The Influence of Temperature on Ozone Production under varying NO_x Conditions – a modelling study: Supplementary Material

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S1 Vertical Mixing with Diurnal Boundary Layer Height

The MECCA box model used in Coates and Butler (2015) included a constant boundary layer height of 1 km and no interactions (vertical mixing) with the free troposphere. In reality, the planetary boundary layer (PBL) height varies diurnally and affects chemistry by diluting emissions after sunrise when the PBL rises.

The expansion of the PBL into the free troposphere introduces vertical mixing with those chemical species present in the free troposphere. When the PBL collapses in the evening, pollutants are trapped in the PBL. The mixing layer height was measured as part of the BAERLIN campaign (Bonn and et.al., 2016) over Berlin, Germany. The profile of mean mixing layer height during the campaign period (June – August 2014) was used in the model to represent the diurnal cycle of the mixing layer height.

The concentrations of the chemical species within the PBL are diluted due to the larger mixing volume when the PBL height increases at the beginning of the day, also the increasing PBL height mixes the chemical species from the free troposphere with the chemical species within the PBL i.e. vertical mixing. The PBL height collapses during night leaving the stable nocturnal boundary layer, trapping the chemical species into a smaller volume thus increasing the concentrations of the chemical species. This vertical mixing scheme was implemented into the boxmodel using the same approach of Lourens (2012).

The mixing ratios of O3, CO and CH4 in the free troposphere were respectively set to 50 ppbv, 116 ppbv and 1.8 ppmv. These conditions were taken from the MATCH-MPIC chemical weather forecast model on the 21st March (the start date of the simulations). The model results (`http://cwf.iass-potsdam.de/`) at the 700 hPa height were chosen and the daily average was used as input into the boxmodel.

S2 Allocation of Benelux AVOC emissions to Mechanism Species

The total MCM v3.2 emissions for each initial species in Tables S1, S2 and S3 were translated to emissions of mechanism species from each reduced chemical mechanism by weighting with the carbon numbers. The final emissions of the mechanism species representing each MCM v3.2 species in CRIv2, MOZART-4, CB05 and RADM2 are presented in Tables S4 – S8 for each country in the Benelux region.

Table S1: Belgium AVOC and BVOC emissions, in molecules cm^{-2} s^{-1}, mapped to MCMv3.2 species.

Type	MCM.species	SNAP.1	SNAP.2	SNAP.34	SNAP.5	SNAP.6	SNAP.71	SNAP.72	SNAP.73	SNAP.74	SNAP.8	SNAP.9	BVOC	Total
Ethane	C2H6	4.15E+08	1.11E+09	2.98E+09			1.74E+08	4.62E+07	8.17E+06		8.30E+07	8.22E+07		4.91E+09
Propane	C3H8	1.14E+09	4.72E+08	1.03E+08	3.12E+10	3.40E+08	8.49E+06	3.15E+07	8.17E+07	2.71E+06	7.53E+07	3.56E+07		3.35E+10
Butanes	NC4H10	7.77E+08	2.42E+08	1.27E+06	1.23E+11	1.26E+09	1.89E+08	3.26E+07		4.48E+07	1.40E+08	2.20E+07		1.25E+11
	IC4H10	9.48E+07	8.49E+07	3.11E+05	2.98E+10	5.73E+07	8.81E+07	1.52E+07		2.09E+07	7.02E+07	2.20E+07		3.03E+10
Pentanes	NC5H12	6.21E+08	2.25E+08		8.78E+10		1.13E+08	1.31E+07		2.25E+07	4.51E+07	1.11E+07		8.89E+10
	IC5H12	2.62E+08	1.21E+08		5.25E+10		2.19E+08	2.54E+07		4.37E+07	8.60E+07	1.11E+07		5.33E+10
	NEOP											1.11E+07		1.11E+07
Hexane and Higher Alkanes	NC6H14	3.89E+08	2.39E+07	3.15E+08	1.26E+10	1.12E+09	3.98E+08	1.94E+08		8.35E+06	1.04E+08	3.84E+06		1.52E+10
	M2PE			4.06E+07	1.94E+09	2.35E+08					1.73E+08	1.65E+06		2.39E+09
	M3PE			3.04E+07	9.69E+08	2.35E+08					1.04E+08			1.34E+09
	NC7H16	1.67E+08	4.11E+07	1.48E+08	1.35E+10	4.05E+08	6.55E+07	3.20E+07		1.38E+06	2.98E+07	1.94E+07		1.45E+10
	M2HEX					1.52E+08	5.10E+07	2.49E+07		1.07E+06	4.48E+07			2.74E+08
	M3HEX					1.52E+08	3.64E+07	1.78E+07		7.64E+05	2.98E+07			2.37E+08
	M22C4										3.47E+07			3.47E+07
	M23C4										3.47E+07			3.47E+07
	NC8H18			6.13E+07	1.01E+10	4.44E+07	5.75E+07	2.81E+07		1.21E+06	1.70E+08	6.63E+06		1.04E+10
	NC9H20			3.41E+07		1.07E+09						2.21E+06		1.10E+09
	NC10H22			4.30E+07		2.07E+09	2.56E+07	1.25E+07		5.38E+05		3.32E+06		2.15E+09
	NC11H24			1.68E+07		8.44E+08	9.33E+06	4.56E+06		1.96E+05	1.91E+07	1.21E+06		8.95E+08
	NC12H26					5.96E+07	1.52E+08	7.44E+07		3.20E+06	1.76E+07			3.07E+08
	CHEX		3.81E+07	1.04E+07		2.41E+08						1.12E+06		2.91E+08
Ethene	C2H4	8.93E+07	2.49E+09	3.11E+10			9.61E+08	5.94E+08	4.38E+07		1.18E+09	1.43E+08		3.66E+10
Propene	C3H6	5.95E+07	5.21E+08	5.33E+08			3.38E+08	9.90E+07	1.95E+07		2.06E+08	4.10E+07		1.82E+09
Higher Alkenes	HEX1ENE	5.05E+06	1.28E+07									1.63E+07		3.42E+07
	BUT1ENE		1.80E+07	6.24E+07							1.96E+07			9.99E+07
	MEPROPENE										9.80E+06			9.80E+06
	TBUT2ENE										9.80E+06			9.80E+06
	CBUT2ENE										9.80E+06			9.80E+06
	CPENT2ENE		5.65E+06								3.92E+06			9.57E+06
	TPENT2ENE		5.65E+06								3.92E+06			9.57E+06
	PENT1ENE		5.14E+06	5.93E+06							1.57E+07			2.68E+07
	ME2BUT2ENE		3.08E+06								7.84E+06			1.09E+07
	ME3BUT1ENE		3.08E+06								7.84E+06			1.09E+07
	ME2BUT1ENE		2.05E+06											2.05E+06
Ethyne	C2H2	6.97E+05	7.84E+08	3.45E+08			8.95E+08	2.80E+08	1.73E+07	1.09E+07	3.95E+08	5.38E+07		2.78E+09
Benzene	BENZENE	6.91E+07	4.64E+08	5.74E+08	3.05E+09		2.16E+08	3.56E+07		1.53E+06	7.98E+07	2.75E+07		4.52E+09
Toluene	TOLUENE	8.49E+07	1.54E+08	4.87E+07	2.59E+09	2.30E+09	4.88E+08	2.26E+07		1.30E+06	6.79E+07	1.81E+07		5.78E+09

Table S1: Belgium AVOC and BVOC emissions, in molecules cm^{-2} s^{-1}, mapped to MCMv3.2 species.

Type	MCM.species	SNAP.1	SNAP.2	SNAP.34	SNAP.5	SNAP.6	SNAP.71	SNAP.72	SNAP.73	SNAP.74	SNAP.8	SNAP.9	BVOC	Total
Xylenes	MXYL	4.20E+07	1.32E+07	1.60E+06	3.74E+08	1.33E+09	1.04E+08	9.52E+06		2.05E+05	1.86E+07	3.66E+06		1.90E+09
	OXYL	9.33E+06	1.32E+07	6.42E+05	3.74E+08	3.33E+08	1.04E+08	9.52E+06		2.05E+05	1.51E+07	2.19E+06		8.61E+08
	PXYL		1.32E+07	6.42E+05	3.74E+08	3.33E+08	7.79E+07	7.14E+06		1.53E+05	1.86E+07	2.93E+06		8.28E+08
Trimethylbenzenes	TM123B	6.21E+03	1.06E+06			2.23E+07	1.79E+07				3.33E+06	3.30E+05		4.49E+07
	TM124B	6.21E+03	1.06E+06	1.46E+07		7.60E+07	7.50E+07				7.76E+06	4.40E+05		1.75E+08
	TM135B	6.21E+03	1.06E+06			2.23E+07	2.86E+07				3.33E+06	4.40E+05		5.58E+07
Other Aromatics	EBENZ	1.36E+07		1.65E+07		6.07E+07	7.76E+07	5.32E+07	1.53E+04		1.74E+08	3.93E+06		3.99E+08
	PBENZ					1.34E+07	6.86E+07	4.70E+07	1.35E+04		2.79E+07	1.73E+06		1.59E+08
	IPBENZ					4.92E+07					2.79E+07	1.73E+06		7.88E+07
	PETHTOL					4.47E+06					5.59E+07			6.03E+07
	METHTOL					1.34E+07					5.59E+07			6.93E+07
	OETHTOL										4.19E+07			4.19E+07
	DIET35TOL						1.45E+08	9.94E+07	2.86E+04					2.45E+08
	DIME35EB					7.60E+07	1.79E+07	1.23E+07	3.53E+03					1.06E+08
	STYRENE			1.68E+07		1.55E+07	1.65E+07	1.13E+07	3.25E+03					6.01E+07
	BENZAL						2.77E+07	1.90E+07	5.46E+03					4.68E+07
	PHENOL			1.86E+07										1.86E+07
Formaldehyde	HCHO	2.74E+07	5.76E+08				2.12E+08	2.78E+08	1.09E+07		1.23E+09	2.22E+07		2.35E+09
Other Aldehydes	CH3CHO	2.82E+06	7.80E+07	7.07E+07			5.74E+07	1.15E+08	2.09E+06		2.22E+08	5.17E+06		5.53E+08
	C2H5CHO	1.61E+06	5.91E+07				9.67E+06	1.94E+07	3.52E+05		8.41E+07	3.92E+06		1.78E+08
	C3H7CHO	1.29E+04	4.76E+07								6.78E+07	3.16E+06		1.19E+08
	IPRCHO	1.29E+04	4.76E+07								4.52E+07	3.16E+06		9.60E+07
	C4H9CHO	1.08E+04	3.99E+07									2.64E+06		4.25E+07
	ACR	1.67E+04	6.13E+07				1.50E+07	3.02E+07	5.48E+05			4.06E+06		1.11E+08
	MACR	1.33E+04	4.90E+07									3.25E+06		5.23E+07
	C4ALDB	1.33E+04	4.90E+07				8.01E+06	1.61E+07	2.92E+05			3.25E+06		7.67E+07
	MGLYOX										4.52E+07			4.52E+07
Alkadienes and	C4H6	2.64E+07	4.69E+08	3.10E+08	4.19E+10		4.51E+08	1.21E+08	3.14E+07	1.98E+07	2.84E+08	3.97E+07		4.36E+10
Other Alkynes	C5H8												3.35E+09	3.35E+09
Organic Acids	HCOOH	1.27E+06	7.07E+08								1.67E+08	5.23E+07		9.28E+08
	CH3CO2H	9.72E+05	5.42E+08	4.37E+07							1.28E+08	4.01E+07		7.55E+08
	PROPACID	7.88E+05	4.39E+08								1.04E+08	3.25E+07		5.77E+08
	ACO2H			3.64E+07										3.64E+07

Table S1: Belgium AVOC and BVOC emissions, in molecules cm^{-2} s^{-1}, mapped to MCMv3.2 species.

Type	MCM.species	SNAP.1	SNAP.2	SNAP.34	SNAP.5	SNAP.6	SNAP.71	SNAP.72	SNAP.73	SNAP.74	SNAP.8	SNAP.9	BVOC	Total
Alcohols	CH3OH	5.18E+04		2.12E+06		2.14E+09					4.03E+07	1.81E+07		2.20E+09
	C2H5OH	3.60E+04	9.73E+08	5.98E+07		2.19E+09					2.80E+07	4.77E+07		3.30E+09
	NPROPOL	2.76E+04				1.78E+08					2.15E+07	5.78E+06		2.06E+08
	IPROPOL	2.76E+04		7.52E+05		2.85E+08					2.15E+07			3.08E+08
	NBUTOL	2.24E+04				1.74E+08					1.74E+07			1.91E+08
	BUT2OL	2.24E+04				1.16E+08					1.74E+07	7.80E+06		1.41E+08
	IBUTOL	2.24E+04				7.23E+07					1.74E+07			8.97E+07
	TBUTOL	2.24E+04									1.74E+07			1.74E+07
	PECOH	1.88E+04									1.46E+07			1.47E+07
	IPEAOH	1.88E+04									1.46E+07			1.47E+07
	ME3BUOL	1.88E+04									1.46E+07			1.47E+07
	IPECOH	1.88E+04									1.46E+07			1.47E+07
	IPEBOH	1.88E+04									1.46E+07			1.47E+07
	CYHEXOL	1.66E+04									1.29E+07			1.29E+07
	MIBKAOH	1.43E+04				3.69E+07					1.11E+07			4.80E+07
	ETHGLY	2.67E+04				5.18E+07					2.08E+07			7.26E+07
	PROPGLY	2.18E+04				1.03E+08					1.69E+07			1.20E+08
	C6H5CH2OH					2.97E+07								2.97E+07
	MBO	1.93E+04									1.50E+07			1.50E+07
Ketones	CH3COCH3	1.29E+05	1.08E+07	1.66E+08		2.28E+09	6.45E+06	3.59E+07			1.73E+08	1.06E+06		2.67E+09
	MEK		8.73E+06			1.10E+09						8.54E+05		1.11E+09
	MPRK		7.31E+06									7.15E+05		8.03E+06
	DIEK		7.31E+06									7.15E+05		8.03E+06
	MIPK		7.31E+06									7.15E+05		8.03E+06
	HEX2ONE		6.29E+06									6.15E+05		6.90E+06
	HEX3ONE		6.29E+06									6.15E+05		6.90E+06
	MIBK		6.29E+06			6.60E+08						6.15E+05		6.67E+08
	MTBK		6.29E+06									6.15E+05		6.90E+06
	CYHEXONE		6.42E+06	8.91E+06		5.39E+07						6.28E+05		6.99E+07
Terpenes	APINENE											2.28E+06	4.19E+08	4.22E+08
	BPINENE											2.28E+06	4.19E+08	4.22E+08
	LIMONENE					7.33E+07						3.42E+06	4.19E+08	4.96E+08
Esters	METHACET			6.18E+07										6.18E+07
	ETHACET			7.08E+06		1.47E+09								1.48E+09
	NBUTACET					1.03E+09								1.03E+09
	IPROACET					3.63E+08								3.63E+08
	CH3OCHO			6.93E+06										6.93E+06

Table S1: Belgium AVOC and BVOC emissions, in molecules cm^{-2} s^{-1}, mapped to MCMv3.2 species.

Type	MCM.species	SNAP.1	SNAP.2	SNAP.34	SNAP.5	SNAP.6	SNAP.71	SNAP.72	SNAP.73	SNAP.74	SNAP.8	SNAP.9	BVOC	Total
	NPROACET					1.36E+08						5.94E+06		1.42E+08
Ethers	CH3OCH3		3.36E+07	2.43E+08		8.29E+07								3.59E+08
	DIETETHER		2.09E+07	9.06E+07										1.11E+08
	MTBE		1.76E+07											1.76E+07
	DIIPRETHER		1.52E+07	6.57E+07								1.47E+07		9.56E+07
	ETBE		1.52E+07											1.52E+07
	MO2EOL		2.04E+07			1.00E+08								1.21E+08
	EOX2EOL		1.72E+07			8.48E+07								1.02E+08
	PR2OHMOX		1.72E+07			1.70E+08								1.87E+08
	BUOX2ETOH		1.31E+07			8.14E+08								8.27E+08
	BOX2PROL		1.17E+07											1.17E+07
Chlorinated Hydrocarbons	CH2CL2			1.75E+08		6.57E+08						1.09E+06		8.34E+08
	CH3CH2CL			1.36E+08										1.36E+08
	CH3CCL3					4.60E+08						3.47E+05		4.61E+08
	TRICLETH			6.66E+07		1.04E+09						3.52E+05		1.11E+09
	CDICLETH			4.51E+07								7.11E+05		4.58E+07
	TDICLETH			4.51E+07								4.74E+05		4.56E+07
	CH3CL			1.39E+08										1.39E+08
	CCL2CH2			4.51E+07										4.51E+07
	CHCL2CH3											5.35E+05		5.35E+05
	VINCL			4.20E+07										4.20E+07
	TCE			1.05E+07		2.53E+08						6.93E+05		2.64E+08
	CHCL3			2.93E+07										2.93E+07
Total		4.30E+09	1.13E+10	3.85E+10	4.12E+11	2.91E+10	6.00E+09	2.47E+09	2.16E+08	1.85E+08	6.61E+09	8.86E+08	4.61E+09	5.16E+11

Table S2: Netherlands AVOC and BVOC emissions, in molecules cm^{-2} s^{-1}, mapped to MCMv3.2 species.

Type	MCM.species	Snap.1	Snap.2	Snap.34	Snap.5	Snap.6	Snap.71	Snap.72	Snap.73	Snap.74	Snap.8	Snap.9	BVOC	Total
Ethane	C2H6	5.70E+08	5.15E+08	6.20E+09			3.15E+08	4.38E+07	5.22E+07		1.36E+08	1.28E+08		7.96E+09
Propane	C3H8	1.60E+09	6.01E+08	2.47E+09	3.38E+10	2.93E+08	1.53E+07	2.99E+07	5.22E+08	1.66E+07	8.83E+07	3.96E+07		3.94E+10
Butanes	NC4H10	1.13E+09	6.33E+08	9.48E+08	1.42E+11	1.09E+09	3.41E+08	3.09E+07		2.74E+08	8.82E+07	2.02E+07		1.47E+11
	IC4H10	1.37E+08	2.22E+08	2.32E+08	3.46E+10	4.93E+07	1.59E+08	1.44E+07		1.28E+08	4.41E+07	2.02E+07		3.56E+10
Pentanes	NC5H12	9.18E+08	7.80E+08		1.03E+11		2.04E+08	1.24E+07		1.38E+08	3.69E+07	3.79E+06		1.05E+11
	IC5H12	3.87E+08	4.18E+08		6.13E+10		3.96E+08	2.41E+07		2.67E+08	7.05E+07	3.79E+06		6.29E+10
	NEOP											3.79E+06		3.79E+06
Hexane and Higher Alkanes	NC6H14	5.43E+08	3.23E+07	8.96E+08	1.47E+10	9.22E+08	7.19E+08	1.84E+08		5.11E+07	1.63E+08	1.32E+06		1.82E+10
	M2PE			1.16E+08	2.26E+09	1.94E+08					2.71E+08	5.65E+05		2.84E+09
	M3PE			8.67E+07	1.13E+09	1.94E+08					1.63E+08			1.57E+09
	NC7H16	2.33E+08	5.56E+07	4.23E+08	1.58E+10	3.34E+08	1.18E+08	3.03E+07		8.41E+06	4.66E+07	6.64E+06		1.71E+10
	M2HEX					1.25E+08	9.20E+07	2.36E+07		6.54E+06	6.99E+07			3.17E+08
	M3HEX					1.25E+08	6.57E+07	1.68E+07		4.67E+06	4.66E+07			2.59E+08
	M22C4										5.42E+07			5.42E+07
	M23C4										5.42E+07			5.42E+07
	NC8H18			1.74E+08	1.17E+10	3.66E+07	1.04E+08	2.66E+07		7.38E+06	2.66E+08	2.27E+06		1.23E+10
	NC9H20			9.71E+07		8.80E+08						7.59E+05		9.78E+08
	NC10H22			1.23E+08		1.70E+09	4.63E+07	1.19E+07		3.29E+06		1.14E+06		1.89E+09
	NC11H24			4.78E+07		6.95E+08	1.69E+07	4.32E+06		1.20E+06	2.99E+07	4.15E+05		7.96E+08
	NC12H26					4.91E+07	2.75E+08	7.05E+07		1.96E+07	2.74E+07			4.42E+08
	CHEX		5.15E+07	2.96E+07		1.99E+08						3.86E+05		2.80E+08
Ethene	C2H4	1.23E+08	1.11E+09	2.58E+09			1.74E+09	5.63E+08	2.80E+08		1.82E+09	4.70E+07		8.25E+09
Propene	C3H6	8.22E+07	3.19E+08	1.26E+08			6.10E+08	9.38E+07	1.24E+08		3.09E+08	1.35E+07		1.68E+09
Higher Alkenes	HEX1ENE	1.60E+07	2.47E+06									5.51E+06		2.40E+07
	BUT1ENE		3.45E+06	1.78E+08							4.91E+06			1.86E+08
	MEPROPENE										2.46E+06			2.46E+06
	TBUT2ENE										2.46E+06			2.46E+06
	CBUT2ENE										2.46E+06			2.46E+06
	CPENT2ENE		1.09E+06								9.82E+05			2.07E+06
	TPENT2ENE		1.09E+06								9.82E+05			2.07E+06
	PENT1ENE		9.87E+05	2.56E+05							3.93E+06			5.17E+06
	ME2BUT2ENE		5.92E+05								1.96E+06			2.56E+06
	ME3BUT1ENE		5.92E+05								1.96E+06			2.56E+06
	ME2BUT1ENE		3.95E+05											3.95E+05
Ethyne	C2H2	2.00E+06	4.29E+08	8.16E+07			1.62E+09	2.65E+08	1.10E+08	6.66E+07	6.36E+08	1.77E+07		3.22E+09
Benzene	BENZENE	1.18E+08	5.17E+08	2.56E+08	3.58E+09		3.89E+08	3.37E+07		9.35E+06	1.06E+08	9.04E+06		5.02E+09
Toluene	TOLUENE	1.29E+08	2.10E+08	3.57E+07	3.04E+09	1.97E+09	8.80E+08	2.14E+07		7.93E+06	6.42E+07	6.00E+06		6.37E+09

Table S2: Netherlands AVOC and BVOC emissions, in molecules cm^{-2} s^{-1}, mapped to MCMv3.2 species.

Type	MCM.species	Snap.1	Snap.2	Snap.34	Snap.5	Snap.6	Snap.71	Snap.72	Snap.73	Snap.74	Snap.8	Snap.9	BVOC	Total
Xylenes	MXYL	6.30E+07	7.31E+06	6.93E+04	4.40E+08	1.14E+09	1.88E+08	9.02E+06		1.25E+06	2.62E+07	1.22E+06		1.88E+09
	OXYL	1.40E+07	7.31E+06	2.77E+04	4.40E+08	2.85E+08	1.88E+08	9.02E+06		1.25E+06	2.13E+07	7.34E+05		9.66E+08
	PXYL		7.31E+06	2.77E+04	4.40E+08	2.85E+08	1.41E+08	6.76E+06		9.38E+05	2.62E+07	9.79E+05		9.08E+08
Trimethylbenzenes	TM123B	1.06E+04	2.03E+05			1.91E+07	3.23E+07				0.00E+00	1.11E+05		5.17E+07
	TM124B	1.06E+04	2.03E+05	4.15E+07		6.51E+07	1.35E+08				0.00E+00	1.49E+05		2.42E+08
	TM135B	1.06E+04	2.03E+05			1.91E+07	5.16E+07				0.00E+00	1.49E+05		7.11E+07
Other Aromatics	EBENZ	2.15E+07		4.69E+07		5.20E+07	1.40E+08	5.04E+07	9.77E+04		3.16E+08	1.32E+06		6.29E+08
	PBENZ					1.15E+07	1.24E+08	4.45E+07	8.63E+04		5.08E+07	5.81E+05		2.31E+08
	IPBENZ					4.21E+07					5.08E+07	5.81E+05		9.35E+07
	PETHTOL					3.83E+06					1.02E+08			1.05E+08
	METHTOL					1.15E+07					1.02E+08			1.13E+08
	OETHTOL										7.62E+07			7.62E+07
	DIET35TOL						2.62E+08	9.42E+07	1.83E+05					3.56E+08
	DIME35EB					6.51E+07	3.23E+07	1.16E+07	2.25E+04					1.09E+08
	STYRENE			4.78E+07		1.32E+07	2.98E+07	1.07E+07	2.08E+04					1.02E+08
	BENZAL						5.01E+07	1.80E+07	3.49E+04					6.81E+07
	PHENOL			5.29E+07										5.29E+07
Formaldehyde	HCHO	1.55E+08	1.59E+09				3.83E+08	2.63E+08	6.97E+07		9.11E+08	7.29E+06		3.38E+09
Other Aldehydes	CH3CHO	8.96E+06	4.73E+07	3.05E+06			1.04E+08	1.09E+08	1.34E+07		2.48E+08	1.69E+06		5.35E+08
	C2H5CHO	5.10E+06	3.59E+07				1.75E+07	1.84E+07	2.25E+06		9.39E+07	1.28E+06		1.74E+08
	C3H7CHO	2.21E+04	2.89E+07								7.56E+07	1.03E+06		1.06E+08
	IPRCHO	2.21E+04	2.89E+07								5.04E+07	1.03E+06		8.04E+07
	C4H9CHO	1.85E+04	2.42E+07									8.64E+05		2.51E+07
	ACR	2.84E+04	3.72E+07				2.71E+07	2.86E+07	3.50E+06			1.33E+06		9.78E+07
	MACR	2.27E+04	2.97E+07									1.06E+06		3.08E+07
	C4ALDB	2.27E+04	2.97E+07				1.45E+07	1.53E+07	1.87E+06			1.06E+06		6.24E+07
	MGLYOX										5.05E+07			5.05E+07
Alkadienes and	C4H6	4.12E+07	2.77E+08	4.43E+09	4.92E+10		8.14E+08	1.15E+08	2.01E+08	1.21E+08	3.98E+08	1.31E+07		5.56E+10
Other Alkynes	C5H8													0.00E+00
Organic Acids	HCOOH	3.39E+06	4.54E+08								0.00E+00	1.71E+07		4.74E+08
	CH3CO2H	2.60E+06	3.48E+08	1.24E+08							0.00E+00	1.31E+07		4.88E+08
	PROPACID	2.11E+06	2.82E+08								0.00E+00	1.06E+07		2.95E+08
	ACO2H			1.04E+08										1.04E+08

Table S2: Netherlands AVOC and BVOC emissions, in molecules cm^{-2} s^{-1}, mapped to MCMv3.2 species.

Type	MCM.species	Snap.1	Snap.2	Snap.34	Snap.5	Snap.6	Snap.71	Snap.72	Snap.73	Snap.74	Snap.8	Snap.9	BVOC	Total
Alcohols	CH3OH	8.82E+04		1.08E+06		1.84E+09					1.19E+05	5.92E+06		1.85E+09
	C2H5OH	6.14E+04	6.51E+08	3.05E+07		1.88E+09					8.29E+04	1.56E+07		2.58E+09
	NPROPOL	4.70E+04				1.53E+08					6.35E+04	1.89E+06		1.55E+08
	IPROPOL	4.70E+04		3.83E+05		2.45E+08					6.35E+04			2.46E+08
	NBUTOL	3.81E+04				1.49E+08					5.15E+04			1.49E+08
	BUT2OL	3.81E+04				9.94E+07					5.15E+04	2.56E+06		1.02E+08
	IBUTOL	3.81E+04				6.21E+07					5.15E+04			6.22E+07
	TBUTOL	3.81E+04									5.15E+04			8.97E+04
	PECOH	3.21E+04									4.33E+04			7.54E+04
	IPEAOH	3.21E+04									4.33E+04			7.54E+04
	ME3BUOL	3.21E+04									4.33E+04			7.54E+04
	IPECOH	3.21E+04									4.33E+04			7.54E+04
	IPEBOH	3.21E+04									4.33E+04			7.54E+04
	CYHEXOL	2.82E+04									3.81E+04			6.64E+04
	MIBKAOH	2.43E+04				3.17E+07					3.29E+04			3.18E+07
	ETHGLY	4.56E+04				4.45E+07					6.15E+04			4.46E+07
	PROPGLY	3.72E+04				8.88E+07					5.02E+04			8.88E+07
	C6H5CH2OH					2.55E+07								2.55E+07
	MBO	3.28E+04									4.43E+04			7.72E+04
Ketones	CH3COCH3	2.19E+05	4.54E+06	4.72E+08		1.91E+09	1.16E+07	3.40E+07			1.11E+08	3.54E+05		2.54E+09
	MEK		3.65E+06			9.22E+08						2.85E+05		9.26E+08
	MPRK		3.06E+06									2.39E+05		3.30E+06
	DIEK		3.06E+06									2.39E+05		3.30E+06
	MIPK		3.06E+06									2.39E+05		3.30E+06
	HEX2ONE		2.63E+06									2.05E+05		2.84E+06
	HEX3ONE		2.63E+06									2.05E+05		2.84E+06
	MIBK		2.63E+06			5.53E+08						2.05E+05		5.56E+08
	MTBK		2.63E+06									2.05E+05		2.84E+06
	CYHEXONE		2.69E+06	2.54E+07		4.51E+07						2.09E+05		7.34E+07
Terpenes	APINENE											7.70E+05	1.46E+08	1.47E+08
	BPINENE											7.70E+05	1.46E+08	1.47E+08
	LIMONENE					6.31E+07						1.16E+06	1.46E+08	2.10E+08
Esters	METHACET			2.67E+06										2.67E+06
	ETHACET			3.06E+05		1.29E+09								1.29E+09
	NBUTACET					9.03E+08								9.03E+08
	IPROACET					3.18E+08								3.18E+08
	CH3OCHO			2.99E+05										2.99E+05

Table S2: Netherlands AVOC and BVOC emissions, in molecules cm^{-2} s^{-1}, mapped to MCMv3.2 species.

Type	MCM.species	Snap.1	Snap.2	Snap.34	Snap.5	Snap.6	Snap.71	Snap.72	Snap.73	Snap.74	Snap.8	Snap.9	BVOC	Total
	NPROACET					1.19E+08						2.01E+06		1.21E+08
Ethers	CH3OCH3		2.58E+07	1.05E+07		7.08E+07								1.07E+08
	DIETETHER		1.60E+07	3.91E+06										1.99E+07
	MTBE		1.35E+07											1.35E+07
	DIIPRETHER		1.16E+07	2.84E+06								4.82E+06		1.93E+07
	ETBE		1.16E+07											1.16E+07
	MO2EOL		1.56E+07			8.57E+07								1.01E+08
	EOX2EOL		1.32E+07			7.24E+07								8.56E+07
	PR2OHMOX		1.32E+07			1.45E+08								1.58E+08
	BUOX2ETOH		1.01E+07			6.95E+08								7.05E+08
	BOX2PROL		8.99E+06											8.99E+06
Chlorinated Hydrocarbons	CH2CL2			4.99E+08		5.24E+08						3.68E+05		1.02E+09
	CH3CH2CL			3.86E+08										3.86E+08
	CH3CCL3					3.67E+08						1.17E+05		3.67E+08
	TRICLETH			1.90E+08		8.30E+08						1.19E+05		1.02E+09
	CDICLETH			1.28E+08								2.40E+05		1.29E+08
	TDICLETH			1.28E+08								1.60E+05		1.29E+08
	CH3CL			3.95E+08										3.95E+08
	CCL2CH2			1.28E+08										1.28E+08
	CHCL2CH3											1.80E+05		1.80E+05
	VINCL			1.20E+08										1.20E+08
	TCE			3.00E+07		2.01E+08						2.34E+05		2.32E+08
	CHCL3			8.35E+07										8.35E+07
Total		6.30E+09	9.96E+09	2.26E+10	4.77E+11	2.46E+10	1.08E+10	2.34E+09	1.38E+09	1.13E+09	7.33E+09	4.47E+08	4.37E+08	5.64E+11

Table S3: Luxembourg AVOC and BVOC emissions, in molecules cm^{-2} s^{-1}, mapped to MCMv3.2 species.

Type	MCM.species	Snap.1	Snap.2	Snap.34	Snap.5	Snap.6	Snap.71	Snap.72	Snap.73	Snap.74	Snap.8	Snap.9	BVOC	Total
Ethane	C2H6		4.33E+07				4.78E+08	2.06E+08	3.49E+06		1.26E+08			8.58E+08
Propane	C3H8	1.46E+08	1.36E+07		3.91E+10	3.39E+08	2.33E+07	1.41E+08	3.49E+07	4.34E+07	8.61E+07			4.00E+10
Butanes	NC4H10	2.20E+08	7.87E+06		3.46E+11	1.26E+09	5.18E+08	1.46E+08		7.19E+08	8.71E+07			3.49E+11
	IC4H10	2.68E+07	2.76E+06		8.42E+10	5.71E+07	2.42E+08	6.79E+07		3.35E+08	4.36E+07			8.50E+10
Pentanes	NC5H12	2.44E+08	9.96E+06		2.64E+11		3.10E+08	5.85E+07		3.61E+08	3.62E+07			2.65E+11
	IC5H12	1.03E+08	5.34E+06		1.58E+11		6.01E+08	1.14E+08		7.01E+08	6.91E+07			1.60E+11
	NEOP													0.00E+00
Hexane and Higher Alkanes	NC6H14	2.21E+07	1.19E+06		3.76E+10	1.12E+09	1.09E+09	8.68E+08		1.34E+08	1.59E+08			4.10E+10
	M2PE				5.78E+09	2.37E+08					2.64E+08			6.28E+09
	M3PE				2.89E+09	2.37E+08					1.59E+08			3.29E+09
	NC7H16	9.52E+06	2.04E+06		4.04E+10	4.07E+08	1.80E+08	1.43E+08		2.20E+07	4.55E+07			4.12E+10
	M2HEX					1.53E+08	1.40E+08	1.11E+08		1.71E+07	6.82E+07			4.89E+08
	M3HEX					1.53E+08	9.99E+07	7.94E+07		1.22E+07	4.55E+07			3.90E+08
	M22C4										5.29E+07			5.29E+07
	M23C4										5.29E+07			5.29E+07
	NC8H18				3.00E+10	4.46E+07	1.58E+08	1.25E+08		1.93E+07	2.59E+08			3.06E+10
	NC9H20					1.07E+09								1.07E+09
	NC10H22					2.08E+09	7.03E+07	5.59E+07		8.63E+06				2.21E+09
	NC11H24					8.48E+08	2.56E+07	2.04E+07		3.14E+06	2.91E+07			9.26E+08
	NC12H26					5.98E+07	4.18E+08	3.32E+08		5.13E+07	2.67E+07			8.88E+08
	CHEX		1.89E+06			2.42E+08								2.44E+08
Ethene	C2H4		9.57E+07				2.64E+09	2.65E+09	1.87E+07		1.62E+09			7.03E+09
Propene	C3H6		2.82E+07				9.28E+08	4.42E+08	8.31E+06		2.71E+08			1.68E+09
Higher Alkenes	HEX1ENE		5.03E+05											5.03E+05
	BUT1ENE		7.04E+05											7.04E+05
	MEPROPENE													0.00E+00
	TBUT2ENE													0.00E+00
	CBUT2ENE													0.00E+00
	CPENT2ENE		2.21E+05											2.21E+05
	TPENT2ENE		2.21E+05											2.21E+05
	PENT1ENE		2.01E+05											2.01E+05
	ME2BUT2ENE		1.21E+05											1.21E+05
	ME3BUT1ENE		1.21E+05											1.21E+05
	ME2BUT1ENE		8.05E+04											8.05E+04
Ethyne	C2H2		3.92E+07				2.46E+09	1.25E+09	7.39E+06	1.75E+08	5.83E+08			4.51E+09
Benzene	BENZENE	8.25E+07	2.50E+07		9.58E+09		5.92E+08	1.59E+08		2.45E+07	9.72E+07			1.06E+10
Toluene	TOLUENE	3.88E+07	8.76E+06		8.12E+09	2.53E+09	1.34E+09	1.01E+08		2.08E+07	6.18E+07			1.22E+10

Table S3: Luxembourg AVOC and BVOC emissions, in molecules cm^{-2} s^{-1}, mapped to MCMv3.2 species.

Type	MCM.species	Snap.1	Snap.2	Snap.34	Snap.5	Snap.6	Snap.71	Snap.72	Snap.73	Snap.74	Snap.8	Snap.9	BVOC	Total
Xylenes	MXYL		6.69E+05		1.18E+09	1.46E+09	2.85E+08	4.25E+07		3.28E+06	2.54E+07			3.00E+09
	OXYL		6.69E+05		1.18E+09	3.66E+08	2.85E+08	4.25E+07		3.28E+06	2.07E+07			1.89E+09
	PXYL		6.69E+05		1.18E+09	3.66E+08	2.14E+08	3.19E+07		2.46E+06	2.54E+07			1.82E+09
Trimethylbenzenes	TM123B	1.74E+03	4.15E+04			2.46E+07	4.90E+07							7.36E+07
	TM124B	1.74E+03	4.15E+04			8.35E+07	2.06E+08							2.89E+08
	TM135B	1.74E+03	4.15E+04			2.46E+07	7.84E+07							1.03E+08
Other Aromatics	EBENZ					6.67E+07	2.13E+08	2.38E+08	6.53E+03		3.10E+08			8.28E+08
	PBENZ					1.47E+07	1.88E+08	2.10E+08	5.77E+03		4.98E+07			4.63E+08
	IPBENZ					5.40E+07					4.98E+07			1.04E+08
	PETHTOL					4.91E+06					9.96E+07			1.05E+08
	METHTOL					1.47E+07					9.96E+07			1.14E+08
	OETHTOL										7.47E+07			7.47E+07
	DIET35TOL						3.98E+08	4.44E+08	1.22E+04					8.42E+08
	DIME35EB					8.36E+07	4.91E+07	5.48E+07	1.51E+03					1.88E+08
	STYRENE					1.70E+07	4.52E+07	5.05E+07	1.39E+03					1.13E+08
	BENZAL						7.61E+07	8.49E+07	2.33E+03					1.61E+08
	PHENOL													0.00E+00
Formaldehyde	HCHO	4.29E+08	2.93E+07				5.82E+08	1.24E+09	4.66E+06		7.59E+08			3.04E+09
Other Aldehydes	CH3CHO		4.79E+06				1.57E+08	5.15E+08	8.93E+05		2.10E+08			8.88E+08
	C2H5CHO		3.63E+06				2.65E+07	8.68E+07	1.50E+05		7.97E+07			1.97E+08
	C3H7CHO	3.63E+03	2.92E+06								6.42E+07			6.71E+07
	IPRCHO	3.63E+03	2.92E+06								4.28E+07			4.57E+07
	C4H9CHO	3.04E+03	2.45E+06											2.45E+06
	ACR	4.67E+03	3.76E+06				4.12E+07	1.35E+08	2.34E+05					1.80E+08
	MACR	3.73E+03	3.01E+06											3.01E+06
	C4ALDB	3.73E+03	3.01E+06				2.20E+07	7.19E+07	1.25E+05					9.70E+07
	MGLYOX										4.28E+07			4.28E+07
Alkadienes and	C4H6		2.53E+07		1.31E+11		1.24E+09	5.42E+08	1.34E+07	3.18E+08	3.51E+08			1.34E+11
Other Alkynes	C5H8												1.10E+10	1.10E+10
Organic Acids	HCOOH		4.04E+07											4.04E+07
	CH3CO2H		3.10E+07											3.10E+07
	PROPACID		2.51E+07											2.51E+07
	ACO2H													0.00E+00

Table S3: Luxembourg AVOC and BVOC emissions, in molecules cm^{-2} s^{-1}, mapped to MCMv3.2 species.

Type	MCM.species	Snap.1	Snap.2	Snap.34	Snap.5	Snap.6	Snap.71	Snap.72	Snap.73	Snap.74	Snap.8	Snap.9	BVOC	Total
Alcohols	CH3OH					2.40E+09								2.40E+09
	C2H5OH		6.30E+07			2.45E+09								2.51E+09
	NPROPOL					2.00E+08								2.00E+08
	IPROPOL					3.19E+08								3.19E+08
	NBUTOL					1.94E+08								1.94E+08
	BUT2OL					1.30E+08								1.30E+08
	IBUTOL					8.09E+07								8.09E+07
	TBUTOL													0.00E+00
	PECOH													0.00E+00
	IPEAOH													0.00E+00
	ME3BUOL													0.00E+00
	IPECOH													0.00E+00
	IPEBOH													0.00E+00
	CYHEXOL													0.00E+00
	MIBKAOH					4.13E+07								4.13E+07
	ETHGLY					5.80E+07								5.80E+07
	PROPGLY					1.16E+08								1.16E+08
	C6H5CH2OH					3.33E+07								3.33E+07
Ketones	CH3COCH3	3.61E+04	5.56E+05			2.47E+09	1.77E+07	1.60E+08			9.81E+07			2.75E+09
	MEK		4.48E+05			1.19E+09								1.20E+09
	MPRK		3.75E+05											3.75E+05
	DIEK		3.75E+05											3.75E+05
	MIPK		3.75E+05											3.75E+05
	HEX2ONE		3.22E+05											3.22E+05
	HEX3ONE		3.22E+05											3.22E+05
	MIBK		3.22E+05			7.17E+08								7.17E+08
	MTBK		3.22E+05											3.22E+05
	CYHEXONE		3.29E+05			5.85E+07								5.89E+07
Terpenes	APINENE												1.27E+09	1.27E+09
	BPINENE												1.27E+09	1.27E+09
	LIMONENE					7.31E+07							1.27E+09	1.34E+09
Esters	METHACET													0.00E+00
	ETHACET					1.68E+09								1.68E+09
	NBUTACET					1.18E+09								1.18E+09
	IPROACET					4.14E+08								4.14E+08
	CH3OCHO													0.00E+00
	NPROACET					1.55E+08								1.55E+08

Table S3: Luxembourg AVOC and BVOC emissions, in molecules cm^{-2} s^{-1}, mapped to MCMv3.2 species.

Type	MCM.species	Snap.1	Snap.2	Snap.34	Snap.5	Snap.6	Snap.71	Snap.72	Snap.73	Snap.74	Snap.8	Snap.9	BVOC	Total
Ethers	CH3OCH3		2.35E+06			9.06E+07								9.30E+07
	DIETETHER		1.46E+06											1.46E+06
	MTBE		1.23E+06											1.23E+06
	DIIPRETHER		1.06E+06											1.06E+06
	ETBE		1.06E+06											1.06E+06
	MO2EOL		1.42E+06			1.10E+08								1.11E+08
	EOX2EOL		1.20E+06			9.27E+07								9.39E+07
	PR2OHMOX		1.20E+06			1.85E+08								1.87E+08
	BUOX2ETOH		9.17E+05			8.89E+08								8.90E+08
	BOX2PROL		8.20E+05											8.20E+05
Chlorinated Hydrocarbons	CH2CL2					4.08E+08								4.08E+08
	CH3CH2CL													0.00E+00
	CH3CCL3					2.86E+08								2.86E+08
	TRICLETH					6.46E+08								6.46E+08
	CDICLETH													0.00E+00
	TDICLETH													0.00E+00
	CH3CL													0.00E+00
	CCL2CH2													0.00E+00
	CHCL2CH3													0.00E+00
	VINCL													0.00E+00
	TCE					1.57E+08								1.57E+08
	CHCL3													0.00E+00
Total		1.32E+09	5.46E+08	0.00E+00	1.16E+12	3.02E+10	1.65E+10	1.10E+10	9.23E+07	2.97E+09	6.65E+09	0.00E+00	1.48E+10	1.24E+12

Table S4: Benelux AVOC and BVOC emissions, in molecules cm^{-2} s^{-1}, mapped from MCMv3.2 species into corresponding CRIv2 species. Emissions were weighted by the carbon numbers of the respective species.

Type	**MCMv3.2 Species**	**CRIv2 Species**	**Belgium**	**Netherlands**	**Luxembourg**	**Total**
Ethane	C2H6	C2H6	4.91E+09	8.58E+08	7.96E+09	1.37E+10
Propane	C3H8	C3H8	3.35E+10	4.00E+10	3.94E+10	1.13E+11
Butanes	NC4H10	NC4H10	1.25E+11	3.49E+11	1.47E+11	6.21E+11
	IC4H10	IC4H10	3.03E+10	8.50E+10	3.56E+10	1.51E+11
Pentanes	NC5H12	NC5H12	8.89E+10	2.65E+11	1.05E+11	4.59E+11
	IC5H12	IC5H12	5.33E+10	1.60E+11	6.29E+10	2.76E+11
	NEOP	NEOP	1.11E+07	0.00E+00	3.79E+06	1.49E+07
Hexane and Higher Alkanes	NC6H14	NC6H14	1.52E+10	4.10E+10	1.82E+10	7.44E+10
	M2PE	M2PE	2.39E+09	6.28E+09	2.84E+09	1.15E+10
	M3PE	M3PE	1.34E+09	3.29E+09	1.57E+09	6.20E+09
	NC7H16	NC7H16	1.45E+10	4.12E+10	1.71E+10	7.28E+10
	M2HEX	M2HEX	2.74E+08	4.89E+08	3.17E+08	1.08E+09
	M3HEX	M3HEX	2.37E+08	3.90E+08	2.59E+08	8.86E+08
	M22C4	M22C4	3.47E+07	5.29E+07	5.42E+07	1.42E+08
	M23C4	M23C4	3.47E+07	5.29E+07	5.42E+07	1.42E+08
	NC8H18	NC8H18	1.04E+10	3.06E+10	1.23E+10	5.33E+10
	NC9H20	NC9H20	1.10E+09	1.07E+09	9.78E+08	3.15E+09
	NC10H22	NC10H22	2.15E+09	2.21E+09	1.89E+09	6.25E+09
	NC11H24	NC11H24	8.95E+08	9.26E+08	7.96E+08	2.62E+09
	NC12H26	NC12H26	3.07E+08	8.88E+08	4.42E+08	1.64E+09
	CHEX	CHEX	2.91E+08	2.44E+08	2.80E+08	8.15E+08
Ethene	C2H4	C2H4	3.66E+10	7.03E+09	8.25E+09	5.19E+10
Propene	C3H6	C3H6	1.82E+09	1.68E+09	1.68E+09	5.18E+09
Higher Alkenes	HEX1ENE	HEX1ENE	3.42E+07	5.03E+05	2.40E+07	5.87E+07
	BUT1ENE	BUT1ENE	9.99E+07	7.04E+05	1.86E+08	2.87E+08
	MEPROPENE	MEPROPENE	9.80E+06	0.00E+00	2.46E+06	1.23E+07
	TBUT2ENE	TBUT2ENE	9.80E+06	0.00E+00	2.46E+06	1.23E+07
	CBUT2ENE	CBUT2ENE	9.80E+06	0.00E+00	2.46E+06	1.23E+07
	CPENT2ENE	CPENT2ENE	9.57E+06	2.21E+05	2.07E+06	1.19E+07
	TPENT2ENE	TPENT2ENE	9.57E+06	2.21E+05	2.07E+06	1.19E+07
	PENT1ENE	PENT1ENE	2.68E+07	2.01E+05	5.17E+06	3.22E+07
	ME2BUT2ENE	ME2BUT2ENE	1.09E+07	1.21E+05	2.56E+06	1.36E+07
	ME3BUT1ENE	ME3BUT1ENE	1.09E+07	1.21E+05	2.56E+06	1.36E+07
	ME2BUT1ENE	ME2BUT1ENE	2.05E+06	8.05E+04	3.95E+05	2.53E+06

Table S4: Benelux AVOC and BVOC emissions, in molecules cm^{-2} s^{-1}, mapped from MCMv3.2 species into corresponding CRIv2 species. Emissions were weighted by the carbon numbers of the respective species.

Type	**MCMv3.2 Species**	**CRIv2 Species**	**Belgium**	**Netherlands**	**Luxembourg**	**Total**
Ethyne	C2H2	C2H2	2.78E+09	4.51E+09	3.22E+09	1.05E+10
Benzene	BENZENE	BENZENE	4.52E+09	1.06E+10	5.02E+09	2.01E+10
Toluene	TOLUENE	TOLUENE	5.78E+09	1.22E+10	6.37E+09	2.44E+10
Xylenes	MXYL	MXYL	1.90E+09	3.00E+09	1.88E+09	6.78E+09
	OXYL	OXYL	8.61E+08	1.89E+09	9.66E+08	3.72E+09
	PXYL	PXYL	8.28E+08	1.82E+09	9.08E+08	3.56E+09
Trimethylbenzenes	TM123B	TM123B	4.49E+07	7.36E+07	5.17E+07	1.70E+08
	TM124B	TM124B	1.75E+08	2.89E+08	2.42E+08	7.06E+08
	TM135B	TM135B	5.58E+07	1.03E+08	7.11E+07	2.30E+08
Other Aromatics	EBENZ	EBENZ	3.99E+08	8.28E+08	6.29E+08	1.86E+09
	PBENZ	PBENZ	1.59E+08	4.63E+08	2.31E+08	8.53E+08
	IPBENZ	IPBENZ	7.88E+07	1.04E+08	9.35E+07	2.76E+08
	PETHTOL	PETHTOL	6.03E+07	1.05E+08	1.05E+08	2.70E+08
	METHTOL	METHTOL	6.93E+07	1.14E+08	1.13E+08	2.96E+08
	OETHTOL	OETHTOL	4.19E+07	7.47E+07	7.62E+07	1.93E+08
	DIET35TOL	DIET35TOL	2.45E+08	8.42E+08	3.56E+08	1.44E+09
	DIME35EB	DIME35EB	1.06E+08	1.88E+08	1.09E+08	4.03E+08
	STYRENE	STYRENE	6.01E+07	1.13E+08	1.02E+08	2.75E+08
	BENZAL	BENZAL	4.68E+07	1.61E+08	6.81E+07	2.76E+08
	PHENOL	AROH14	1.86E+07	0.00E+00	5.29E+07	7.15E+07
Formaldehyde	HCHO	HCHO	2.35E+09	3.04E+09	3.38E+09	8.77E+09
Other Aldehydes	CH3CHO	CH3CHO	5.53E+08	8.88E+08	5.35E+08	1.98E+09
	C2H5CHO	C2H5CHO	1.78E+08	1.97E+08	1.74E+08	5.49E+08
	C3H7CHO	C3H7CHO	1.19E+08	6.71E+07	1.06E+08	2.92E+08
	IPRCHO	IPRCHO	9.60E+07	4.57E+07	8.04E+07	2.22E+08
	C4H9CHO	C4H9CHO	4.25E+07	2.45E+06	2.51E+07	7.01E+07
	ACR	UCARB10	8.33E+07	1.35E+08	7.33E+07	2.92E+08
	MACR	UCARB10	5.23E+07	3.01E+06	3.08E+07	8.61E+07
	C4ALDB	UCARB10	7.67E+07	9.70E+07	6.24E+07	2.36E+08
	MGLYOX	CARB6	4.52E+07	2.85E+07	3.36E+07	1.07E+08
Alkadienes and	C4H6	C4H6	4.36E+10	1.34E+11	5.56E+10	2.33E+11
Other Alkynes	C5H8	C5H8	3.35E+09	1.10E+10	0.00E+00	1.44E+10

Table S4: Benelux AVOC and BVOC emissions, in molecules cm^{-2} s^{-1}, mapped from MCMv3.2 species into corresponding CRIv2 species. Emissions were weighted by the carbon numbers of the respective species.

Type	**MCMv3.2 Species**	**CRIv2 Species**	**Belgium**	**Netherlands**	**Luxembourg**	**Total**
Organic Acids	HCOOH	HCOOH	9.28E+08	4.04E+07	4.74E+08	1.44E+09
	CH3CO2H	CH3CO2H	7.55E+08	3.10E+07	4.88E+08	1.27E+09
	PROPACID	PROPACID	5.77E+08	2.51E+07	2.95E+08	8.97E+08
	ACO2H	PROPACID	3.64E+07	0.00E+00	1.04E+08	1.40E+08
Alcohols	CH3OH	CH3OH	2.20E+09	2.40E+09	1.85E+09	6.45E+09
	C2H5OH	C2H5OH	3.30E+09	2.51E+09	2.58E+09	8.39E+09
	NPROPOL	NPROPOL	2.06E+08	2.00E+08	1.55E+08	5.61E+08
	IPROPOL	IPROPOL	3.08E+08	3.19E+08	2.46E+08	8.73E+08
	NBUTOL	NBUTOL	1.91E+08	1.94E+08	1.49E+08	5.34E+08
	BUT2OL	BUT2OL	1.41E+08	1.30E+08	1.02E+08	3.73E+08
	IBUTOL	IBUTOL	8.97E+07	8.09E+07	6.22E+07	2.33E+08
	TBUTOL	TBUTOL	1.74E+07	0.00E+00	8.97E+04	1.75E+07
	PECOH	PECOH	1.47E+07	0.00E+00	7.54E+04	1.48E+07
	IPEAOH	IPEAOH	1.47E+07	0.00E+00	7.54E+04	1.48E+07
	ME3BUOL	ME3BUOL	1.47E+07	0.00E+00	7.54E+04	1.48E+07
	IPECOH	IPECOH	1.47E+07	0.00E+00	7.54E+04	1.48E+07
	IPEBOH	IPEBOH	1.47E+07	0.00E+00	7.54E+04	1.48E+07
	CYHEXOL	CYHEXOL	1.29E+07	0.00E+00	6.64E+04	1.30E+07
	MIBKAOH	MIBKAOH	4.80E+07	4.13E+07	3.18E+07	1.21E+08
	ETHGLY	ETHGLY	7.26E+07	5.80E+07	4.46E+07	1.75E+08
	PROPGLY	PROPGLY	1.20E+08	1.16E+08	8.88E+07	3.25E+08
	C6H5CH2OH	BENZAL	2.31E+07	2.59E+07	1.99E+07	6.89E+07
	MBO	PENT1ENE	1.50E+07	0.00E+00	7.72E+04	1.51E+07
Ketones	CH3COCH3	CH3COCH3	2.67E+09	2.75E+09	2.54E+09	7.96E+09
	MEK	MEK	1.11E+09	1.20E+09	9.26E+08	3.24E+09
	MPRK	MPRK	8.03E+06	3.75E+05	3.30E+06	1.17E+07
	DIEK	DIEK	8.03E+06	3.75E+05	3.30E+06	1.17E+07
	MIPK	MIPK	8.03E+06	3.75E+05	3.30E+06	1.17E+07
	HEX2ONE	HEX2ONE	6.90E+06	3.22E+05	2.84E+06	1.01E+07
	HEX3ONE	HEX3ONE	6.90E+06	3.22E+05	2.84E+06	1.01E+07
	MIBK	MIBK	6.67E+08	7.17E+08	5.56E+08	1.94E+09
	MTBK	MTBK	6.90E+06	3.22E+05	2.84E+06	1.01E+07
	CYHEXONE	CYHEXONE	6.99E+07	5.89E+07	7.34E+07	2.02E+08

Table S4: Benelux AVOC and BVOC emissions, in molecules cm^{-2} s^{-1}, mapped from MCMv3.2 species into corresponding CRIv2 species. Emissions were weighted by the carbon numbers of the respective species.

Type	**MCMv3.2 Species**	**CRIv2 Species**	**Belgium**	**Netherlands**	**Luxembourg**	**Total**
Ethers	CH3OCH3	CH3OCH3	3.59E+08	9.30E+07	1.07E+08	5.59E+08
	DIETETHER	DIETETHER	1.11E+08	1.46E+06	1.99E+07	1.32E+08
	MTBE	MTBE	1.76E+07	1.23E+06	1.35E+07	3.23E+07
	DIIPRETHER	DIIPRETHER	9.56E+07	1.06E+06	1.93E+07	1.16E+08
	ETBE	ETBE	1.52E+07	1.06E+06	1.16E+07	2.79E+07
	MO2EOL	MO2EOL	1.21E+08	1.11E+08	1.01E+08	3.33E+08
	EOX2EOL	EOX2EOL	1.02E+08	9.39E+07	8.56E+07	2.82E+08
	PR2OHMOX	PR2OHMOX	1.87E+08	1.87E+08	1.58E+08	5.32E+08
	BUOX2ETOH	BUOX2ETOH	8.27E+08	8.90E+08	7.05E+08	2.42E+09
	BOX2PROL	BOX2PROL	1.17E+07	8.20E+05	8.99E+06	2.15E+07
Chlorinated Hydrocarbons	CH2CL2	C2H2	4.17E+08	2.04E+08	5.12E+08	1.13E+09
	CH3CH2CL	C2H2	1.36E+08	0.00E+00	3.86E+08	5.22E+08
	CH3CCL3	C2H2	4.61E+08	2.86E+08	3.67E+08	1.11E+09
	TRICLETH	C2H4	1.11E+09	6.46E+08	1.02E+09	2.78E+09
	CDICLETH	C2H4	4.58E+07	0.00E+00	1.29E+08	1.75E+08
	TDICLETH	C2H4	4.56E+07	0.00E+00	1.29E+08	1.75E+08
	CH3CL	C2H2	6.93E+07	0.00E+00	1.97E+08	2.66E+08
	CCL2CH2	C2H4	4.51E+07	0.00E+00	1.28E+08	1.73E+08
	CHCL2CH3	C2H2	5.35E+05	0.00E+00	1.80E+05	7.15E+05
	VINCL	C2H4	4.20E+07	0.00E+00	1.20E+08	1.62E+08
	TCE	C2H4	2.64E+08	1.57E+08	2.32E+08	6.53E+08
	CHCL3	C2H4	1.47E+07	0.00E+00	4.17E+07	5.64E+07
Esters	METHACET	METHACET	6.18E+07	0.00E+00	2.67E+06	6.45E+07
	ETHACET	ETHACET	1.48E+09	1.68E+09	1.29E+09	4.45E+09
	NBUTACET	NBUTACET	1.03E+09	1.18E+09	9.03E+08	3.11E+09
	IPROACET	IPROACET	3.63E+08	4.14E+08	3.18E+08	1.10E+09
	CH3OCHO	CH3OCHO	6.93E+06	0.00E+00	2.99E+05	7.23E+06
	NPROACET	NPROACET	1.42E+08	1.55E+08	1.21E+08	4.18E+08
Terpenes	APINENE	APINENE	4.22E+08	1.27E+09	1.47E+08	1.84E+09
	BPINENE	BPINENE	4.22E+08	1.27E+09	1.47E+08	1.84E+09
	LIMONENE	APINENE	4.96E+08	1.34E+09	2.10E+08	2.05E+09
Total			5.15E+11	1.25E+12	5.64E+11	2.32E+12

Table S5: Benelux AVOC and BVOC emissions, in molecules cm^{-2} s^{-1}, mapped from MCMv3.2 species into corresponding MOZART-4 species. Emissions were weighted by the carbon numbers of the respective species.

Type	**MCMv3.2 Species**	**MOZART-4 Species**	**Belgium**	**Netherlands**	**Luxembourg**	**Total**
Ethane	C2H6	C2H6	4.91E+09	8.58E+08	7.96E+09	1.37E+10
Propane	C3H8	C3H8	3.35E+10	4.00E+10	3.94E+10	1.13E+11
Butanes	NC4H10	BIGALK	1.00E+11	2.79E+11	1.17E+11	4.96E+11
	IC4H10	BIGALK	2.42E+10	6.80E+10	2.85E+10	1.21E+11
Pentanes	NC5H12	BIGALK	8.89E+10	2.65E+11	1.05E+11	4.59E+11
	IC5H12	BIGALK	5.33E+10	1.60E+11	6.29E+10	2.76E+11
	NEOP	BIGALK	1.11E+07	0.00E+00	3.79E+06	1.49E+07
Hexane and Higher Alkanes	NC6H14	BIGALK	1.82E+10	4.92E+10	2.18E+10	8.92E+10
	M2PE	BIGALK	2.87E+09	7.54E+09	3.41E+09	1.38E+10
	M3PE	BIGALK	1.61E+09	3.94E+09	1.89E+09	7.44E+09
	NC7H16	BIGALK	2.02E+10	5.77E+10	2.39E+10	1.02E+11
	M2HEX	BIGALK	3.83E+08	6.84E+08	4.44E+08	1.51E+09
	M3HEX	BIGALK	3.31E+08	5.45E+08	3.63E+08	1.24E+09
	M22C4	BIGALK	4.16E+07	6.34E+07	6.51E+07	1.70E+08
	M23C4	BIGALK	4.16E+07	6.34E+07	6.51E+07	1.70E+08
	NC8H18	BIGALK	1.67E+10	4.89E+10	1.97E+10	8.53E+10
	NC9H20	BIGALK	1.99E+09	1.93E+09	1.76E+09	5.68E+09
	NC10H22	BIGALK	4.31E+09	4.42E+09	3.78E+09	1.25E+10
	NC11H24	BIGALK	1.97E+09	2.04E+09	1.75E+09	5.76E+09
	NC12H26	BIGALK	7.37E+08	2.13E+09	1.06E+09	3.93E+09
	CHEX	BIGALK	3.49E+08	2.93E+08	3.36E+08	9.78E+08
Ethene	C2H4	C2H4	3.66E+10	7.03E+09	8.25E+09	5.19E+10
Propene	C3H6	C3H6	1.82E+09	1.68E+09	1.68E+09	5.18E+09
Higher Alkenes	HEX1ENE	BIGENE	5.13E+07	7.55E+05	3.60E+07	8.81E+07
	BUT1ENE	BIGENE	9.99E+07	7.04E+05	1.86E+08	2.87E+08
	MEPROPENE	BIGENE	9.80E+06	0.00E+00	2.46E+06	1.23E+07
	TBUT2ENE	BIGENE	9.80E+06	0.00E+00	2.46E+06	1.23E+07
	CBUT2ENE	BIGENE	9.80E+06	0.00E+00	2.46E+06	1.23E+07
	CPENT2ENE	BIGENE	1.20E+07	2.77E+05	2.58E+06	1.49E+07
	TPENT2ENE	BIGENE	1.20E+07	2.77E+05	2.58E+06	1.49E+07
	PENT1ENE	BIGENE	3.34E+07	2.52E+05	6.47E+06	4.01E+07
	ME2BUT2ENE	BIGENE	1.37E+07	1.51E+05	3.20E+06	1.71E+07
	ME3BUT1ENE	BIGENE	1.37E+07	1.51E+05	3.20E+06	1.71E+07
	ME2BUT1ENE	BIGENE	2.57E+06	1.01E+05	4.93E+05	3.16E+06

Table S5: Benelux AVOC and BVOC emissions, in molecules cm^{-2} s^{-1}, mapped from MCMv3.2 species into corresponding MOZART-4 species. Emissions were weighted by the carbon numbers of the respective species.

Type	**MCMv3.2 Species**	**MOZART-4 Species**	**Belgium**	**Netherlands**	**Luxembourg**	**Total**
Ethyne	C2H2	C2H2	2.78E+09	4.51E+09	3.22E+09	1.05E+10
Benzene	BENZENE	TOLUENE	3.87E+09	9.05E+09	4.30E+09	1.72E+10
Toluene	TOLUENE	TOLUENE	5.78E+09	1.22E+10	6.37E+09	2.44E+10
Xylenes	MXYL	TOLUENE	2.17E+09	3.43E+09	2.14E+09	7.74E+09
	OXYL	TOLUENE	9.85E+08	2.16E+09	1.10E+09	4.25E+09
	PXYL	TOLUENE	9.46E+08	2.08E+09	1.04E+09	4.07E+09
Trimethylbenzenes	TM123B	TOLUENE	5.78E+07	9.47E+07	6.65E+07	2.19E+08
	TM124B	TOLUENE	2.25E+08	3.72E+08	3.12E+08	9.09E+08
	TM135B	TOLUENE	7.17E+07	1.32E+08	9.14E+07	2.95E+08
Other Aromatics	EBENZ	TOLUENE	4.57E+08	9.46E+08	7.19E+08	2.12E+09
	PBENZ	TOLUENE	2.04E+08	5.95E+08	2.97E+08	1.10E+09
	IPBENZ	TOLUENE	1.01E+08	1.34E+08	1.20E+08	3.55E+08
	PETHTOL	TOLUENE	7.76E+07	1.34E+08	1.36E+08	3.48E+08
	METHTOL	TOLUENE	8.90E+07	1.47E+08	1.45E+08	3.81E+08
	OETHTOL	TOLUENE	5.39E+07	9.61E+07	9.80E+07	2.48E+08
	DIET35TOL	TOLUENE	3.84E+08	1.32E+09	5.60E+08	2.26E+09
	DIME35EB	TOLUENE	1.52E+08	2.68E+08	1.56E+08	5.76E+08
	STYRENE	TOLUENE	7.72E+07	1.45E+08	1.31E+08	3.53E+08
	BENZAL	TOLUENE	6.01E+07	2.07E+08	8.76E+07	3.55E+08
	PHENOL	TOLUENE	1.59E+07	0.00E+00	4.54E+07	6.13E+07
Formaldehyde	HCHO	CH2O	2.35E+09	3.04E+09	3.38E+09	8.77E+09
Other Aldehydes	CH3CHO	CH3CHO	5.53E+08	8.88E+08	5.35E+08	1.98E+09
	C2H5CHO	CH3CHO	2.67E+08	2.95E+08	2.61E+08	8.23E+08
	C3H7CHO	CH3CHO	2.37E+08	1.34E+08	2.11E+08	5.82E+08
	IPRCHO	CH3CHO	1.92E+08	9.14E+07	1.61E+08	4.44E+08
	C4H9CHO	CH3CHO	1.06E+08	6.13E+06	6.27E+07	1.75E+08
	ACR	MACR	8.33E+07	1.35E+08	7.33E+07	2.92E+08
	MACR	MACR	5.23E+07	3.01E+06	3.08E+07	8.61E+07
	C4ALDB	MACR	7.67E+07	9.70E+07	6.24E+07	2.36E+08
	MGLYOX	CH3COCHO	4.52E+07	4.28E+07	5.05E+07	1.39E+08
Alkadienes and	C4H6	BIGENE	4.36E+10	1.34E+11	4.45E+10	2.22E+11
Other Alkynes	C5H8	ISOP	3.35E+09	1.10E+10	0.00E+00	1.44E+10

Table S5: Benelux AVOC and BVOC emissions, in molecules cm^{-2} s^{-1}, mapped from MCMv3.2 species into corresponding MOZART-4 species. Emissions were weighted by the carbon numbers of the respective species.

Type	**MCMv3.2 Species**	**MOZART-4 Species**	**Belgium**	**Netherlands**	**Luxembourg**	**Total**
Organic Acids	HCOOH	HCOOH	9.28E+08	4.04E+07	4.74E+08	1.44E+09
	CH3CO2H	CH3COOH	7.55E+08	3.10E+07	4.88E+08	1.27E+09
	PROPACID	CH3COOH	8.65E+08	3.77E+07	4.42E+08	1.34E+09
	ACO2H	CH3COOH	5.46E+07	0.00E+00	1.56E+08	2.11E+08
Alcohols	CH3OH	CH3OH	2.20E+09	2.40E+09	1.85E+09	6.45E+09
	C2H5OH	C2H5OH	3.30E+09	2.51E+09	2.58E+09	8.39E+09
	NPROPOL	C2H5OH	3.08E+08	3.00E+08	2.33E+08	8.41E+08
	IPROPOL	C2H5OH	4.61E+08	4.79E+08	3.69E+08	1.31E+09
	NBUTOL	C2H5OH	3.82E+08	3.89E+08	2.98E+08	1.07E+09
	BUT2OL	C2H5OH	2.82E+08	2.59E+08	2.04E+08	7.45E+08
	IBUTOL	C2H5OH	1.79E+08	1.62E+08	1.24E+08	4.65E+08
	TBUTOL	C2H5OH	3.48E+07	0.00E+00	1.79E+05	3.50E+07
	PECOH	C2H5OH	3.66E+07	0.00E+00	1.88E+05	3.68E+07
	IPEAOH	C2H5OH	3.66E+07	0.00E+00	1.88E+05	3.68E+07
	ME3BUOL	C2H5OH	3.66E+07	0.00E+00	1.88E+05	3.68E+07
	IPECOH	C2H5OH	3.66E+07	0.00E+00	1.88E+05	3.68E+07
	IPEBOH	C2H5OH	3.66E+07	0.00E+00	1.88E+05	3.68E+07
	CYHEXOL	C2H5OH	3.87E+07	0.00E+00	1.99E+05	3.89E+07
	MIBKAOH	C2H5OH	1.44E+08	1.24E+08	9.53E+07	3.63E+08
	ETHGLY	C2H5OH	7.26E+07	5.80E+07	4.46E+07	1.75E+08
	PROPGLY	C2H5OH	1.80E+08	1.73E+08	1.33E+08	4.86E+08
	C6H5CH2OH	C2H5OH	1.04E+08	1.17E+08	8.94E+07	3.10E+08
	MBO	C2H5OH	3.75E+07	0.00E+00	1.93E+05	3.77E+07
Ketones	CH3COCH3	CH3COCH3	2.67E+09	2.75E+09	2.54E+09	7.96E+09
	MEK	MEK	1.11E+09	1.20E+09	9.26E+08	3.24E+09
	MPRK	MEK	1.00E+07	4.69E+05	4.12E+06	1.46E+07
	DIEK	MEK	1.00E+07	4.69E+05	4.12E+06	1.46E+07
	MIPK	MEK	1.00E+07	4.69E+05	4.12E+06	1.46E+07
	HEX2ONE	MEK	1.04E+07	4.84E+05	4.25E+06	1.51E+07
	HEX3ONE	MEK	1.04E+07	4.84E+05	4.25E+06	1.51E+07
	MIBK	MEK	1.00E+09	1.08E+09	8.34E+08	2.91E+09
	MTBK	MEK	1.04E+07	4.84E+05	4.25E+06	1.51E+07
	CYHEXONE	MEK	1.05E+08	8.83E+07	1.10E+08	3.03E+08

Table S5: Benelux AVOC and BVOC emissions, in molecules cm^{-2} s^{-1}, mapped from MCMv3.2 species into corresponding MOZART-4 species. Emissions were weighted by the carbon numbers of the respective species.

Type	MCMv3.2 Species	MOZART-4 Species	Belgium	Netherlands	Luxembourg	Total
Ethers	CH3OCH3	BIGALK	1.44E+08	3.72E+07	1.47E+08	3.28E+08
	DIETETHER	BIGALK	8.92E+07	1.17E+06	1.47E+08	2.37E+08
	MTBE	BIGALK	1.76E+07	1.23E+06	2.10E+08	2.29E+08
	DIIPRETHER	BIGALK	1.15E+08	1.27E+06	1.60E+06	1.18E+08
	ETBE	BIGALK	1.82E+07	1.27E+06	1.03E+09	1.05E+09
	MO2EOL	BIGALK	7.25E+07	6.67E+07	1.08E+09	1.22E+09
	EOX2EOL	BIGALK	8.16E+07	7.51E+07	3.18E+08	4.75E+08
	PR2OHMOX	BIGALK	1.49E+08	1.49E+08	2.99E+05	2.98E+08
	BUOX2ETOH	BIGALK	9.92E+08	1.07E+09	1.21E+08	2.18E+09
	BOX2PROL	BIGALK	1.64E+07	1.15E+06	4.28E+07	6.04E+07
Chlorinated Hydrocarbons	CH2CL2	BIGALK	1.67E+08	8.16E+07	1.60E+07	2.65E+08
	CH3CH2CL	BIGALK	5.42E+07	0.00E+00	1.35E+07	6.77E+07
	CH3CCL3	BIGALK	1.84E+08	1.14E+08	2.32E+07	3.21E+08
	TRICLETH	BIGALK	4.43E+08	2.58E+08	1.40E+07	7.15E+08
	CDICLETH	BIGALK	1.83E+07	0.00E+00	6.08E+07	7.91E+07
	TDICLETH	BIGALK	1.82E+07	0.00E+00	6.85E+07	8.67E+07
	CH3CL	BIGALK	2.77E+07	0.00E+00	1.26E+08	1.54E+08
	CCL2CH2	BIGALK	1.80E+07	0.00E+00	8.46E+08	8.64E+08
	CHCL2CH3	BIGALK	2.14E+05	0.00E+00	1.26E+07	1.28E+07
	VINCL	BIGALK	1.68E+07	0.00E+00	2.05E+08	2.22E+08
	TCE	BIGALK	1.06E+08	6.27E+07	1.54E+08	3.23E+08
	CHCL3	BIGALK	5.86E+06	0.00E+00	1.47E+08	1.53E+08
Esters	METHACET	BIGALK	3.71E+07	0.00E+00	4.08E+08	4.45E+08
	ETHACET	BIGALK	1.18E+09	1.35E+09	5.15E+07	2.58E+09
	NBUTACET	BIGALK	1.24E+09	1.41E+09	5.15E+07	2.70E+09
	IPROACET	BIGALK	3.63E+08	4.14E+08	7.90E+07	8.56E+08
	CH3OCHO	BIGALK	6.93E+06	0.00E+00	5.14E+07	5.83E+07
	NPROACET	BIGALK	1.42E+08	1.55E+08	7.22E+04	2.97E+08
Terpenes	APINENE	C10H16	4.22E+08	1.27E+09	4.78E+07	1.74E+09
	BPINENE	C10H16	4.22E+08	1.27E+09	9.26E+07	1.78E+09
	LIMONENE	C10H16	4.96E+08	1.34E+09	1.67E+07	1.85E+09
Total			5.05E+11	1.21E+12	5.39E+11	2.25E+12

Table S6: Benelux AVOC and BVOC emissions, in molecules cm^{-2} s^{-1}, mapped from MCMv3.2 species into corresponding RADM2 species. Emissions were weighted by the carbon numbers of the respective species.

Type	**MCMv3.2 Species**	**RADM2 Species**	**Belgium**	**Netherlands**	**Luxembourg**	**Total**
Ethane	C2H6	ETH	4.91E+09	8.58E+08	7.96E+09	1.37E+10
Propane	C3H8	HC3	3.47E+10	4.13E+10	4.08E+10	1.17E+11
Butanes	NC4H10	HC3	1.73E+11	4.81E+11	2.02E+11	8.56E+11
	IC4H10	HC3	4.18E+10	1.17E+11	4.91E+10	2.08E+11
Pentanes	NC5H12	HC5	9.26E+10	2.76E+11	1.09E+11	4.78E+11
	IC5H12	HC5	5.55E+10	1.66E+11	6.55E+10	2.87E+11
	NEOP	HC3	1.91E+07	0.00E+00	6.54E+06	2.56E+07
Hexane and Higher Alkanes	NC6H14	HC5	1.89E+10	5.12E+10	2.28E+10	9.29E+10
	M2PE	HC5	2.99E+09	7.85E+09	3.55E+09	1.44E+10
	M3PE	HC5	1.67E+09	4.11E+09	1.97E+09	7.75E+09
	NC7H16	HC5	2.11E+10	6.01E+10	2.49E+10	1.06E+11
	M2HEX	HC8	2.42E+08	4.33E+08	2.81E+08	9.56E+08
	M3HEX	HC8	2.10E+08	3.45E+08	2.30E+08	7.85E+08
	M22C4	HC3	7.18E+07	1.09E+08	1.12E+08	2.93E+08
	M23C4	HC5	4.34E+07	6.61E+07	6.78E+07	1.77E+08
	NC8H18	HC8	1.06E+10	3.10E+10	1.25E+10	5.41E+10
	NC9H20	HC8	1.26E+09	1.22E+09	1.11E+09	3.59E+09
	NC10H22	HC8	2.73E+09	2.80E+09	2.39E+09	7.92E+09
	NC11H24	HC8	1.25E+09	1.29E+09	1.11E+09	3.65E+09
	NC12H26	HC8	4.66E+08	1.35E+09	6.71E+08	2.49E+09
	CHEX	HC8	2.21E+08	1.85E+08	2.13E+08	6.19E+08
Ethene	C2H4	OL2	3.66E+10	7.03E+09	8.25E+09	5.19E+10
Propene	C3H6	OLT	1.43E+09	1.32E+09	1.32E+09	4.07E+09
Higher Alkenes	HEX1ENE	OLT	5.40E+07	7.94E+05	3.79E+07	9.27E+07
	BUT1ENE	OLT	1.05E+08	7.41E+05	1.96E+08	3.02E+08
	MEPROPENE	OLI	8.17E+06	0.00E+00	2.05E+06	1.02E+07
	TBUT2ENE	OLI	8.17E+06	0.00E+00	2.05E+06	1.02E+07
	CBUT2ENE	OLI	8.17E+06	0.00E+00	2.05E+06	1.02E+07
	CPENT2ENE	OLI	9.97E+06	2.31E+05	2.15E+06	1.24E+07
	TPENT2ENE	OLI	9.97E+06	2.31E+05	2.15E+06	1.24E+07
	PENT1ENE	OLT	3.52E+07	2.65E+05	6.81E+06	4.23E+07
	ME2BUT2ENE	OLI	1.14E+07	1.26E+05	2.66E+06	1.42E+07
	ME3BUT1ENE	OLT	1.44E+07	1.59E+05	3.36E+06	1.79E+07
	ME2BUT1ENE	OLI	2.14E+06	8.39E+04	4.11E+05	2.63E+06

Table S6: Benelux AVOC and BVOC emissions, in molecules cm^{-2} s^{-1}, mapped from MCMv3.2 species into corresponding RADM2 species. Emissions were weighted by the carbon numbers of the respective species.

Type	**MCMv3.2 Species**	**RADM2 Species**	**Belgium**	**Netherlands**	**Luxembourg**	**Total**
Ethyne	C2H2	HC3	1.92E+09	3.11E+09	2.22E+09	7.25E+09
Benzene	BENZENE	TOL	3.82E+09	8.93E+09	4.24E+09	1.70E+10
Toluene	TOLUENE	TOL	5.69E+09	1.21E+10	6.28E+09	2.41E+10
Xylenes	MXYL	XYL	1.71E+09	2.69E+09	1.69E+09	6.09E+09
	OXYL	XYL	7.74E+08	1.70E+09	8.68E+08	3.34E+09
	PXYL	XYL	7.44E+08	1.63E+09	8.16E+08	3.19E+09
Trimethylbenzenes	TM123B	XYL	4.54E+07	7.45E+07	5.23E+07	1.72E+08
	TM124B	XYL	1.77E+08	2.93E+08	2.45E+08	7.15E+08
	TM135B	XYL	5.64E+07	1.04E+08	7.19E+07	2.32E+08
Other Aromatics	EBENZ	TOL	4.50E+08	9.33E+08	7.08E+08	2.09E+09
	PBENZ	TOL	2.01E+08	5.86E+08	2.93E+08	1.08E+09
	IPBENZ	TOL	9.99E+07	1.32E+08	1.18E+08	3.50E+08
	PETHTOL	XYL	6.10E+07	1.06E+08	1.07E+08	2.74E+08
	METHTOL	XYL	7.00E+07	1.16E+08	1.14E+08	3.00E+08
	OETHTOL	XYL	4.24E+07	7.56E+07	7.71E+07	1.95E+08
	DIET35TOL	XYL	3.02E+08	1.04E+09	4.41E+08	1.78E+09
	DIME35EB	XYL	1.19E+08	2.11E+08	1.23E+08	4.53E+08
	STYRENE	TOL	7.61E+07	1.43E+08	1.29E+08	3.48E+08
	BENZAL	CSL	6.38E+07	2.20E+08	9.29E+07	3.77E+08
	PHENOL	CSL	1.69E+07	0.00E+00	4.81E+07	6.50E+07
Formaldehyde	HCHO	HCHO	2.35E+09	3.04E+09	3.38E+09	8.77E+09
Other Aldehydes	CH3CHO	ALD	4.61E+08	7.40E+08	4.46E+08	1.65E+09
	C2H5CHO	ALD	2.23E+08	2.46E+08	2.18E+08	6.87E+08
	C3H7CHO	ALD	1.98E+08	1.12E+08	1.76E+08	4.86E+08
	IPRCHO	ALD	1.60E+08	7.62E+07	1.34E+08	3.70E+08
	C4H9CHO	ALD	8.86E+07	5.10E+06	5.23E+07	1.46E+08
	ACR	ALD	1.39E+08	2.25E+08	1.22E+08	4.86E+08
	MACR	ALD	8.71E+07	5.02E+06	5.14E+07	1.44E+08
	C4ALDB	ALD	1.28E+08	1.62E+08	1.04E+08	3.94E+08
	MGLYOX	MGLY	4.52E+07	2.85E+07	3.36E+07	1.07E+08
Alkadienes and	C4H6	OLI	3.64E+10	1.12E+11	4.63E+10	1.95E+11
Other Alkynes	C5H8	ISO	3.35E+09	1.10E+10	0.00E+00	1.44E+10

Table S6: Benelux AVOC and BVOC emissions, in molecules cm^{-2} s^{-1}, mapped from MCMv3.2 species into corresponding RADM2 species. Emissions were weighted by the carbon numbers of the respective species.

Type	**MCMv3.2 Species**	**RADM2 Species**	**Belgium**	**Netherlands**	**Luxembourg**	**Total**
Organic Acids	HCOOH	ORA1	9.28E+08	4.04E+07	4.74E+08	1.44E+09
	CH3CO2H	ORA2	7.55E+08	3.10E+07	4.88E+08	1.27E+09
	PROPACID	ORA2	8.65E+08	3.77E+07	4.42E+08	1.34E+09
	ACO2H	OLT	2.87E+07	0.00E+00	8.19E+07	1.11E+08
Alcohols	CH3OH	HC3	7.59E+08	8.27E+08	6.37E+08	2.22E+09
	C2H5OH	HC3	2.27E+09	1.73E+09	1.78E+09	5.78E+09
	NPROPOL	HC5	1.29E+08	1.25E+08	9.70E+07	3.51E+08
	IPROPOL	HC5	1.92E+08	2.00E+08	1.54E+08	5.46E+08
	NBUTOL	HC8	9.67E+07	9.84E+07	7.55E+07	2.71E+08
	BUT2OL	HC8	7.14E+07	6.56E+07	5.17E+07	1.89E+08
	IBUTOL	HC8	4.54E+07	4.10E+07	3.15E+07	1.18E+08
	TBUTOL	HC3	2.40E+07	0.00E+00	1.24E+05	2.41E+07
	PECOH	HC8	9.27E+06	0.00E+00	4.77E+04	9.32E+06
	IPEAOH	HC8	9.27E+06	0.00E+00	4.77E+04	9.32E+06
	ME3BUOL	HC8	9.27E+06	0.00E+00	4.77E+04	9.32E+06
	IPECOH	HC3	2.53E+07	0.00E+00	1.30E+05	2.54E+07
	IPEBOH	HC8	9.27E+06	0.00E+00	4.77E+04	9.32E+06
	CYHEXOL	HC8	9.79E+06	0.00E+00	5.04E+04	9.84E+06
	MIBKAOH	KET	7.39E+07	6.36E+07	4.89E+07	1.86E+08
	ETHGLY	HC8	1.84E+07	1.47E+07	1.13E+07	4.44E+07
	PROPGLY	HC8	4.57E+07	4.39E+07	3.37E+07	1.23E+08
	C6H5CH2OH	HC8	2.64E+07	2.95E+07	2.26E+07	7.85E+07
	MBO	OLT	1.97E+07	0.00E+00	1.02E+05	1.98E+07
Ketones	CH3COCH3	KET	2.05E+09	2.11E+09	1.95E+09	6.11E+09
	MEK	KET	1.14E+09	1.23E+09	9.49E+08	3.32E+09
	MPRK	KET	1.03E+07	4.81E+05	4.23E+06	1.50E+07
	DIEK	KET	1.03E+07	4.81E+05	4.23E+06	1.50E+07
	MIPK	KET	1.03E+07	4.81E+05	4.23E+06	1.50E+07
	HEX2ONE	HC5	8.63E+06	4.03E+05	3.55E+06	1.26E+07
	HEX3ONE	HC5	8.63E+06	4.03E+05	3.55E+06	1.26E+07
	MIBK	HC5	8.34E+08	8.96E+08	6.95E+08	2.43E+09
	MTBK	KET	1.06E+07	4.96E+05	4.36E+06	1.55E+07
	CYHEXONE	HC5	8.73E+07	7.36E+07	9.18E+07	2.53E+08

Table S6: Benelux AVOC and BVOC emissions, in molecules cm^{-2} s^{-1}, mapped from MCMv3.2 species into corresponding RADM2 species. Emissions were weighted by the carbon numbers of the respective species.

Type	**MCMv3.2 Species**	**RADM2 Species**	**Belgium**	**Netherlands**	**Luxembourg**	**Total**
Ethers	CH3OCH3	HC3	2.48E+08	6.41E+07	7.38E+07	3.86E+08
	DIETETHER	HC8	5.64E+07	7.40E+05	1.01E+07	6.72E+07
	MTBE	HC3	3.03E+07	2.12E+06	2.32E+07	5.56E+07
	DIIPRETHER	HC8	7.26E+07	8.06E+05	1.47E+07	8.81E+07
	ETBE	HC8	1.15E+07	8.06E+05	8.83E+06	2.11E+07
	MO2EOL	HC8	4.59E+07	4.22E+07	3.85E+07	1.27E+08
	EOX2EOL	HC8	5.16E+07	4.75E+07	4.33E+07	1.42E+08
	PR2OHMOX	HC8	9.46E+07	9.45E+07	8.00E+07	2.69E+08
	BUOX2ETOH	HC8	6.28E+08	6.76E+08	5.35E+08	1.84E+09
	BOX2PROL	HC8	1.04E+07	7.26E+05	7.97E+06	1.91E+07
Chlorinated Hydrocarbons	CH2CL2	HC3	2.87E+08	1.41E+08	3.53E+08	7.81E+08
	CH3CH2CL	HC3	9.35E+07	0.00E+00	2.66E+08	3.60E+08
	CH3CCL3	HC3	3.18E+08	1.97E+08	2.53E+08	7.68E+08
	TRICLETH	HC3	7.64E+08	4.45E+08	7.03E+08	1.91E+09
	CDICLETH	HC3	3.16E+07	0.00E+00	8.88E+07	1.20E+08
	TDICLETH	HC3	3.14E+07	0.00E+00	8.87E+07	1.20E+08
	CH3CL	HC3	4.78E+07	0.00E+00	1.36E+08	1.84E+08
	CCL2CH2	HC8	1.14E+07	0.00E+00	3.25E+07	4.39E+07
	CHCL2CH3	HC3	3.69E+05	0.00E+00	1.24E+05	4.93E+05
	VINCL	HC8	1.06E+07	0.00E+00	3.03E+07	4.09E+07
	TCE	HC3	1.82E+08	1.08E+08	1.60E+08	4.50E+08
	CHCL3	HC3	1.01E+07	0.00E+00	2.88E+07	3.89E+07
Esters	METHACET	HC3	6.39E+07	0.00E+00	2.76E+06	6.67E+07
	ETHACET	HC3	2.04E+09	2.32E+09	1.78E+09	6.14E+09
	NBUTACET	HC5	1.29E+09	1.47E+09	1.13E+09	3.89E+09
	IPROACET	HC3	6.26E+08	7.14E+08	5.48E+08	1.89E+09
	CH3OCHO	HC3	1.19E+07	0.00E+00	5.16E+05	1.24E+07
	NPROACET	HC3	2.45E+08	2.68E+08	2.09E+08	7.22E+08
Terpenes	APINENE	OLI	8.78E+08	2.65E+09	3.05E+08	3.83E+09
	BPINENE	OLI	8.78E+08	2.65E+09	3.05E+08	3.83E+09
	LIMONENE	OLI	1.03E+09	2.80E+09	4.38E+08	4.27E+09
Total			5.83E+11	1.44E+12	6.42E+11	2.66E+12

Table S7: Allocation of MCMv3.2 species used to represent NMVOC emissions from Benelux allocated to CB05 species.

Type	**MCMv3.2 Species**	**PAR**	**OLE**	**TOL**	**XYL**	**FORM**	**ALD2**	**ALDX**	**MEOH**	**ETOH**	**FACD**	**AACD**	**ETH**	**ETHA**	**IOLE**	**ISOP**	**TERP**
Ethane	C2H6													1			
Propane	C3H8	2															
Butanes	NC4H10	4															
	IC4H10	4															
Pentanes	NC5H12	5															
	IC5H12	5															
	NEOP	4															
Hexane and Higher Alkanes	NC6H14	6															
	M2PE	6															
	M3PE	6															
	NC7H16	7															
	M2HEX	7															
	M3HEX	7															
	M22C4	5															
	M23C4	6															
	NC8H18	8															
	NC9H20	9															
	NC10H22	10															
	NC11H24	11															
	NC12H26	12															
	CHEX	6															
Ethene	C2H4												1				
Propene	C3H6	1	1														

Table S7: Allocation of MCMv3.2 species used to represent NMVOC emissions from Benelux allocated to CB05 species.

Type	**MCMv3.2 Species**	**PAR**	**OLE**	**TOL**	**XYL**	**FORM**	**ALD2**	**ALDX**	**MEOH**	**ETOH**	**FACD**	**AACD**	**ETH**	**ETHA**	**IOLE**	**ISOP**	**TERP**
Higher Alkenes	HEX1ENE	4	1														
	BUT1ENE	2	1														
	MEPROPENE	3				1											
	TBUT2ENE														1		
	CBUT2ENE														1		
	CPENT2ENE	1													1		
	TPENT2ENE	1													1		
	PENT1ENE	3	1														
	ME2BUT2ENE	3					1										
	ME3BUT1ENE	3	1														
	ME2BUT1ENE	4				1											
Ethyne	C2H2	1															
Benzene	BENZENE	1															
Toluene	TOLUENE			1													
Xylenes	MXYL				1												
	OXYL				1												
	PXYL				1												
Trimethylbenzenes	TM123B	1			1												
	TM124B	1			1												
	TM135B	1			1												

Table S7: Allocation of MCMv3.2 species used to represent NMVOC emissions from Benelux allocated to CB05 species.

Type	MCMv3.2 Species	PAR	OLE	TOL	XYL	FORM	ALD2	ALDX	MEOH	ETOH	FACD	AACD	ETH	ETHA	IOLE	ISOP	TERP
Other Aromatics	EBENZ	1		1													
	PBENZ	2		1													
	IPBENZ	2		1													
	PETHTOL	1			1												
	METHTOL	1			1												
	OETHTOL	1			1												
	DIET35TOL	3			1												
	DIME35EB	2			1												
	STYRENE		1	1													
	BENZAL			1													
	PHENOL	1															
Formaldehyde	HCHO					1											
Other Aldehydes	CH3CHO						1										
	C2H5CHO	1						1									
	C3H7CHO	2						1									
	IPRCHO	2						1									
	C4H9CHO	3						1									
	ACR		1					1									
	MACR	1	1					1									
	C4ALDB		1					1									
	MGLYOX					1		1									
Alkadienes and Other Alkynes	C4H6		2														
	C5H8															1	
Organic Acids	HCOOH										1						
	CH3CO2H											1					
	PROPACID	1										1					

Table S7: Allocation of MCMv3.2 species used to represent NMVOC emissions from Benelux allocated to CB05 species.

Type	MCMv3.2 Species	PAR	OLE	TOL	XYL	FORM	ALD2	ALDX	MEOH	ETOH	FACD	AACD	ETH	ETHA	IOLE	ISOP	TERP
	ACO2H		1														
Alcohols	CH3OH								1								
	C2H5OH									1							
	NPROPOL	3															
	IPROPOL	3															
	NBUTOL	4															
	BUT2OL	4															
	IBUTOL	4															
	TBUTOL	3															
	PECOH	5															
	IPEAOH	5															
	ME3BUOL	5															
	IPECOH	5															
	IPEBOH	5															
	CYHEXOL	6															
	MIBKAOH	6															
	ETHGLY	2															
	PROPGLY	3															
	C6H5CH2OH			1													
	MBO	3	1														
Ketones	CH3COCH3	3															
	MEK	4															
	MPRK	5															
	DIEK	5															
	MIPK	5															
	HEX2ONE	6															

Table S7: Allocation of MCMv3.2 species used to represent NMVOC emissions from Benelux allocated to CB05 species.

Type	MCMv3.2 Species	PAR	OLE	TOL	XYL	FORM	ALD2	ALDX	MEOH	ETOH	FACD	AACD	ETH	ETHA	IOLE	ISOP	TERP
	HEX3ONE	6															
	MIBK	6															
	MTBK	6															
	CYHEXONE	6															
Ethers	CH3OCH3	2															
	DIETETHER	4															
	MTBE	4															
	DIIPRETHER	6															
	ETBE	3															
	MO2EOL	3															
	EOX2EOL	4															
	PR2OHMOX	2															
	BUOX2ETOH	6															
	BOX2PROL	7															
Chlorinated Hydrocarbons	CH2CL2																
	CH3CH2CL																
	CH3CCL3																
	TRICLETH												1				
	CDICLETH																
	TDICLETH																
	CH3CL																
	CCL2CH2																
	CHCL2CH3																
	VINCL												1				
	TCE																
	CHCL3																

Table S7: Allocation of MCMv3.2 species used to represent NMVOC emissions from Benelux allocated to CB05 species.

Type	**MCMv3.2 Species**	**PAR**	**OLE**	**TOL**	**XYL**	**FORM**	**ALD2**	**ALDX**	**MEOH**	**ETOH**	**FACD**	**AACD**	**ETH**	**ETHA**	**IOLE**	**ISOP**	**TERP**
Esters	METHACET	2															
	ETHACET	3															
	NBUTACET	5															
	IPROACET	4															
	CH3OCHO	1															
	NPROACET	4															
Terpenes	APINENE																1
	BPINENE																1
	LIMONENE																1

Table S8: Benelux emissions of AVOC and BVOC species in CB05. Emissions are in molecules cm^{-2} s^{-1} and determined by multiplying the MCMv3.2 emissions from Tables S1–S3 by the allocated number of CB05 species from Table S7.

CB05 Species	**Belgium**	**Luxembourg**	**Netherlands**	**Total**
PAR	1.80E+12	4.90E+12	2.10E+12	8.80E+12
OLE	8.96E+10	2.70E+11	1.13E+11	4.73E+11
TOL	6.55E+09	1.39E+10	7.51E+09	2.80E+10
XYL	4.39E+09	8.50E+09	4.87E+09	1.78E+10
FORM	2.41E+09	3.09E+09	3.44E+09	8.94E+09
ALD2	5.64E+08	8.88E+08	5.37E+08	1.99E+09
ALDX	7.21E+08	6.35E+08	6.27E+08	1.98E+09
MEOH	2.20E+09	2.40E+09	1.85E+09	6.45E+09
ETOH	3.30E+09	2.51E+09	2.58E+09	8.39E+09
FACD	9.28E+08	4.04E+07	4.74E+08	1.44E+09
AACD	1.33E+09	5.61E+07	7.83E+08	2.17E+09
ETH	3.78E+10	7.68E+09	9.39E+09	5.49E+10
ETHA	4.91E+09	8.58E+08	7.96E+09	1.37E+10
IOLE	3.87E+07	4.43E+05	9.05E+06	4.82E+07
ISOP	3.35E+09	1.10E+10	0.00E+00	1.44E+10
TERP	1.34E+09	3.89E+09	5.03E+08	5.73E+09
Total	1.96E+12	5.23E+12	2.25E+12	9.44E+12

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