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Supplement of

A rapid method to derive horizontal distributions of trace gases and aerosols near the surface using multi-axis differential optical absorption spectroscopy

Y. Wang et al.

Correspondence to: T. Wagner (thomas.wagner@mpic.de) and P. H. Xie (phxie@aiofm.ac.cn)

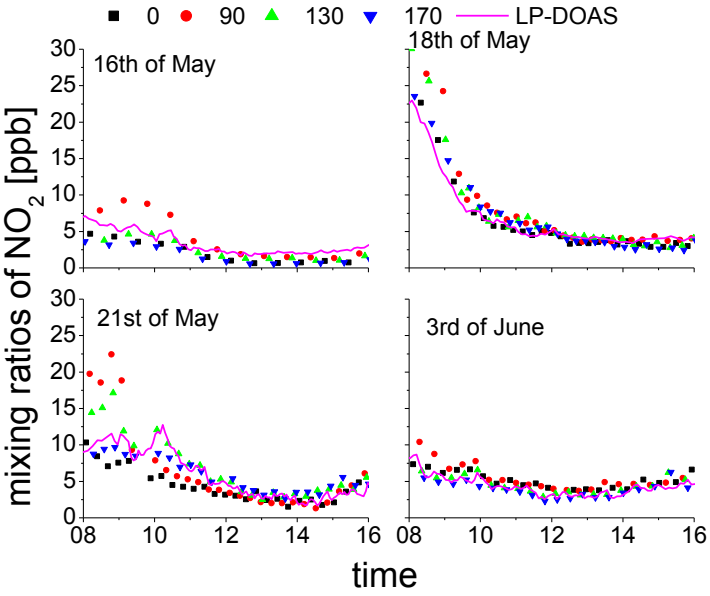
Table S1: Correction factors as function of the O_4 dAMF. The coefficients of the fitted polynomials for all combinations of RAAs of 0 °, 45 °, 90 °, 135 °and 180 ° and SZAs of 20 °, 30 °, 40 °, 50 °, 60 °, 70 ° and 80 °. The trace gases represent different wavelength ranges: NO_2: 360 nm and 340 nm, SO_2: 310 nm.

gas	SZA	RAA	Average(2^{nd}, 1^{st}, 0^{th})	Maximum (2^{nd}, 1^{st}, 0^{th})	Minimum (2^{nd}, 1^{st}, 0^{th})
NO_2	20	0	-0.03891 0.20524 0.68264	0.00143 0.03353 0.92275	-0.04439 0.28079 0.48257
NO_2	20	45	-0.03805 0.21135 0.65085	-0.00263 0.06926 0.88029	-0.05195 0.30156 0.43624
NO_2	20	90	-0.03279 0.20918 0.60927	-0.00329 0.0783 0.85051	-0.01907 0.23095 0.39755
NO_2	20	135	-0.02772 0.20555 0.58464	0.00716 0.05 0.85417	-0.03365 0.29352 0.31858
NO_2	20	180	-0.02363 0.1988 0.57993	0.01002 0.04139 0.85839	-0.01862 0.25561 0.32766
NO_2	30	0	0.04075 -0.09645 1.01105	0.03509 -0.08762 1.09803	0.01289 0.00552 0.84644
NO_2	30	45	0.00631 0.02191 0.89015	0.01315 -0.01157 1.01418	-0.00921 0.10154 0.71227
NO_2	30	90	-0.02109 0.14227 0.72667	0.00197 0.04156 0.93029	-0.03814 0.24599 0.49396
NO_2	30	135	-0.02911 0.19695 0.63902	-0.00395 0.08153 0.86845	-0.01907 0.2312 0.41217
NO_2	30	180	-0.03361 0.2255 0.60294	-0.00329 0.08663 0.85701	-0.01973 0.25262 0.37683
NO_2	40	0	0.12091 -0.355 1.24702	0.10909 -0.36145 1.37915	-0.05048 0.178 0.80755
NO_2	40	45	0.0425 -0.11467 1.04103	0.01372 -0.03267 1.08048	0.01632 -0.01394 0.86408
NO_2	40	90	-0.01143 0.09154 0.80199	0.00545 0.01933 0.97269	-0.00606 0.11042 0.63475
NO_2	40	135	-0.03039 0.19112 0.67332	0.00329 0.05226 0.91265	-0.0342 0.25764 0.44473
NO_2	40	180	-0.03771 0.23197 0.62861	-0.00215 0.08186 0.87976	-0.02291 0.24853 0.41881
NO_2	50	0	0.41231 -1.20812 1.78374	0.46185 -1.49138 2.23103	0.0043 -0.02392 1.01731

NO_2	50	45	0.10232 -0.32701 1.2204	0.0903 -0.33133 1.34116	0.04545 -0.12758 0.97395
NO_2	50	90	-0.00337 0.04929 0.84802	0.05491 -0.18479 1.151	-0.01345 0.13452 0.60598
NO_2	50	135	-0.03038 0.17781 0.69914	-0.01381 0.09471 0.90257	-0.00526 0.15821 0.51103
NO_2	50	180	-0.04001 0.22723 0.64987	-0.01644 0.1175 0.87455	-0.01118 0.20324 0.45561
NO_2	60	0	0.57384 -1.71249 2.06838	0.69707 -2.30229 2.83968	0.02828 -0.10837 1.05765
NO_2	60	45	0.12781 -0.43195 1.27768	0.12215 -0.45392 1.45594	0.05155 -0.16229 0.97242
NO_2	60	90	0.01412 -0.02195 0.8787	0.00779 -0.02012 1.02377	0.02598 -0.01746 0.68603
NO_2	60	135	-0.01407 0.11411 0.72034	0.00224 0.02989 0.94019	0.00784 0.09774 0.51416
NO_2	60	180	-0.02478 0.1658 0.67086	-0.00727 0.07248 0.90287	-0.00606 0.16279 0.46336
NO_2	70	0	0.0184 -0.03941 0.9071	0.01923 -0.0798 1.11594	0.01871 -0.00344 0.71014
NO_2	70	45	0.00357 0.00361 0.82125	0.01208 -0.04193 1.02057	-0.01063 0.08744 0.57195
NO_2	70	90	-0.00114 0.0481 0.71569	0.00631 -0.00475 0.9344	0.00884 0.05586 0.49026
NO_2	70	135	-0.00784 0.09171 0.64812	0.0029 0.02311 0.88813	4.83148E-4 0.11558 0.40208
NO_2	70	180	-0.00472 0.08845 0.63794	0.00338 0.03241 0.86451	0.01256 0.08595 0.40447
NO_2	80	0	0.0184 -0.07765 0.68907	0.01735 -0.09034 0.92912	0.02501 -0.06934 0.40507
NO_2	80	45	-0.05879 0.29238 0.38758	-0.30228 1.4375 -0.50682	-0.21268 1.09184 -0.68669
NO_2	80	90	-1.32756E-5 0.03564 0.6044	0.00731 -0.01599 0.846	0.00614 0.04993 0.35489
NO_2	80	135	-0.00306 0.04787 0.59273	0.00438 -0.007 0.84049	0.0038 0.05584 0.3537
NO_2	80	180	-0.00331 0.04781	0.00146 0.00687	-8.76824E-4 0.0813

			0.5937	0.82325	0.33232
SO_2	20	0	-0.03676 0.20063 0.68157	-0.00644 0.05769 0.91072	-0.03652 0.26005 0.48864
SO_2	20	45	-0.03689 0.20884 0.65156	-0.00658 0.07983 0.88018	-0.04603 0.28961 0.43903
SO_2	20	90	-0.03331 0.2108 0.61238	-0.00855 0.09206 0.85021	-0.02565 0.25447 0.38919
SO_2	20	135	-0.0302 0.21354 0.58755	-0.00286 0.08082 0.84387	-0.0358 0.30572 0.31878
SO_2	20	180	-0.02778 0.21145 0.58211	-0.00143 0.07822 0.84482	-0.02578 0.27728 0.3324
SO_2	30	0	0.05151 -0.13403 1.03769	0.03222 -0.10202 1.13994	0.02363 -0.02243 0.8559
SO_2	30	45	0.01467 -0.00836 0.9148	0.00921 -0.01063 1.03046	-0.00395 0.08554 0.72085
SO_2	30	90	-0.01923 0.12815 0.7511	-0.00263 0.04552 0.94389	-0.03222 0.22116 0.52507
SO_2	30	135	-0.03689 0.21263 0.651	-0.01315 0.10082 0.87761	-0.02499 0.24467 0.4291
SO_2	30	180	-0.04259 0.24353 0.61801	-0.01776 0.11943 0.86324	-0.03157 0.28182 0.3903
SO_2	40	0	0.13723 -0.40049 1.24366	0.11333 -0.38261 1.38668	0.14848 -0.41352 1.15561
SO_2	40	45	0.04975 -0.14269 1.04559	0.04275 -0.14898 1.17848	0.02039 -0.02552 0.84908
SO_2	40	90	-0.00524 0.05979 0.8293	-0.00242 0.02691 0.98733	-0.00121 0.09176 0.64212
SO_2	40	135	-0.02754 0.16343 0.71444	-0.00921 0.06979 0.9294	-0.02302 0.21147 0.49151
SO_2	40	180	-0.03474 0.20166 0.6754	-0.0136 0.09268 0.90415	-0.02291 0.23536 0.44991
SO_2	50	0	0.14791 -0.44355 1.27721	0.12674 -0.44043 1.4442	0.01002 -0.01162 0.90349
SO_2	50	45	0.0483 -0.14685 1.0406	0.05576 -0.21333 1.21263	0.02909 -0.05309 0.84465
SO_2	50	90	-0.0031 0.04223 0.83262	0.00953 -0.03394 1.02516	-0.00112 0.08238 0.63057
SO_2	50	135	-0.02447	-0.01118	-0.00921

			0.14183 0.72322	0.06561 0.93305	0.15893 0.50269
SO_2	50	180	-0.03133 0.18062 0.68523	-0.02104 0.10934 0.89633	-6.57618E-4 0.1747 0.44774
SO_2	60	0	0.0827 -0.26039 1.11879	0.09272 -0.33452 1.33011	0.0171 -0.02754 0.83778
SO_2	60	45	0.02926 -0.09043 0.94948	0.02746 -0.11091 1.11615	0.01345 0.00104 0.72469
SO_2	60	90	6.41577E-5 0.02796 0.79627	0.00208 -0.00465 0.98296	0.01455 0.03885 0.57608
SO_2	60	135	-0.0132 0.09495 0.7164	-0.00224 0.02699 0.93481	0.00897 0.08436 0.49807
SO_2	60	180	-0.02048 0.12988 0.68552	-0.01091 0.06218 0.90845	-0.0097 0.15782 0.44868
SO_2	70	0	0.00744 2.68664E-5 0.7559	0.01247 -0.05145 0.98129	-0.00779 0.10901 0.47045
SO_2	70	45	0.00444 0.00946 0.73777	0.01111 -0.04428 0.96197	0.00435 0.06963 0.46625
SO_2	70	90	-0.00157 0.03809 0.69208	0.00421 -0.01455 0.92242	0.00673 0.0604 0.44545
SO_2	70	135	-0.00481 0.05733 0.66368	0.00773 -0.0209 0.91558	0.0029 0.08783 0.40663
SO_2	70	180	-0.00624 0.07431 0.63342	0.00483 0.00642 0.87167	0.00435 0.0943 0.38735
SO_2	80	0	0.00953 -0.04124 0.69152	0.00946 -0.06071 0.92181	0.01465 -0.0289 0.42858
SO_2	80	45	0.00379 0.00538 0.65199	-0.03554 0.17217 0.67849	0.03629 -0.09993 0.50504
SO_2	80	90	8.93117E-4 0.02302 0.63729	0.00818 -0.03736 0.88782	0.00585 0.04886 0.38297
SO_2	80	135	3.4843E-4 0.02566 0.63319	0.00585 -0.02673 0.87626	0.00468 0.05299 0.37678
SO_2	80	180	-1.34648E-5 0.02568 0.63381	0.00438 -0.02266 0.87394	-0.00146 0.08252 0.35308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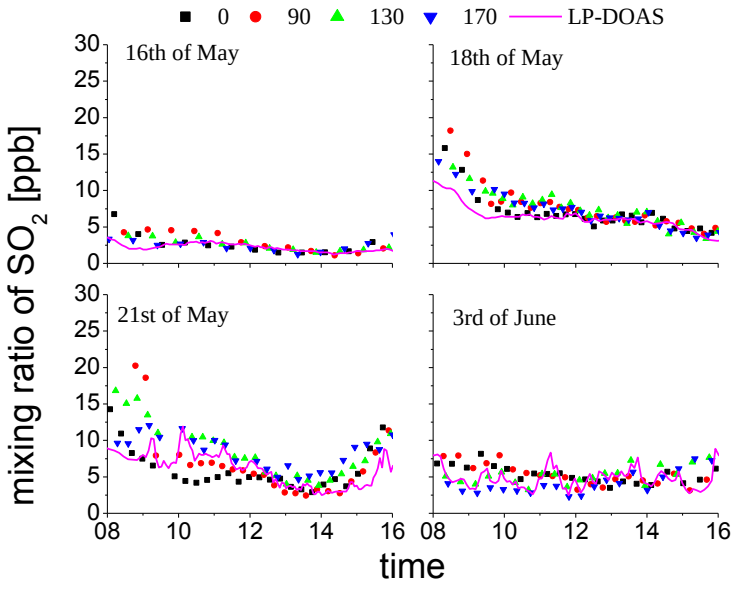
16th of May
18th of May
21st of May
3rd of June
mixing ratios of NO2 [ppb]
time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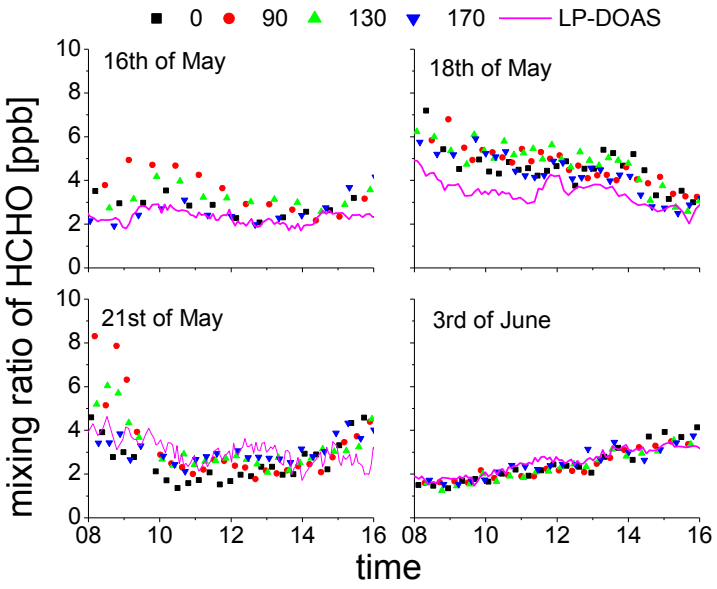

Fig. S1: Same as Figs. 18, 19, and 20 but with all data points included.