Table S1. New species in the IS scheme (in addition to isoprene nitrates listed in Table1).

Species	Description
DHMOB	dihydroxycarbonyl from HC5
DIBOO	peroxy radical from isoprene+OH
HACET	hydroxyacetone
HC5	C5 hydroxycarbonyl
HC5OO	peroxy radical from HC5
HPALD	hydroperoxymethyl-butenal
IEPOX	dihydroxyepoxide
IEPOXOO	peroxy radical from IEPOX
ISOPNOOB	peroxy radical from ISOPNB
ISOPNOOD	peroxy radical from ISOPND
ISOPO2	peroxy radical from isoprene+OH
ISOPOOH	hydroxyhydroperoxide from $ISOPO_2$+HO_2
MACROO	peroxy radical from MACR
MVKOO	peroxy radical from MVK
NISOPO2	peroxy radical from isoprene+NO_3
NIT1NO3OOA	acyl peroxy radical from NIT1+NO_3/OH
NIT1NO3OOB	peroxy radical from NIT1+NO_3
NIT1OHOO	peroxy radical from NIT1+OH
PYRUACD	pyruvic acid

Table S2. Summary of updates in isoprene oxidation chemistry in the IS scheme to the standard SAPRC-07 mechanism (Carter 2010).

Mechanism		Notes	
isoprene with OH	Rate Constants	Rate	Products
ISOPRENE + OH = ISOPO2 + ISOPRXN	2.54E-11*exp(410/T)	[1]	[2],[19]
ISOPO2 + NO = 0.40*MVK + 0.26*MACR + 0.883*NO2 + 0.07*ISOPND + 0.047*ISOPNB + 0.66*HCHO + 0.10*HC5 + 0.043*ARO2 + 0.08*DIBOO + 0.803*HO2	2.60E-12*exp(380/T)	[1]	[2]
ISOPO2 + HO2 = 0.880*ISOPOOH + 0.120*OH + 0.047*MACR + 0.073*MVK +0.120*HO2 + 0.120*HCHO	2.06E-13*exp(1300/T)	[3]	[4]
ISOPO2 + MEO2 = 0.45*HO2 + 0.37*HCHO + 0.23*MVK + 0.15*MACR + 0.05*DIBOO + 0.06*HC5 + 0.02*ARO2 + 0.5*PRD2 + 0.5*HCHO + 0.5*HO2 + 0.25*HCHO +0.25*MEOH - 0.62*XC	1.80E-12	[3],[5]	[1],[2]
ISOPO2 + RO2C = 0.45*HO2 + 0.37*HCHO + 0.23*MVK + 0.15*MACR + 0.05*DIBOO + 0.06*HC5 + 0.02*ARO2 + 0.5*PRD2 - 0.62*XC	6.80E-13	[3],[5]	[1],[2]
ISOPO2 + ISOPO2 = 0.91*HO2 + 0.75*HCHO + 0.45*MVK + 0.29*MACR + 0.09*DIBOO + 0.11*HC5 + 0.05*ARO2 + PRD2 - 1.24*XC	2.30E-12	[3],[5]	[1],[2]
ISOPO2 + MECO3 = MEO2 + CO2 + 0.91*HO2 + 0.75*HCHO + 0.45*MVK + 0.29*MACR + 0.09*DIBOO + 0.11*HC5 + 0.05*ARO2 - 0.16*XC	4.40E-13*exp(1070/T)	[1]	[1],[2]
ISOPO2 = HO2 + HPALD	4.07E+08*exp(-7694/T)	[6]	[7]
HPALD = OH + HO2 + 0.5*HACET + 0.5*MGLY + 0.25*HOCCHO + 0.25*GLY + HCHO	J_{HPALD}	[7]	[7]
HPALD + OH = OH + PRD2 - XC	4.60E-11	[7]	[7],[5]
isoprene with NO_3			
ISOPRENE + NO3 = NISOPO2	3.03E-12*exp(-448/T)	[1]	[8]
NISOPO2 + NO3 = 0.70*NIT1 + 0.035*MVK + 0.035*MACR + 1.3*NO2 + 0.80*HO2 + 0.070*HCHO + 0.23*HC5	2.30E-12	[1]	[8],[5]
NISOPO2 + NO = 0.70*NIT1 + 0.035*MVK + 0.035*MACR + 1.3*NO2 + 0.80*HO2 + 0.070*HCHO + 0.23*HC5	2.60E-12*exp(380/T)	[1]	[8],[5]
NISOPO2 + HO2 = NISOPOOH	2.06E-13*exp(1300/T)	[3]	[12]
NISOPO2 + MEO2 = 0.35*NIT1 + 0.0175*MVK + 0.0175*MACR + 0.15*NO2 + 0.40*HO2 + 0.035*HCHO + 0.115*HC5 + 0.25*NIT1 + 0.25*ISOPND + 0.5*HCHO + 0.5*HO2 + 0.25*HCHO + 0.25*MEOH	1.30E-12	[18]	[1],[8],[5]
NISOPO2 + RO2C = 0.35*NIT1 + 0.0175*MVK + 0.0175*MACR + 0.15*NO2 + 0.40*HO2 + 0.035*HCHO + 0.115*HC5 + 0.25*NIT1 + 0.25*ISOPND	6.04E-13	[18],[5]	[1],[8],[5]
NISOPO2 +NISOPO2 = 0.70*NIT1 + 0.035*MVK + 0.035*MACR + 0.3*NO2 + 0.80*HO2 + 0.070*HCHO + 0.23*HC5 + 0.5*NIT1 + 0.5*ISOPND	1.20E-12	[18]	[1],[8],[5]
NISOPO2 + MECO3 = MEO2 + CO2 + 0.70*NIT1 + 0.035*MVK + 0.035*MACR + 0.3*NO2 + 0.80*HO2 + 0.070*HCHO + 0.23*HC5	4.40E-13*exp(1070/T)	[1]	[1],[8],[5]
isoprene nitrates with OH, O_3, and NO_3			
ISOPND + OH = ISOPNOOD	2.40E-11*exp(410/T)	[2],[5]	[2]
ISOPNOOD + NO = 0.34*PRD2 + 0.15*PROPNN + 0.44*HACET + 0.07*MVKN +0.13*ETHLN + 0.31*HCOOH + 0.31*NO3 + 0.72*HCHO + 0.15*HOCCHO + 1.34*NO2 + 0.35*HO2 - 0.68*XC	2.60E-12*exp(380/T)	[1]	[2]
ISOPNOOD + HO2 = RNO3I - XC	2.06E-13*exp(1300/T)	[3]	[5]
ISOPNOOD + MEO2 = 0.17*PRD2 + 0.075*PROPNN + 0.22*HACET + 0.035*MVKN +0.065*ETHLN + 0.155*HCOOH + 0.155*NO3 + 0.36*HCHO + 0.075*HOCCHO +0.17*NO2 + 0.175*HO2 +	2.00E-13	[1]	[1],[2]

0.5*RNO3I + 0.25*HCHO + 0.25*MEOH + 0.5*HO2+ 0.5*HCHO - 0.84*XC			
ISOPNOOD + RO2C = 0.17*PRD2 + 0.075*PROPNN + 0.22*HACET + 0.035*MVKN +0.065*ETHLN + 0.155*HCOOH + 0.155*NO3 + 0.36*HCHO + 0.075*HOCCHO +0.17*NO2 + 0.175*HO2 + 0.5*RNO3I - 0.84*XC	3.50E-14	[1]	[1],[2]
ISOPNOOD + MECO3 = MEO2 + CO2 + 0.34*PRD2 + 0.15*PROPNN + 0.44*HACET +0.07*MVKN + 0.13*ETHLN + 0.31*HCOOH + 0.31*NO3 + 0.72*HCHO +0.15*HOCCHO + 0.34*NO2 + 0.35*HO2 - 0.68*XC	4.40E-13*exp(1070/T)	[1]	[1],[2]
ISOPND + O3 = 0.36*ETHLN + 0.29*PROPNN + 0.70*MGLY + 0.12*RCOOH+ 0.39*HO2 + 0.038*HCHO + 0.029*CO + 0.73*OH + 0.017*CO2 + 0.36*NO2+ 0.16*HACET + 0.34*HOCCHO - 0.26*XC	8.70E-15*exp(-1520/T)	[10],[5]	[1],[5],[11]
ISOPNB + OH = ISOPNOOB	3.28E-12*exp(410/T)	[2],[5]	[2]
ISOPNOOB + NO = 0.6*HOCCHO + 0.6*HACET + 0.4*HCHO + 0.4*HO2 + 0.26*MACRN + 0.14*MVKN + 1.6*NO2	2.60E-12*exp(380/T)	[1]	[2]
ISOPNOOB + HO2 = RNO3I - XC	2.06E-13*exp(1300/T)	[3]	[5]
ISOPNOOB + MEO2 = 0.3*HOCCHO + 0.3*HACET + 0.2*HCHO + 0.2*HO2 + 0.13*MACRN + 0.07*MVKN + 0.3*NO2 + 0.5*RNO3I + 0.25*HCHO + 0.25*MEOH+ 0.5*HO2 + 0.5*HCHO - 0.5*XC	2.00E-13	[1]	[1],[2]
ISOPNOOB + RO2C = 0.3*HOCCHO + 0.3*HACET + 0.2*HCHO + 0.2*HO2 +0.13*MACRN + 0.07*MVKN + 0.3*NO2 + 0.5*RNO3I - 0.5*XC	3.50E-14	[1]	[1],[2]
ISOPNOOB + MECO3 = MEO2 + CO2 + 0.6*HOCCHO + 0.6*HACET + 0.4*HCHO +0.4*HO2 + 0.26*MACRN + 0.14*MVKN + 0.6*NO2	4.40E-13*exp(1070/T)	[1]	[1],[2]
ISOPNB + O3 = 0.12*MVKN + 0.32*MACRN + 0.34*OH + 0.08*HO2 + 0.26*CO + 0.07*CO2 + 0.16*HCOOH + 0.56*HCHO + 0.28*RNO3I + 0.04*HACET + 0.28*NO2 + 0.24*BACL - 0.57*XC	2.13E-14*exp(-1520/T)	[10],[5]	[1],[5],[11]
NIT1 + NO3 = 0.6*NIT1NO3OOA + 0.6*HNO3 + 0.4*NIT1NO3OOB	3.15E-13*exp(-448/T)	[8],[5]	[8],[5]
NIT1NO3OOA + NO3 = NO2 + PROPNNB + CO + CO2 + HO2	4.00E-12	[9]	[9]
NIT1NO3OOA + NO = NO2 + PROPNNB + CO + CO2 + HO2	6.70E-12*exp(340/T)	[1]	[9]
NIT1NO3OOA + NO2 = MAPAN + XN + XC	$1.21e\text{-}11*(T/300)^{-1.07}$	[1]	[1]
NIT1NO3OOA + HO2 = 0.75*RCOOOH + 0.25*RCOOH + 0.25*O3 + XN + 2*XC	5.20E-13*exp(980/T)	[1]	[1]
NIT1NO3OOA + RO2C = PROPNNB + CO + CO2 + HO2	4.40E-13*exp(1070/T)	[1]	[1],[9]
NIT1NO3OOA + MEO2 = PROPNNB + CO + CO2 + HO2 + HCHO + HO2	2.00E-12*exp(500/T)	[1]	[1],[9]
NIT1NO3OOA + MECO3 = MEO2 + CO2 + PROPNNB + CO + CO2 + HO2	2.90E-12*exp(500/T)	[1]	[1],[9]
NIT1NO3OOB + NO3 = PROPNNB + GLY + NO2 + NO2	2.30E-12	[1]	[1],[11]
NIT1NO3OOB + NO = 0.94*PROPNNB + 0.94*GLY + 0.94*NO2 + 0.06*RNO3I + 0.94*NO2 - 0.06*XC + 0.13*XN	2.60E-12*exp(380/T)	[1]	[1],[11]
NIT1NO3OOB + HO2 = RNO3I - XC + XN	2.06E-13*exp(1300/T)	[3]	[5]
NIT1NO3OOB + RO2C = 0.7*PROPNNB + 0.7*GLY + 0.7*NO2 + 0.3*RNO3I - 0.3*XC + 0.3*XN	3.50E-14	[1]	[1],[5],[11]
NIT1NO3OOB + MEO2 = 0.7*PROPNNB + 0.7*GLY + 0.7*NO2 + 0.3*RNO3I +0.25*HCHO + 0.25*MEOH + 0.5*HO2 + 0.5*HCHO - 0.3*XC + 0.3*XN	2.00E-13	[1]	[1],[5],[11]
NIT1NO3OOB + MECO3 = MEO2 + CO2 + PROPNNB + GLY + NO2	4.40E-13*exp(1070/T)	[1]	[1],[5],[11]
NIT1 + O3 = 0.3*PROPNNB + 0.45*CO + 0.15*OH + 0.45*HO2 + 0.15*CO2 +0.7*GLY + 0.7*OH + 0.7*NO2 + 0.7*MGLY	4.15E-15*exp(-1520/T)	[5]	[1],[5],[11]
NIT1 + OH = 0.345*NIT1NO3OOA + 0.655*NIT1OHOO	7.48E-12*exp(410/T)	[1],[11]	[1],[5],[11]

NIT1OHOO + NO = 0.919*PROPNNB + 0.919*GLY + 0.015*CO + 0.015*RNO3I +0.934*NO2 + 0.934*HO2 + 0.066*RNO3I - 0.096*XC + 0.066*XN	2.60E-12*exp(380/T)	[1]	[1],[5],[11]
NIT1OHOO + HO2 = R6OOH + XN - XC	2.06E-13*exp(1300/T)	[3]	[1]
NIT1OHOO + RO2C = 0.689*PROPNNB + 0.689*GLY + 0.011*CO + 0.011*RNO3I +0.7*HO2 + 0.3*RNO3I - 0.323*XC	3.50E-14	[1]	[1],[5],[11]
NIT1OHOO + MEO2 = 0.689*PROPNNB + 0.689*GLY + 0.011*CO + 0.011*RNO3I +0.7*HO2 + 0.3*RNO3I + 0.25*HCHO + 0.25*MEOH + 0.50*HCHO + 0.50*HO2 - 0.323*XC	2.00E-13	[1]	[1],[5],[11]
NIT1OHOO + MECO3 = MEO2 + CO2 + 0.984*PROPNNB + 0.984*GLY + 0.016*CO +0.016*RNO3I + HO2 - 0.033*XC	4.40E-13*exp(1070/T)	[1]	[1],[5],[11]
NISOPOOH + OH = RNO3I + OH	5.00E-11	[12]	[12],[5]
NISOPOOH + OH = 0.3*NISOPO2 + 0.7*OH + 0.7*NIT1	3.80E-12*exp(200/T)	[12]	[12],[5]
MVKN + OH = 0.65*HCOOH + 0.65*MGLY + 0.35*HCHO + 0.35*PYRUACD + NO3	3.50E-12*exp(140/T)	[2],[5]	[2]
MVKN = MECO3 + NO2 + HOCCHO	J_{NOA}	[9]	[9]
MACRN + OH = 0.08*CCOOH + 0.08*HCHO + 0.08*NO3 + 0.07*HCOOH + 0.07*NO3 +0.07*MGLY + 0.85*HACET + 0.85*NO2 + 0.93*CO2	1.28E-11*exp(405/T)	[2],[5]	[2]
MACRN = HACET + NO2 + CO + HO2	J_{C2CHO}	[5]	[9]
ETHLN + OH = HCHO + CO2 + NO2	2.94E-12*exp(365/T)	[2],[5]	[2]
ETHLN = NO2 + HCHO + HO2 + CO	J_{NOA}	[9]	[9]
RNO3I + OH = NO2 + HO2 + PRD2	8.00E-12	[12]	[12],[5]
PROPNN + OH = MGLY + NO2	4.00E-13	[13],[12]	[9]
PROPNNB + OH = MGLY + NO2	4.00E-13	[13],[12]	[9]
PROPNN = MECO3 + HCHO + NO2	J_{NOA}	[14],[15],[3]	[15]
PROPNNB = MECO3 + HCHO + NO2	J_{NOA}	[14],[15],[3]	[15]
MVK with OH			
MVK + OH =MVKOO	2.60E-12*exp(610/T)	[1]	[2]
MVKOO + NO = 0.625*HOCCHO + 0.625*MECO3 + 0.265*MGLY + 0.265*HCHO +0.265*HO2 + 0.11*MVKN + 0.89*NO2	2.60E-12*exp(380/T)	[1]	[2]
MVKOO + HO2 = ROOH + XC	1.82E-13*exp(1300/T)	[3]	[1]
MVKOO + MEO2 = 0.35*HOCCHO + 0.35*MECO3 + 0.15*MGLY + 0.15*HCHO +0.15*HO2 + 0.5*MEK + 0.25*HCHO + 0.25*MEOH + 0.5*HCHO + 0.50*HO2	2.00E-13	[1]	[1],[2]
MVKOO + RO2C = 0.35*HOCCHO + 0.35*MECO3 + 0.15*MGLY + 0.15*HCHO + 0.15*HO2 + 0.5*MEK	3.50E-14	[1]	[1],[2]
MVKOO + MECO3 = MEO2 + CO2 + 0.7*HOCCHO + 0.7*MECO3 + 0.3*MGLY + 0.3*HCHO + 0.3*HO2	4.40E-13*exp(1070/T)	[1]	[1],[2]
MACR with OH			
MACR + OH = 0.47*MACROO + 0.53*MACO3	8.00E-12*exp(380/T)	[1]	[2]
MACROO + NO = 0.85*NO2 + 0.85*HO2 + 0.72*HACET + 0.72*CO + 0.13*HCHO +0.13*MGLY + 0.15*MACRN	2.60E-12*exp(380/T)	[1]	[2],[5]
MACROO + HO2 = ROOH + XC	1.82E-13*exp(1300/T)	[3]	[1]
MACROO + MEO2 = 0.50*HO2 + 0.424*HACET + 0.424*CO + 0.076*HCHO +0.076*MGLY + 0.5*PRD2 + 0.25*HCHO +	2.00E-13	[1]	[1],[2]

0.25*MEOH + 0.5*HCHO + 0.5*HO2 - XC			
MACROO + RO2C = 0.50*HO2 + 0.424*HACET + 0.424*CO + 0.076*HCHO +0.076*MGLY + 0.5*PRD2 - XC	3.50E-14	[1]	[1],[2]
MACROO + MECO3 = MEO2 + CO2 + HO2 + 0.15*MGLY + 0.85*HACET + 0.85*CO + 0.15*HCHO	4.40E-13*exp(1070/T)	[1]	[1],[2]
MACO3 + NO = NO2 + CO + CO2 + HCHO + MEO2	6.70E-12*exp(340/T)	[1]	[2]
MACO3 + NO2 = MAPAN	$1.21e\text{-}11*(T/300)^{-1.07}$	[1]	[1]
MACO3 + HO2 = 0.75*RCOOOH + 0.25*RCOOH + 0.25*O3 + XC	5.20E-13*exp(980/T)	[1]	[1]
MACO3 + NO3 = NO2 + CO + CO2 + HCHO + MEO2	4.00E-12	[9]	[1],[2]
MACO3 + MEO2 = HCHO + HO2 + CO + CO2 + HCHO + MEO2	2.00E-12*exp(500/T)	[1]	[1],[2]
MACO3 + RO2C = CO + CO2 + HCHO + MEO2	4.40E-13*exp(1070/T)	[1]	[1],[2]
MACO3 + RO2XC = CO + CO2 + HCHO + MEO2	4.40E-13*exp(1070/T)	[1]	[1],[2]
MACO3 + MECO3 = CO2 + MEO2 + CO + CO2 + HCHO + MEO2	2.90E-12*exp(500/T)	[1]	[1],[2]
MACO3 + RCO3 = CO + CO2 + HCHO + MEO2 + RO2C + xHO2 + yROOH + xCCHO + CO2	2.90E-12*exp(500/T)	[1]	[1],[2]
MACO3 + BZCO3 = CO + CO2 + HCHO + MEO2 + BZO + RO2C + CO2	2.90E-12*exp(500/T)	[1]	[1],[2]
MACO3 + MACO3 = 2*CO + 2*CO2 + 2*HCHO + 2*MEO2	2.90E-12*exp(500/T)	[1]	[1],[2]
ISOPOOH and IEPOX with OH			
ISOPOOH + OH = IEPOX + OH	1.90E-11*exp(390/T)	[4],[12]	[4],[12]
ISOPOOH + OH = 0.387*ISOPO2 + 0.613*HC5 + 0.613*OH	4.75E-12*exp(200/T)	[12]	[12]
ISOPOOH = OH + 0.91*HO2 + 0.75*HCHO + 0.45*MVK +0.29*MACR + 0.09*DIBOO + 0.11*HC5 + 0.05*ARO2 - 0.16*XC	J_{COOH}	[5]	[2],[5]
IEPOX + OH =IEPOXOO	5.78E-11*exp(-400/T)	[4]	[4]
IEPOXOO + HO2 = 0.725*HACET + 0.275*HOCCHO + 0.275*GLY + 0.275*MGLY +1.125*OH + 0.825*HO2 + 0.200*CO2 + 0.375*HCHO + 0.074*HCOOH + 0.251*CO	2.06E-13*exp(1300/T)	[3]	[4]
IEPOXOO + NO = 0.725*HACET + 0.275*HOCCHO + 0.275*GLY + 0.275*MGLY +0.125*OH + 0.825*HO2 + 0.200*CO2 + 0.375*HCHO + 0.074*HCOOH + 0.251*CO + NO2	2.60E-12*exp(380/T)	[1]	[4],[5]
IEPOXOO + MEO2 = 0.363*HACET + 0.138*HOCCHO + 0.138*GLY + 0.138*MGLY +0.063*OH + 0.413*HO2 + 0.100*CO2 + 0.188*HCHO + 0.037*HCOOH + 0.126*CO+ 0.5*PRD2 + 0.5*HCHO + 0.5*HO2 + 0.25*HCHO + 0.25*MEOH - 0.5*XC	2.00E-13	[1]	[1],[4]
IEPOXOO + RO2C = 0.363*HACET + 0.138*HOCCHO + 0.138*GLY + 0.138*MGLY +0.063*OH + 0.413*HO2 + 0.100*CO2 + 0.188*HCHO + 0.037*HCOOH + 0.126*CO + 0.5*PRD2 - 0.5*XC	3.50E-14	[1]	[1],[4]
IEPOXOO + MECO3 = 0.725*HACET + 0.275*HOCCHO + 0.275*GLY + 0.275*MGLY +0.125*OH + 0.825*HO2 + 0.200*CO2 + 0.375*HCHO + 0.074*HCOOH + 0.251*CO + MEO2 + CO2	4.40E-13*exp(1070/T)	[1]	[1],[4]
other main isoprene oxidation products			
HC5 + OH = HC5OO	1.42E-11*exp(610/T)	[2],[5]	[2]
HC5OO + NO = NO2 + 0.234*HOCCHO + 0.234*MGLY + 0.216*GLY + 0.216*HACET +0.29*DHMOB + 0.17*RCOOH + 0.09*PRD2 + 0.09*CO + HO2 + 0.16*XC	2.60E-12*exp(380/T)	[1]	[2]
HC5OO + HO2 = R6OOH - XC	2.06E-13*exp(1300/T)	[3]	[1]
HC5OO + MEO2 = 0.117*HOCCHO + 0.117*MGLY + 0.108*GLY + 0.108*HACET +0.145*DHMOB + 0.085*RCOOH + 0.045*PRD2 + 0.045*CO + 0.5*HO2 +0.5*PRD2 + 0.25*HCHO + 0.25*MEOH + 0.5*HO2 + 0.5*HCHO - 0.42*XC	2.00E-13	[1]	[1],[2]
HC5OO + RO2C = 0.117*HOCCHO + 0.117*MGLY + 0.108*GLY +	3.50E-14	[1]	[1],[2]

0.108*HACET +0.145*DHMOB + 0.085*RCOOH + 0.045*PRD2 + 0.045*CO + 0.5*HO2 + 0.5*PRD2 - 0.42*XC			
HC5OO + MECO3 = MEO2 + CO2 + 0.234*HOCCHO + 0.234*MGLY + 0.216*GLY +0.216*HACET + 0.29*DHMOB + 0.17*RCOOH + 0.09*PRD2 + 0.09*CO + HO2 + 0.16*XC	4.40E-13*exp(1070/T)	[1]	[1],[2]
HC5 + O3 = 0.50*MGLY + 0.35*GLY + 0.79*OH + 0.02*HCHO + 0.35*HOCCHO +0.59*CO + 0.15*HACET + 0.13*RCOOH + 0.08*CO2 + 0.6*HO2 + 0.35*MECO3 - 0.13*XC	3.94E-15*exp(-1520/T)	[9],[5]	[1],[5],[11]
DIBOO + NO = NO2 + HO2 + 0.52*HOCCHO + 0.52*MGLY + 0.48*GLY + 0.48*HACET	2.60E-12*exp(380/T)	[1]	[2]
DIBOO + HO2 = R6OOH - XC	2.06E-13*exp(1300/T)	[3]	[1]
DIBOO + MEO2 = 0.5*HO2 + 0.26*HOCCHO + 0.26*MGLY + 0.24*GLY +0.24*HACET + 0.5*PRD2 + 0.25*HCHO + 0.25*MEOH + 0.5*HCHO + 0.50*HO2 - 0.5*XC	2.00E-13	[1]	[1],[2]
DIBOO + RO2C = 0.5*HO2 + 0.26*HOCCHO + 0.26*MGLY + 0.24*GLY +0.24*HACET + 0.5*PRD2 - 0.5*XC	3.50E-14	[1]	[1],[2]
DIBOO + MECO3 = HO2 + 0.52*HOCCHO + 0.52*MGLY + 0.48*GLY + 0.48*HACET + MEO2 + CO2	4.40E-13*exp(1070/T)	[1]	[1],[2]
miscellaneous changes			
MAPAN + OH = HACET + CO + NO2	2.90E-11	[9]	[9]
HOCCHO + OH = 0.75*HO2 + 0.25*OH + 0.13*GLY + 0.52*CO + 0.35*CO2+ 0.16*HCOOH + 0.71*HCHO	8.00E-12	[2]	[2][20]
DHMOB + OH = 1.5*CO + 0.5*HO2 + 0.5*HACET + 0.5*PRD2 - XC	1.00E-11	[2]	[2]
PYRUACD = CCHO + CO2	J_{MGLY}	[5]	[17]
HACET + OH = 0.75*MGLY + 0.825*HO2 + 0.125*HCOOH + 0.1*OH + 0.125*MEO2 +0.20*CO2 + 0.05*CO + 0.125*CCOOH	2.15E-12*exp(305/T)	[2],[16]	[2][20]
HACET = HO2 + MECO3 + HCHO	1.75E-1*J_{MEK}	[1]	[1]

Notes:

[1]: SAPRC-07 (Carter, 2010)
[2]: Paulot et al. (2009a)
[3]: Saunders et al. (2003)
[4]: Paulot et al. (2009b)
[5]: this work
[6]: Crounse et al. (2011)
[7]: Peeters and Müller (2010)
[8]: Rollins et al. (2009)
[9]: Master Chemical Mechanism (MCM V3.2, http://mcm.leeds.ac.uk/MCM/) (Saunders et al., 2003)
[10]: Lockwood et al. (2010)
[11]: SAPRC-99 (Carter, 2000)
[12]: Paulot et al. (2012)
[13]: Zhu et al. (1991)

[14]: Roberts and Fajer (1989)
[15]: Barnes et al. (1993)
[16]: Dillon et al. (2006)
[17]: Yamamoto and Back (1985)
[18]: Jenkin et al. (1997)
[19]: Hutzell et al. (2012)
[20]: Butkovskaya et al. (2006a, b) (Recent work by Orlando et al. (2012) suggests limited acid formation from glycoladehyde and hydroxyacetone oxidation under atmospheric conditions. Therefore, our study likely represents an upper limit for the amount of formic and acetic acid originated from isoprene oxidation.

Figure S1. Comparisons of vertical profiles of selected modeled species with observations within 5 km of the surface. Measurements are from the same datasets as those shown in Fig. 2 except for extended elevation. The black squares and lines are observed median concentrations. The red (blue) circles and lines are modeled median concentrations from the SI (base) simulation. The grey boxes show the interquartile ranges of observations, and the colored error bars show those for the model results.

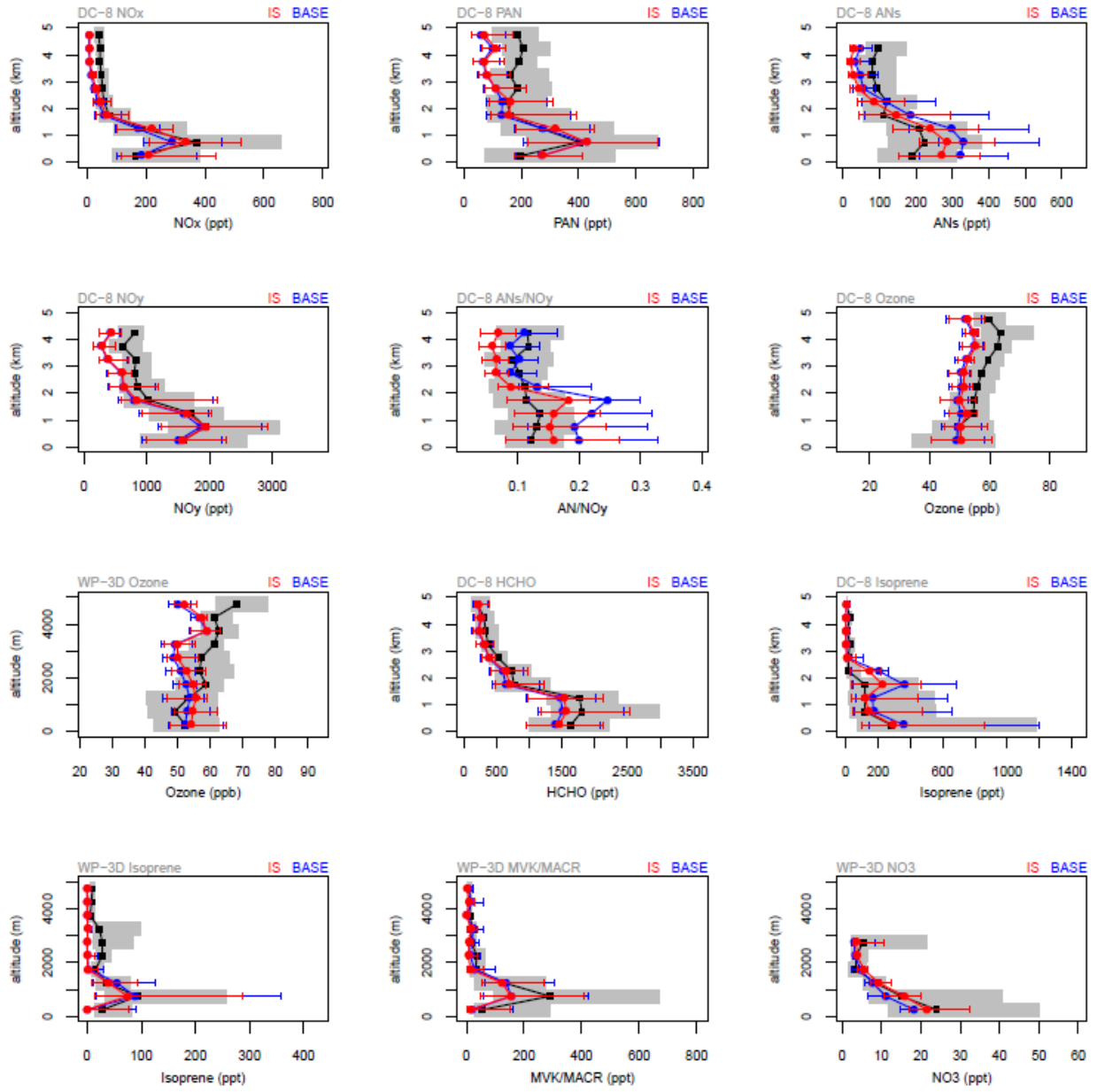
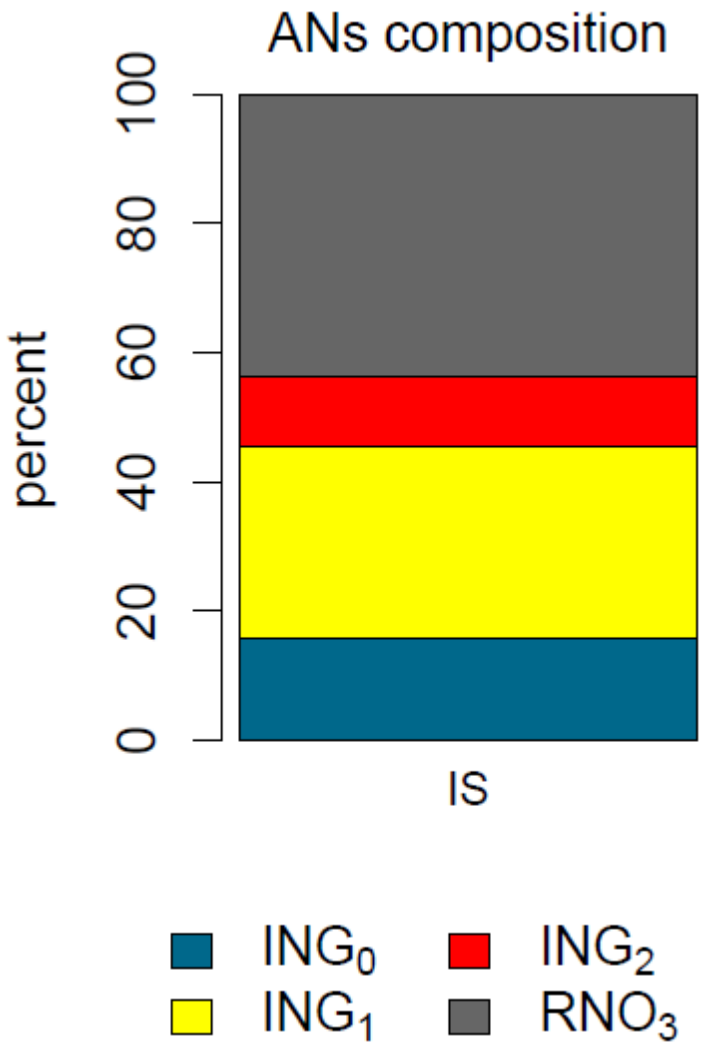


Figure S2. Composition of ANs from the IS simulation. Results are summarized over the entire modeling period for the southeastern US within 2 km of the surface.



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