

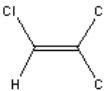
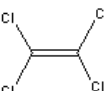
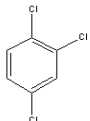
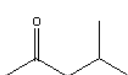
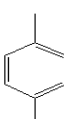
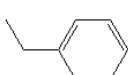
Table S1: SS-IMS operating conditions summary.

Parameter	Settings	
Total IMS length	11.3	cm
Drift tube length	6.96	cm
Voltage at front of tube	3989 ± 14	V
Gate voltage	3064 ± 36	V
Aperture (last ring) voltage	121	V
Drift tube pressure	698 ± 5	Torr
Drift gas temperature	22.7 ± 1.2	°C
Carrier flow	10	mL min ⁻¹
Drift flow	200	mL min ⁻¹
Gases	Air & nitrogen	
IMS gate pulse frequency	40	Hz
IMS scan time	25	ms
IMS gate pulse width	200	µs

Table S2: Chemical names, CAS numbers, molecular weight, density (25 °C) and vapor pressure (20 °C) of VOCs investigated.

Compound (CAS)	MWt / g mol ⁻¹	Density (g cm ⁻³)	Vapor Pressure (atm.)
2,4-lutidine (108-47-4)	107.15	0.927	n/a
TCE (79-01-6)	131.39	1.463	0.0803
PCE (127-18-4)	165.83	1.623	0.0171
DCM (75-09-2)	84.93	1.325	0.4648
DCE (107-06-2)	98.96	1.256	0.1145
Chloroform (63-66-3)	119.38	1.498	0.2092
1,2,4-TCB (120-82-1)	181.45	1.463	
MTBE (1634-04-4)	88.15	0.74	0.2756
MIBK (108-10-1)	100.16	0.801	0.0217
Acetone (67-64-1)	58.08	0.791	0.2421
Toluene (108-88-3)	92.14	0.865	0.0289
p-Xylene (95-47-6)	106.17	0.879	0.0092
Ethylbenzene (100-41-4)	106.17	0.867	0.0132

Table S3: Chemical structures of environmental contaminants.

Name	Chemical Structure	Molecular Formula
2,4-lutidine		C ₇ H ₉ N
Trichloroethylene (TCE)		C ₂ HCl ₃
Tetrachloroethylene (PCE)		C ₂ Cl ₄
Dichloromethane (DCM)		CH ₂ Cl ₂
1,2-dichloroethane (DCE)		C ₂ H ₄ Cl ₂
Chloroform		CHCl ₃
1,2,4-trichlorobenzene (1,2,4-TCB)		C ₆ H ₃ Cl ₃
MTBE		C ₅ H ₁₂ O
MIBK		C ₆ H ₁₂ O
Acetone		C ₃ H ₆ O
Toluene		C ₇ H ₈
p-xylene		C ₈ H ₁₀
Ethylbenzene		C ₈ H ₁₀

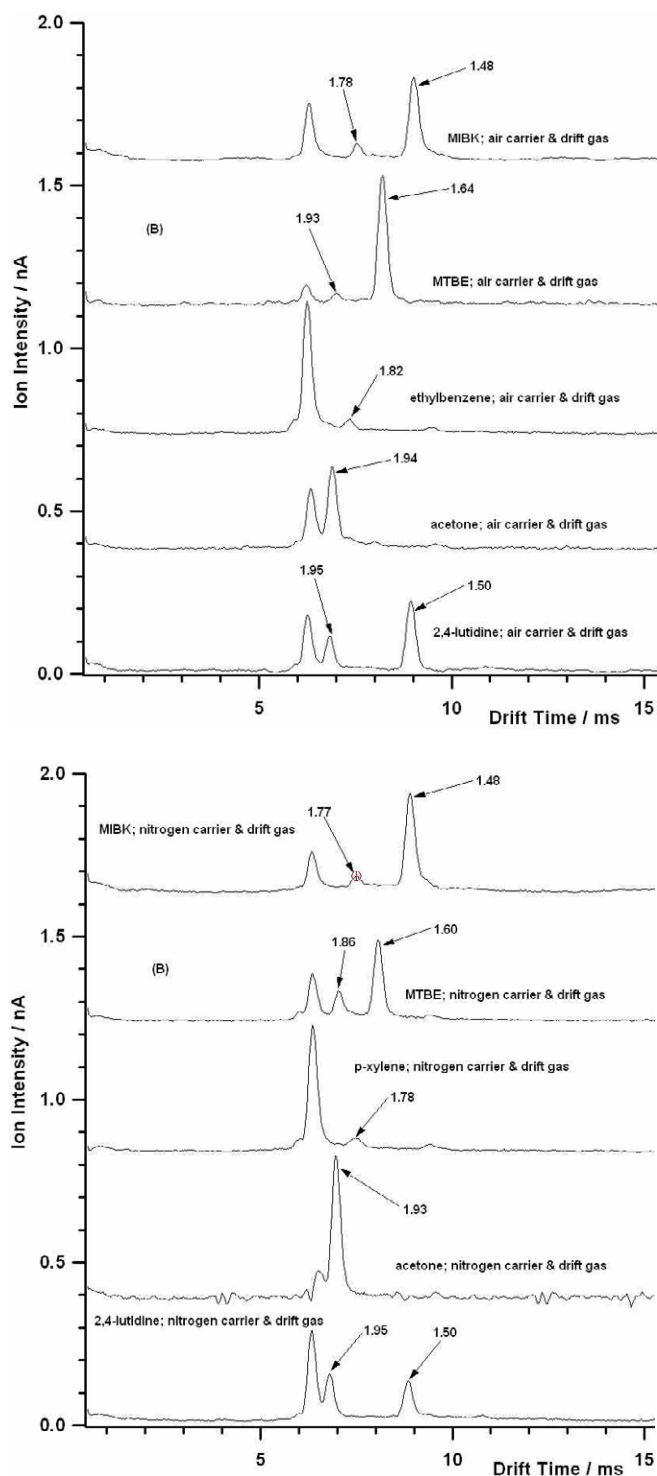


Figure S1: Ion mobility spectra for individual responses of environmental contaminants in the positive ion mode using air (top) and nitrogen (bottom) as drift and carrier gas. The data show that the individual responses can be detected in the positive ion mode with the SS-IMS. The reduced mobility compared well to literature values. In the top plot acetone, ethylbenzene, MTBE and MIBK were offset by 0.4, 0.7, 1.1 and 1.6 nA, respectively. In the bottom plot acetone, p-xylene, MTBE and MIBK were offset by 0.4, 0.8, 1.2 and 1.7 nA, respectively.