



Supplement of

Development of a broadband cavity-enhanced absorption spectrometer for simultaneous measurements of ambient NO₃, NO₂, and H₂O

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Table S1: Comparison of BBCEAS performances for NO₃ measurement

Reference	Reflectivity (max. performance)	Detection limit (time resolution)		Accuracy
		reported	inferred*	
Ball et al. (2004)	99.9965 % @ 670 nm	2.5 pptv (1 σ , 516 seconds)	-	N/A
Venables et al. (2006)	99.775 % @ 665 nm	4 pptv (N/A, 57 seconds)	-	14 %
Langridge et al. (2008)	99.9913 % @ 660 nm	0.25 pptv (1 σ , 10 seconds)	0.35 pptv (1 σ , 5 seconds)	0.1 pptv (1 σ , 60 seconds) N/A
Varma et al. (2009)	99.98 % @ 662 nm	2 pptv (1 σ , 5 seconds)	-	16 %
Kennedy et al. (2011)	N/A	1.1 pptv (1 σ , 1 second)	0.35 pptv (1 σ , 5 seconds)	0.1 pptv (1 σ , 60 seconds) 11 %
Wu et al. (2014)	99.991 % @ [638, 672 nm]	7.9 pptv (N/A, 60 seconds)	-	12 %
Wang et al. (2017)	99.9936 % @ 662 nm	2.4 pptv (1 σ , 1 second)	0.6 pptv (1 σ , 5 seconds)	0.3 pptv (1 σ , 60 seconds) 19 %
Suhail et al. (2019)	99.95 % @ 660 nm	36 pptv (N/A, 600 seconds)	-	N/A
Wang and Lu (2019)	99.985 % @ 662 nm	3.0 pptv (2 σ , 30 seconds)	-	11–15 %
Fouqueau et al. (2020)	99.974 % @ 662 nm	6 pptv (N/A, 10 seconds)	-	9 %
		1.41 pptv (1 σ , 1 second)		
This work	99.9995 % @ 662 nm	0.60 pptv (1 σ , 5 seconds)	-	10.8 %
		0.15 pptv (1 σ , 60 seconds)		

*: Estimated detection limits from Allan deviation plot readings

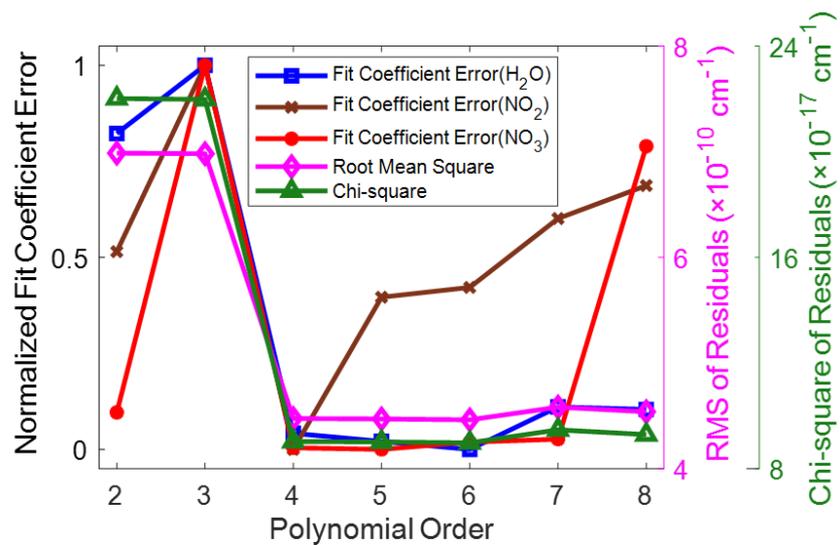


Figure S1: Statistics of spectral fitting for ambient data with the order of the polynomial. Data was acquired on August 26th, 2021 (UTC) from shipborne observation, which matches with data in Figure 4. Normalized fit coefficient uncertainty which ranged from 0 to 1 was used for convenience.

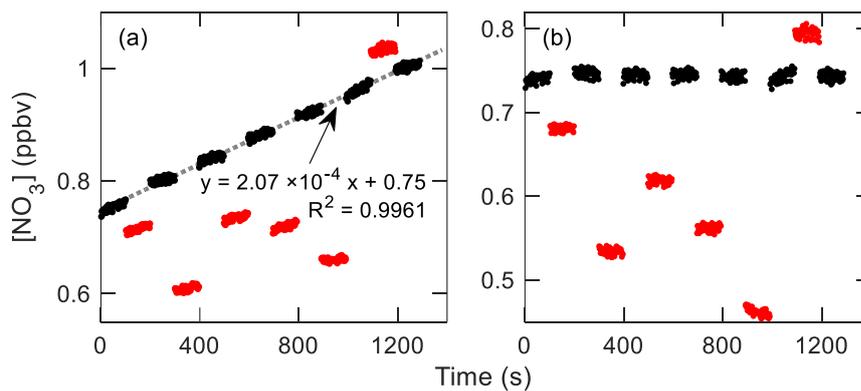


Figure S2: Time series of the linearity test for NO_3 (a) without the correction for the steady drift in NO_3 source (gray dotted line) and (b) with the correction (same as Figure 7 (a)).