Supplementary Information for

Significantly wetter or drier future conditions for one to two thirds of the world's population

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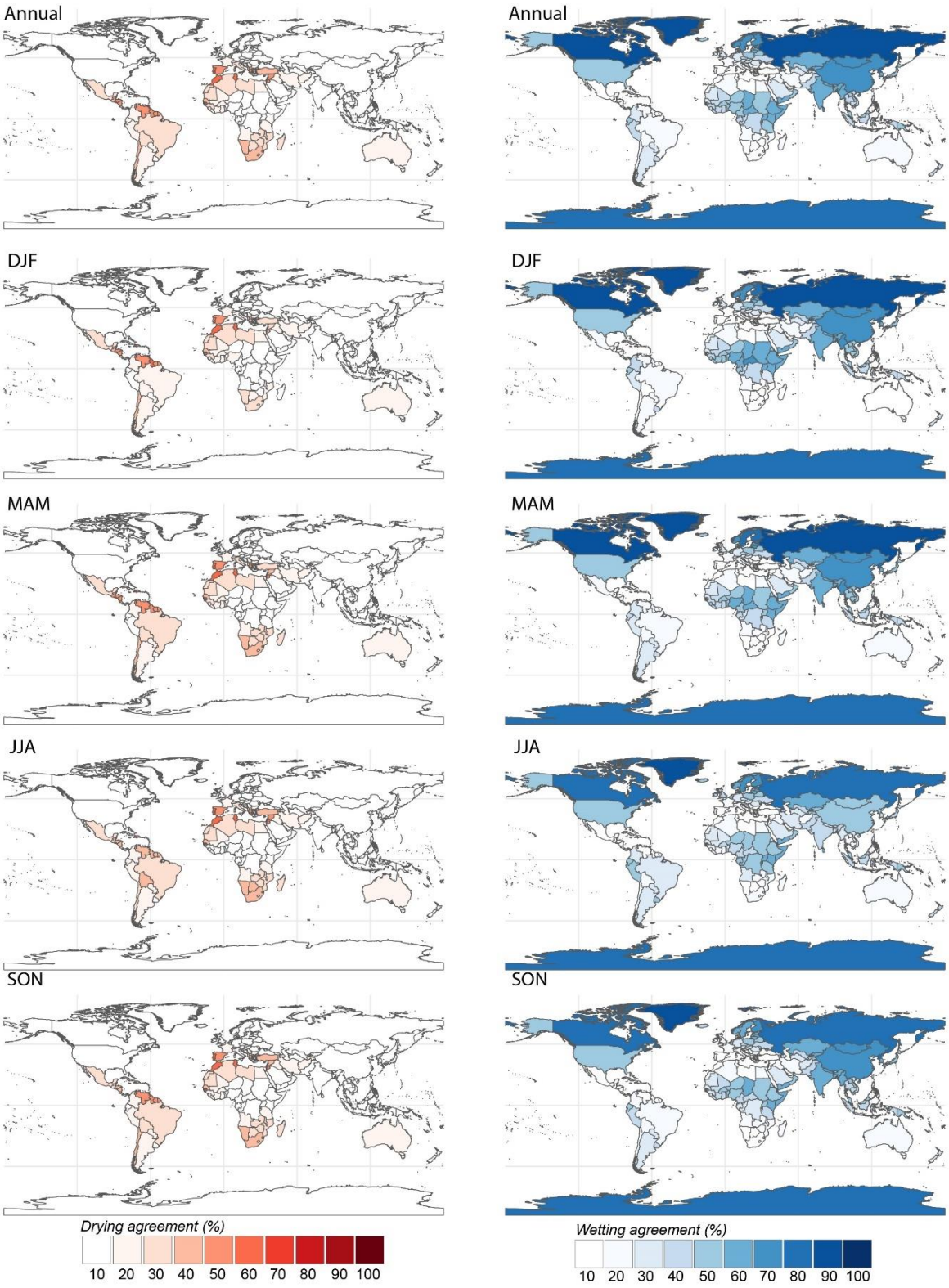

Figure S1. Multi-model drying and wetting agreement for 67 GCMs (25 CMIP5 and 42 CMIP6 models) under intermediate emissions (RCP4.5 /SSP2-4.5) for annual and calendar seasons across countries (see Supplementary Data 1 for additional country details and Supplementary Data 2 for state-level analysis).

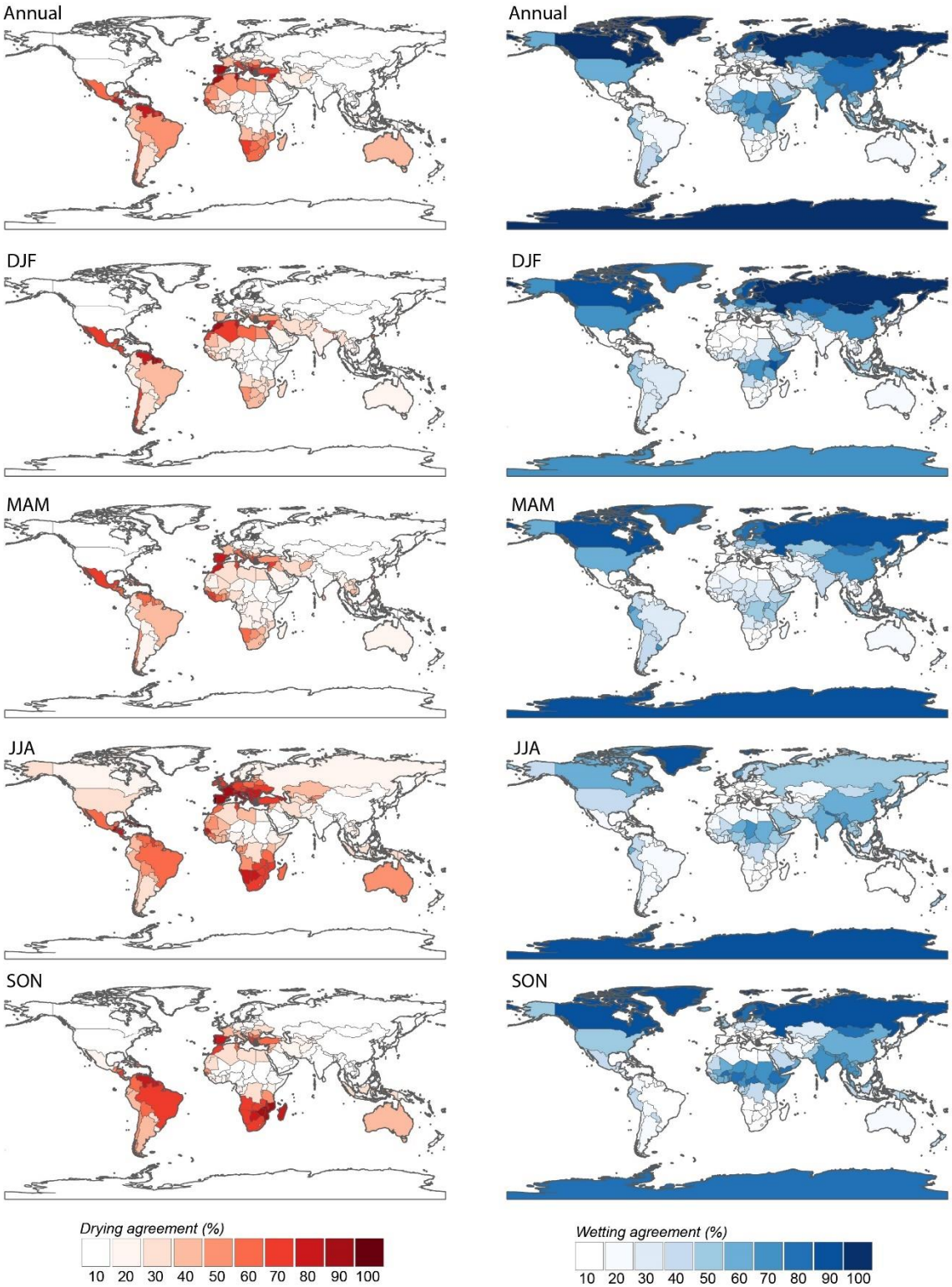

Figure S2. Multi-model drying and wetting agreement for 79 GCMs (35 CMIP5 and 44 CMIP6 models) under very high emissions (RCP8.5 /SSP5-8.5) for annual and calendar seasons across countries (see Supplementary Data 1 for additional country details and Supplementary Data 2 for state-level analysis).

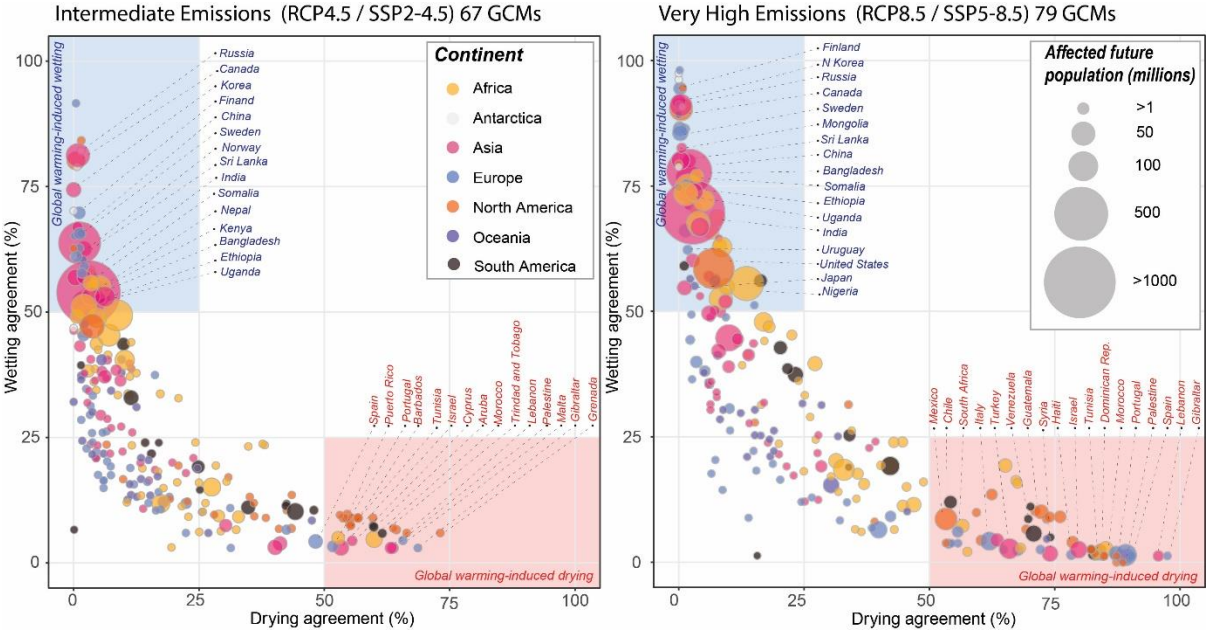

Figure S3. Future population affected by global warming-induced wetting and drying based on the agreement of long-term annual precipitation trends of 146 CMIP5 and CMIP6 GCMs forced under intermediate and very high emissions. Country-level regionalization of drying and wetting agreement and future affected population. Colours denote continents and bubble size shows population. Red and blue rectangles indicate the regions where the majority of GCMs agree. Countries with higher agreement, population and representative of different regions are labelled.

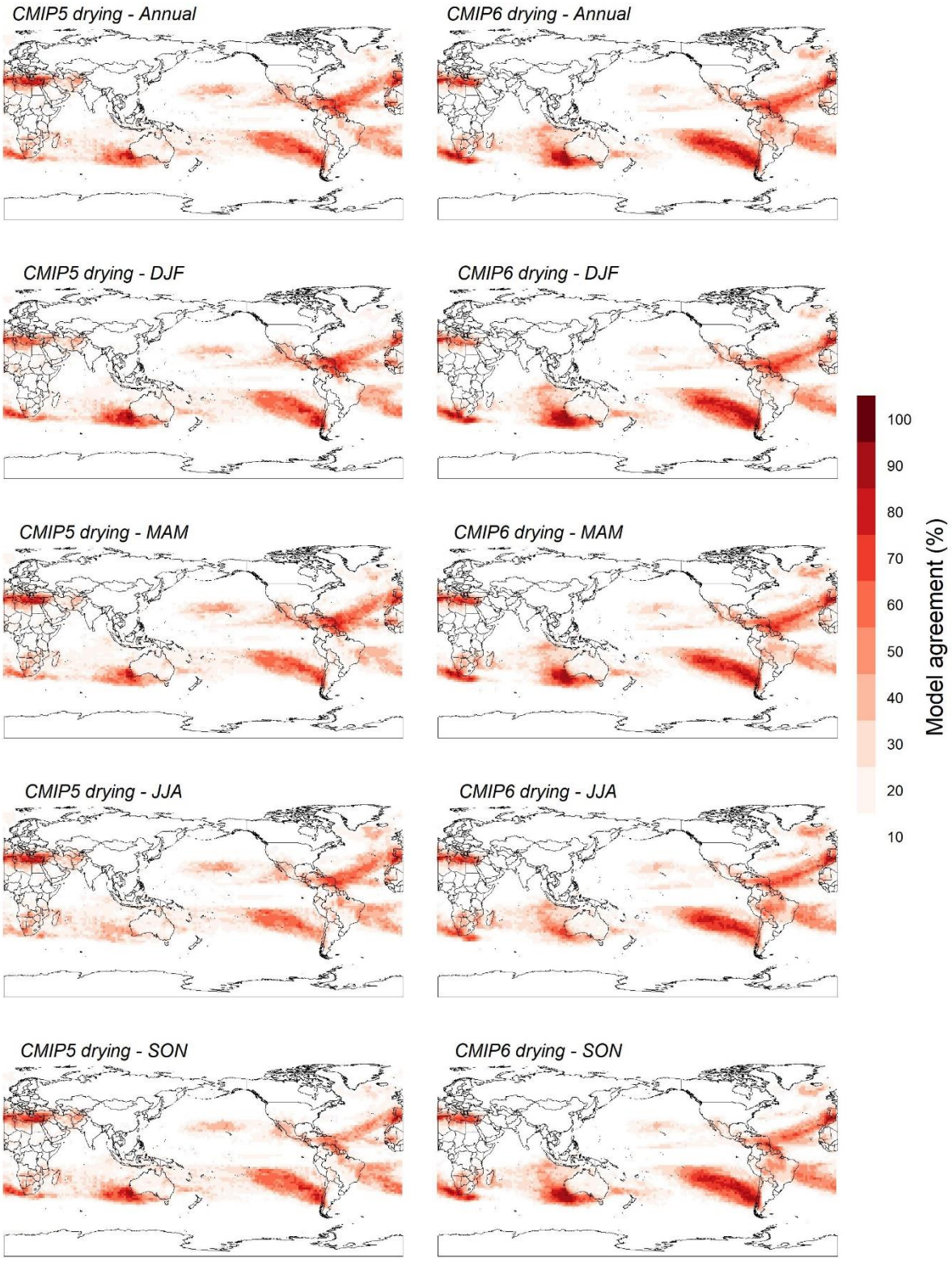

Figure S4. Multi-model drying agreement for 25 CMIP5 and 42 CMIP6 models for annual and calendar seasons obtained by long-term non-parametric trends under intermediate emissions (RCP4.5 / SSP2-4.5).

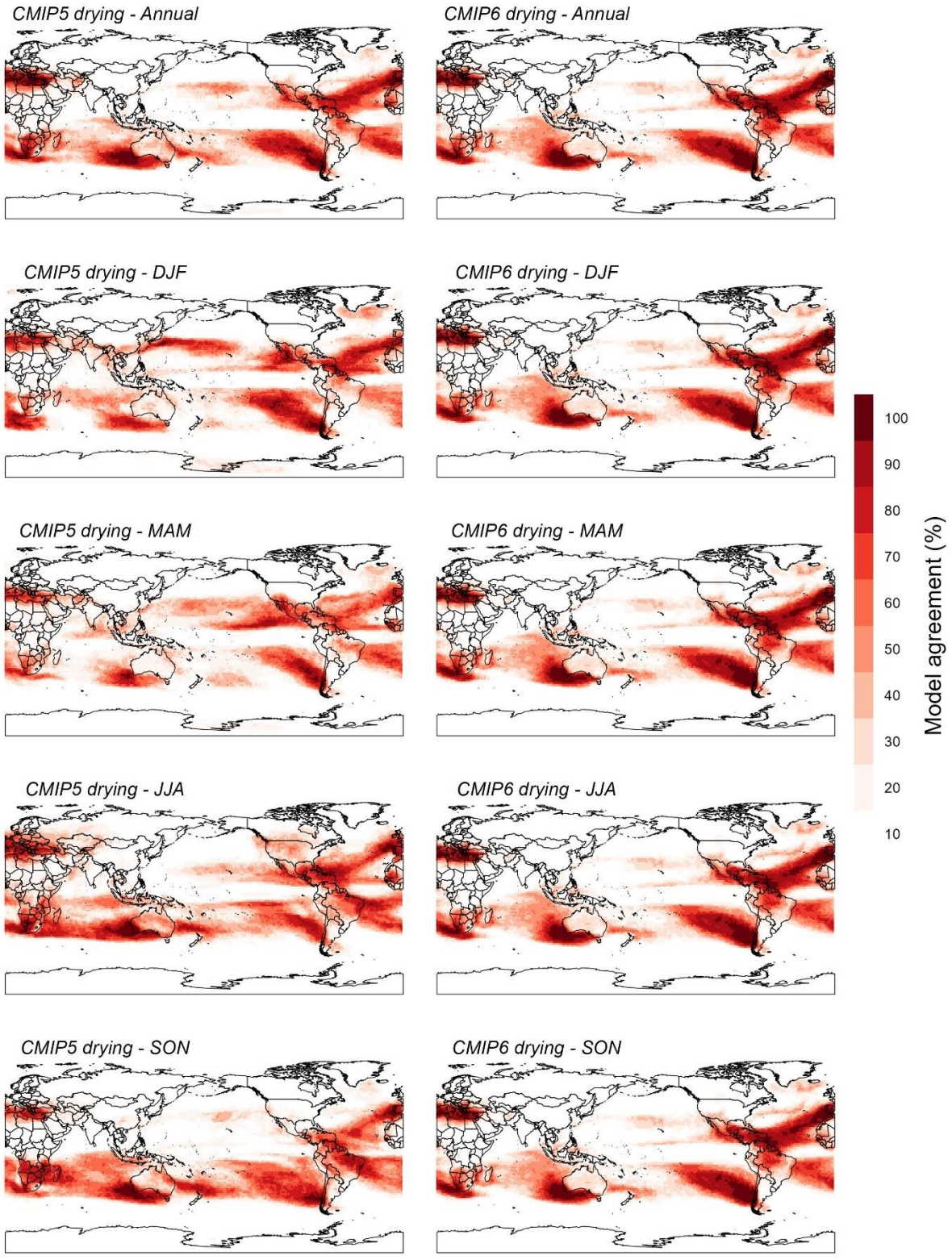

Figure S5. Multi-model drying agreement for 35 CMIP5 and 44 CMIP6 models for annual and calendar seasons obtained by long-term non-parametric trends under very high emissions (RCP8.5 / SSP5-8.5).

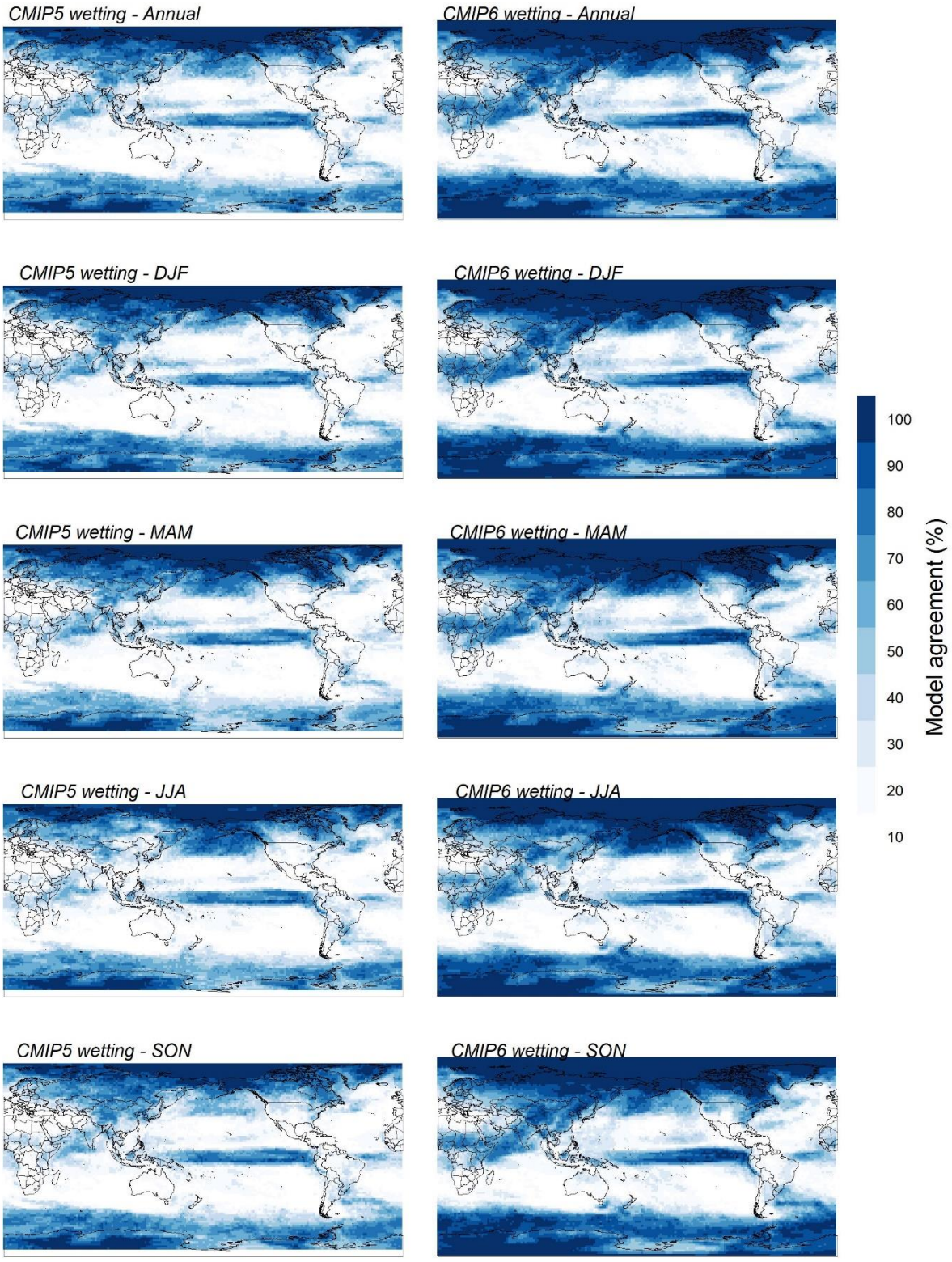

Figure S6. Multi-model wetting agreement for 25 CMIP5 and 42 CMIP6 models for annual and calendar seasons obtained by long-term non-parametric trends under very high emissions (RCP4.5 / SSP2-4.5).

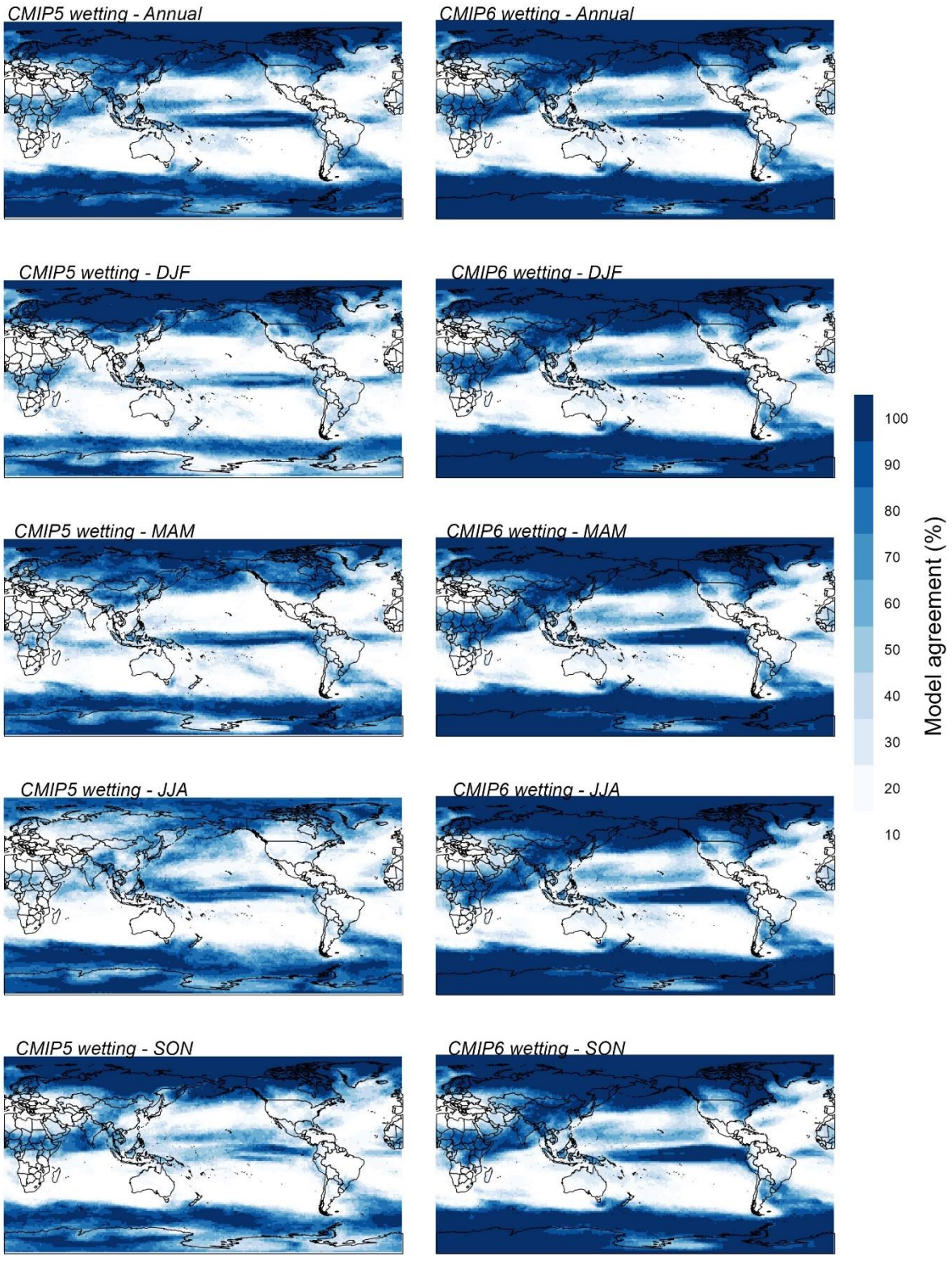

Figure S7. Multi-model wetting agreement for 35 CMIP5 and 44 CMIP6 models for annual and calendar seasons obtained by long-term non-parametric trends under very high emissions (RCP8.5 / SSP5-8.5).

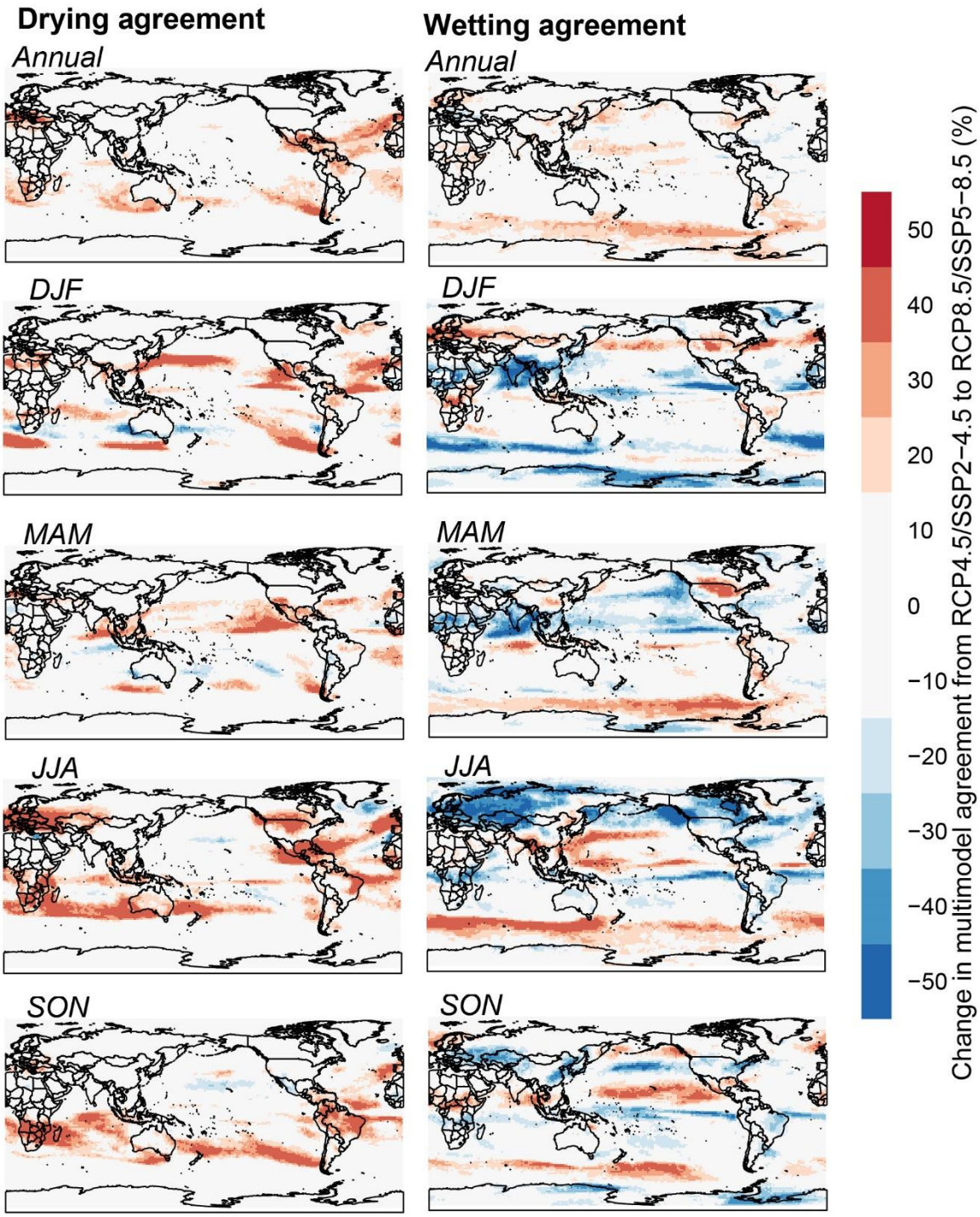

Figure S8. Difference in multi-model drying and wetting agreement between intermediate and very high-emissions scenarios (that is [RCP8.5 and SSP5-8.5 agreement] – [RCP4.5 and SSP2-4.5 agreement]) for CMIP5 and 6 models for annual and seasonal multi-model agreement.

Table S1 Ensemble of 67 GCMs (25 CMIP5 and 42 CMIP6 models) forced under intermediate emissions scenarios (RCP4.5 /SSP2-4.5) used in this study.

ID	MODEL NAME	GENERATION	INSTITUTION AND COUNTRY
1	ACCESS-CM2	CMIP6	CSIRO-ARCCSS, Australia
2	ACCESS-ESM1-5	CMIP6	CSIRO-BOM, Australia
3	AWI-CM-1-1-MR	CMIP6	AWI, Germany
4	BCC-CSM2-MR	CMIP6	BCC, CMA, China
5	CAMS-CSM1-0	CMIP6	CAS, China
6	CanESM5-CanOE	CMIP6	CCCMA, Canada
7	CanESM5	CMIP6	CCCMA, Canada
8	CAS-ESM2-0	CMIP6	CAS, China
9	CESM2-WACCM	CMIP6	NSF-DOE-NCAR, USA
10	CESM2	CMIP6	NSF-DOE-NCAR, USA
11	CIESM	CMIP6	CIESM, China
12	CMCC-CM2-SR5	CMIP6	CMCC, Italy
13	CNRM-CM6-1-HR	CMIP6	CMCC, Italy
14	CNRM-ESM2-1	CMIP6	CNRM-CERFACS, France
15	EC-Earth3-CC	CMIP6	EC-Earth-Consortium, Europe
16	EC-Earth3-Veg-LR	CMIP6	EC-Earth-Consortium, Europe
17	EC-Earth3-Veg	CMIP6	EC-Earth-Consortium, Europe
18	EC-Earth3	CMIP6	EC-Earth-Consortium, Europe
19	FGOALS-f3-L	CMIP6	CAS, China
20	FGOALS-g3	CMIP6	CAS, China
21	FIO-ESM-2-0	CMIP6	FIO, SOA, China
22	GFDL-CM4	CMIP6	NOAA, GFDL, USA
23	GFDL-ESM4	CMIP6	NOAA, GFDL, USA
24	GISS-E2-1-G	CMIP6	NASA/GISS, NY, USA
25	HadGEM3-GC31-LL	CMIP6	MOHC, UK
26	IITM-ESM	CMIP6	CCCR, IITM, India
27	INM-CM4-8	CMIP6	INM, Russia
28	INM-CM5-0	CMIP6	INM, Russia
29	IPSL-CM6A-LR	CMIP6	IPSL, France
30	KACE-1-0-G	CMIP6	NIMR-KMA, Korea
31	MCM-UA-1-0	CMIP6	UA, AZ, USA
32	MIROC-ES2L	CMIP6	JAMSTEC, Japan
33	MIROC6	CMIP6	JAMSTEC, Japan
34	MPI-ESM1-2-HR	CMIP6	MPI-N, Germany
35	MPI-ESM1-2-LR	CMIP6	MPI-N, Germany
36	MRI-ESM2-0	CMIP6	MRI, Japan
37	NESM3	CMIP6	NU-IST, China
38	NorESM2-LM	CMIP6	NCC, Norway
39	NorESM2-MM	CMIP6	NCC, Norway
40	TaiESM1	CMIP6	RCEC, Taiwan
41	UKESM1-0-LL	CMIP6	MOHC-NERC, UK
42	ACCESS-CM2	CMIP5	CSIRO-BOM, Australia

43	bcc-csm1-1-m	CMIP5	BCC, CMA, China
44	bcc-csm1-1	CMIP5	BCC, CMA, China
45	BNU-ESM	CMIP5	BNU, China
46	CanESM2	CMIP5	CCCMA, Canada
47	CESM1-BGC	CMIP5	NSF-DOE-NCAR, USA
48	CESM1-CAM5	CMIP5	NSF-DOE-NCAR, USA
49	CMCC-CM	CMIP5	CMCC, Italy
50	CMCC-CMS	CMIP5	CMCC, Italy
51	EC-EARTH	CMIP5	EC-EARTH, Europe
52	FGOALS-g2	CMIP5	CAS, China
53	FGOALS-s2	CMIP5	CAS, China
54	FIO-ESM	CMIP5	FIO, SOA, China
55	GISS-E2-H-CC	CMIP5	NASA/GISS, NY, USA
56	GISS-E2-R-CC	CMIP5	NASA/GISS, NY, USA
57	GISS-E2-R	CMIP5	NASA/GISS, NY, USA
58	HadGEM2-AO	CMIP5	MOHC, UK
59	HadGEM2-ES	CMIP5	MOHC, UK
60	inmcm4	CMIP5	MINM, Russia
61	IPSL-CM5A-LR	CMIP5	IPSL, France
62	IPSL-CM5A-MR	CMIP5	IPSL, France
63	MIROC-ESM-CHEM	CMIP5	JAMSTEC, Japan
64	MIROC-ESM	CMIP5	JAMSTEC, Japan
65	MPI-ESM-MR	CMIP5	MPI-N, Germany
66	MRI-CGCM3	CMIP5	MRI, Japan
67	NorESM1-ME	CMIP5	NCC, Norway

Table S2 Ensemble of 79 GCMs (35 CMIP5 and 44 CMIP6 models) forced under very high emissions scenarios (RCP8.5 /SSP5-8.5) used in this study.

ID	MODEL NAME	GENERATION	INSTITUTION AND COUNTRY
1	ACCESS1-0	CMIP5	CSIRO-BOM, Australia
2	ACCESS1-3	CMIP5	CSIRO-BOM, Australia
3	bcc-csm1-1-m	CMIP5	BCC, CMA, China
4	bcc-csm1-1	CMIP5	BCC, CMA, China
5	BNU-ESM	CMIP5	BNU, China
6	CanESM2	CMIP5	CCCMA, Canada
7	CCSM4	CMIP5	NCAR, USA
8	CESM1-BGC	CMIP5	NSF-DOE-NCAR, USA
9	CESM1-CAM5	CMIP5	NSF-DOE-NCAR, USA
10	CMCC-CESM	CMIP5	CMCC, Italy
11	CMCC-CM	CMIP5	CMCC, Italy
12	CMCC-CMS	CMIP5	CMCC, Italy
13	CNRM-CM5	CMIP5	CNRM-CERFACS, France
14	GFDL-CM3	CMIP5	NOAA, GFDL, USA
15	GFDL-ESM2G	CMIP5	NOAA, GFDL, USA
16	GFDL-ESM2M	CMIP5	NOAA, GFDL, USA
17	GISS-E2-H-CC	CMIP5	NASA/GISS, NY, USA
18	GISS-E2-H	CMIP5	NASA/GISS, NY, USA
19	GISS-E2-R-CC	CMIP5	NASA/GISS, NY, USA
20	GISS-E2-R	CMIP5	NASA/GISS, NY, USA
21	HadGEM2-AO	CMIP5	NIMR-KMA, Korea
22	HadGEM2-CC	CMIP5	MOHC, UK
23	INMCM4	CMIP5	INM, Russia
24	IPSL-CM5A-LR	CMIP5	IPSL, France
25	IPSL-CM5A-MR	CMIP5	IPSL, France
26	IPSL-CM5B-LR	CMIP5	IPSL, France
27	MIROC-ESM-CHEM	CMIP5	JAMSTEC, Japan
28	MIROC-ESM	CMIP5	JAMSTEC, Japan
29	MIROC5	CMIP5	JAMSTEC, Japan
30	MPI-ESM-LR	CMIP5	MPI-N, Germany
31	MPI-ESM-MR	CMIP5	MPI-N, Germany
32	MRI-CGCM3	CMIP5	MPI-N, Germany
33	MRI-ESM1	CMIP5	MRI, Japan
34	NorESM1-M	CMIP5	NCC, Norway
35	NorESM1-ME	CMIP5	NCC, Norway
36	ACCESS-CM2	CMIP6	CSIRO-ARCCSS, Australia
37	ACCESS-ESM1-5	CMIP6	CSIRO-BOM, Australia
38	AWI-CM-1-1-MR	CMIP6	AWI, Germany
39	BCC-CSM2-MR	CMIP6	BCC, CMA, China
40	CAMS-CSM1-0	CMIP6	CAS, China
41	CanESM5-CanOE	CMIP6	CCCMA, Canada
42	CanESM5	CMIP6	CCCMA, Canada

43	CAS-ESM2-0	CMIP6	CAS, China
44	CESM2-WACCM	CMIP6	NSF-DOE-NCAR, USA
45	CESM2	CMIP6	NSF-DOE-NCAR, USA
46	CIESM	CMIP6	CIESM, China
47	CMCC-CM2-SR5	CMIP6	CMCC, Italy
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49	CNRM-CM6-1-HR	CMIP6	CNRM-CERFACS, France
50	CNRM-CM6-1	CMIP6	CNRM-CERFACS, France
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53	EC-Earth3-Veg-LR	CMIP6	EC-Earth-Consortium, Europe
54	EC-Earth3-Veg	CMIP6	EC-Earth-Consortium, Europe
55	EC-Earth3	CMIP6	EC-Earth-Consortium, Europe
56	FGOALS-f3-L	CMIP6	CAS, China
57	FGOALS-g3	CMIP6	CAS, China
58	FIO-ESM-2-0	CMIP6	FIO, SOA, China
59	GFDL-CM4	CMIP6	NOAA, GFDL, USA
60	GFDL-ESM4	CMIP6	NOAA, GFDL, USA
61	GISS-E2-1-G	CMIP6	NASA/GISS, NY, USA
62	GISS-E2-1-G	CMIP6	NASA/GISS, NY, USA
63	GISS-E2-1-G	CMIP6	NASA/GISS, NY, USA
64	HadGEM3-GC31-LL	CMIP6	MOHC, UK
65	HadGEM3-GC31-MM	CMIP6	MOHC, UK
66	INM-CM4-8	CMIP6	INM, Russia
67	INM-CM5-0	CMIP6	INM, Russia
68	IPSL-CM6A-LR	CMIP6	IPSL, France
69	KACE-1-0-G	CMIP6	NIMR-KMA, Korea
70	MIROC-ES2L	CMIP6	JAMSTEC, Japan
71	MIROC6	CMIP6	JAMSTEC, Japan
72	MPI-ESM1-2-HR	CMIP6	MPI-N, Germany
73	MPI-ESM1-2-LR	CMIP6	MPI-N, Germany
74	MRI-ESM2-0	CMIP6	MRI, Japan
75	NESM3	CMIP6	NU-IST, China
76	NorESM2-LM	CMIP6	NCC, Norway
77	NorESM2-MM	CMIP6	NCC, Norway
78	TaiESM1	CMIP6	RCEC, Taiwan
79	UKESM1-0-LL	CMIP6	MOHC-NERC, UK