SUPPORTING INFORMATION

An MCM modeling study of nitryl chloride ($ClNO_2$) impacts on oxidation, ozone production and nitrogen oxide partitioning in polluted continental outflow

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Supplemental Figures and Tables

Pasadena (GC-MS)	R/V Atlantis (GC-FID)	R/V Atlantis (PTR-ToF-MS)	median (pptv)	1σ
methanol	methanol		1220	180
ethanol			1540	200
isopropanol			320	50
ethanal	ethanal		370	150
methacrolein			10	10
propanal			90	20
butanal			20	4
ethane			3120	440
propane		propane	1940	330
i-butane		i-butane	510	70
n-butane		n-butane	1200	190
i-pentane			780	100
n-pentane		n-petane	350	40
hexane			250	30
nonane			40	2
decane			36	2
undecane			34	4
ethene		ethene	900	100
propene		propene	250	60
cis-2-butene			10	2
1-butene		1-butene	25	5
2-methylpropene			80	20
1,3-butadiene			44	17
trans-2-butene			33	7
ethyne		ethyne	320	40
propylbenzene			15	1
isopropylbenzene			5	1
benzaldehyde			40	8
benzene	benzene	benzene	65	5
ethylbenzene			25	2
o-methylethylbenzene			4	1
1,3,5-trimethylbenzene			10	3
phenylethene			14	2
1,2,4-trimethylbenzene			25	5
o-xylene			30	3
toluene	toluene	toluene	140	13
1,2,3-trimethylbenzene			8	2
methylvinylketone			16	25
acetone	acetone		740	260
methylethylketone			53	27
alphapinene			13	8
betapinene			8	4
limonene			9	7
isoprene			30	180

Table S-1. VOC measured during CalNex 2010 at the Pasadena, CA, ground site and aboard the R/V *Atlantis* and used as model constraints. Medians and standard deviations for the diurnal values used in the model are also given.

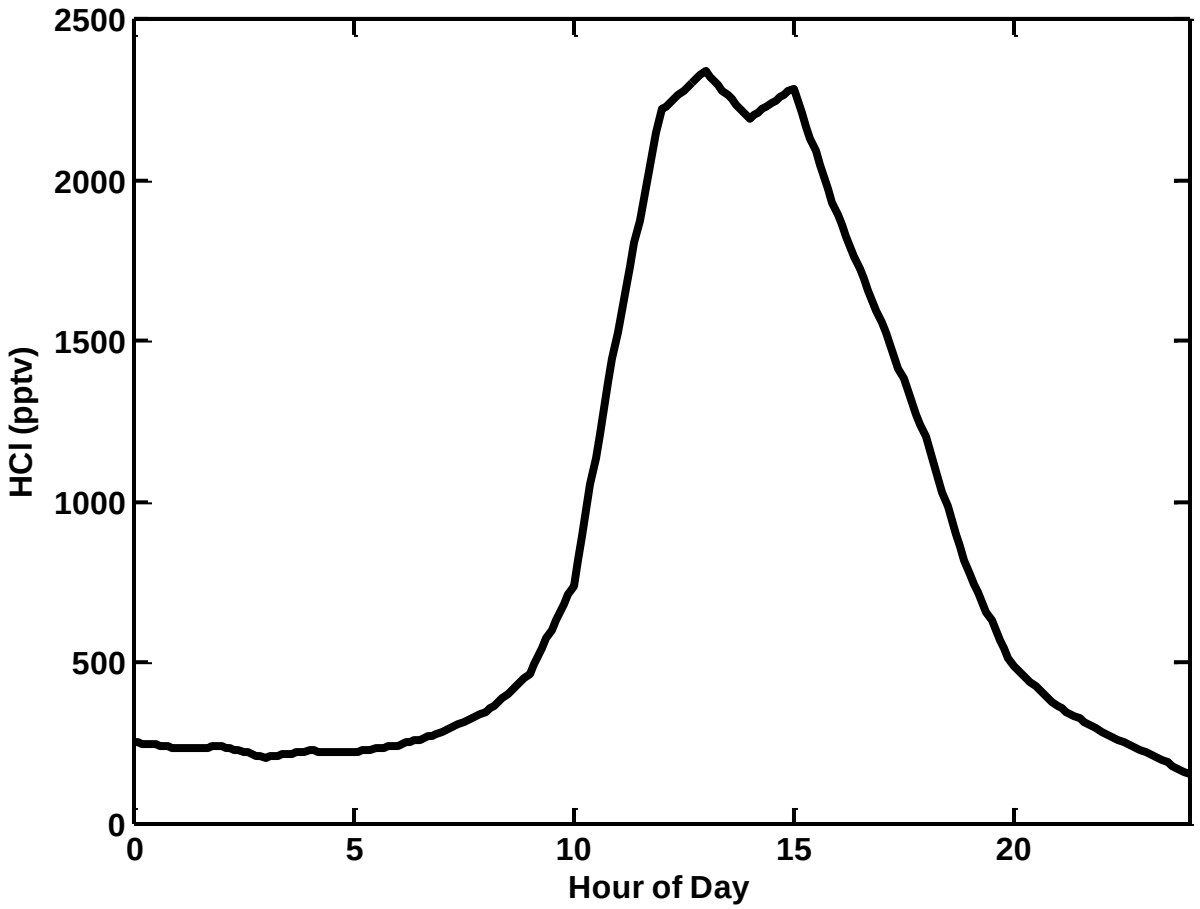

Figure S-1. Hydrochloric acid (HCl) diurnal profile used in the model.

Figure S-2. Methanol oxidation mechanism by atomic chlorine added to the model reactions.

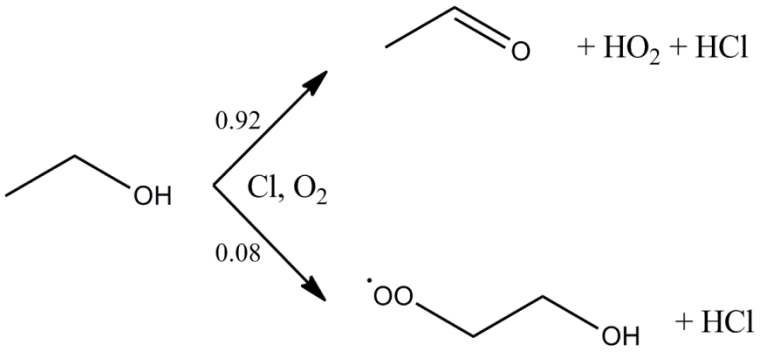

Figure S-3. Ethanol oxidation mechanism by atomic chlorine added to the model reactions.

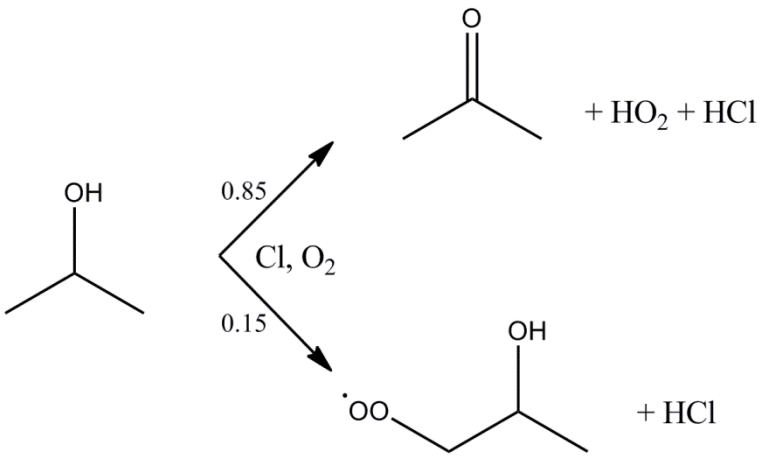

Figure S-4. Isopropanol oxidation mechanism by atomic chlorine added to the model reactions.

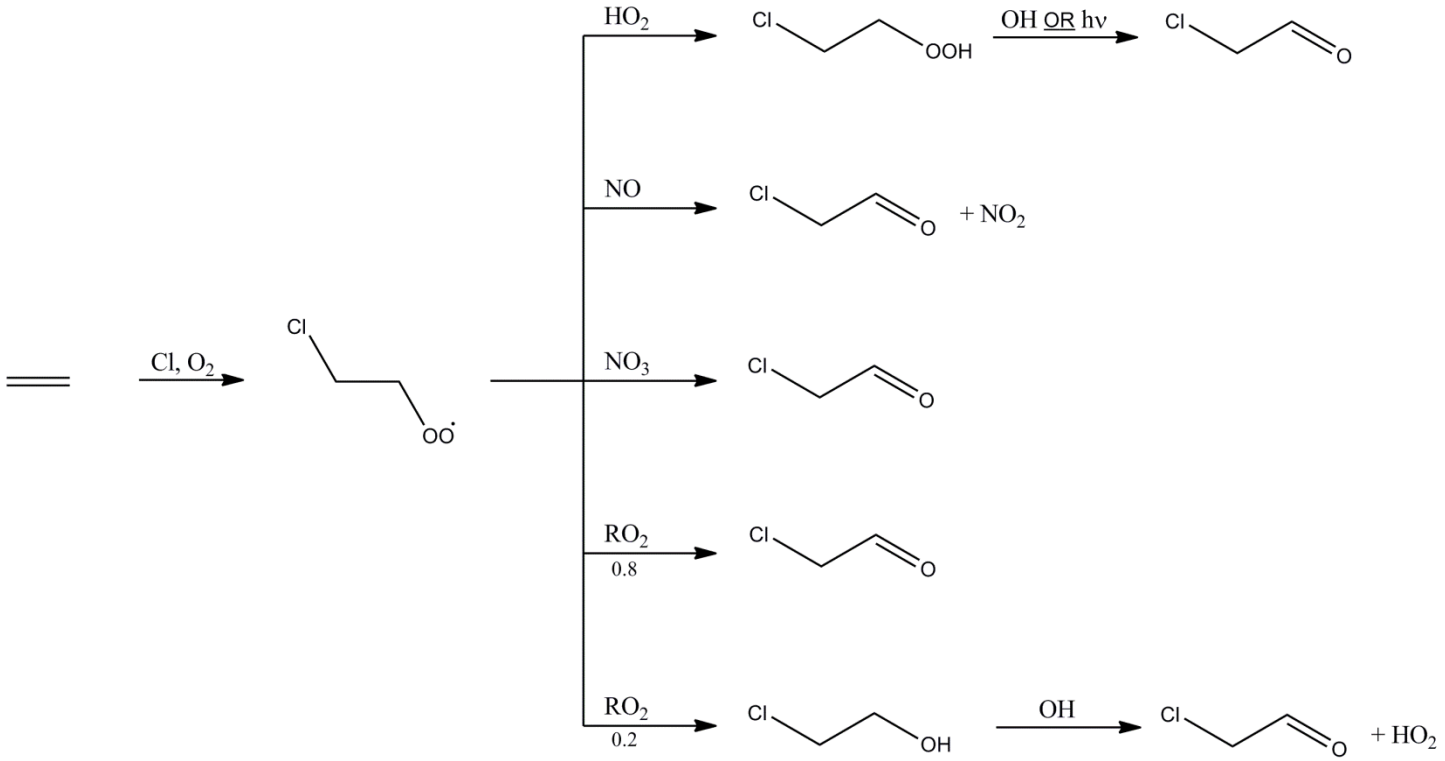

Figure S-5. Ethene oxidation mechanism by atomic chlorine added to the model reactions.

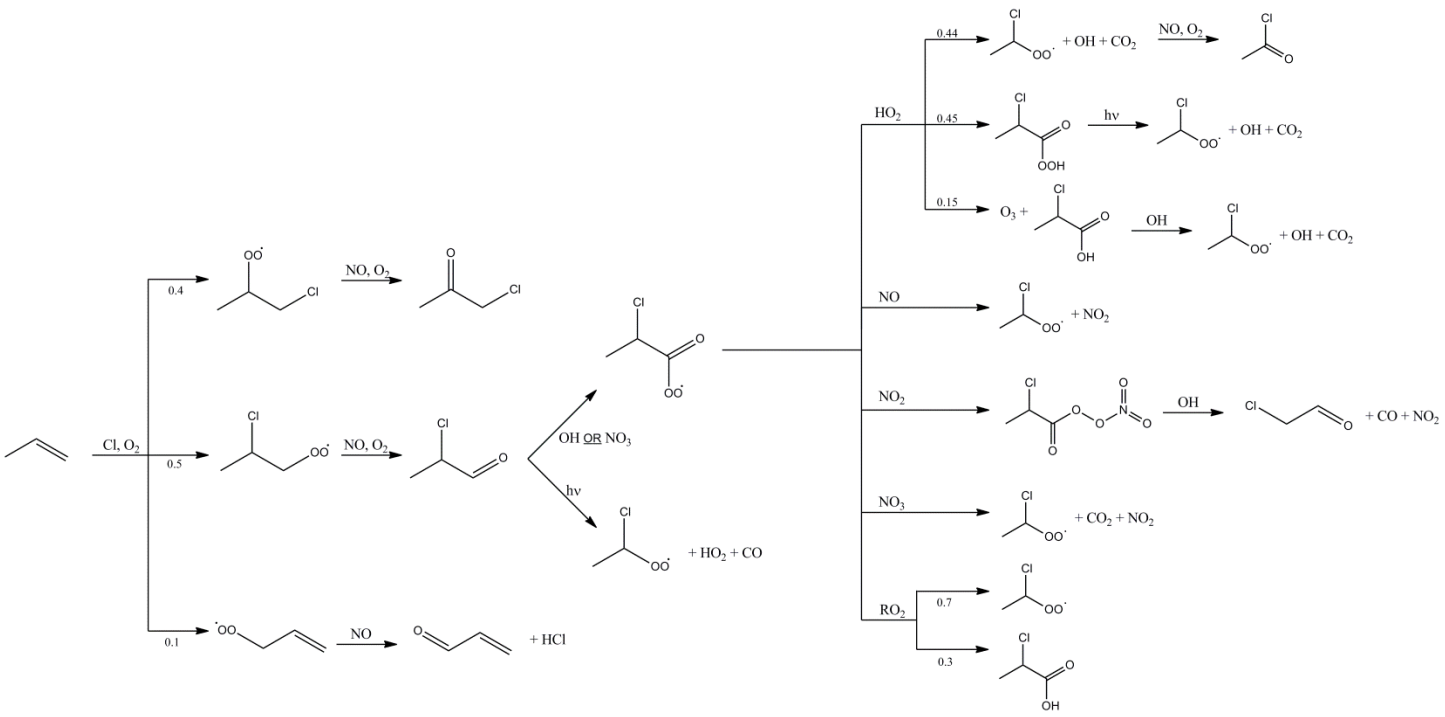

Figure S-6. Propene oxidation mechanism by atomic chlorine added to the model reactions.

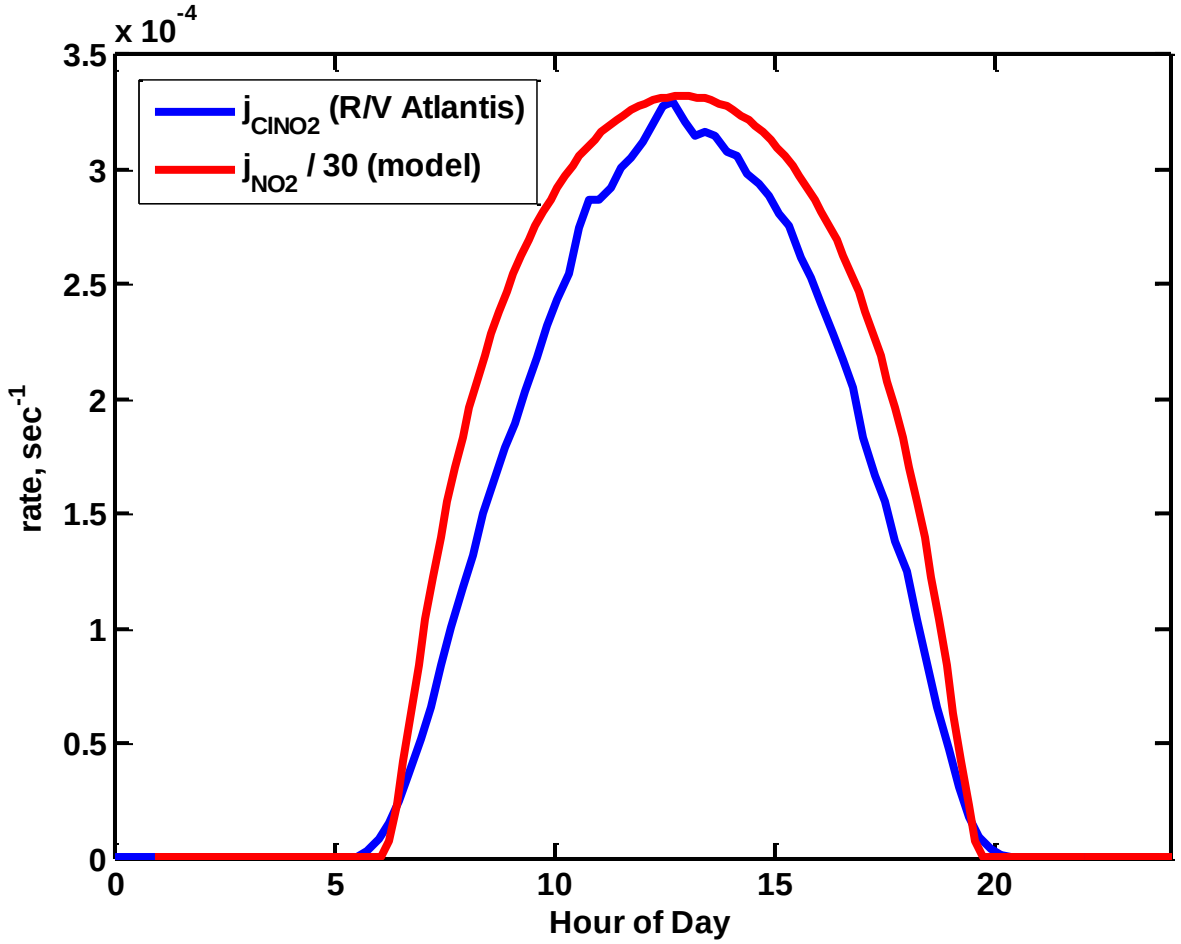

Figure S-7. Photolysis frequency comparison between j_{ClNO2} as measured aboard the R/V *Atlantis* and modeled clear sky $j_{NO2}/30$ which used in the model as a proxy for j_{ClNO2}.

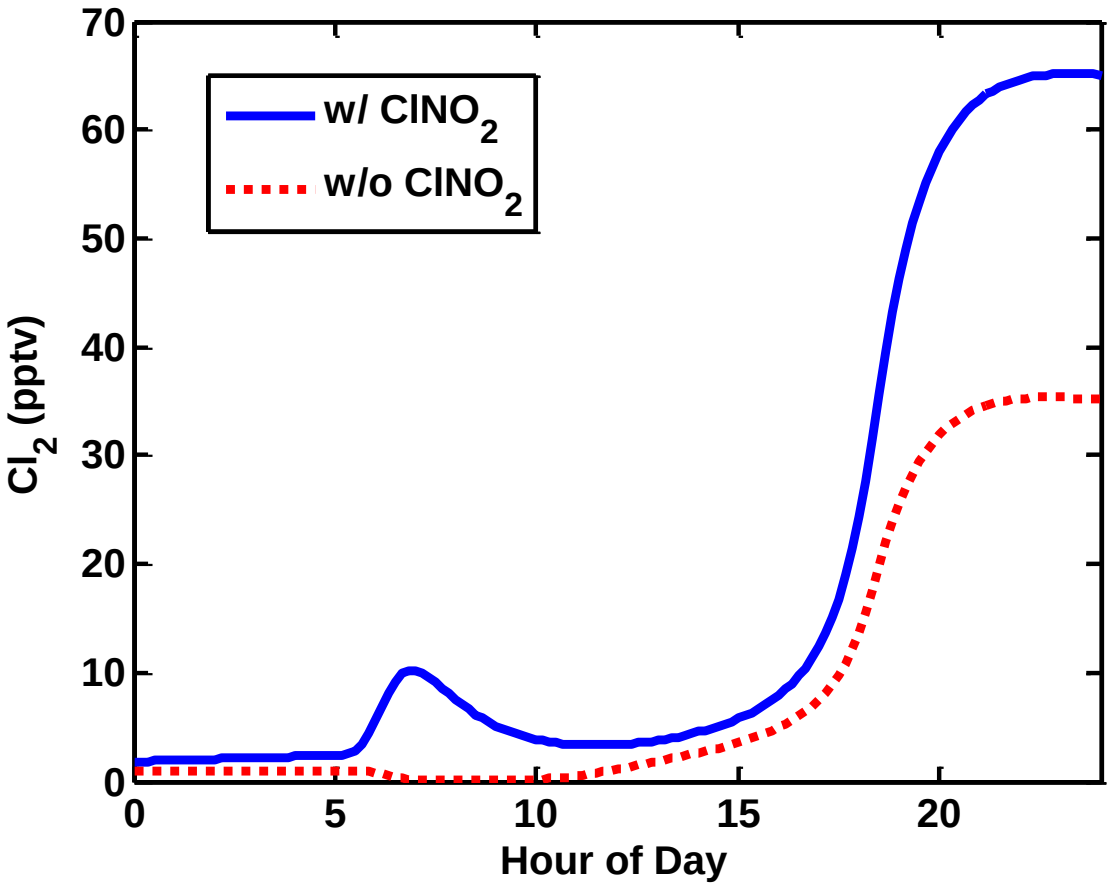

Figure S-8. Effects of $ClNO_2$ on the molecular chlorine (Cl_2) levels during a model run.

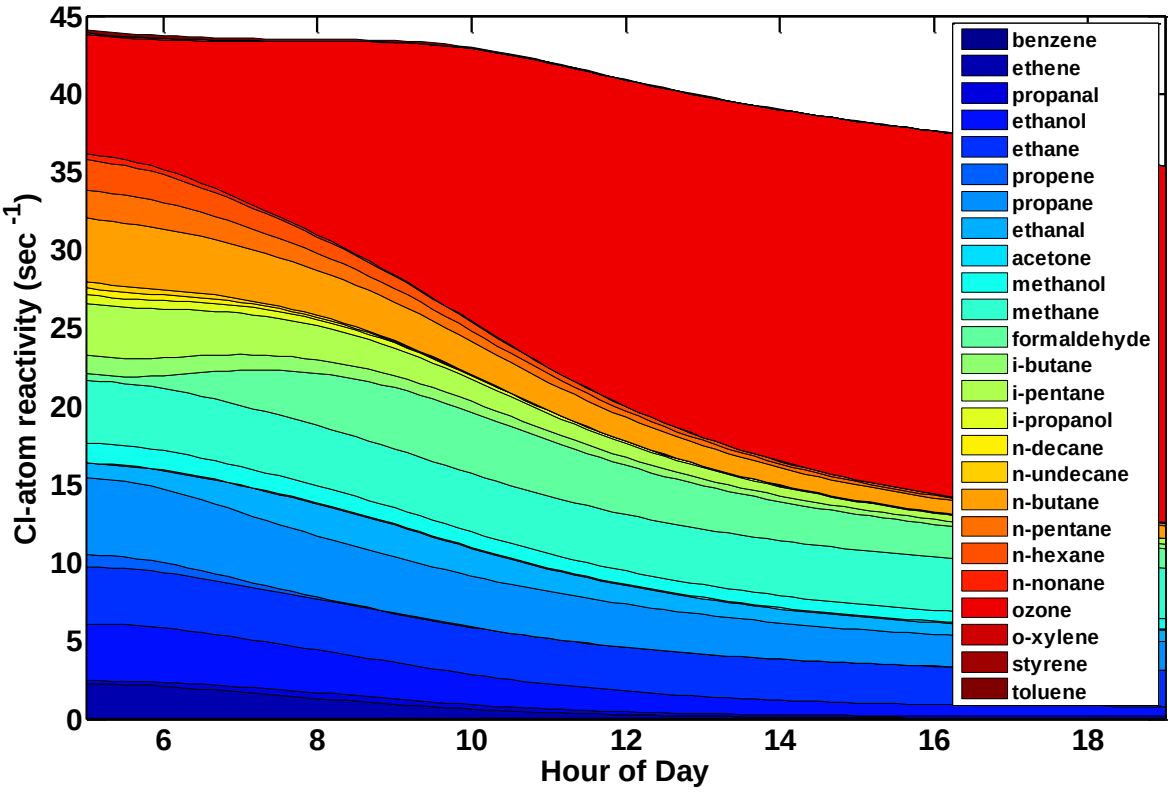

Figure S-9. Predicted Cl-atom reactivity over the course of a model day.