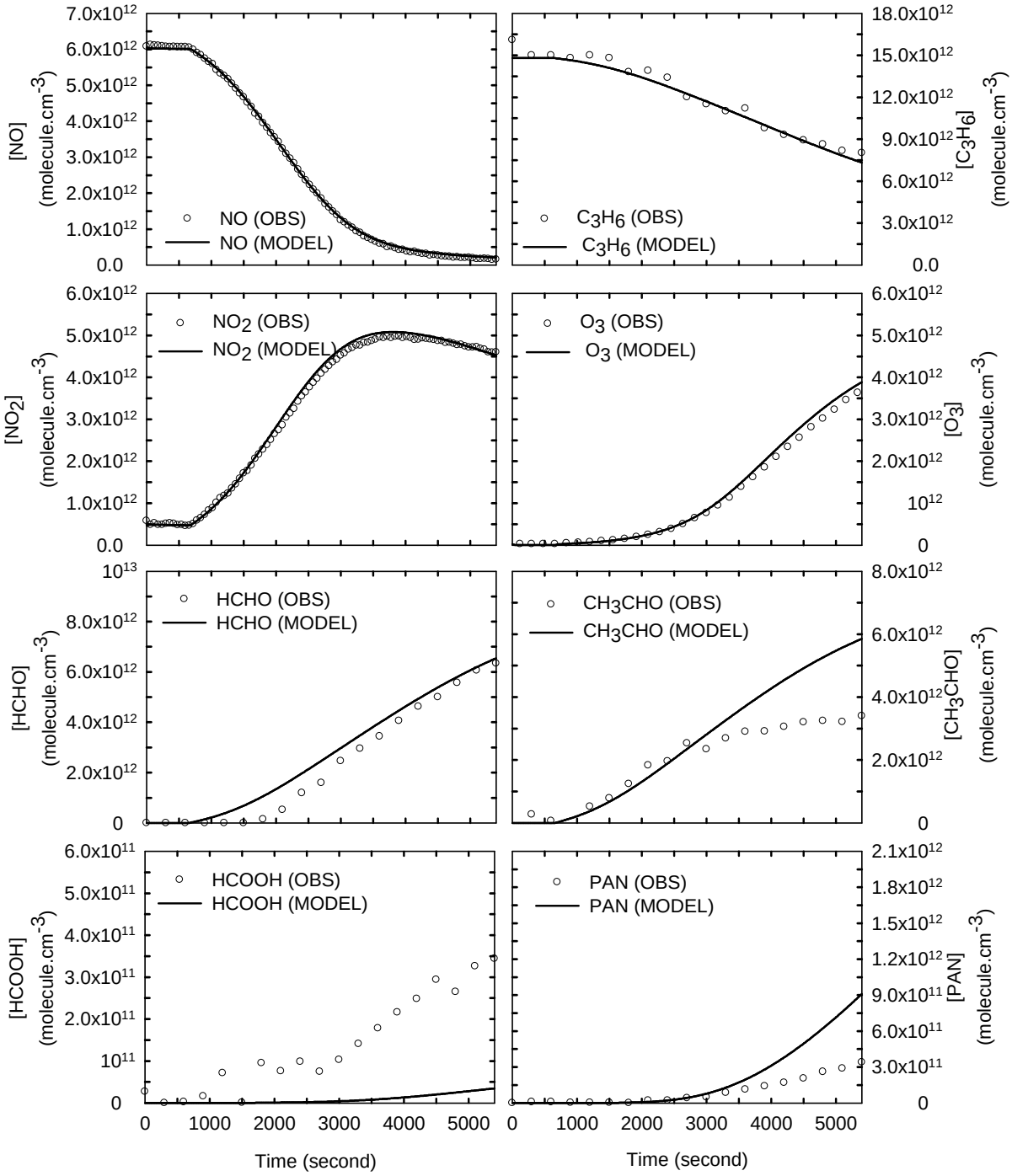
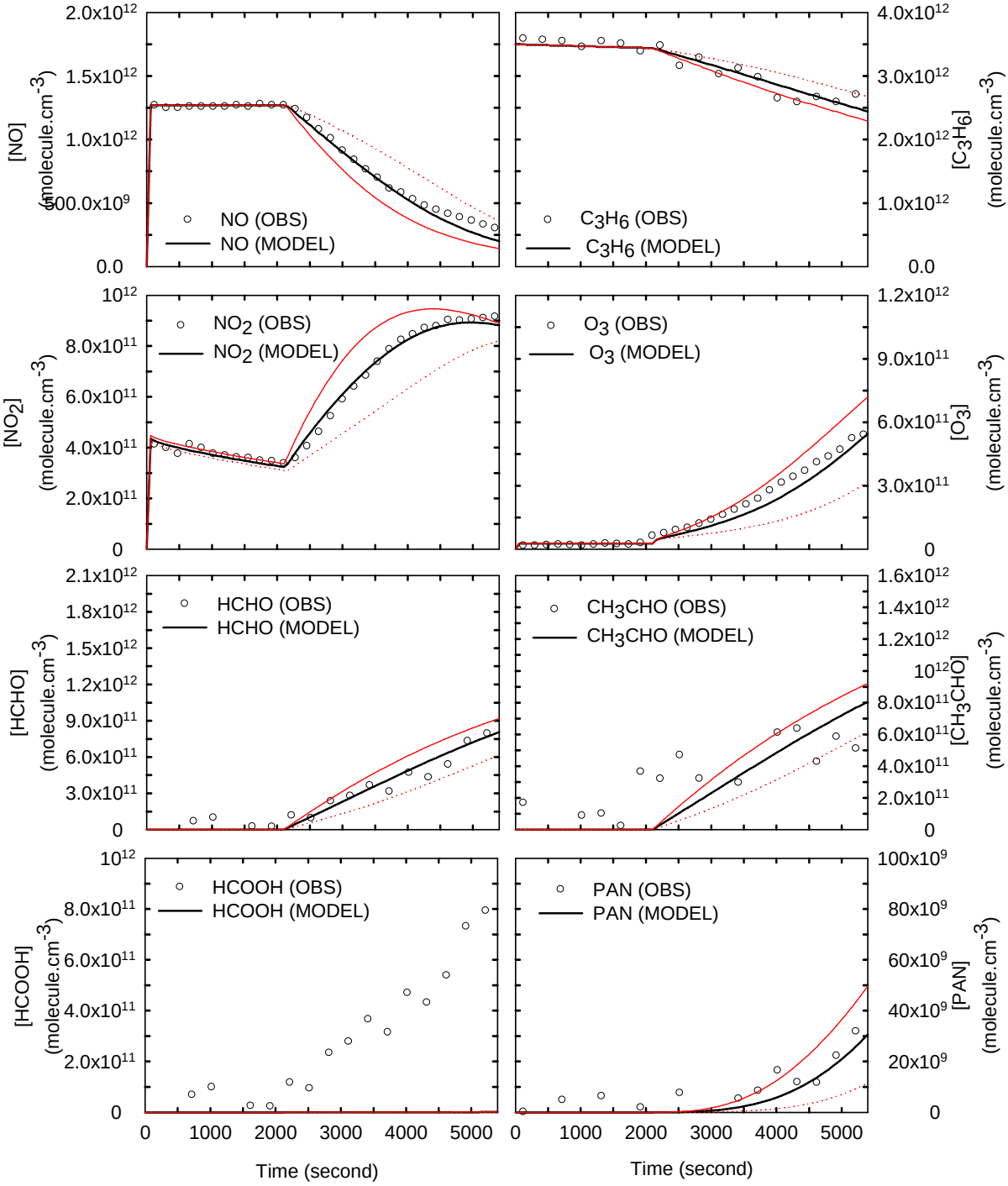
SUPPLEMENTARY MATERIAL

Chemical reaction system used for the modelling of NOx-Air experiments. Rate constants are taken from Atkinson et al., 2004, Atkinson et al., 2006, Atkinson et al., 2007

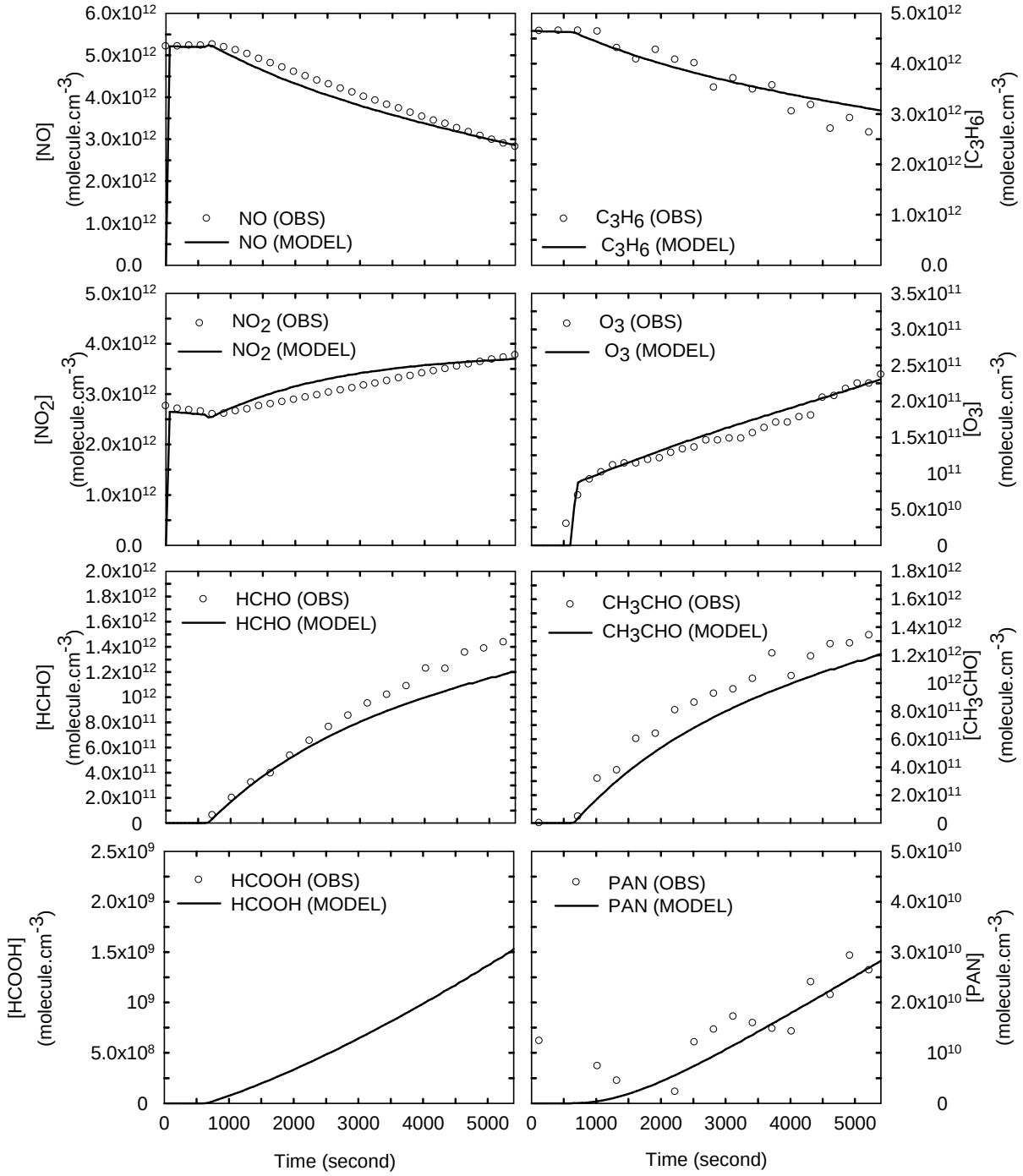
Reaction	Rate constante/unit/Status
$NO_2 \rightarrow NO + O^3P$	J_1 /s^{-1}/ adjusted
$O_3 \rightarrow O^1D + O_2$	J_2 /s^{-1}/ calculated from J_1 value
$HONO \rightarrow OH + NO$	J_3 /s^{-1}/ calculated from J_1 value
$HNO_3 \rightarrow OH + NO_2$	J_4 /s^{-1}/ calculated from J_1 value
$O_3 \rightarrow O^3P + O_2$	J_5 /s^{-1}/ calculated from J_1 value
$NO_3 \rightarrow NO_2 + O^3P$	J_6 /s^{-1}/ calculated from J_1 value
$NO_3 \rightarrow NO + O_2$	J_7 /s^{-1}/ calculated from J_1 value
$O_2 + O^3P + M \rightarrow O_3 + M$	6.0×10^{-34} /cm^6 $molec^{-2}$ s^{-1}
$O_3 + O^3P \rightarrow O_2 + O_2$	8.0×10^{-15} /cm^3 $molec^{-1}$ s^{-1}
$NO_2 + O^3P \rightarrow NO + O_2$	1.0×10^{-11} /cm^3 $molec^{-1}$ s^{-1}
$NO + NO + O_2 \rightarrow NO_2 + NO_2$	2.0×10^{-38}/cm^6 $molec^{-2}$ s^{-1}
$NO + O_3 \rightarrow NO_2 + O_2$	1.8×10^{-14} /cm^3 $molec^{-1}$ s^{-1}
$NO_2 + O_3 \rightarrow NO_3 + O_2$	3.5×10^{-17} /cm^3 $molec^{-1}$ s^{-1}
$NO + NO_3 \rightarrow NO_2 + NO_2$	2.6×10^{-11} /cm^3 $molec^{-1}$ s^{-1}
$O1D + M \rightarrow O^3P + M$	2.6×10^{-11} /cm^3 $molec^{-1}$ s^{-1}
$OH + HNO_3 \rightarrow H_2O + NO_3$	1.5×10^{-13} /cm^3 $molec^{-1}$ s^{-1}
$OH + HONO \rightarrow H_2O + NO_2$	6.0×10^{-12} /cm^3 $molec^{-1}$ s^{-1}
$OH + CO \rightarrow CO_2 + HO_2$	2.8×10^{-13} /cm^3 $molec^{-1}$ s^{-1}
$OH + O_3 \rightarrow HO_2 + O_3$	7.3×10^{-14} /cm^3 $molec^{-1}$ s^{-1}
$HO_2 + OH \rightarrow H_2O + O_2$	1.1×10^{-10} /cm^3 $molec^{-1}$ s^{-1}
$HO_2 + HO_2 \rightarrow H_2O_2 + O_2$	1.6×10^{-12} /cm^3 $molec^{-1}$ s^{-1}
$HO_2 + O_3 \rightarrow OH + O_2 + O_2$	2.0×10^{-15} /cm^3 $molec^{-1}$ s^{-1}
$HO_2 + NO \rightarrow NO_2 + OH$	8.8×10^{-12} /cm^3 $molec^{-1}$ s^{-1}
$HO_2 + NO \rightarrow HNO_3$	1.6×10^{-14} /cm^3 $molec^{-1}$ s^{-1}
$H_2O + N_2O_5 \rightarrow HNO_3 + HNO_3$	2.5×10^{-22} /cm^3 $molec^{-1}$ s^{-1}
$H_2 + OH \rightarrow H_2O + HO_2$	6.7×10^{-15} /cm^3 $molec^{-1}$ s^{-1}
$HO_2NO_2 \rightarrow HO_2 + NO_2$	1.8×10^{-1} /s^{-1}
$NO + O^3P \rightarrow NO_2$	2.3×10^{-12} /cm^3 $molec^{-1}$ s^{-1}/ recalculated from 3rd order equation
$NO_2 + O^3P \rightarrow NO_3$	2.9×10^{-12} /cm^3 $molec^{-1}$ s^{-1}/ recalculated from 3rd order equation
$OH + NO_2 \rightarrow HNO_3$	1.0×10^{-11} /cm^3 $molec^{-1}$ s^{-1}/ recalculated from 3rd order equation
$OH + NO \rightarrow HONO$	8.3×10^{-12} /cm^3 $molec^{-1}$ s^{-1}/ recalculated from 3rd order equation
$H + O_2 \rightarrow HO_2$	1.4×10^{-12} /cm^3 $molec^{-1}$ s^{-1}/ recalculated from 3rd order equation
$HO_2 + NO_2 \rightarrow HO_2NO_2$	1.2×10^{-12} /cm^3 $molec^{-1}$ s^{-1}/ recalculated from 3rd order equation
$NO_2 + NO_3 \rightarrow N_2O_5$	2.1×10^{-12} /cm^3 $molec^{-1}$ s^{-1}/ recalculated from 3rd order equation
$N_2O_5 \rightarrow NO_2 + NO_3$	7.7×10^{-2} / s^{-1}/ recalculated from 2nd order equation
$O^1D + H_2O \rightarrow OH + OH$	2.2×10^{-10} /cm^3 $molec^{-1}$ s^{-1}/ recalculated from 3rd order equation



Comparison of simulated (solid lines) and experimental concentrations (symbols) for NO, NO_2, ozone, propene, formaldehyde, acetaldehyde, formic acid and peroxyacetyl nitrate (PAN) in a propene-NOx-Air system (experiment # H0721)



Comparison of simulated (solid lines) and experimental concentrations (symbols) for NO, NO_2, ozone, propene, formaldehyde, acetaldehyde, formic acid and peroxyacetyl nitrate (PAN) in a propene-NOx-Air system (experiment # N0220). Black lines are the results of modeling with an initial concentration of nitrous acid $[HONO]_0$ = 2 ppb while continuous red lines are for $[HONO]_0$ = 3 ppb and dashed red lines for $[HONO]_0$ = 1 ppb.



Comparison of simulated (solid lines) and experimental concentrations (symbols) for NO, NO_2, ozone, propene, formaldehyde, acetaldehyde, formic acid and peroxyacetyl nitrate (PAN) in a propene-NOx-Air system (experiment # N0306)