Supplement Material

N	Station	Location	Deposition [g/m2/yr]	Region	Reference
1	RossSea3	76.45°S,175.52°W	0.003	SOcean	Mahowald et al. (2009)
2	PrinceElizabethLand5	75.85°S,71.50°E	0.0009	SOcean	Mahowald et al. (2009)
a	Byrd	75.0°S, 120.0°W	0.003	Antartica	Mahowald et al. (1999)
3	RossSea2	75.0°S,170.67°W	0.003	SOcean	Mahowald et al. (2009)
4	PrinceElizabethLand4	74.9°S,74.52°E	0.001	SOcean	Mahowald et al. (2009)
5	PrinceElizabethLand3	73.43°S,76.52°E	0.002	SOcean	Mahowald et al. (2009)
6	PrinceElizabethLand2	70.57°S,76.9°E	0.002	SOcean	Mahowald et al. (2009)
7	RossSea1	69.52°S,170.6°E	0.002	SOcean	Mahowald et al. (2009)
8	PrinceElizabethLand1	66.3°S,75.72°E	0.002	SOcean	Mahowald et al. (2009)
9	PrydzBay3	66.12°S,75.32°E	0.002	SOcean	Mahowald et al. (2009)
10	PrydzBay1	65.57°S,74.98°E	0.002	SOcean	Mahowald et al. (2009)
11	DumontAntartica3	64.97°S,141.45°E	0.0009	SOcean	Mahowald et al. (2009)
12	DumontAntartica4	64.93°S,141.25°E	0.0009	SOcean	Mahowald et al. (2009)
13	WeddellSea	64.93°S,2.59°W	0.52	SOcean	DIRTMAP
14	PrydzBay2	64.9°S,75.0°E	0.003	SOcean	Mahowald et al. (2009)
15	DumontAntartica2	64.88°S,141.07°E	0.0009	SOcean	Mahowald et al. (2009)
16	DumontAntartica1	64.6°S,140.33°E	0.0006	SOcean	Mahowald et al. (2009)
17	Site13Shallow	35.52°S,161.0°E	1.24	EPacific	DIRTMAP
A	NewZealand	34.5°S, 172.75°E	0.14	EPacific	Ginoux et al. (2001)*
18	WR1	20.05°S,9.16°E	4.03	SAtlantic	DIRTMAP
19	Site12Shallow	17.76°S,154.83°E	0.4	EPacific	DIRTMAP
20	Site11Shallow	12.99°S,155.99°E	0.73	EPacific	DIRTMAP
b	Huascaran	9.0°S, 78.0°W	0.2	SAmerica	Mahowald et al. (1999)
21	GBZ4	2.18°S,9.9°W	1.2	EqAtlantic	DIRTMAP
22	CEPS03upper	0.0°N,175.0°E	0.825	EPacific	DIRTMAP
23	Site10	1.22°N,160.57°E	0.84	EPacific	DIRTMAP
24	GBN3upper	1.79°N,11.13°W	4.3	EqAtlantic	DIRTMAP
B	Fanning	3.9°N, 159.3°W	0.09	WPacific	Ginoux et al. (2001)*
25	ECC-T	5.01°N,138.83°E	0.57	EPacific	DIRTMAP
26	PB2	5.37°N,85.58°W	4.8	WPacific	DIRTMAP
27	M5	10.0°N,65.0°E	1.5	IndianOc	DIRTMAP
C	Enewetak	11.3°N,162.3°E	0.44	EPacific	Ginoux et al. (2001)*
28	CV1upper	11.48°N,21.02°W	22.62	EqAtlantic	DIRTMAP
29	NEC-T	12.02°N,134.29°E	0.11	EPacific	DIRTMAP
30	Cast	14.48°N,64.77°E	4.3	IndianOc	DIRTMAP
31	East	15.47°N,68.75°E	7.4	IndianOc	DIRTMAP
32	M4	15.98°N,61.5°E	4.5	IndianOc	DIRTMAP
33	Wast	16.25°N,60.47°E	6.1	IndianOc	DIRTMAP
34	M2M3	17.4°N,58.8°E	12.4	IndianOc	DIRTMAP

35	EumeliMesotropic	18.5°N,21.08°W	18.74	NAtlantic	DIRTMAP
36	BOSF1	19.0°N,20.17°W	21.55	NAtlantic	DIRTMAP
37	CB1-1	20.92°N,19.74°W	20.17	NAtlantic	DIRTMAP
38	EumeliOligotropic	21.05°N,31.17°W	3.73	NAtlantic	DIRTMAP
39	CB2-1	21.15°N,20.69°W	20.09	NAtlantic	DIRTMAP
D	Oahu	21.3°N,157.6°W	0.42	WPacific	Ginoux et al. (2001)*
40	22N25W	21.93°N,25.23°W	6.7	NAtlantic	DIRTMAP
41	25N23W	24.55°N,22.83°W	5.21	NAtlantic	DIRTMAP
E	Miami	25.75°N, 80.25°W	1.62	NAtlantic	Ginoux et al. (2001)*
42	28N22W	28.0°N,21.98°W	2.4	NAtlantic	DIRTMAP
F	Midway	28.2°N,177.35°W	0.6	WPacific	Ginoux et al. (2001)*
43	CI1upper	29.11°N,15.45°W	4.15	NAtlantic	DIRTMAP
44	Eilat	29.52°N,34.92°E	5.83	Europe	Mahowald et al. (2009)
45	Site6	30.0°N,175.0°E	3	EPacific	DIRTMAP
46	DeadSea	31.5°N,35.3°E	44.57	MEast	Mahowald et al. (2009)
47	ST	31.55°N,24.67°W	2.36	NAtlantic	DIRTMAP
G	TelAviv	32.0°N, 34.5°E	30	Europe	Ginoux et al. (2001)*
48	Sargasso	32.08°N,64.25°W	1.9	NAtlantic	DIRTMAP
49	LakeKinneret	32.7°N,35.5°E	285.71	Europe	Mahowald et al. (2009)
50	L1-93	33.15°N,21.98°W	1.76	NAtlantic	DIRTMAP
51	34N21W	33.82°N,21.02°W	4.75	NAtlantic	DIRTMAP
52	Site5upper	34.42°N,177.74°E	3.25	EPacific	DIRTMAP
53	Crete	35.2°N,24.8°E	21.26	Europe	Mahowald et al. (2009)
54	Spain	36.3°N,5.4°E	22.8	Europe	Mahowald et al. (2009)
55	Site7upper	37.4°N,174.95°E	8.77	EPacific	DIRTMAP
H	Taklimakan	40.00°N, 85.00°E	450	Asia	Ginoux et al. (2001)*
56	WP-3	40.0°N,145.43°E	7.32	EPacific	DIRTMAP
I	Spain	41.8°N, 2.3°E	5.3	Europe	Ginoux et al. (2001)*
57	Corsica	42.0°N,9.0°E	15.43	Europe	Mahowald et al. (2009)
58	Sapporo	43.1°N,141.3°E	5.2	EPacific	Mahowald et al. (2009)
59	SEFrance1	43.5°N,4.8°E	11.31	Europe	Mahowald et al. (2009)
60	SEFrance2	43.6°N,7.3°E	1.8	Europe	Mahowald et al. (2009)
61	SEFrance3	43.6°N,7.3°E	32	Europe	Mahowald et al. (2009)
J	FrenchAlps	45.5°N, 6.5°E	2.1	Europe	Ginoux et al. (2001)*
62	Site8	46.12°N,175.03°N	4.09	EPacific	DIRTMAP
63	NP-B	46.82°N,162.12°E	0.86	EPacific	DIRTMAP
64	48N21W-1	47.72°N,20.87°W	3.1	NAtlantic	DIRTMAP
65	48N21W-2	47.83°N,19.5°W	2.8	NAtlantic	DIRTMAP
66	P	50.0°N,144.98°W	0.3	WPacific	DIRTMAP
67	Eiderstedt	54.3°N,8.6°E	1.57	NAtlantic	Mahowald et al. (2009)
68	Nordsea	54.42°N,7.2°E	2.09	NAtlantic	Mahowald et al. (2009)
c	Dye3	65.0°N, 44.0°W	0.02	Greenland	Mahowald et al. (1999)
d	Renland	71.0°N, 27.0°W	0.06	Greenland	Mahowald et al. (1999)

e	GRIP	73.0°N, 38.0°W	0.008	Greenland	Mahowald et al. (1999)
f	CampCentury	77.0°N, 61.0°W	0.04	Greenland	Mahowald et al. (1999)

Table S1: Sites with deposition data. Stations are ordered from south to north. Numbers and letters identifying each station in Figure 1 are given in first column. Regional location for each site coincident with colors used in Figure 1 are given in column 5.
* Original data compilation in Ginoux et al. (2001) combines measurements and model output. Only those data corresponding to actual observations were considered.

N*	Station	Coordinates	Location	Data Range
1	Mawson	67.60°S,62.50°E	Antarctica	Low
2	New Caledonia	22.15°S,167.0°E	SW Pacific	Low
3	Cook Islands	21.25°S,159.75°W	S. Pacific	Low
4	American Samoa	14.25°S,170.58°W	S. Pacific	Low
5	Nauru	0.53°S,166.95°E	W. Tropical Pacific	Low
6	Fanning Island	3.92°N,159.33°W	E. Tropical Pacific	Low
7	Enewetak Atoll	11.33°N,162.33°E	W. Pacific	Low
8	Palmer	64.77°S,64.05°W	Antarctica	Medium
9	King George Island	62.18°S,58.30°W	Antarctica	Medium
10	Cape Grim	40.68°S,144.68°E	Tasmania	Medium
11	Cape Point	34.35°S,18.48°E	South Africa	Medium
12	Norfolk Island	29.08°S,167.98°E	SW Pacific	Medium
13*	Jabirun	12.70°S, 132.90°E	Northern Australia	Medium
14	Hawaii	21.33°N,157.70°W	Northern Pacific	Medium
15	Midway Island	28.22°N,177.35°W	Northern Pacific	Medium
16	Mace Head	53.32°N,9.85°W	Ireland	Medium
17*	Rukomechi	16.00°S, 29.50°E	Zimbabwe	High
18	Barbados	13.17°N,59.43°W	Caribbean	High
19	Miami	25.75°N,80.25°W	Florida, USA	High
20	Hedo	26.92°N,128.25°E	East China Sea	High
21	Bermuda	32.27°N,64.87°W	NW Pacific	High
22	Cheju	33.52°N,126.48°E	East China Sea	High

Table S2: Sites measuring surface concentration and managed by the Rosenstiel School of Marine and Atmospheric Science from the University of Miami. Stations are ordered per regions and from south to north. Numbers identifying each station in Figure 2 are given in first column.
* Additional stations used in the study and not belonging to the network of stations managed by the Rosenstiel School of Marine and Atmospheric Science.

N°	Station	Location	Height (m.a.s.l.)	Location	Region
1	Ilorin	8.32°N, 4.34°E	350	Nigeria	Africa
2	Djougou	9.76°N, 1.60°E	400	Benin	Africa
3	Bandoukoui	11,85°N, 3,75°W	250	Burkina Faso	Africa
4*	Ouagadougou	12.20°N, 1.40°W	290	Burkina Faso	Africa
5	IERCinzana	13.28°N, 5.93°W	285	Mali	Africa
6*	Banizoumbou	13.54°N, 2.66°E	250	Niger	Africa
7	Bidi Bahn	14.06°N, 2.45°W	0	Burkina Faso	Africa
8*	Dakar	14.39°N, 16.96°W	0	Senegal	Africa
9	Agoufou	15.35°N, 1.48°W	305	Mali	Africa
10	Dahkla	23.72°N, 15.95°W	12	Western Sahara	Africa
11	Hamim	22.97°N, 54.30°E	209	United Arab Emirates	Middle East
12	Al Dhafra	24.25°N, 54.55°E	40	United Arab Emirates	Middle East
13	Mussafa	24.37°N, 54.47°E	10	United Arab Emirates	Middle East
14	Dhabi	24.48°N, 54.38°E	15	United Arab Emirates	Middle East
15*	Solar Village	24.91°N, 46.41°E	764	Saudi Arabia	Middle East
16	Bahrain	26.21°N, 50.61°E	25	Saudi Arabia/ Persian Gulf	Middle East
17*	Surinam	5.80°N, 55.20°W	0	Northern South America	America
18*	Barbados	13.17°N, 59.50°W	114	Caribbean	America
19	Guadeloup	16.33°N, 61.50°W	0	Caribbean	America
20	La Parguera	17.97°N, 67.04°W	12	SE Puerto Rico - Caribbean	America
21#*	Cape San Juan (Roosvelt Roads)	18.38°N, 65.62°W (18.20°N, 65.60°W)	15(10)	NE (SE) Puerto Rico - Caribbean	America
22	Andros Island	24.70°N, 77.80°W	0	Caribbean	America
23	Paddockwood	53.50°N, 105.50°W	503	Canada	America
24*	Capo Verde	16.73°°, 22.93°W	60	Offshore Western Africa	Elsewhere
25	Kanpur	26.45°N, 80.35°E	142	Northern India	Elsewhere

Table S3: Selected dusty stations based on the AERONET climatology. Stations are ordered per regions and from south to north. Numbers identifying each station in Figure 8 are given in first column.

[#] Station Cape San Juan is used in the climatology based on the multi-annual database 1996-2006 and Roosvelt Roads in the database of the year 2000.

[*] Stations used in the analysis of the year 2000.

Figure Caption

Figure S1: Global annual distribution for the year 2000 of a) total deposition, b) surface concentration, c) AOD and d) AE of the AEROCOM median model. The corresponding figures of the remaining models can be found via the AeroCom web interfaces (http://nansen.ipsl.jussieu.fr/AEROCOM/data.html).

Figure S2: Monthly averages of measured and simulated surface concentration. Units are $\mu g/m^3$. Each row corresponds to the seasonal cycle at one of the stations. The stations have been grouped into Low (orange), Medium (violet) or High (blue) surface concentration sites (Section 2.2) and each group is identified by a coloured bar on the left side of the left hand figures. Stations are ordered from south to north within each group. The row for each station corresponds to the numbering in Fig. 2. Name and location of each station is given in Table S2 of the supplement material. White color corresponds to month without measurements. Measurements are shown in the subfigure on the upper left side.

Figure S3: Same as Fig. S2 but for relative difference (in %) of model with respect to observations.

Figure S4: AERONET AOD at 550 nm and model output at dusty stations. Each row corresponds to the seasonal cycle at one of the stations. They have been grouped into African (AF, orange), Middle East (ME, violet) and Caribbean-American (C-AM, blue) stations and stations elsewhere in the world (OT, black). Each one of these groups is identified by a coloured bar on the left side of the left hand figures. Stations are ordered from south to north within each group. The row for each station corresponds to the number presented in Fig. 8. Name and location of each station is given in Table S3 of the supplement material. White color corresponds to month without measurements or month not complying with the selection criteria (section 2.3). AERONET data are shown in the first figure on the upper left side and correspond to the climatology based on the multi-annual database 1996-2006.

Figure S5: Same as Fig. S4 but for relative difference (in %) of model with respect to observations.

Figure S6: Same as Fig. 9 but when data of the year 2000 are used. Location of each station is illustrated in Fig. 8. The same numbering of stations in Fig 9. is used. Name and location of each station are given in Table S3 of the supplement material. Root mean square error (RMS), bias, ratio of modeled and observed standard deviation (sigma) and correlation (R) are indicated for each model in the lower right part of the scatter plot. Mean normalized bias and normalized root mean square error are given in parenthesis next to RMS and mean bias, respectively. Black continuous line is the 1:1 line whereas the black dotted lines correspond to the 2:1 and 1:2 lines.

Figure S7: Same as Fig. 10 but when data of the year 2000 are used. The same numbering of stations in Fig. 10 is used. Name and location of each station are given in Table S3 of the supplement material. White color corresponds to month without measurements or month not complying with the selection criteria (section 2.3). For the individual figure of each model presenting the simulated values and their differences (in %) with respect to observations see Fig. S8 and S9, respectively.

Figure S8: Same as Fig. S4 but when data of the year 2000 are used. Location of each station is illustrated in Fig. 8. Name and location of each station are given in Table S3 in the supplement material.

Figure S9: Same as Fig. S8 but for relative difference (in %) of model with respect to observations.

Figure S10: Same as Fig. S4 but for Coarse mode AOD.

Figure S11: Same as Fig. S10 but for relative difference (in %) of model with respect to observations.

Figure S12: Same as Fig. S4 but for Angstrom Exponent.

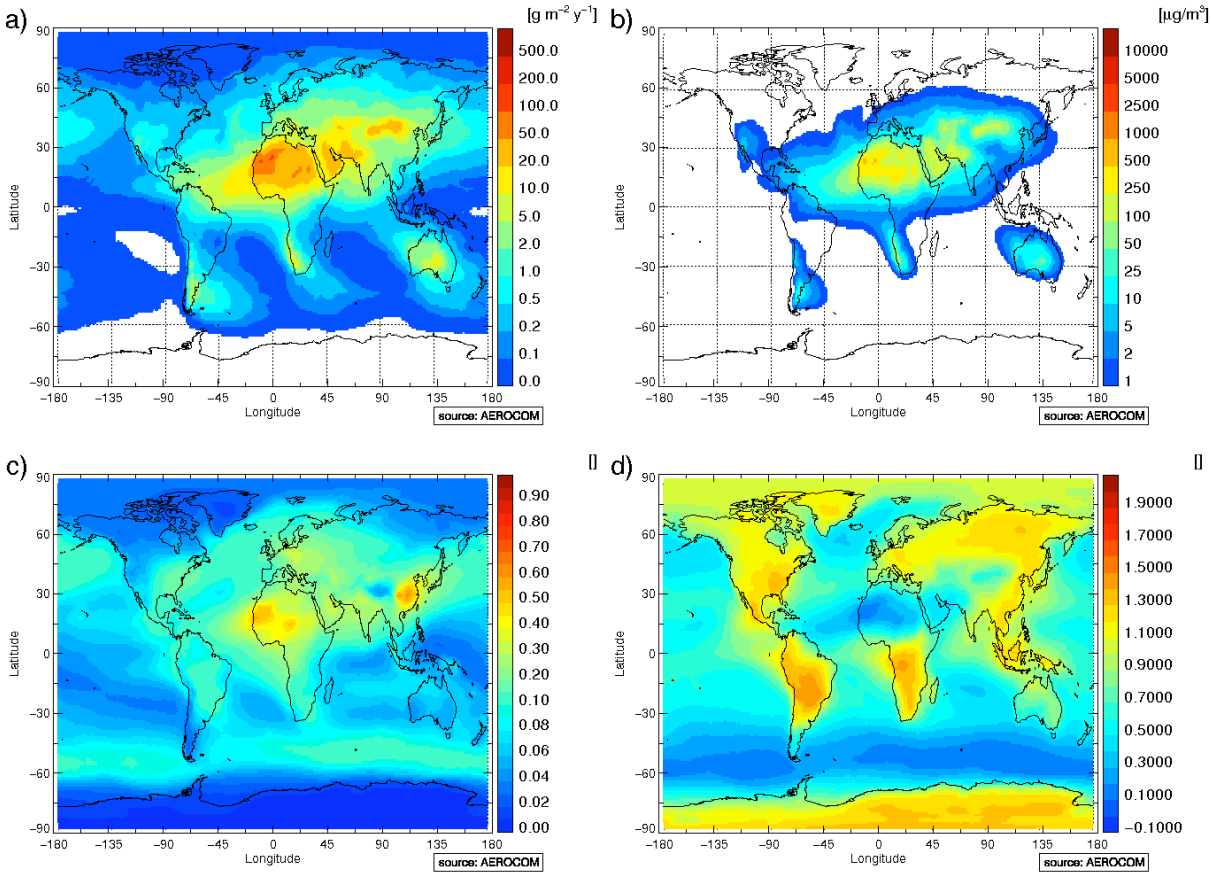
Figure S13: Same as Fig. S12 but for relative difference (in %) of model with respect to observations.

Figure S14: Same as Fig. S6 but for Angström exponent.

Figure S15: Same as Fig. S7 but for Angström exponent. For the individual figure of each model presenting the simulated values and their differences (in %) with respect to observations see Fig. S16 and S17, respectively.

Figure S16: Same as Fig. S8 but for Angstrom Exponent.

Figure S17: Same as Fig. S16 but for relative difference (in %) of model with respect to observations.


a)
[g m^{-2} y^{-1}]
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200.0
100.0
50.0
20.0
10.0
5.0
2.0
1.0
0.5
0.2
0.1
0.0
b)
[µg/m^3]
10000
5000
2500
1000
500
250
100
50
25
10
5
2
1
c)
[]
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.08
0.06
0.04
0.02
0.00
d)
[]
1.9000
1.7000
1.5000
1.3000
1.1000
0.9000
0.7000
0.5000
0.3000
0.1000
−0.1000
Latitude
Longitude
source: AEROCOM

Figure S1

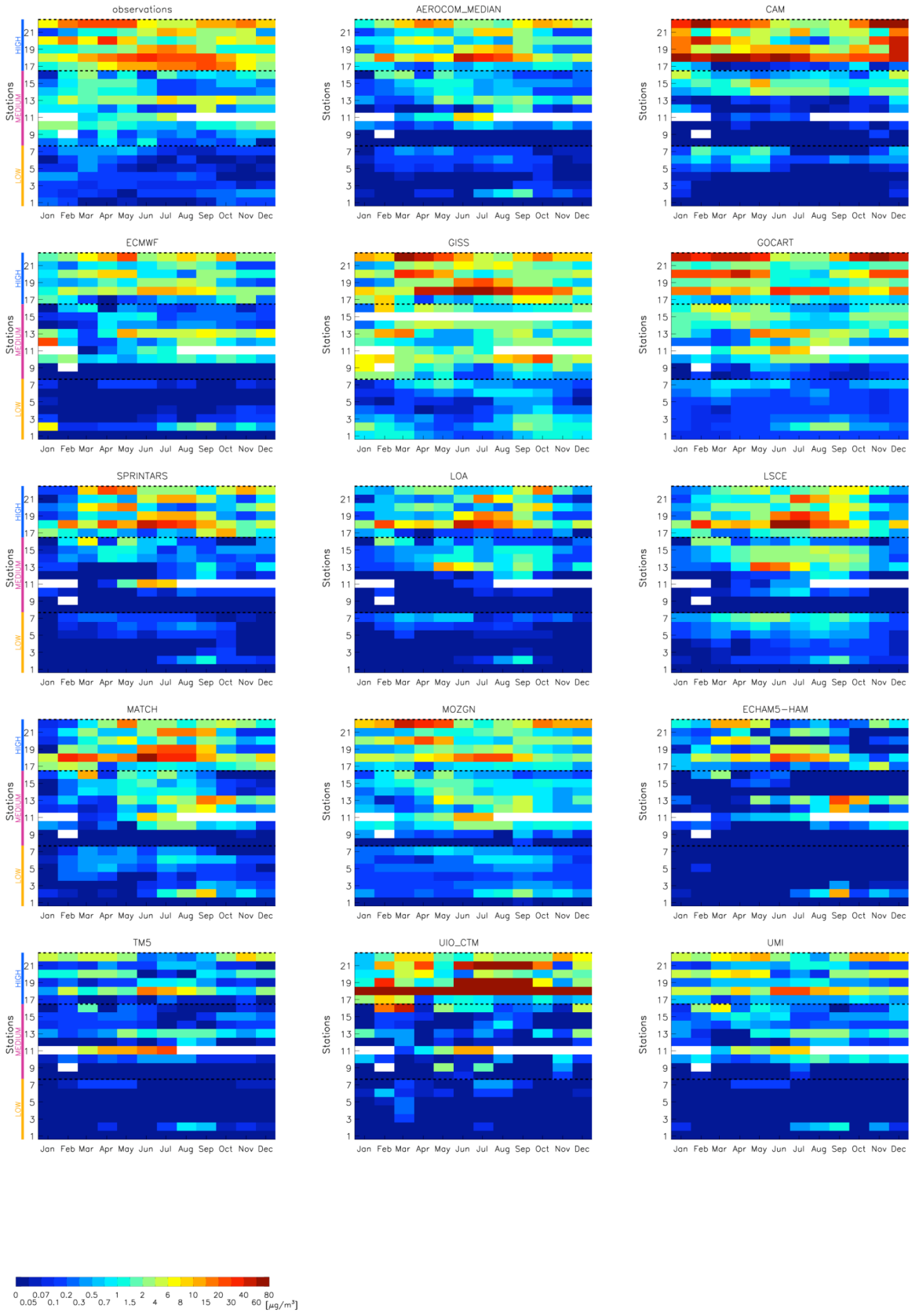

observations
AEROCOM_MEDIAN
CAM
ECMWF
GISS
GOCART
SPRINTARS
LOA
LSCE
MATCH
MOZGN
ECHAM5−HAM
TM5
UIO_CTM
UMI
Stations
HIGH
MEDIUM
LOW
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
0 0.05 0.07 0.1 0.2 0.3 0.5 0.7 1 1.5 2 4 6 8 10 15 20 30 40 60 80 [μg/m³]

Figure S2

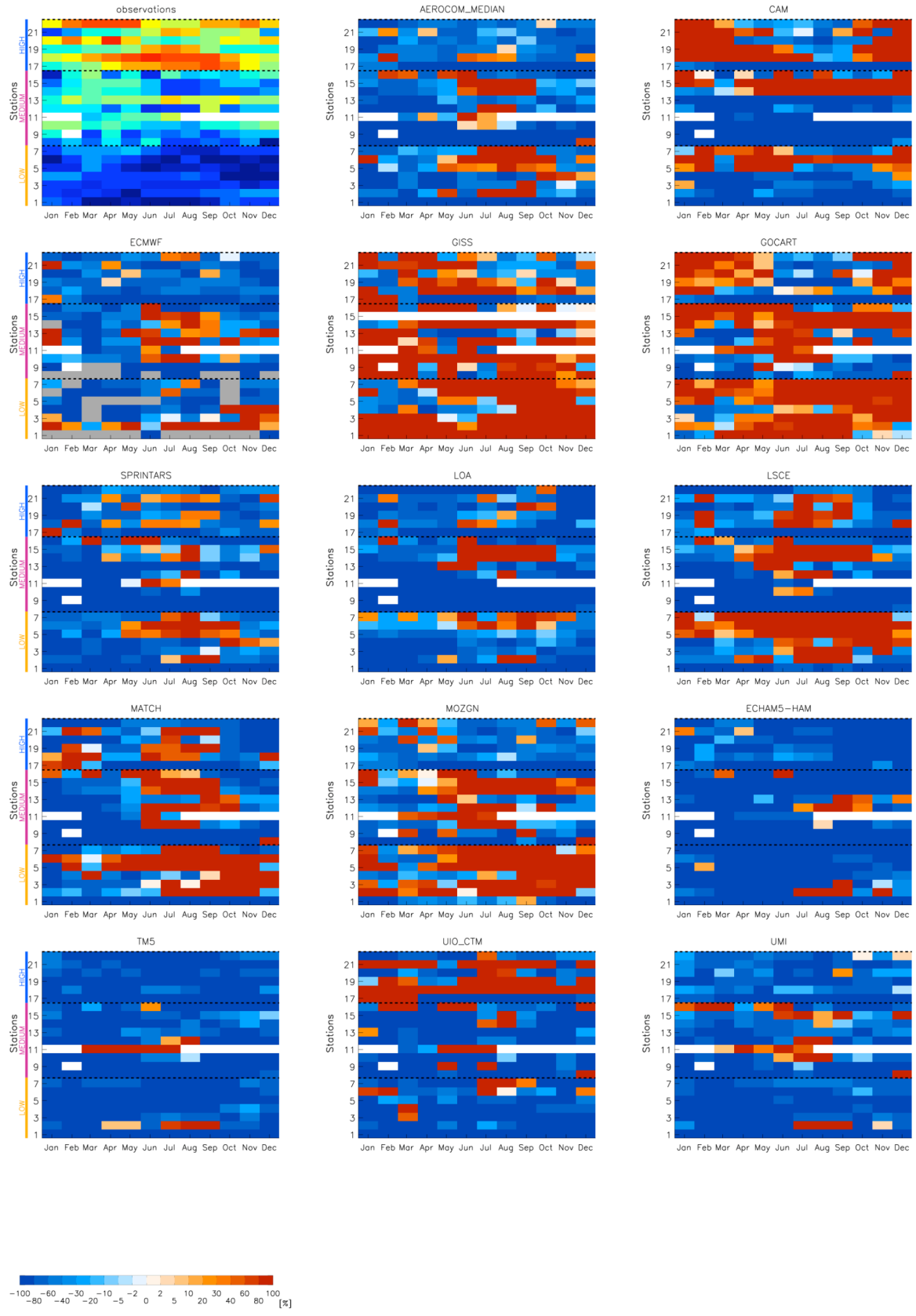

observations
AEROCOM_MEDIAN
CAM
ECMWF
GISS
GOCART
SPRINTARS
LOA
LSCE
MATCH
MOZGN
ECHAM5−HAM
TM5
UIO_CTM
UMI
Stations
HIGH
MEDIUM
LOW
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
−100 −80 −60 −40 −30 −20 −10 −5 −2 0 2 5 10 20 30 40 60 80 100 [%]

Figure S3

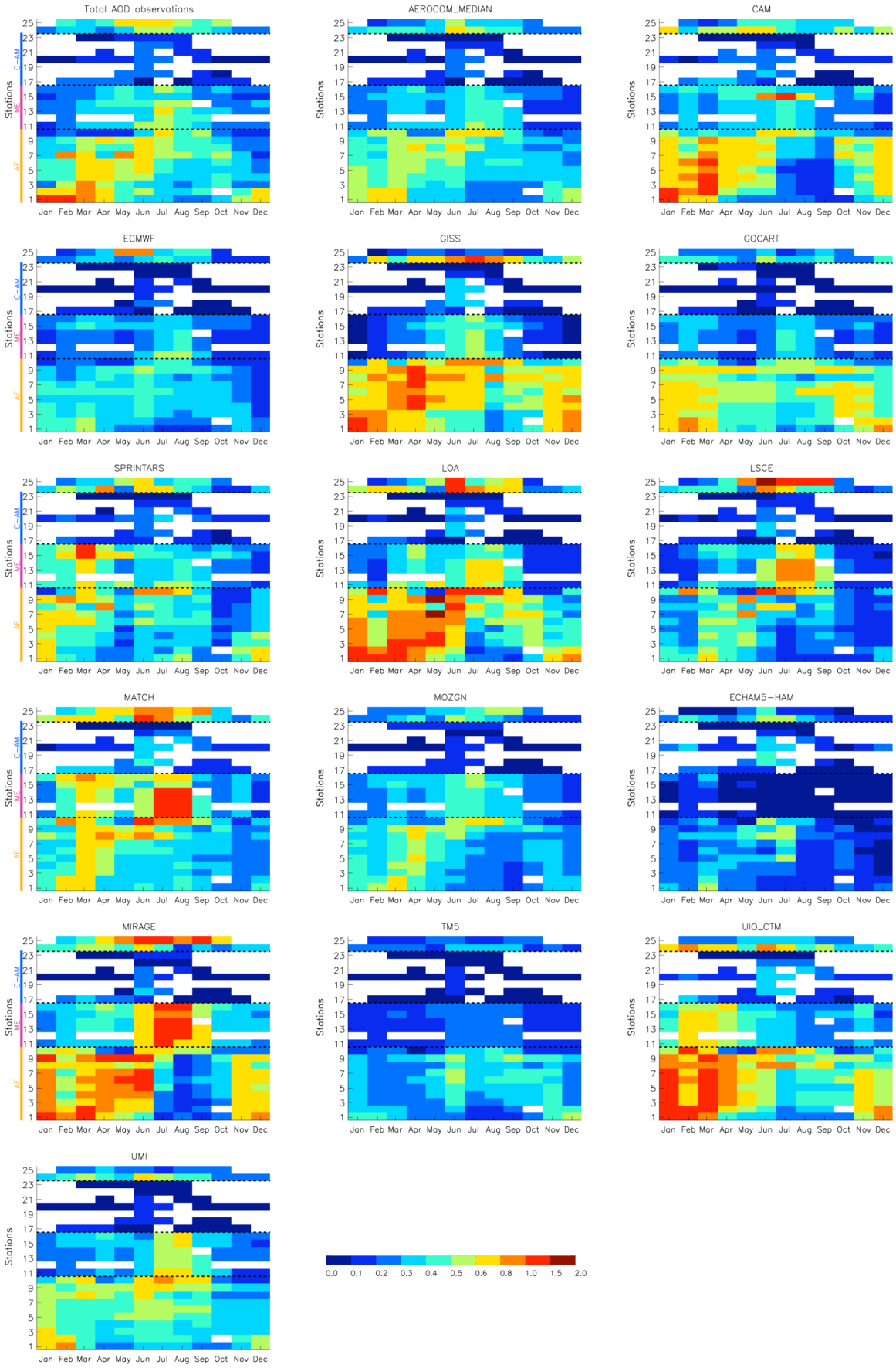

Total AOD observations
AEROCOM_MEDIAN
CAM
ECMWF
GISS
GOCART
SPRINTARS
LOA
LSCE
MATCH
MOZGN
ECHAM5−HAM
MIRAGE
TM5
UIO_CTM
UMI
Stations
C−AM
ME
AF
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.8 1.0 1.5 2.0

Figure S4

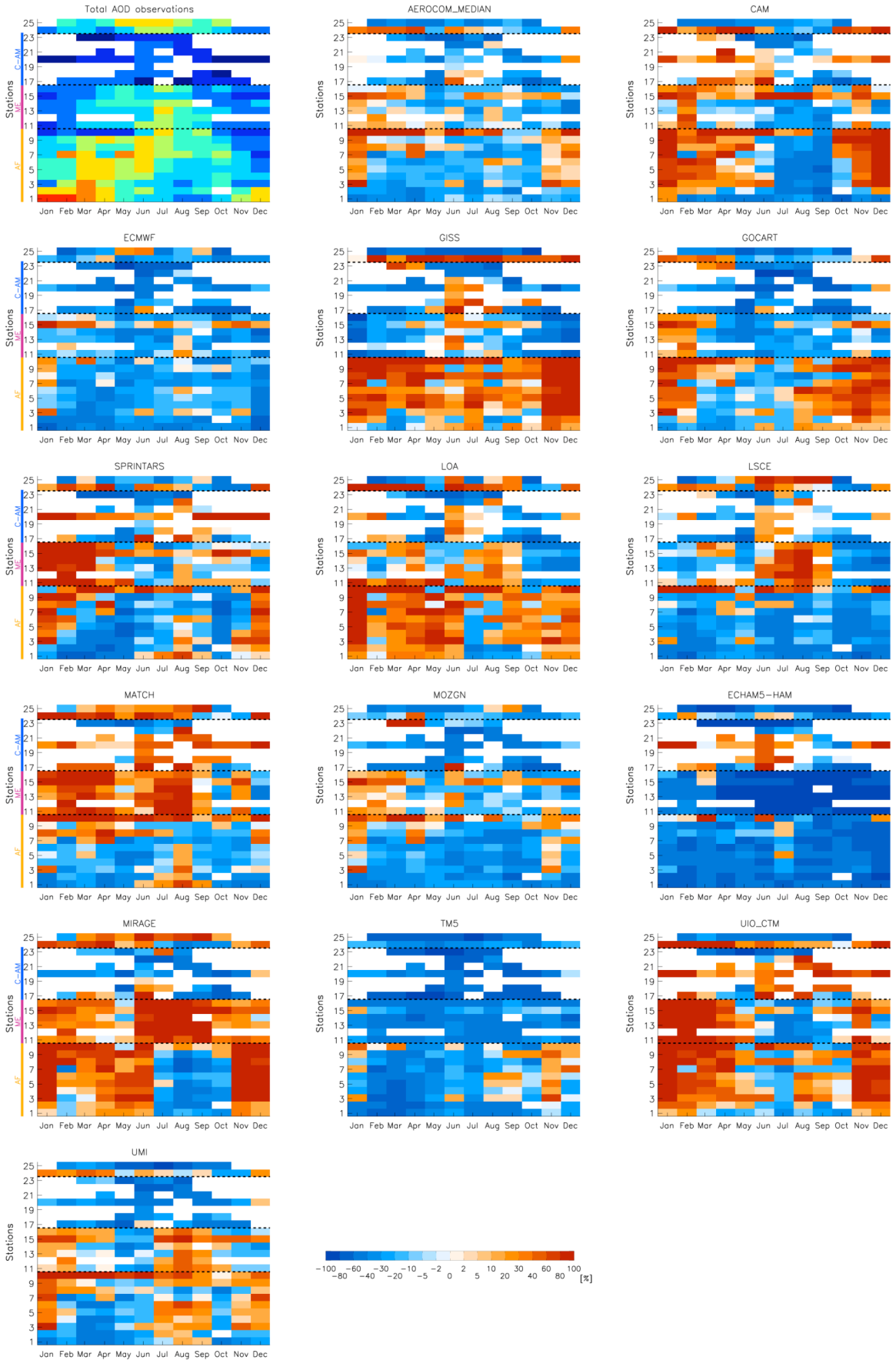
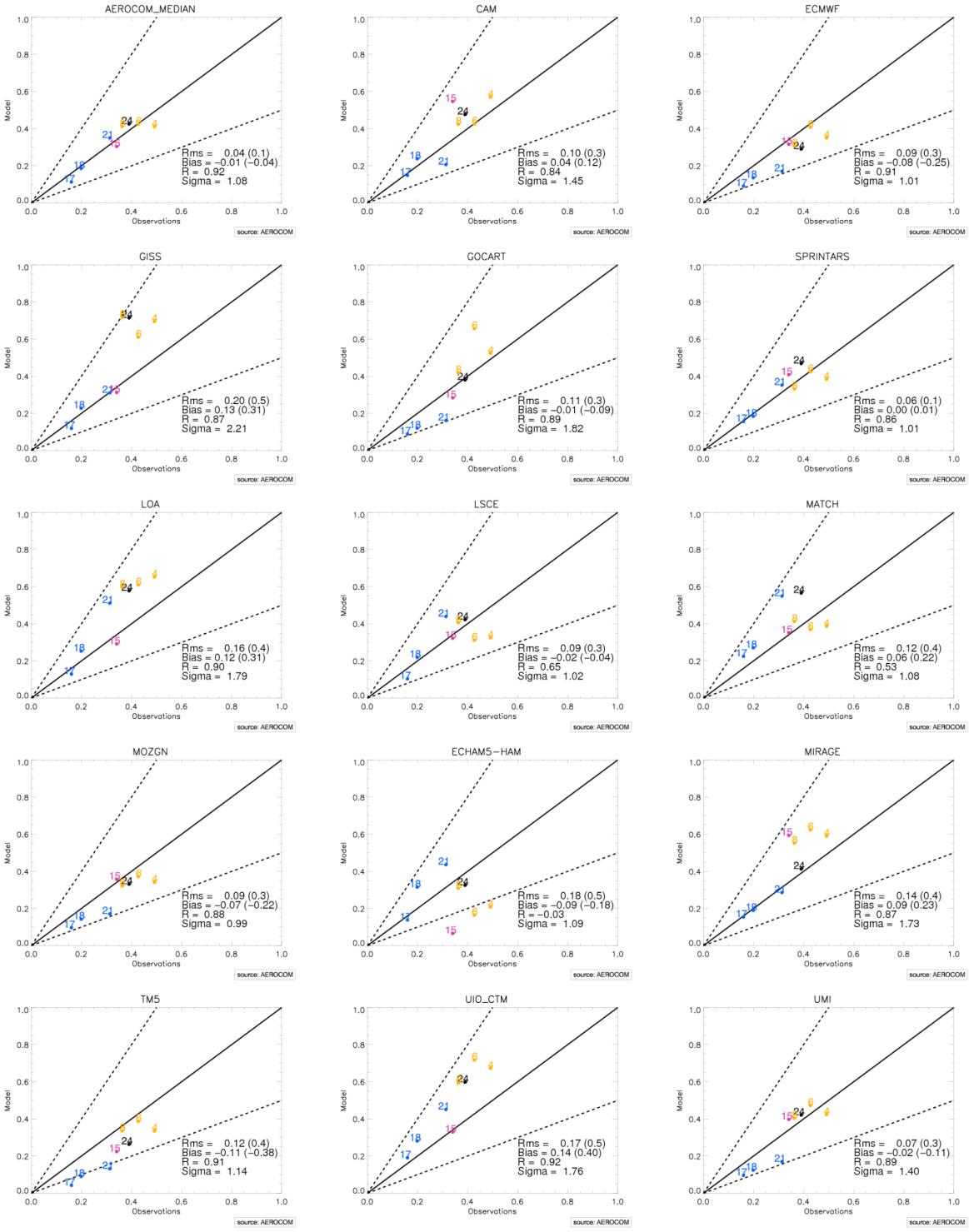

Total AOD observations
AEROCOM_MEDIAN
CAM
ECMWF
GISS
GOCART
SPRINTARS
LOA
LSCE
MATCH
MOZGN
ECHAM5−HAM
MIRAGE
TM5
UIO_CTM
UMI
Stations
C−AM
ME
AF
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
−100 −80 −60 −40 −30 −20 −10 −5 −2 0 2 5 10 20 30 40 60 80 100 [%]

Figure S5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Sigma = 1.08
CAM
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R = 0.84
Sigma = 1.45
ECMWF
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Bias = −0.08 (−0.25)
R = 0.91
Sigma = 1.01
GISS
Rms = 0.20 (0.5)
Bias = 0.13 (0.31)
R = 0.87
Sigma = 2.21
GOCART
Rms = 0.11 (0.3)
Bias = −0.01 (−0.09)
R = 0.89
Sigma = 1.82
SPRINTARS
Rms = 0.06 (0.1)
Bias = 0.00 (0.01)
R = 0.86
Sigma = 1.01
LOA
Rms = 0.16 (0.4)
Bias = 0.12 (0.31)
R = 0.90
Sigma = 1.79
LSCE
Rms = 0.09 (0.3)
Bias = −0.02 (−0.04)
R = 0.65
Sigma = 1.02
MATCH
Rms = 0.12 (0.4)
Bias = 0.06 (0.22)
R = 0.53
Sigma = 1.08
MOZGN
Rms = 0.09 (0.3)
Bias = −0.07 (−0.22)
R = 0.88
Sigma = 0.99
ECHAM5−HAM
Rms = 0.18 (0.5)
Bias = −0.09 (−0.18)
R = −0.03
Sigma = 1.09
MIRAGE
Rms = 0.14 (0.4)
Bias = 0.09 (0.23)
R = 0.87
Sigma = 1.73
TM5
Rms = 0.12 (0.4)
Bias = −0.11 (−0.38)
R = 0.91
Sigma = 1.14
UIO_CTM
Rms = 0.17 (0.5)
Bias = 0.14 (0.40)
R = 0.92
Sigma = 1.76
UMI
Rms = 0.07 (0.3)
Bias = −0.02 (−0.11)
R = 0.89
Sigma = 1.40
Model
Observations
source: AEROCOM

Figure S6

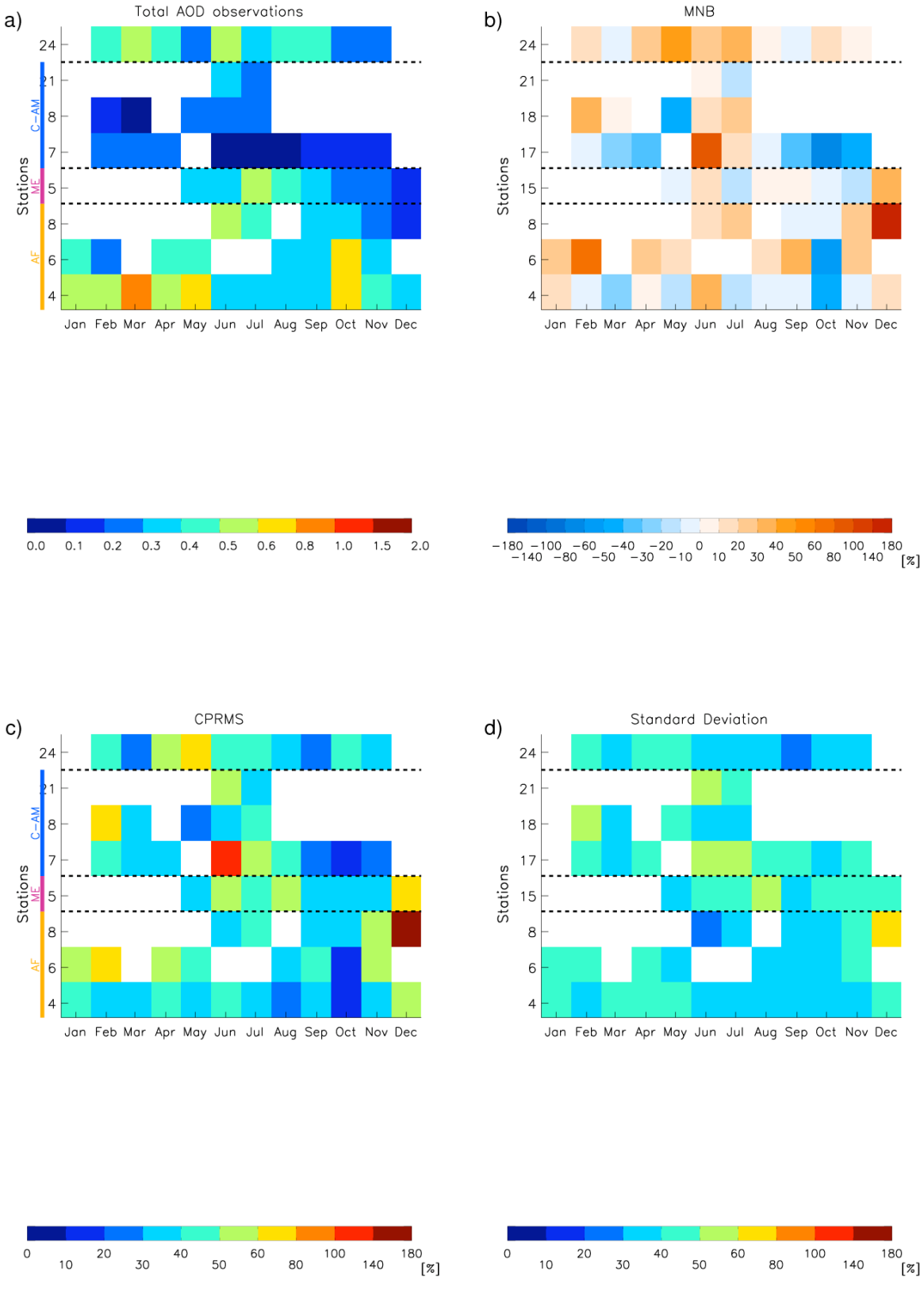
a)
Total AOD observations
Stations
C-AM
ME
AF
24
21
8
7
5
8
6
4
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.8 1.0 1.5 2.0
b)
MNB
Stations
24
21
18
17
15
8
6
4
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
−180 −140 −100 −80 −60 −50 −40 −30 −20 −10 0 10 20 30 40 50 60 80 100 140 180
[%]
c)
CPRMS
Stations
C-AM
ME
AF
24
21
8
7
5
8
6
4
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
0 10 20 30 40 50 60 80 100 140 180
[%]
d)
Standard Deviation
Stations
24
21
18
17
15
8
6
4
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
0 10 20 30 40 50 60 80 100 140 180
[%]

Figure S7

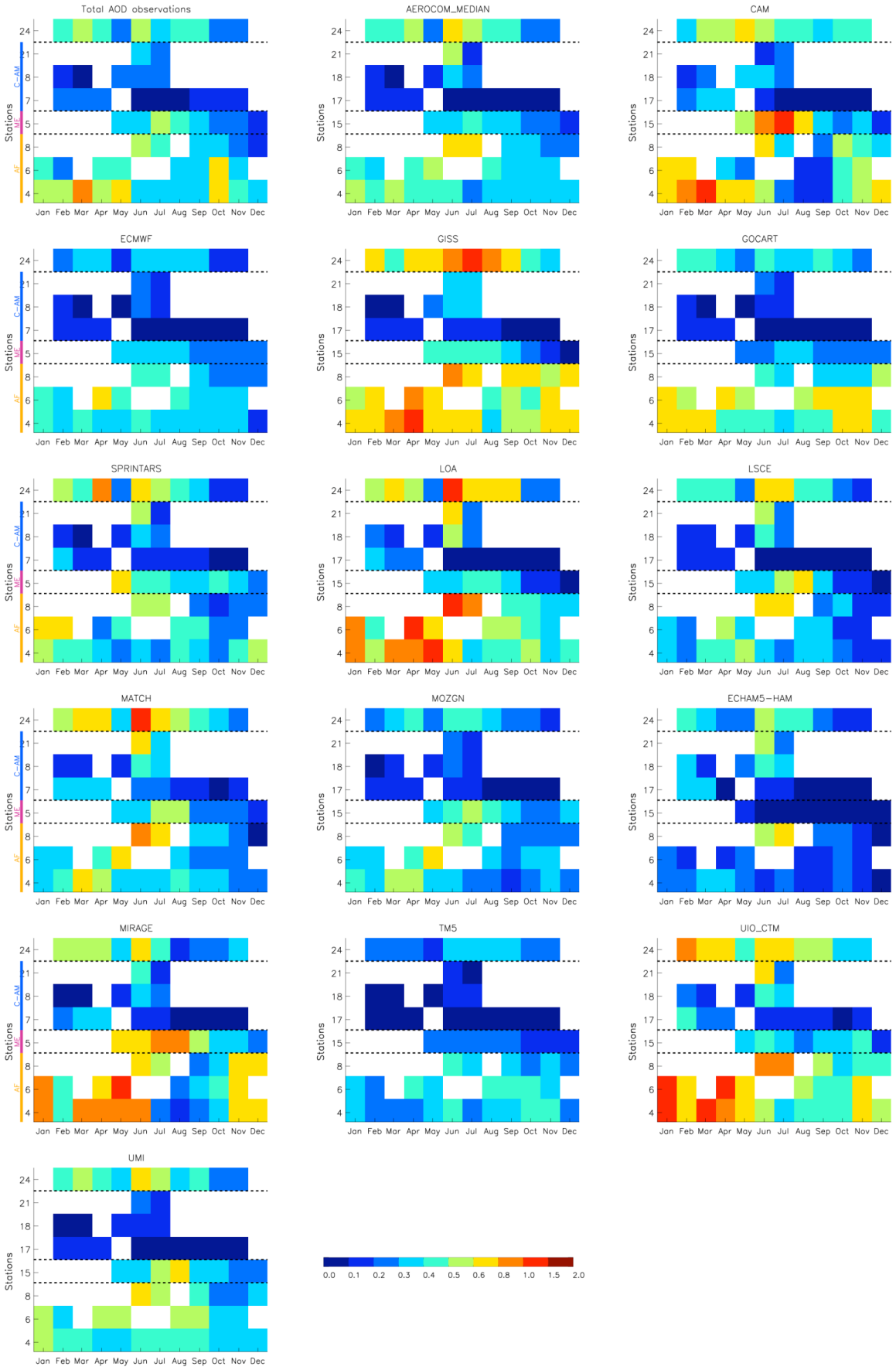
Total AOD observations
AEROCOM_MEDIAN
CAM
ECMWF
GISS
GOCART
SPRINTARS
LOA
LSCE
MATCH
MOZGN
ECHAM5−HAM
MIRAGE
TM5
UIO_CTM
UMI
Stations
C−AM
MA
AF
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.8 1.0 1.5 2.0

Figure S8

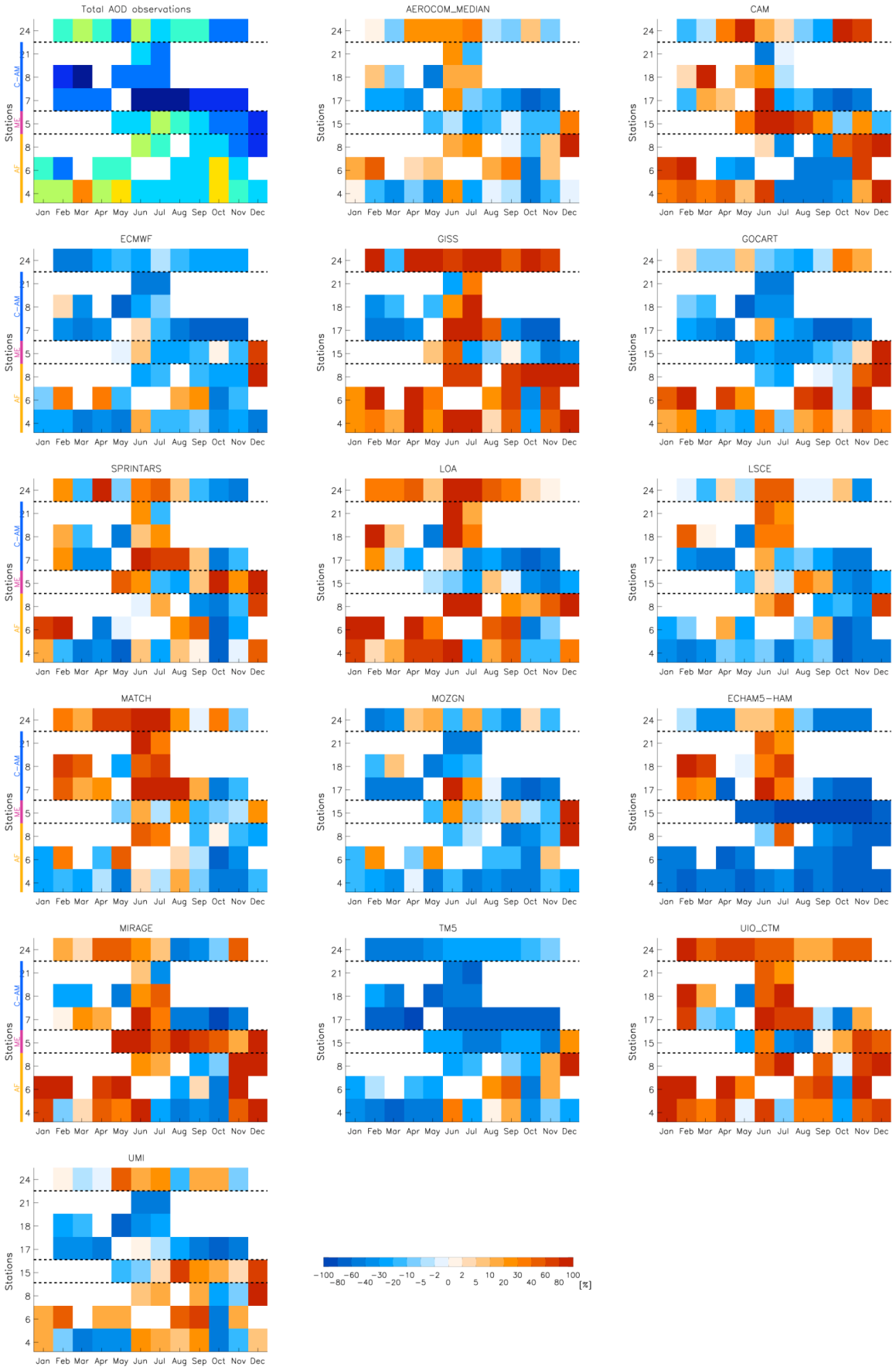
Total AOD observations
AEROCOM_MEDIAN
CAM
ECMWF
GISS
GOCART
SPRINTARS
LOA
LSCE
MATCH
MOZGN
ECHAM5−HAM
MIRAGE
TM5
UIO_CTM
UMI
Stations
C−AM
M
AF
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
−100 −80 −60 −40 −30 −20 −10 −5 −2 0 2 5 10 20 30 40 60 80 100 [%]

Figure S9

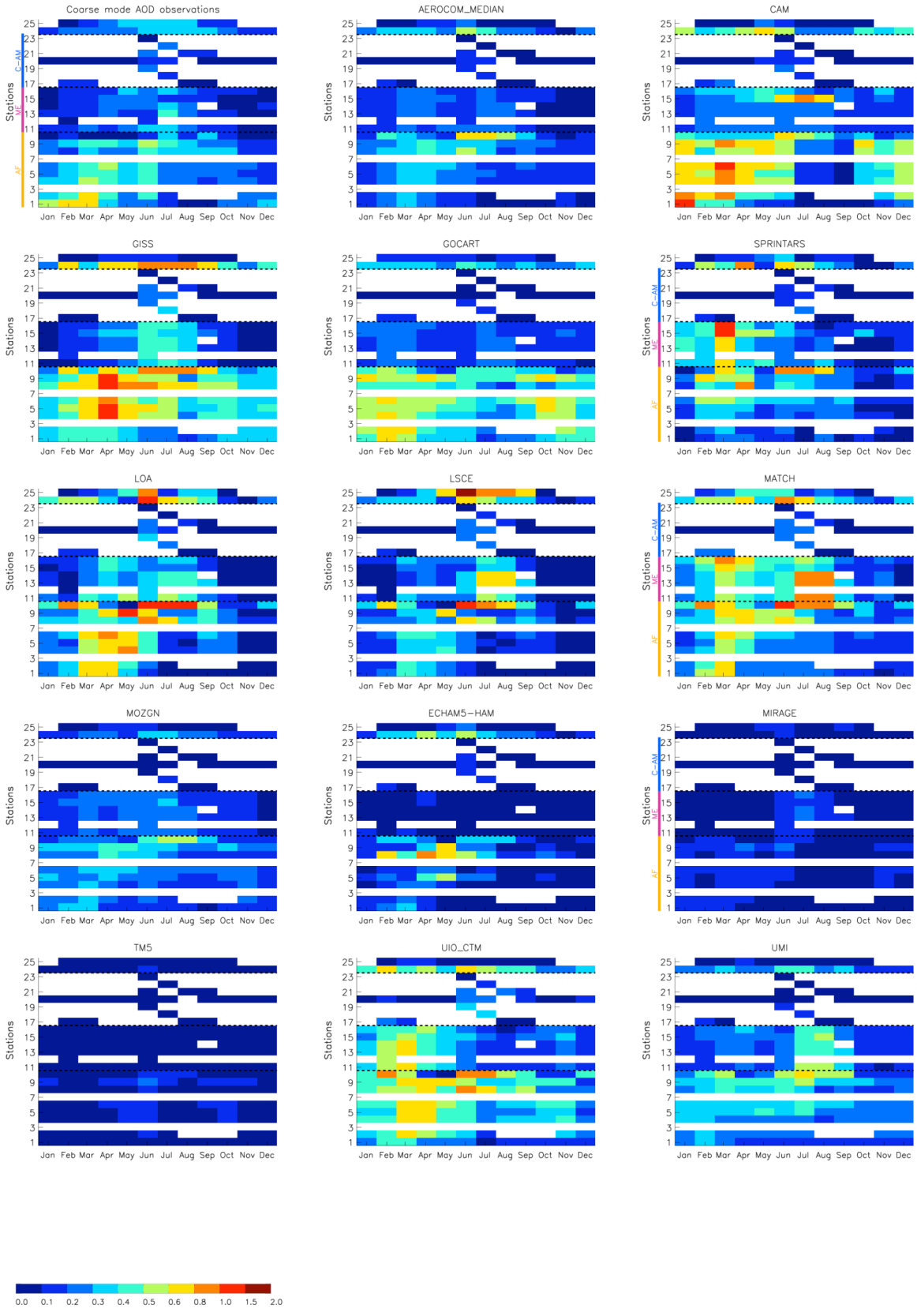
Coarse mode AOD observations
AEROCOM_MEDIAN
CAM
GISS
GOCART
SPRINTARS
LOA
LSCE
MATCH
MOZGN
ECHAM5−HAM
MIRAGE
TM5
UIO_CTM
UMI
Stations
C−AN
MF
AF
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.8 1.0 1.5 2.0

Figure S10

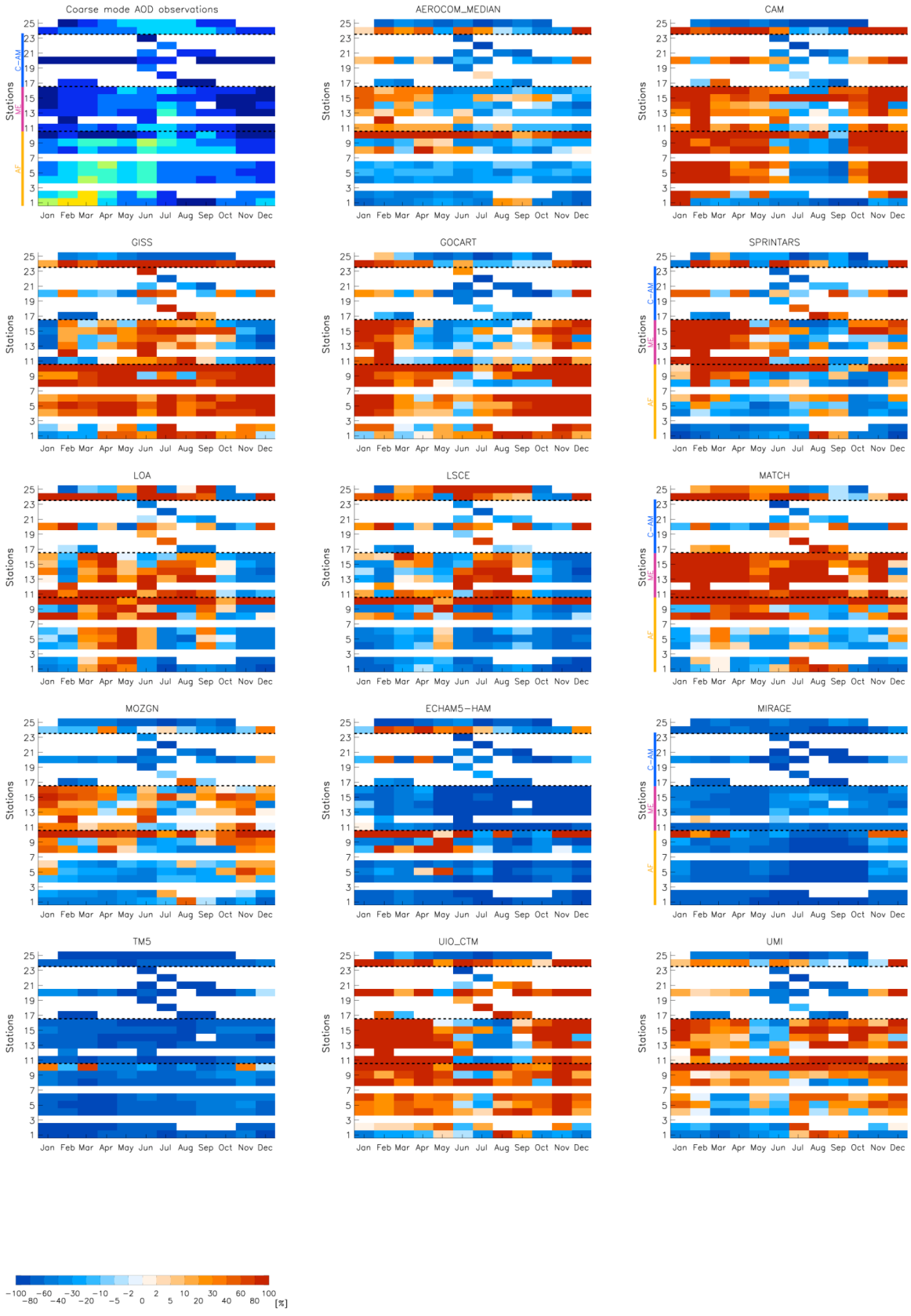
Coarse mode AOD observations
AEROCOM_MEDIAN
CAM
GISS
GOCART
SPRINTARS
LOA
LSCE
MATCH
MOZGN
ECHAM5−HAM
MIRAGE
TM5
UIO_CTM
UMI
Stations
C−AN
ME
AF
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
−100 −80 −60 −40 −30 −20 −10 −5 −2 0 2 5 10 20 30 40 60 80 100 [%]

Figure S11

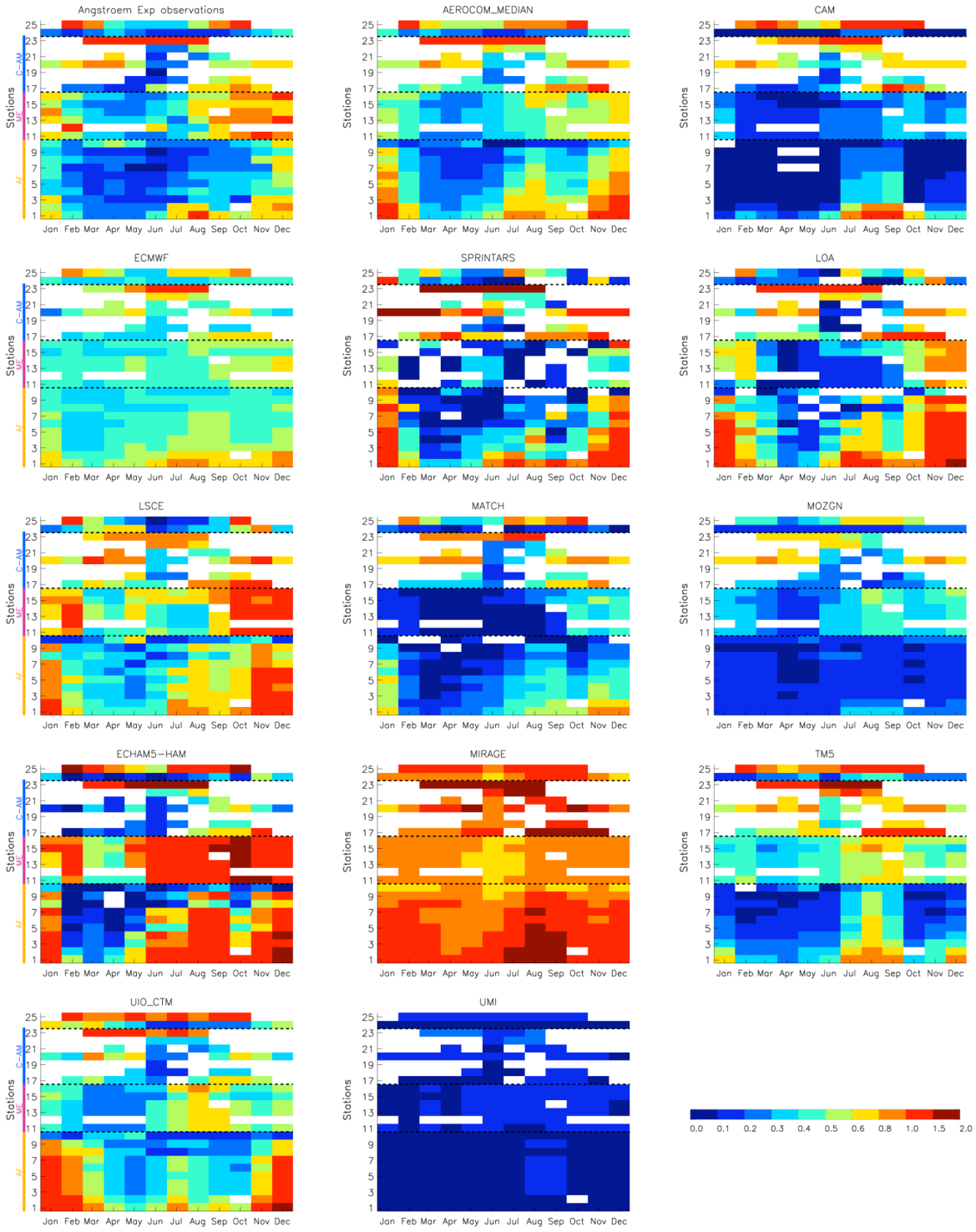
Angstroem Exp observations
AEROCOM_MEDIAN
CAM
ECMWF
SPRINTARS
LOA
LSCE
MATCH
MOZGN
ECHAM5−HAM
MIRAGE
TM5
UIO_CTM
UMI
Stations
C−AM
ME
AF
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.8 1.0 1.5 2.0

Figure S12

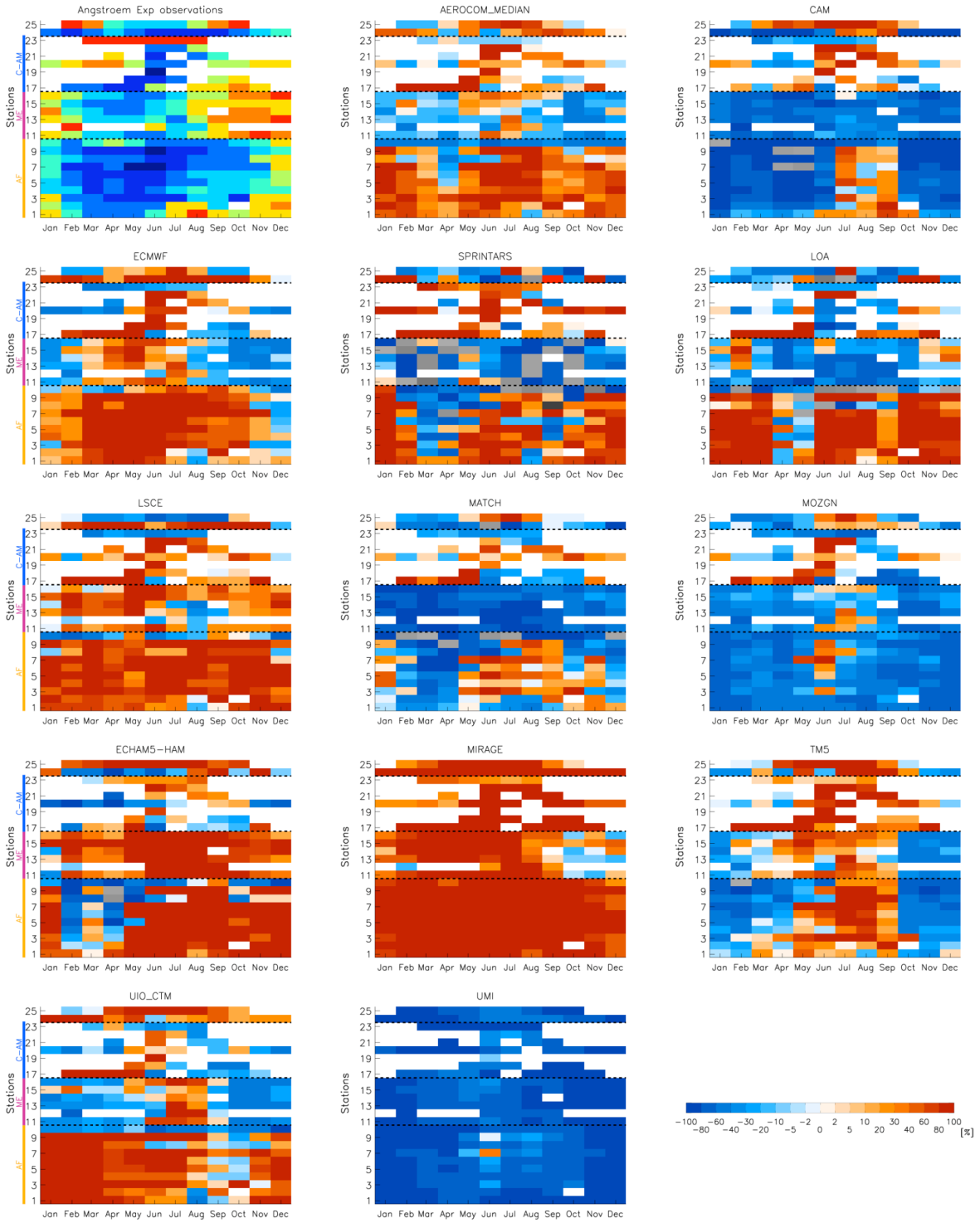
Angstroem Exp observations
AEROCOM_MEDIAN
CAM
ECMWF
SPRINTARS
LOA
LSCE
MATCH
MOZGN
ECHAM5−HAM
MIRAGE
TM5
UIO_CTM
UMI
Stations
C−AM
MF
AF
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
−100 −80 −60 −40 −30 −20 −10 −5 −2 0 2 5 10 20 30 40 60 80 100 [%]

Figure S13

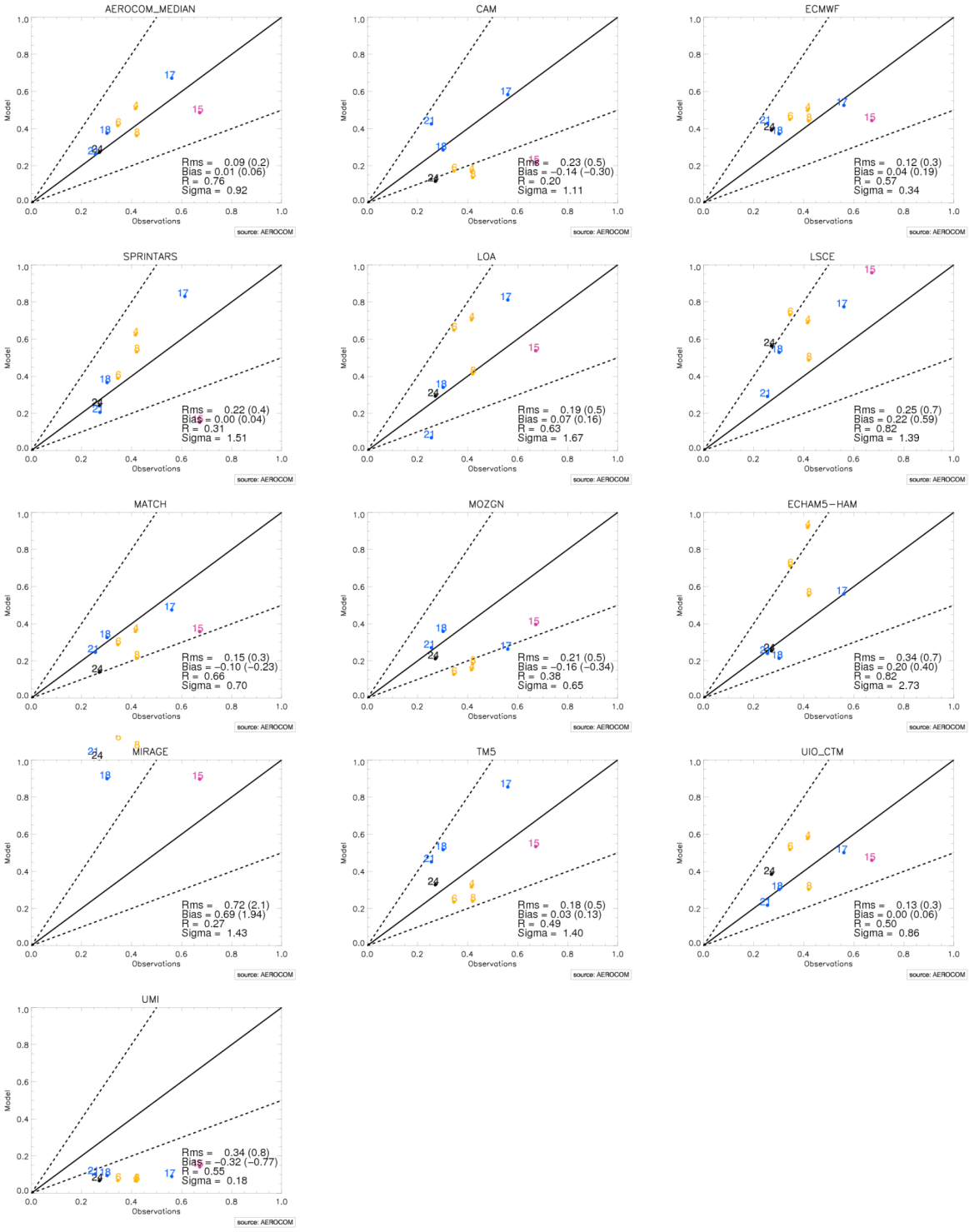
AEROCOM_MEDIAN
Rms = 0.09 (0.2)
Bias = 0.01 (0.06)
R = 0.76
Sigma = 0.92
CAM
Rms = 0.23 (0.5)
Bias = −0.14 (−0.30)
R = 0.20
Sigma = 1.11
ECMWF
Rms = 0.12 (0.3)
Bias = 0.04 (0.19)
R = 0.57
Sigma = 0.34
SPRINTARS
Rms = 0.22 (0.4)
Bias = 0.00 (0.04)
R = 0.31
Sigma = 1.51
LOA
Rms = 0.19 (0.5)
Bias = 0.07 (0.16)
R = 0.63
Sigma = 1.67
LSCE
Rms = 0.25 (0.7)
Bias = 0.22 (0.59)
R = 0.82
Sigma = 1.39
MATCH
Rms = 0.15 (0.3)
Bias = −0.10 (−0.23)
R = 0.66
Sigma = 0.70
MOZGN
Rms = 0.21 (0.5)
Bias = −0.16 (−0.34)
R = 0.38
Sigma = 0.65
ECHAM5−HAM
Rms = 0.34 (0.7)
Bias = 0.20 (0.40)
R = 0.82
Sigma = 2.73
MIRAGE
Rms = 0.72 (2.1)
Bias = 0.69 (1.94)
R = 0.27
Sigma = 1.43
TM5
Rms = 0.18 (0.5)
Bias = 0.03 (0.13)
R = 0.49
Sigma = 1.40
UIO_CTM
Rms = 0.13 (0.3)
Bias = 0.00 (0.06)
R = 0.50
Sigma = 0.86
UMI
Rms = 0.34 (0.8)
Bias = −0.32 (−0.77)
R = 0.55
Sigma = 0.18
Model
Observations
source: AEROCOM

Figure S14

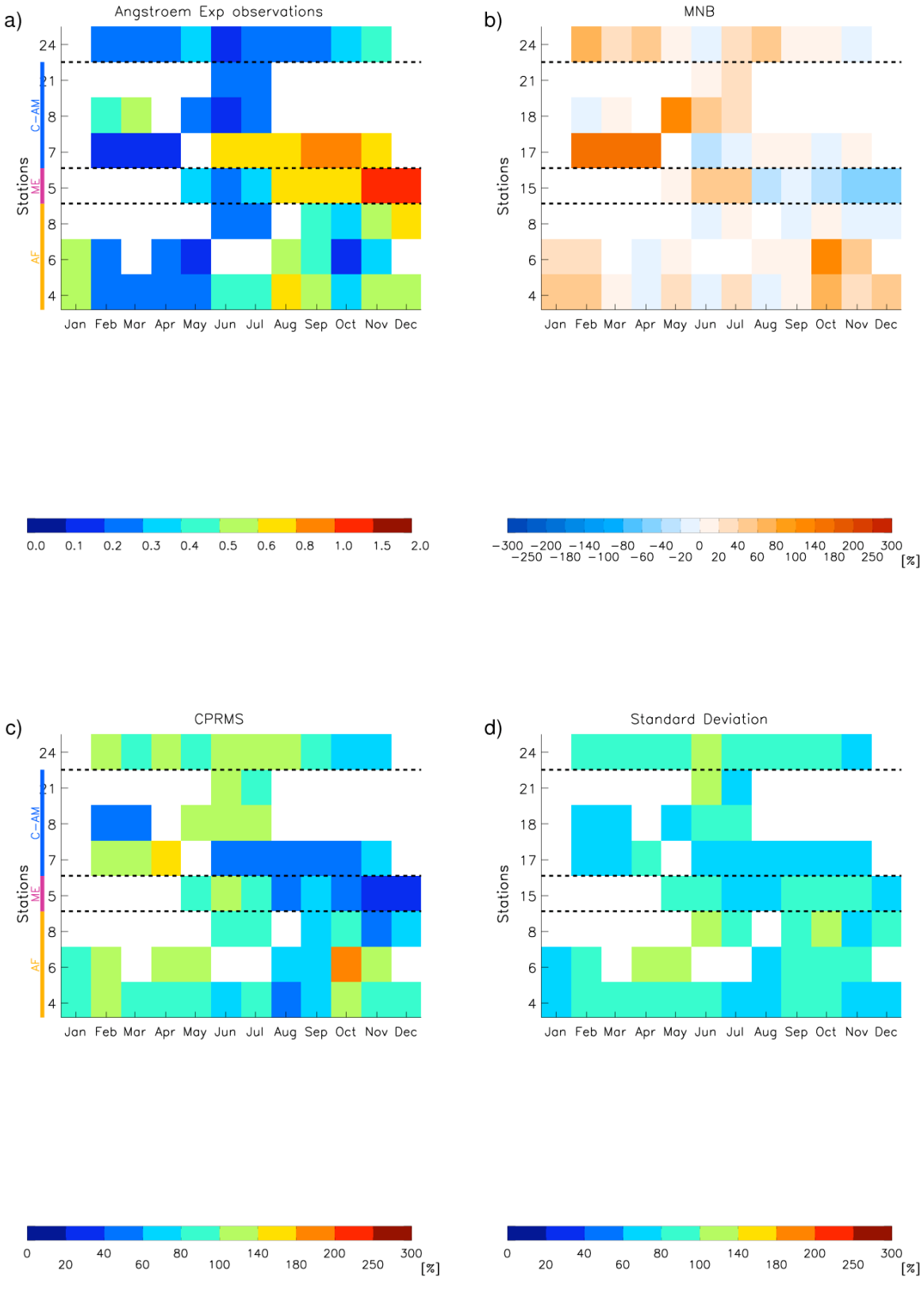
a)
Angstroem Exp observations
Stations
C-AM
ME
AF
24
21
8
7
5
8
6
4
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.8 1.0 1.5 2.0
b)
MNB
Stations
24
21
18
17
15
8
6
4
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
−300 −250 −200 −180 −140 −100 −80 −60 −40 −20 0 20 40 60 80 100 140 180 200 250 300
[%]
c)
CPRMS
Stations
C-AM
ME
AF
24
21
8
7
5
8
6
4
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
0 20 40 60 80 100 140 180 200 250 300
[%]
d)
Standard Deviation
Stations
24
21
18
17
15
8
6
4
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
0 20 40 60 80 100 140 180 200 250 300
[%]

Figure S15

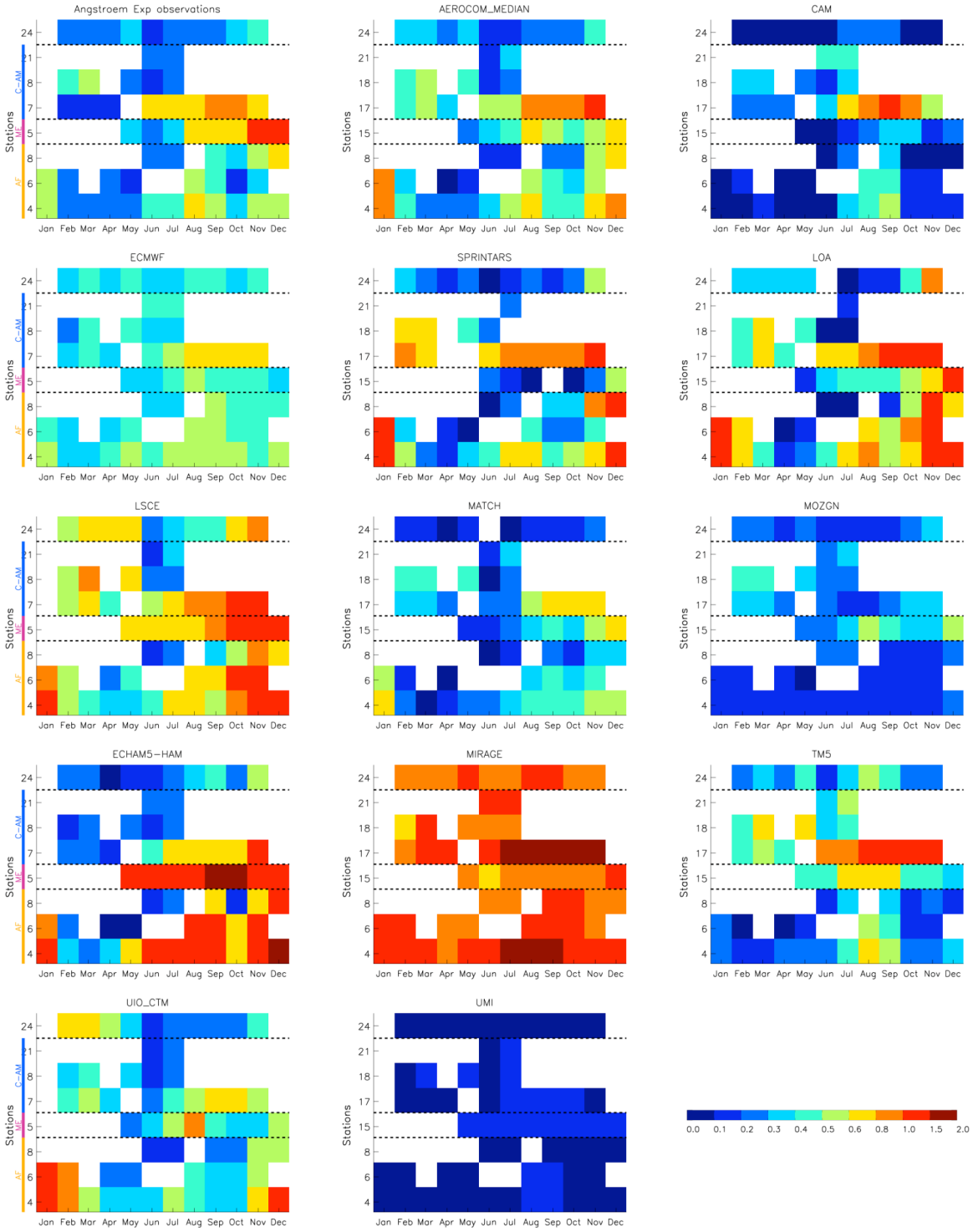
Angstroem Exp observations
AEROCOM_MEDIAN
CAM
ECMWF
SPRINTARS
LOA
LSCE
MATCH
MOZGN
ECHAM5−HAM
MIRAGE
TM5
UIO_CTM
UMI
Stations
C−AM
M
AF
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.8 1.0 1.5 2.0

Figure S16

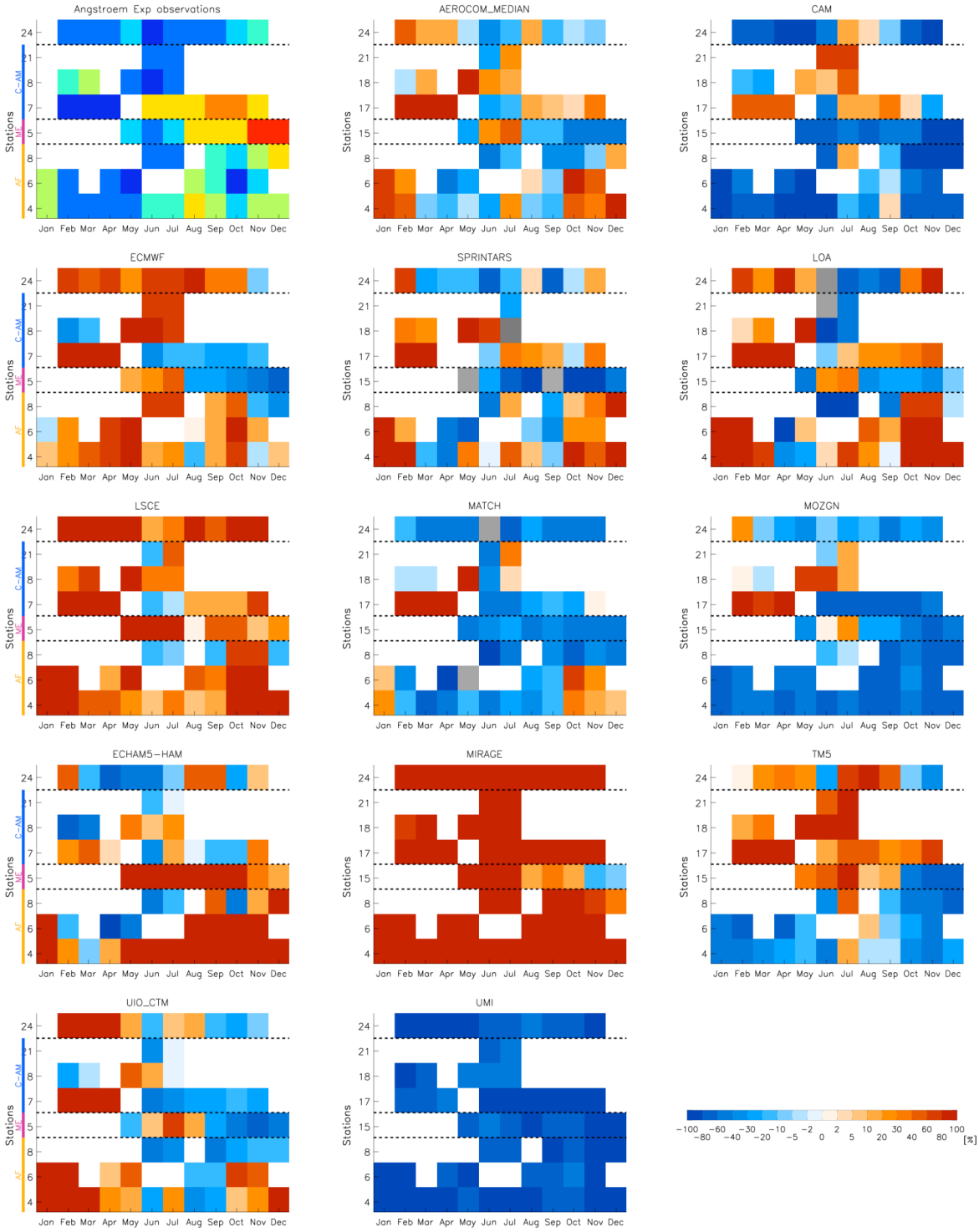
Angstroem Exp observations
AEROCOM_MEDIAN
CAM
ECMWF
SPRINTARS
LOA
LSCE
MATCH
MOZGN
ECHAM5−HAM
MIRAGE
TM5
UIO_CTM
UMI
Stations
C−AM
M
AF
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
−100 −80 −60 −40 −30 −20 −10 −5 −2 0 2 5 10 20 30 40 60 80 100 [%]

Figure S17