

Supplemental material to:  
**Intercomparison of NO<sub>3</sub> radical detection instruments in the atmosphere simulation chamber SAPHIR**  
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Instrument	Measurement method	Location	Species measured	Cavity parameters	Light source	Detection wavelength	Detector	Baseline detection, time interval	Sampling lines, flow rates, residence time**	Aerosol filter & exchange rate	Total NO <sub>3</sub> transmission efficiency	Accuracy	Precision (1σ) time resolution
NOAA-CRDS	Cavity ring-down spectroscopy (narrow-band)	outside chamber	NO <sub>3</sub> N <sub>2</sub> O <sub>5</sub> , NO <sub>2</sub>	PFA Teflon, L=0.91m, i.d.=6.4mm, R=99.999%	YAG pumped dye laser (50Hz)	661.94nm (NO <sub>3</sub> ) 532nm (NO <sub>2</sub> )	PMT, 16bit ADC	NO titration, 1min	8 slm, i.d.=4mm, L=0.4m, p=350hPa * 0.1s	2μm pore, 0.5 - 3h	92 ± 3%	+17 % / -5 %	0.2 - 0.5 pptv 1 s
UAF-CRDS	Cavity ring-down spectroscopy (narrow-band)	outside chamber	NO <sub>3</sub> N <sub>2</sub> O <sub>5</sub>	PFA Teflon, L=0.66 m, i.d.=16mm, R=99.995,	Pulsed diode laser (500 Hz)	662nm	PMT, 12bit ADC	NO titration, 3 min	8 slm, i.d.=6.3mm, L=0.4m, 2s	2μm pore, once a day	76 %	± 20 %	0.5 pptv 1 s
MPI-CRDS	Cavity ring-down spectroscopy (narrow-band)	outside chamber	NO <sub>3</sub> N <sub>2</sub> O <sub>5</sub>	Teflon coated Pyrex glass, i.d.=15mm, L=0.7m, R=99.98%	Pulsed diode laser (200 Hz)	662nm	PMT, 9bit ADC	NO titration, 1 min	8 slm, i.d.=9.5mm, L=0.68m, 1s	2μm pore, 1(-3) per day	75 ± 2 %	± 14 %	4 pptv 5 s
ULEIC-BBCRDS	Cavity ring-down spectroscopy (broad-band)	outside chamber	NO <sub>3</sub> NO <sub>2</sub> , H <sub>2</sub> O, aerosol extinction	PFA Teflon, L=1.83 m, i.d.=19mm, R=99.996%	YAG pumped broadband dye laser (20 Hz)	652-673nm	Spectrograph, f=250mm, (0.36 nm FWHM resolution) & clocked CCD camera	synthetic air 3 hours	10.1 slm, 4 PFA tubes, i.d.=3mm, L= 0.4m, 2.7s	no	75 ± 10 %	+16 % / -13 %	2 pptv 1 min
UCC-IBBCEAS	Cavity enhanced absorption spectroscopy (incoherent broad-band)	in situ	NO <sub>3</sub> NO <sub>2</sub> , H <sub>2</sub> O, aerosol extinction	Open path, L=20.13m, R=99.87%	Hot-spot Xe lamp	620–720nm	Spectrograph, f=330mm, (0.6nm FWHM resolution) & CCD camera	Zero air reference spectrum, once a day	n.a.	no	n.a.	± 16 %	1 pptv 5 s
UHD-CEDOAS	Cavity enhanced absorption spectroscopy (incoherent broad-band)	in situ	NO <sub>3</sub>	Open path L=0.62m, R=99.985%	LED	665nm FWHM 23nm	Mini spectrograph, f=42mm (1.06nm FWHM resolution) & CCD camera	Zero air reference spectrum, once a day	n.a.	no	n.a.	± 8 %	3 – 6 pptv 5 min
FZJ-DOAS	Differential optical absorption spectroscopy (incoherent broad-band)	in situ	NO <sub>3</sub> NO <sub>2</sub> , H <sub>2</sub> O	Open path multiple reflection cell, optical path length: 960m	Xe lamp	601 - 690nm	Spectrograph, f=460mm (0.4nm FWHM resolution) & photo diode array camera	Zero air reference spectrum, once a day	n.a.	no	n.a.	5 % ± 20 pptv	10 pptv 1 min

\* all other instruments measured at ambient pressure

\*\* residence time of the gas inside the whole instrument