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Supplementary Material

Regional Climate Projections

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Table S11.1. *Biases in present-day (1980-1999) surface air temperature and precipitation in the MMD simulations. The simulated temperatures are compared with the HadCRUT2v (Jones, et. al., 2001) data set and precipitation with the CMAP (update of Xie and Arkin, 1997) data set. Temperature biases are in °C and precipitation biases in per cent. Shown are the minimum, median (50%) and maximum biases among the models, as well as the first (25%) and third (75%) quartile values. Colors indicate regions/seasons for which at least 75% of the models have the same sign of bias, with orange indicating positive and light violet negative temperature biases and light blue positive and light brown negative precipitation biases.*

		temperature BIAS					% precipitation BIAS				
REGION	SEASON	MIN	25	50	75	MAX	MIN	25	50	75	MAX
Africa											
WAF	DJF	-5.7	-2.5	-1.6	-0.6	1.8	-35	-2	11	30	63
	MAM	-3.9	-2.9	-1.4	-0.7	0.3	-17	-8	23	47	70
	JJA	-3.1	-1.5	0.4	0.1	2.1	-44	-17	-5	16	40
	SON	-3.0	-2.2	-0.9	0.1	1.5	-28	-8	0	31	60
	ANN	-3.4	-2.4	-1.2	-0.3	1.2	-26	-7	5	26	55
EAF	DJF	-3.9	-2.7	-1.8	-0.6	0.1	-11	19	45	56	66
	MAM	-3.4	-1.8	-1.2	-0.5	0.8	-36	-1	13	29	57
	JJA	-3.4	-1.5	-1.0	0.2	1.2	-48	-15	3	28	78
	SON	-2.7	-1.8	-1.2	-0.3	0.7	12	34	48	71	110
	ANN	-3.1	-1.8	-1.3	-0.3	0.5	-16	13	22	42	69
SAF	DJF	-2.6	-1.6	-1.0	-0.4	1.6	-28	5	27	35	63
	MAM	-3.1	-1.8	-1.4	-0.3	1.9	-31	4	31	55	113
	JJA	-4.6	-2.2	-0.6	0.7	2.6	-36	-6	28	48	246
	SON	-2.2	-0.8	0.0	1.0	2.3	-51	19	39	65	130
	ANN	-2.8	-1.3	-0.8	0.0	2.0	-30	14	35	44	79
SAH	DJF	-8.0	-4.4	-2.9	-1.0	2.7	-87	-80	-72	-37	13
	MAM	-6.2	-2.6	-1.6	0.0	2.7	-91	-67	-27	-28	127
	JJA	-5.5	-1.3	-0.4	1.0	3.1	-96	2	50	110	534
	SON	-6.0	-3.1	-1.9	-0.7	1.9	-87	-29	30	57	287
	ANN	-6.4	-2.8	-1.8	-0.2	2.2	-86	-32	0	33	139
Europe											
NEU	DJF	-22 (-5.3[1])	-4.8	-3.0	-2.1	1.2	-5	11	27	32	69
	MAM	-11 (-5.0)	-4.1	-2.8	-1.5	1.0	-12	10	28	41	54
	JJA	-3.3	-1.6	-0.9	0.5	3.2	-58	-14	-9	6	16
	SON	-9 (-4.4)	-3.1	-1.5	0.7	1.4	-10	3	8	20	36
	ANN	-11(-3.9)	-3.1	-2.4	-0.9	1.7	-18	-4	10	22	30
SEM	DJF	-4.6	-2.3	-1.1	-0.1	2.1	-8	-1	8	11	67
	MAM	-3.1	-1.7	-1.1	-0.1	1.5	-23	-3	15	26	80
	JJA	-2.8	-1.4	-0.0	0.5	4.2	-53	-13	8	19	65
	SON	-3.5	-2.4	-1.6	-0.8	1.0	-32	-21	-9	5	31
	ANN	-2.9	-2.0	-1.1	-0.3	1.7	-19	-6	0	13	60

[1] Excluding one model

		temperature BIAS					% precipitation BIAS				
REGION	SEASON	MIN	25	50	75	MAX	MIN	25	50	75	MAX
Asia											
NAS	DJF	-9.3	-2.9	-1.3	0.0	2.9	-18	5	12	19	93
	MAM	-6.0	-4.3	-2.7	-0.5	0.6	-4	39	45	74	110
	JJA	-4.8	-2.0	-0.5	0.4	2.2	-38	-2	19	32	62
	SON	-6.2	-2.6	-2.1	-0.5	1.9	-14	12	23	30	49
	ANN	-5.2	-2.6	-1.4	-0.6	1.3	-11	15	24	35	55
CAS	DJF	-4.4	-2.6	-1.2	0.2	3.3	-33	-2	18	43	77
	MAM	-4.3	-3.0	-1.4	0.2	2.0	-36	22	25	34	83
	JJA	-4.9	-1.6	0.3	1.4	5.7	-71	-37	-25	14	60
	SON	-4.5	-3.2	-1.9	-0.4	1.6	49	-12	-4	15	47
	ANN	-3.9	-2.3	-1.4	0.6	2.2	-44	4	12	21	53
TIB	DJF	-9.3	-3.8	-2.2	-1.4	2.2	15	131	177	255	685
	MAM	-7.0	-4.3	-3.8	-1.3	0.6	130	160	209	261	486
	JJA	-6.7	-2.5	-1.0	-0.2	1.6	4	30	37	53	148
	SON	-5.9	-3.6	-2.5	-1.7	0.0	66	93	150	180	330
	ANN	-5.3	-3.3	-2.5	-1.6	0.6	51	88	110	142	244
EAS	DJF	-6.5	-4.5	-3.7	-1.3	1.8	-20	26	60	79	142
	MAM	-5.2	-2.9	-2.0	-1.0	0.5	1	32	45	60	105
	JJA	-3.9	-2.0	-1.1	-0.4	1.4	-15	0	3	15	27
	SON	-5.9	-3.4	-2.7	-1.6	-0.3	-17	1	14	34	75
	ANN	-5.4	-3.2	-2.5	-1.2	0.2	-6	12	22	31	60
SAS	DJF	-7.4	-4.0	-2.6	-1.6	1.9	-27	0	30	59	127
	MAM	-5.6	-1.9	-0.7	-0.4	2.5	-44	-26	-1	13	72
	JJA	-2.9	-1.3	-0.1	0.6	1.9	-70	-25	-14	5	29
	SON	-5.2	-3.2	-2.1	-0.9	2.6	-26	-12	-2	14	42
	ANN	-4.8	-2.4	-1.4	-0.8	2.2	-49	-16	-10	5	33
SEA	DJF	-3.6	-2.6	-1.8	-1.2	0.4	-37	-10	-2	26	49
	MAM	-2.6	-1.6	-0.5	-0.1	1.1	-32	-9	11	25	59
	JJA	-2.5	-1.8	-0.7	-0.4	1.0	-28	-10	4	16	46
	SON	-3.0	-1.9	-1.2	-0.8	1.0	-37	-12	-4	18	51
	ANN	-2.8	-1.9	-1.0	-0.5	0.8	-28	-13	0	23	43

		temperature BIAS					% precipitation BIAS				
REGION	SEASON	MIN	25	50	75	MAX	MIN	25	50	75	MAX
North America											
ALA	DJF	-9.8	-2.4	-0.8	1.9	8.2	3	33	51	89	179
	MAM	-7.4	-1.4	0.2	1.0	3.8	25	58	86	108	197
	JJA	-4.9	-1.6	-0.4	0.4	3.1	8	18	40	54	113
	SON	-5.7	-1.6	-0.6	1.4	4.8	14	33	52	65	113
	ANN	-5.2	-1.8	-0.4	0.6	3.7	14	41	53	59	106
CGI	DJF	-12.5	-4.5	-2.4	-0.5	4.8	-14	5	14	29	98
	MAM	-6.3	-2.6	-1.1	1.0	5.5	-4	19	29	45	97
	JJA	-4.4	-2.7	-0.9	0.9	4.7	4	13	16	30	47
	SON	-7.5	-3.8	-1.9	-0.4	6.6	0	10	15	21	72
	ANN	-7.	-3.2	-2.0	0.3	5.3	0	12	21	29	69
WNA	DJF	-4.7	-2.7	-0.9	-0.5	0.9	32	66	93	103	192
	MAM	-4.6	-2.9	-2.0	-1.0	0.1	37	62	71	93	158
	JJA	-2.5	-1.3	-0.4	0.9	2.2	-9	22	28	45	98
	SON	-4.4	-1.8	-1.2	-0.3	1.1	10	45	61	75	110
	ANN	-3.8	-1.8	-1.3	-0.5	0.7	29	53	65	74	130
CNA	DJF	-4.0	-2.4	-0.8	0.8	3.0	-37	-6	7	20	84
	MAM	-4.1	-1.3	-1.1	0.6	2.8	-17	-3	8	25	41
	JJA	-1.8	-0.3	0.4	1.6	3.5	-34	-21	-12	15	39
	SON	-3.8	-1.3	-0.6	0.4	2.3	-37	-24	-16	0	24
	ANN	-3.2	-1.0	-0.5	0.6	2.6	-18	-8	2	5	21
ENA	DJF	-4.6	-2.8	-1.6	-0.6	3.4	-18	-2	17	25	55
	MAM	-4.5	-2.1	-1.3	-0.7	2.4	-5	13	21	27	38
	JJA	-3.7	-1.4	-0.9	-0.5	2.3	-10	-2	13	18	45
	SON	-4.2	-2.0	-1.2	-0.6	2.0	-30	-17	-4	6	25
	ANN	-4.2	-2.1	-1.2	-0.6	2.2	-7	1	9	17	27

REGION	SEASON	temperature BIAS MIN	25	50	75	MAX	% precipitation BIAS MIN	25	50	75	MAX
Central and South America											
CAM	DJF	-4.9	-3.6	-2.9	-1.9	0.9	-30	-31	56	74	336
	MAM	-4.0	-2.6	-1.2	-0.6	3.0	-51	-6	19	52	191
	JJA	-3.2	-1.6	-0.8	0.2	2.6	-60	-23	-8	15	83
	SON	-3.6	-2.3	-1.5	-1.0	2.0	-45	-27	-6	37	69
	ANN	-3.4	-2.6	-1.5	-0.9	2.1	-31	-16	6	24	98
AMZ	DJF	-1.6	-1.3	-0.7	-0.4	2.1	-34	-16	-2	6	31
	MAM	-1.7	-1.4	-1.2	-0.6	1.7	-27	22	-13	-2	12
	JJA	-2.9	-1.9	-0.4	0.5	0.8	-56	-39	-26	-11	43
	SON	-1.5	-0.2	0.0	0.9	3.0	-57	-7	8	26	38
	ANN	-1.6	-1.2	-0.6	0.1	1.8	-31	-18	-8	5	26
SSA	DJF	-1.1	-0.1	0.4	1.2	5.1	-43	-8	8	16	42
	MAM	-1.1	-0.4	0.1	0.8	3.9	-50	-19	-14	-7	12
	JJA	-2.4	-1.3	-0.3	0.3	2.1	-29	-20	4	22	64
	SON	-2.3	-0.8	0.0	1.0	2.7	-43	-11	0	14	54
	ANN	-1.6	-0.6	0.3	0.7	3.4	-38	-13	0	10	33
Australia and New Zealand											
NAU	DJF	-2.3	-1.4	-0.4	0.1	2.2	-77	-12	33	47	123
	MAM	-3.2	-1.4	-0.6	0.8	2.3	-61	-15	1	41	106
	JJA	-4.6	-2.9	-0.9	0.0	3.0	-42	-28	11	48	168
	SON	-2.4	-0.8	-0.2	0.5	3.5	-86	-25	17	78	218
	ANN	-2.6	-1.7	-0.6	0.5	2.8	-71	-19	20	52	131
SAU	DJF	-1.4	0.3	1.4	2.2	4.6	-51	-5	35	53	68
	MAM	-1.9	-0.9	-0.3	1.1	4.2	-54	-32	-6	8	39
	JJA	-3.5	-1.9	-1.0	0.0	1.3	-60	-26	-19	-7	31
	SON	-3.4	0.1	0.6	1.4	3.2	-67	-32	-18	-1	53
	ANN	-2.5	-0.4	0.1	0.8	3.3	-59	-21	-6	16	36

		temperature BIAS					% precipitation BIAS				
REGION	SEASON	MIN	25	50	75	MAX	MIN	25	50	75	MAX
Small Islands											
CAR	DJF	-0.9	0.1	0.5	0.8	2.0	-44	-24	-5	16	129
	MAM	-1.9	-0.7	-0.3	0.0	1.2	-75	-61	-38	-34	13
	JJA	-1.8	-0.8	-0.5	-0.1	1.0	-76	-57	-40	-17	45
	SON	-1.1	-0.1	0.4	0.8	2.0	-65	-49	-29	-2	25
	ANN	-1.3	-0.3	0.0	0.3	1.5	-64	-45	-32	-8	20
IND	DJF	-0.3	0.3	0.5	0.9	1.7	-22	-5	1	7	39
	MAM	-0.4	0.3	0.6	1.1	1.8	-31	-16	-11	-1	26
	JJA	-0.2	0.3	0.8	1.1	2.5	-31	-12	-2	2	16
	SON	-0.3	0.3	0.6	1.0	2.1	-26	-12	-5	4	32
	ANN	-0.3	0.2	0.6	1.0	2.0	-22	-10	-3	-1	20
MED	DJF	0.1	1.9	3.6	4.0	6.1	-31	-14	-8	3	36
	MAM	-2.0	-0.9	0.0	0.5	1.8	-56	-38	-13	-7	27
	JJA	-4.6	-2.8	-1.3	-0.5	1.6	-75	-43	-29	1	48
	SON	-0.5	0.5	1.5	1.9	2.8	-32	-24	-5	3	71
	ANN	-1.1	-0.1	0.7	1.4	2.4	-39	-22	-12	1	36
TNE	DJF	-0.8	0.2	0.8	1.1	2.4	-52	-40	-31	24	14
	MAM	-1.7	0.1	0.6	0.9	1.7	-65	-47	-31	-20	0
	JJA	-2.1	-0.2	-0.1	0.5	1.2	-33	0	17	30	56
	SON	-1.3	-0.1	0.3	0.8	1.5	-57	-28	-17	-6	5
	ANN	-1.5	0.2	0.4	0.6	1.5	-45	-23	-15	-5	11
NPA	DJF	-0.1	0.3	0.9	1.4	1.7	-14	-7	0	6	14
	MAM	-0.6	-0.1	0.3	0.8	1.3	-28	-15	-10	-3	13
	JJA	-1.0	-0.3	0.4	0.6	1.0	-15	2	4	12	31
	SON	-0.2	0.4	1.0	1.2	1.7	-12	-4	0.5	6	17
	ANN	-0.5	0.2	0.7	1.0	1.3	-13	-4	0	4	13
SPA	DJF	-0.3	0.3	0.7	0.9	2.2	-25	-6	0	6	31
	MAM	0.1	0.8	1.2	1.4	2.4	-6	8	14	21	28
	JJA	0.0	0.8	1.1	1.4	2.4	2	12	16	21	45
	SON	-0.5	0.1	0.4	0.7	1.8	-16	6	8	13	40
	ANN	0.0	0.6	0.8	1.2	2.1	-7	6	11	15	31

Table S11.2. *Percentiles of probability distributions of climate change based on the method of Tebaldi et al. (2004, 2005), for the SRES A1B scenario (see Section 11.10.2.2.2 for a description of the method). The changes represent differences between the periods1980-1999 and 2080-2099 and are given in °C for temperature and in per cent of the 1980-1999 mean for precipitation.*

		temperature RESPONSE Quantiles					% precipitation RESPONSE				
REGION	SEASON	5	25	50	75	95	5	25	50	75	95
Africa											
WAF	DJF	2.3	2.8	3.1	3.4	3.9	-5	2	7	12	20
	JJA	2.3	2.7	3.0	3.2	3.6	-14	-3	3	9	18
EAF	DJF	2.1	2.6	2.9	3.2	3.8	4	11	15	19	25
	JJA	2.4	2.8	3.1	3.4	3.8	-20	-6	3	11	25
SAF	DJF	2.4	2.7	2.9	3.0	3.4	-10	-3	1	4	10
	JJA	2.2	2.8	3.2	3.6	4.3	-44	-28	-19	-9	7
SAH	DJF	2.1	2.8	3.3	3.8	4.5	-69	-35	-14	10	44
	JJA	2.8	3.4	3.8	4.3	4.8	-43	-19	-3	14	37
Europe											
NEU	DJF	2.9	3.7	4.2	4.8	5.7	6	13	17	21	27
	JJA	1.7	2.3	2.7	3.1	3.7	-12	-5	0	4	11
SEM	DJF	1.7	2.3	2.7	3.0	3.6	-15	-11	-9	-6	-2
	JJA	3.1	3.6	3.9	4.3	4.8	-44	-32	-25	-17	-5
Asia											
NAS	DJF	4.1	4.9	5.5	6.0	6.8	16	23	27	32	38
	JJA	2.3	2.8	3.3	3.7	4.3	-2	4	8	13	19
CAS	DJF	2.2	2.8	3.3	3.8	4.5	-14	-4	3	10	20
	JJA	2.9	3.7	4.1	4.7	5.6	-48	-27	-14	-1	17
TIB	DJF	3.3	4.0	4.5	4.9	5.6	-4	11	21	30	45
	JJA	2.8	3.5	4.0	4.4	5.0	-8	-2	2	6	13
EAS	DJF	2.2	3.1	3.6	4.1	4.8	-11	-1	6	12	24
	JJA	2.3	2.6	2.9	3.2	3.7	1	5	7	10	14
SAS	DJF	2.5	3.1	3.6	4.0	4.5	-32	-16	-6	7	23
	JJA	1.8	2.3	2.7	3.0	3.5	-6	4	10	16	26
SEA	DJF	1.9	2.2	2.3	2.5	2.8	-6	1	4	9	15
	JJA	1.9	2.2	2.3	2.5	2.8	-6	2	6	11	17
North America											
ALA	DJF	4.9	6.1	6.9	7.7	9.1	9	18	24	30	40
	JJA	1.7	2.3	2.7	3.1	3.7	8	13	16	20	24
WNA	DJF	2.5	3.2	3.7	4.2	4.9	-1	4	7	10	15
	JJA	2.7	3.3	3.6	4.0	4.6	-14	-8	-4	0	7
CNA	DJF	2.2	3.0	3.5	3.9	4.6	-10	-2	3	8	16
	JJA	2.9	3.5	4.0	4.4	5.5	-27	-14	-7	0	13
ENA	DJF	2.6	3.2	3.6	4.1	4.7	3	9	13	16	22
	JJA	2.5	2.9	3.2	3.4	3.8	-7	-3	0	4	8

		temperature RESPONSE Quantiles					% precipitation RESPONSE				
REGION	SEASON	5	25	50	75	95	5	25	50	75	95
Central and South America											
CAM	DJF	1.8	2.3	2.7	3.1	3.6	-30	-20	-14	-7	1
	JJA	2.1	2.5	2.8	3.0	3.4	-24	-17	-11	-5	4
AMZ	DJF	2.5	2.8	3.0	3.2	3.6	-3	2	6	9	14
	JJA	2.3	2.9	3.3	3.7	4.2	-19	-3	3	12	-9
SSA	DJF	2.0	2.4	2.6	2.9	3.3	-8	-2	2	6	12
	JJA	1.7	2.1	2.4	2.7	3.1	-15	-6	-1	5	13
Australia and New Zealand											
NAU	DJF	2.3	2.7	2.9	3.2	3.5	-18	-8	-1	6	18
	JJA	2.0	2.6	3.0	3.4	4.0	-48	-25	-11	3	25
SAU	DJF	1.7	2.2	2.4	2.7	3.2	-22	-10	-1	7	19
	JJA	1.6	1.9	2.1	2.3	2.6	-18	-13	-9	-6	-1
Polar Region											
ARC	DJF	4.4	6.2	7.5	8.6	10.5	13	20	25	30	36
	JJA	1.7	2.1	2.5	2.8	3.4	5	9	12	15	19
ANT	DJF	0.1	1.4	2.7	3.9	5.7	-6	2	8	14	22
	JJA	1.0	2.2	2.9	3.7	4.8	-1	10	16	23	34

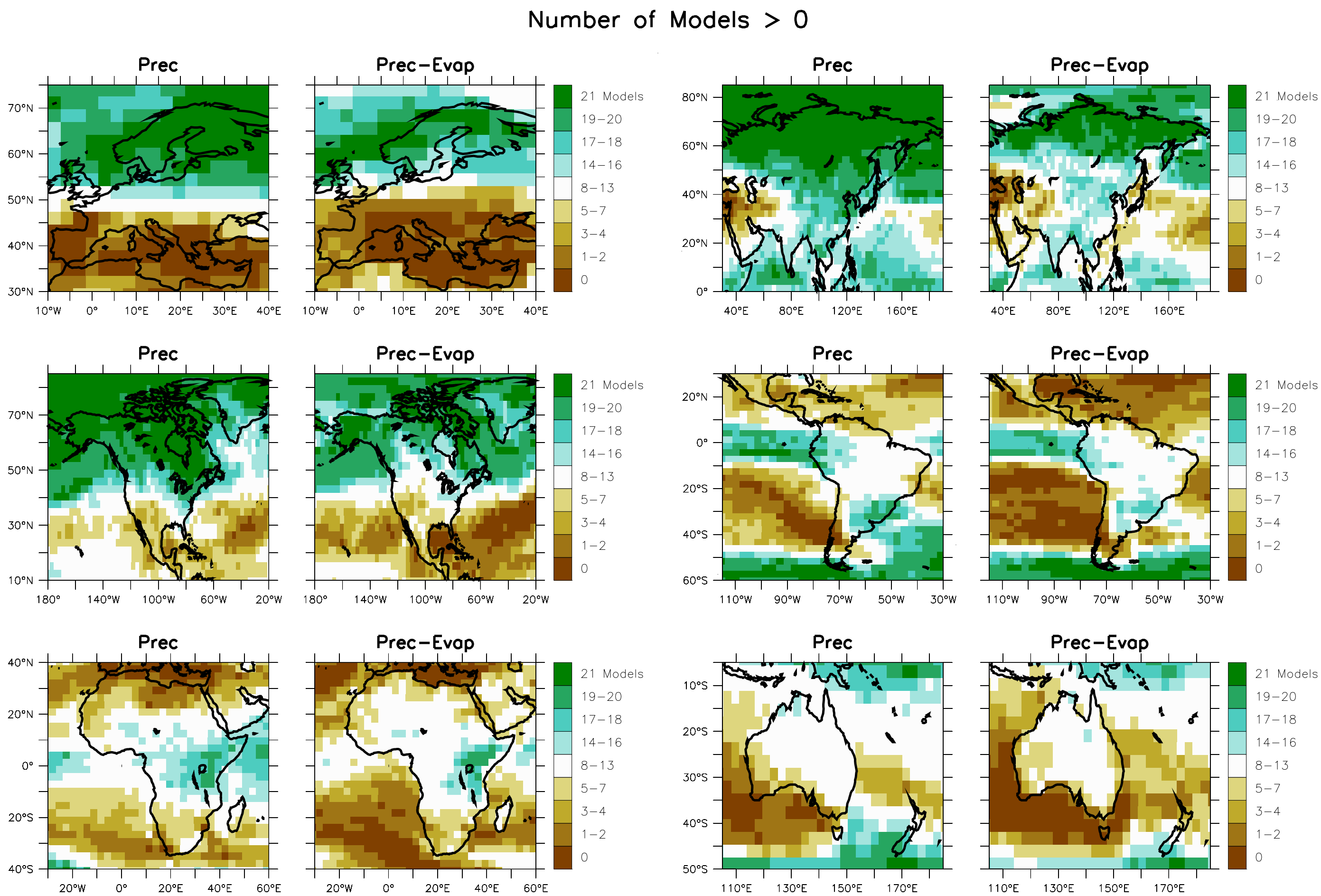


Figure S11.1. The number of models (out of 21) that project increases in precipitation contrasted with the number that predict increases in precipitation minus evaporation, between the periods 1980-1999 and 2080-2099 under the A1B scenario. First two columns: Europe, North America and Africa; last two columns: Asia, South America and Australia.

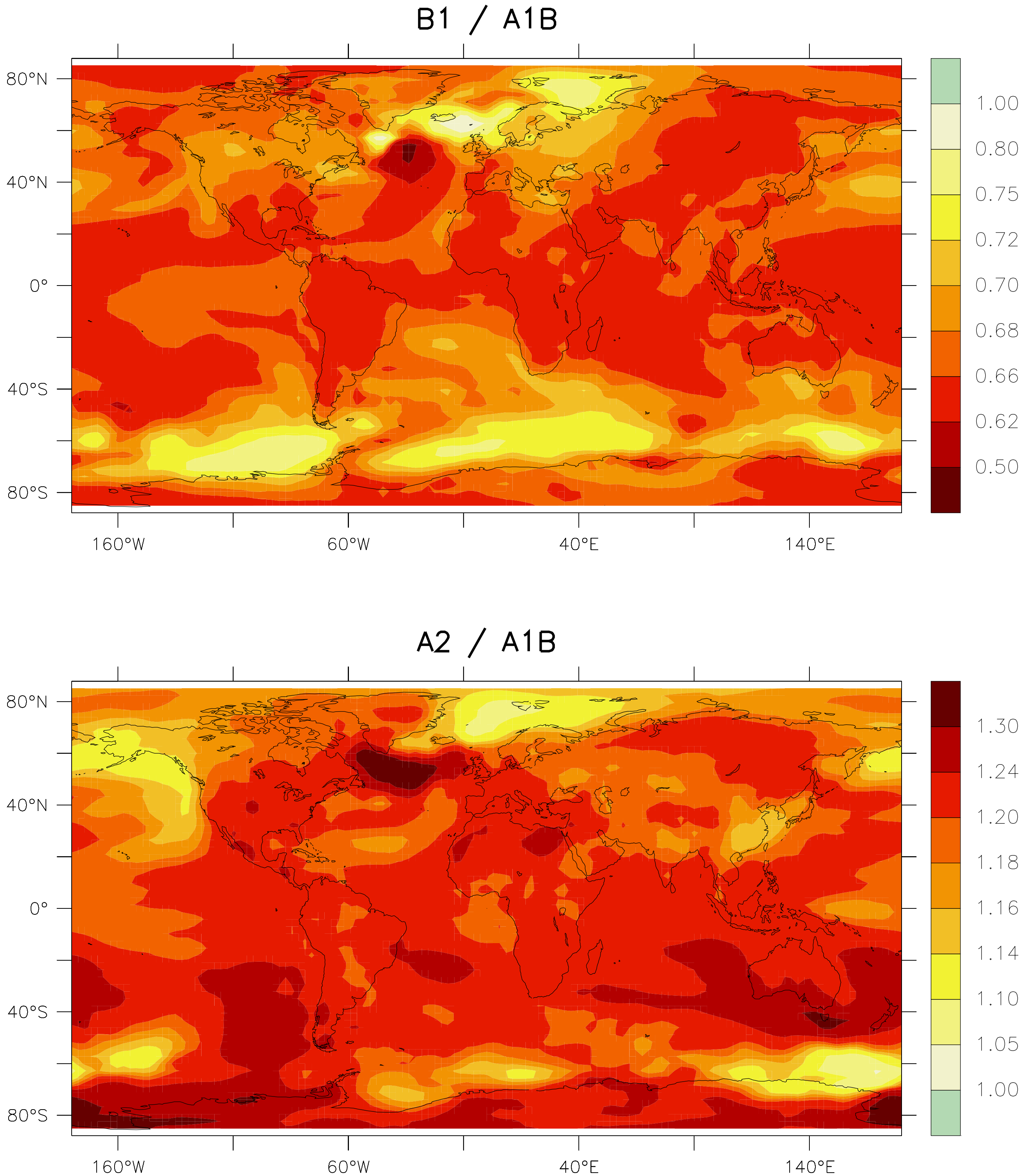


Figure S11.2. *Ratios of ensemble mean and annual mean temperature changes from 1980-1999 to 2080-2099. Top: ratio between the B1 and A1B scenarios; bottom: ratio between the A2 and A1B scenarios.*

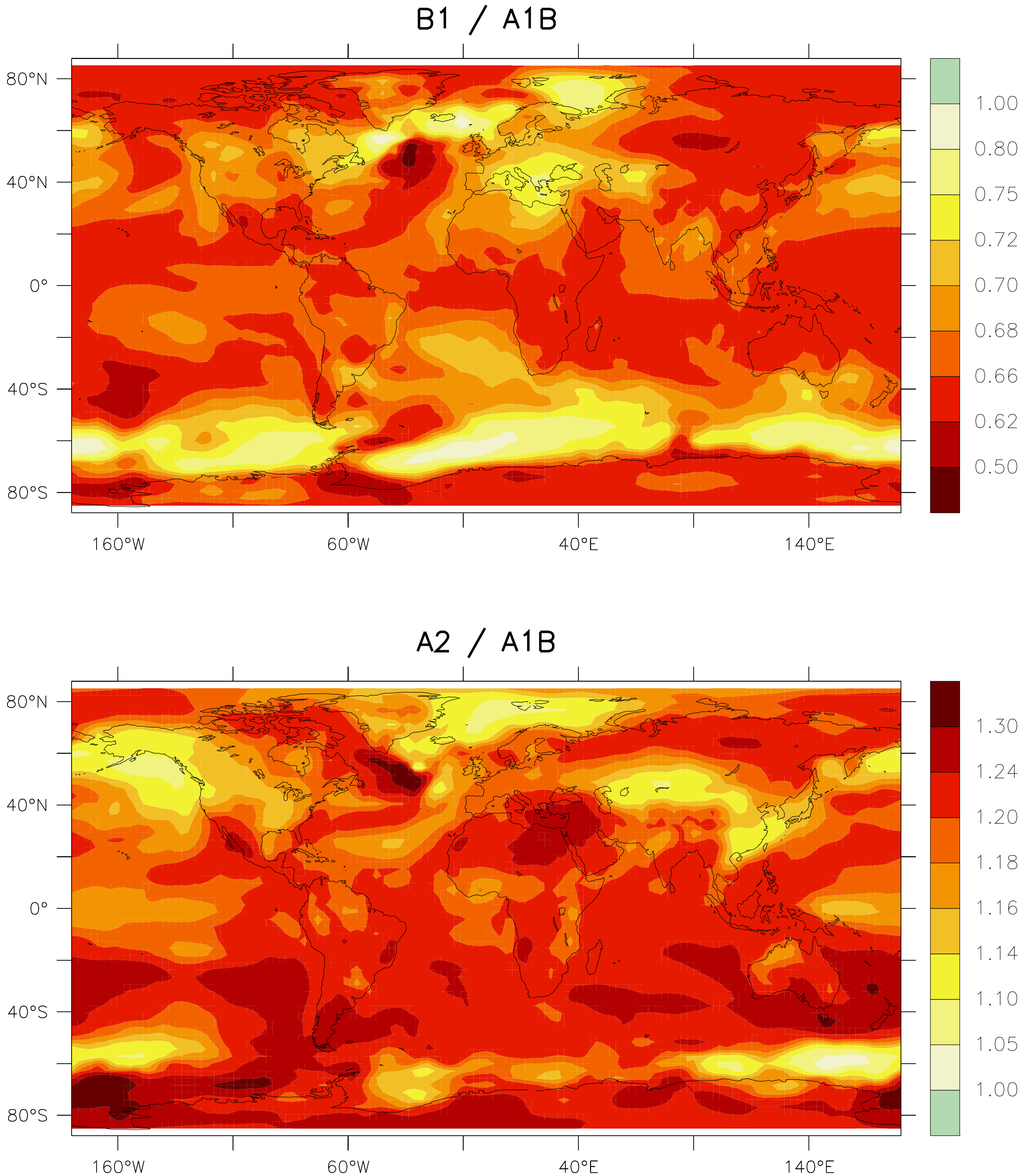
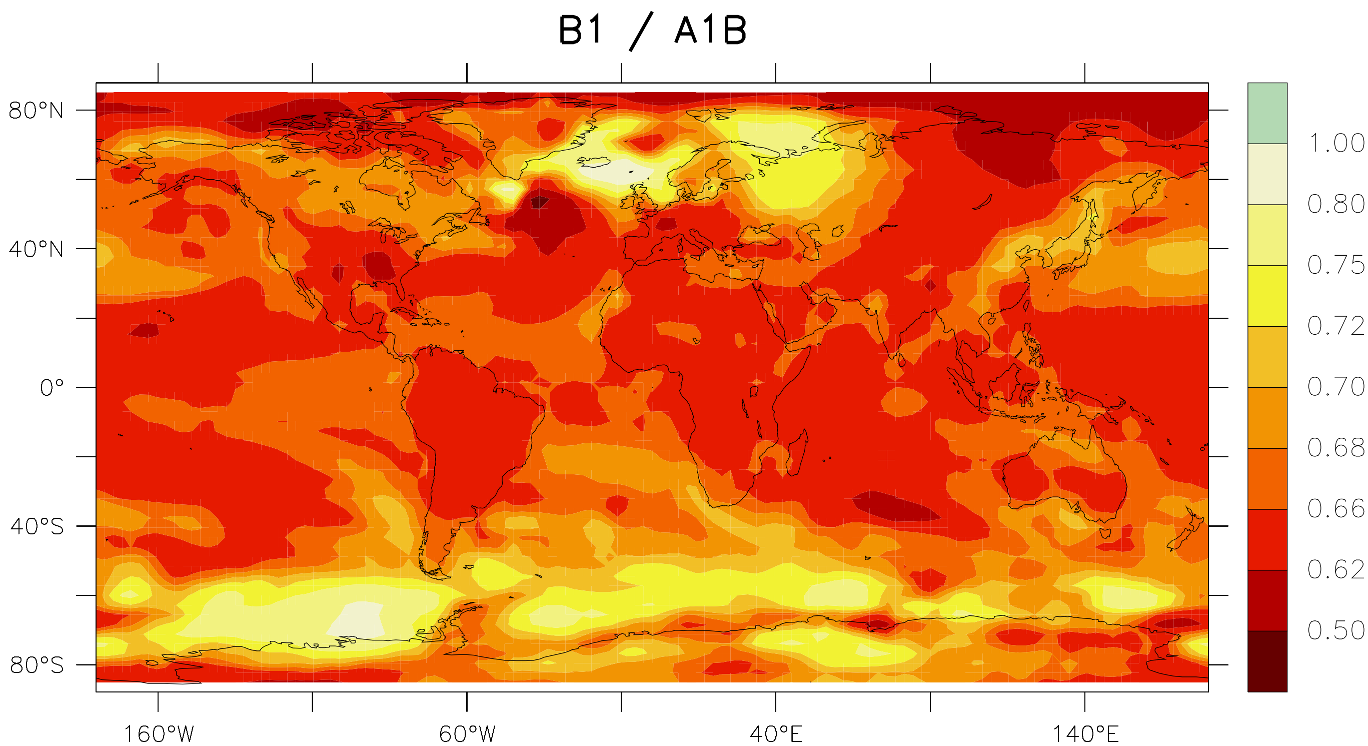


Figure S11.3. *As Figure S11.2, but for December-January-February.*



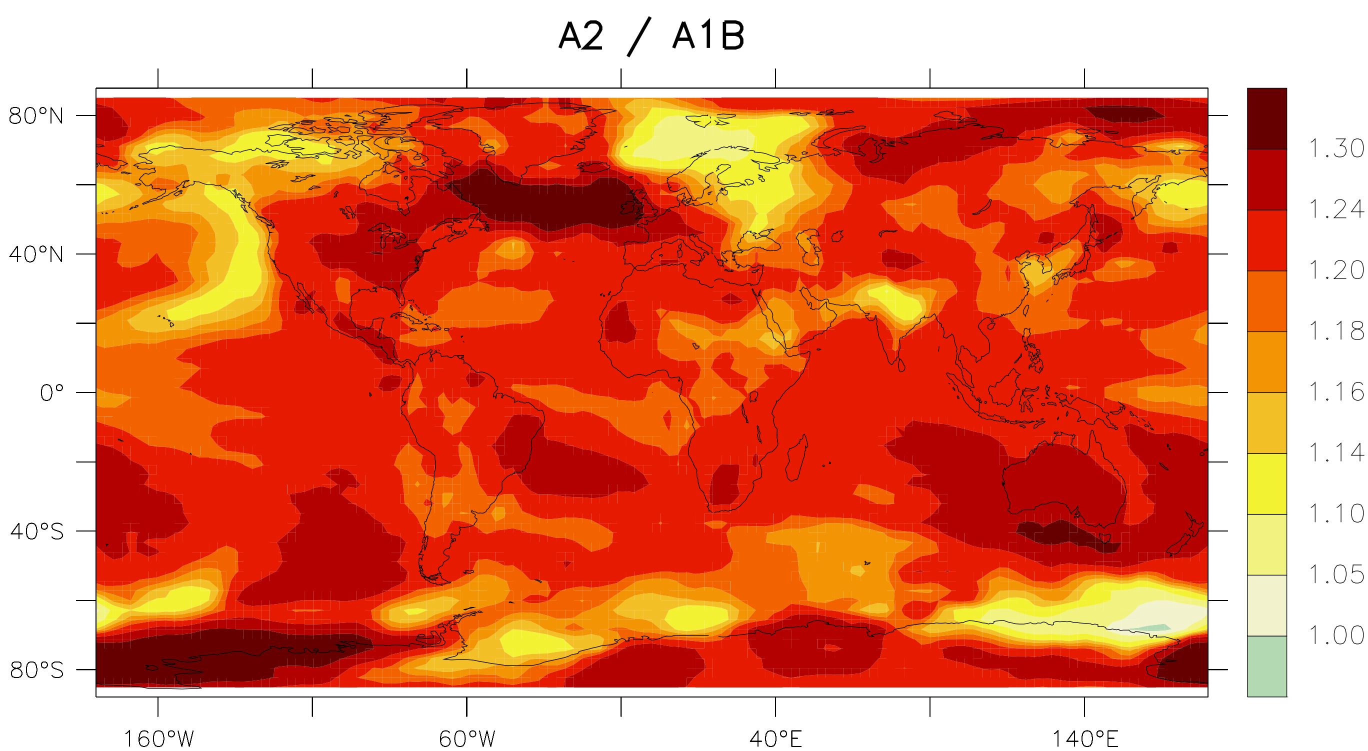


Figure S11.4. *As Figure S11.2, but for June-July-August.*

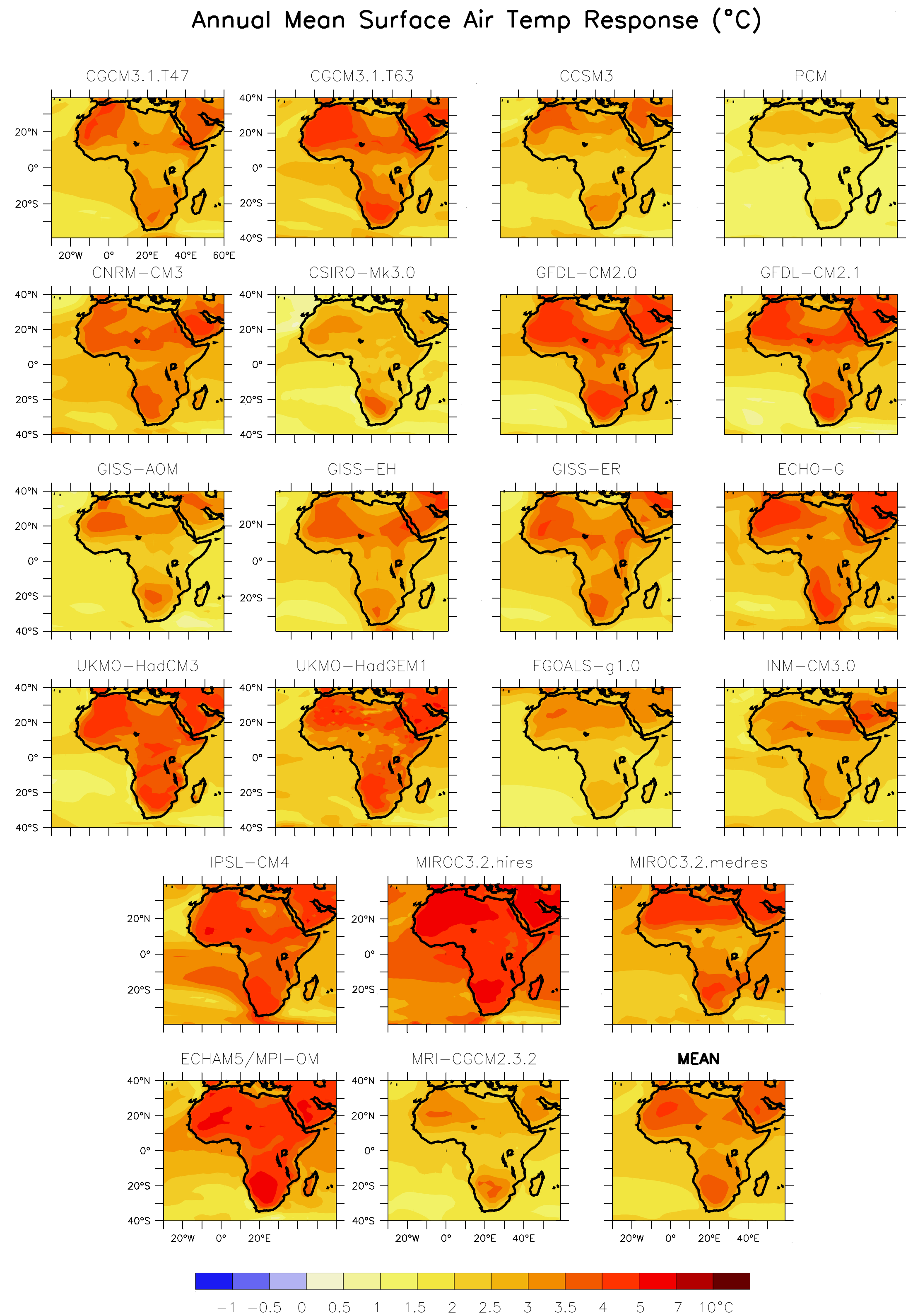


Figure S11.5. *The annual mean temperature response in Africa in 21 MMD models. Shown is the temperature change from the years 1980-1999 to 2080-2099 under the A1B scenario, averaging over all available realizations for each model. The change averaged over all models is shown in the lower right hand corner.*

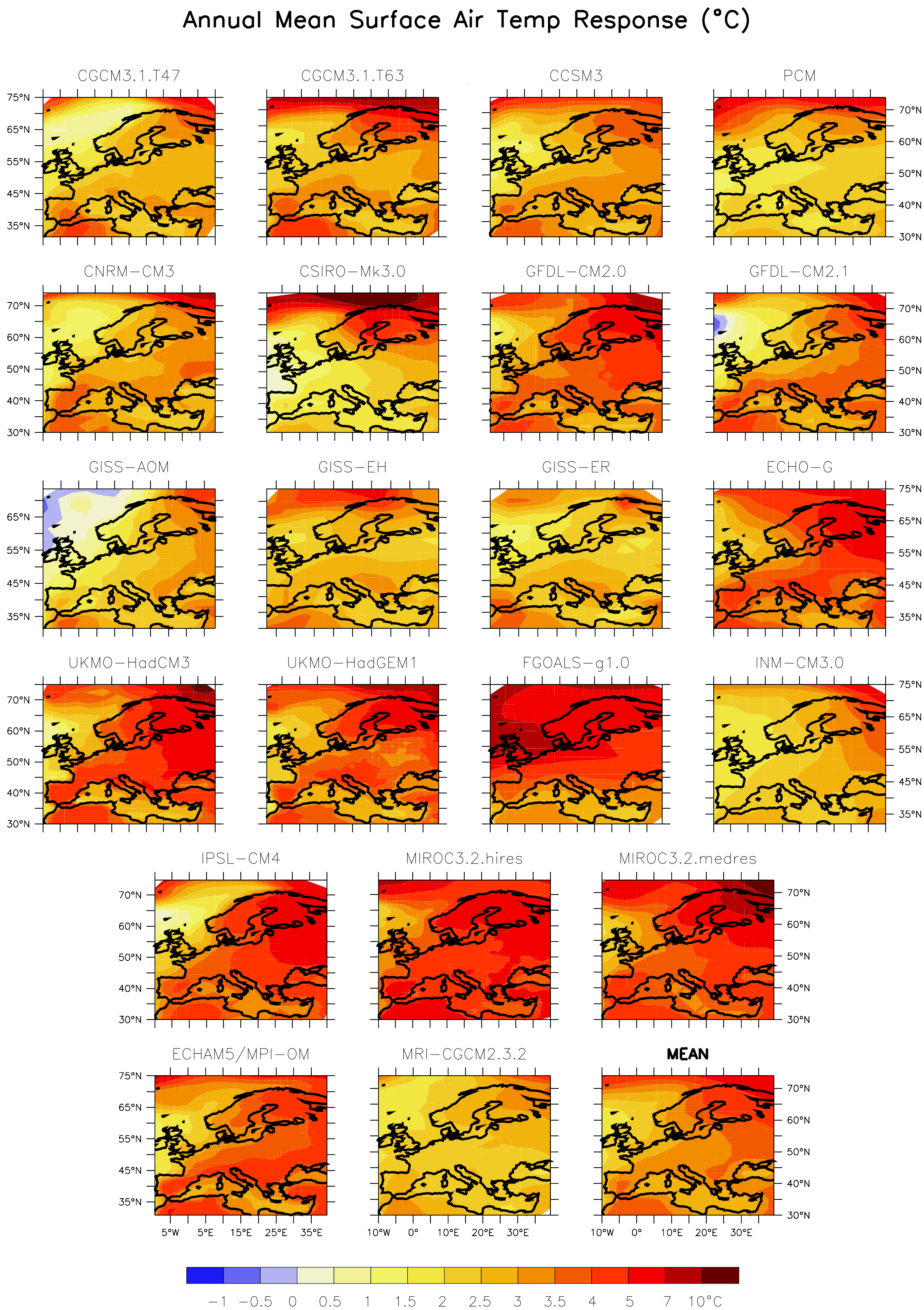


Figure S11.6. *The annual mean temperature response in Europe in 21 MMD models. Shown is the temperature change from the years 1980-1999 to 2080-2099 under the A1B scenario, averaging over all available realizations for each model. The change averaged over all models is shown in the lower right hand corner.*

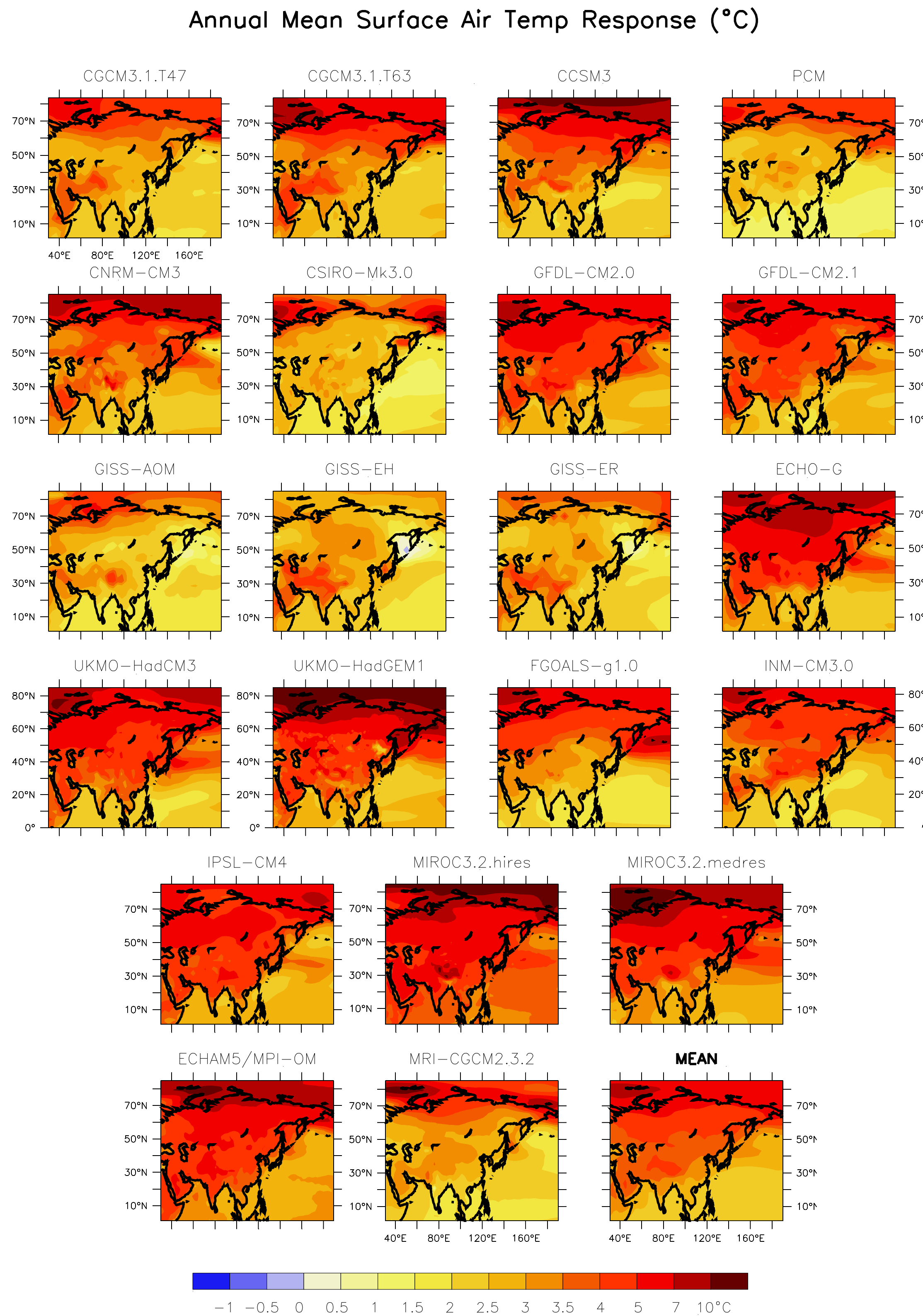


Figure S11.7. The annual mean temperature response in Asia in 21 MMD models. Shown is the temperature change from the years 1980-1999 to 2080-2099 under the A1B scenario, averaging over all available realizations for each model. The change averaged over all models is shown in the lower right hand corner.

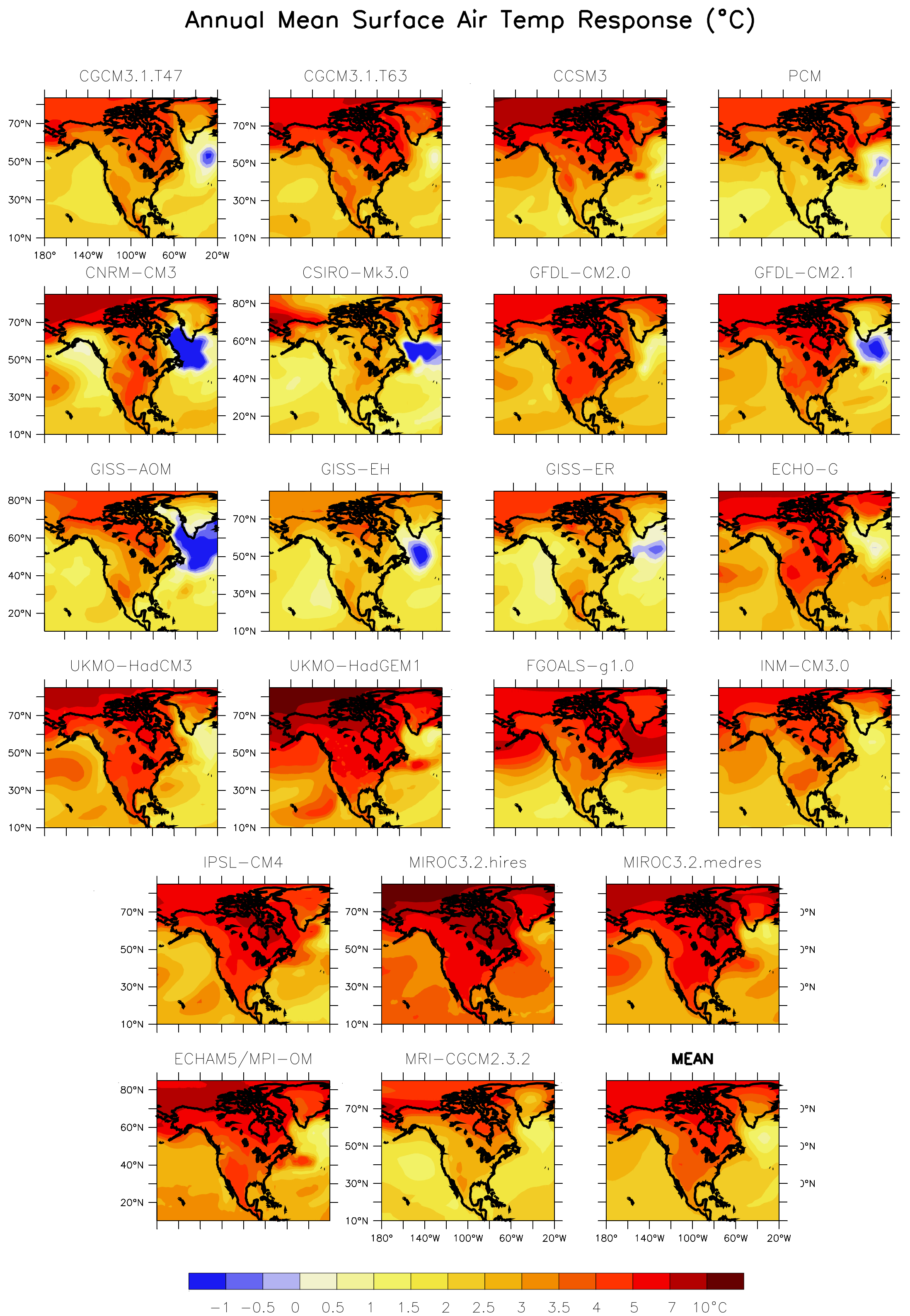


Figure S11.8. The annual mean temperature response in North America in 21 MMD models. Shown is the temperature change from the years 1980-1999 to 2080-2099 under the A1B scenario, averaging over all available realizations for each model. The change averaged over all models is shown in the lower right hand corner.

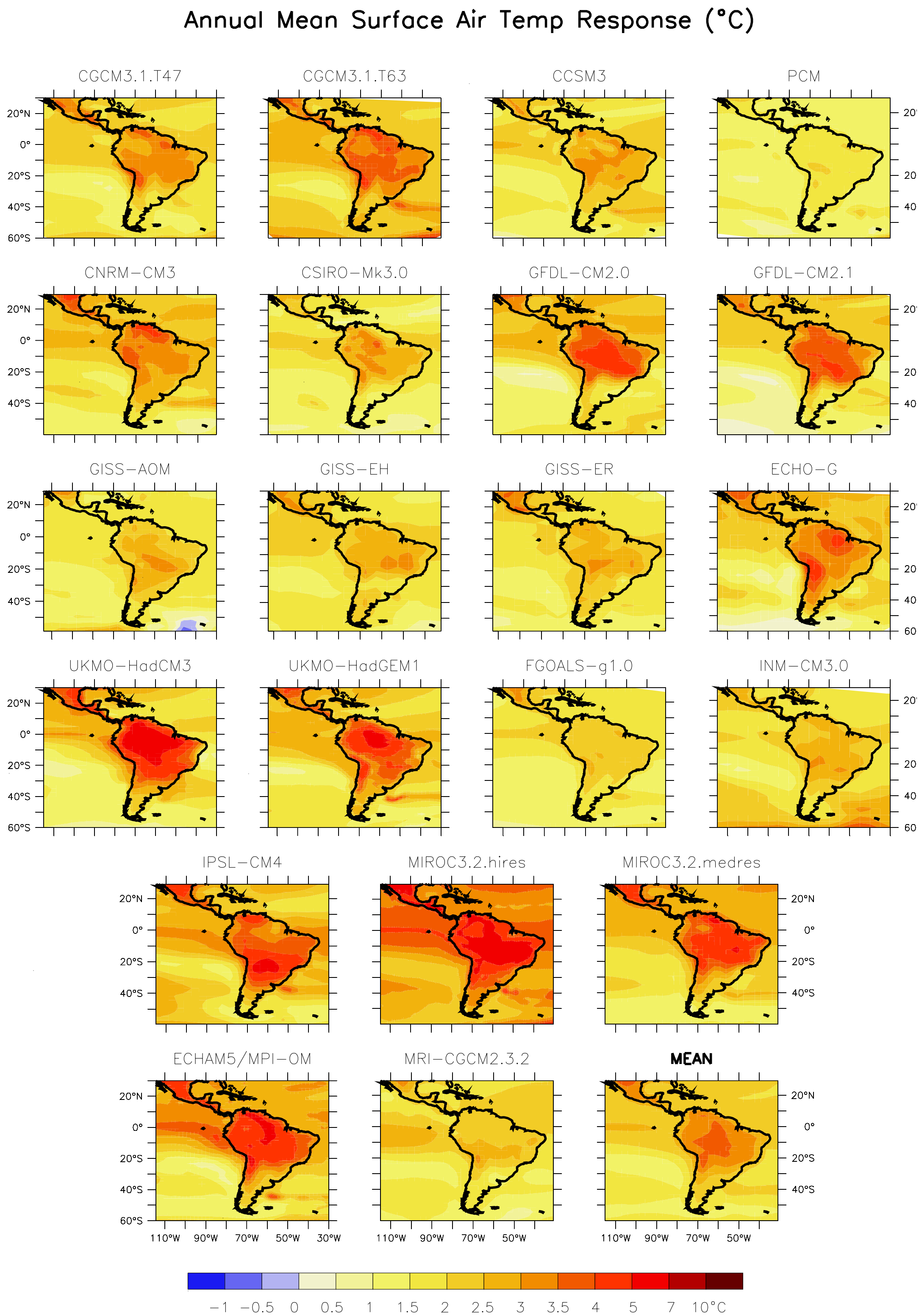


Figure S11.9. The annual mean temperature response in Central and South America in 21 MMD models. Shown is the temperature change from the years 1980-1999 to 2080-2099 under the A1B scenario, averaging over all available realizations for each model. The change averaged over all models is shown in the lower right hand corner.

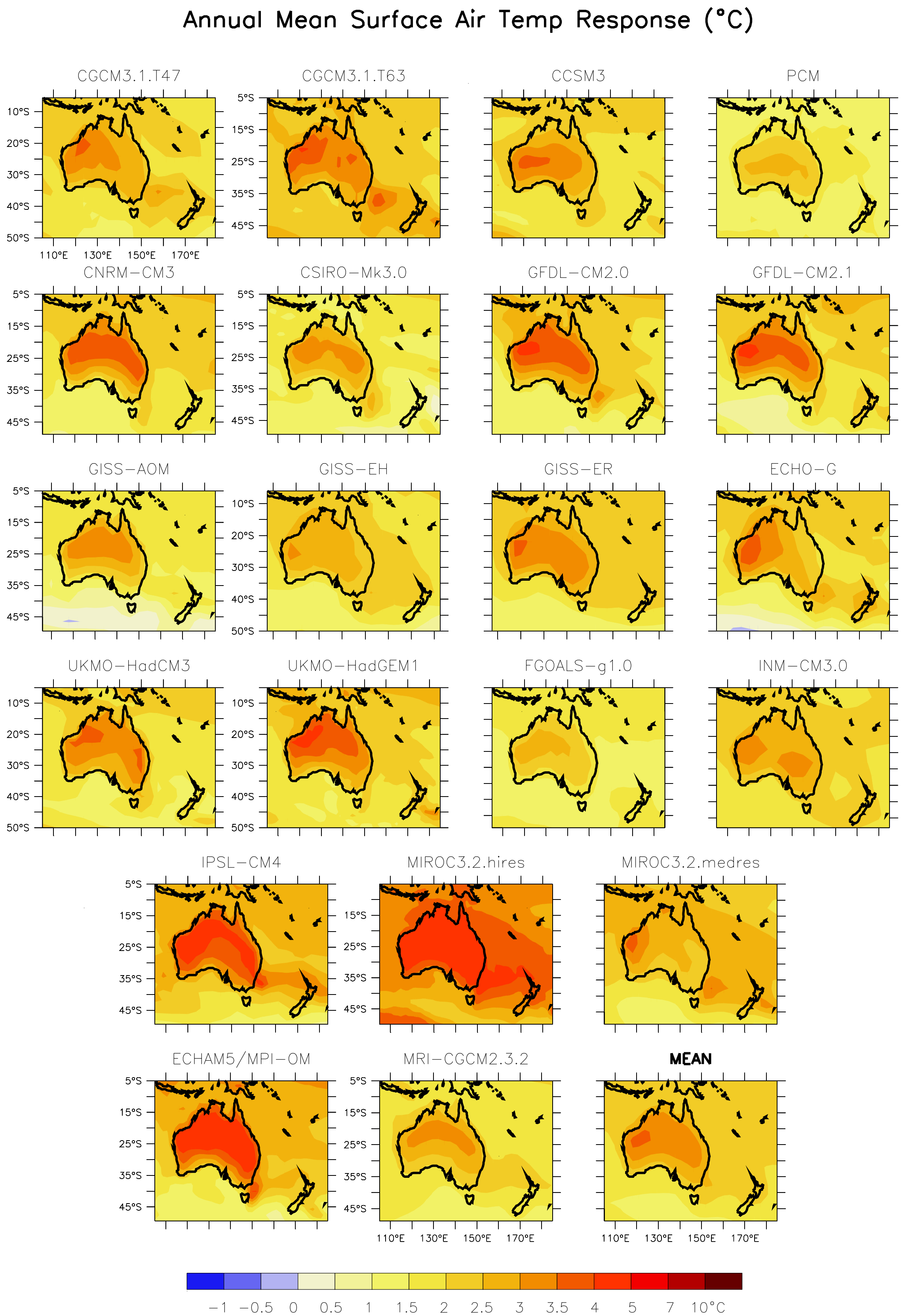


Figure S11.10. *The annual mean temperature response in Australia and New Zealand in 21 MMD models. Shown is the temperature change from the years 1980-1999 to 2080-2099 under the A1B scenario, averaging over all available realizations for each model. The change averaged over all models is shown in the lower right hand corner.*

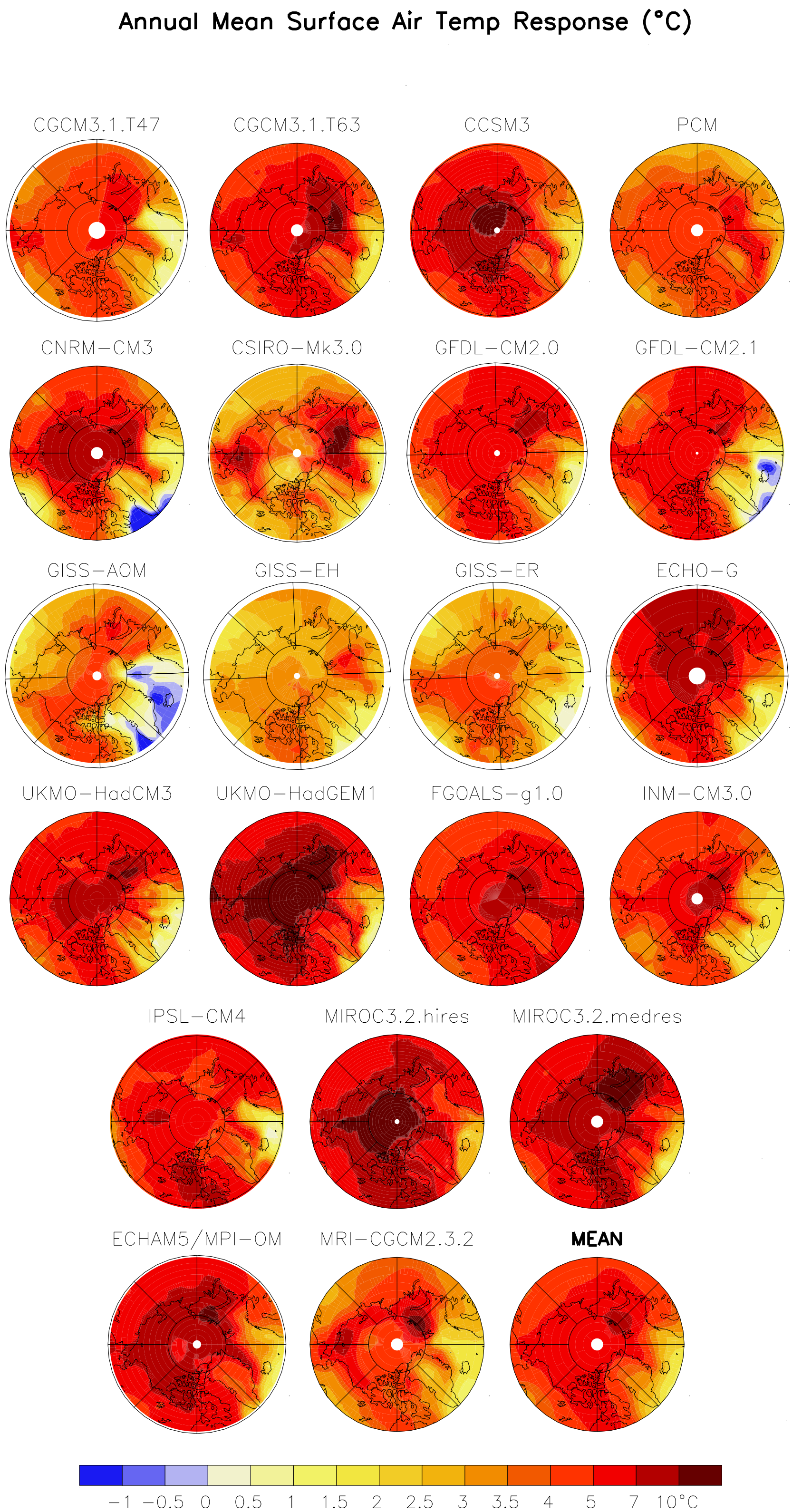


Figure S11.11. *The annual mean temperature response in Arctic in 21 MMD models. Shown is the temperature change from the years 1980-1999 to 2080-2099 under the A1B scenario, averaging over all available realizations for each model. The change averaged over all models is shown in the lower right hand corner.*

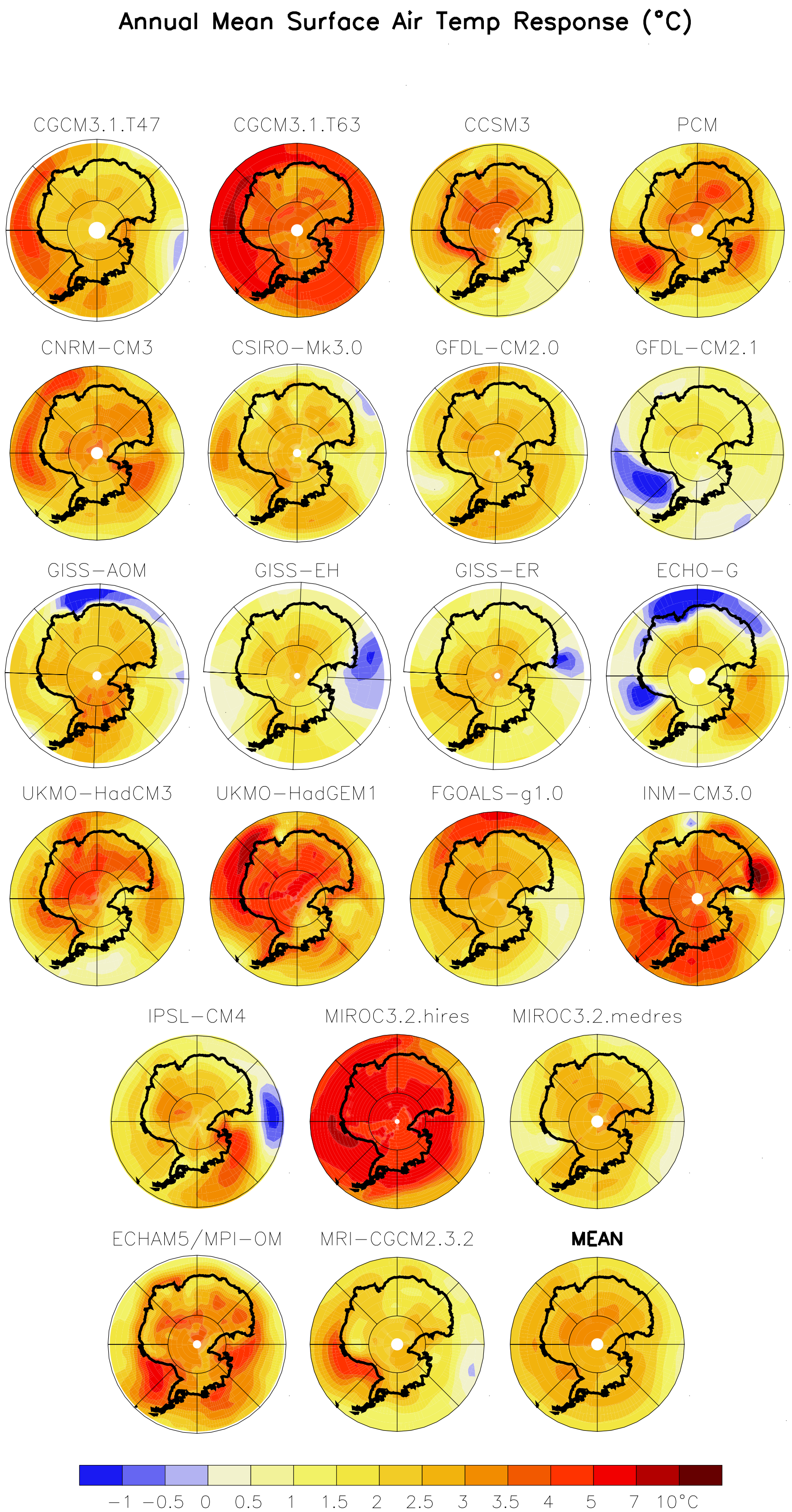


Figure S11.12. The annual mean temperature response in Antarctic in 21 MMD models. Shown is the temperature change from the years 1980-1999 to 2080-2099 under the A1B scenario, averaging over all available realizations for each model. The change averaged over all models is shown in the lower right hand corner.

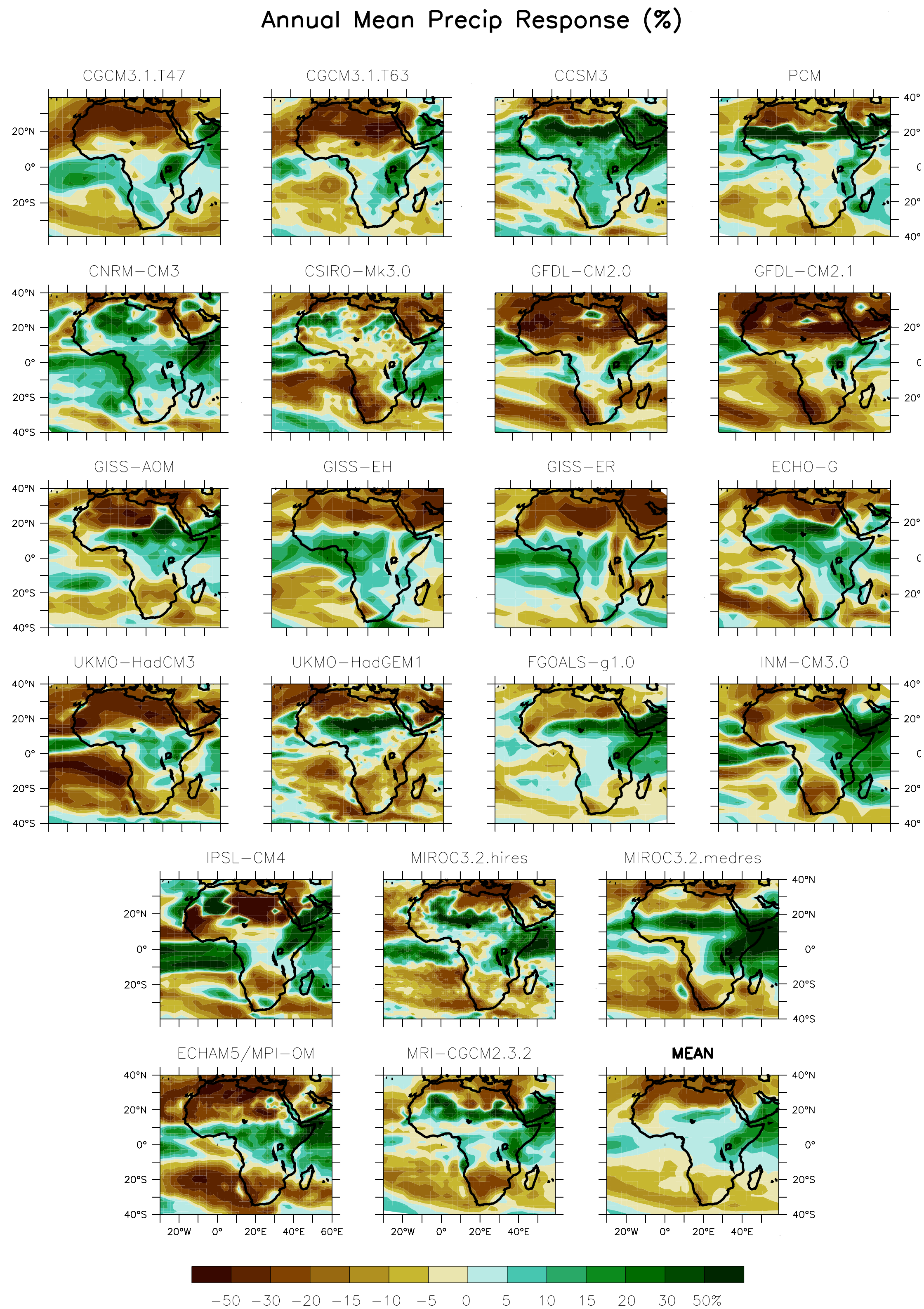


Figure S11.13. The annual mean precipitation response in Africa in 21 MMD models. Shown is the per cent change in precipitation from the years 1980-1999 to 2080-2099 under the A1B scenario, averaging over all available realizations for each model. Brown indicates a reduction in precipitation and green an increase. The per cent change in the precipitation averaged over all models is shown in the lower right hand corner.

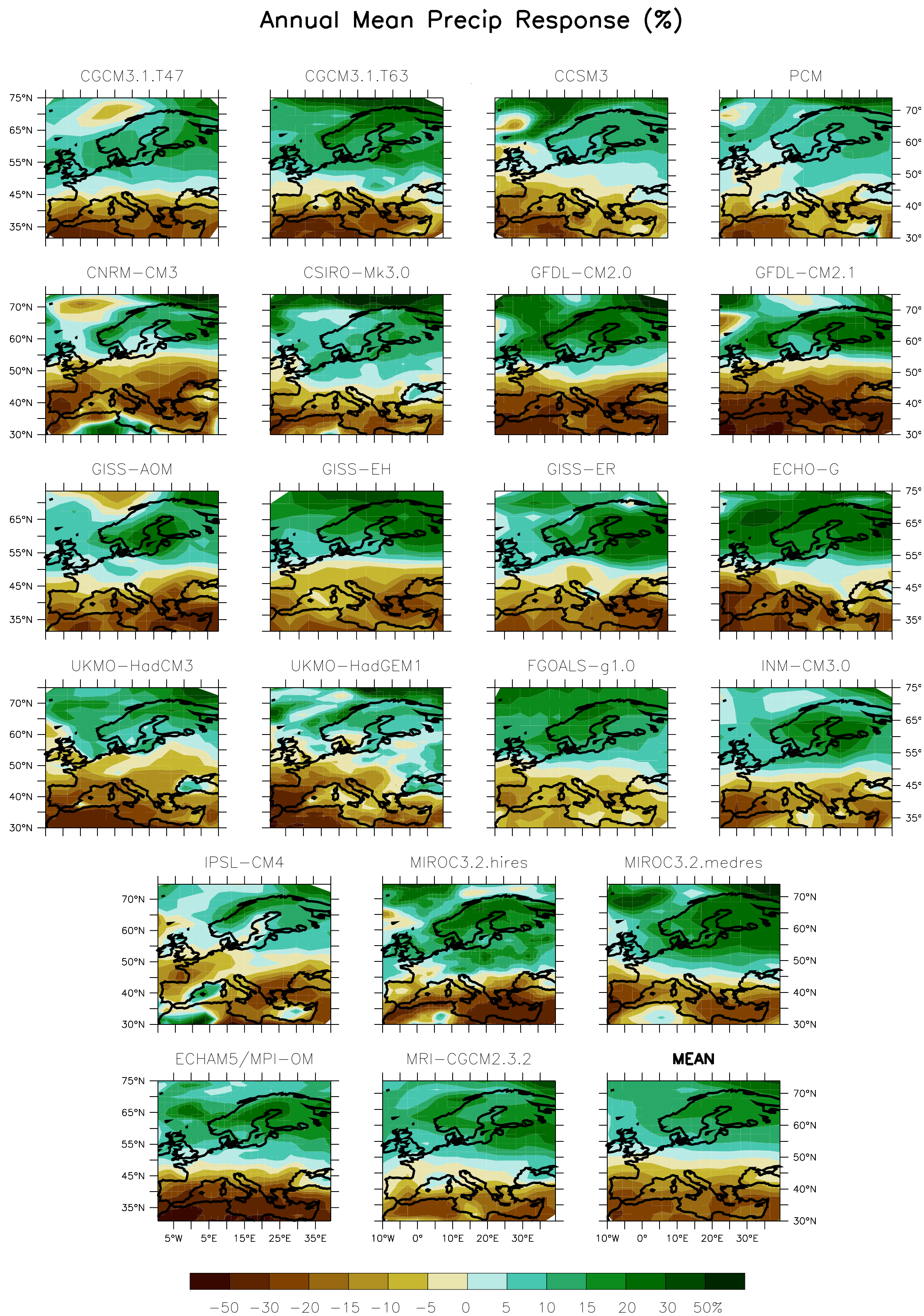


Figure S11.14. The annual mean precipitation response in Europe in 21 MMD models. Shown is the per cent change in precipitation from the years 1980-1999 to 2080-2099 under the A1B scenario, averaging over all available realizations for each model. Brown indicates a reduction in precipitation and green an increase. The per cent change in the precipitation averaged over all models is shown in the lower right hand corner.

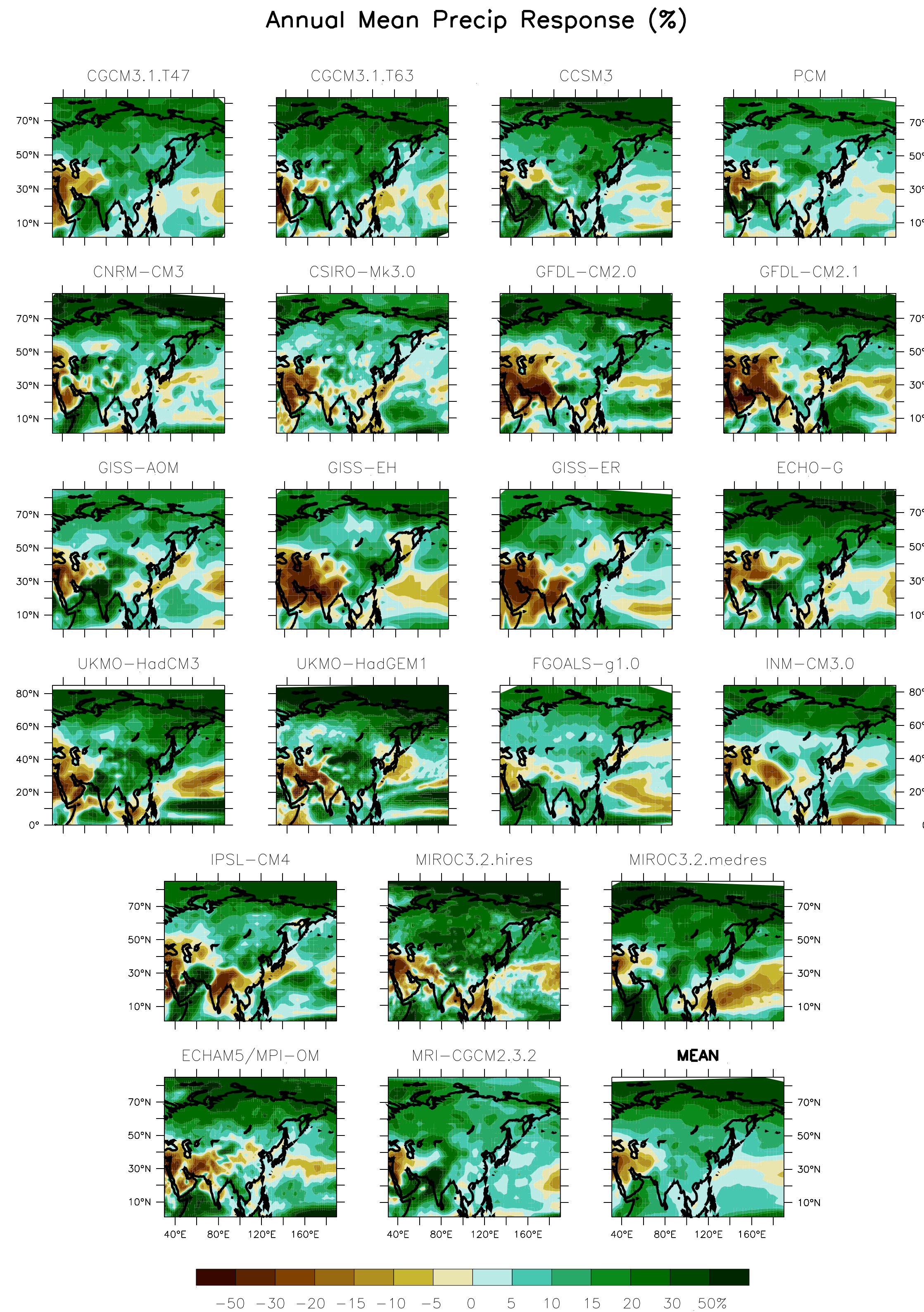


Figure S11.15. *The annual mean precipitation response in Asia in 21 MMD models. Shown is the per cent change in precipitation from the years 1980-1999 to 2080-2099 under the A1B scenario, averaging over all available realizations for each model. Brown indicates a reduction in precipitation and green an increase. The per cent change in the precipitation averaged over all models is shown in the lower right hand corner.*

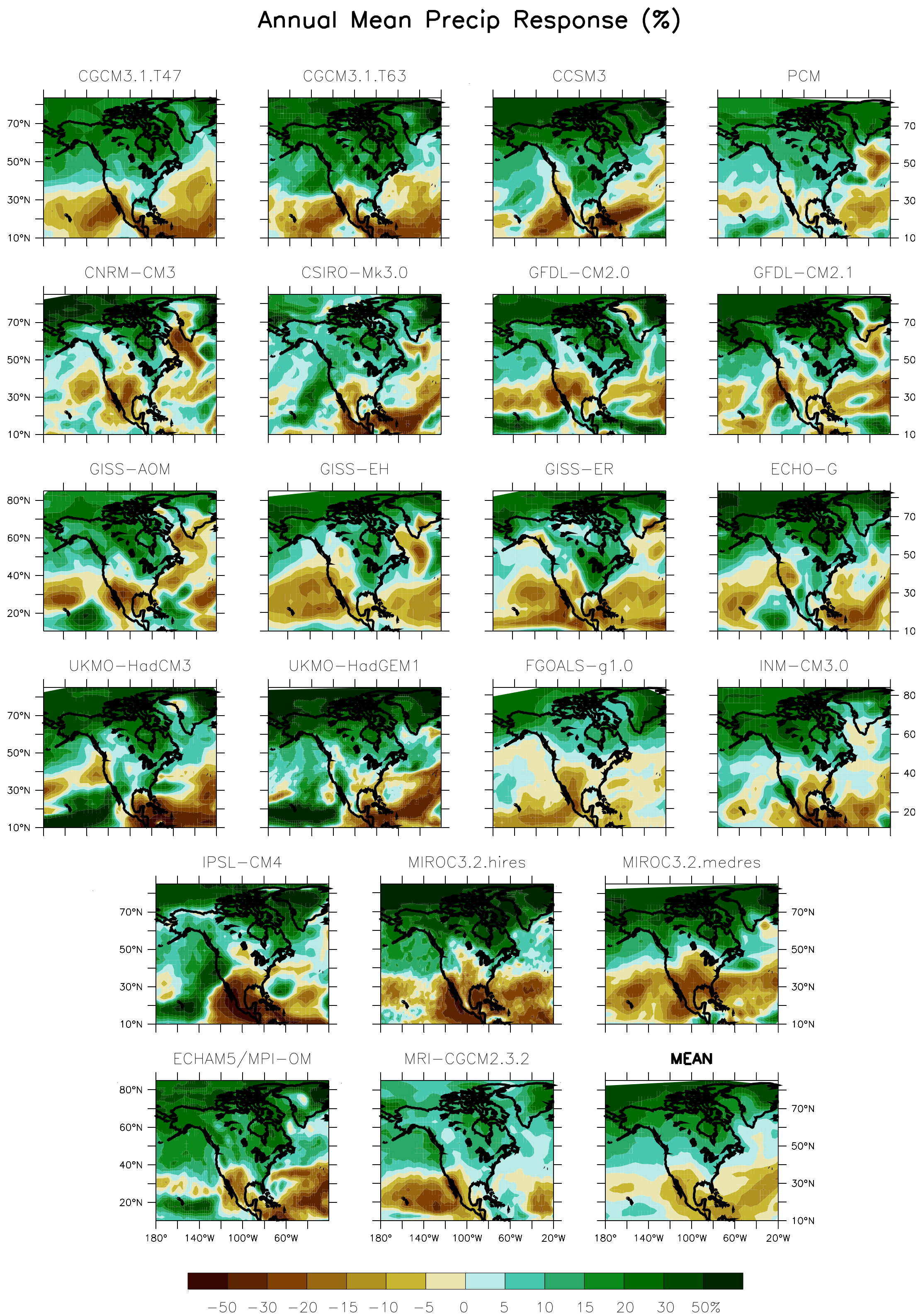


Figure S11.16. The annual mean precipitation response in North America in 21 MMD models. Shown is the per cent change in precipitation from the years 1980-1999 to 2080-2099 under the A1B scenario, averaging over all available realizations for each model. Brown indicates a reduction in precipitation and green an increase. The per cent change in the precipitation averaged over all models is shown in the lower right hand corner.

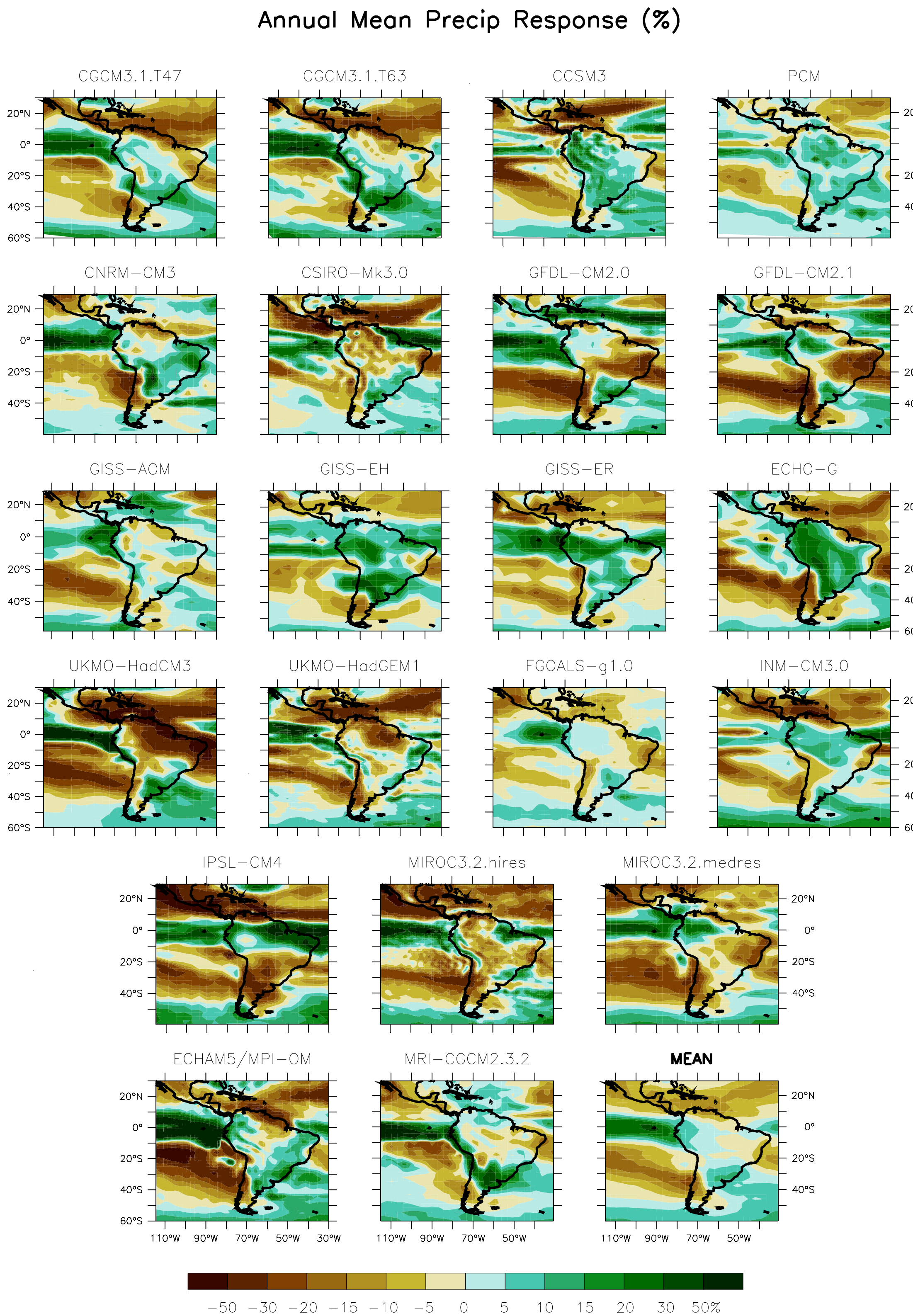


Figure S11.17. *The annual mean precipitation response in Central and South America in 21 MMD models. Shown is the per cent change in precipitation from the years 1980-1999 to 2080-2099 under the A1B scenario, averaging over all available realizations for each model. Brown indicates a reduction in precipitation and green an increase. The per cent change in the precipitation averaged over all models is shown in the lower right hand corner.*

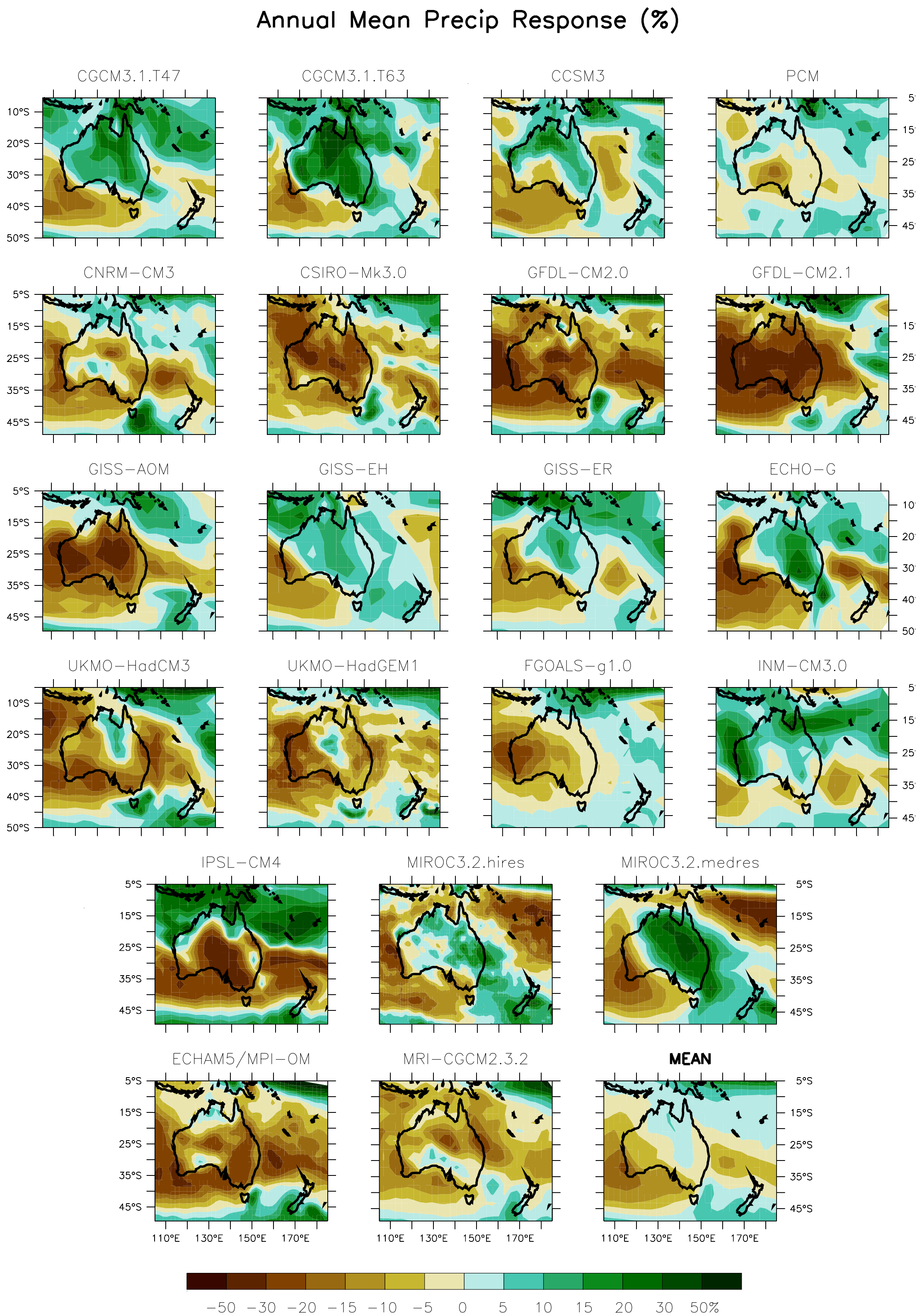


Figure S11.18. *The annual mean precipitation response in Australia and New Zealand in 21 MMD models. Shown is the per cent change in precipitation from the years 1980-1999 to 2080-2099 under the A1B scenario, averaging over all available realizations for each model. Brown indicates a reduction in precipitation and green an increase. The per cent change in the precipitation averaged over all models is shown in the lower right hand corner.*

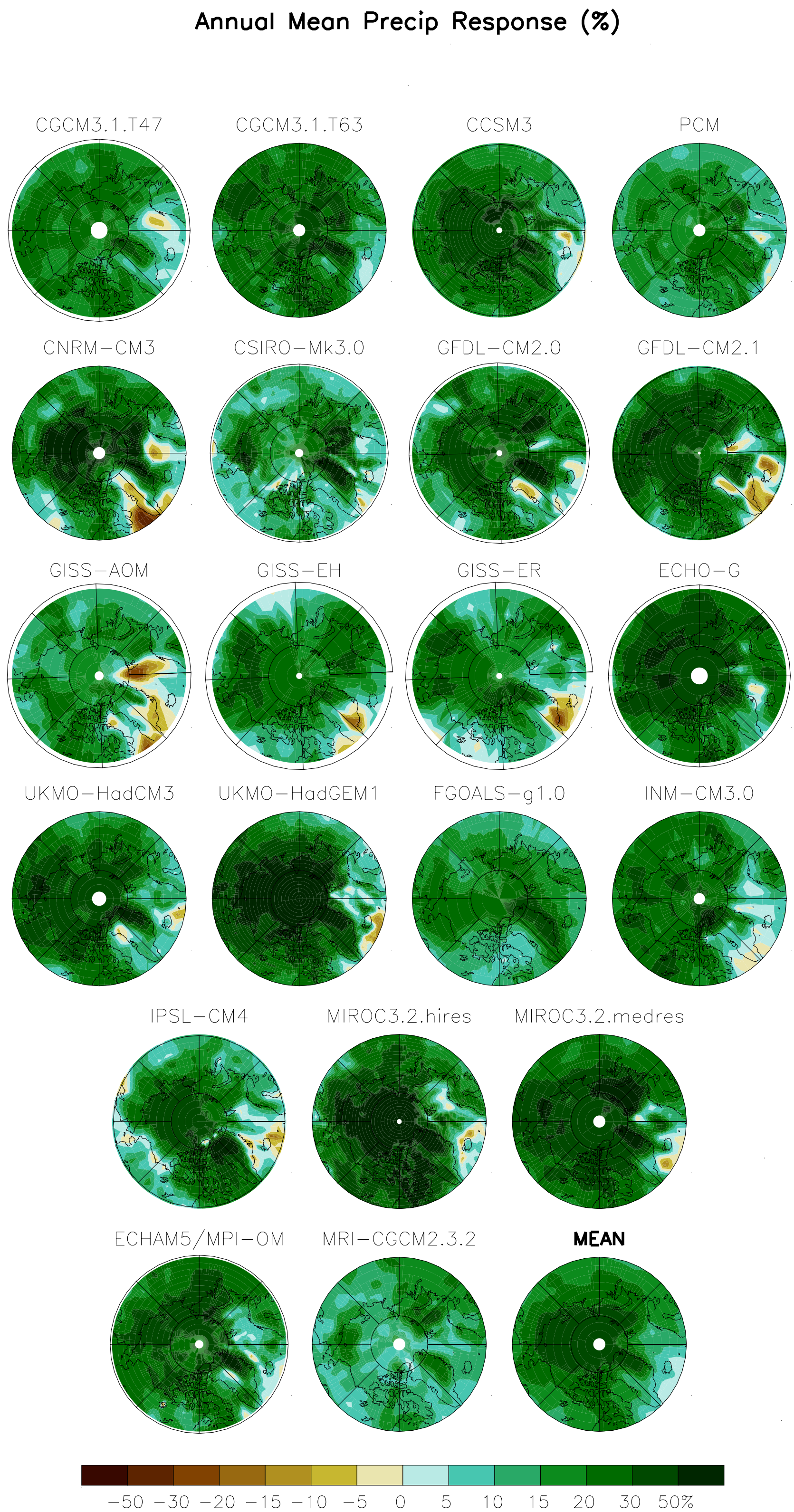


Figure S11.19. *The annual mean precipitation response in Arctic in 21 MMD models. Shown is the per cent change in precipitation from the years 1980-1999 to 2080-2099 under the A1B scenario, averaging over all available realizations for each model. Brown indicates a reduction in precipitation and green an increase. The per cent change in the precipitation averaged over all models is shown in the lower right hand corner.*

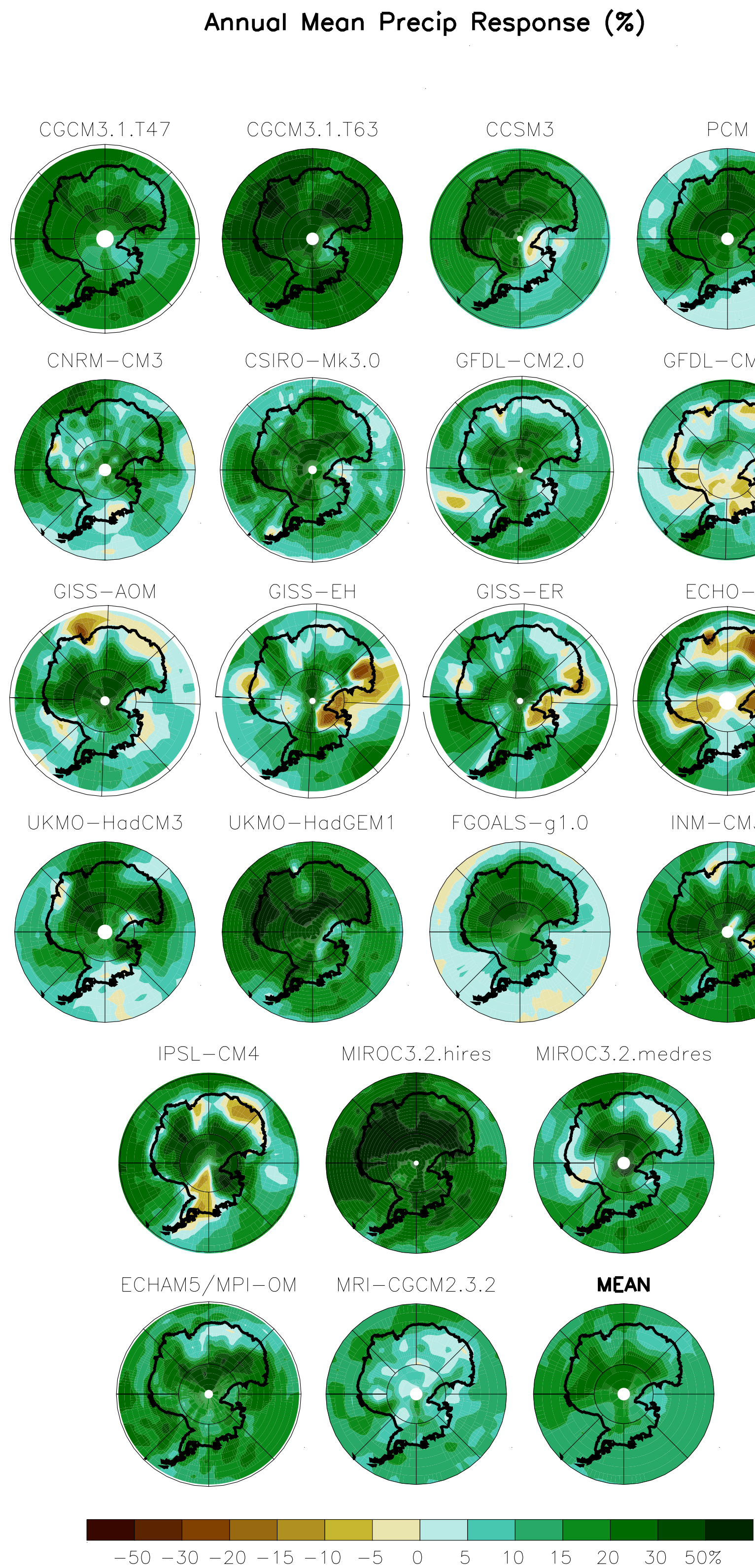


Figure S11.20. The annual mean precipitation response in Antarctic in 21 MMD models. Shown is the per cent change in precipitation from the years 1980-1999 to 2080-2099 under the A1B scenario, averaging over all available realizations for each model. Brown indicates a reduction in precipitation and green an increase. The per cent change in the precipitation averaged over all models is shown in the lower right hand corner.

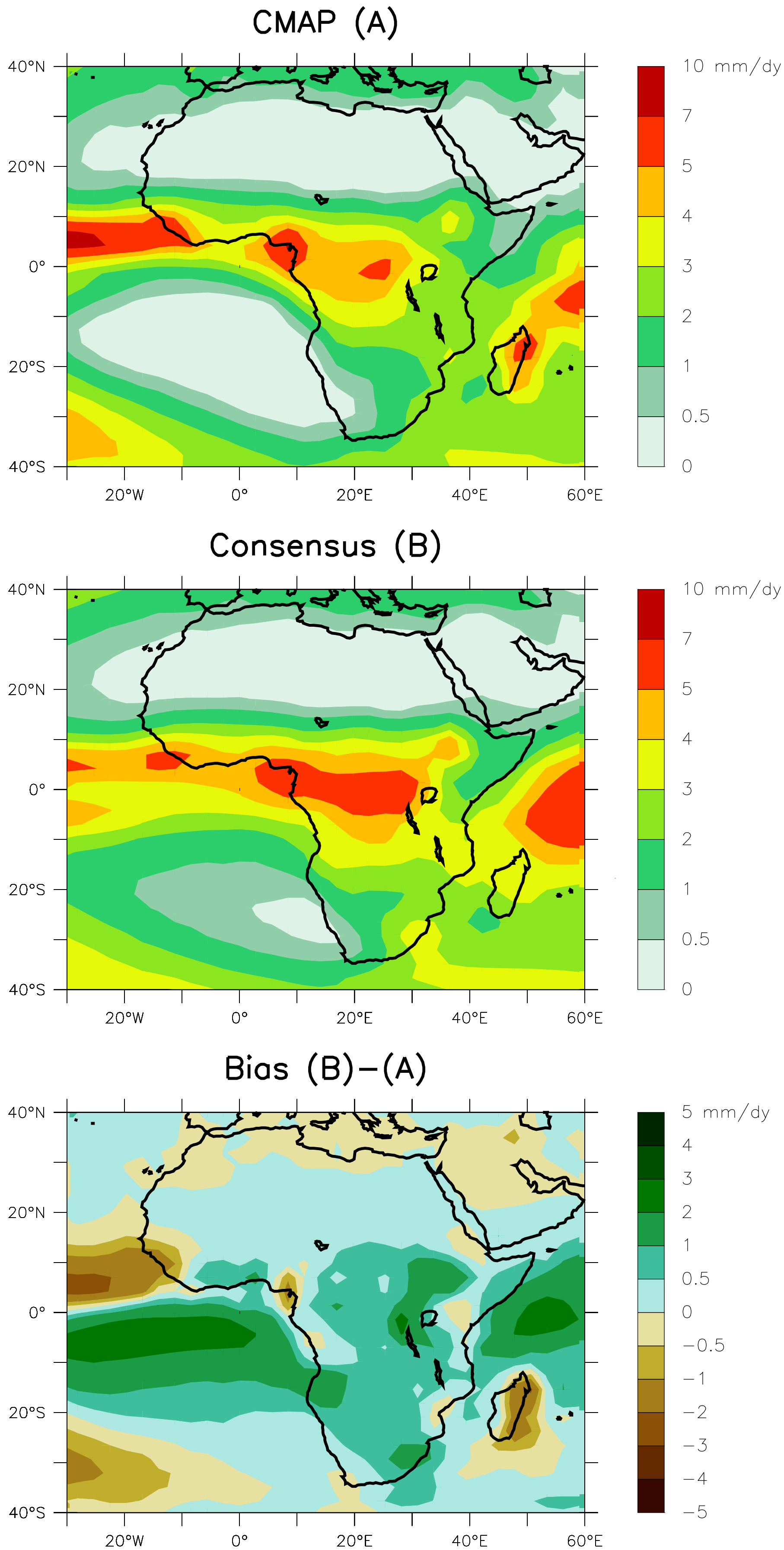


Figure S11.21. *Annual mean precipitation (in mm/day) in Africa in the years 1980-1999. (a) CMAP data set (update of Xie and Arkin, 1997); (b) mean of 21 MMD models; (c) difference between the multi-model mean and the CMAP data.*

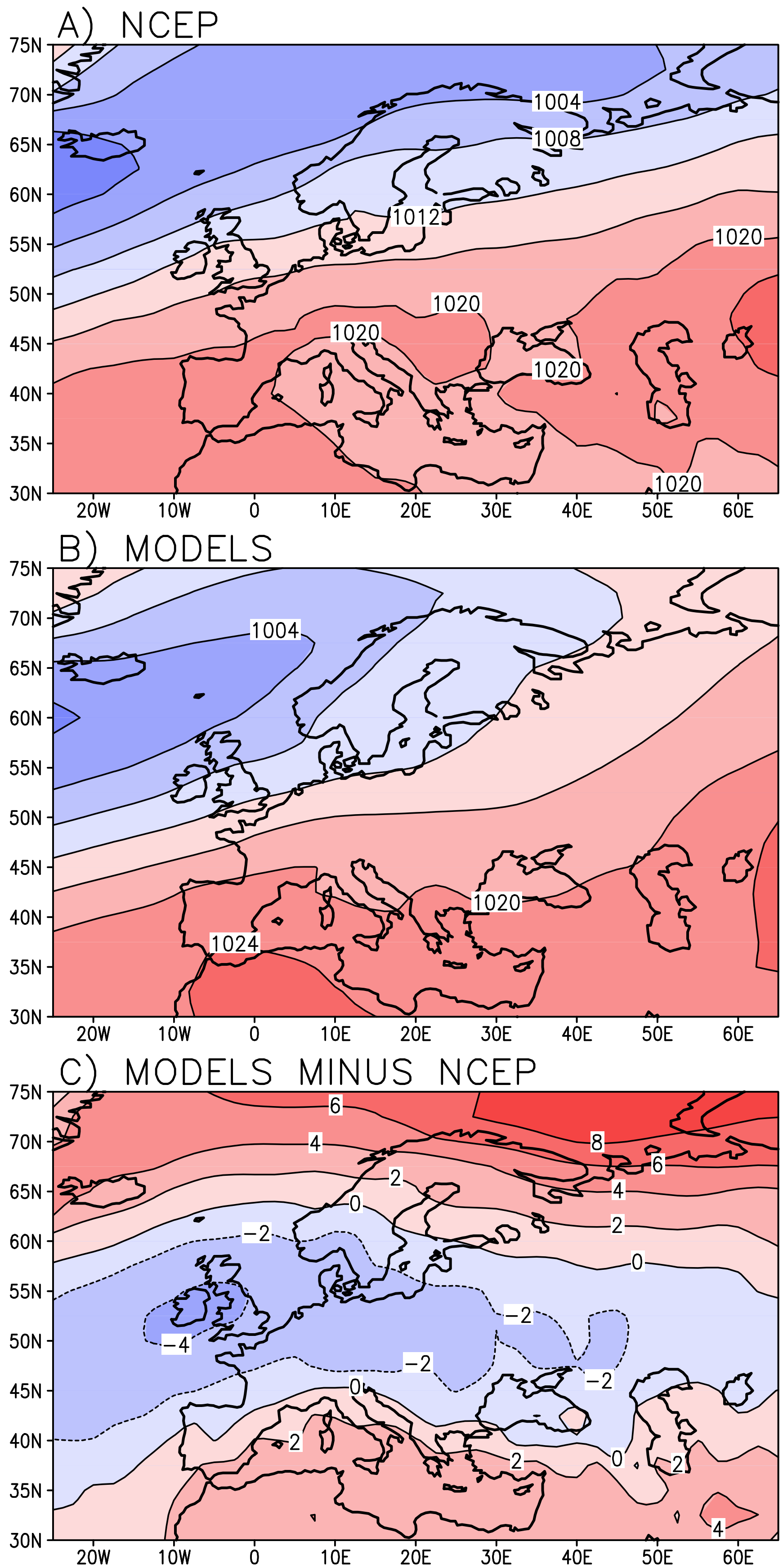


Figure S11.22. Mean sea level pressure (hPa) in the boreal winter (December-January-February) in the years 1980-1999. a) NCEP reanalysis (Kistler et al., 2001), b) MMD multi-model mean, c) multi-model mean bias.

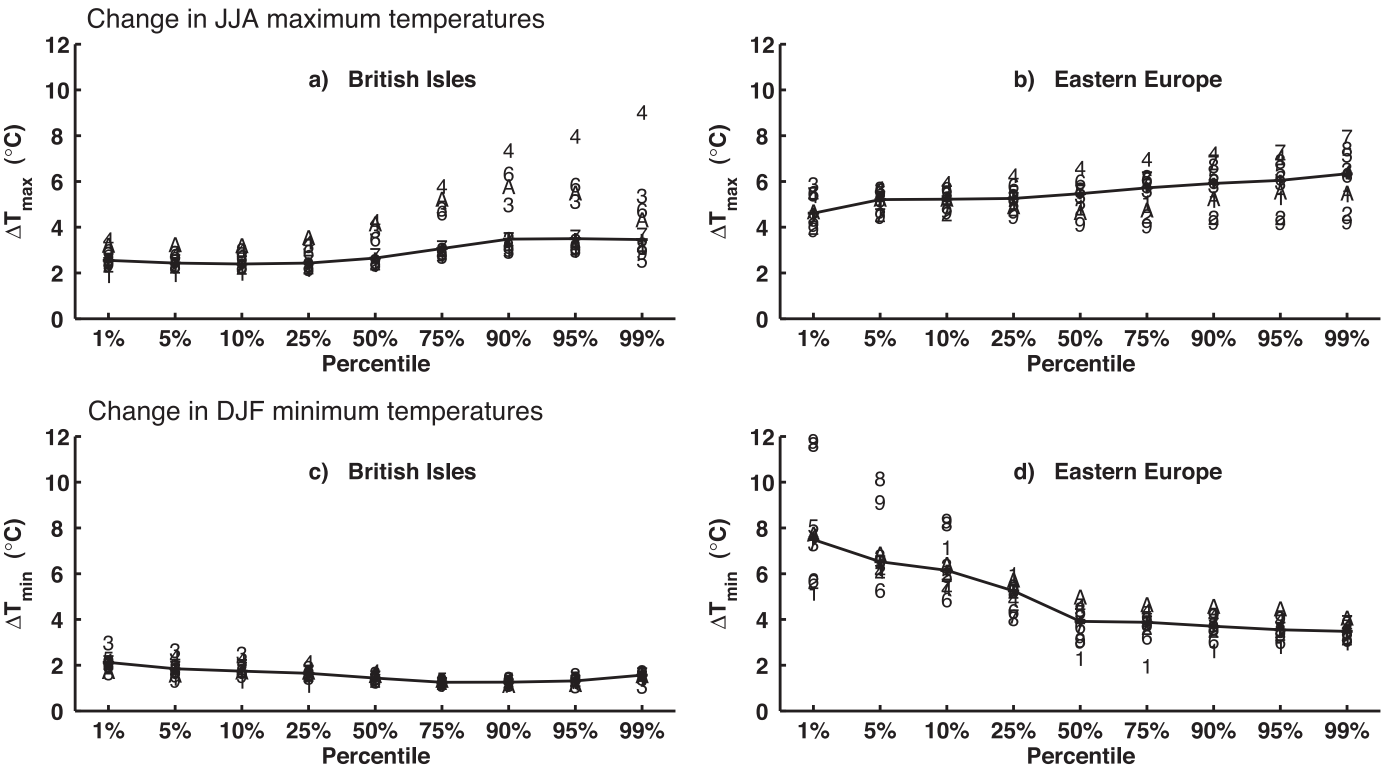


Figure S11.23. *Changes in the distribution of JJA daily maximum temperatures (top) and DJF daily minimum temperatures (bottom) in the British Isles (left) and in eastern Europe in HadAM3H-driven PRUDENCE simulations (from 1961–1990 to 2071–2100 under the SRES A2 scenario). The horizontal axis gives the percentile of the distribution. The vertical axis gives the changes in each percentile (in °C) separately for ten RCMs (1–9 and A). The lines show the median of the RCM projections (based on Kjellström et al., 2006).*

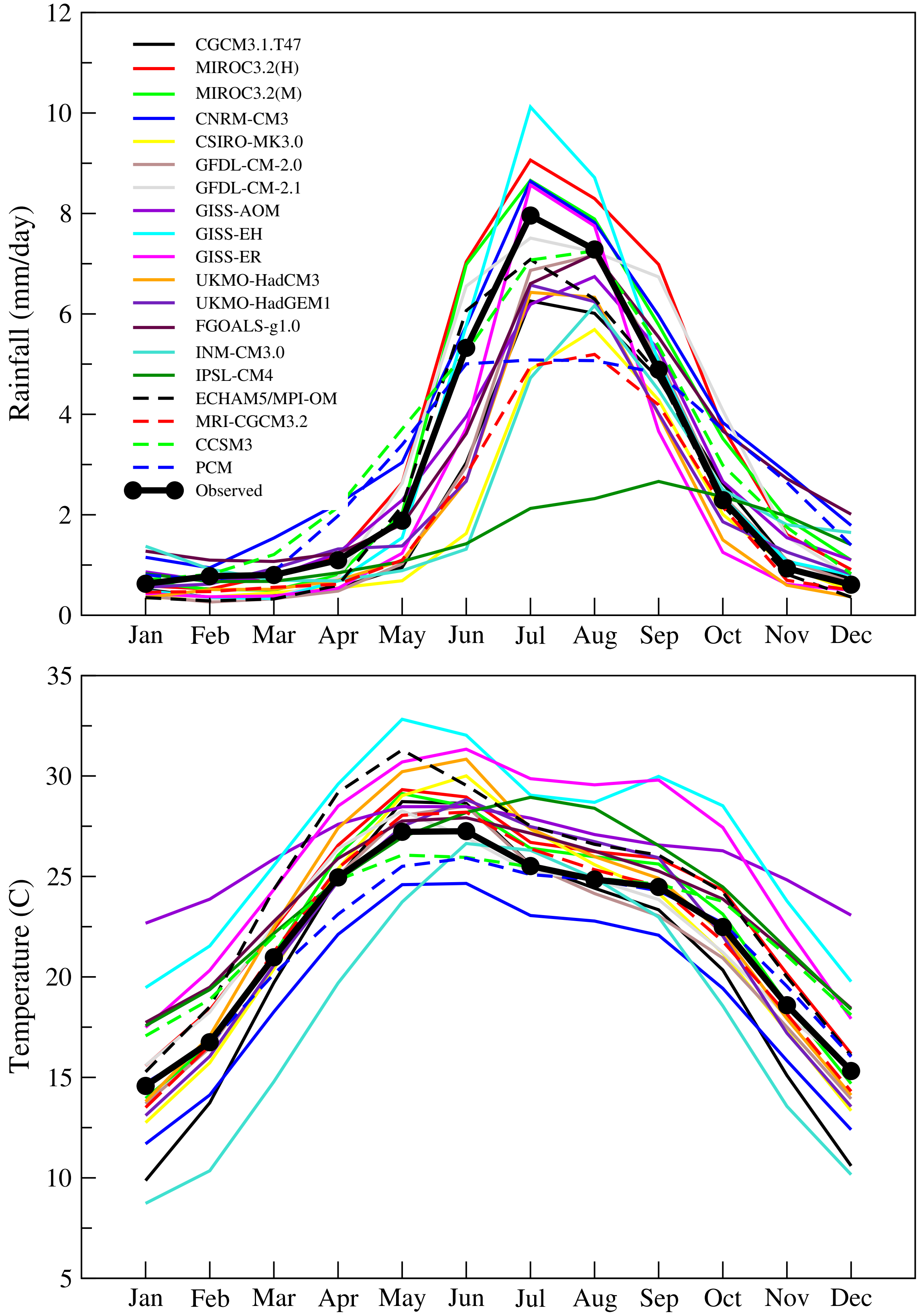


Figure S11.24. Area-averaged annual cycles of rainfall (top) and surface air temperature (bottom) over South Asia in the years 1979-2000 as simulated in the MMD models and as based on observed data (similar to the analysis of Lal and Harasawa (2000) for an earlier generation of models).

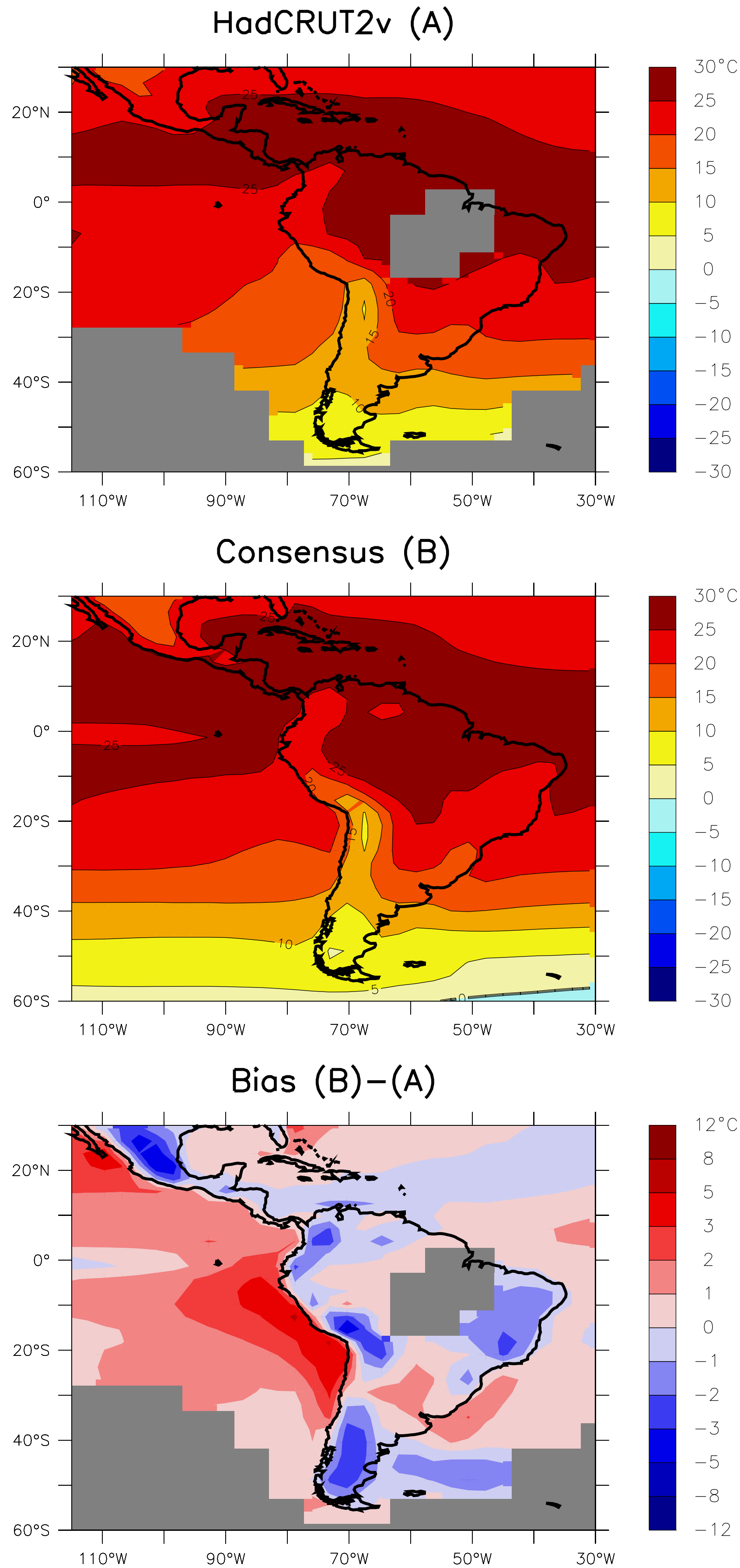


Figure S11.25. *MMD ensemble annual mean surface air temperatures in South America compared with observations. a) observations from the HadCRUT2v data set (Jones et al., 2001); b) mean of the 21 MMD models; c) difference between the multi-model mean and the HadCRUT2v data. Units °C.*

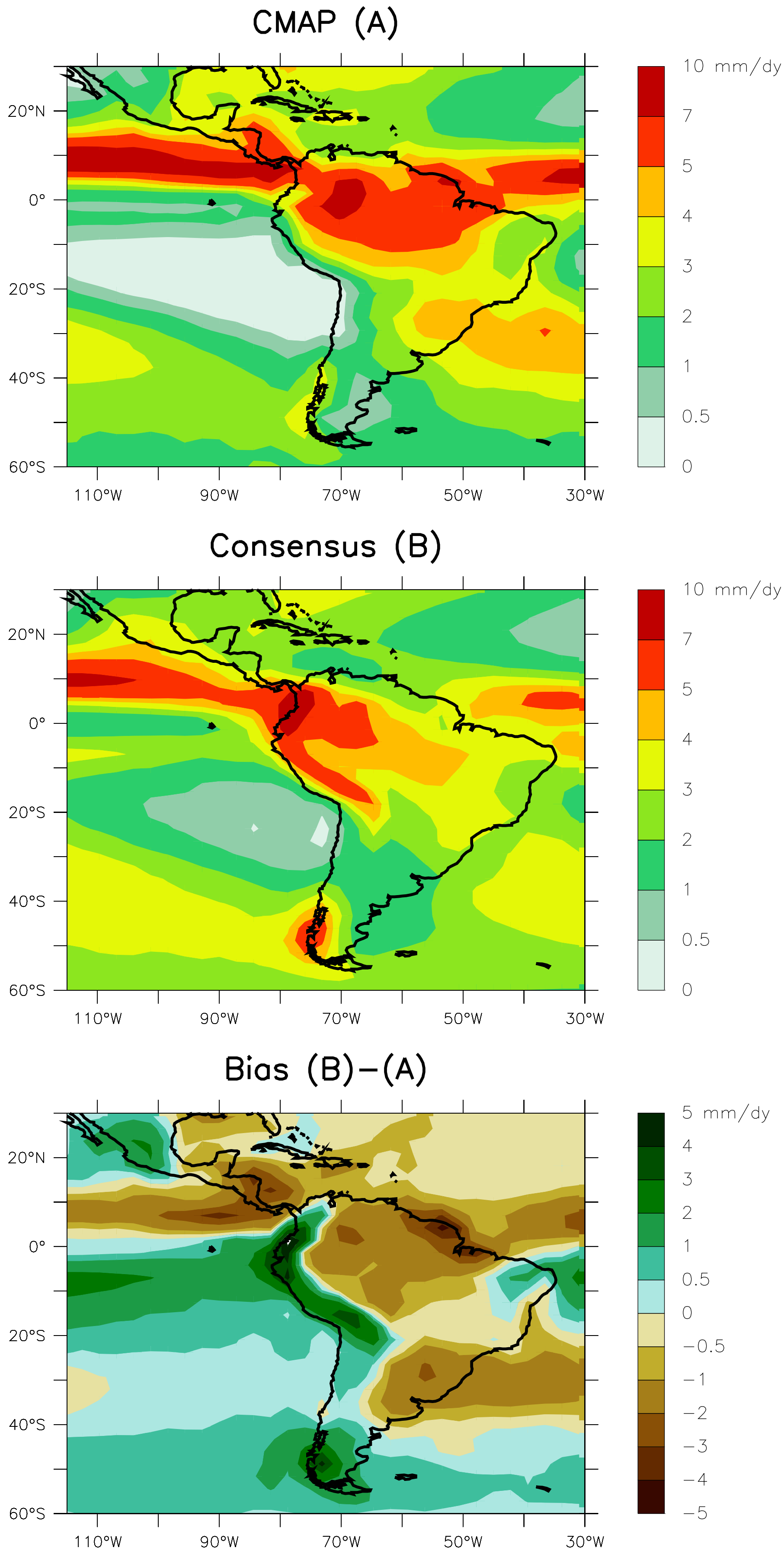


Figure S11.26. *As Figure S11.25, but for precipitation. Observations (CMAP) are an update of Xie and Arkin (1997). Units mm/day.*

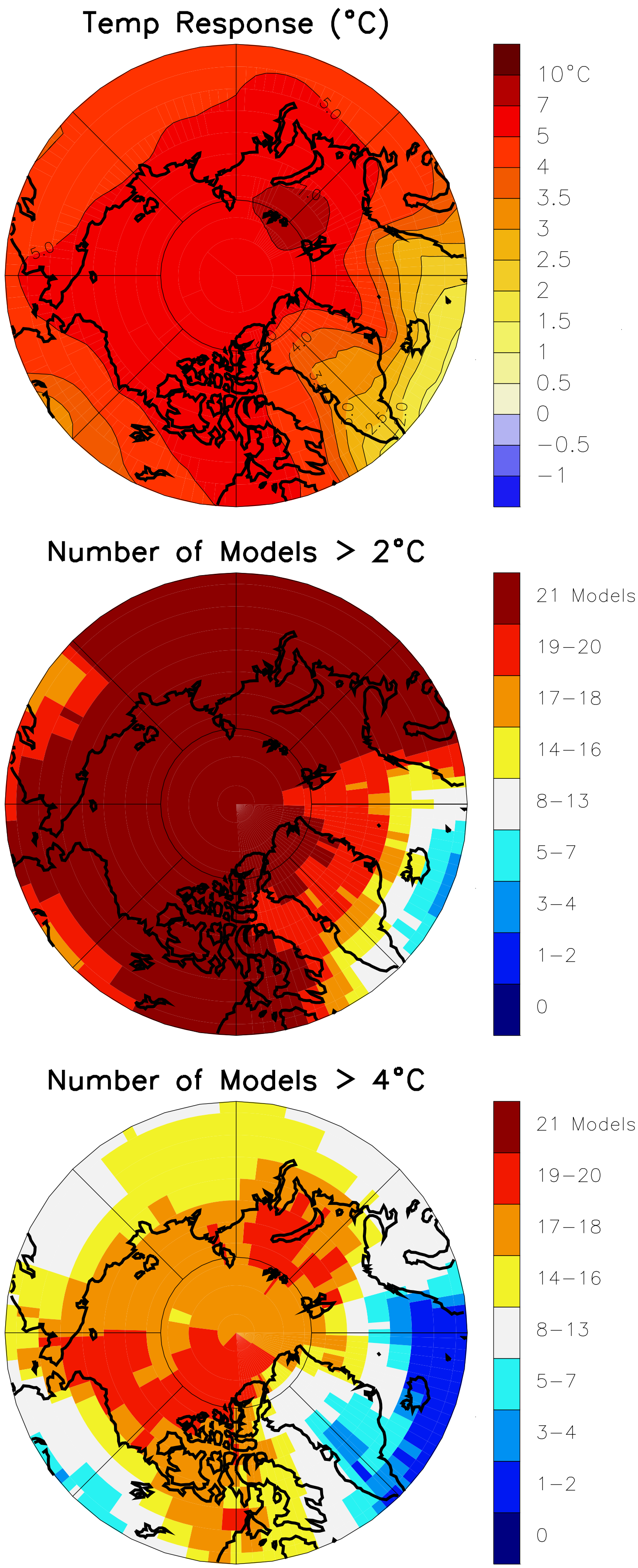


Figure S11.27. *Annual surface air temperature change in the Arctic from 1980–1999 to 2080–2099 under the A1B scenario. Top: mean response, averaged over 21 MMD models; middle and bottom: number of MMD models that generate a warming greater than 2°C and 4°C, respectively.*

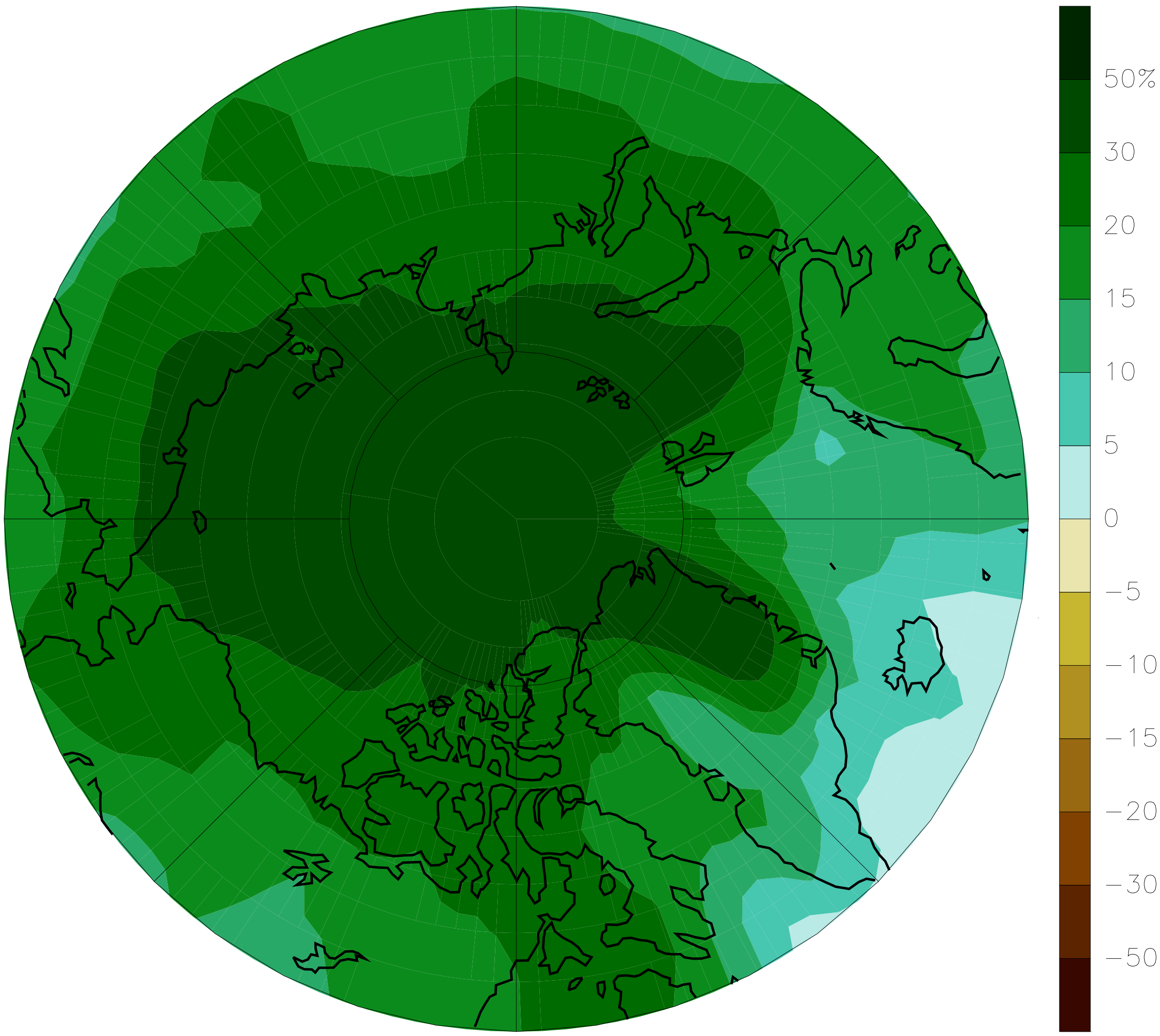


Figure S11.28. Mean annual percentage precipitation change (averaged over 21 MMD models) in the Arctic from 1980–1999 to 2080-2099 under the A1B scenario.

Antarctic Land (60S−90S), A1B Response

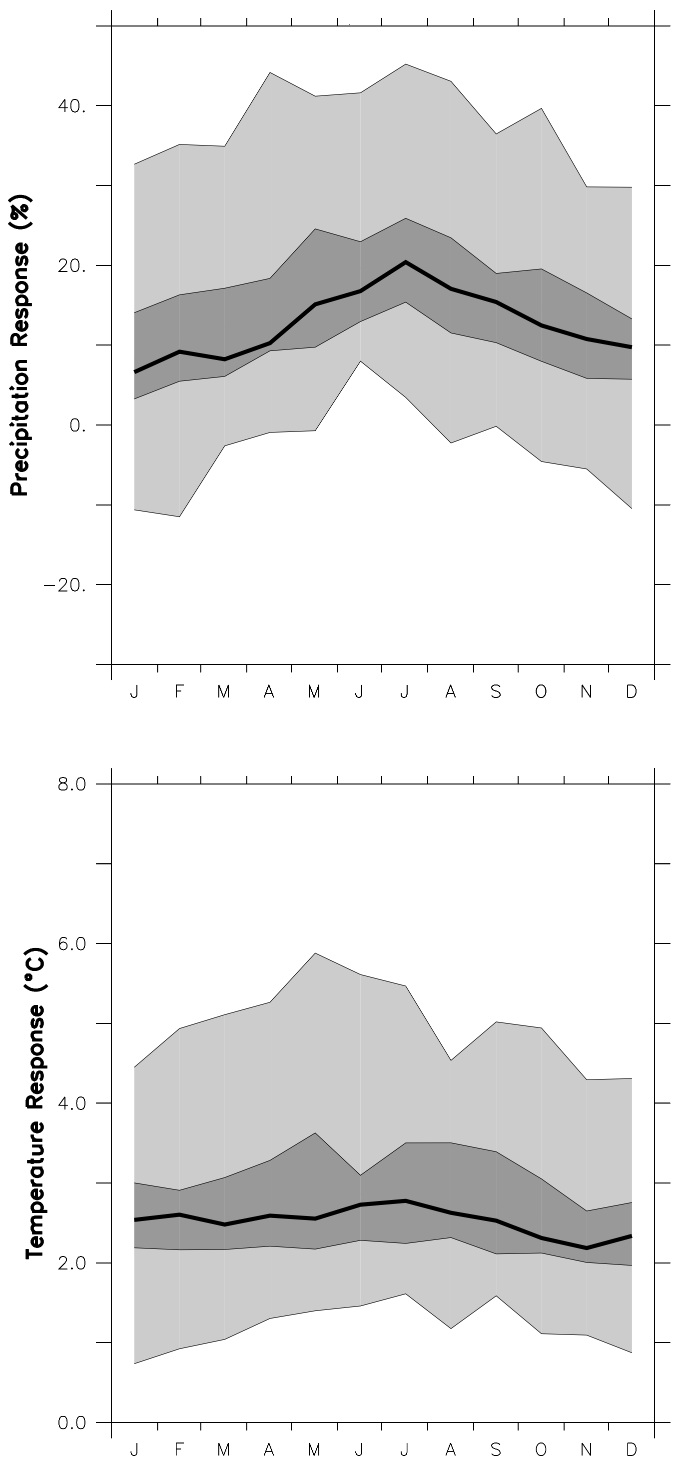


Figure S11.29. *Annual cycle of Antarctic continent area mean temperature and percentage precipitation changes (averaged over the Antarctic continent) for 2080-2099 minus 1980-1999, under the A1B scenario. Thick lines represent the ensemble median of the 21 MMD models. The dark grey area represents the 25% and 75% quartile values among the 21 models, while the light grey area shows the total range of the models.*

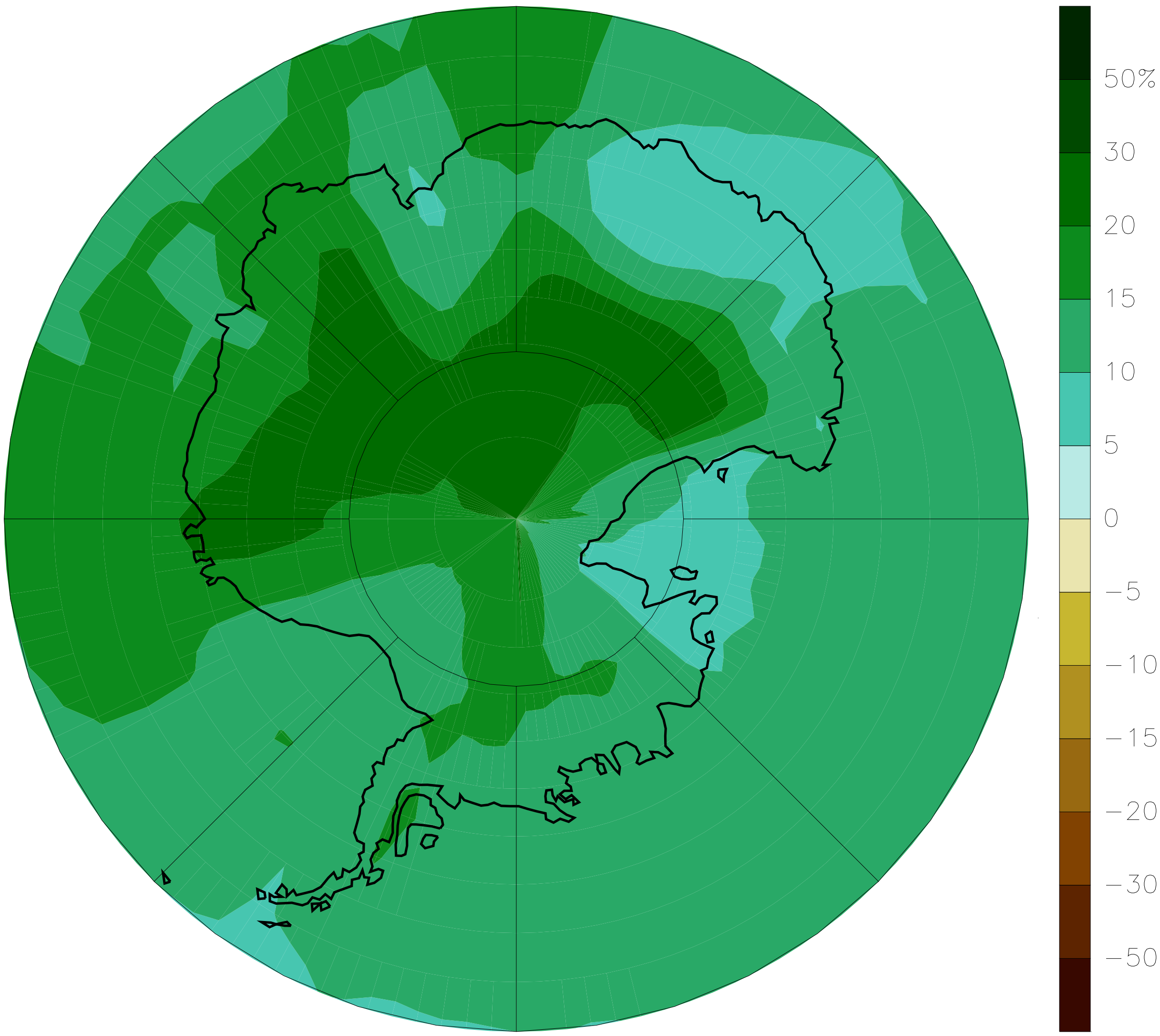


Figure S11.30. Mean annual percentage precipitation change (averaged over 21 MMD models) in the Antarctic from 1980–1999 to 2080–2099 under the A1B scenario.

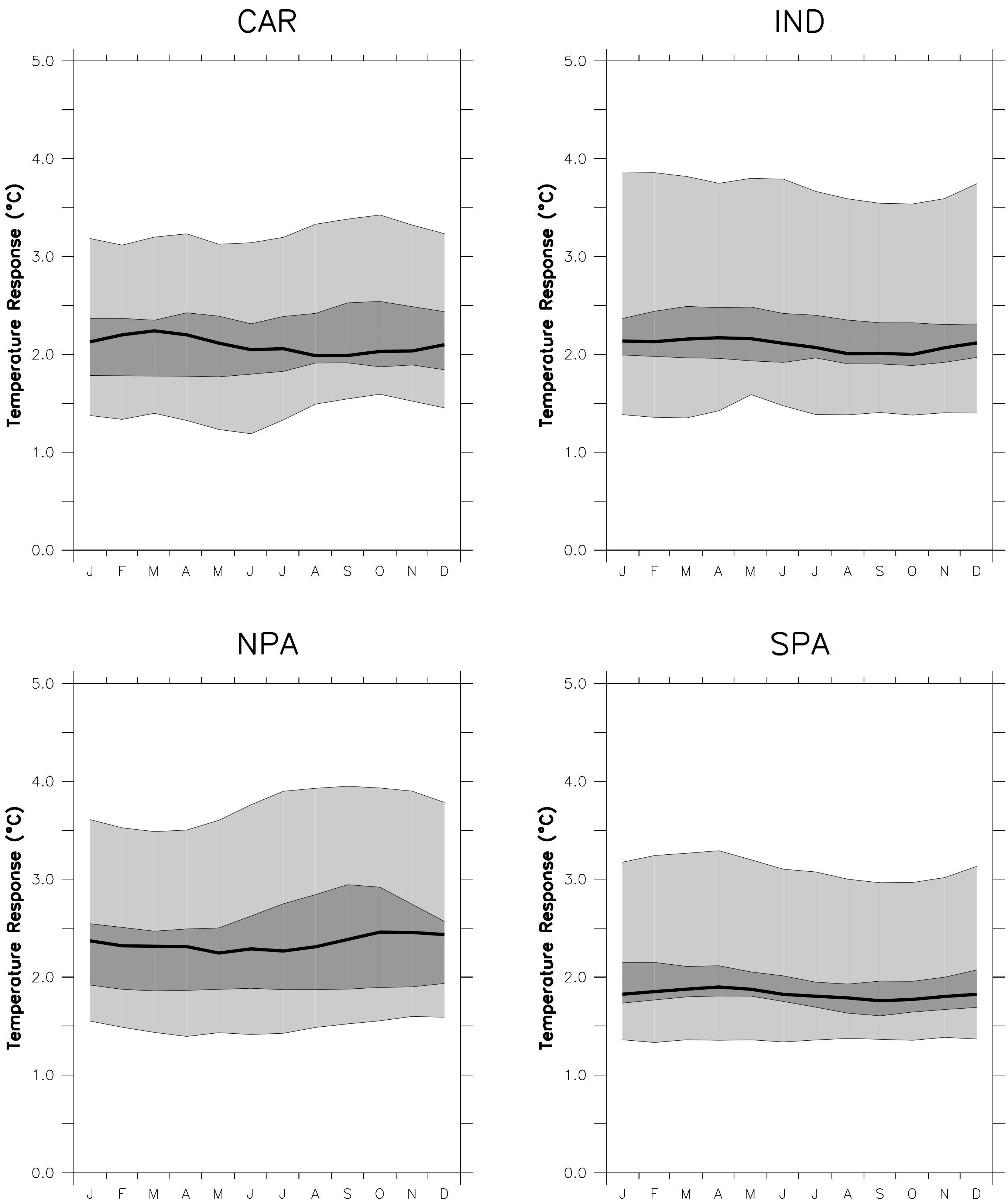


Figure S11.31. *Monthly temperature change (ºC) from 1980-1999 to 2080-2099 in the MMD models under the SRES A1B scenario. (a) Caribbean (CAR), (b) Indian Ocean (IND), (c) Northern Pacific Ocean (NPA) and (d) Southern Pacific Ocean (SPA). Thick lines represent the ensemble median of the21 MMD models. The dark grey area represents the 25% and 75% quartile values among the 21 models, while the light grey area shows the total range of the models.*

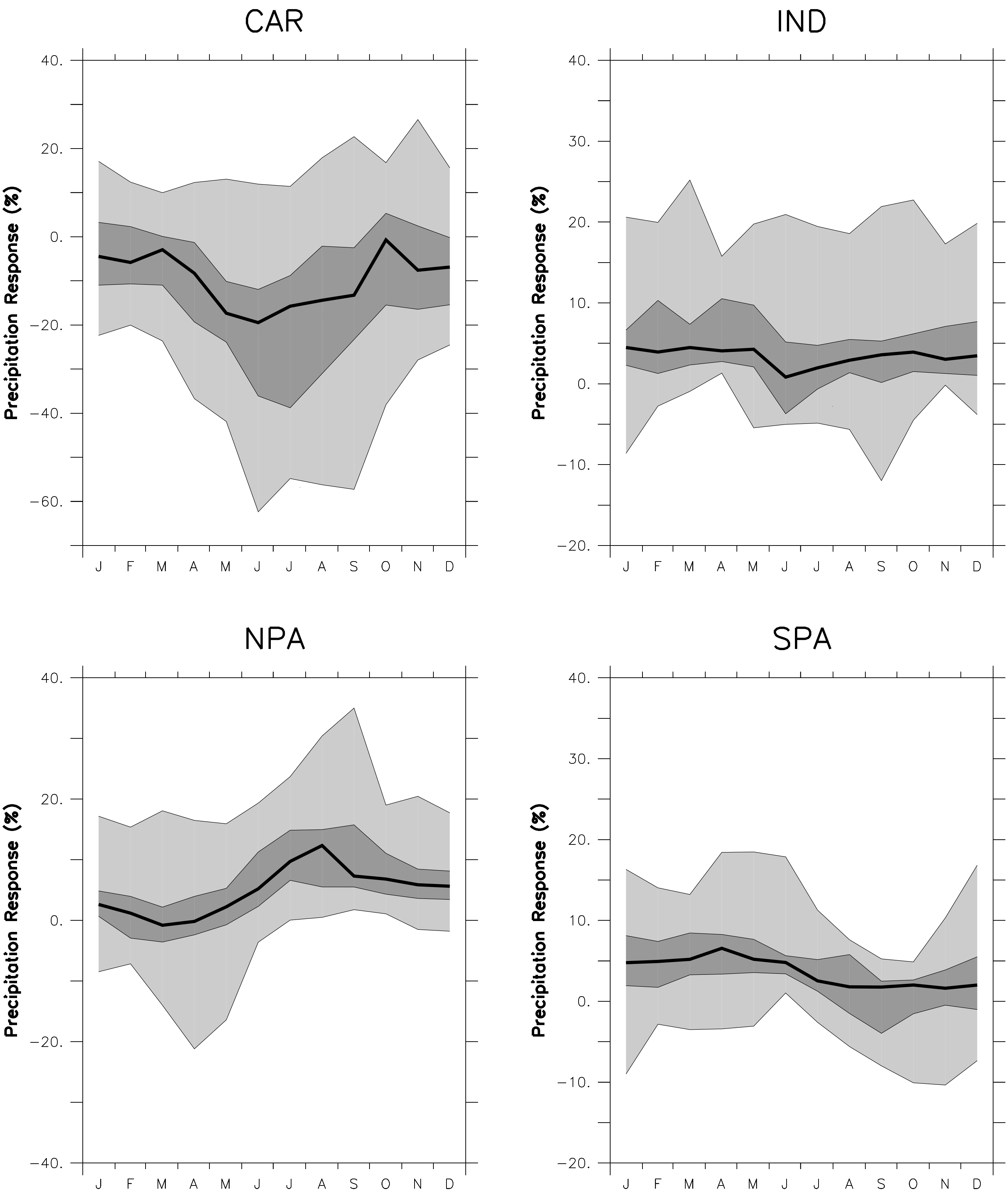


Figure S11.32. *As Figure S11.31 but for precipitation change (%).*

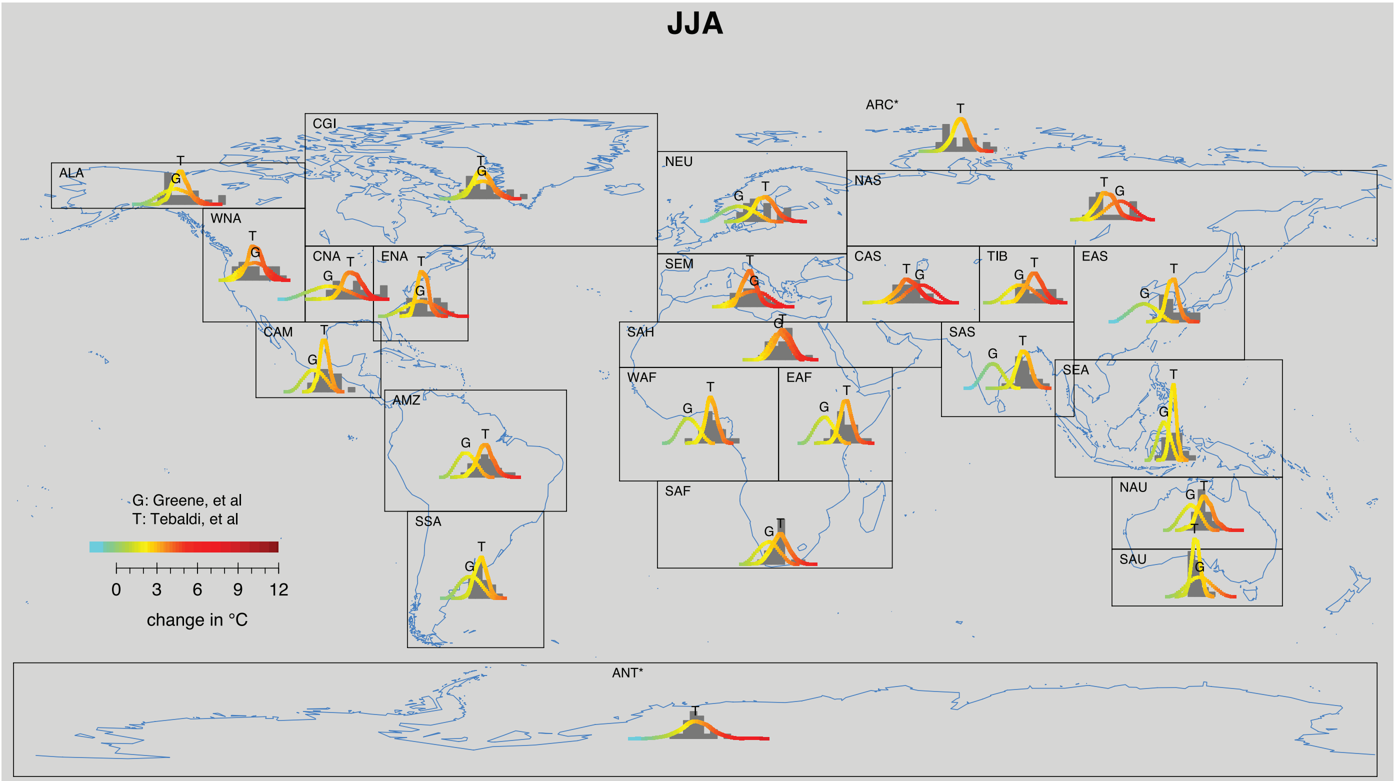


Figure S11.33. *Comparison between probability distributions of regional temperature change from 1980-1999 to 2080-2099 between the Tebaldi et al. (2004, 2005) and Greene et al. (2006) methods as well as the raw climate model projections (displayed as histograms), for the boreal summer (JJA) under the A1B scenario. Asterisks adjacent to ARC and ANT regions indicate that the Greene et al. results were not available.*

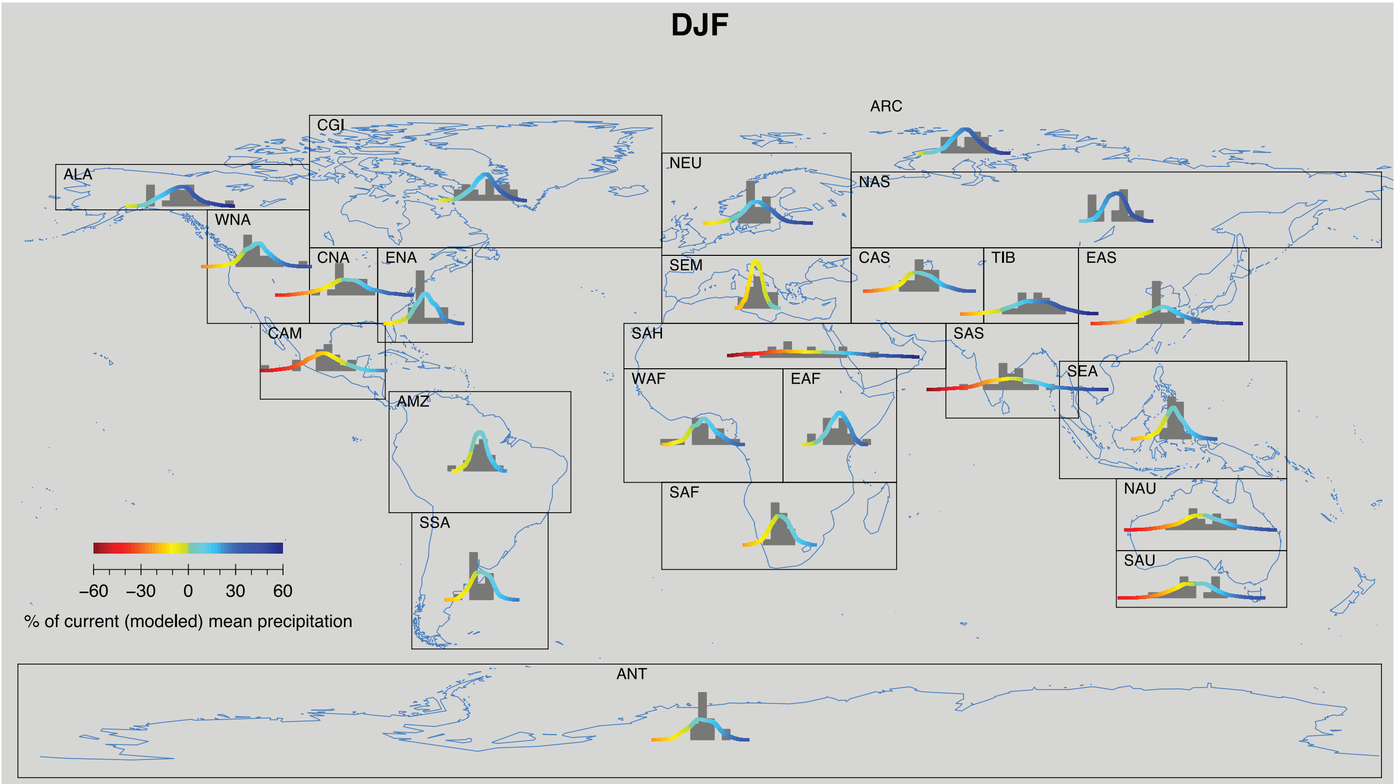


Figure S11.34. Probability distributions of precipitation change from 1980-1999 to 2080-2099 as derived with the Tebaldi et al. (2004, 2005) method, together with raw climate model results (displayed as histograms), for the boreal winter (DJF) under the A1B scenario. The changes are given in per cent of the 1980-1999 mean and the extreme tails (0.05% of each) of the distributions have been truncated to facilitate the display. Results were not available for the Greene et al. (2006) method.

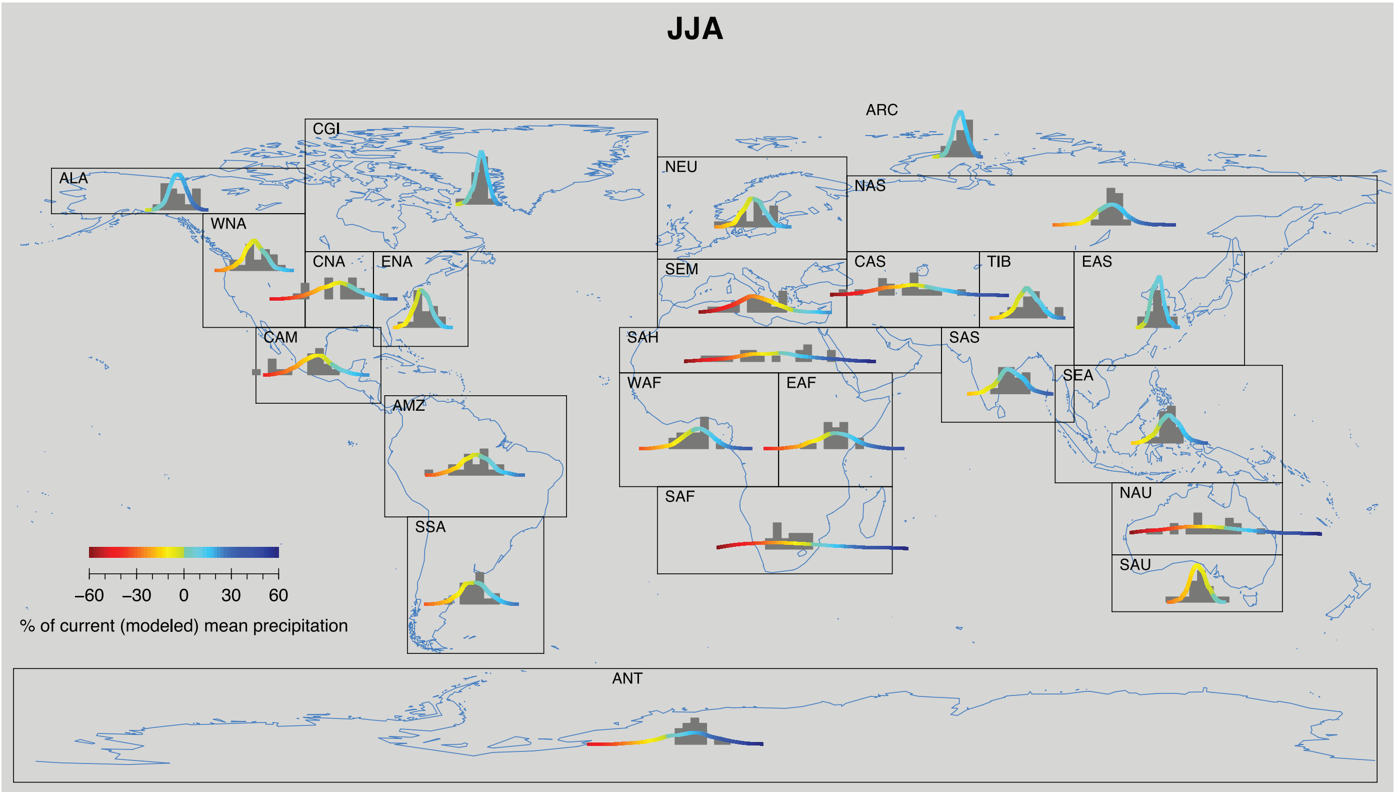


Figure S11.35. *As figure S11.34 but for the boreal summer (JJA).*

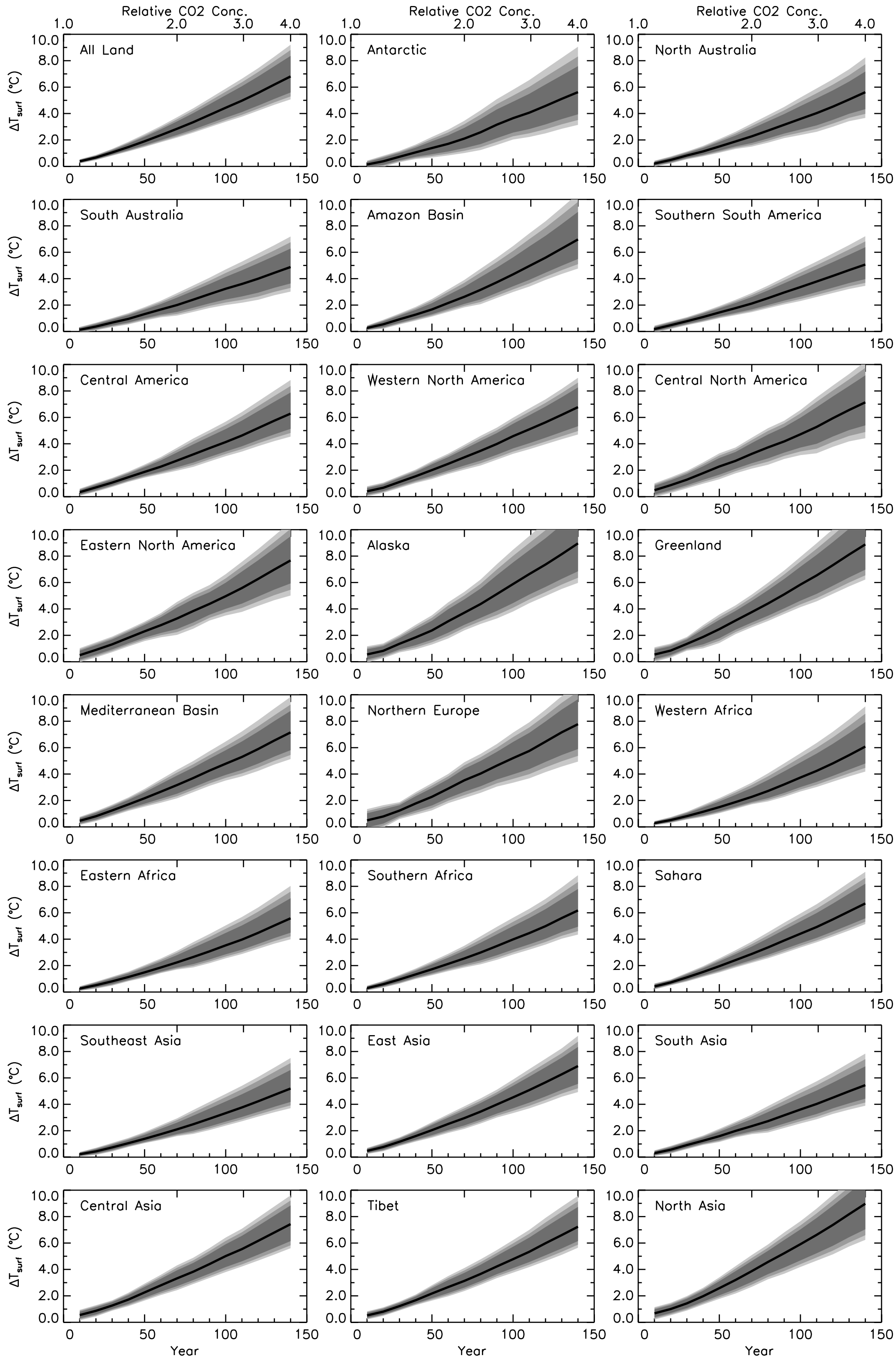


Figure S11.36. Results from the perturbed physics ensemble of Harris et al. (2006) showing evolution in the median, and 80%, 90%, and 95% confidence ranges for annual surface temperature change, for a 1% per annum increase in CO_2 concentration for 150 years, for all 24 regions described by Giorgi and Francisco (2000).

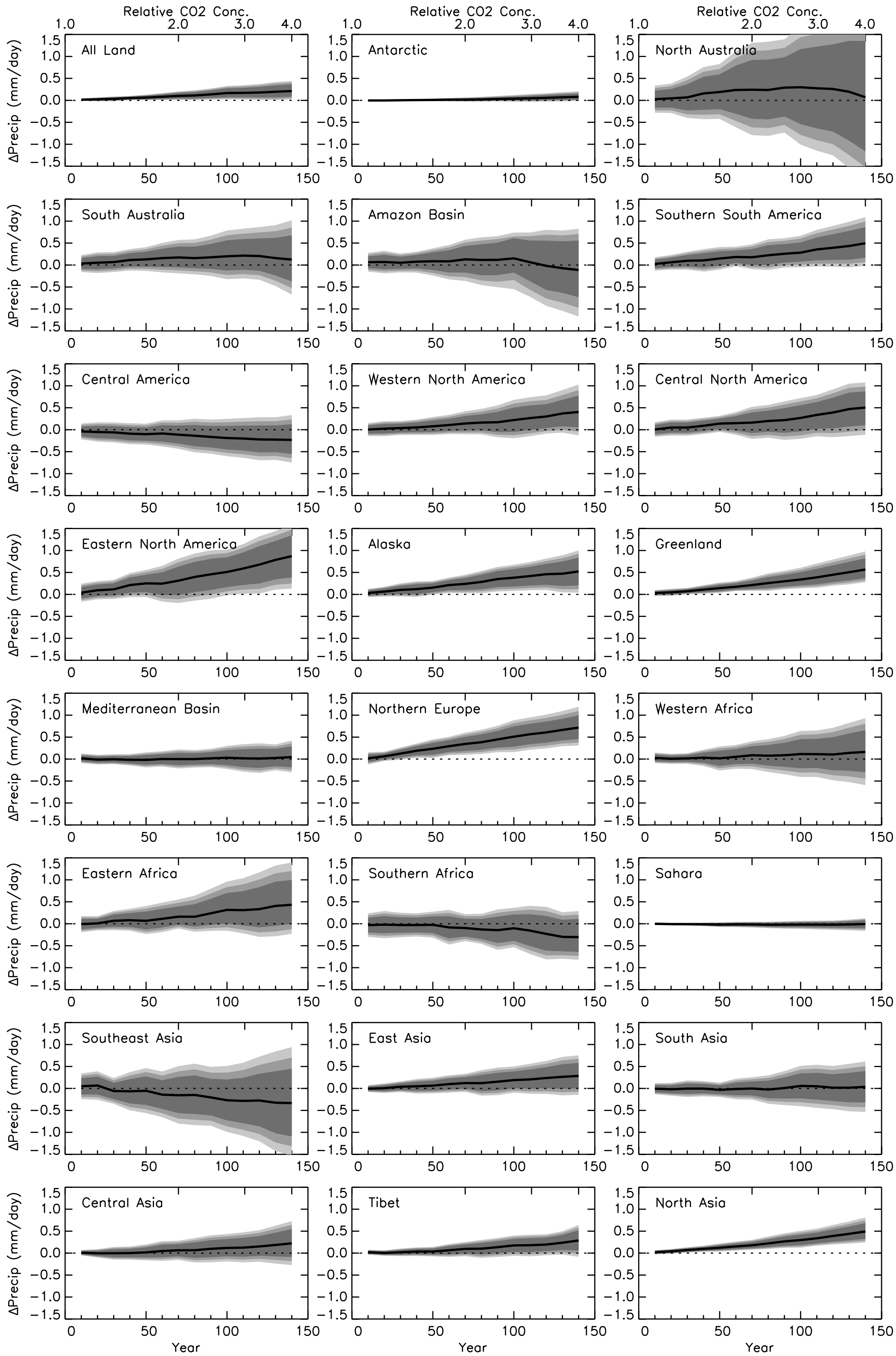


Figure S11.37. *Results from the perturbed physics ensemble of Harris et al. (2006) showing evolution in the median, and 80%, 90%, and 95% confidence ranges for December-January-February precipitation change, for a 1% per annum increase in* CO_2 *concentration for 150 years, for all 24 regions defined by Giorgi and Francisco (2000).*

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