

Instrument	Operating principle	Species measured	Time resolution	Detection limits	Inlet setup	Reference
PTR-ToF	Chemical ionization mass spectrometry; H_3O^+ reagent ions	Polar and unsaturated NMOG (several hundred)	2 Hz	20 pptv (acrylonitrile) to 2.6 ppb (H_2S) at 1 Hz resolution	Stack: from sampling platform, 16 m long Room: from 3 m above combustion chamber floor, 7 m long Both: 1/2" OD PFA inlet, 40 °C, flow rate 100 lpm; subsample 500 sccm through PEEK capillary	Yuan et al. (2016)
NO^+ -CIMS	Chemical ionization mass spectrometry; NO^+ reagent ions	Saturated, unsaturated, and polar NMOG (several hundred)	2 Hz	20 pptv (aromatics) to 19 ppb (methanol) at 1 Hz resolution	Same as PTR-ToF	Koss et al. (2016)
GC-EI-MS	Gas chromatographic (GC) separation with electron-ionization quadrupole mass spectrometry (EI-MS)	NMOG (several hundred)	4 min sample (240 sccm) every 20 min	< 5 pptv (most species) for 4 min sample	Stack: from sampling platform, 16 m long, 1/2" OD PFA inlet, flow rate 20 lpm Room: from 3 m above combustion chamber floor, 7 m long, 1/4" OD PFA, flow rate 2–7 lpm Both: dynamically diluted with UHP N_2	Lerner et al. (2017)
GC-CIMS	Gas chromatographic separation with chemical ionization mass spectrometry (CIMS)	Polar and unsaturated NMOG (several hundred)	4 min sample every 20 min	qualitative measurement only	Same as GC-EI-MS	(this work)
OP-FTIR	Open-path FTIR absorption spectroscopy	Small organic and inorganic trace gases (about 20)	0.73 Hz	1 ppbv at 0.73 Hz resolution	From sampling platform (no inlet)	Stockwell et al. (2014); Selimovic et al. (2017)
ACES	Broadband cavity-enhanced spectroscopy (Airborne Cavity-Enhanced Spectrometer)	Glyoxal, NO_2 , HONO, methyl glyoxal	1 Hz	100 pptv (glyoxal) to 2 ppbv (HONO); ~ 5 ppbv for methylglyoxal	Stack: from sampling platform, 1 m long 1/4" OD PFA including particle filter	Min et al. (2016)
I^- CIMS	Chemical ionization mass spectrometry; I^- reagent ions	Polar NMOG (several hundred)	1 Hz	1 pptv (malonic acid) to 1.5 ppbv (peroxyacetic acid) at 1 Hz resolution	Shared with PTR-ToF Stack: from sampling platform, 16 m long Room: from 3 m above combustion chamber floor, 7 m long Both: 1/2" OD PFA inlet, flow rate 100 lpm	Lee et al. (2014)