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Supplement of

Modeled deposition of nitrogen and sulfur in Europe estimated by 14 air quality model systems: evaluation, effects of changes in emissions and implications for habitat protection

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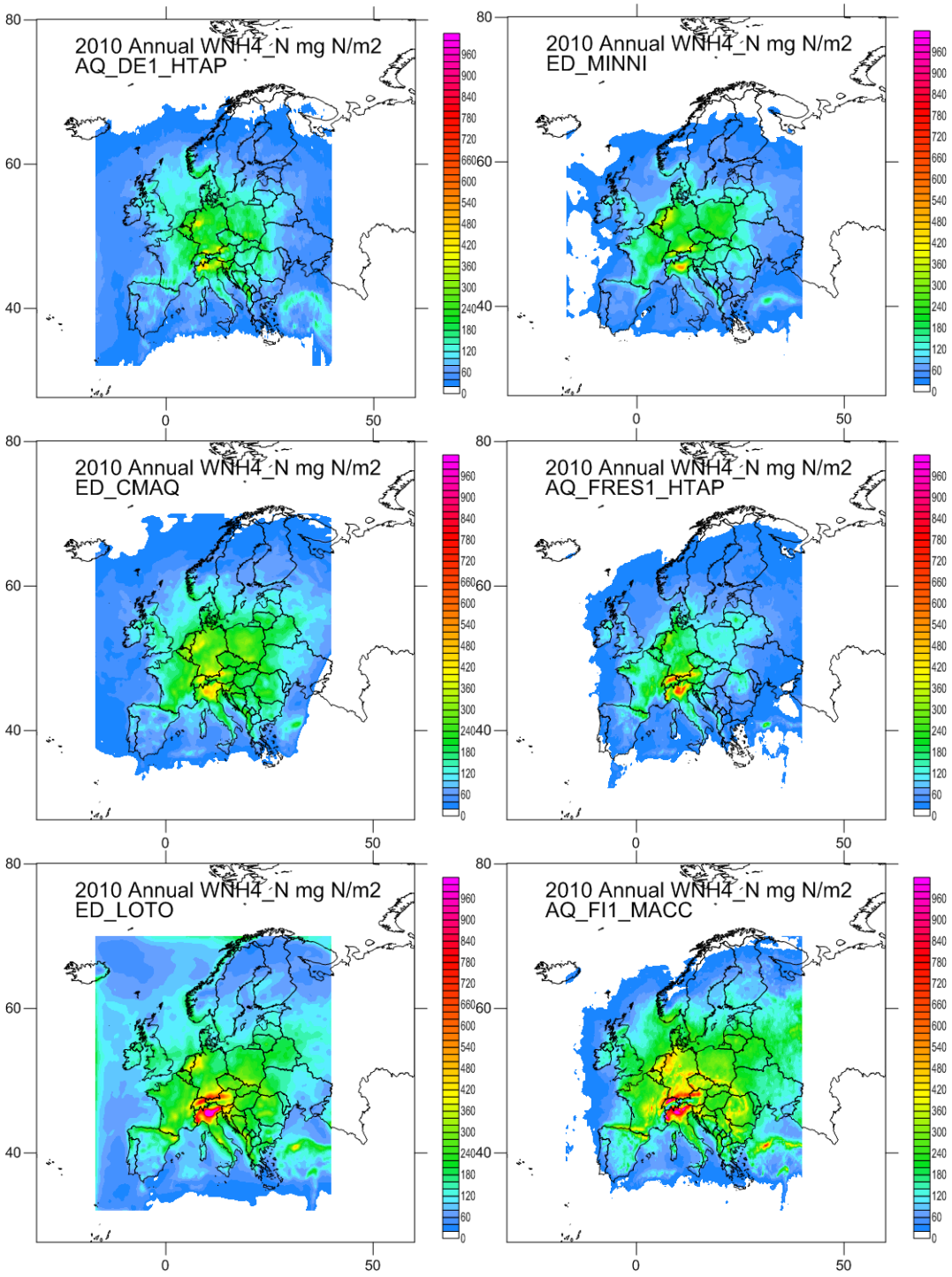
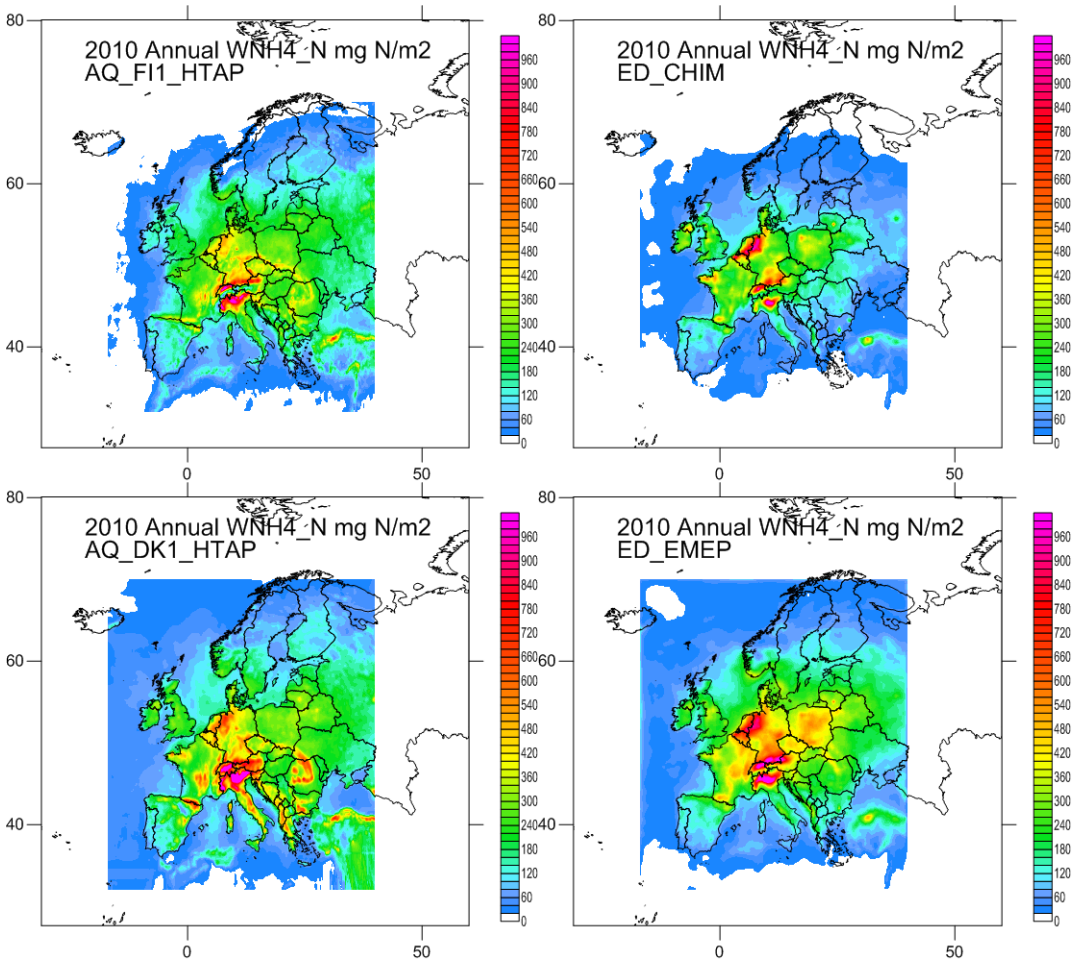
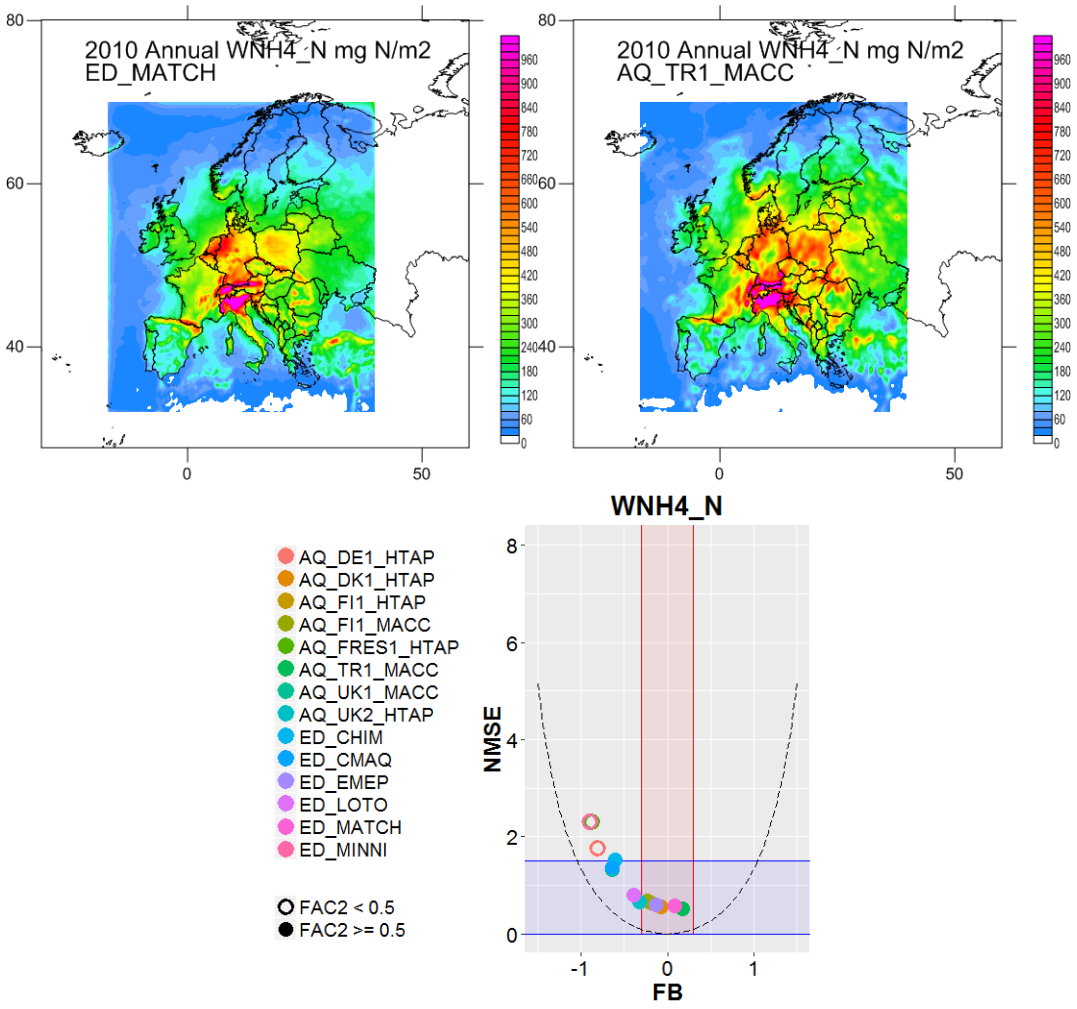
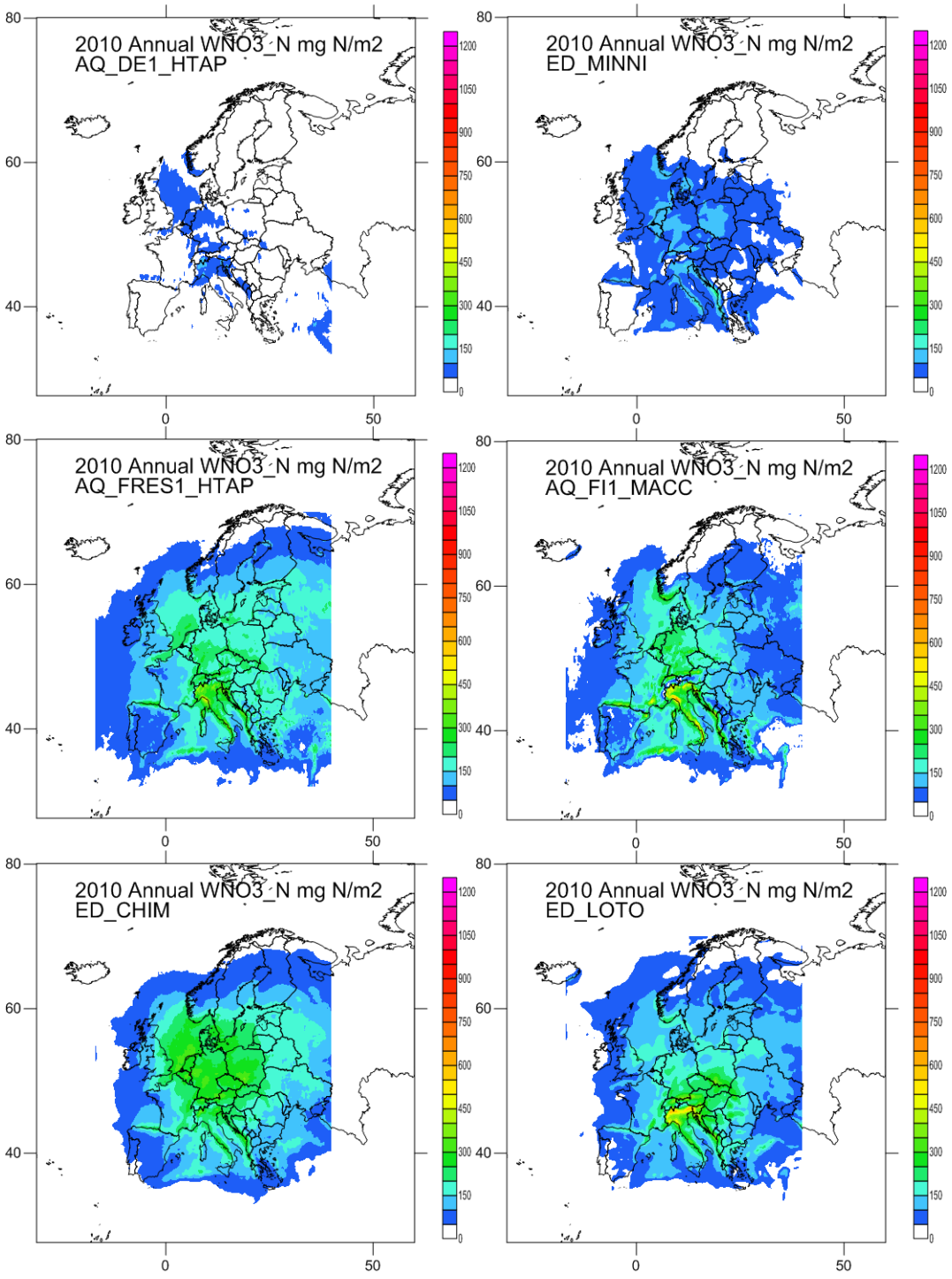
S1.1 Annual deposition of WNH4_N

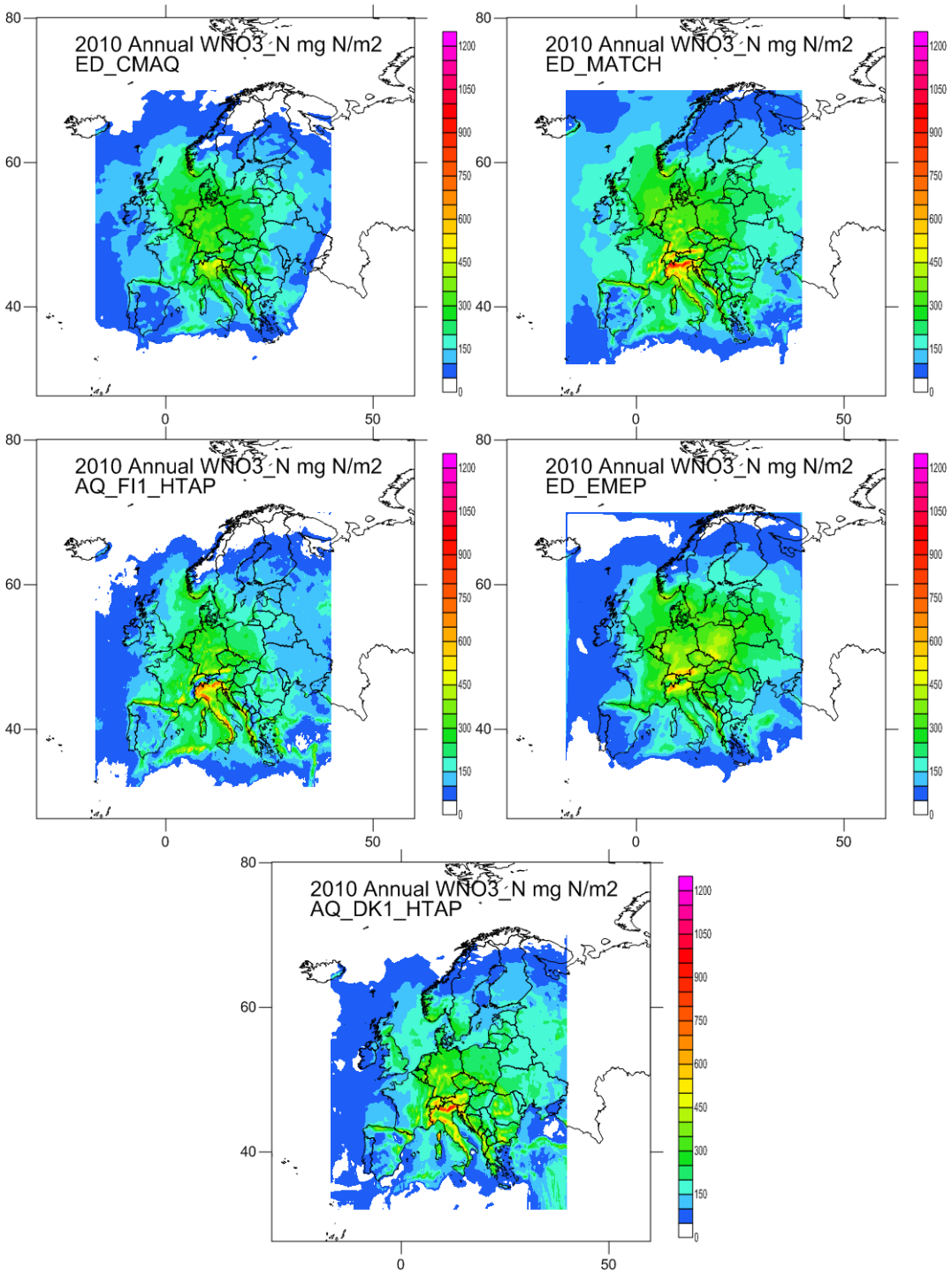


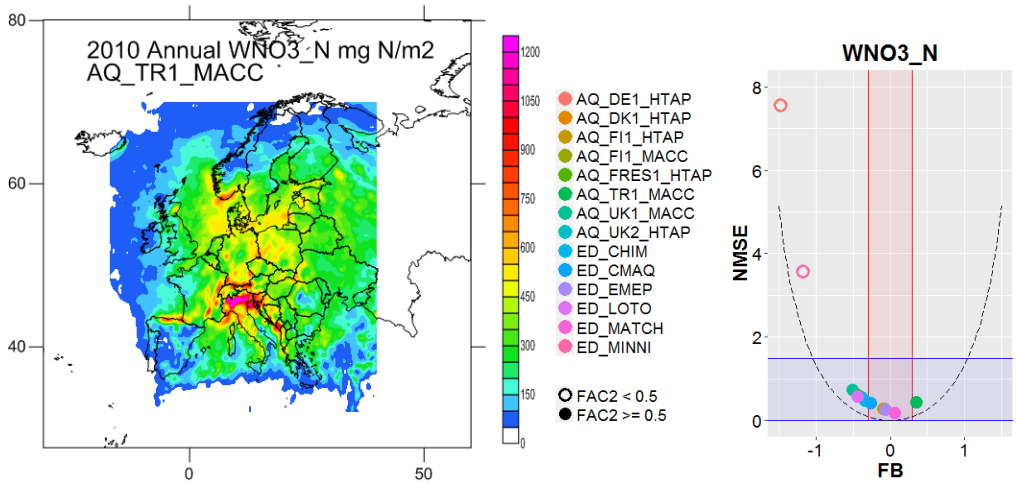

2010 Annual WNH4_N mg N/m2
AQ_FI1_HTAP
2010 Annual WNH4_N mg N/m2
ED_CHIM
2010 Annual WNH4_N mg N/m2
AQ_DK1_HTAP
2010 Annual WNH4_N mg N/m2
ED_EMEP
80
60
40
0
50
960
900
840
780
720
660
600
540
480
420
360
300
240
180
120
60
0


2010 Annual WNH4_N mg N/m2
ED_MATCH
2010 Annual WNH4_N mg N/m2
AQ_TR1_MACC
80
60
40
0
50
960
900
840
780
720
660
600
540
480
420
360
300
240
180
120
60
0
WNH4_N
AQ_DE1_HTAP
AQ_DK1_HTAP
AQ_FI1_HTAP
AQ_FI1_MACC
AQ_FRES1_HTAP
AQ_TR1_MACC
AQ_UK1_MACC
AQ_UK2_HTAP
ED_CHIM
ED_CMAQ
ED_EMEP
ED_LOTO
ED_MATCH
ED_MINNI
FAC2 < 0.5
FAC2 >= 0.5
NMSE
FB
8
6
4
2
0
-1
0
1

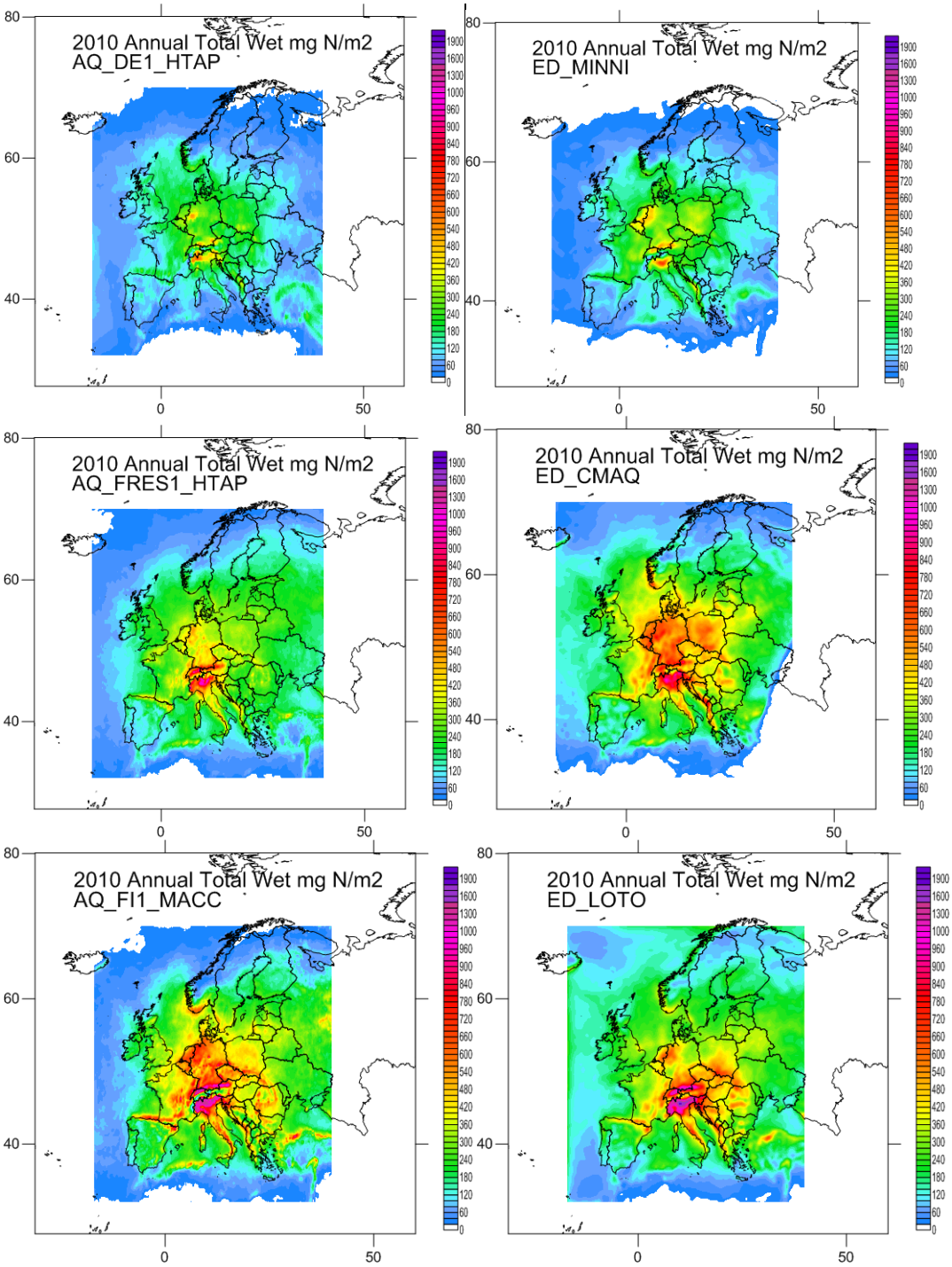
S1.2 Annual deposition of WNO3_N

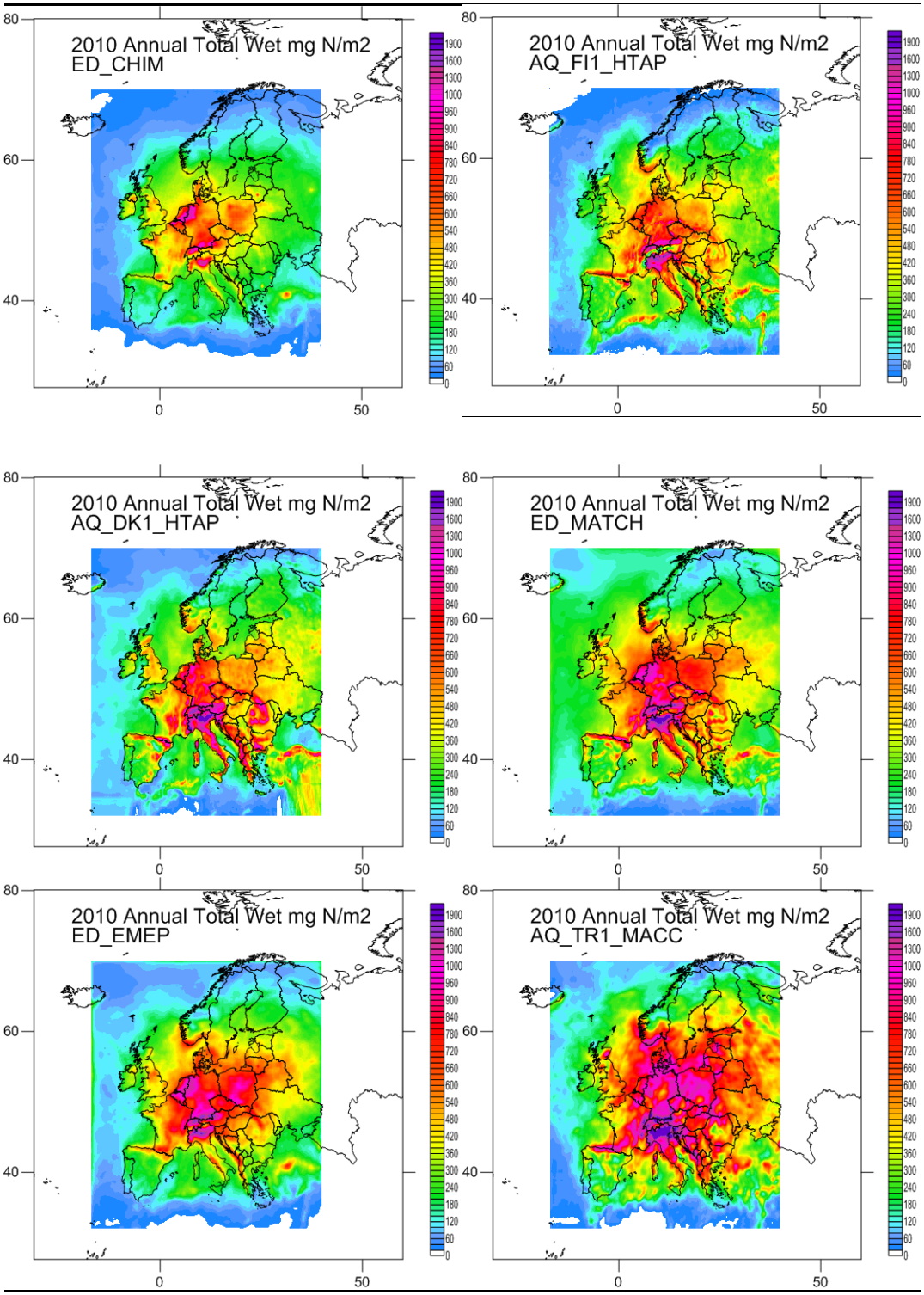



2010 Annual WNO3_N mg N/m2
ED_CMAQ
2010 Annual WNO3_N mg N/m2
ED_MATCH
2010 Annual WNO3_N mg N/m2
AQ_FI1_HTAP
2010 Annual WNO3_N mg N/m2
ED_EMEP
2010 Annual WNO3_N mg N/m2
AQ_DK1_HTAP
80
60
40
0
50
1200
1050
900
750
600
450
300
150
0

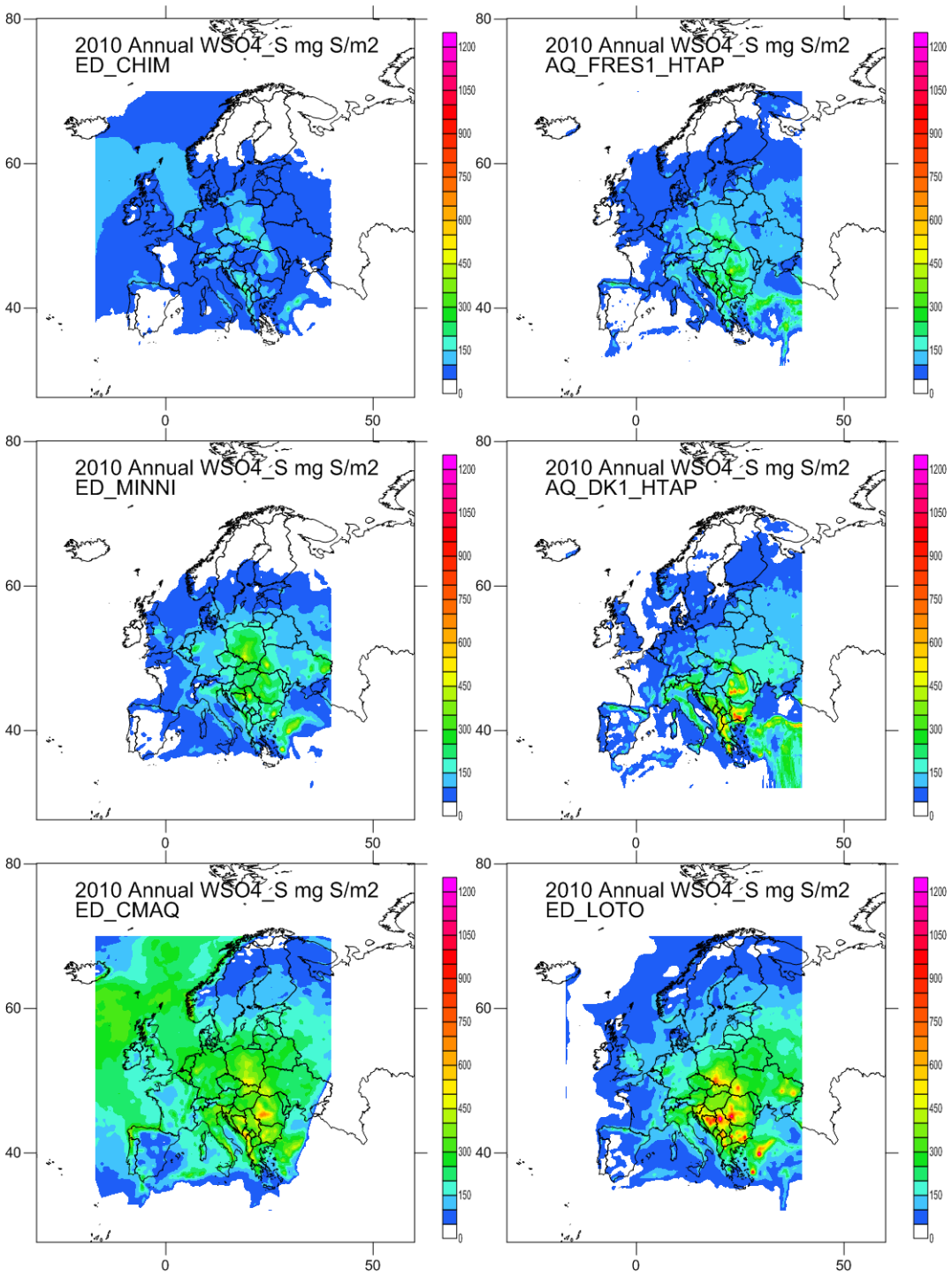

2010 Annual WNO3_N mg N/m2
AQ_TR1_MACC
80
60
40
0
50
1200
1050
900
750
600
450
300
150
0
AQ_DE1_HTAP
AQ_DK1_HTAP
AQ_FI1_HTAP
AQ_FI1_MACC
AQ_FRES1_HTAP
AQ_TR1_MACC
AQ_UK1_MACC
AQ_UK2_HTAP
ED_CHIM
ED_CMAQ
ED_EMEP
ED_LOTO
ED_MATCH
ED_MINNI
FAC2 < 0.5
FAC2 >= 0.5
WNO3_N
NMSE
FB
8
6
4
2
0
-1
0
1

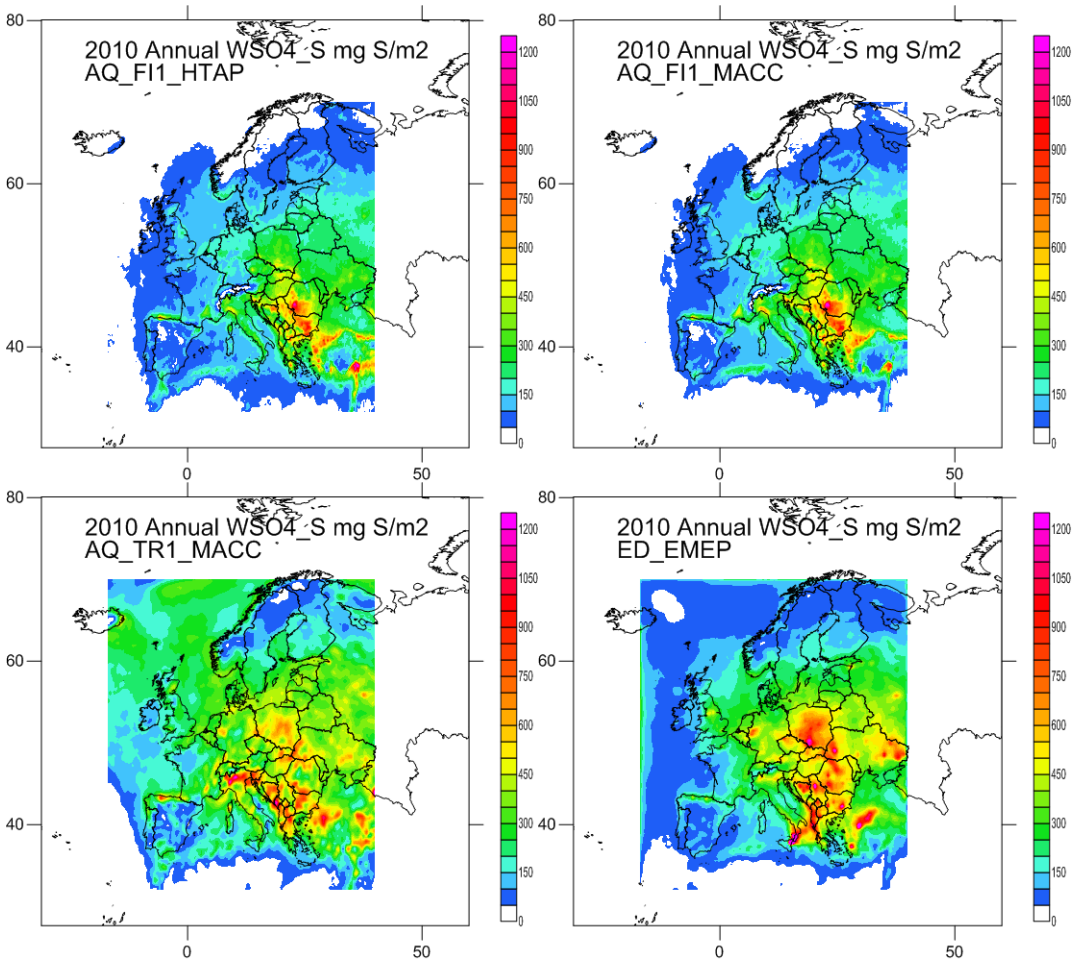
S1.3 Annual deposition of total wet N (WNH4_N + WNO3_N)

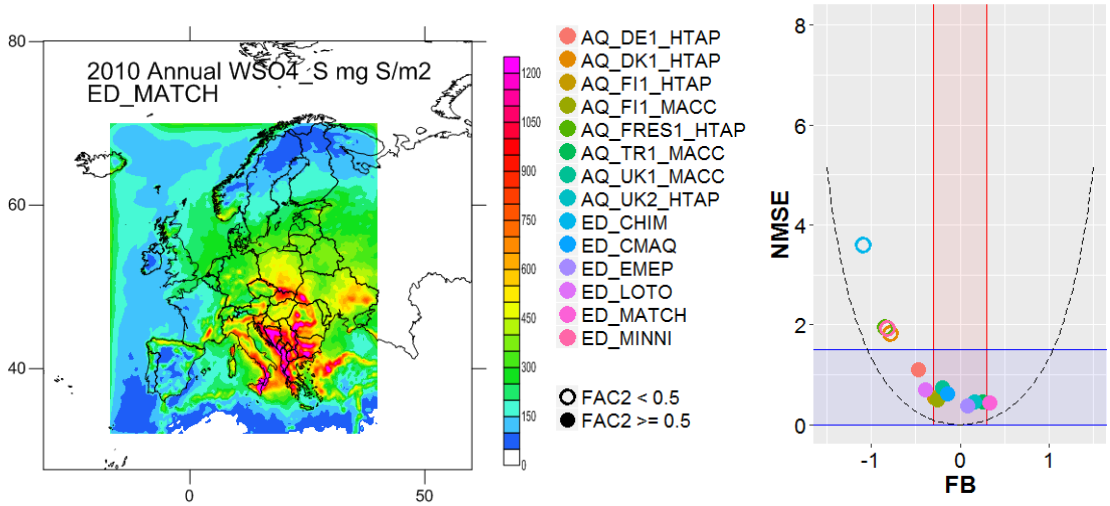



2010 Annual Total Wet mg N/m2
ED_CHIM
2010 Annual Total Wet mg N/m2
AQ_FI1_HTAP
2010 Annual Total Wet mg N/m2
AQ_DK1_HTAP
2010 Annual Total Wet mg N/m2
ED_MATCH
2010 Annual Total Wet mg N/m2
ED_EMEP
2010 Annual Total Wet mg N/m2
AQ_TR1_MACC
80
60
40
0
50
1900
1600
1300
1000
960
900
840
780
720
660
600
540
480
420
360
300
240
180
120
60
0

S1.3 Annual deposition of WSO4_S

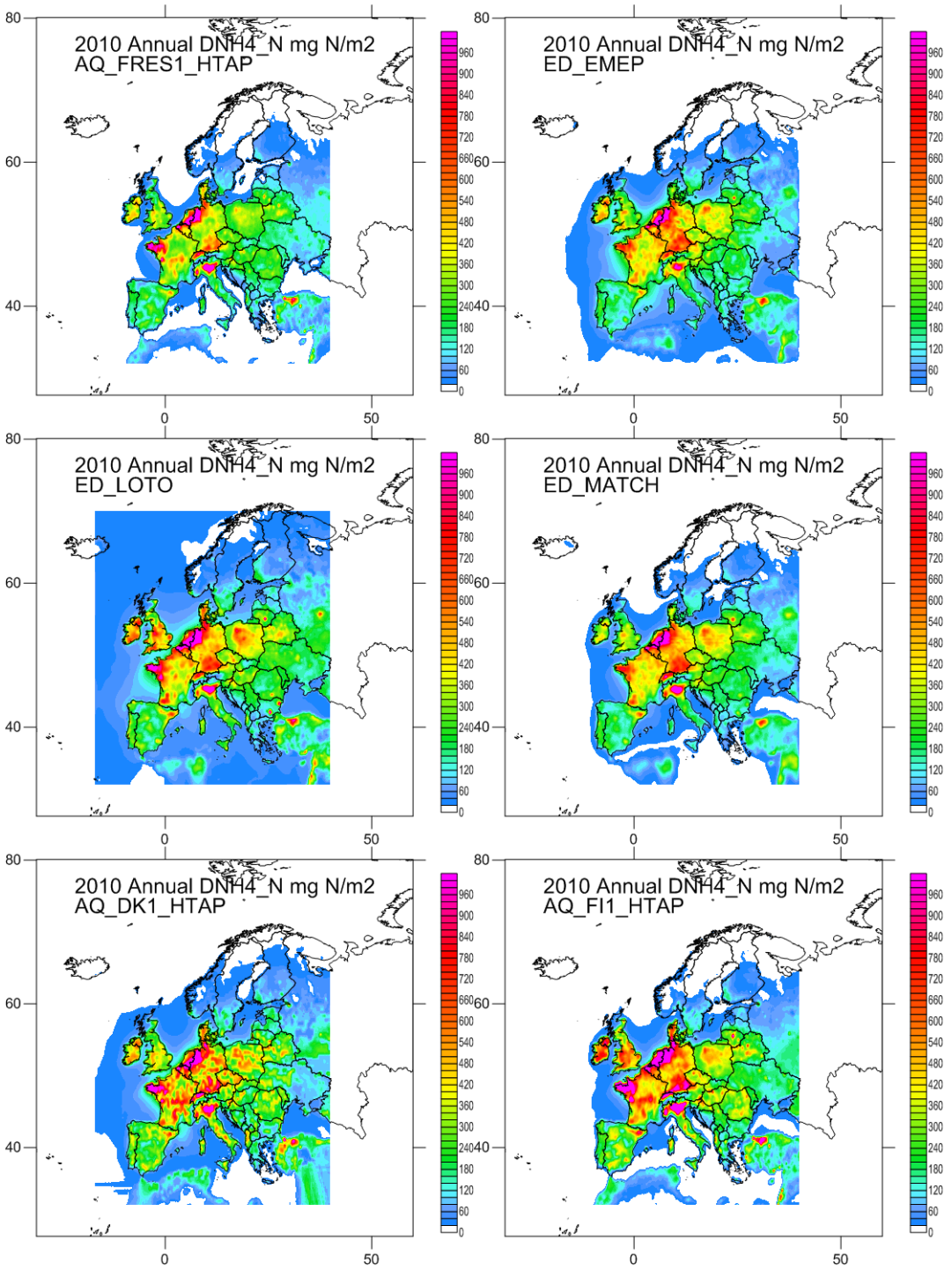


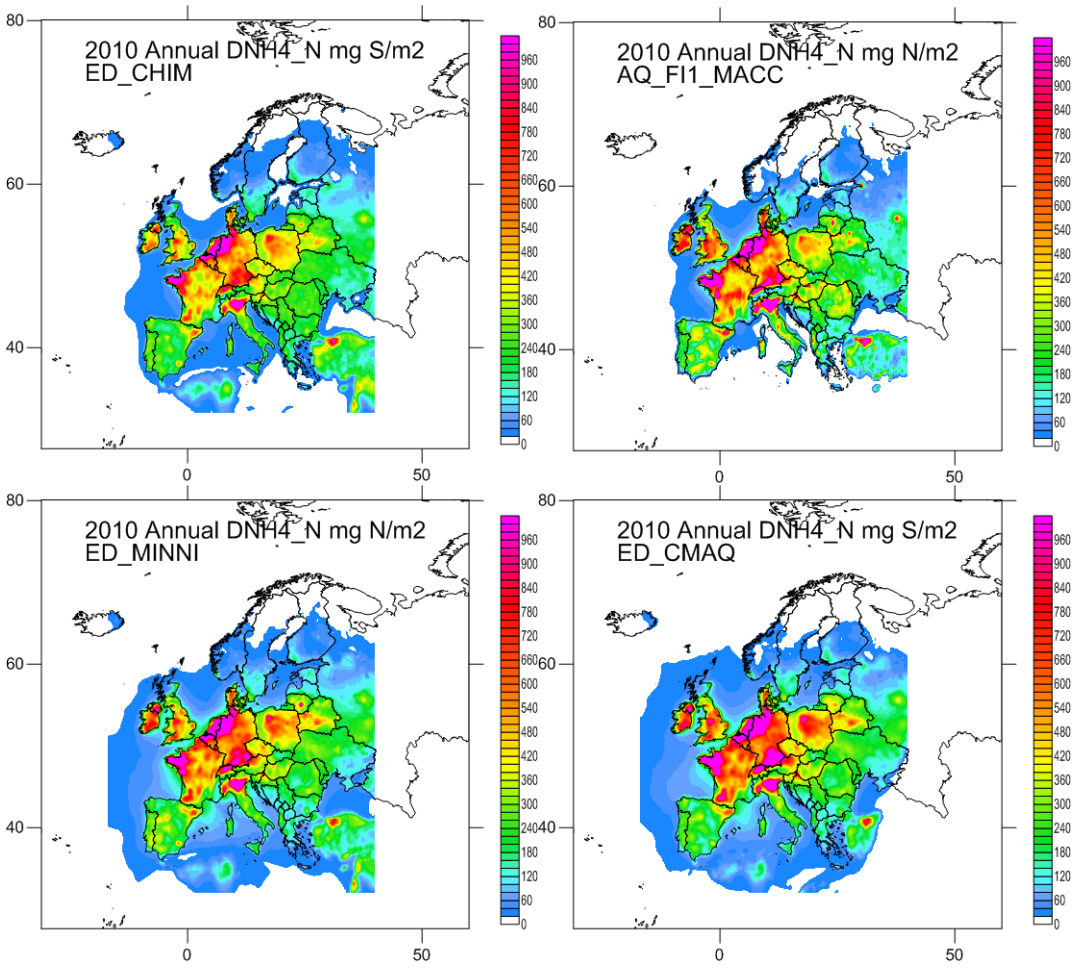

2010 Annual WSO4_S mg S/m2
AQ_FI1_HTAP
2010 Annual WSO4_S mg S/m2
AQ_FI1_MACC
2010 Annual WSO4_S mg S/m2
AQ_TR1_MACC
2010 Annual WSO4_S mg S/m2
ED_EMEP
80
60
40
0
50
1200
1050
900
750
600
450
300
150
0


2010 Annual WSO4_S mg S/m2
ED_MATCH
AQ_DE1_HTAP
AQ_DK1_HTAP
AQ_FI1_HTAP
AQ_FI1_MACC
AQ_FRES1_HTAP
AQ_TR1_MACC
AQ_UK1_MACC
AQ_UK2_HTAP
ED_CHIM
ED_CMAQ
ED_EMEP
ED_LOTO
ED_MATCH
ED_MINNI
FAC2 < 0.5
FAC2 >= 0.5
WSO4_S
NMSE
FB

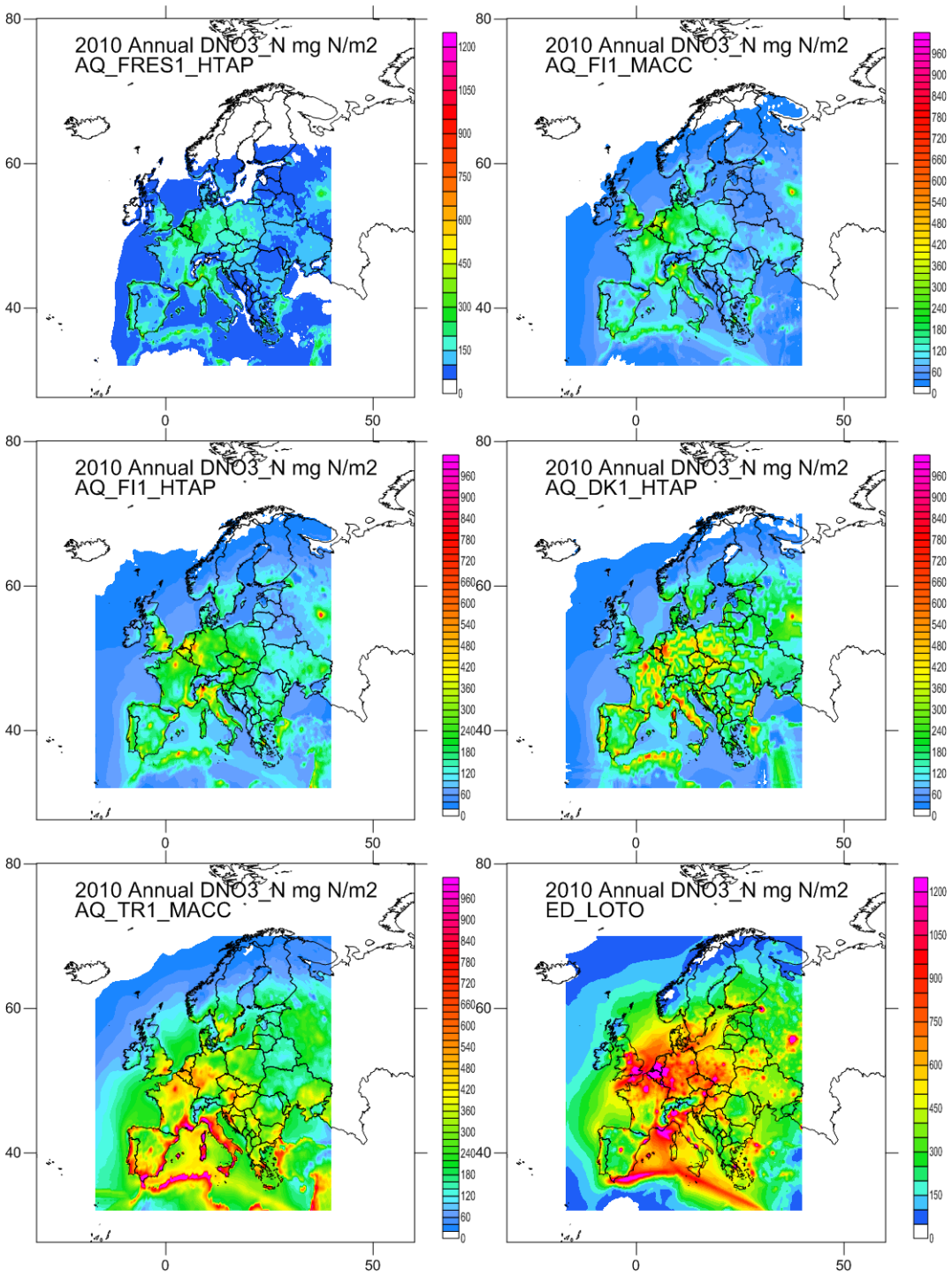
S2. MAPS OF DRY DEPOSITION FOR DIFFERENT COMPOUNDS

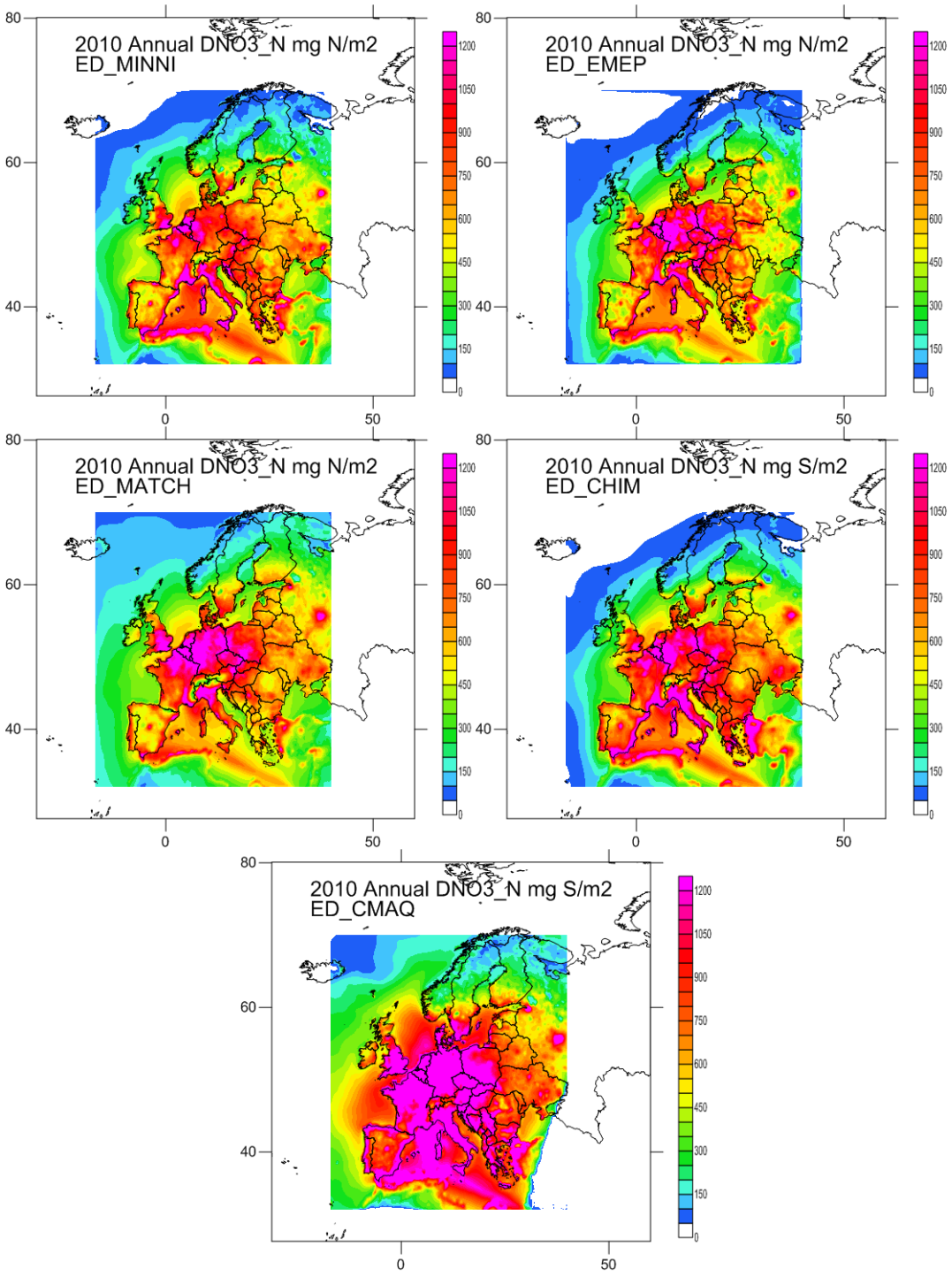
S2.1 Annual deposition of DNH4_N



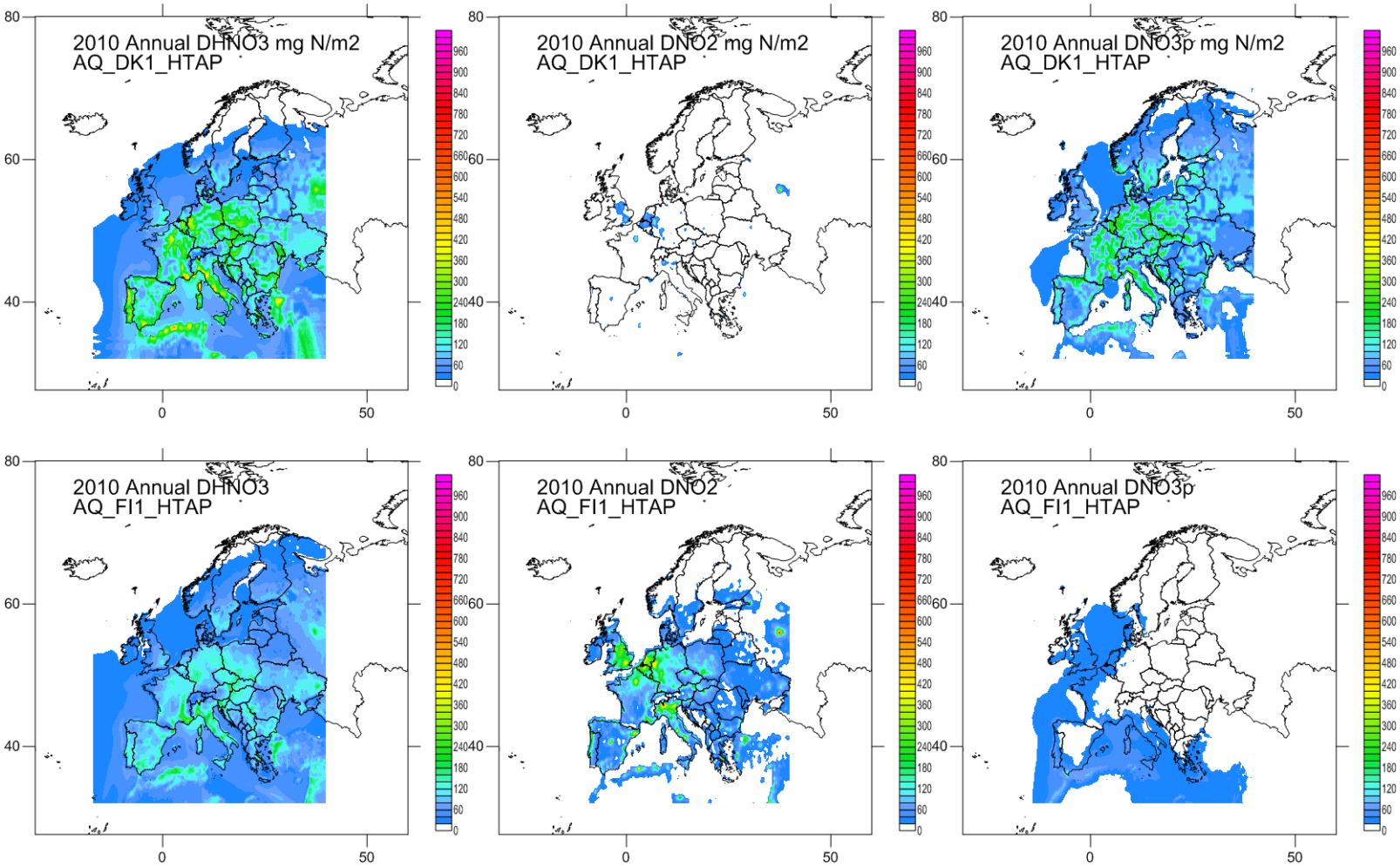

2010 Annual DNH4_N mg S/m2
ED_CHIM
2010 Annual DNH4_N mg N/m2
AQ_FI1_MACC
2010 Annual DNH4_N mg N/m2
ED_MINNI
2010 Annual DNH4_N mg S/m2
ED_CMAQ
80
60
40
0
50
960
900
840
780
720
660
600
540
480
420
360
300
240
180
120
60
0

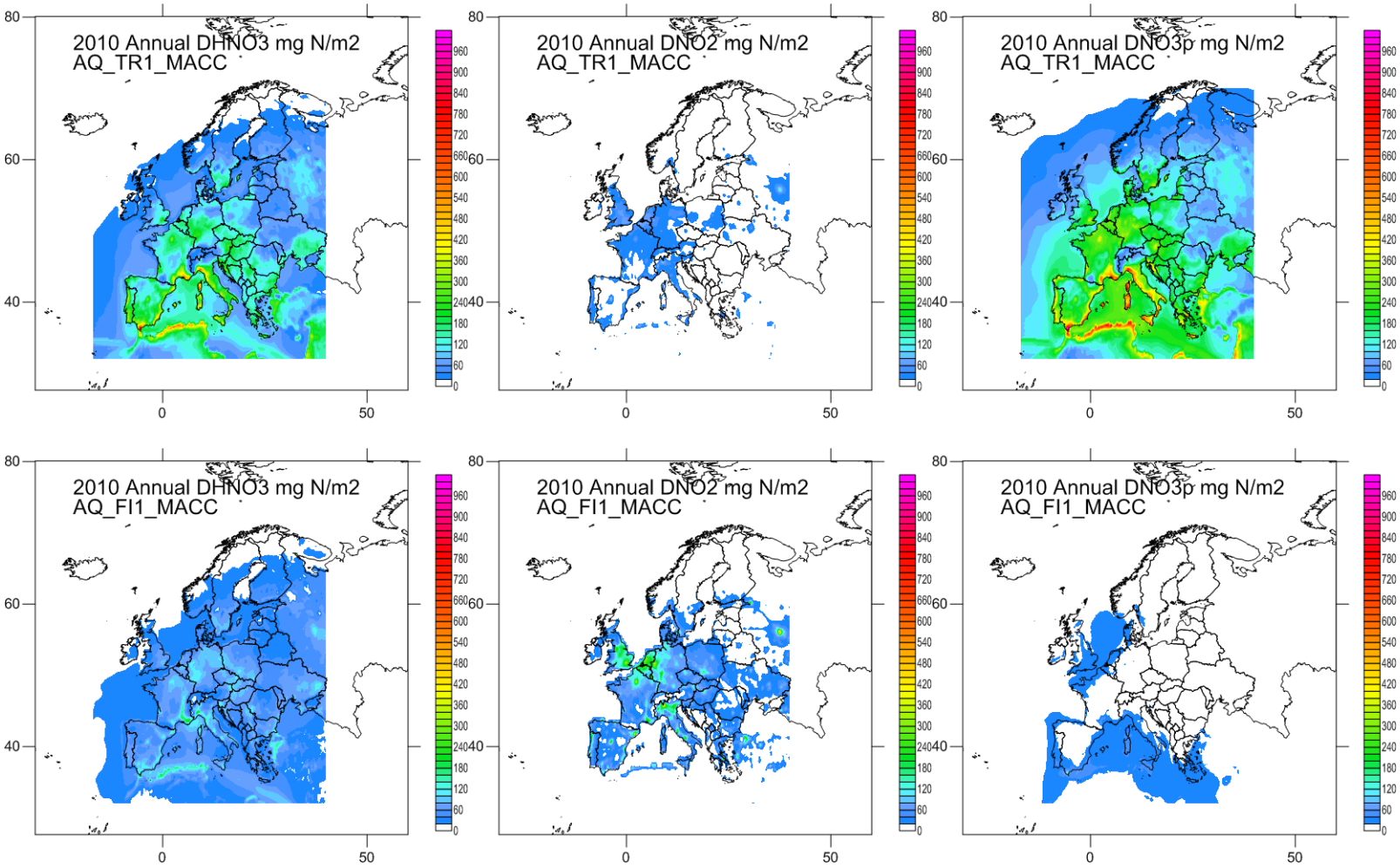
S2.2 Annual deposition of DNO3_N



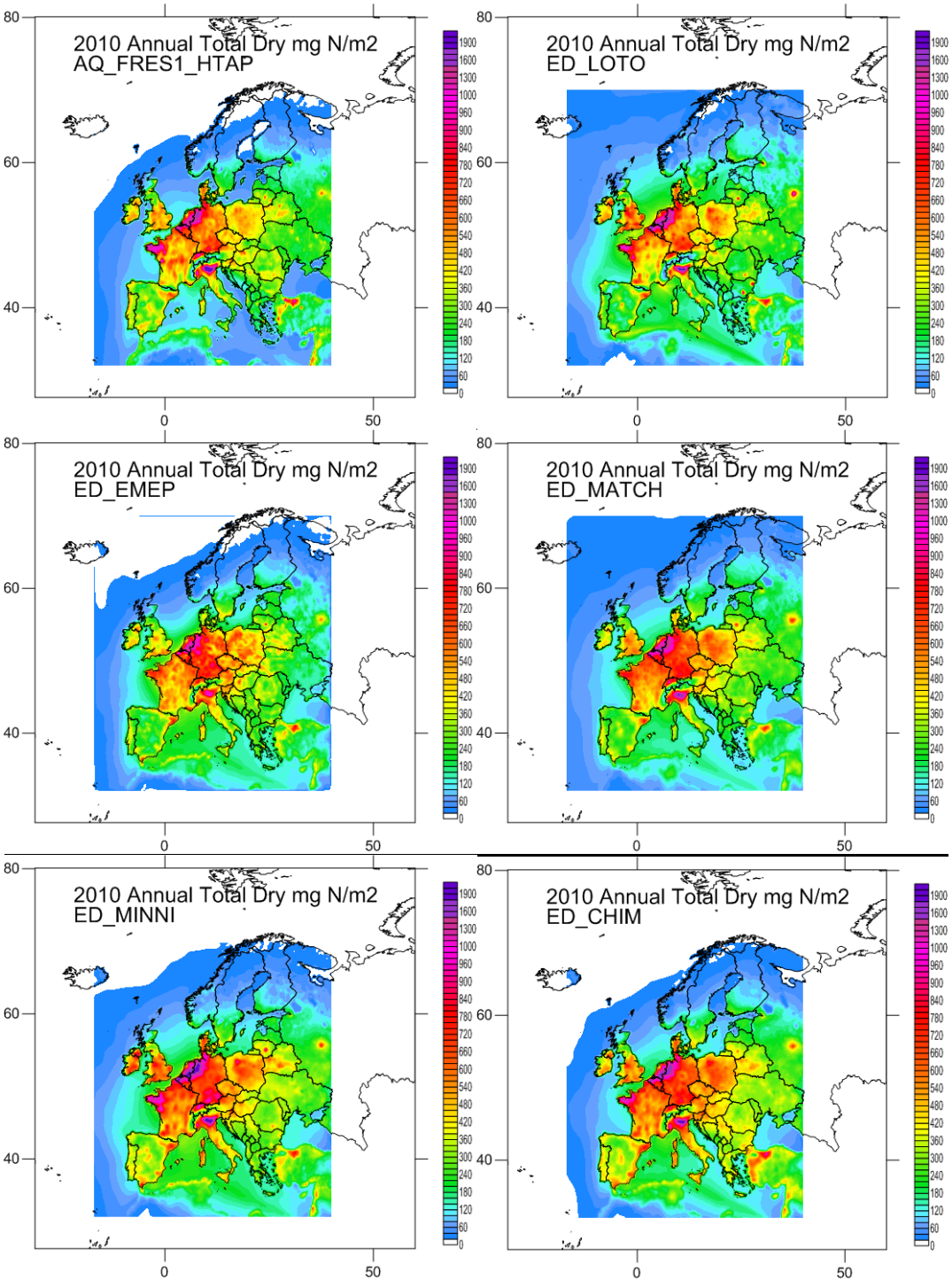

2010 Annual DNO3_N mg N/m2
ED_MINNI
2010 Annual DNO3_N mg N/m2
ED_EMEP
2010 Annual DNO3_N mg N/m2
ED_MATCH
2010 Annual DNO3_N mg S/m2
ED_CHIM
2010 Annual DNO3_N mg S/m2
ED_CMAQ
80
60
40
0
50
1200
1050
900
750
600
450
300
150
0

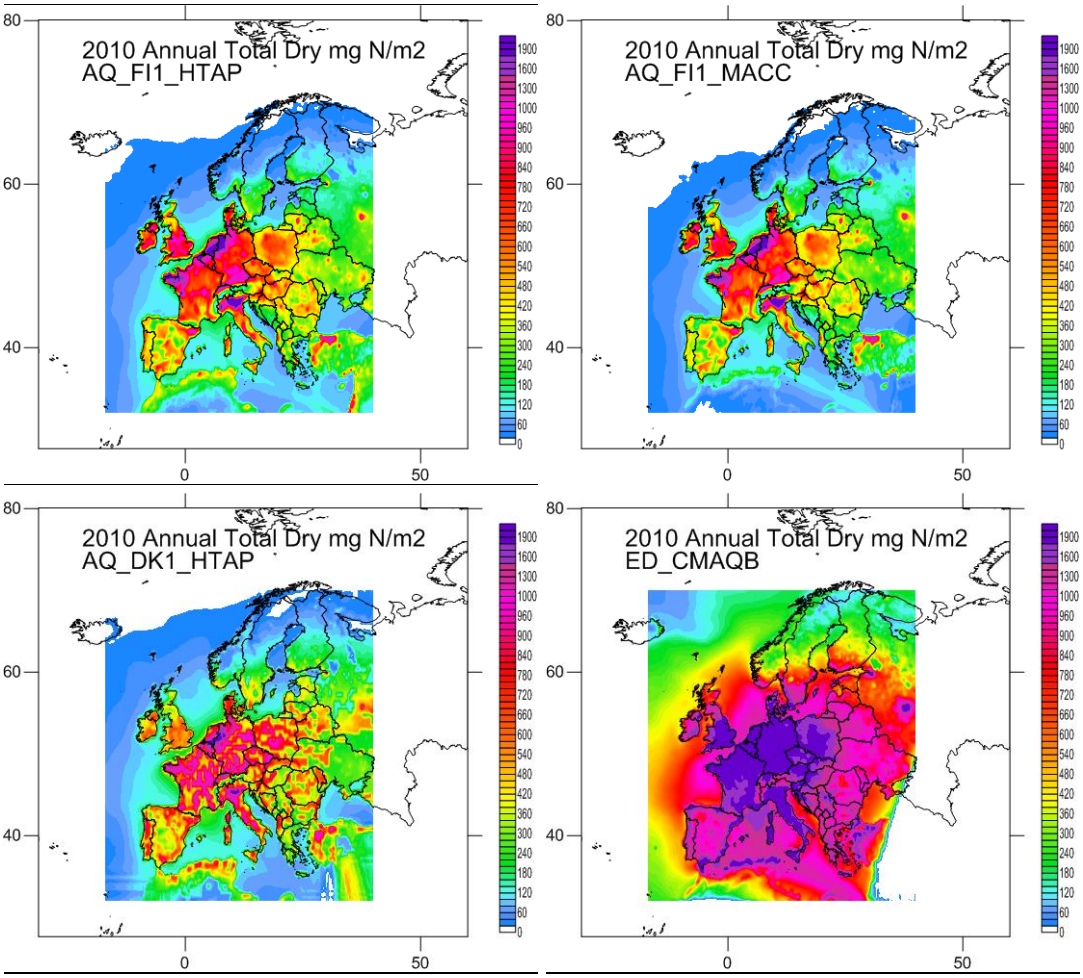
S2.3 Annual dry deposition of the gas and particle components contributing to DNO3_N



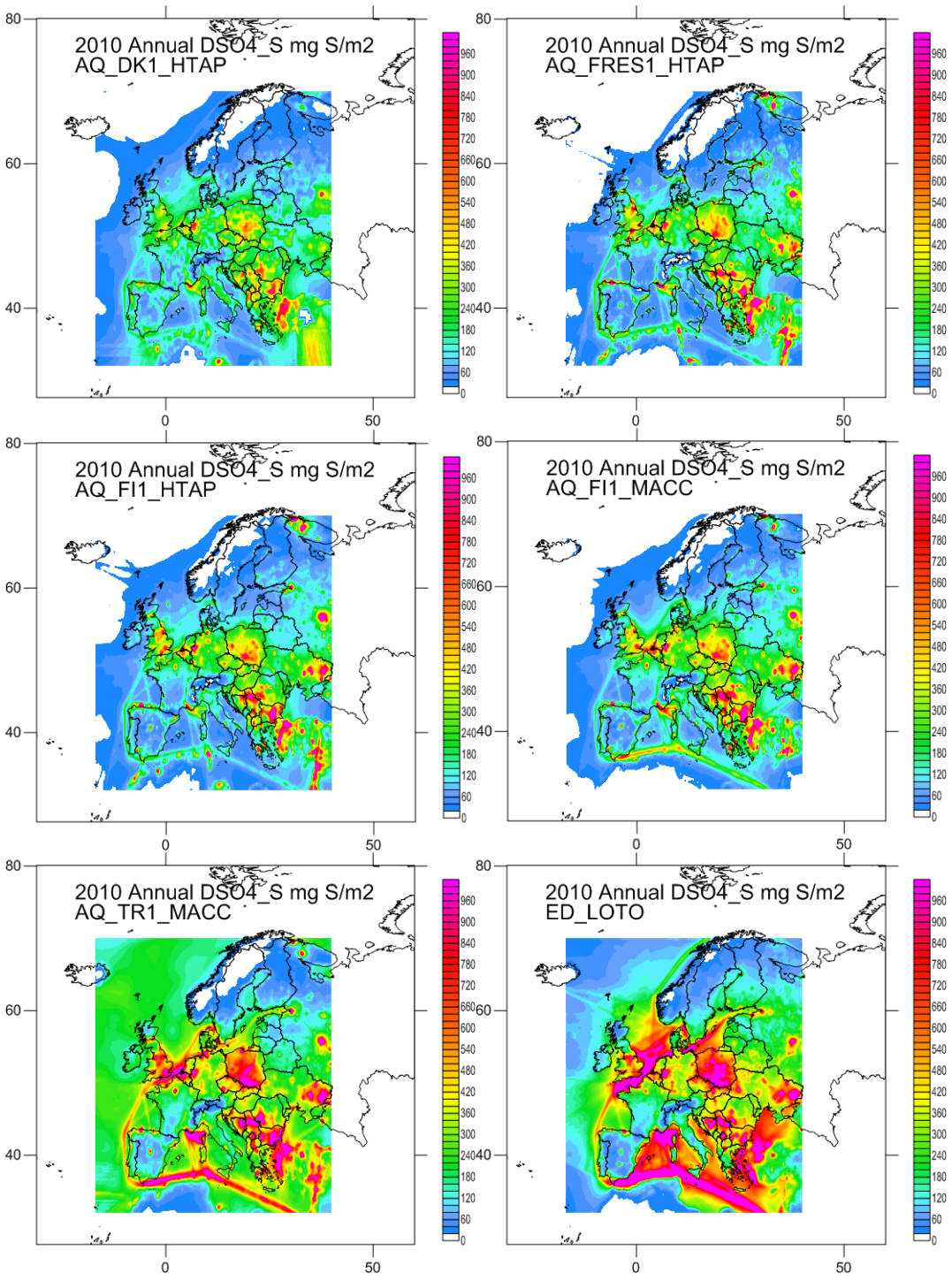

2010 Annual DHNO3 mg N/m2
AQ_TR1_MACC
2010 Annual DNO2 mg N/m2
AQ_TR1_MACC
2010 Annual DNO3p mg N/m2
AQ_TR1_MACC
2010 Annual DHNO3 mg N/m2
AQ_FI1_MACC
2010 Annual DNO2 mg N/m2
AQ_FI1_MACC
2010 Annual DNO3p mg N/m2
AQ_FI1_MACC
80
60
40
0
50
960
900
840
780
720
660
600
540
480
420
360
300
240
180
120
60
0

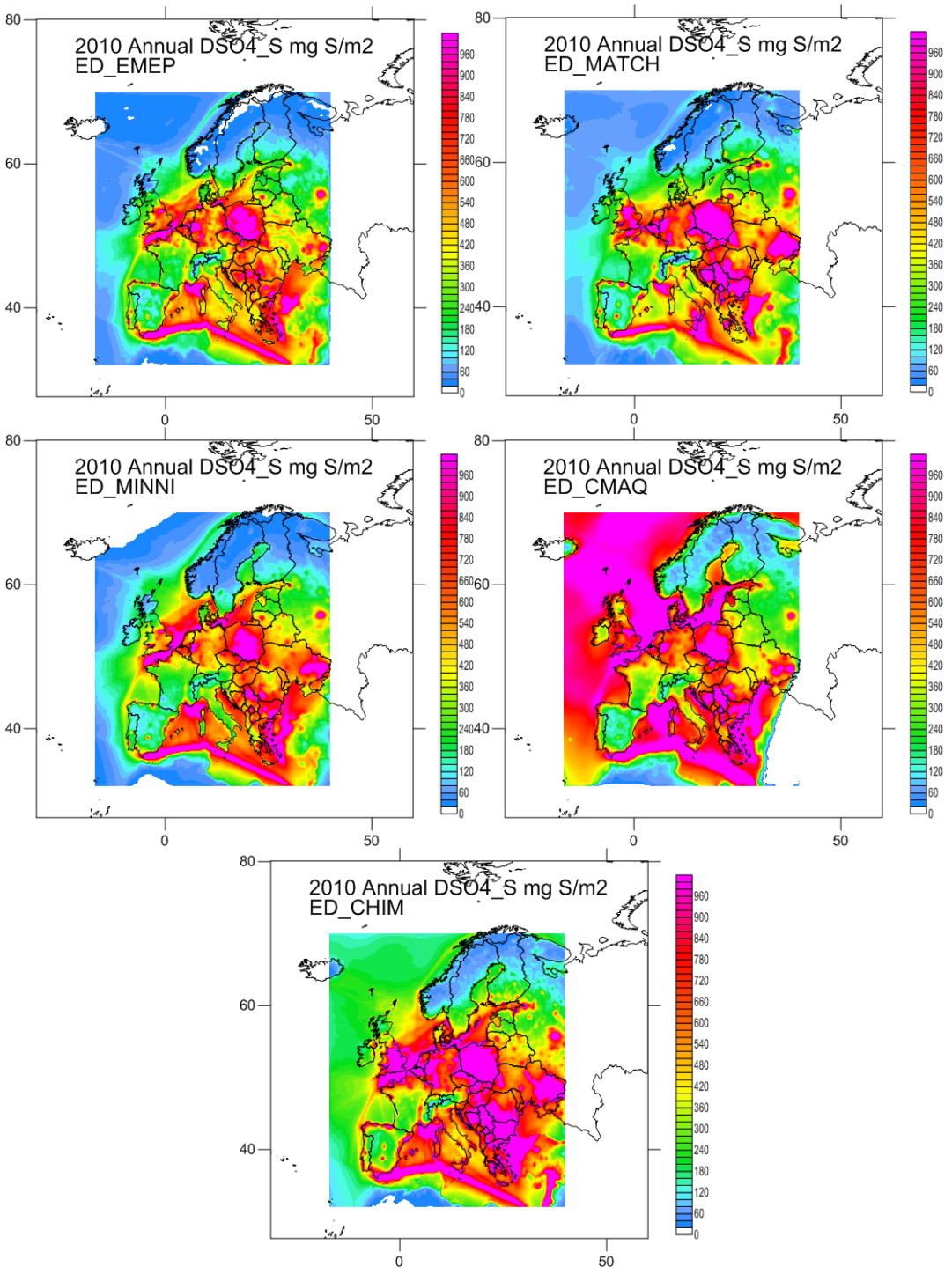
S2.4 Annual deposition of total dry N (DNH4_N + DNO3_N)




2010 Annual Total Dry mg N/m2
AQ_FI1_HTAP
2010 Annual Total Dry mg N/m2
AQ_FI1_MACC
2010 Annual Total Dry mg N/m2
AQ_DK1_HTAP
2010 Annual Total Dry mg N/m2
ED_CMAQB
80
60
40
0
50
1900
1600
1300
1000
960
900
840
780
720
660
600
540
480
420
360
300
240
180
120
60
0

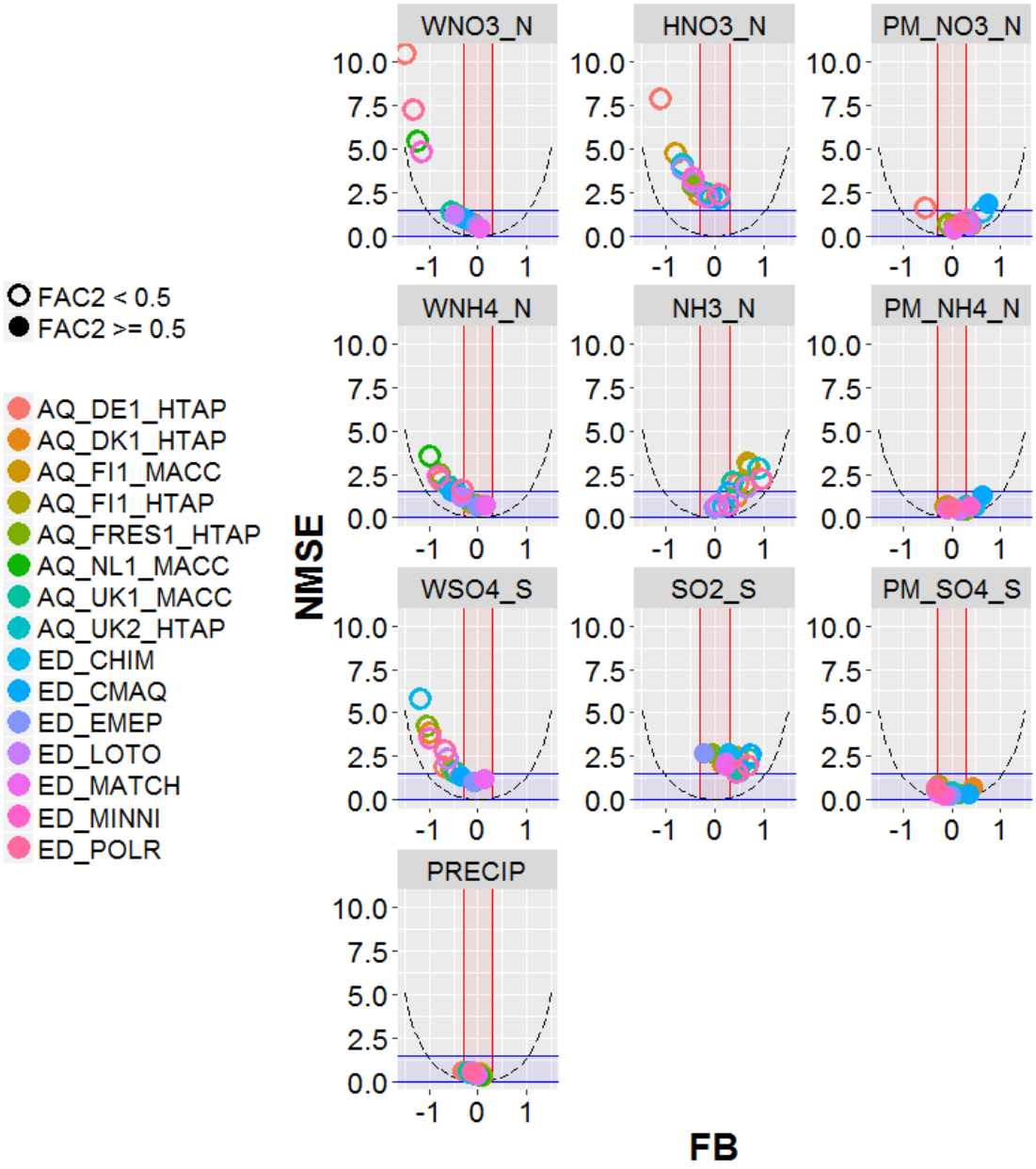
S2.5 Annual deposition of DSO4_S



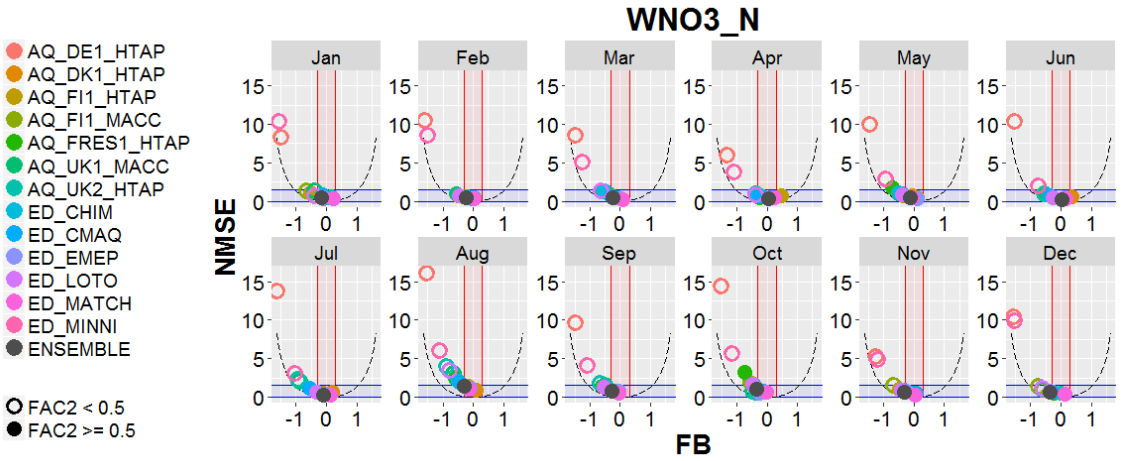

2010 Annual DSO4_S mg S/m2
ED_EMEP
2010 Annual DSO4_S mg S/m2
ED_MATCH
2010 Annual DSO4_S mg S/m2
ED_MINNI
2010 Annual DSO4_S mg S/m2
ED_CMAQ
2010 Annual DSO4_S mg S/m2
ED_CHIM
80
60
40
0
50
960
900
840
780
720
660
600
540
480
420
360
300
240
180
120
60
0

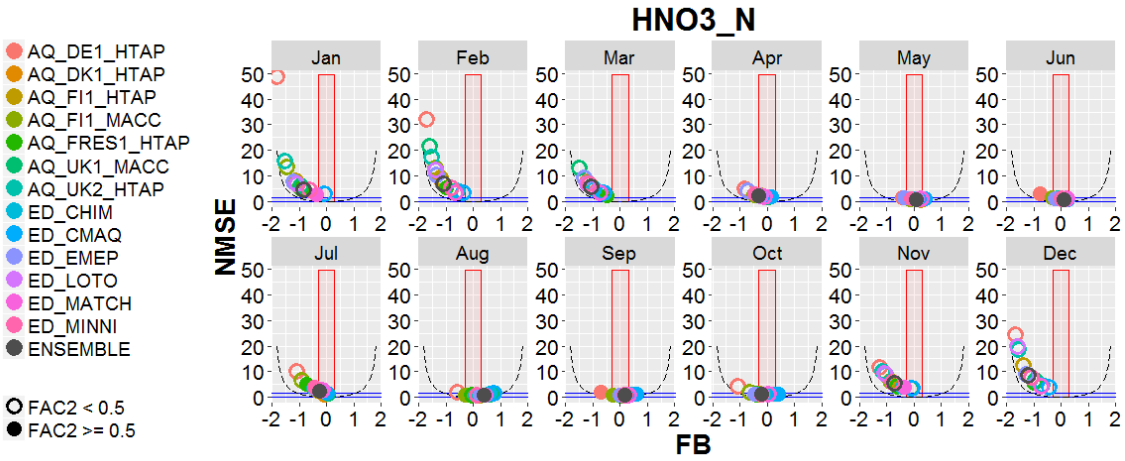
S3. STATISTICS FOR WET DEPOSITION FOR DIFFERENT COMPOUNDS

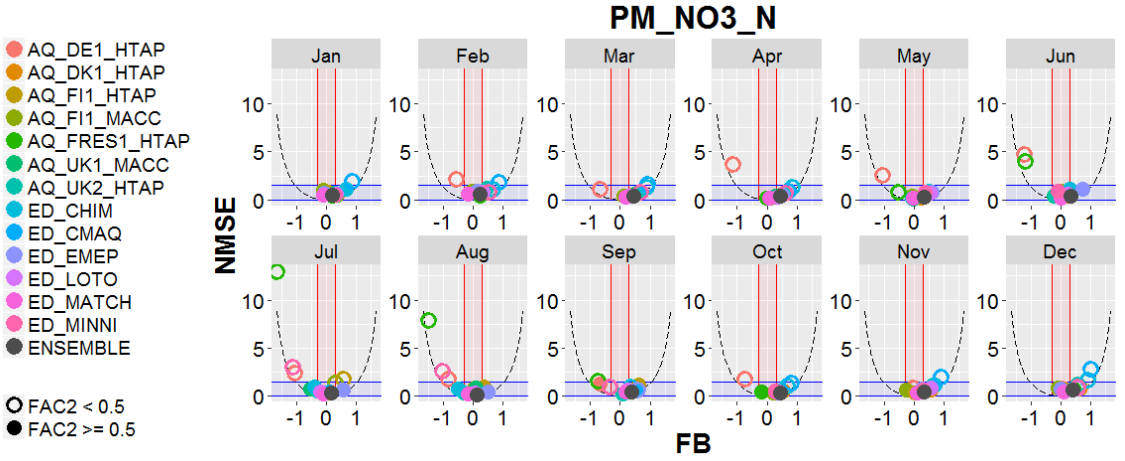
S3.1 STATISTICS FROM MONTHLY VALUES (FB, NMSE and FAC2)



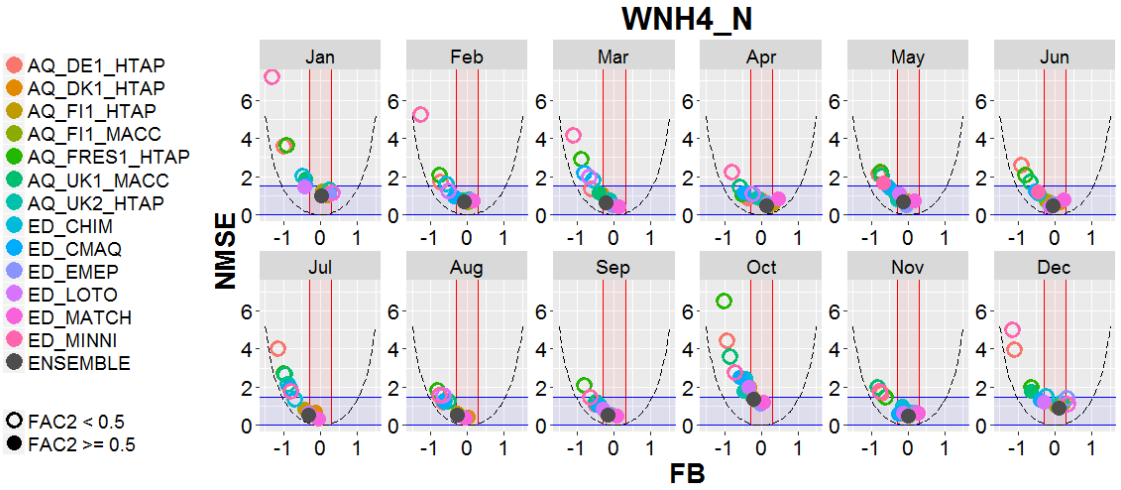
S3.2 STATISTICS BY MONTH (FB, NMSE and FAC2) FOR OXIDISED-N SPECIES

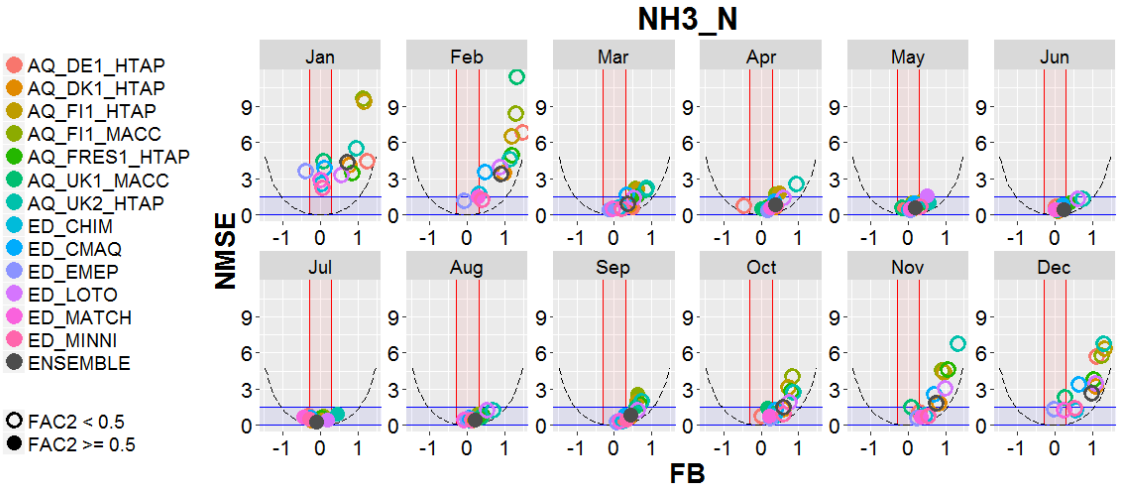


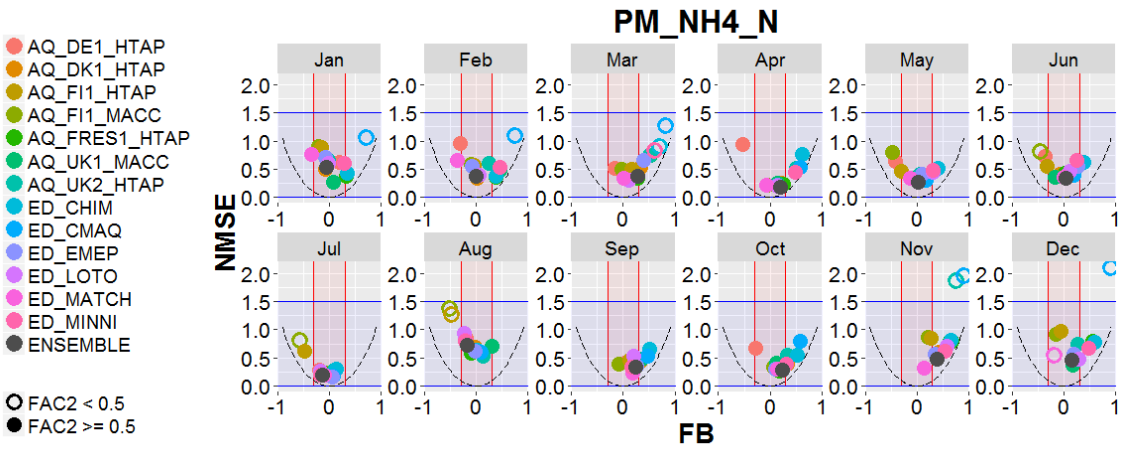




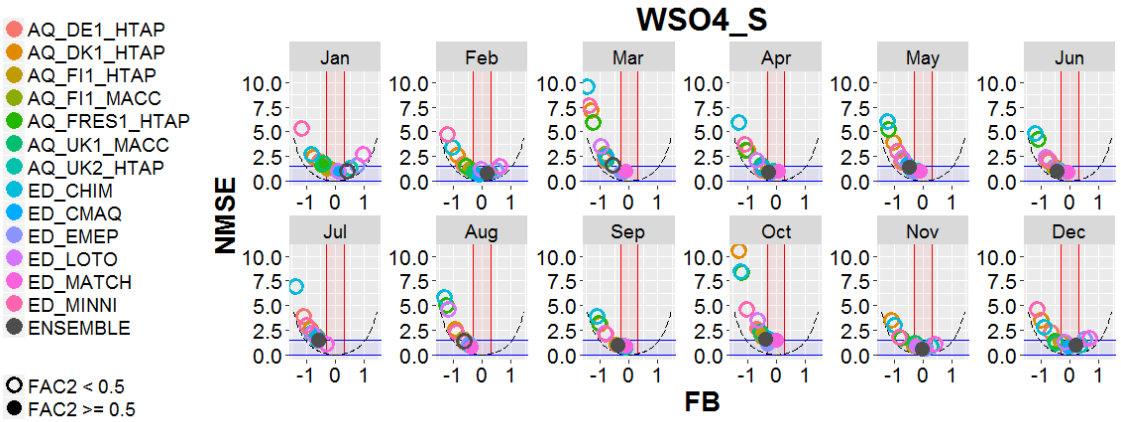
S3.3 STATISTICS BY MONTH (FB, NMSE and FAC2) FOR REDUCED-N SPECIES

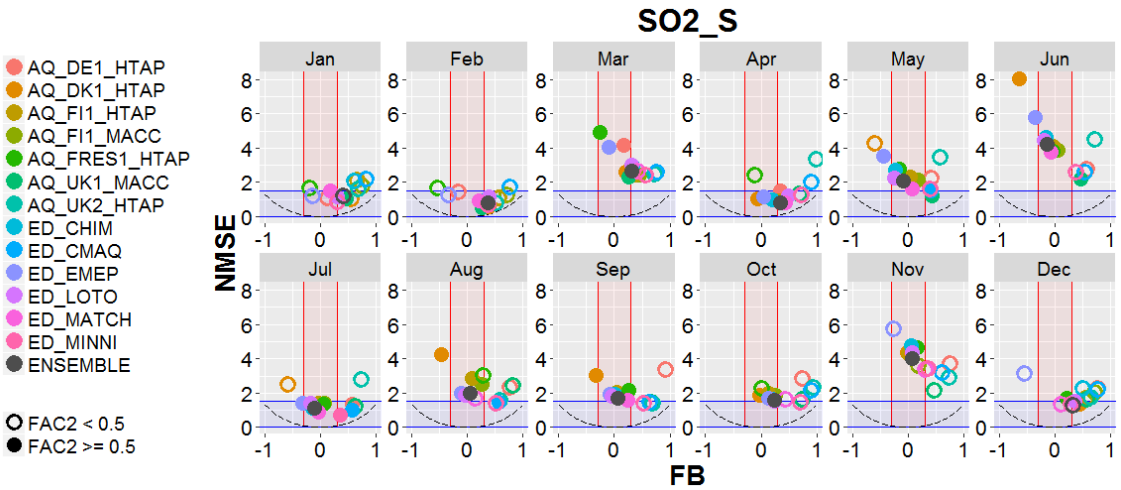


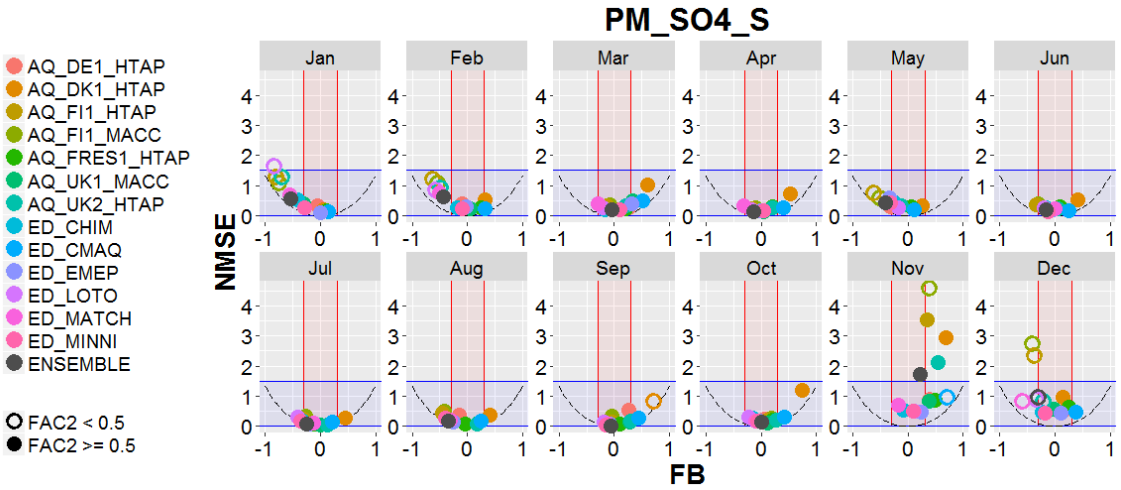




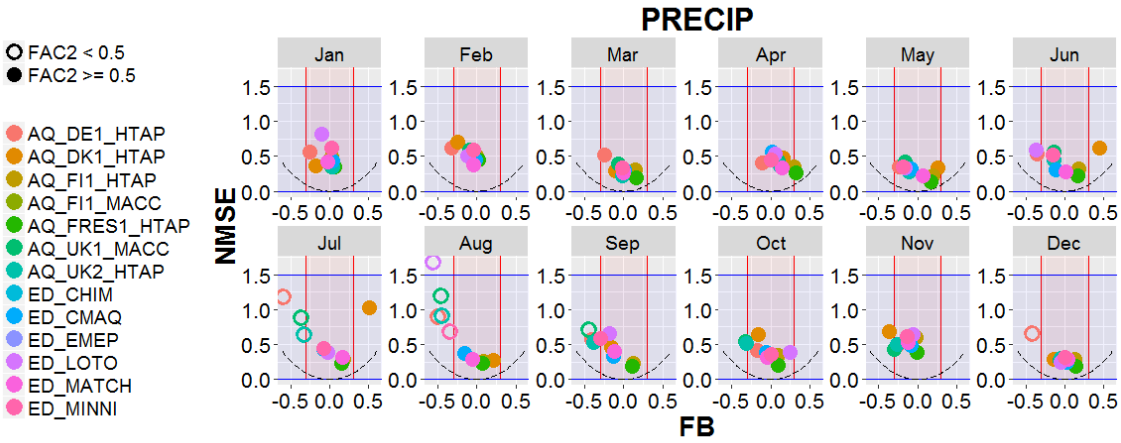
S3.4 Statistics by month (FB, NMSE and FAC2) for S species







S3.5 Statistics by month (FB, NMSE and FAC2) for precipitation



S3.6 . Tables with complete statistics from monthly values (definition in S3.10). All available sites

Variable	Model	n	FAC2	FB	NMSE	MB	MGE	NMB	NMGE	RMSE	r	COE	IOA
WNO3_N	AQ_DE1_HTAP	667	0.05	-1.50	10.50	-19.77	19.86	-0.86	0.86	28.43	0.54	-0.38	0.31
WNO3_N	AQ_DK1_HTAP	682	0.67	-0.10	0.78	-2.25	11.74	-0.10	0.51	19.10	0.54	0.18	0.59
WNO3_N	AQ_FI1_MACC	694	0.53	-0.47	1.26	-8.52	12.15	-0.38	0.54	20.01	0.55	0.15	0.57
WNO3_N	AQ_FI1_HTAP	694	0.63	-0.13	0.80	-2.79	11.65	-0.12	0.52	18.87	0.56	0.18	0.59
WNO3_N	AQ_FRES1_HTAP	694	0.64	-0.46	1.31	-8.38	11.53	-0.37	0.51	20.47	0.53	0.19	0.59
WNO3_N	AQ_UK1_MACC	694	0.47	-0.54	1.42	-9.58	12.66	-0.42	0.56	20.42	0.56	0.11	0.56
WNO3_N	AQ_UK2_HTAP	680	0.59	-0.32	1.06	-6.37	12.14	-0.28	0.53	20.00	0.52	0.15	0.58
WNO3_N	ED_CHIM	682	0.70	-0.36	1.07	-6.93	11.11	-0.30	0.49	19.73	0.54	0.22	0.61
WNO3_N	ED_CMAQ	682	0.69	-0.25	0.91	-5.01	10.97	-0.22	0.48	19.24	0.53	0.23	0.62
WNO3_N	ED_EMEP	682	0.68	-0.05	0.64	-1.08	11.41	-0.05	0.50	17.82	0.60	0.20	0.60
WNO3_N	ED_LOTO	682	0.54	-0.48	1.26	-8.83	12.20	-0.39	0.53	20.09	0.56	0.15	0.57
WNO3_N	ED_MATCH	682	0.75	0.05	0.49	1.21	10.20	0.05	0.45	16.41	0.67	0.29	0.64
WNO3_N	ED_MINNI	682	0.16	-1.16	4.84	-16.79	17.34	-0.74	0.76	25.85	0.48	-0.21	0.39
WNO3_N	ENSEMBLE	682	0.79	-0.20	0.66	-4.18	9.44	-0.18	0.41	16.81	0.68	0.34	0.67
HNO3_N	AQ_DE1_HTAP	166	0.23	-1.11	7.94	-0.10	0.11	-0.71	0.83	0.20	0.12	0.04	0.52
HNO3_N	AQ_DK1_HTAP	154	0.49	-0.35	2.42	-0.04	0.11	-0.30	0.78	0.18	0.35	0.11	0.56
HNO3_N	AQ_FI1_MACC	166	0.40	-0.80	4.79	-0.08	0.10	-0.57	0.78	0.19	0.19	0.10	0.55
HNO3_N	AQ_FI1_HTAP	166	0.43	-0.41	2.87	-0.05	0.11	-0.34	0.80	0.18	0.22	0.09	0.54
HNO3_N	AQ_FRES1_HTAP	166	0.50	-0.47	2.93	-0.05	0.10	-0.38	0.74	0.18	0.25	0.15	0.58
HNO3_N	AQ_UK1_MACC	154	0.45	-0.21	2.50	-0.03	0.12	-0.19	0.89	0.20	0.20	0.00	0.50
HNO3_N	AQ_UK2_HTAP	154	0.38	-0.67	4.14	-0.07	0.12	-0.50	0.85	0.20	0.14	0.04	0.52
HNO3_N	ED_CHIM	154	0.49	-0.09	2.30	-0.01	0.13	-0.09	0.92	0.20	0.15	-0.04	0.48
HNO3_N	ED_CMAQ	154	0.48	0.09	2.15	0.01	0.13	0.09	0.96	0.21	0.14	-0.09	0.45
HNO3_N	ED_EMEP	154	0.38	-0.67	3.92	-0.07	0.11	-0.50	0.81	0.19	0.22	0.08	0.54
HNO3_N	ED_LOTO	154	0.42	-0.44	3.16	-0.05	0.11	-0.36	0.83	0.20	0.15	0.06	0.53

Variable	Model	n	FAC2	FB	NMSE	MB	MGE	NMB	NMGE	RMSE	r	COE	IOA
HNO3_N	ED_MATCH	154	0.42	-0.16	2.24	-0.02	0.12	-0.15	0.88	0.19	0.15	0.00	0.50
HNO3_N	ED_MINNI	154	0.40	-0.45	3.37	-0.05	0.12	-0.37	0.87	0.20	0.06	0.02	0.51
HNO3_N	ENSEMBLE	154	0.50	-0.40	2.76	-0.05	0.11	-0.33	0.80	0.19	0.23	0.09	0.55
PM_NO3_N	AQ_DE1_HTAP	393	0.37	-0.55	1.61	-0.14	0.23	-0.43	0.68	0.32	0.43	-0.10	0.45
PM_NO3_N	AQ_DK1_HTAP	382	0.64	0.40	0.59	0.16	0.22	0.50	0.67	0.31	0.68	-0.06	0.47
PM_NO3_N	AQ_FI1_MACC	393	0.63	0.05	0.70	0.02	0.18	0.05	0.56	0.28	0.53	0.10	0.55
PM_NO3_N	AQ_FI1_HTAP	393	0.64	0.32	0.76	0.13	0.23	0.39	0.70	0.34	0.54	-0.12	0.44
PM_NO3_N	AQ_FRES1_HTAP	393	0.44	-0.08	0.68	-0.03	0.19	-0.08	0.58	0.26	0.71	0.07	0.53
PM_NO3_N	AQ_UK1_MACC	382	0.68	0.29	0.68	0.11	0.20	0.35	0.63	0.31	0.66	0.01	0.50
PM_NO3_N	AQ_UK2_HTAP	370	0.66	0.35	0.90	0.14	0.24	0.42	0.71	0.38	0.65	-0.14	0.43
PM_NO3_N	ED_CHIM	382	0.46	0.62	1.38	0.29	0.37	0.90	1.12	0.53	0.68	-0.78	0.11
PM_NO3_N	ED_CMAQ	382	0.50	0.74	1.85	0.39	0.41	1.19	1.27	0.66	0.67	-1.02	-0.01
PM_NO3_N	ED_EMEP	382	0.62	0.37	0.66	0.15	0.23	0.45	0.69	0.32	0.58	-0.10	0.45
PM_NO3_N	ED_LOTO	382	0.67	0.34	0.64	0.13	0.21	0.41	0.63	0.31	0.68	0.00	0.50
PM_NO3_N	ED_MATCH	382	0.76	0.04	0.39	0.01	0.14	0.04	0.43	0.21	0.74	0.32	0.66
PM_NO3_N	ED_MINNI	382	0.45	0.32	0.91	0.12	0.26	0.37	0.79	0.36	0.63	-0.25	0.37
PM_NO3_N	ENSEMBLE	382	0.70	0.34	0.48	0.13	0.18	0.40	0.56	0.27	0.72	0.11	0.56
WNH4_N	AQ_DE1_HTAP	690	0.39	-0.77	2.14	-15.30	17.36	-0.55	0.63	26.96	0.62	0.07	0.53
WNH4_N	AQ_DK1_HTAP	704	0.59	-0.03	0.84	-0.91	15.54	-0.03	0.58	24.17	0.53	0.16	0.58
WNH4_N	AQ_FI1_MACC	715	0.59	-0.16	0.82	-3.87	14.39	-0.14	0.54	22.39	0.60	0.23	0.61
WNH4_N	AQ_FI1_HTAP	715	0.59	-0.12	0.82	-2.99	14.79	-0.11	0.55	22.86	0.59	0.20	0.60
WNH4_N	AQ_FRES1_HTAP	716	0.39	-0.80	2.53	-15.30	17.11	-0.57	0.64	27.86	0.54	0.08	0.54
WNH4_N	AQ_UK1_MACC	716	0.45	-0.61	1.82	-12.55	16.59	-0.47	0.62	26.33	0.53	0.11	0.55
WNH4_N	AQ_UK2_HTAP	714	0.53	-0.26	1.11	-6.25	16.12	-0.23	0.60	24.73	0.51	0.13	0.57
WNH4_N	ED_CHIM	704	0.49	-0.47	1.50	-10.17	16.07	-0.38	0.60	25.86	0.49	0.14	0.57
WNH4_N	ED_CMAQ	704	0.55	-0.55	1.55	-11.62	14.81	-0.43	0.55	25.12	0.59	0.20	0.60
WNH4_N	ED_EMEP	704	0.63	-0.01	0.67	-0.29	14.53	-0.01	0.54	21.85	0.64	0.22	0.61

Variable	Model	n	FAC2	FB	NMSE	MB	MGE	NMB	NMGE	RMSE	r	COE	IOA
WNH4_N	ED_LOTO	704	0.54	-0.35	1.21	-8.06	15.00	-0.30	0.56	24.65	0.53	0.19	0.60
WNH4_N	ED_MATCH	704	0.61	0.17	0.70	4.82	16.00	0.18	0.60	24.42	0.62	0.14	0.57
WNH4_N	ED_MINNI	704	0.35	-0.81	2.36	-15.47	16.92	-0.58	0.63	26.75	0.63	0.09	0.54
WNH4_N	ENSEMBLE	703	0.68	-0.12	0.69	-2.99	13.14	-0.11	0.49	20.97	0.65	0.29	0.65
NH3_N	AQ_DE1_HTAP	166	0.42	0.47	1.97	0.52	0.96	0.62	1.14	1.50	-0.08	-0.93	0.04
NH3_N	AQ_DK1_HTAP	154	0.48	0.46	1.17	0.50	0.80	0.59	0.96	1.14	0.39	-0.55	0.23
NH3_N	AQ_FI1_MACC	166	0.43	0.66	3.14	0.83	1.21	0.98	1.43	2.10	0.32	-1.41	-0.17
NH3_N	AQ_FI1_HTAP	166	0.49	0.69	2.92	0.88	1.16	1.04	1.38	2.06	0.34	-1.32	-0.14
NH3_N	AQ_FRES1_HTAP	166	0.45	0.62	1.92	0.76	1.06	0.90	1.26	1.61	0.40	-1.11	-0.05
NH3_N	AQ_UK1_MACC	154	0.48	0.37	2.07	0.38	0.80	0.46	0.96	1.45	0.40	-0.54	0.23
NH3_N	AQ_UK2_HTAP	154	0.32	0.89	2.83	1.33	1.55	1.59	1.86	2.26	0.49	-2.00	-0.33
NH3_N	ED_CHIM	154	0.44	0.16	0.69	0.14	0.60	0.17	0.72	0.75	0.52	-0.16	0.42
NH3_N	ED_CMAQ	154	0.48	0.28	1.48	0.27	0.75	0.32	0.89	1.17	0.26	-0.45	0.28
NH3_N	ED_EMEP	154	0.48	0.01	0.59	0.01	0.52	0.01	0.62	0.64	0.53	0.00	0.50
NH3_N	ED_LOTO	154	0.40	0.64	1.73	0.78	1.05	0.93	1.26	1.53	0.59	-1.04	-0.02
NH3_N	ED_MATCH	154	0.49	0.07	0.72	0.06	0.56	0.07	0.67	0.73	0.45	-0.08	0.46
NH3_N	ED_MINNI	154	0.40	0.29	0.75	0.28	0.68	0.34	0.82	0.84	0.48	-0.32	0.34
NH3_N	ENSEMBLE	154	0.46	0.45	1.22	0.48	0.81	0.58	0.97	1.16	0.47	-0.57	0.21
PM_NH4_N	AQ_DE1_HTAP	350	0.63	-0.10	0.72	-0.06	0.33	-0.10	0.55	0.49	0.56	0.19	0.59
PM_NH4_N	AQ_DK1_HTAP	339	0.73	0.14	0.45	0.09	0.30	0.15	0.49	0.44	0.69	0.30	0.65
PM_NH4_N	AQ_FI1_MACC	350	0.61	-0.15	0.70	-0.09	0.31	-0.14	0.51	0.47	0.61	0.25	0.63
PM_NH4_N	AQ_FI1_HTAP	350	0.64	-0.03	0.64	-0.02	0.32	-0.03	0.52	0.48	0.60	0.23	0.62
PM_NH4_N	AQ_FRES1_HTAP	350	0.72	0.29	0.47	0.20	0.32	0.33	0.53	0.48	0.75	0.23	0.61
PM_NH4_N	AQ_UK1_MACC	339	0.71	0.23	0.51	0.16	0.31	0.27	0.52	0.49	0.74	0.25	0.63
PM_NH4_N	AQ_UK2_HTAP	327	0.66	0.29	0.72	0.21	0.39	0.34	0.63	0.61	0.67	0.10	0.55
PM_NH4_N	ED_CHIM	339	0.66	0.47	0.67	0.38	0.44	0.62	0.72	0.63	0.75	-0.04	0.48
PM_NH4_N	ED_CMAQ	339	0.56	0.63	1.29	0.56	0.61	0.92	0.99	0.96	0.73	-0.43	0.28

Variable	Model	n	FAC2	FB	NMSE	MB	MGE	NMB	NMGE	RMSE	r	COE	IOA
PM_NH4_N	ED_EMEP	339	0.72	0.13	0.54	0.09	0.31	0.14	0.50	0.48	0.66	0.27	0.64
PM_NH4_N	ED_LOTO	339	0.74	0.14	0.46	0.09	0.30	0.15	0.49	0.44	0.70	0.30	0.65
PM_NH4_N	ED_MATCH	339	0.73	-0.10	0.48	-0.06	0.26	-0.10	0.43	0.40	0.73	0.37	0.69
PM_NH4_N	ED_MINNI	339	0.66	0.36	0.65	0.27	0.38	0.44	0.62	0.59	0.69	0.10	0.55
PM_NH4_N	ENSEMBLE	339	0.78	0.11	0.40	0.07	0.27	0.11	0.44	0.41	0.73	0.37	0.69
WSO4_S	AQ_DE1_HTAP	692	0.39	-0.67	1.92	-13.89	17.44	-0.50	0.63	26.88	0.55	0.06	0.53
WSO4_S	AQ_DK1_HTAP	704	0.30	-0.99	3.89	-17.75	19.47	-0.66	0.73	30.67	0.42	-0.05	0.48
WSO4_S	AQ_FI1_MACC	715	0.47	-0.51	1.65	-10.82	16.64	-0.40	0.62	26.60	0.46	0.10	0.55
WSO4_S	AQ_FI1_HTAP	715	0.46	-0.54	1.73	-11.39	16.62	-0.42	0.62	26.75	0.46	0.10	0.55
WSO4_S	AQ_FRES1_HTAP	716	0.30	-1.04	4.27	-18.31	19.67	-0.68	0.73	31.09	0.44	-0.06	0.47
WSO4_S	AQ_UK1_MACC	716	0.45	-0.47	1.53	-10.14	16.90	-0.38	0.63	26.14	0.49	0.09	0.54
WSO4_S	AQ_UK2_HTAP	714	0.51	-0.08	1.03	-2.05	17.58	-0.08	0.65	26.18	0.43	0.05	0.53
WSO4_S	ED_CHIM	704	0.24	-1.20	5.81	-20.09	20.72	-0.75	0.77	32.26	0.48	-0.11	0.44
WSO4_S	ED_CMAQ	704	0.55	-0.34	1.36	-7.81	15.89	-0.29	0.59	26.33	0.40	0.15	0.57
WSO4_S	ED_EMEP	704	0.52	-0.11	1.04	-2.75	17.34	-0.10	0.65	25.93	0.41	0.07	0.53
WSO4_S	ED_LOTO	704	0.39	-0.63	2.32	-12.77	18.72	-0.48	0.70	29.54	0.29	-0.01	0.50
WSO4_S	ED_MATCH	704	0.51	0.12	1.15	3.29	20.15	0.12	0.75	30.50	0.35	-0.08	0.46
WSO4_S	ED_MINNI	704	0.28	-0.98	3.53	-17.67	18.88	-0.66	0.71	29.34	0.55	-0.02	0.49
WSO4_S	ENSEMBLE	703	0.53	-0.29	1.21	-6.83	16.11	-0.25	0.60	25.47	0.45	0.13	0.57
SO2_S	AQ_DE1_HTAP	695	0.39	0.49	2.45	0.36	0.66	0.65	1.19	1.12	0.31	-0.34	0.33
SO2_S	AQ_DK1_HTAP	671	0.59	0.14	2.07	0.09	0.41	0.15	0.72	0.88	0.54	0.19	0.60
SO2_S	AQ_FI1_MACC	695	0.50	0.48	2.43	0.36	0.57	0.64	1.03	1.11	0.52	-0.16	0.42
SO2_S	AQ_FI1_HTAP	695	0.57	0.36	2.52	0.24	0.48	0.43	0.86	1.06	0.48	0.03	0.52
SO2_S	AQ_FRES1_HTAP	695	0.53	-0.05	2.69	-0.03	0.42	-0.05	0.75	0.89	0.42	0.16	0.58
SO2_S	AQ_UK1_MACC	683	0.50	0.51	1.57	0.39	0.54	0.69	0.96	0.92	0.62	-0.08	0.46
SO2_S	AQ_UK2_HTAP	671	0.36	0.70	2.32	0.62	0.77	1.08	1.35	1.25	0.55	-0.52	0.24
SO2_S	ED_CHIM	671	0.56	0.28	2.70	0.18	0.48	0.32	0.84	1.08	0.48	0.05	0.53

Variable	Model	n	FAC2	FB	NMSE	MB	MGE	NMB	NMGE	RMSE	r	COE	IOA
SO2_S	ED_CMAQ	671	0.35	0.73	2.56	0.65	0.80	1.14	1.40	1.34	0.56	-0.58	0.21
SO2_S	ED_EMEP	671	0.51	-0.21	2.63	-0.11	0.38	-0.19	0.66	0.83	0.51	0.25	0.63
SO2_S	ED_LOTO	671	0.59	0.21	2.11	0.13	0.43	0.23	0.76	0.92	0.50	0.14	0.57
SO2_S	ED_MATCH	671	0.52	0.22	1.93	0.14	0.44	0.25	0.78	0.89	0.51	0.12	0.56
SO2_S	ED_MINNI	671	0.41	0.44	1.56	0.32	0.55	0.57	0.96	0.89	0.55	-0.08	0.46
SO2_S	ENSEMBLE	671	0.58	0.23	1.89	0.15	0.42	0.26	0.73	0.88	0.54	0.18	0.59
PM_SO4_S	AQ_DE1_HTAP	288	0.75	-0.01	0.38	-0.01	0.19	-0.01	0.44	0.26	0.50	0.13	0.57
PM_SO4_S	AQ_DK1_HTAP	265	0.74	0.44	0.70	0.24	0.28	0.56	0.67	0.44	0.57	-0.39	0.30
PM_SO4_S	AQ_FI1_MACC	288	0.57	-0.26	0.89	-0.10	0.22	-0.23	0.51	0.35	0.37	-0.01	0.49
PM_SO4_S	AQ_FI1_HTAP	288	0.55	-0.30	0.83	-0.11	0.21	-0.26	0.50	0.33	0.40	0.01	0.50
PM_SO4_S	AQ_FRES1_HTAP	288	0.86	0.15	0.29	0.07	0.15	0.16	0.36	0.25	0.69	0.29	0.65
PM_SO4_S	AQ_UK1_MACC	277	0.79	0.06	0.28	0.02	0.15	0.06	0.37	0.22	0.65	0.27	0.64
PM_SO4_S	AQ_UK2_HTAP	277	0.72	0.01	0.48	0.01	0.18	0.01	0.45	0.28	0.45	0.11	0.56
PM_SO4_S	ED_CHIM	265	0.83	-0.22	0.32	-0.08	0.15	-0.20	0.36	0.21	0.68	0.26	0.63
PM_SO4_S	ED_CMAQ	265	0.74	0.33	0.28	0.17	0.20	0.40	0.48	0.27	0.71	0.00	0.50
PM_SO4_S	ED_EMEP	265	0.85	-0.02	0.27	-0.01	0.14	-0.02	0.33	0.22	0.74	0.31	0.66
PM_SO4_S	ED_LOTO	265	0.71	-0.32	0.53	-0.12	0.19	-0.28	0.45	0.26	0.54	0.08	0.54
PM_SO4_S	ED_MATCH	265	0.75	-0.31	0.43	-0.11	0.16	-0.27	0.39	0.24	0.64	0.20	0.60
PM_SO4_S	ED_MINNI	265	0.83	-0.14	0.25	-0.06	0.14	-0.13	0.32	0.20	0.74	0.34	0.67
PM_SO4_S	ENSEMBLE	265	0.79	-0.23	0.41	-0.09	0.16	-0.21	0.37	0.24	0.61	0.24	0.62
PRECIP	AQ_DE1_HTAP	661	0.63	-0.33	0.60	-23.45	36.92	-0.28	0.44	54.65	0.68	0.23	0.62
PRECIP	AQ_DK1_HTAP	668	0.71	0.05	0.54	3.98	40.01	0.05	0.49	60.94	0.61	0.17	0.58
PRECIP	AQ_FI1_MACC	706	0.81	0.11	0.37	9.43	30.81	0.12	0.39	50.88	0.71	0.36	0.68
PRECIP	AQ_FI1_HTAP	706	0.81	0.11	0.37	9.43	30.81	0.12	0.39	50.88	0.71	0.36	0.68
PRECIP	AQ_FRES1_HTAP	708	0.83	0.11	0.26	9.48	28.27	0.12	0.36	42.91	0.79	0.41	0.70
PRECIP	AQ_UK1_MACC	695	0.63	-0.20	0.56	-14.57	37.43	-0.18	0.47	54.53	0.66	0.22	0.61
PRECIP	AQ_UK2_HTAP	681	0.68	-0.17	0.47	-12.82	35.49	-0.16	0.44	51.37	0.68	0.26	0.63

Variable	Model	n	FAC2	FB	NMSE	MB	MGE	NMB	NMGE	RMSE	r	COE	IOA
PRECIP	ED_CHIM	708	0.66	-0.11	0.52	-8.39	36.46	-0.11	0.46	53.92	0.62	0.24	0.62
PRECIP	ED_CMAQ	708	0.75	-0.06	0.39	-4.47	32.03	-0.06	0.40	48.39	0.70	0.33	0.67
PRECIP	ED_EMEP	708	0.66	-0.11	0.52	-8.39	36.46	-0.11	0.46	53.92	0.62	0.24	0.62
PRECIP	ED_LOTO	708	0.68	-0.11	0.59	-8.50	38.21	-0.11	0.48	57.73	0.57	0.20	0.60
PRECIP	ED_MATCH	708	0.76	-0.01	0.35	-0.40	30.30	-0.01	0.38	47.15	0.73	0.37	0.68
PRECIP	ED_MINNI	708	0.66	-0.11	0.52	-8.39	36.46	-0.11	0.46	53.92	0.62	0.24	0.62
TNO3_N	AQ_DE1_HTAP	554	0.41	-0.70	1.46	-0.25	0.29	-0.52	0.59	0.41	0.52	-0.04	0.48
TNO3_N	AQ_DK1_HTAP	544	0.77	0.27	0.31	0.15	0.23	0.31	0.47	0.31	0.73	0.18	0.59
TNO3_N	AQ_FI1_MACC	554	0.80	-0.06	0.45	-0.03	0.21	-0.05	0.44	0.32	0.59	0.23	0.61
TNO3_N	AQ_FI1_HTAP	554	0.74	0.22	0.49	0.12	0.26	0.25	0.53	0.38	0.57	0.07	0.54
TNO3_N	AQ_FRES1_HTAP	554	0.73	-0.13	0.31	-0.06	0.18	-0.12	0.37	0.26	0.77	0.35	0.68
TNO3_N	AQ_UK1_MACC	544	0.84	0.20	0.31	0.11	0.20	0.23	0.41	0.30	0.75	0.28	0.64
TNO3_N	AQ_UK2_HTAP	544	0.85	0.17	0.40	0.09	0.21	0.18	0.44	0.34	0.74	0.24	0.62
TNO3_N	ED_CHIM	544	0.63	0.53	0.73	0.36	0.39	0.73	0.79	0.55	0.76	-0.39	0.31
TNO3_N	ED_CMAQ	544	0.53	0.65	1.05	0.47	0.49	0.97	1.00	0.70	0.74	-0.75	0.12
TNO3_N	ED_EMEP	544	0.72	0.23	0.43	0.13	0.26	0.26	0.52	0.36	0.60	0.08	0.54
TNO3_N	ED_LOTO	544	0.81	0.17	0.30	0.09	0.20	0.18	0.41	0.29	0.73	0.29	0.64
TNO3_N	ED_MATCH	544	0.83	0.05	0.26	0.03	0.17	0.06	0.35	0.25	0.75	0.38	0.69
TNO3_N	ED_MINNI	544	0.79	0.20	0.37	0.11	0.22	0.22	0.44	0.33	0.74	0.22	0.61
TNO3_N	ENSEMBLE	544	0.81	0.22	0.27	0.12	0.20	0.25	0.41	0.28	0.76	0.28	0.64
TNH4_N	AQ_DE1_HTAP	472	0.59	0.10	1.01	0.15	0.96	0.11	0.66	1.53	0.29	-0.11	0.44
TNH4_N	AQ_DK1_HTAP	461	0.74	0.23	0.46	0.38	0.74	0.26	0.51	1.10	0.69	0.15	0.57
TNH4_N	AQ_FI1_MACC	472	0.72	0.19	0.79	0.30	0.84	0.21	0.58	1.41	0.54	0.03	0.51
TNH4_N	AQ_FI1_HTAP	472	0.72	0.22	0.77	0.36	0.83	0.25	0.57	1.41	0.55	0.04	0.52
TNH4_N	AQ_FRES1_HTAP	472	0.74	0.32	0.64	0.55	0.87	0.38	0.60	1.36	0.65	0.00	0.50
TNH4_N	AQ_UK1_MACC	461	0.72	0.17	0.69	0.26	0.78	0.18	0.54	1.30	0.57	0.11	0.55
TNH4_N	AQ_UK2_HTAP	461	0.54	0.66	1.40	1.42	1.58	0.98	1.09	2.41	0.76	-0.81	0.10

Variable	Model	n	FAC2	FB	NMSE	MB	MGE	NMB	NMGE	RMSE	r	COE	IOA
TNH4_N	ED_CHIM	461	0.73	0.24	0.42	0.39	0.73	0.27	0.51	1.06	0.71	0.16	0.58
TNH4_N	ED_CMAQ	461	0.64	0.36	0.74	0.63	0.99	0.43	0.68	1.49	0.58	-0.13	0.43
TNH4_N	ED_EMEP	461	0.79	0.01	0.35	0.02	0.57	0.01	0.39	0.86	0.73	0.35	0.68
TNH4_N	ED_LOTO	461	0.74	0.34	0.63	0.60	0.86	0.41	0.60	1.36	0.68	0.01	0.51
TNH4_N	ED_MATCH	461	0.79	-0.10	0.39	-0.14	0.56	-0.10	0.39	0.86	0.73	0.36	0.68
TNH4_N	ED_MINNI	461	0.73	0.24	0.42	0.39	0.74	0.27	0.51	1.06	0.69	0.15	0.57
TNH4_N	ENSEMBLE	461	0.79	0.17	0.40	0.28	0.67	0.19	0.46	1.00	0.70	0.23	0.62
TSO4_S	AQ_DE1_HTAP	245	0.57	0.37	0.80	0.34	0.57	0.45	0.76	0.81	0.52	-0.39	0.31
TSO4_S	AQ_DK1_HTAP	222	0.80	0.35	0.48	0.32	0.38	0.42	0.49	0.64	0.81	0.08	0.54
TSO4_S	AQ_FI1_MACC	245	0.74	0.18	0.57	0.15	0.39	0.20	0.51	0.62	0.71	0.06	0.53
TSO4_S	AQ_FI1_HTAP	245	0.79	0.06	0.37	0.04	0.28	0.06	0.37	0.47	0.75	0.33	0.66
TSO4_S	AQ_FRES1_HTAP	245	0.81	0.07	0.44	0.05	0.32	0.07	0.43	0.52	0.59	0.22	0.61
TSO4_S	AQ_UK1_MACC	234	0.84	0.26	0.44	0.22	0.35	0.30	0.48	0.56	0.68	0.15	0.57
TSO4_S	AQ_UK2_HTAP	234	0.72	0.37	0.76	0.33	0.50	0.45	0.67	0.77	0.63	-0.20	0.40
TSO4_S	ED_CHIM	222	0.84	0.00	0.52	0.00	0.29	0.00	0.38	0.55	0.76	0.28	0.64
TSO4_S	ED_CMAQ	222	0.65	0.52	0.90	0.54	0.62	0.70	0.80	0.95	0.77	-0.50	0.25
TSO4_S	ED_EMEP	222	0.81	-0.13	0.42	-0.09	0.29	-0.12	0.38	0.46	0.73	0.29	0.64
TSO4_S	ED_LOTO	222	0.83	-0.08	0.40	-0.06	0.29	-0.07	0.37	0.47	0.75	0.30	0.65
TSO4_S	ED_MATCH	222	0.81	-0.08	0.38	-0.06	0.30	-0.08	0.40	0.45	0.72	0.26	0.63
TSO4_S	ED_MINNI	222	0.80	0.20	0.46	0.17	0.36	0.22	0.47	0.57	0.74	0.12	0.56
TSO4_S	ENSEMBLE	222	0.88	-0.02	0.28	-0.02	0.24	-0.02	0.32	0.40	0.81	0.41	0.71

S3.7 . Tables with complete statistics from annual values (definition in S3.10). All available sites

Variable	Model	n	FAC2	FB	NMSE	MB	MGE	NMB	NMGE	RMSE	r	COE	IOA
WNO3_N	AQ_DE1_HTAP	59	0.00	-1.50	7.77	-227.79	227.79	-0.86	0.86	279.67	0.70	-0.80	0.10
WNO3_N	AQ_DK1_HTAP	58	0.88	-0.09	0.29	-22.81	94.48	-0.08	0.35	138.04	0.64	0.25	0.63
WNO3_N	AQ_FI1_MACC	59	0.68	-0.45	0.58	-98.20	110.99	-0.37	0.42	160.47	0.72	0.12	0.56
WNO3_N	AQ_FI1_HTAP	59	0.92	-0.12	0.25	-30.28	77.75	-0.11	0.29	124.09	0.74	0.39	0.69
WNO3_N	AQ_FRES1_HTAP	59	0.86	-0.44	0.60	-95.39	104.40	-0.36	0.39	164.29	0.73	0.17	0.59
WNO3_N	AQ_UK1_MACC	59	0.61	-0.53	0.74	-111.10	121.67	-0.42	0.46	174.25	0.66	0.04	0.52
WNO3_N	AQ_UK2_HTAP	58	0.81	-0.30	0.38	-70.33	88.30	-0.26	0.33	141.62	0.73	0.30	0.65
WNO3_N	ED_CHIM	58	0.84	-0.34	0.50	-78.79	97.40	-0.29	0.36	159.14	0.66	0.23	0.61
WNO3_N	ED_CMAQ	58	0.91	-0.23	0.38	-56.18	91.54	-0.21	0.34	147.47	0.65	0.27	0.64
WNO3_N	ED_EMEP	58	0.93	-0.03	0.23	-9.12	83.17	-0.03	0.31	126.36	0.70	0.34	0.67
WNO3_N	ED_LOTO	58	0.69	-0.47	0.57	-101.85	113.84	-0.38	0.42	159.40	0.74	0.10	0.55
WNO3_N	ED_MATCH	58	0.91	0.07	0.18	19.16	86.91	0.07	0.32	118.49	0.76	0.31	0.66
WNO3_N	ED_MINNI	58	0.05	-1.16	3.33	-197.09	198.24	-0.73	0.74	252.68	0.63	-0.57	0.21
WNO3_N	ENSEMBLE	58	0.95	-0.19	0.26	-46.05	74.44	-0.17	0.28	125.09	0.77	0.41	0.71
HNO3_N	AQ_DE1_HTAP	13	0.15	-1.11	5.04	-0.10	0.11	-0.71	0.79	0.17	0.17	0.02	0.51
HNO3_N	AQ_DK1_HTAP	12	0.58	-0.35	1.18	-0.04	0.09	-0.30	0.60	0.13	0.47	0.26	0.63
HNO3_N	AQ_FI1_MACC	13	0.46	-0.82	2.81	-0.08	0.10	-0.58	0.72	0.15	0.41	0.10	0.55
HNO3_N	AQ_FI1_HTAP	13	0.62	-0.42	1.43	-0.05	0.09	-0.35	0.63	0.13	0.40	0.22	0.61
HNO3_N	AQ_FRES1_HTAP	13	0.54	-0.48	1.69	-0.05	0.09	-0.39	0.64	0.14	0.28	0.21	0.60
HNO3_N	AQ_UK1_MACC	12	0.67	-0.21	1.20	-0.03	0.09	-0.19	0.66	0.14	0.27	0.19	0.60
HNO3_N	AQ_UK2_HTAP	12	0.42	-0.67	2.33	-0.07	0.10	-0.50	0.73	0.15	0.19	0.11	0.55
HNO3_N	ED_CHIM	12	0.50	-0.11	1.26	-0.01	0.11	-0.10	0.74	0.15	0.15	0.09	0.55
HNO3_N	ED_CMAQ	12	0.58	0.08	1.29	0.01	0.11	0.09	0.77	0.17	0.11	0.05	0.52
HNO3_N	ED_EMEP	12	0.33	-0.67	2.18	-0.07	0.11	-0.50	0.77	0.15	0.35	0.06	0.53
HNO3_N	ED_LOTO	12	0.50	-0.44	1.54	-0.05	0.10	-0.36	0.71	0.14	0.30	0.12	0.56

Variable	Model	n	FAC2	FB	NMSE	MB	MGE	NMB	NMGE	RMSE	r	COE	IOA
HNO3_N	ED_MATCH	12	0.58	-0.17	1.22	-0.02	0.11	-0.15	0.79	0.15	0.12	0.04	0.52
HNO3_N	ED_MINNI	12	0.42	-0.46	1.83	-0.05	0.11	-0.37	0.75	0.15	0.07	0.08	0.54
HNO3_N	ENSEMBLE	12	0.58	-0.41	1.47	-0.05	0.10	-0.34	0.66	0.14	0.30	0.18	0.59
PM_NO3_N	AQ_DE1_HTAP	33	0.45	-0.57	0.97	-0.15	0.18	-0.44	0.55	0.25	0.52	-0.10	0.45
PM_NO3_N	AQ_DK1_HTAP	32	0.69	0.40	0.32	0.16	0.18	0.50	0.56	0.23	0.77	-0.08	0.46
PM_NO3_N	AQ_FI1_MACC	33	0.79	0.08	0.30	0.03	0.14	0.08	0.44	0.19	0.59	0.14	0.57
PM_NO3_N	AQ_FI1_HTAP	33	0.70	0.35	0.34	0.14	0.19	0.43	0.56	0.23	0.66	-0.11	0.45
PM_NO3_N	AQ_FRES1_HTAP	33	0.58	-0.11	0.29	-0.03	0.14	-0.10	0.42	0.17	0.74	0.16	0.58
PM_NO3_N	AQ_UK1_MACC	32	0.75	0.30	0.32	0.11	0.16	0.35	0.49	0.22	0.69	0.05	0.53
PM_NO3_N	AQ_UK2_HTAP	31	0.74	0.35	0.41	0.14	0.19	0.42	0.55	0.26	0.69	-0.11	0.44
PM_NO3_N	ED_CHIM	32	0.59	0.61	0.79	0.29	0.32	0.88	0.96	0.40	0.73	-0.86	0.07
PM_NO3_N	ED_CMAQ	32	0.50	0.75	1.04	0.39	0.40	1.19	1.22	0.50	0.71	-1.36	-0.15
PM_NO3_N	ED_EMEP	32	0.72	0.37	0.31	0.15	0.17	0.46	0.52	0.22	0.76	-0.01	0.49
PM_NO3_N	ED_LOTO	32	0.78	0.34	0.35	0.13	0.17	0.41	0.51	0.23	0.75	0.02	0.51
PM_NO3_N	ED_MATCH	32	0.81	0.04	0.16	0.01	0.10	0.04	0.32	0.14	0.81	0.39	0.69
PM_NO3_N	ED_MINNI	32	0.66	0.30	0.39	0.11	0.18	0.35	0.56	0.24	0.68	-0.08	0.46
PM_NO3_N	ENSEMBLE	32	0.75	0.34	0.24	0.13	0.15	0.41	0.46	0.19	0.82	0.10	0.55
WNH4_N	AQ_DE1_HTAP	61	0.34	-0.77	1.18	-175.31	178.63	-0.56	0.57	227.76	0.77	-0.29	0.36
WNH4_N	AQ_DK1_HTAP	60	0.85	-0.03	0.29	-8.19	120.15	-0.03	0.38	168.00	0.62	0.15	0.57
WNH4_N	AQ_FI1_MACC	61	0.87	-0.15	0.23	-43.58	100.68	-0.14	0.32	140.83	0.75	0.27	0.64
WNH4_N	AQ_FI1_HTAP	61	0.89	-0.11	0.23	-33.29	101.76	-0.11	0.32	142.16	0.74	0.27	0.63
WNH4_N	AQ_FRES1_HTAP	61	0.34	-0.80	1.34	-179.62	183.18	-0.57	0.58	239.02	0.60	-0.32	0.34
WNH4_N	AQ_UK1_MACC	61	0.54	-0.61	0.83	-146.99	161.42	-0.47	0.51	209.19	0.65	-0.16	0.42
WNH4_N	AQ_UK2_HTAP	61	0.79	-0.26	0.33	-71.80	114.49	-0.23	0.36	159.83	0.70	0.17	0.59
WNH4_N	ED_CHIM	60	0.57	-0.47	0.71	-119.51	149.64	-0.38	0.47	209.71	0.53	-0.06	0.47
WNH4_N	ED_CMAQ	60	0.65	-0.55	0.72	-135.88	142.47	-0.43	0.45	201.13	0.70	-0.01	0.49
WNH4_N	ED_EMEP	60	0.90	-0.01	0.16	-2.02	90.99	-0.01	0.29	126.65	0.81	0.35	0.68

Variable	Model	n	FAC2	FB	NMSE	MB	MGE	NMB	NMGE	RMSE	r	COE	IOA
WNH4_N	ED_LOTO	60	0.82	-0.35	0.38	-93.79	125.30	-0.30	0.40	163.54	0.74	0.11	0.56
WNH4_N	ED_MATCH	60	0.82	0.17	0.31	59.53	123.99	0.19	0.39	190.34	0.72	0.12	0.56
WNH4_N	ED_MINNI	60	0.30	-0.81	1.30	-181.83	184.02	-0.58	0.58	234.07	0.78	-0.31	0.35
WNH4_N	ENSEMBLE	60	0.93	-0.11	0.21	-33.40	92.82	-0.11	0.29	134.95	0.76	0.34	0.67
NH3_N	AQ_DE1_HTAP	13	0.54	0.40	0.59	0.42	0.62	0.50	0.74	0.78	0.03	-0.83	0.08
NH3_N	AQ_DK1_HTAP	12	0.67	0.43	0.79	0.46	0.65	0.55	0.79	0.91	0.67	-0.83	0.08
NH3_N	AQ_FI1_MACC	13	0.46	0.66	2.59	0.81	1.09	0.98	1.31	1.89	0.59	-2.25	-0.38
NH3_N	AQ_FI1_HTAP	13	0.62	0.68	2.37	0.87	1.02	1.04	1.23	1.83	0.62	-2.04	-0.34
NH3_N	AQ_FRES1_HTAP	13	0.46	0.62	1.59	0.75	0.96	0.89	1.15	1.45	0.64	-1.84	-0.30
NH3_N	AQ_UK1_MACC	12	0.67	0.37	1.21	0.37	0.63	0.45	0.76	1.09	0.63	-0.77	0.11
NH3_N	AQ_UK2_HTAP	12	0.42	0.85	2.31	1.21	1.39	1.47	1.68	1.97	0.70	-2.90	-0.49
NH3_N	ED_CHIM	12	0.58	0.11	0.37	0.10	0.46	0.12	0.56	0.53	0.71	-0.30	0.35
NH3_N	ED_CMAQ	12	0.58	0.28	1.17	0.27	0.60	0.32	0.73	1.03	0.34	-0.69	0.16
NH3_N	ED_EMEP	12	0.67	-0.04	0.27	-0.03	0.34	-0.04	0.42	0.42	0.70	0.03	0.52
NH3_N	ED_LOTO	12	0.58	0.63	1.61	0.76	0.92	0.92	1.12	1.45	0.77	-1.60	-0.23
NH3_N	ED_MATCH	12	0.58	0.06	0.44	0.05	0.43	0.06	0.52	0.56	0.57	-0.21	0.39
NH3_N	ED_MINNI	12	0.50	0.25	0.45	0.24	0.54	0.29	0.65	0.63	0.64	-0.51	0.25
NH3_N	ENSEMBLE	12	0.67	0.44	0.97	0.46	0.69	0.56	0.84	1.01	0.69	-0.95	0.02
PM_NH4_N	AQ_DE1_HTAP	28	0.79	-0.07	0.31	-0.04	0.23	-0.07	0.40	0.31	0.70	0.39	0.69
PM_NH4_N	AQ_DK1_HTAP	27	0.74	0.17	0.25	0.11	0.23	0.19	0.39	0.32	0.74	0.40	0.70
PM_NH4_N	AQ_FI1_MACC	28	0.68	-0.12	0.38	-0.07	0.24	-0.11	0.42	0.34	0.64	0.36	0.68
PM_NH4_N	AQ_FI1_HTAP	28	0.82	0.00	0.29	0.00	0.23	0.00	0.40	0.32	0.69	0.39	0.69
PM_NH4_N	AQ_FRES1_HTAP	28	0.75	0.32	0.28	0.22	0.26	0.37	0.45	0.37	0.78	0.31	0.66
PM_NH4_N	AQ_UK1_MACC	27	0.78	0.25	0.29	0.17	0.25	0.29	0.42	0.36	0.76	0.36	0.68
PM_NH4_N	AQ_UK2_HTAP	26	0.77	0.31	0.46	0.22	0.34	0.37	0.56	0.48	0.71	0.15	0.58
PM_NH4_N	ED_CHIM	27	0.74	0.48	0.45	0.38	0.38	0.63	0.64	0.51	0.81	0.03	0.51
PM_NH4_N	ED_CMAQ	27	0.56	0.65	0.77	0.57	0.57	0.96	0.96	0.73	0.78	-0.46	0.27

Variable	Model	n	FAC2	FB	NMSE	MB	MGE	NMB	NMGE	RMSE	r	COE	IOA
PM_NH4_N	ED_EMEP	27	0.78	0.17	0.26	0.11	0.23	0.18	0.39	0.33	0.75	0.41	0.71
PM_NH4_N	ED_LOTO	27	0.78	0.17	0.24	0.11	0.21	0.18	0.36	0.32	0.78	0.45	0.73
PM_NH4_N	ED_MATCH	27	0.81	-0.07	0.24	-0.04	0.21	-0.07	0.36	0.28	0.78	0.45	0.73
PM_NH4_N	ED_MINNI	27	0.74	0.39	0.35	0.28	0.31	0.48	0.53	0.43	0.77	0.20	0.60
PM_NH4_N	ENSEMBLE	27	0.78	0.14	0.21	0.09	0.20	0.15	0.34	0.29	0.78	0.49	0.75
WSO4_S	AQ_DE1_HTAP	61	0.72	-0.50	1.02	-101.28	116.67	-0.40	0.46	198.53	0.55	0.09	0.54
WSO4_S	AQ_DK1_HTAP	59	0.34	-0.82	1.87	-149.52	152.26	-0.58	0.59	227.10	0.65	-0.17	0.42
WSO4_S	AQ_FI1_MACC	61	0.80	-0.30	0.47	-67.02	78.54	-0.26	0.31	150.17	0.75	0.39	0.69
WSO4_S	AQ_FI1_HTAP	61	0.82	-0.34	0.52	-73.15	79.73	-0.29	0.31	153.87	0.76	0.38	0.69
WSO4_S	AQ_FRES1_HTAP	61	0.33	-0.87	1.99	-153.64	153.64	-0.60	0.60	225.45	0.76	-0.20	0.40
WSO4_S	AQ_UK1_MACC	61	0.80	-0.27	0.70	-59.95	99.36	-0.24	0.39	186.09	0.49	0.22	0.61
WSO4_S	AQ_UK2_HTAP	60	0.85	0.14	0.35	38.89	110.23	0.15	0.43	162.01	0.64	0.15	0.57
WSO4_S	ED_CHIM	59	0.20	-1.07	3.35	-178.72	178.72	-0.70	0.70	259.29	0.60	-0.37	0.31
WSO4_S	ED_CMAQ	59	0.85	-0.14	0.59	-34.54	95.94	-0.13	0.37	183.13	0.49	0.26	0.63
WSO4_S	ED_EMEP	59	0.90	0.10	0.36	27.86	103.39	0.11	0.40	162.36	0.64	0.21	0.60
WSO4_S	ED_LOTO	59	0.75	-0.42	0.72	-89.42	101.21	-0.35	0.39	175.85	0.68	0.22	0.61
WSO4_S	ED_MATCH	59	0.80	0.33	0.40	101.40	132.97	0.39	0.52	191.78	0.77	-0.02	0.49
WSO4_S	ED_MINNI	59	0.32	-0.83	1.89	-150.73	151.05	-0.59	0.59	227.12	0.67	-0.16	0.42
WSO4_S	ENSEMBLE	59	0.93	-0.08	0.29	-19.75	69.14	-0.08	0.27	132.35	0.77	0.47	0.73
SO2_S	AQ_DE1_HTAP	58	0.48	0.50	1.83	0.38	0.60	0.67	1.07	0.98	0.31	-0.38	0.31
SO2_S	AQ_DK1_HTAP	56	0.79	0.14	1.26	0.09	0.33	0.15	0.57	0.69	0.53	0.26	0.63
SO2_S	AQ_FI1_MACC	58	0.53	0.49	1.31	0.36	0.54	0.64	0.97	0.82	0.49	-0.25	0.37
SO2_S	AQ_FI1_HTAP	58	0.60	0.36	1.40	0.25	0.44	0.44	0.79	0.79	0.45	-0.02	0.49
SO2_S	AQ_FRES1_HTAP	58	0.62	-0.04	1.86	-0.02	0.34	-0.04	0.61	0.74	0.43	0.21	0.61
SO2_S	AQ_UK1_MACC	57	0.63	0.52	1.05	0.39	0.51	0.70	0.90	0.75	0.67	-0.16	0.42
SO2_S	AQ_UK2_HTAP	56	0.38	0.70	1.62	0.62	0.75	1.08	1.32	1.05	0.57	-0.71	0.15
SO2_S	ED_CHIM	56	0.59	0.28	1.49	0.18	0.43	0.32	0.76	0.80	0.47	0.01	0.51

Variable	Model	n	FAC2	FB	NMSE	MB	MGE	NMB	NMGE	RMSE	r	COE	IOA
SO2_S	ED_CMAQ	56	0.34	0.73	1.62	0.65	0.78	1.14	1.36	1.06	0.56	-0.76	0.12
SO2_S	ED_EMEP	56	0.55	-0.21	1.78	-0.11	0.32	-0.19	0.55	0.69	0.54	0.28	0.64
SO2_S	ED_LOTO	56	0.66	0.20	1.33	0.13	0.38	0.23	0.66	0.73	0.50	0.14	0.57
SO2_S	ED_MATCH	56	0.57	0.22	1.28	0.14	0.40	0.25	0.70	0.72	0.52	0.09	0.54
SO2_S	ED_MINNI	56	0.41	0.44	1.14	0.32	0.51	0.57	0.89	0.76	0.55	-0.15	0.42
SO2_S	ENSEMBLE	56	0.64	0.23	1.23	0.15	0.38	0.26	0.67	0.71	0.53	0.13	0.56
PM_SO4_S	AQ_DE1_HTAP	23	0.87	0.00	0.22	0.00	0.12	0.00	0.29	0.20	0.55	0.34	0.67
PM_SO4_S	AQ_DK1_HTAP	21	0.81	0.46	0.65	0.26	0.26	0.60	0.62	0.44	0.55	-0.53	0.24
PM_SO4_S	AQ_FI1_MACC	23	0.61	-0.25	0.57	-0.09	0.19	-0.22	0.45	0.28	0.40	-0.03	0.49
PM_SO4_S	AQ_FI1_HTAP	23	0.65	-0.29	0.51	-0.11	0.20	-0.25	0.47	0.26	0.46	-0.06	0.47
PM_SO4_S	AQ_FRES1_HTAP	23	0.91	0.18	0.24	0.08	0.12	0.20	0.29	0.23	0.64	0.35	0.67
PM_SO4_S	AQ_UK1_MACC	22	0.77	0.06	0.19	0.03	0.11	0.06	0.26	0.18	0.63	0.41	0.70
PM_SO4_S	AQ_UK2_HTAP	22	0.82	0.03	0.26	0.01	0.13	0.03	0.31	0.21	0.57	0.27	0.64
PM_SO4_S	ED_CHIM	21	0.86	-0.20	0.24	-0.08	0.15	-0.18	0.34	0.19	0.59	0.16	0.58
PM_SO4_S	ED_CMAQ	21	0.71	0.34	0.24	0.18	0.19	0.41	0.44	0.25	0.63	-0.08	0.46
PM_SO4_S	ED_EMEP	21	0.95	0.00	0.19	0.00	0.10	0.00	0.24	0.19	0.69	0.42	0.71
PM_SO4_S	ED_LOTO	21	0.71	-0.32	0.32	-0.12	0.17	-0.27	0.40	0.21	0.61	0.02	0.51
PM_SO4_S	ED_MATCH	21	0.71	-0.28	0.32	-0.11	0.17	-0.25	0.39	0.21	0.57	0.04	0.52
PM_SO4_S	ED_MINNI	21	0.86	-0.13	0.18	-0.05	0.11	-0.12	0.27	0.17	0.71	0.34	0.67
PM_SO4_S	ENSEMBLE	21	0.86	-0.21	0.29	-0.08	0.15	-0.19	0.36	0.21	0.59	0.12	0.56
PRECIP	AQ_DE1_HTAP	58	0.90	-0.34	0.28	-281.73	315.20	-0.29	0.33	426.21	0.66	0.06	0.53
PRECIP	AQ_DK1_HTAP	56	0.95	0.05	0.15	47.22	282.85	0.05	0.29	389.18	0.65	0.15	0.58
PRECIP	AQ_FI1_MACC	59	0.90	0.11	0.14	112.66	240.34	0.12	0.25	375.83	0.65	0.29	0.64
PRECIP	AQ_FI1_HTAP	59	0.90	0.11	0.14	112.66	240.34	0.12	0.25	375.83	0.65	0.29	0.64
PRECIP	AQ_FRES1_HTAP	59	0.93	0.11	0.09	113.76	209.91	0.12	0.22	294.53	0.78	0.38	0.69
PRECIP	AQ_UK1_MACC	58	0.91	-0.20	0.20	-174.59	302.22	-0.18	0.31	388.63	0.66	0.09	0.55
PRECIP	AQ_UK2_HTAP	57	0.93	-0.17	0.14	-153.14	254.83	-0.16	0.26	336.58	0.71	0.24	0.62

Variable	Model	n	FAC2	FB	NMSE	MB	MGE	NMB	NMGE	RMSE	r	COE	IOA
PRECIP	ED_CHIM	56	0.91	-0.08	0.17	-71.14	270.52	-0.07	0.28	382.92	0.50	0.19	0.59
PRECIP	ED_CMAQ	56	0.96	-0.02	0.12	-21.57	247.43	-0.02	0.26	326.47	0.65	0.26	0.63
PRECIP	ED_EMEP	56	0.91	-0.08	0.17	-71.14	270.52	-0.07	0.28	382.92	0.50	0.19	0.59
PRECIP	ED_LOTO	56	1.00	-0.08	0.11	-72.56	229.08	-0.07	0.24	306.88	0.72	0.31	0.66
PRECIP	ED_MATCH	56	0.98	0.03	0.09	29.91	215.48	0.03	0.22	298.74	0.74	0.35	0.68
PRECIP	ED_MINNI	56	0.91	-0.08	0.17	-71.14	270.52	-0.07	0.28	382.92	0.50	0.19	0.59
TNO3_N	AQ_DE1_HTAP	46	0.52	-0.70	0.97	-0.25	0.26	-0.52	0.53	0.33	0.68	-0.11	0.44
TNO3_N	AQ_DK1_HTAP	45	0.82	0.28	0.19	0.16	0.19	0.33	0.40	0.24	0.79	0.18	0.59
TNO3_N	AQ_FI1_MACC	46	0.89	-0.05	0.23	-0.02	0.17	-0.05	0.36	0.22	0.63	0.26	0.63
TNO3_N	AQ_FI1_HTAP	46	0.80	0.23	0.22	0.13	0.19	0.26	0.40	0.25	0.69	0.18	0.59
TNO3_N	AQ_FRES1_HTAP	46	0.93	-0.13	0.13	-0.06	0.12	-0.12	0.26	0.16	0.85	0.46	0.73
TNO3_N	AQ_UK1_MACC	45	0.96	0.21	0.18	0.11	0.17	0.24	0.36	0.23	0.79	0.27	0.64
TNO3_N	AQ_UK2_HTAP	45	0.91	0.17	0.19	0.09	0.16	0.19	0.34	0.23	0.78	0.30	0.65
TNO3_N	ED_CHIM	45	0.67	0.54	0.52	0.35	0.35	0.73	0.74	0.45	0.79	-0.51	0.25
TNO3_N	ED_CMAQ	45	0.44	0.66	0.75	0.47	0.47	0.98	0.98	0.58	0.79	-1.01	0.00
TNO3_N	ED_EMEP	45	0.89	0.24	0.19	0.13	0.19	0.28	0.39	0.23	0.77	0.20	0.60
TNO3_N	ED_LOTO	45	0.89	0.17	0.15	0.09	0.15	0.19	0.30	0.20	0.82	0.38	0.69
TNO3_N	ED_MATCH	45	0.91	0.06	0.11	0.03	0.12	0.06	0.26	0.17	0.82	0.48	0.74
TNO3_N	ED_MINNI	45	0.91	0.20	0.16	0.11	0.17	0.22	0.35	0.22	0.80	0.29	0.65
TNO3_N	ENSEMBLE	45	0.87	0.23	0.15	0.13	0.17	0.26	0.35	0.21	0.82	0.29	0.64
TNH4_N	AQ_DE1_HTAP	40	0.78	0.10	0.46	0.15	0.69	0.11	0.48	1.02	0.48	0.07	0.54
TNH4_N	AQ_DK1_HTAP	39	0.87	0.25	0.27	0.40	0.60	0.28	0.42	0.84	0.80	0.21	0.60
TNH4_N	AQ_FI1_MACC	40	0.85	0.19	0.54	0.31	0.69	0.22	0.48	1.15	0.62	0.07	0.54
TNH4_N	AQ_FI1_HTAP	40	0.88	0.23	0.51	0.36	0.66	0.26	0.46	1.14	0.64	0.11	0.56
TNH4_N	AQ_FRES1_HTAP	40	0.83	0.33	0.44	0.56	0.73	0.39	0.52	1.11	0.78	0.01	0.50
TNH4_N	AQ_UK1_MACC	39	0.87	0.17	0.33	0.27	0.59	0.19	0.41	0.88	0.72	0.22	0.61
TNH4_N	AQ_UK2_HTAP	39	0.56	0.67	1.20	1.45	1.53	1.02	1.08	2.21	0.86	-1.02	-0.01

Variable	Model	n	FAC2	FB	NMSE	MB	MGE	NMB	NMGE	RMSE	r	COE	IOA
TNH4_N	ED_CHIM	39	0.82	0.25	0.27	0.40	0.59	0.28	0.41	0.84	0.79	0.23	0.61
TNH4_N	ED_CMAQ	39	0.72	0.37	0.51	0.64	0.84	0.45	0.59	1.22	0.68	-0.11	0.44
TNH4_N	ED_EMEP	39	0.90	0.03	0.20	0.04	0.48	0.03	0.34	0.64	0.81	0.37	0.68
TNH4_N	ED_LOTO	39	0.74	0.36	0.50	0.62	0.72	0.44	0.51	1.20	0.76	0.05	0.52
TNH4_N	ED_MATCH	39	0.82	-0.08	0.23	-0.12	0.48	-0.08	0.34	0.66	0.80	0.36	0.68
TNH4_N	ED_MINNI	39	0.85	0.25	0.26	0.40	0.57	0.28	0.40	0.81	0.79	0.25	0.63
TNH4_N	ENSEMBLE	39	0.85	0.19	0.26	0.29	0.55	0.21	0.38	0.79	0.78	0.28	0.64
TSO4_S	AQ_DE1_HTAP	20	0.75	0.32	0.49	0.30	0.44	0.39	0.57	0.64	0.73	-0.47	0.27
TSO4_S	AQ_DK1_HTAP	18	0.94	0.32	0.26	0.30	0.33	0.38	0.41	0.47	0.89	-0.13	0.44
TSO4_S	AQ_FI1_MACC	20	0.85	0.14	0.28	0.12	0.31	0.16	0.41	0.44	0.68	-0.04	0.48
TSO4_S	AQ_FI1_HTAP	20	0.90	0.02	0.13	0.02	0.19	0.02	0.24	0.29	0.78	0.37	0.69
TSO4_S	AQ_FRES1_HTAP	20	0.90	0.04	0.17	0.03	0.23	0.04	0.30	0.33	0.70	0.24	0.62
TSO4_S	AQ_UK1_MACC	19	0.89	0.23	0.25	0.20	0.27	0.26	0.36	0.42	0.71	0.11	0.56
TSO4_S	AQ_UK2_HTAP	19	0.84	0.31	0.36	0.28	0.40	0.37	0.53	0.53	0.78	-0.33	0.34
TSO4_S	ED_CHIM	18	0.89	-0.02	0.24	-0.02	0.23	-0.02	0.29	0.38	0.81	0.20	0.60
TSO4_S	ED_CMAQ	18	0.78	0.49	0.56	0.51	0.56	0.65	0.71	0.75	0.86	-0.93	0.04
TSO4_S	ED_EMEP	18	0.89	-0.16	0.18	-0.12	0.22	-0.15	0.28	0.31	0.85	0.24	0.62
TSO4_S	ED_LOTO	18	0.89	-0.11	0.16	-0.08	0.21	-0.10	0.27	0.30	0.84	0.27	0.64
TSO4_S	ED_MATCH	18	0.89	-0.12	0.14	-0.09	0.22	-0.11	0.28	0.28	0.86	0.25	0.62
TSO4_S	ED_MINNI	18	0.89	0.17	0.25	0.14	0.31	0.18	0.40	0.43	0.85	-0.08	0.46
TSO4_S	ENSEMBLE	18	0.89	-0.06	0.10	-0.04	0.19	-0.06	0.24	0.24	0.90	0.34	0.67

S3.8 . Tables with complete statistics from annual values (definition in S3.10). Common sites

Variable	Model	n	FAC2	FB	NMSE	MB	MGE	NMB	NMGE	RMSE	r	COE	IOA
WNO3_N	AQ_DE1_HTAP	10	0.00	-1.50	6.99	-182.27	182.27	-0.86	0.86	212.33	0.73	-0.93	0.04
WNO3_N	AQ_DK1_HTAP	10	1.00	0.05	0.06	10.85	44.58	0.05	0.21	55.45	0.91	0.53	0.76
WNO3_N	AQ_FI1_MACC	10	0.60	-0.50	0.44	-85.55	88.51	-0.40	0.42	109.07	0.85	0.06	0.53
WNO3_N	AQ_FI1_HTAP	10	0.90	-0.12	0.13	-24.26	53.33	-0.11	0.25	71.96	0.84	0.44	0.72
WNO3_N	AQ_FRES1_HTAP	10	1.00	-0.35	0.26	-62.88	65.40	-0.30	0.31	91.18	0.87	0.31	0.65
WNO3_N	AQ_UK1_MACC	10	0.50	-0.48	0.60	-81.64	110.23	-0.38	0.52	129.09	0.58	-0.17	0.42
WNO3_N	AQ_UK2_HTAP	10	0.80	-0.33	0.29	-59.79	75.59	-0.28	0.36	96.92	0.77	0.20	0.60
WNO3_N	ED_CHIM	10	1.00	-0.26	0.18	-48.95	50.57	-0.23	0.24	79.37	0.88	0.47	0.73
WNO3_N	ED_CMAQ	10	1.00	-0.16	0.15	-31.91	61.28	-0.15	0.29	75.29	0.82	0.35	0.68
WNO3_N	ED_EMEP	10	1.00	0.11	0.12	23.99	61.58	0.11	0.29	78.24	0.86	0.35	0.67
WNO3_N	ED_LOTO	10	0.80	-0.27	0.17	-50.93	60.31	-0.24	0.28	75.66	0.88	0.36	0.68
WNO3_N	ED_MATCH	10	1.00	0.21	0.21	48.61	80.02	0.23	0.38	107.57	0.84	0.15	0.58
WNO3_N	ED_MINNI	10	0.00	-1.12	2.57	-153.06	153.06	-0.72	0.72	180.23	0.82	-0.62	0.19
WNO3_N	ENSEMBLE	10	1.00	-0.09	0.08	-18.04	40.45	-0.08	0.19	56.60	0.89	0.57	0.79
HNO3_N	AQ_DE1_HTAP	10	0.10	-1.27	5.94	-0.13	0.13	-0.78	0.82	0.19	0.29	-0.07	0.46
HNO3_N	AQ_DK1_HTAP	10	0.60	-0.49	1.19	-0.06	0.09	-0.40	0.55	0.14	0.53	0.27	0.64
HNO3_N	AQ_FI1_MACC	10	0.40	-0.95	3.02	-0.11	0.12	-0.65	0.71	0.17	0.50	0.06	0.53
HNO3_N	AQ_FI1_HTAP	10	0.60	-0.60	1.50	-0.08	0.10	-0.46	0.61	0.15	0.52	0.20	0.60
HNO3_N	AQ_FRES1_HTAP	10	0.50	-0.67	1.86	-0.08	0.10	-0.50	0.62	0.16	0.38	0.18	0.59
HNO3_N	AQ_UK1_MACC	10	0.70	-0.39	1.08	-0.05	0.09	-0.32	0.56	0.14	0.44	0.27	0.64
HNO3_N	AQ_UK2_HTAP	10	0.40	-0.86	2.56	-0.10	0.11	-0.60	0.69	0.17	0.40	0.09	0.55
HNO3_N	ED_CHIM	10	0.50	-0.31	1.13	-0.04	0.10	-0.27	0.62	0.15	0.31	0.19	0.59
HNO3_N	ED_CMAQ	10	0.60	-0.18	0.84	-0.03	0.09	-0.16	0.56	0.14	0.41	0.26	0.63
HNO3_N	ED_EMEP	10	0.30	-0.83	2.29	-0.10	0.12	-0.59	0.72	0.16	0.49	0.05	0.53
HNO3_N	ED_LOTO	10	0.50	-0.63	1.60	-0.08	0.11	-0.48	0.65	0.15	0.47	0.14	0.57

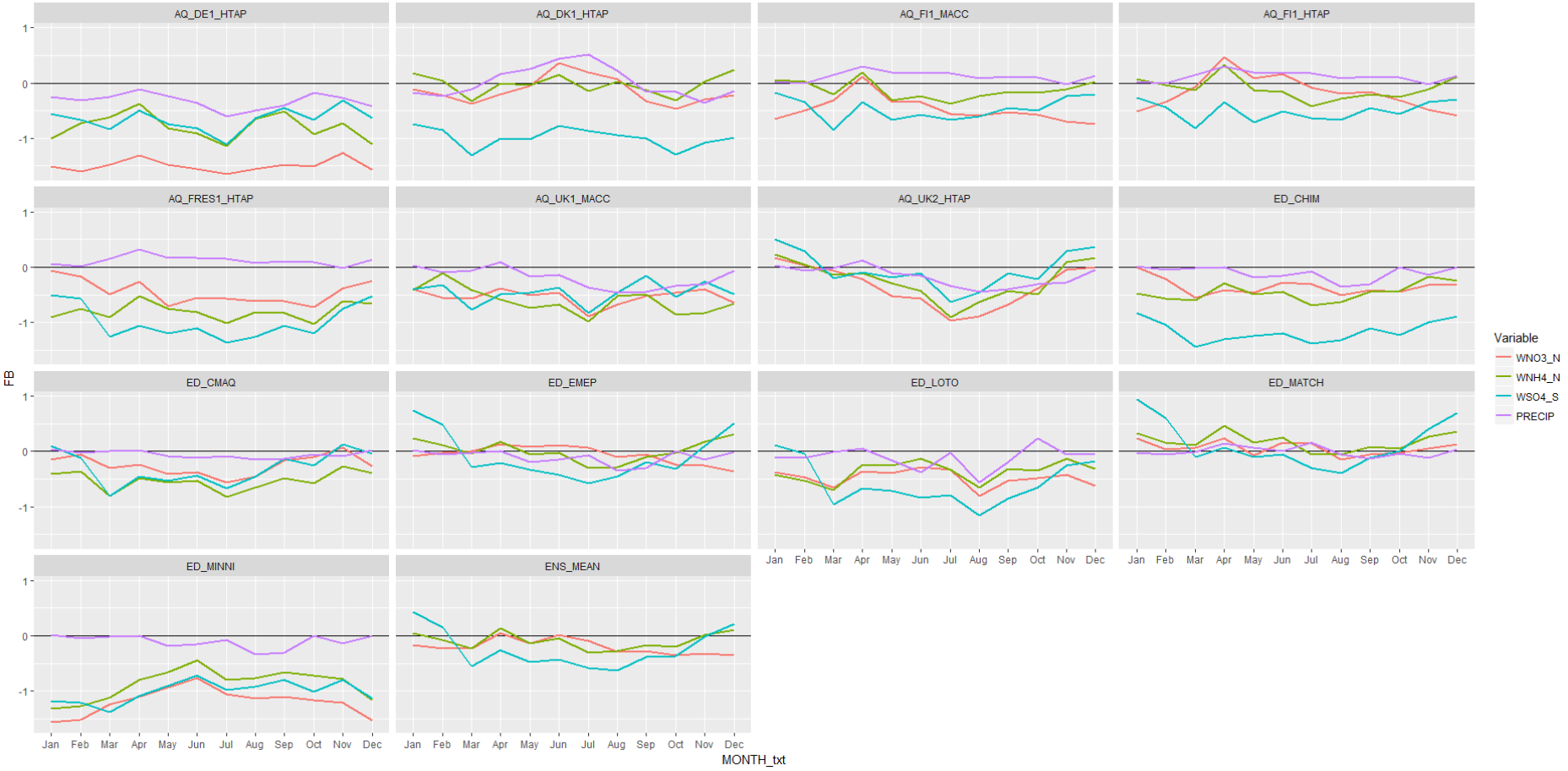
Variable	Model	n	FAC2	FB	NMSE	MB	MGE	NMB	NMGE	RMSE	r	COE	IOA
HNO3_N	ED_MATCH	10	0.60	-0.36	1.19	-0.05	0.11	-0.30	0.69	0.15	0.27	0.10	0.55
HNO3_N	ED_MINNI	10	0.40	-0.66	1.91	-0.08	0.11	-0.50	0.69	0.16	0.29	0.10	0.55
HNO3_N	ENSEMBLE	10	0.60	-0.58	1.50	-0.07	0.10	-0.45	0.61	0.15	0.45	0.20	0.60
PM_NO3_N	AQ_DE1_HTAP	10	0.70	-0.46	0.64	-0.13	0.14	-0.37	0.39	0.22	0.67	0.26	0.63
PM_NO3_N	AQ_DK1_HTAP	10	0.80	0.44	0.34	0.20	0.22	0.56	0.61	0.26	0.79	-0.18	0.41
PM_NO3_N	AQ_FI1_MACC	10	0.90	-0.12	0.23	-0.04	0.11	-0.12	0.31	0.16	0.76	0.39	0.70
PM_NO3_N	AQ_FI1_HTAP	10	0.90	0.18	0.14	0.07	0.11	0.19	0.31	0.15	0.84	0.41	0.70
PM_NO3_N	AQ_FRES1_HTAP	10	0.70	0.18	0.16	0.07	0.12	0.20	0.34	0.15	0.85	0.34	0.67
PM_NO3_N	AQ_UK1_MACC	10	0.70	0.30	0.32	0.12	0.18	0.35	0.50	0.23	0.70	0.03	0.52
PM_NO3_N	AQ_UK2_HTAP	10	0.60	0.36	0.53	0.15	0.24	0.44	0.69	0.31	0.55	-0.33	0.34
PM_NO3_N	ED_CHIM	10	0.50	0.68	0.79	0.36	0.37	1.03	1.04	0.45	0.71	-1.01	0.00
PM_NO3_N	ED_CMAQ	10	0.40	0.77	1.03	0.44	0.45	1.26	1.26	0.54	0.78	-1.43	-0.18
PM_NO3_N	ED_EMEP	10	0.70	0.34	0.31	0.14	0.19	0.41	0.53	0.23	0.70	-0.03	0.48
PM_NO3_N	ED_LOTO	10	0.90	0.45	0.35	0.20	0.21	0.58	0.59	0.26	0.93	-0.14	0.43
PM_NO3_N	ED_MATCH	10	0.90	0.08	0.21	0.03	0.12	0.09	0.35	0.17	0.72	0.33	0.66
PM_NO3_N	ED_MINNI	10	0.70	0.41	0.35	0.18	0.21	0.52	0.59	0.26	0.76	-0.14	0.43
PM_NO3_N	ENSEMBLE	10	0.80	0.33	0.23	0.14	0.17	0.39	0.47	0.20	0.82	0.09	0.55
WNH4_N	AQ_DE1_HTAP	9	0.44	-0.76	1.06	-170.51	170.51	-0.55	0.55	215.16	0.55	-0.55	0.23
WNH4_N	AQ_DK1_HTAP	9	0.89	0.18	0.30	63.05	137.57	0.20	0.44	186.71	0.82	-0.25	0.38
WNH4_N	AQ_FI1_MACC	9	0.89	0.05	0.22	14.57	113.54	0.05	0.37	149.34	0.83	-0.03	0.48
WNH4_N	AQ_FI1_HTAP	9	0.89	0.07	0.24	22.81	118.26	0.07	0.38	158.39	0.82	-0.07	0.46
WNH4_N	AQ_FRES1_HTAP	9	0.33	-0.55	0.52	-133.56	141.45	-0.43	0.46	169.61	0.79	-0.28	0.36
WNH4_N	AQ_UK1_MACC	9	0.67	-0.43	0.51	-110.16	159.01	-0.35	0.51	177.79	0.55	-0.44	0.28
WNH4_N	AQ_UK2_HTAP	9	0.89	-0.12	0.22	-35.30	102.05	-0.11	0.33	137.08	0.67	0.07	0.54
WNH4_N	ED_CHIM	9	0.78	-0.13	0.23	-37.29	117.57	-0.12	0.38	140.77	0.66	-0.07	0.47
WNH4_N	ED_CMAQ	9	0.78	-0.40	0.29	-102.82	103.72	-0.33	0.33	135.97	0.80	0.06	0.53
WNH4_N	ED_EMEP	9	0.89	0.23	0.22	82.66	135.40	0.27	0.44	165.63	0.81	-0.23	0.39

Variable	Model	n	FAC2	FB	NMSE	MB	MGE	NMB	NMGE	RMSE	r	COE	IOA
WNH4_N	ED_LOTO	9	0.89	-0.07	0.19	-20.34	111.97	-0.07	0.36	132.33	0.82	-0.02	0.49
WNH4_N	ED_MATCH	9	0.78	0.38	0.61	146.90	191.90	0.47	0.62	295.22	0.83	-0.74	0.13
WNH4_N	ED_MINNI	9	0.56	-0.63	0.65	-149.29	149.29	-0.48	0.48	181.22	0.81	-0.36	0.32
WNH4_N	ENSEMBLE	9	0.89	0.12	0.23	38.91	117.59	0.13	0.38	158.33	0.82	-0.07	0.47
NH3_N	AQ_DE1_HTAP	9	0.44	0.57	0.76	0.62	0.77	0.79	0.99	0.91	0.15	-0.85	0.08
NH3_N	AQ_DK1_HTAP	9	0.67	0.64	0.88	0.74	0.74	0.94	0.94	1.02	0.80	-0.77	0.11
NH3_N	AQ_FI1_MACC	9	0.44	0.94	2.98	1.38	1.38	1.77	1.77	2.24	0.73	-2.31	-0.40
NH3_N	AQ_FI1_HTAP	9	0.56	0.93	2.88	1.37	1.37	1.75	1.75	2.19	0.74	-2.28	-0.39
NH3_N	AQ_FRES1_HTAP	9	0.56	0.77	1.71	0.97	0.97	1.24	1.24	1.53	0.77	-1.33	-0.14
NH3_N	AQ_UK1_MACC	9	0.78	0.59	1.32	0.66	0.67	0.85	0.86	1.22	0.74	-0.61	0.19
NH3_N	AQ_UK2_HTAP	9	0.44	1.02	2.68	1.62	1.63	2.08	2.09	2.24	0.83	-2.92	-0.49
NH3_N	ED_CHIM	9	0.78	0.37	0.26	0.35	0.40	0.45	0.51	0.48	0.91	0.05	0.52
NH3_N	ED_CMAQ	9	0.67	0.52	1.21	0.55	0.60	0.71	0.77	1.12	0.46	-0.44	0.28
NH3_N	ED_EMEP	9	0.89	0.19	0.14	0.16	0.25	0.21	0.32	0.32	0.89	0.40	0.70
NH3_N	ED_LOTO	9	0.44	0.84	1.86	1.12	1.12	1.44	1.44	1.66	0.89	-1.69	-0.26
NH3_N	ED_MATCH	9	0.67	0.29	0.36	0.26	0.37	0.34	0.48	0.54	0.73	0.10	0.55
NH3_N	ED_MINNI	9	0.56	0.49	0.41	0.51	0.53	0.65	0.67	0.64	0.85	-0.26	0.37
NH3_N	ENSEMBLE	9	0.67	0.66	1.06	0.77	0.77	0.98	0.98	1.13	0.82	-0.85	0.08
PM_NH4_N	AQ_DE1_HTAP	9	1.00	-0.17	0.15	-0.13	0.24	-0.16	0.29	0.30	0.74	0.27	0.63
PM_NH4_N	AQ_DK1_HTAP	9	0.67	0.11	0.12	0.09	0.28	0.11	0.33	0.31	0.67	0.16	0.58
PM_NH4_N	AQ_FI1_MACC	9	0.78	-0.27	0.27	-0.20	0.27	-0.24	0.32	0.38	0.58	0.20	0.60
PM_NH4_N	AQ_FI1_HTAP	9	1.00	-0.14	0.14	-0.11	0.24	-0.13	0.28	0.29	0.74	0.29	0.64
PM_NH4_N	AQ_FRES1_HTAP	9	0.67	0.27	0.16	0.26	0.32	0.32	0.39	0.39	0.70	0.03	0.52
PM_NH4_N	AQ_UK1_MACC	9	0.78	0.17	0.15	0.15	0.28	0.19	0.34	0.35	0.67	0.16	0.58
PM_NH4_N	AQ_UK2_HTAP	9	0.67	0.24	0.27	0.23	0.42	0.28	0.51	0.49	0.50	-0.27	0.36
PM_NH4_N	ED_CHIM	9	0.67	0.40	0.27	0.42	0.43	0.51	0.52	0.53	0.54	-0.30	0.35
PM_NH4_N	ED_CMAQ	9	0.56	0.55	0.40	0.64	0.64	0.77	0.77	0.70	0.80	-0.92	0.04

Variable	Model	n	FAC2	FB	NMSE	MB	MGE	NMB	NMGE	RMSE	r	COE	IOA
PM_NH4_N	ED_EMEP	9	0.78	0.07	0.15	0.06	0.29	0.07	0.35	0.34	0.55	0.12	0.56
PM_NH4_N	ED_LOTO	9	0.67	0.18	0.14	0.17	0.29	0.20	0.35	0.34	0.70	0.14	0.57
PM_NH4_N	ED_MATCH	9	0.67	-0.16	0.24	-0.12	0.34	-0.15	0.41	0.38	0.40	-0.03	0.49
PM_NH4_N	ED_MINNI	9	0.67	0.29	0.20	0.28	0.35	0.34	0.42	0.43	0.59	-0.06	0.47
PM_NH4_N	ENSEMBLE	9	0.67	0.05	0.11	0.05	0.25	0.05	0.30	0.29	0.72	0.24	0.62
WSO4_S	AQ_DE1_HTAP	12	0.75	-0.23	0.24	-38.52	70.62	-0.21	0.38	81.29	0.80	0.22	0.61
WSO4_S	AQ_DK1_HTAP	11	0.55	-0.52	0.37	-78.17	78.17	-0.41	0.41	89.10	0.93	0.19	0.60
WSO4_S	AQ_FI1_MACC	12	0.75	-0.24	0.24	-39.46	71.22	-0.21	0.38	80.97	0.91	0.21	0.61
WSO4_S	AQ_FI1_HTAP	12	0.75	-0.30	0.23	-48.80	62.89	-0.26	0.34	76.74	0.91	0.31	0.65
WSO4_S	AQ_FRES1_HTAP	12	0.33	-0.69	0.67	-96.36	96.36	-0.51	0.51	106.94	0.95	-0.06	0.47
WSO4_S	AQ_UK1_MACC	12	0.75	0.11	0.23	22.26	67.19	0.12	0.36	94.49	0.70	0.26	0.63
WSO4_S	AQ_UK2_HTAP	12	0.75	0.42	0.35	99.31	112.18	0.53	0.60	137.54	0.86	-0.24	0.38
WSO4_S	ED_CHIM	11	0.27	-0.92	1.66	-120.24	120.24	-0.63	0.63	148.52	0.77	-0.24	0.38
WSO4_S	ED_CMAQ	11	0.91	0.15	0.14	30.22	63.91	0.16	0.34	75.67	0.83	0.34	0.67
WSO4_S	ED_EMEP	11	0.91	0.25	0.30	54.41	83.57	0.29	0.44	118.38	0.87	0.14	0.57
WSO4_S	ED_LOTO	11	0.82	-0.08	0.13	-15.37	53.06	-0.08	0.28	64.85	0.96	0.45	0.73
WSO4_S	ED_MATCH	11	0.55	0.62	1.06	172.30	176.94	0.91	0.93	270.30	0.95	-0.83	0.09
WSO4_S	ED_MINNI	11	0.27	-0.79	1.00	-107.94	109.69	-0.57	0.58	125.14	0.85	-0.13	0.43
WSO4_S	ENSEMBLE	11	0.91	0.13	0.22	25.68	67.68	0.13	0.36	94.15	0.94	0.30	0.65
SO2_S	AQ_DE1_HTAP	12	0.42	0.75	2.04	0.40	0.45	1.19	1.33	0.71	0.71	-1.48	-0.19
SO2_S	AQ_DK1_HTAP	11	0.91	0.23	0.26	0.09	0.14	0.26	0.40	0.21	0.87	0.20	0.60
SO2_S	AQ_FI1_MACC	12	0.58	0.62	1.04	0.30	0.33	0.91	0.99	0.47	0.56	-0.86	0.07
SO2_S	AQ_FI1_HTAP	12	0.83	0.43	0.58	0.18	0.21	0.55	0.63	0.32	0.64	-0.18	0.41
SO2_S	AQ_FRES1_HTAP	12	0.58	0.02	0.74	0.01	0.18	0.02	0.54	0.29	0.43	-0.01	0.49
SO2_S	AQ_UK1_MACC	12	0.75	0.59	1.12	0.28	0.31	0.85	0.92	0.48	0.52	-0.72	0.14
SO2_S	AQ_UK2_HTAP	12	0.33	0.70	1.37	0.36	0.40	1.08	1.18	0.57	0.72	-1.21	-0.10
SO2_S	ED_CHIM	11	0.55	0.35	1.30	0.15	0.29	0.43	0.83	0.49	0.69	-0.64	0.18

Variable	Model	n	FAC2	FB	NMSE	MB	MGE	NMB	NMGE	RMSE	r	COE	IOA
SO2_S	ED_CMAQ	11	0.27	0.76	2.14	0.44	0.50	1.24	1.40	0.78	0.73	-1.79	-0.28
SO2_S	ED_EMEP	11	0.36	-0.21	0.67	-0.07	0.21	-0.19	0.58	0.26	0.73	-0.14	0.43
SO2_S	ED_LOTO	11	0.64	0.21	0.77	0.08	0.20	0.24	0.55	0.35	0.75	-0.10	0.45
SO2_S	ED_MATCH	11	0.64	0.20	0.56	0.08	0.21	0.22	0.58	0.29	0.74	-0.16	0.42
SO2_S	ED_MINNI	11	0.36	0.57	1.17	0.28	0.37	0.80	1.03	0.52	0.73	-1.05	-0.02
SO2_S	ENSEMBLE	11	0.73	0.22	0.37	0.09	0.18	0.25	0.50	0.24	0.82	0.02	0.51
PM_SO4_S	AQ_DE1_HTAP	12	0.92	0.06	0.05	0.03	0.08	0.07	0.20	0.10	0.92	0.60	0.80
PM_SO4_S	AQ_DK1_HTAP	11	0.73	0.45	0.44	0.26	0.27	0.59	0.61	0.37	0.90	-0.42	0.29
PM_SO4_S	AQ_FI1_MACC	12	0.50	-0.32	0.23	-0.11	0.14	-0.28	0.34	0.17	0.86	0.31	0.66
PM_SO4_S	AQ_FI1_HTAP	12	0.50	-0.40	0.30	-0.14	0.16	-0.33	0.39	0.19	0.85	0.20	0.60
PM_SO4_S	AQ_FRES1_HTAP	12	0.92	0.17	0.09	0.08	0.11	0.18	0.26	0.13	0.92	0.46	0.73
PM_SO4_S	AQ_UK1_MACC	12	0.75	-0.01	0.07	0.00	0.08	-0.01	0.19	0.11	0.89	0.61	0.80
PM_SO4_S	AQ_UK2_HTAP	12	0.83	-0.05	0.08	-0.02	0.09	-0.05	0.22	0.11	0.89	0.55	0.77
PM_SO4_S	ED_CHIM	11	0.91	-0.29	0.17	-0.11	0.13	-0.25	0.30	0.16	0.89	0.30	0.65
PM_SO4_S	ED_CMAQ	11	0.73	0.24	0.12	0.12	0.14	0.27	0.32	0.18	0.83	0.26	0.63
PM_SO4_S	ED_EMEP	11	1.00	-0.05	0.08	-0.02	0.09	-0.05	0.19	0.12	0.91	0.55	0.78
PM_SO4_S	ED_LOTO	11	0.82	-0.30	0.22	-0.11	0.14	-0.26	0.31	0.18	0.80	0.27	0.64
PM_SO4_S	ED_MATCH	11	0.64	-0.44	0.30	-0.16	0.17	-0.36	0.38	0.19	0.89	0.12	0.56
PM_SO4_S	ED_MINNI	11	0.91	-0.17	0.08	-0.07	0.08	-0.16	0.19	0.11	0.93	0.56	0.78
PM_SO4_S	ENSEMBLE	11	0.91	-0.31	0.14	-0.12	0.12	-0.27	0.28	0.14	0.94	0.35	0.68

S3.9 Monthly values of WNO3_N, WNH4_N, WSO4_S and precipitation



S3.10 Definition of statistical metrics in S3.6, 3.7 and 3.8

Mean Gross Error, MGE

$$\text{MGE} = \frac{1}{n}\sum_{1}^{n}|M - O|$$

Root Mean Square Error, RMSE

$$\text{RMSE} = \sqrt{\frac{\sum_{1}^{n}(M - O)^2}{n}}$$

Normalized Mean Bias, NMB

$$\text{NMB} = \frac{\sum_{1}^{n}(M - O)}{\sum_{1}^{n}(O)}$$

Normalized Mean Gross Error, NMGE

$$\text{NMGE} = \frac{\sum_{1}^{n} |M - O|}{\sum_{1}^{n} (O)}$$

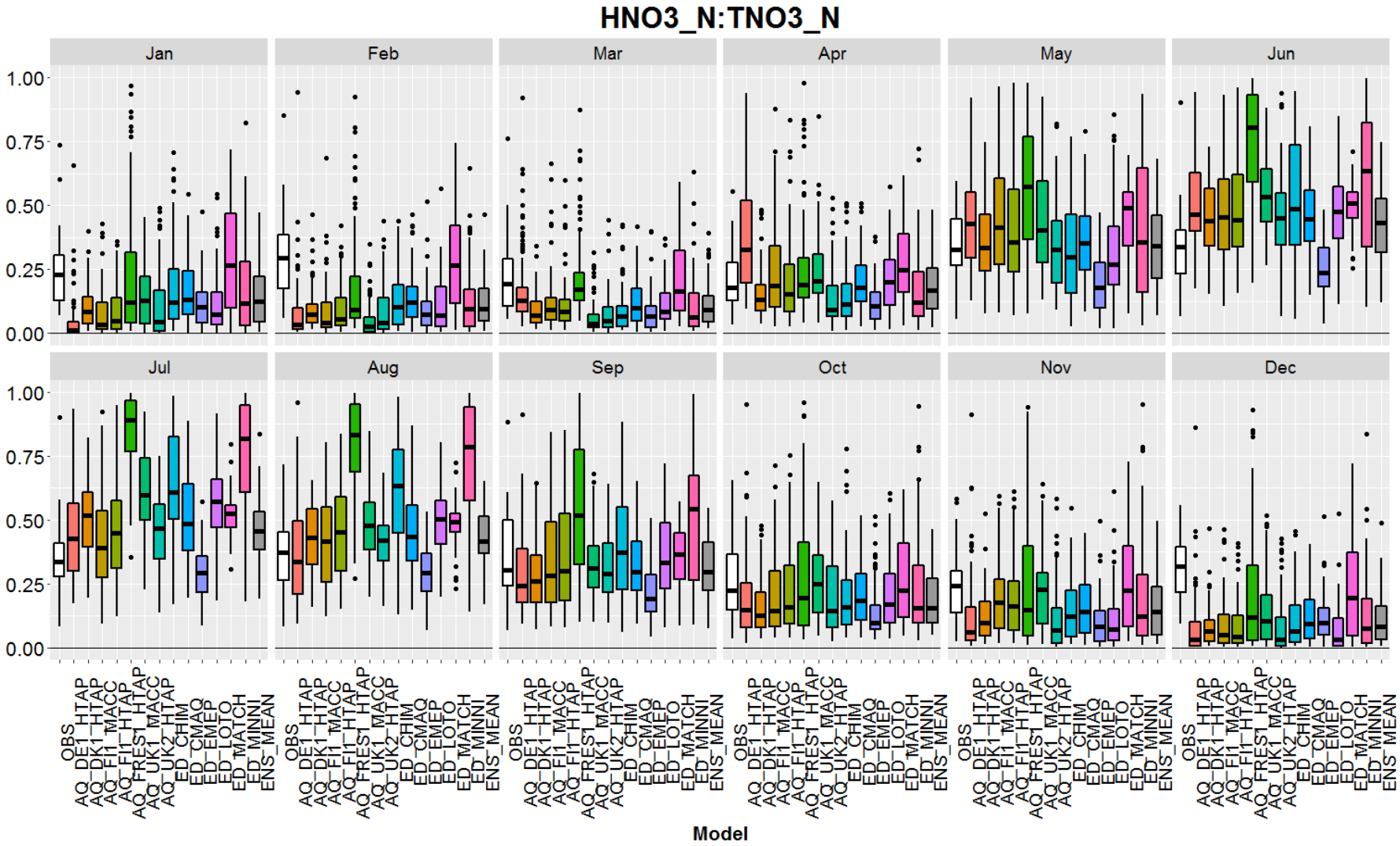
Correlation Coefficient, r

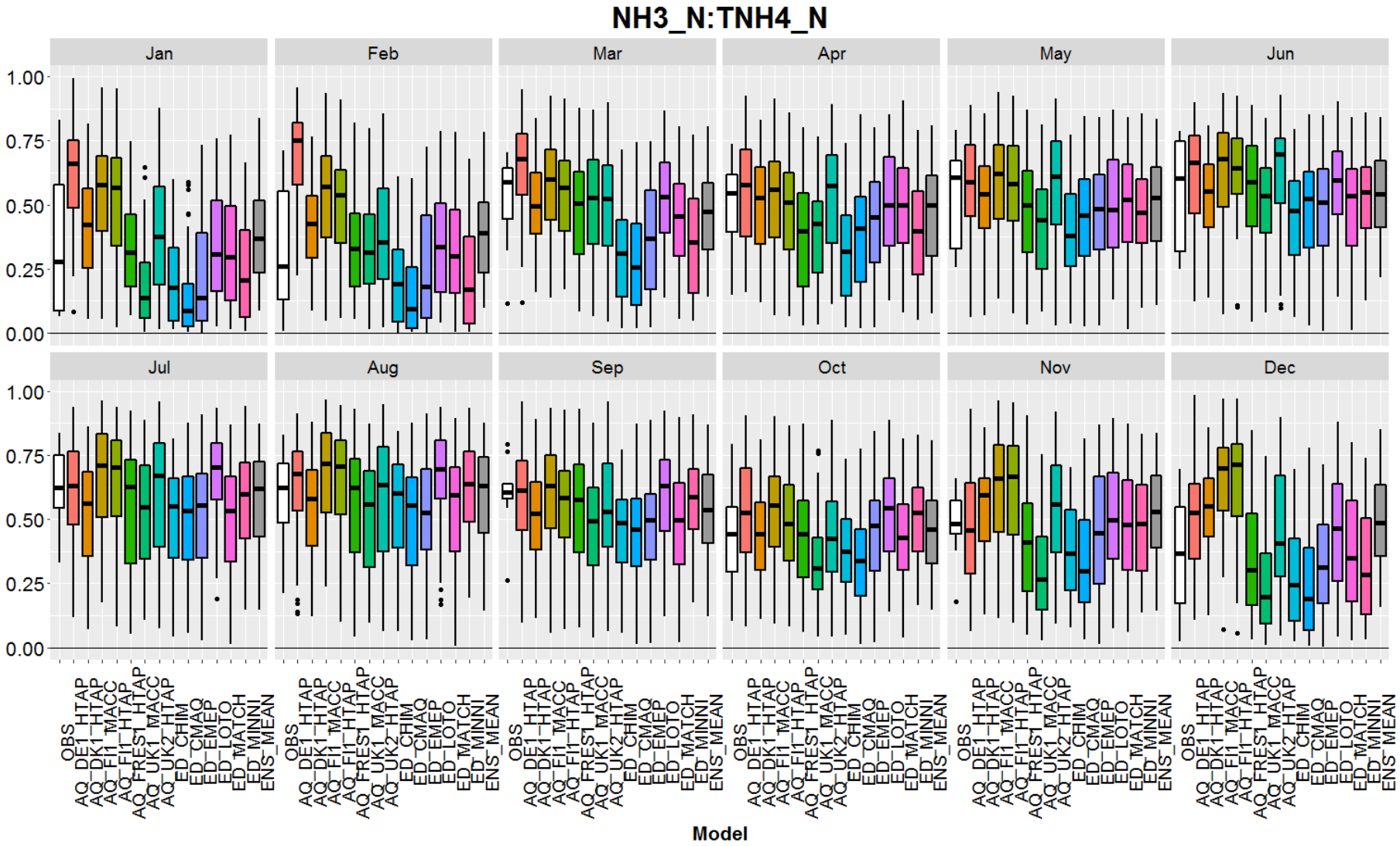
$$r = \frac{1}{(n-1)} \sum_{1}^{n} \left(\left(\frac{O - \overline{O}}{\sigma_o} \right) * \left(\frac{M - \overline{M}}{\sigma_m} \right) \right)$$

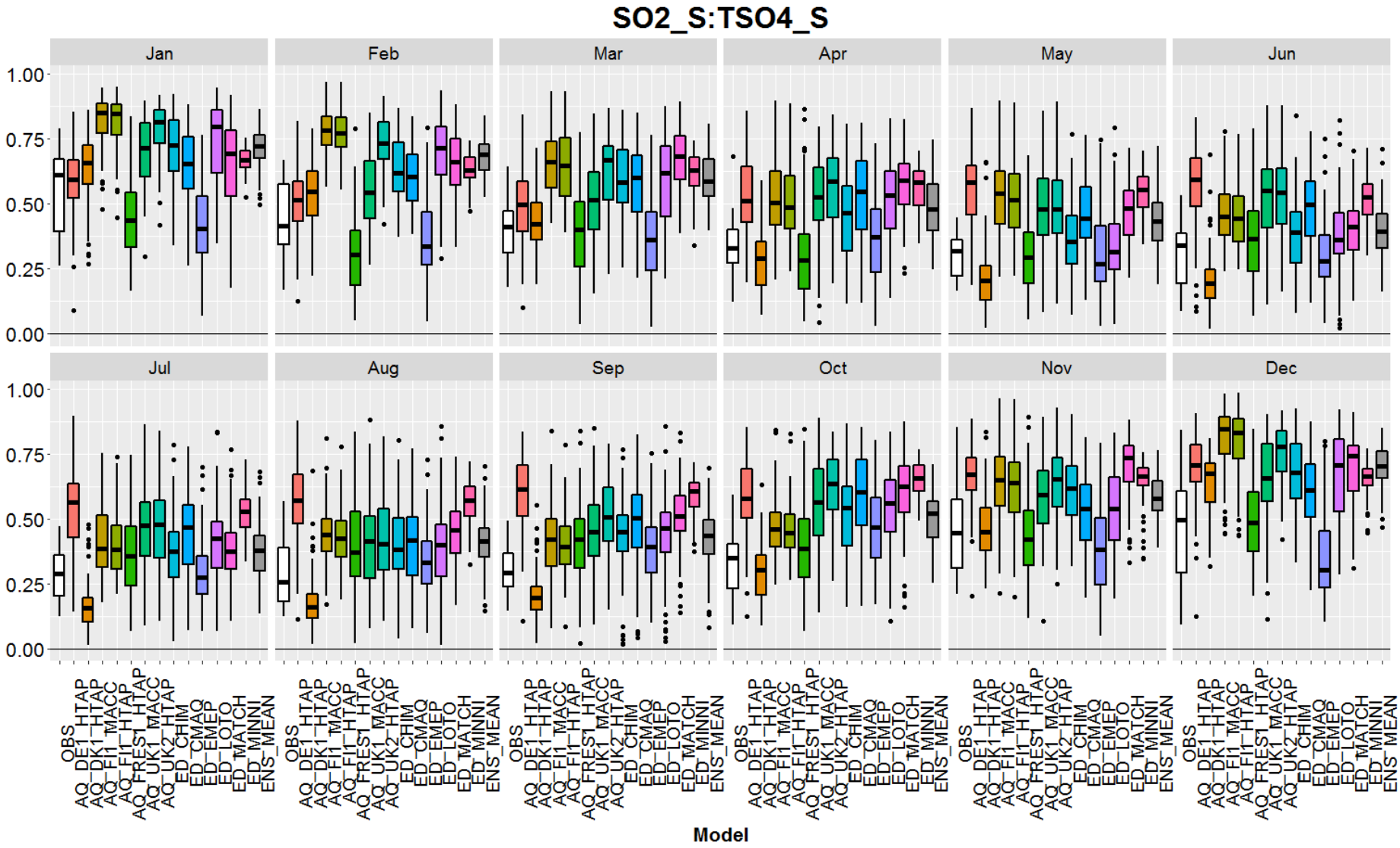
Index of Agreement, IOA

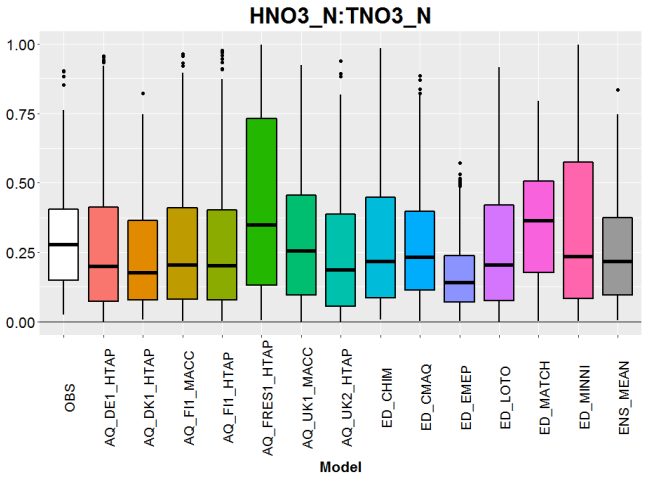
$$\text{IOA} = 1 - \left[\frac{\sum_{1}^{n} (O - M)^2}{\sum_{1}^{n} \left(\left| M - \overline{O} \right| + \left| O - \overline{O} \right| \right)^2} \right]$$

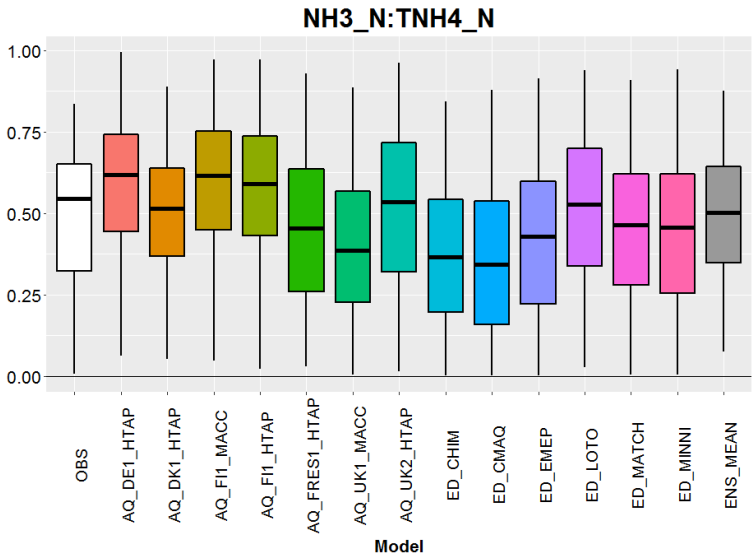
S4. Gas/particle contribution

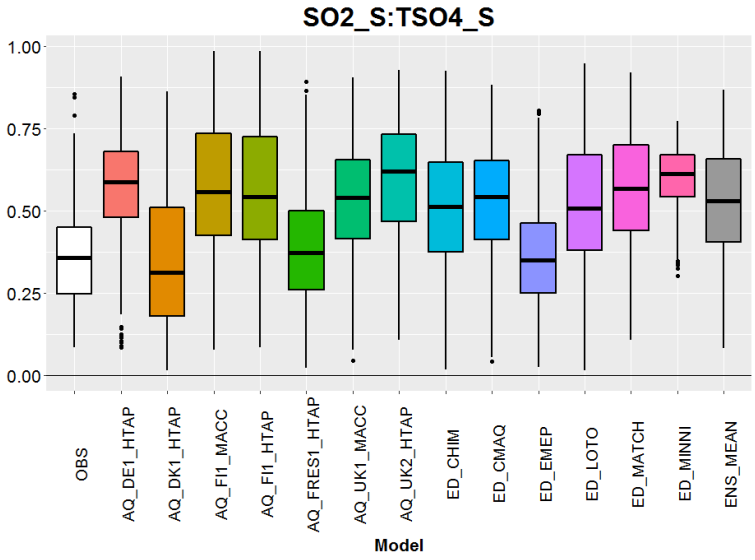

HNO3_N:TNO3_N
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
1.00
0.75
0.50
0.25
0.00
OBS
AQ_DE1_HTAP
AQ_DK1_HTAP
AQ_FI1_MACC
AQ_FI1_HTAP
AQ_FRES1_HTAP
AQ_UK1_MACC
AQ_UK2_HTAP
ED_CHIM
ED_CMAQ
ED_EMEP
ED_LOTO
ED_MATCH
ED_MINNI
ENS_MEAN
Model


NH3_N:TNH4_N
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
1.00
0.75
0.50
0.25
0.00
OBS
AQ_DE1_HTAP
AQ_DK1_HTAP
AQ_FI1_MACC
AQ_FI1_HTAP
AQ_FRES1_HTAP
AQ_UK1_MACC
AQ_UK2_HTAP
ED_CHIM
ED_CMAQ
ED_EMEP
ED_LOTO
ED_MATCH
ED_MINNI
ENS_MEAN
Model


SO2_S:TSO4_S
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
1.00
0.75
0.50
0.25
0.00
OBS
AQ_DE1_HTAP
AQ_DK1_HTAP
AQ_FI1_MACC
AQ_FI1_HTAP
AQ_FRES1_HTAP
AQ_UK1_MACC
AQ_UK2_HTAP
ED_CHIM
ED_CMAQ
ED_EMEP
ED_LOTO
ED_MATCH
ED_MINNI
ENS_MEAN
Model

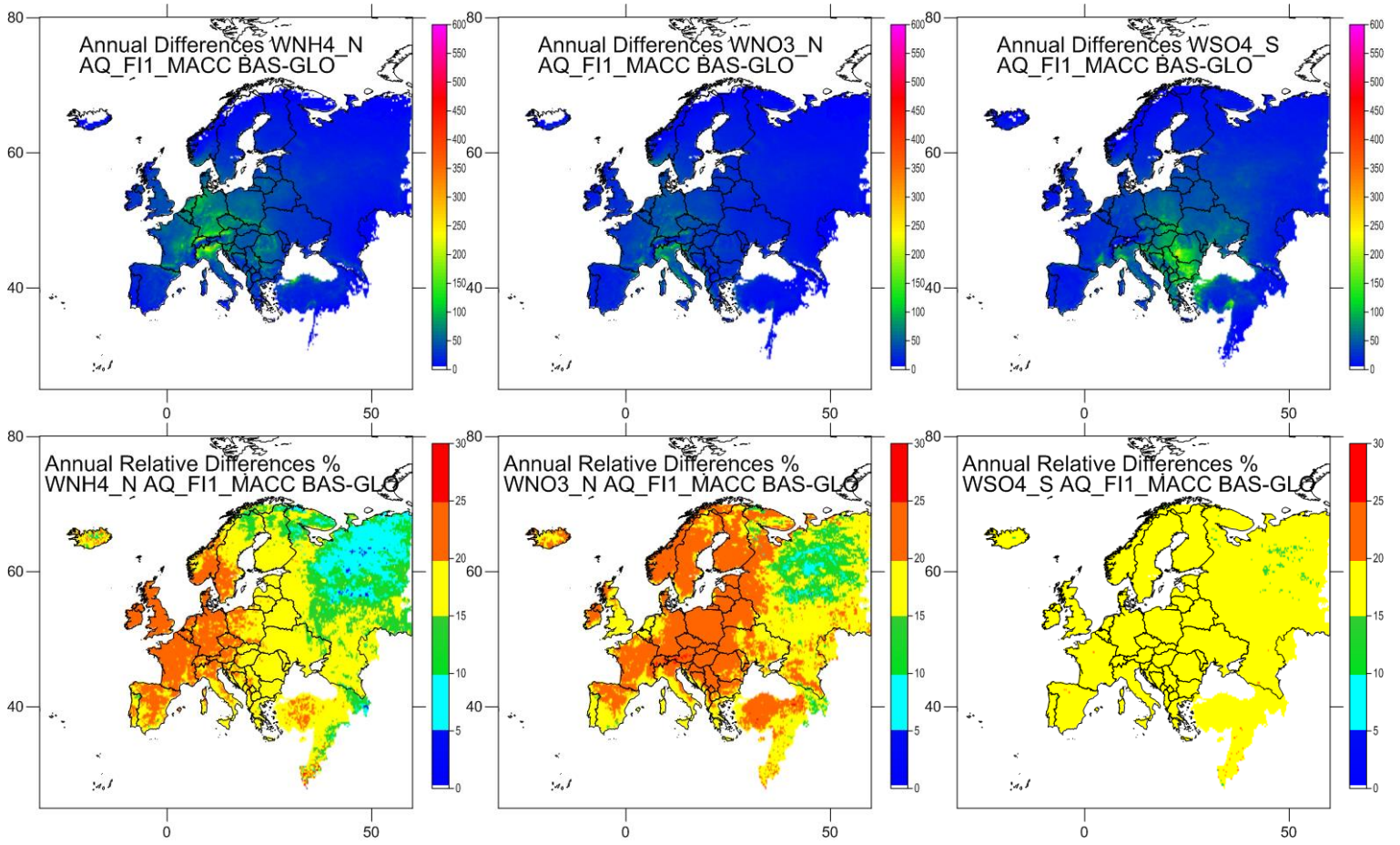

HNO3_N:TNO3_N
1.00
0.75
0.50
0.25
0.00
OBS
AQ_DE1_HTAP
AQ_DK1_HTAP
AQ_FI1_MACC
AQ_FI1_HTAP
AQ_FRES1_HTAP
AQ_UK1_MACC
AQ_UK2_HTAP
ED_CHIM
ED_CMAQ
ED_EMEP
ED_LOTO
ED_MATCH
ED_MINNI
ENS_MEAN
Model


NH3_N:TNH4_N
1.00
0.75
0.50
0.25
0.00
OBS
AQ_DE1_HTAP
AQ_DK1_HTAP
AQ_FI1_MACC
AQ_FI1_HTAP
AQ_FRES1_HTAP
AQ_UK1_MACC
AQ_UK2_HTAP
ED_CHIM
ED_CMAQ
ED_EMEP
ED_LOTO
ED_MATCH
ED_MINNI
ENS_MEAN
Model


SO2_S:TSO4_S
1.00
0.75
0.50
0.25
0.00
OBS
AQ_DE1_HTAP
AQ_DK1_HTAP
AQ_FI1_MACC
AQ_FI1_HTAP
AQ_FRES1_HTAP
AQ_UK1_MACC
AQ_UK2_HTAP
ED_CHIM
ED_CMAQ
ED_EMEP
ED_LOTO
ED_MATCH
ED_MINNI
ENS_MEAN
Model

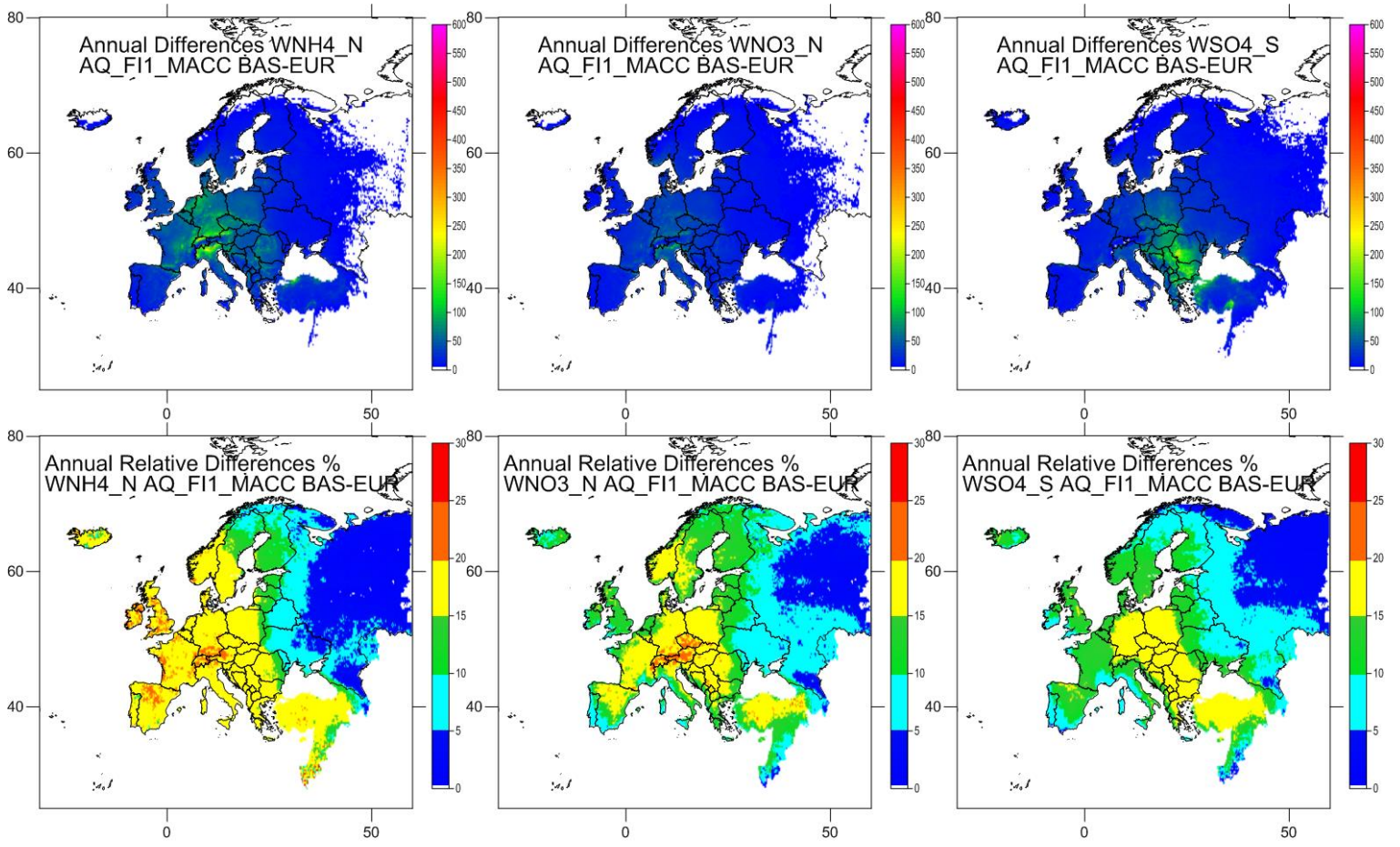
S5. EFFECT ON WET DEPOSTION IN EUROPE OF A REDUCTION OF A 20% OF EMISSIONS 1) AT A GLOBAL SCALE, (GLO), 2) IN EUROPE (EUR) AND 3) IN NORTH AMERICA (NAM)

S5.1 EFFECT ON WET DEPOSTION IN EUROPE OF A REDUCTION OF A 20% OF GLOBAL EMISSIONS (GLO) FOR WNH4_N (left), WNO3_N (middle) and WSO4_S (right), ACCORDING TO AQ_FI1_MACC

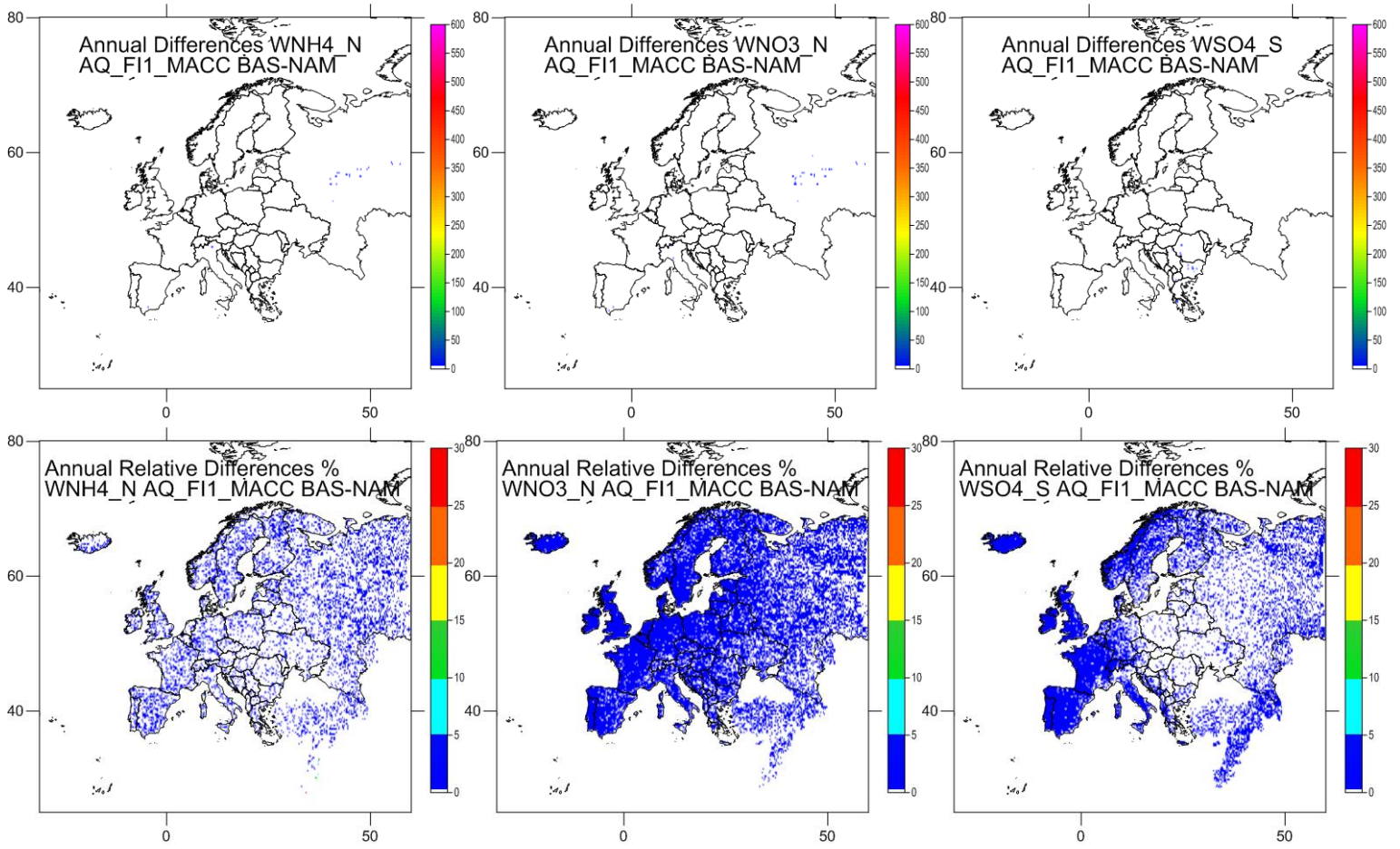


5

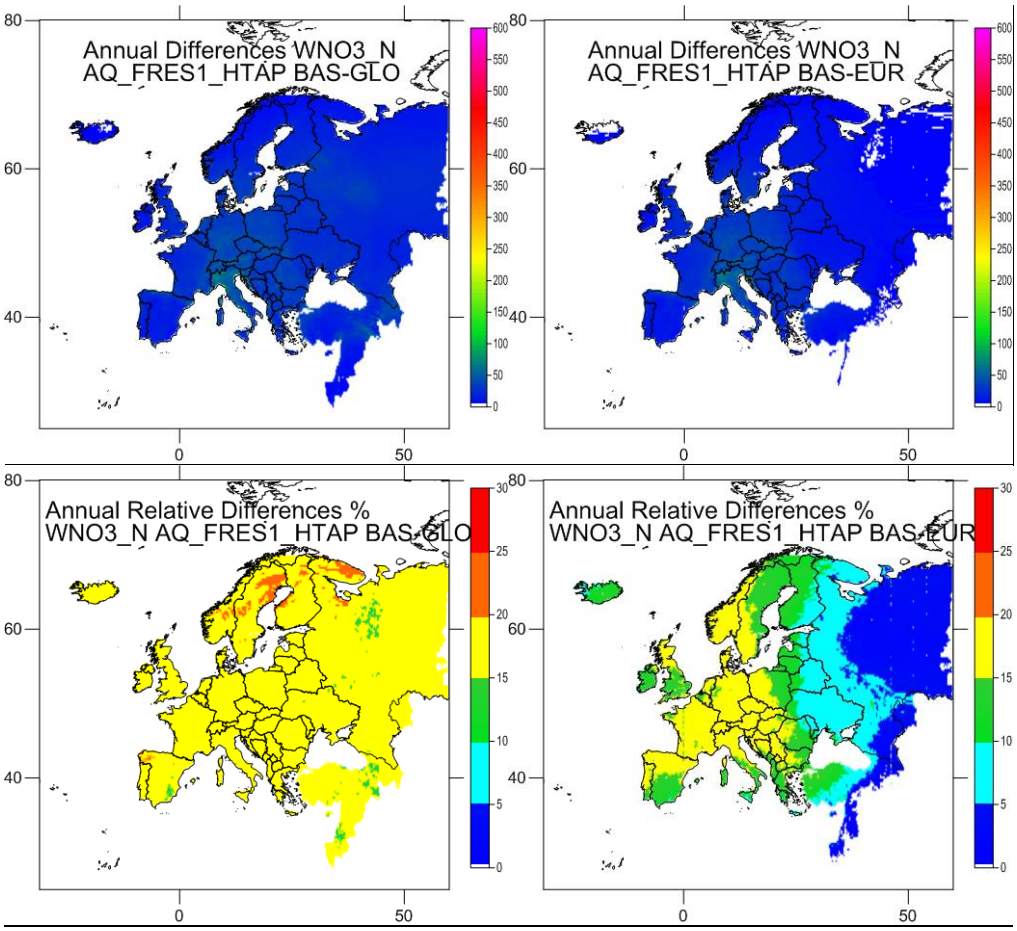
S5.2 EFFECT ON WET DEPOSTION IN EUROPE OF A REDUCTION OF A 20% OF EUROPEAN EMISSIONS (EUR) FOR WNH4_N (left), WNO3_N (middle) and WSO4_S (right), ACCORDING TO AQ_FI1_MACC



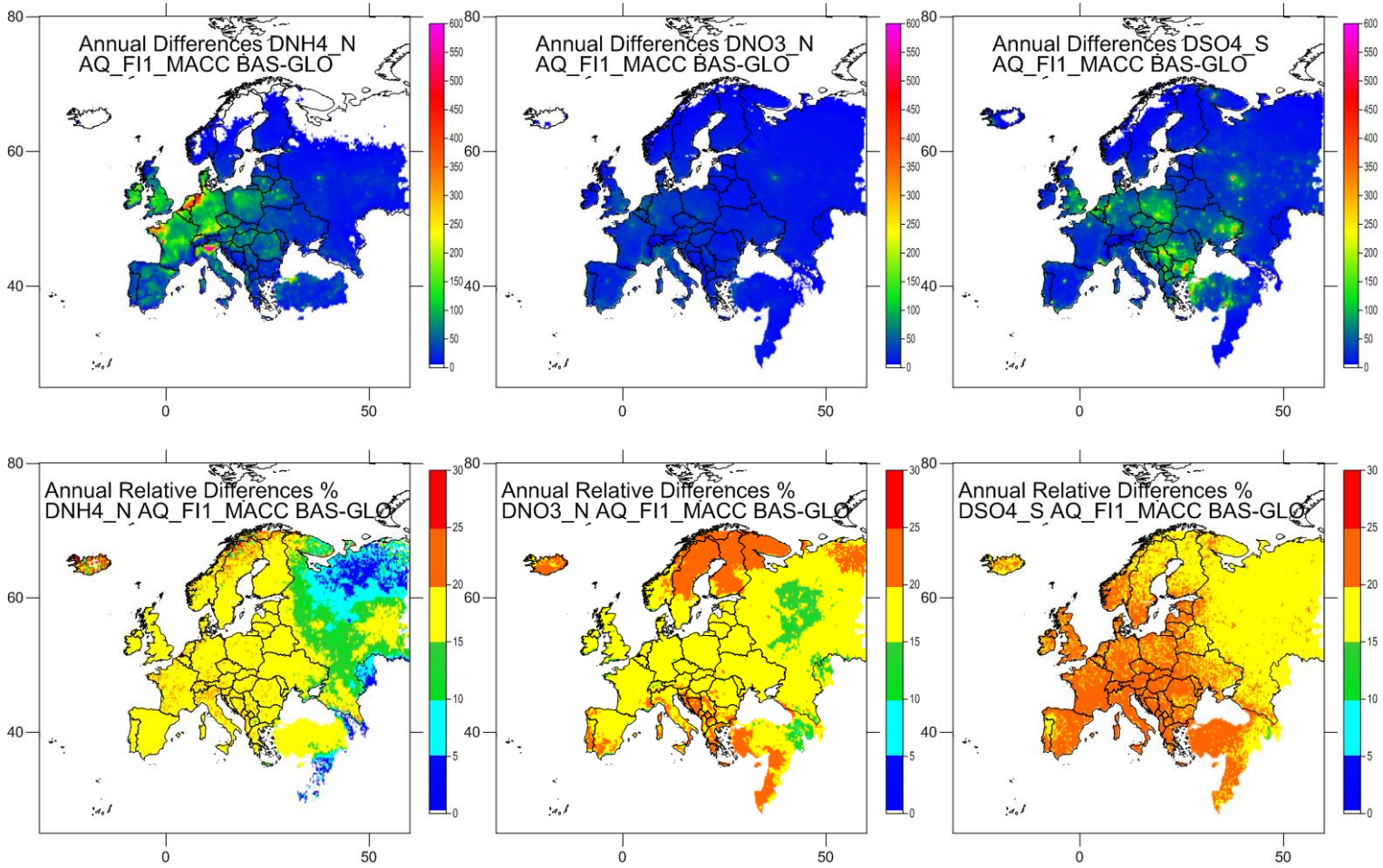
S5.3. EFFECT ON WET DEPOSTION IN EUROPE OF A REDUCTION OF A 20% OF NORTH-AMERICAN EMISSIONS (NAM) FOR WNH4_N (left), WNO3_N (middle) and WSO4_S (right), ACCORDING TO AQ_FI1_MACC

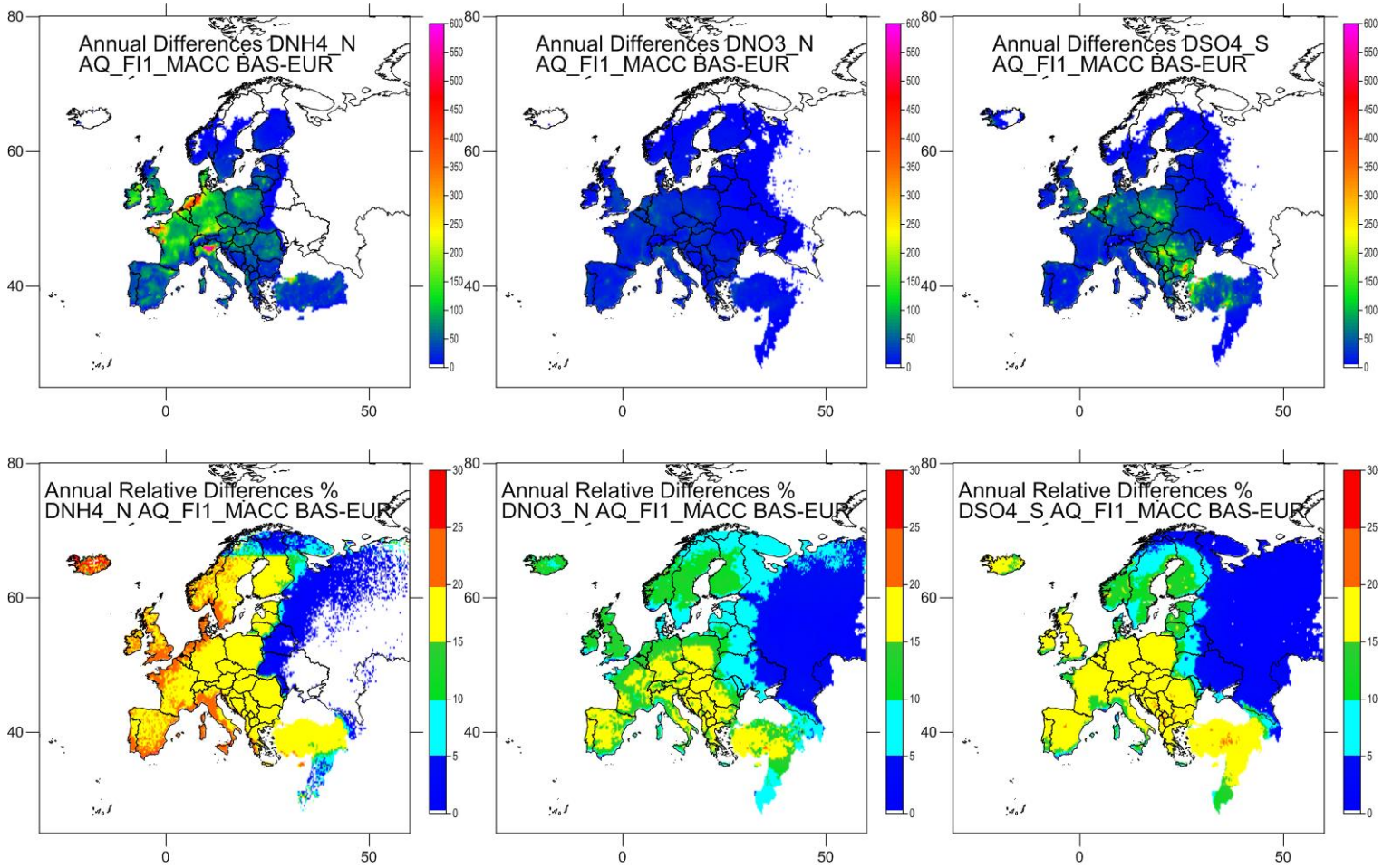


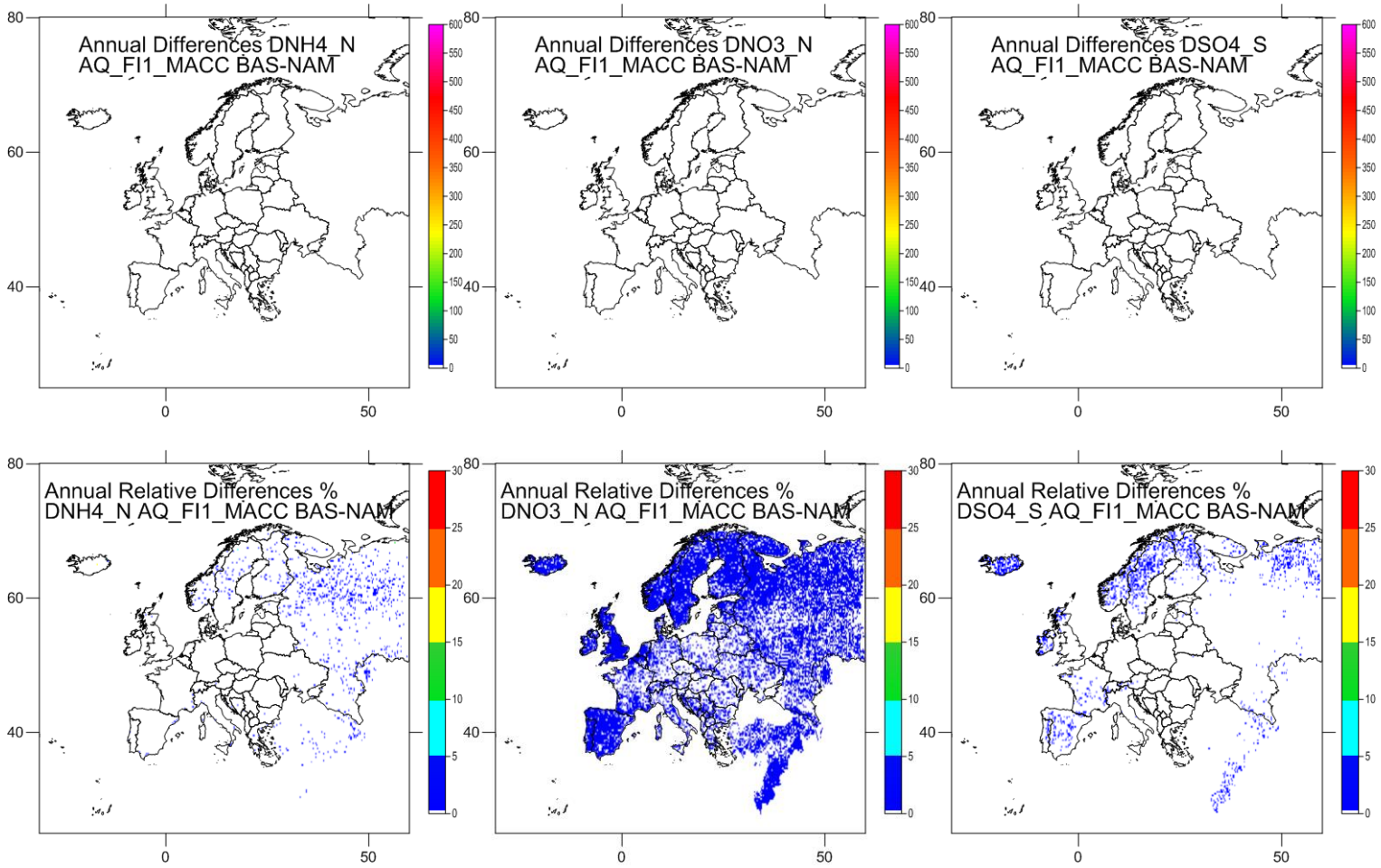
S5.4 . Effect on Europe of the reduction of 20% of emissions at a global scale (left maps), in Europe (middle) and in North America (right) for WNO3_N, according to HT_FRES1_HTAP in terms of wet deposition



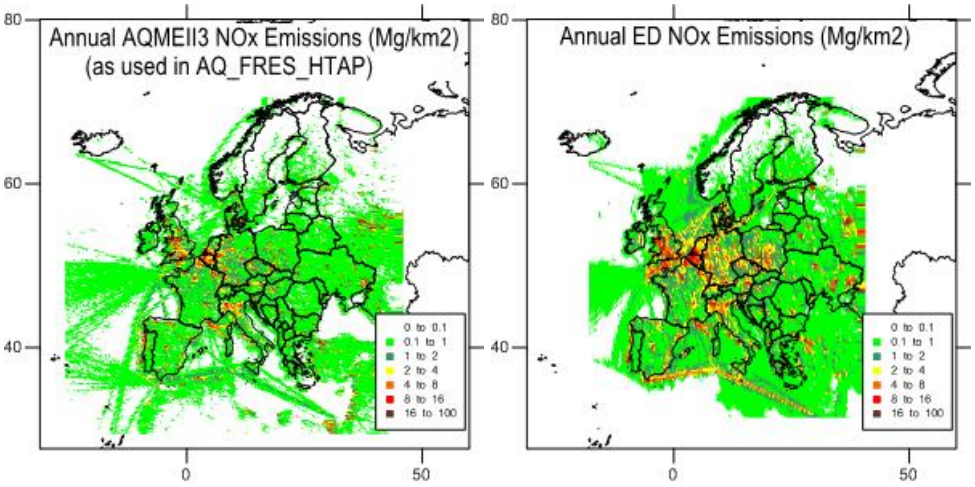
S6. EFFECT ON DRY DEPOSTION IN EUROPE OF A REDUCTION OF A 20% OF EMISSIONS 1) AT A GLOBAL SCALE, (GLO), 2) IN EUROPE (EUR) AND 3) IN NORTH AMERICA (NAM)

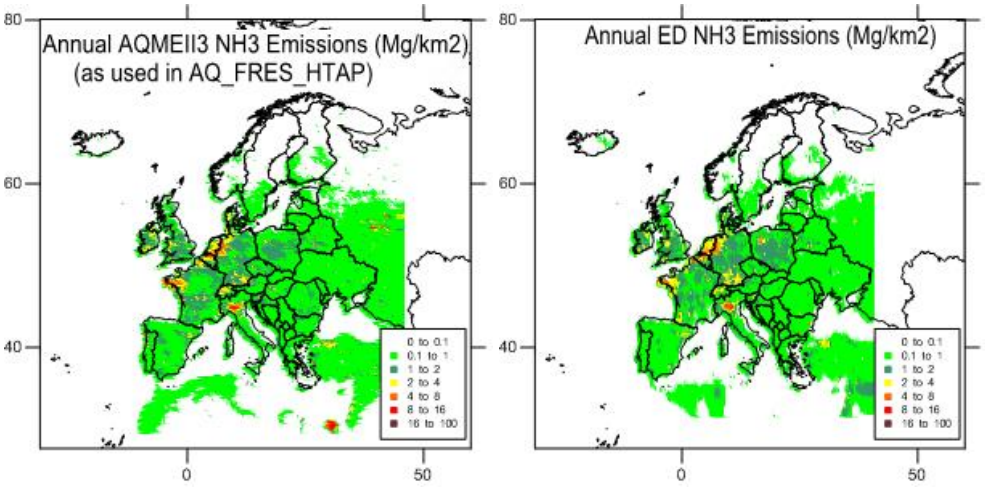

Annual Differences DNH4_N
AQ_FI1_MACC BAS-GLO
Annual Differences DNO3_N
AQ_FI1_MACC BAS-GLO
Annual Differences DSO4_S
AQ_FI1_MACC BAS-GLO
Annual Relative Differences %
DNH4_N AQ_FI1_MACC BAS-GLO
Annual Relative Differences %
DNO3_N AQ_FI1_MACC BAS-GLO
Annual Relative Differences %
DSO4_S AQ_FI1_MACC BAS-GLO
80
60
40
0
50
600
550
500
450
400
350
300
250
200
150
100
50
0
30
25
20
15
10
5
0

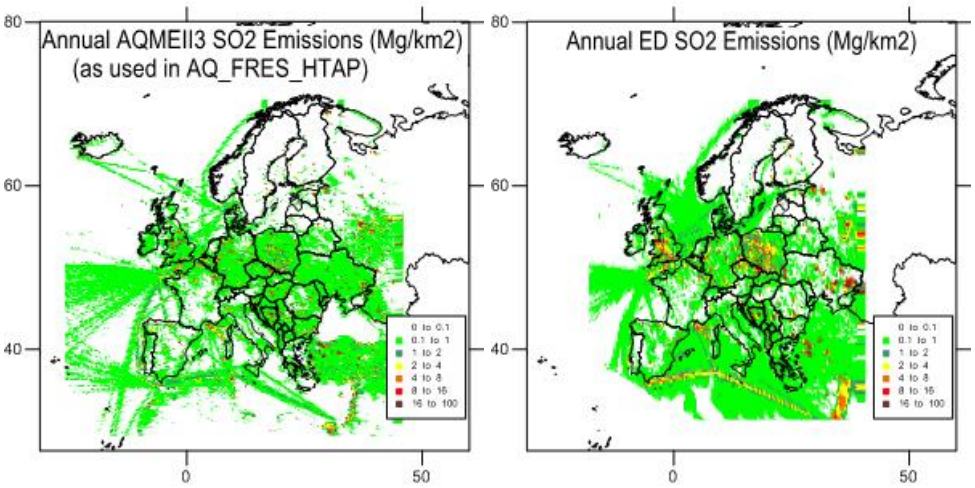

Annual Differences DNH4_N
AQ_FI1_MACC BAS-EUR
Annual Differences DNO3_N
AQ_FI1_MACC BAS-EUR
Annual Differences DSO4_S
AQ_FI1_MACC BAS-EUR
Annual Relative Differences %
DNH4_N AQ_FI1_MACC BAS-EUR
Annual Relative Differences %
DNO3_N AQ_FI1_MACC BAS-EUR
Annual Relative Differences %
DSO4_S AQ_FI1_MACC BAS-EUR
80
60
40
0
50
600
550
500
450
400
350
300
250
200
150
100
50
0
30
25
20
15
10
5
0


Annual Differences DNH4_N
AQ_FI1_MACC BAS-NAM
Annual Differences DNO3_N
AQ_FI1_MACC BAS-NAM
Annual Differences DSO4_S
AQ_FI1_MACC BAS-NAM
Annual Relative Differences %
DNH4_N AQ_FI1_MACC BAS-NAM
Annual Relative Differences %
DNO3_N AQ_FI1_MACC BAS-NAM
Annual Relative Differences %
DSO4_S AQ_FI1_MACC BAS-NAM
80
60
40
0
50
600
550
500
450
400
350
300
250
200
150
100
50
0
30
25
20
15
10
5
0

S7A. Emissions of NOx, NH3 and SO2 for the AQMEII3/HTAP and ED/TFMM communities







S7B. Differences between the emissions of NOX, NH3 and SO2 of the AQMEII3/HTAP and ED/TFMM communities: