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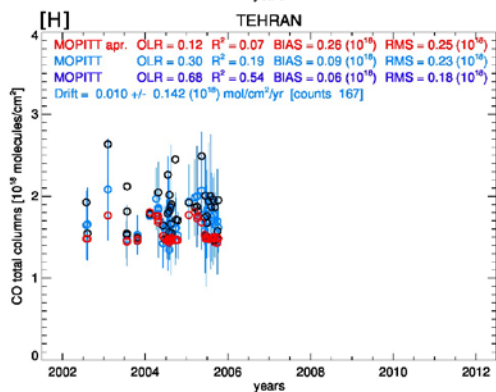
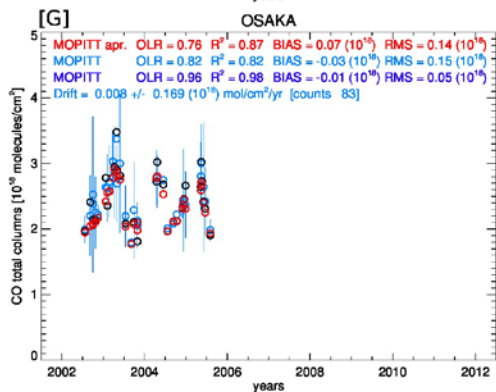
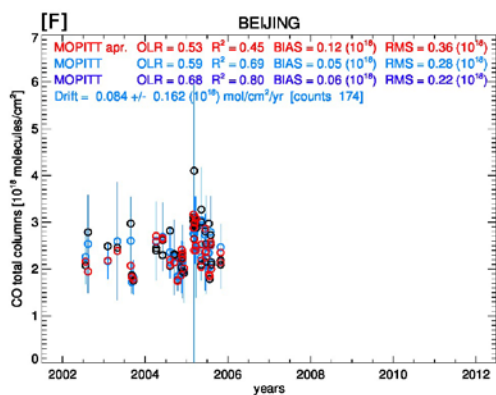
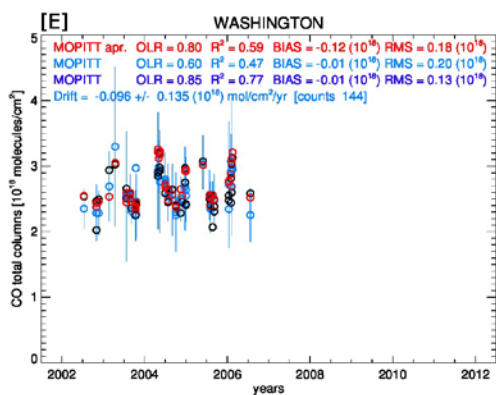
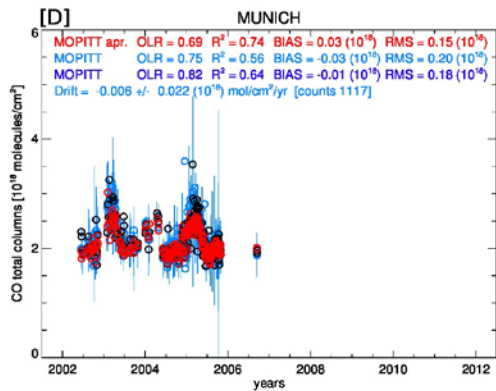
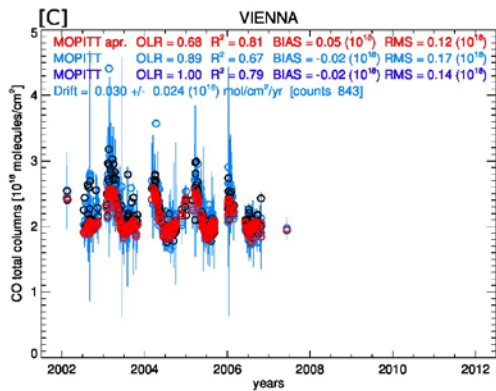
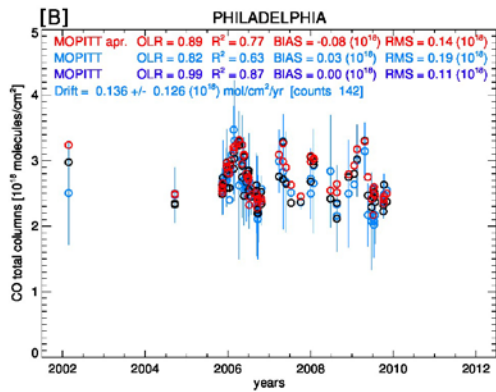
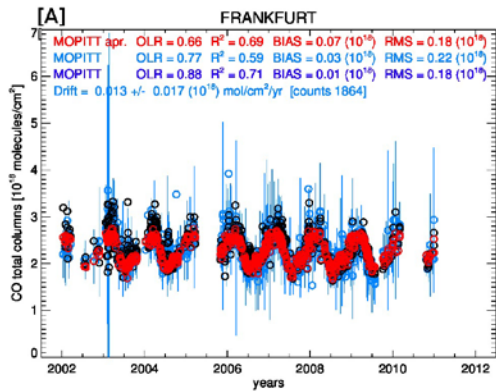


Supplement of

Validation of nine-years of MOPITT V5 NIR using MOZAIC/IAGOS measurements: biases and long term stability

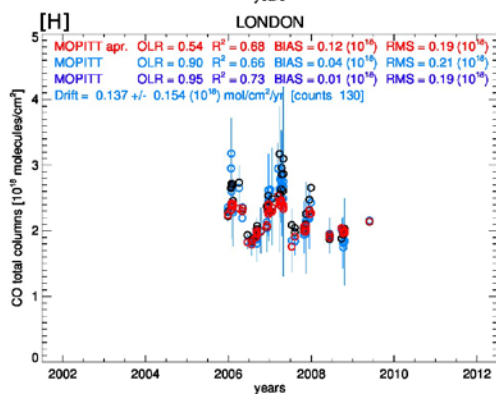
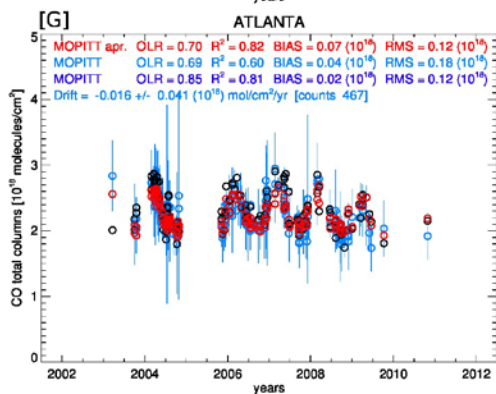
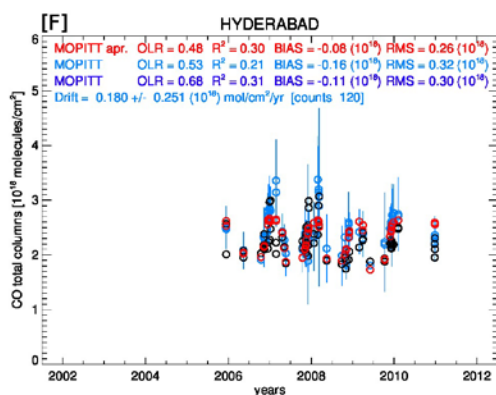
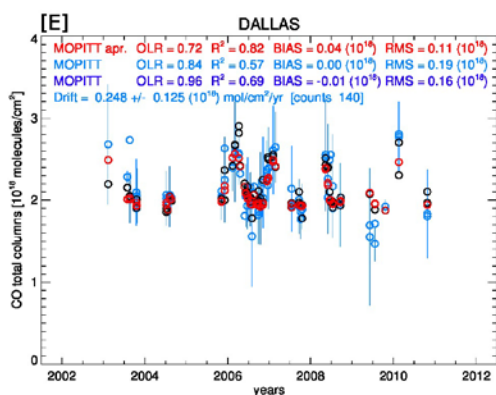
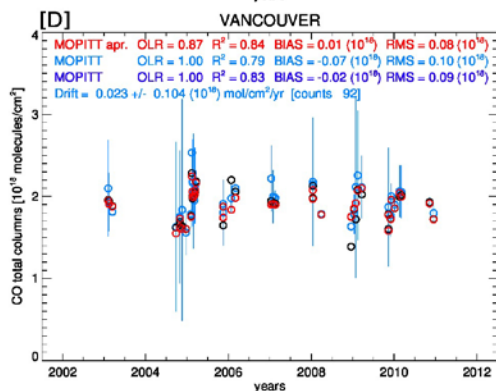
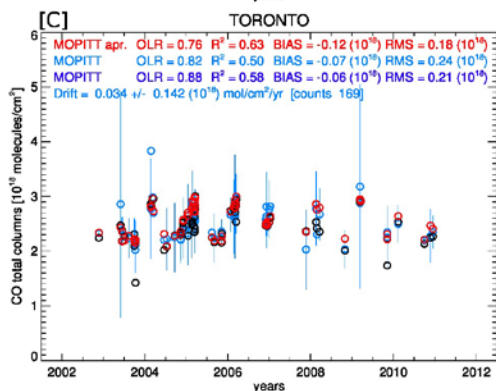
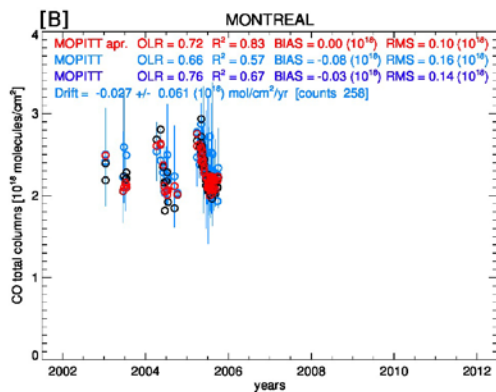
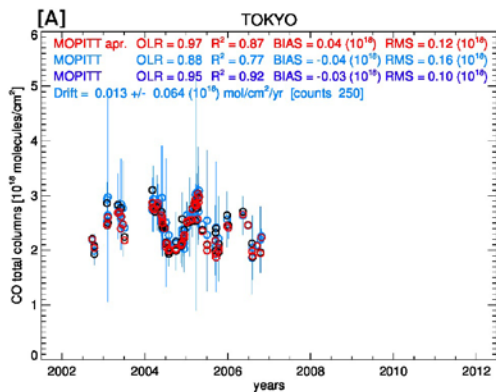
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926 **Figure S1A/B/C/D/E/F/G/H**

927 As Figure 3 but for eight different stations



930 **Figure S2A/B/C/D/E/F/G/H**

931 As Figure S1 but for eight different stations

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Number of MOPITT pixels along a MOZAIC/IAGOS flight path	Total number of MOZAIC-MOPITT comparisons	Percentage of pixels for which MOZAIC/IAGOS falls within MOPITT range
2	744	39.5
3	549	61.2
4	456	72.8
5	470	74.5
6	401	76.8
7	304	83.6
8	280	92.9
9	264	84.9
10	282	86.9
11	224	87.1
12	252	90.9
13	214	91.1
14	209	92.8
15	195	95.9
16	209	93.8
17	221	89.1
18	137	91.2
19	191	91.1
20	210	82.9
21	169	94.1
22	144	94.4
23	187	89.3
24	131	89.3
25	115	96.5
26	131	88.6
27	129	93.0
28	98	81.6
29	110	96.4
30	121	99.2
31	85	97.6
32	97	96.9
33	98	96.9
34	62	91.9
35	51	88.4
36	62	98.4
37	57	100
38	19	100
39	9	100
40	19	100

936 **Table S1.** Statistics of the number of pixels for which the MOZAIC/IAGOS column falls within
937 the range of MOPITT columns along the MOZAIC/IAGOS flight path. The first column
938 indicates the number of MOPITT pixels along the flight path. The second column shows the
939 number of pixels that qualify according to the selection criterion in the first column. The third
940 column shows the percentage of pixels qualifying for the selection criterion for which the
941 MOZAIC/IAGOS column falls within the range of MOPITT column values.
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AIRPORT	AREA	N	A	M	MR
FRANKFURT	EUR	1864	0.829	0.765	0.844
MUNICH	EUR	1117	0.858	0.747	0.797
VIENNA	EUR	843	0.898	0.816	0.891
WINDHOEK		561	0.655	0.813	0.884
ATLANTA	NAM	467	0.905	0.772	0.902
LOS_ANGELES	NAM	281	0.780	0.687	0.784
NEW_DELHI	ASIA	268	0.514	0.646	0.793
MONTREAL	NAM	258	0.910	0.753	0.818
TOKYO	ASIA	250	0.932	0.879	0.958
PARIS	EUR	207	0.865	0.833	0.876
ABU_DHABI	ASIA	201	0.719	0.544	0.619
BEIJING	ASIA	174	0.670	0.828	0.894
TORONTO	NAM	169	0.796	0.707	0.761
TEHRAN	ASIA	167	0.255	0.437	0.734
WASHINGTON	NAM	144	0.766	0.682	0.878
PHILADELPHIA	NAM	142	0.875	0.795	0.932
DALLAS	NAM	140	0.908	0.753	0.828
NEW_YORK	NAM	139	0.786	0.731	0.847
LONDON	EUR	130	0.827	0.811	0.855
PORTLAND	NAM	128	0.883	0.850	0.942
HYDERABAD	ASIA	120	0.548	0.462	0.557
CHICAGO	NAM	99	0.815	0.693	0.776
VANCOUVER	NAM	92	0.919	0.887	0.913
OSAKA	ASIA	83	0.935	0.908	0.990
CAIRO	REST	80	0.829	0.793	0.956
HONG_KONG	ASIA	73	0.686	0.560	0.944
SHANGHAI	ASIA	66	0.582	0.350	0.630
BOSTON	NAM	61	0.933	0.455	0.458
DETROIT	NAM	53	0.946	0.882	0.927
RIYADH	ASIA	51	0.709	0.589	0.692
KUWAIT_CITY	ASIA	46	0.738	0.803	0.887
CHARLOTTE	NAM	44	0.695	0.159	0.360
SAN_FRANCISCO	NAM	37	0.914	0.965	0.998
CALGARY	NAM	29	0.861	0.762	0.661
KHARTOUM	REST	29	0.739	0.675	0.997

945

946 **Table S2A.** Correlation coefficient for airport time series comparison as shown in Figure 4 (see
947 also figure 3 and supplementary figures S1 and S2). The first column indicates the area to which
948 the airport belongs, second column (N) indicates the number of collocations, the third column

949 (A) the correlation coefficient for the comparison between MOZAIC/IAGOS and the MOPITT a
950 priori, the fourth column (M) coefficient for the comparison between MOZAIC/IAGOS and
951 MOPITT, and the fifth column (MR) is for the comparison between MOZAIC/IAGOS in which
952 case it is assumed that if the MOZAIC/IAGOS column falls within the range of MOPITT total
953 column measurements along the MOZAIC/IAGOS flight path, the MOPITT column equals the
954 MOZAIC/IAGOS column, the so called “range”. The color coding indicates if the correlation
955 has worsened (pink) or improved (green) compared to the statistic based on the
956 MOZAIC/IAGOS comparison with the MOPITT a priori (column A).

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958

AIRPORT	AREA		N	A	M	MR
FRANKFURT	EUR		1864	0.065	0.034	0.013
MUNICH	EUR		1117	0.026	-0.031	-0.014
VIENNA	EUR		843	0.047	-0.024	-0.018
WINDHOEK			561	-0.035	-0.022	-0.019
ATLANTA	NAM		467	0.071	0.042	0.023
LOS_ANGELES	NAM		281	-0.020	-0.055	-0.031
NEW_DELHI	ASIA		268	0.215	0.044	0.029
MONTREAL	NAM		258	0.003	-0.081	-0.025
TOKYO	ASIA		250	0.035	-0.044	-0.026
PARIS	EUR		207	0.091	0.033	0.025
ABU_DHABI	ASIA		201	0.133	-0.056	-0.056
BEIJING	ASIA		174	0.116	0.050	0.063
TORONTO	NAM		169	-0.116	-0.074	-0.059
TEHRAN	ASIA		167	0.260	0.086	0.063
WASHINGTON	NAM		144	-0.121	-0.009	-0.014
PHILADELPHIA	NAM		142	-0.079	0.028	-0.003
DALLAS	NAM		140	0.038	-0.004	-0.011
NEW_YORK	NAM		139	-0.044	0.064	0.053
LONDON	EUR		130	0.121	0.040	0.010
PORTLAND	NAM		128	0.054	0.008	-0.004
HYDERABAD	ASIA		120	-0.077	-0.165	-0.113
CHICAGO	NAM		99	0.157	0.092	0.107
VANCOUVER	NAM		92	0.007	-0.075	-0.023
OSAKA	ASIA		83	0.072	-0.028	-0.008
CAIRO	REST		80	0.157	-0.057	0.004
HONG_KONG	ASIA		73	0.385	0.058	0.043
SHANGHAI	ASIA		66	0.032	-0.033	-0.035
BOSTON	NAM		61	0.019	0.036	0.064
DETROIT	NAM		53	0.042	0.022	-0.000
RIYADH	ASIA		51	0.020	-0.131	-0.043
KUWAIT_CITY	ASIA		46	0.083	-0.040	0.009
CHARLOTTE	NAM		44	-0.068	-0.000	-0.058
SAN_FRANCISCO	NAM		37	0.044	-0.033	0.003
CALGARY	NAM		29	-0.015	0.099	0.043
KHARTOUM	REST		29	0.074	-0.035	0.003

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961 **Table S2B.** As figure S2A but for the bias between the time series. The color coding indicates if

962 the bias in absolute sense has worsened (pink) or improved (green) compared to the statistic

963 based on the MOZAIC/IAGOS comparison with the MOPITT a priori (column A).

964

AIRPORT	N	A	M	MR
FRANKFURT	1864	0.177	0.217	0.180
MUNICH	1117	0.147	0.204	0.184
VIENNA	843	0.123	0.170	0.136
WINDHOEK	561	0.237	0.188	0.136
ATLANTA	467	0.124	0.179	0.120
LOS_ANGELES	281	0.159	0.226	0.201
NEW_DELHI	268	0.351	0.309	0.247
MONTREAL	258	0.103	0.160	0.140
TOKYO	250	0.125	0.162	0.095
PARIS	207	0.160	0.169	0.147
ABU_DHABI	201	0.108	0.229	0.206
BEIJING	174	0.363	0.276	0.225
TORONTO	169	0.177	0.237	0.214
TEHRAN	167	0.248	0.234	0.176
WASHINGTON	144	0.185	0.199	0.128
PHILADELPHIA	142	0.145	0.186	0.110
DALLAS	140	0.110	0.190	0.163
NEW_YORK	139	0.218	0.241	0.184
LONDON	130	0.188	0.210	0.185
PORTLAND	128	0.095	0.118	0.077
HYDERABAD	120	0.257	0.319	0.303
CHICAGO	99	0.251	0.289	0.254
VANCOUVER	92	0.080	0.104	0.090
OSAKA	83	0.136	0.152	0.052
CAIRO	80	0.160	0.185	0.084
HONG_KONG	73	0.360	0.458	0.161
SHANGHAI	66	0.437	0.532	0.427
BOSTON	61	0.074	0.276	0.248
DETROIT	53	0.105	0.163	0.132
RIYADH	51	0.081	0.097	0.086
KUWAIT_CITY	46	0.140	0.120	0.091
CHARLOTTE	44	0.199	0.395	0.352
SAN_FRANCISCO	37	0.185	0.150	0.025
CALGARY	29	0.072	0.180	0.164
KHARTOUM	29	0.155	0.169	0.019

967 **Table S2C.** As Figure S2A but for the root-mean-square differences. The color coding indicates
968 if the root-mean-square difference has worsened (pink) or improved (green) compared to the
969 statistic based on the MOZAIC/IAGOS comparison with the MOPITT a priori (column A).