs by OH/O3 > The current models largely underestimated SOA or PAN concentrations

Methods

→WRF-Chem 3.7.1, domain1 for East Asia (81Km); domain 2 for East china (27Km) \triangleright Six additional HONO sources, 4 direct emissions (traffic, biomass burning, soil, indoor) and 2 heterogeneous reactions(aerosol/ground surface). ►VBS(Volatility Basic Set) approach for SOA partition. Containing glyoxal SOA formation mechanism ► February of 2017 for PAN simulation; Nov.29~Dec.03 of 2017 for SOA simulation.

Physical/Chemical schemes	
Advection scheme	Runge-Kutta 3
Boundary layer scheme	YSU
Cloud microphysics	Lin et al. (198
Cumulus parameterization	New Grell sch
Land-surface model	Noah
Long-wave radiation	RRTM
Short-wave radiation	Goddard
Surface layer	Revised MM5
Aerosol option	MOSAIC
Chemistry option	Updated MOZ
Photolysis scheme	F-TUV

Contact

E-mail: jw_zhang@mail.iap.ac.cn

Reference:

Zhang et al., STOTEN (2019) 110–123. DOI:10.1016/j.scitotenv.2019.05.100. Zhang et al., Journal of Environmental Scienses (in press) Zhang et al., Atmos. Env. 214 (2019) 116821. DOI:10.1016/j.atmosenv.2019.116821. Qiu et al., STOTEN 650 (2019) 1944–1953. DOI:10.1016/j.scitotenv.2018.09.253.

Effect of potential HONO sources on ROx budgets and SOA and PAN formation in North China in winter Jingwei Zhang^{1,2}, Junling An^{1,2} 1. Institute of Atmospheric Physics (IAP), Chinese Academy of Sciences, Beijing 100029, China 2. University of Chinese Academy of Sciences, Beijing 100049, China Results Altitude(m) Sites locations 45°N **Orange: HONO/SOA Red : PAN** 35°N het-g indoor biomass 30°N $\overline{}$ 25°N *§* 60 ⊦ (b) 50 40 20° 115°E 120°E 105°E 20 Local time (hour) 500 2000 4000 100 10 3rd order simulations and typical ROx PAN ₽_{RO2}: **0.52**,0.∠ L_{RO2} : **0.52**,0.29 neme cycles in typical clean day (Feb.13) HONO+hv: 0.34, 0.04 MGLY+hv: 0.04, 0.04 Alkenes+O₃: 0.007, 0.007 OH and haze day (Feb.15), bold values GLY+hv: 0.04, 0.04 **0.01**, 0.01 O₃+hv: NO+OH: **0.13**, 0.05 (6S), normal (base) 0.49 0.24 NO₂+OH: **0.40**, 0.17 C₃H₆: **0.12**, 0.000 O₂+OH: **0.02**, 0.008 2/21 2/25 2/172/1 BIGALK:0.05, 0.02 Monin-Obukhov scheme Foluene:**0.03**. 0.01 lenes:**0.07**. 0.03 qd NO:**0.64**, ((Units: ppb h⁻¹) ZART mechanism (b) Rural MGLY+hv: 0.04, 0.04 **AN:0.07**, 0.05 HO₂NO **0.67**, 0.36 (a) Feb. PAN pyrolysis: 0.03, 0.03 ONIT:0.006.0 0002 • • • • • • • • • • ---Obs_daily ----- base 3.13; P_{RO2}: **5.35**, 1.27 - CBM-Z (Qiu,2019) - - - RADM2(Qiu,2019) Obs_hourly 1.75, 0.23 HONO+hv: 4.71, 0.66 (c) Urbar MGLY+hv: 0.34, 0.14 Alkenes+O₂: **0.01**, 0.007 GLY+hv: **0.14**, 0.08 0.001.0.00 HCHO+hv: 0.37, 0.19 NO+OH: 3.02, 0.88 **2.41**, 0.50 NO₂+OH: **3.16**, 0.49 H-: 0.95. 0 * (d) Rural SO₂+OH: 0.18, 0.04 : **0.13**.0.12 luene:0.13.0.10 BIGALK:0.61. Xylenes:0.43, 0.2 Toluene:**0.34**. 0.07 nes:0.70. 0.17 NO:6.20, (Units: ppb h⁻¹) 2113_0:00 12:00 2114_0:00





