

*Earth's future*

Supporting Information for

**Larger Drought and Flood Hazards and Adverse Impacts on Population and Economic Productivity under 2.0 than 1.5°C Warming**

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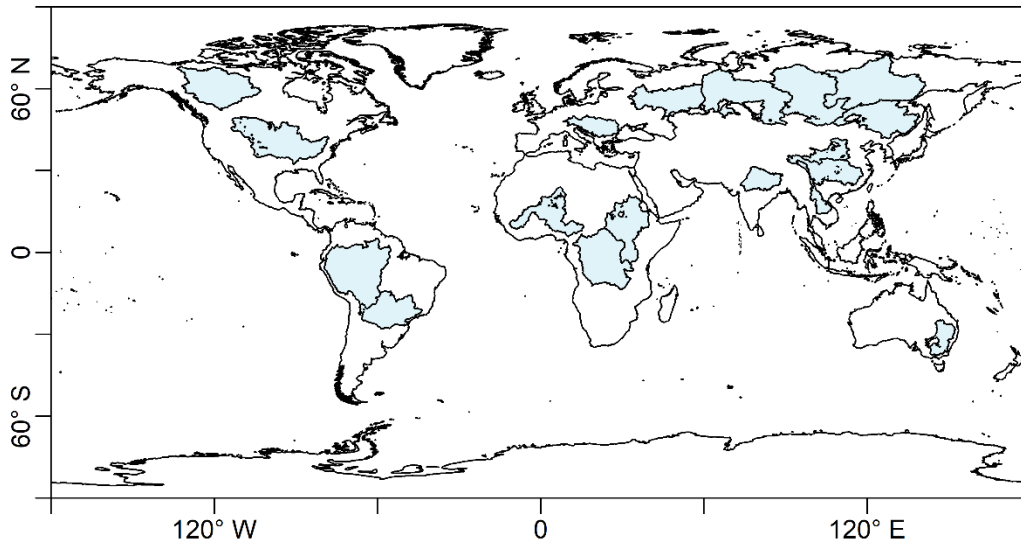
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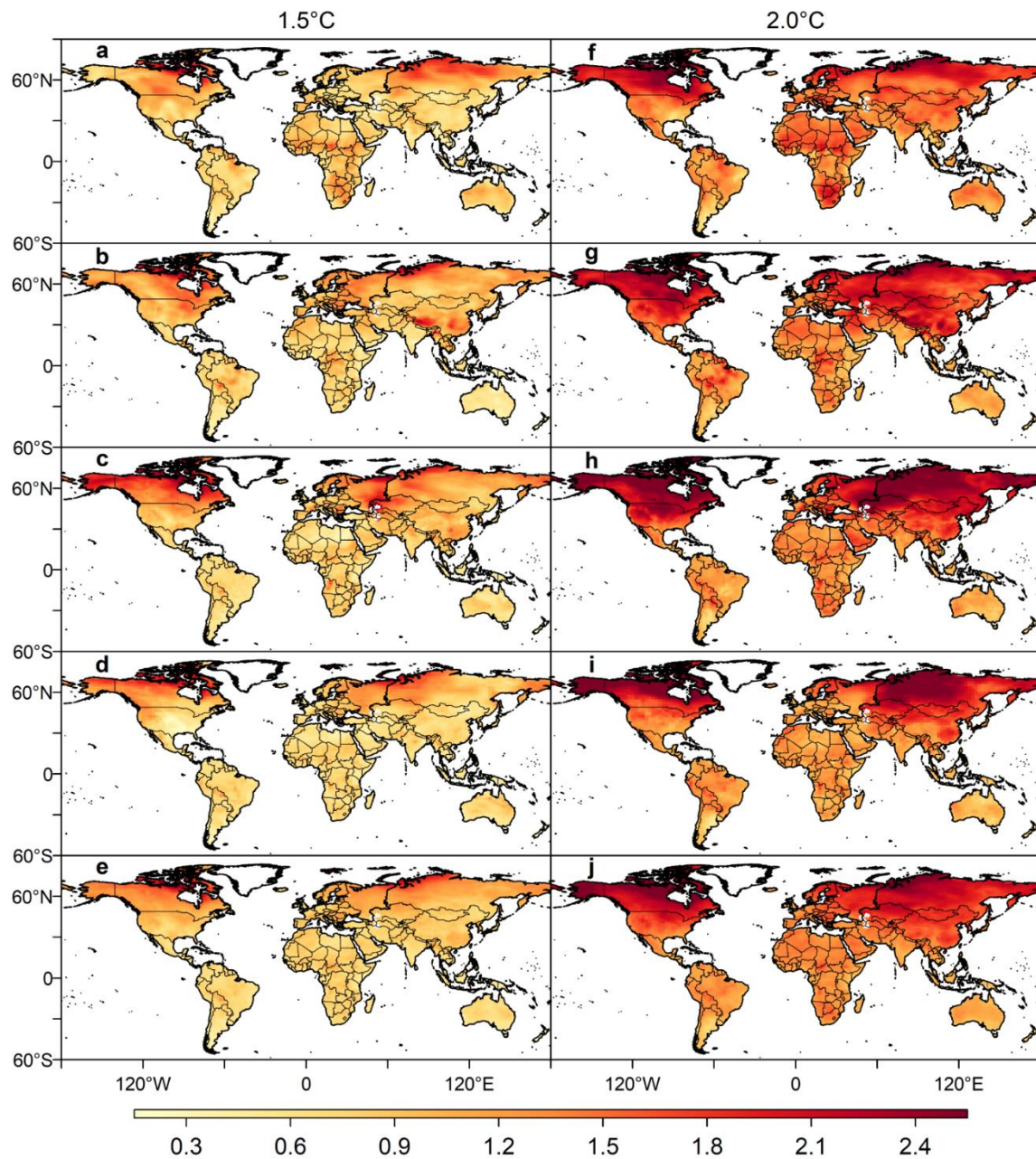
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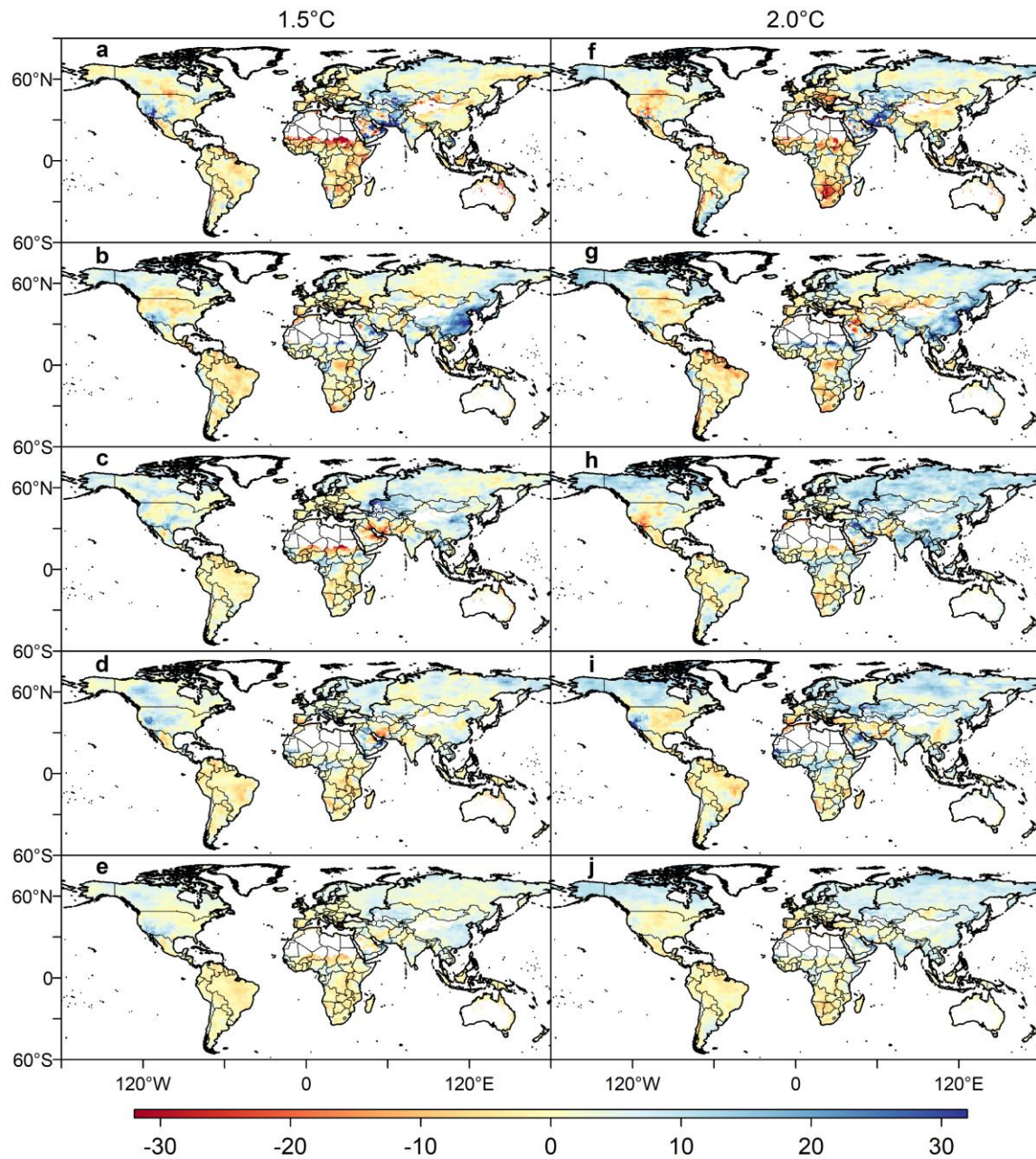
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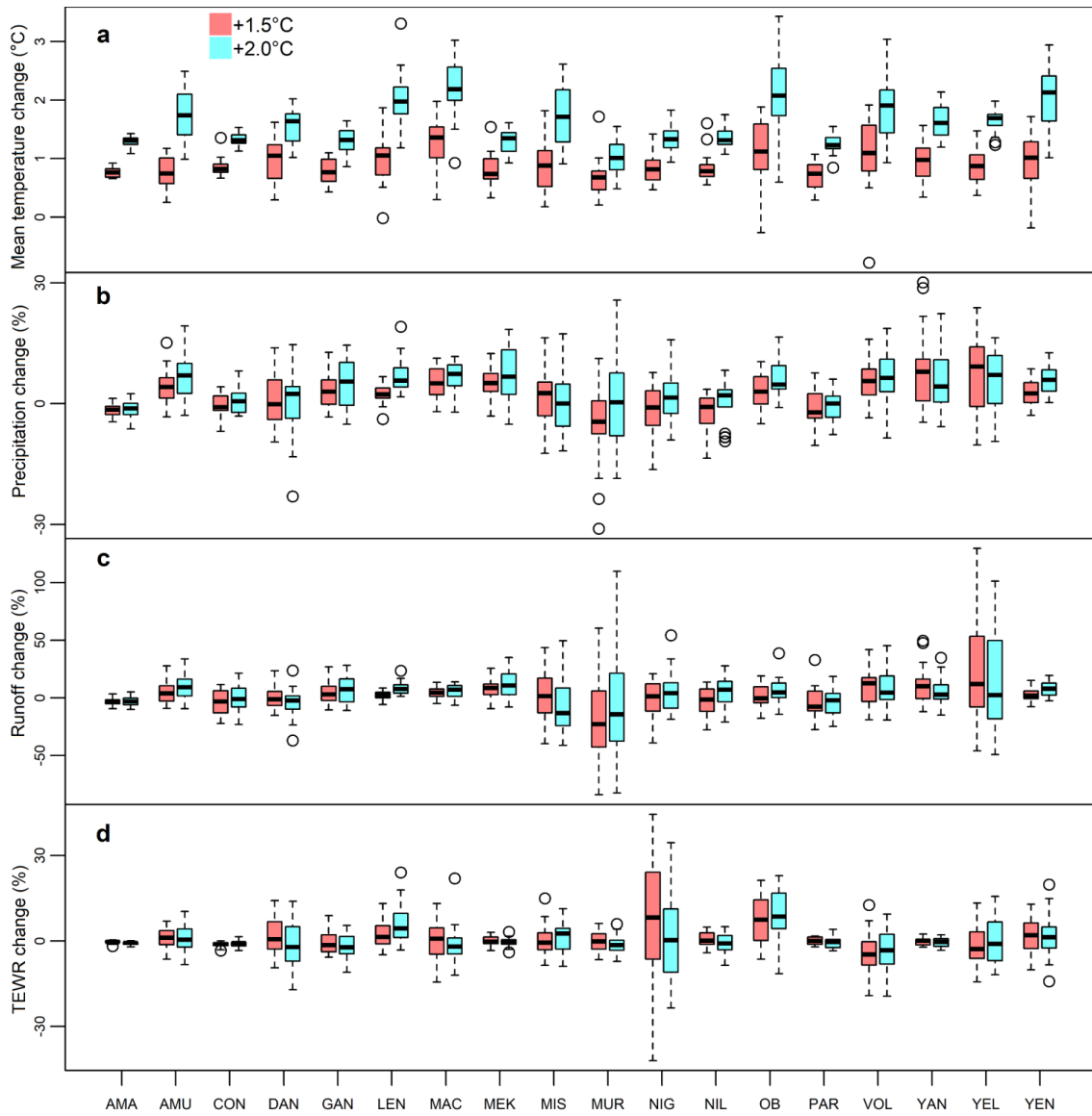
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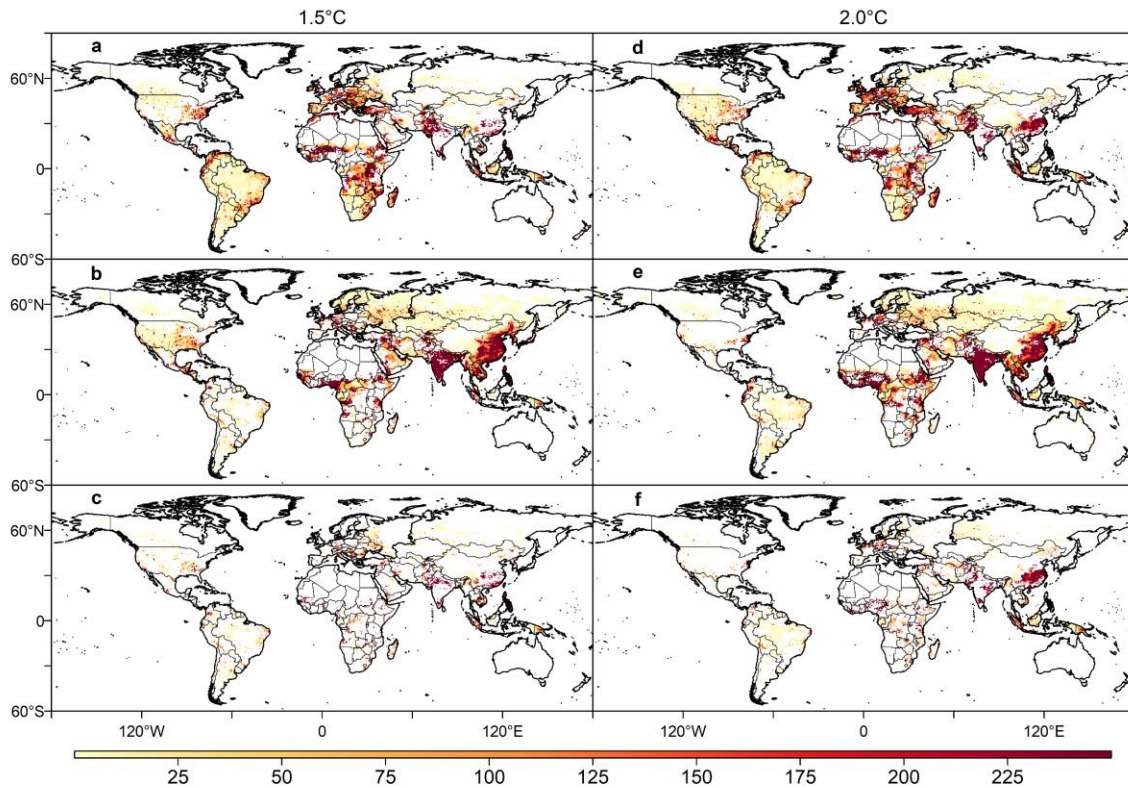
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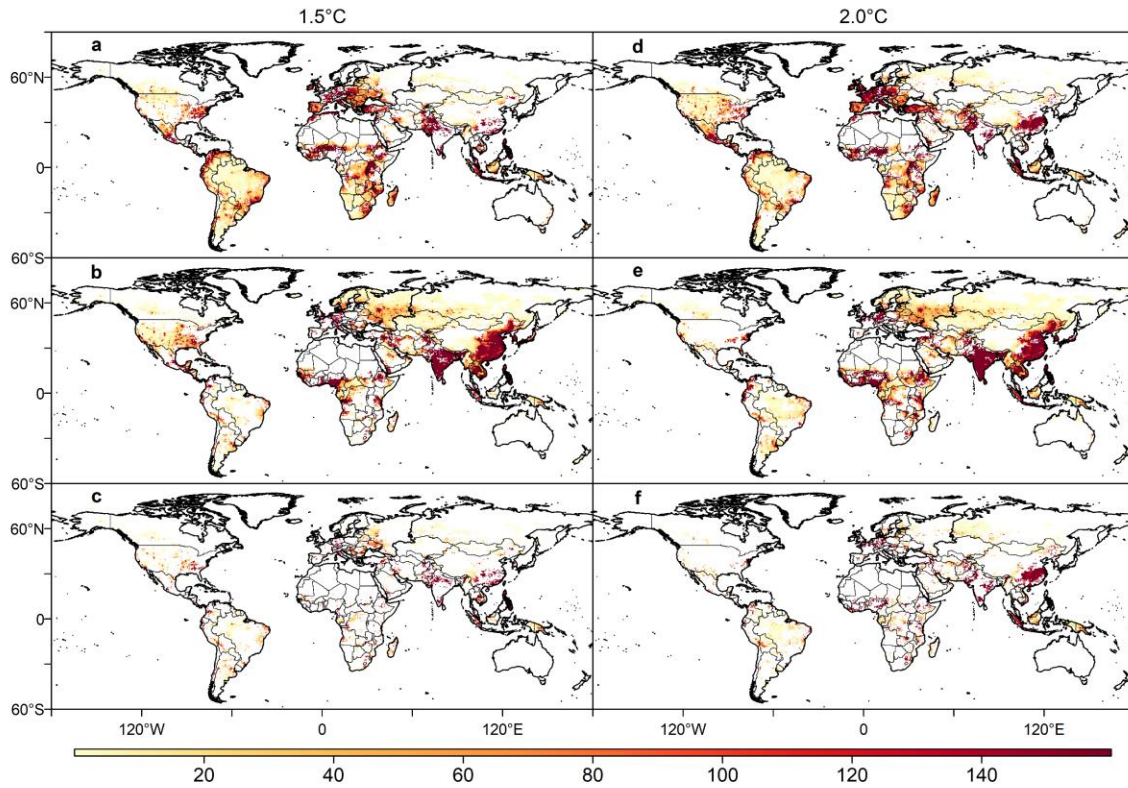
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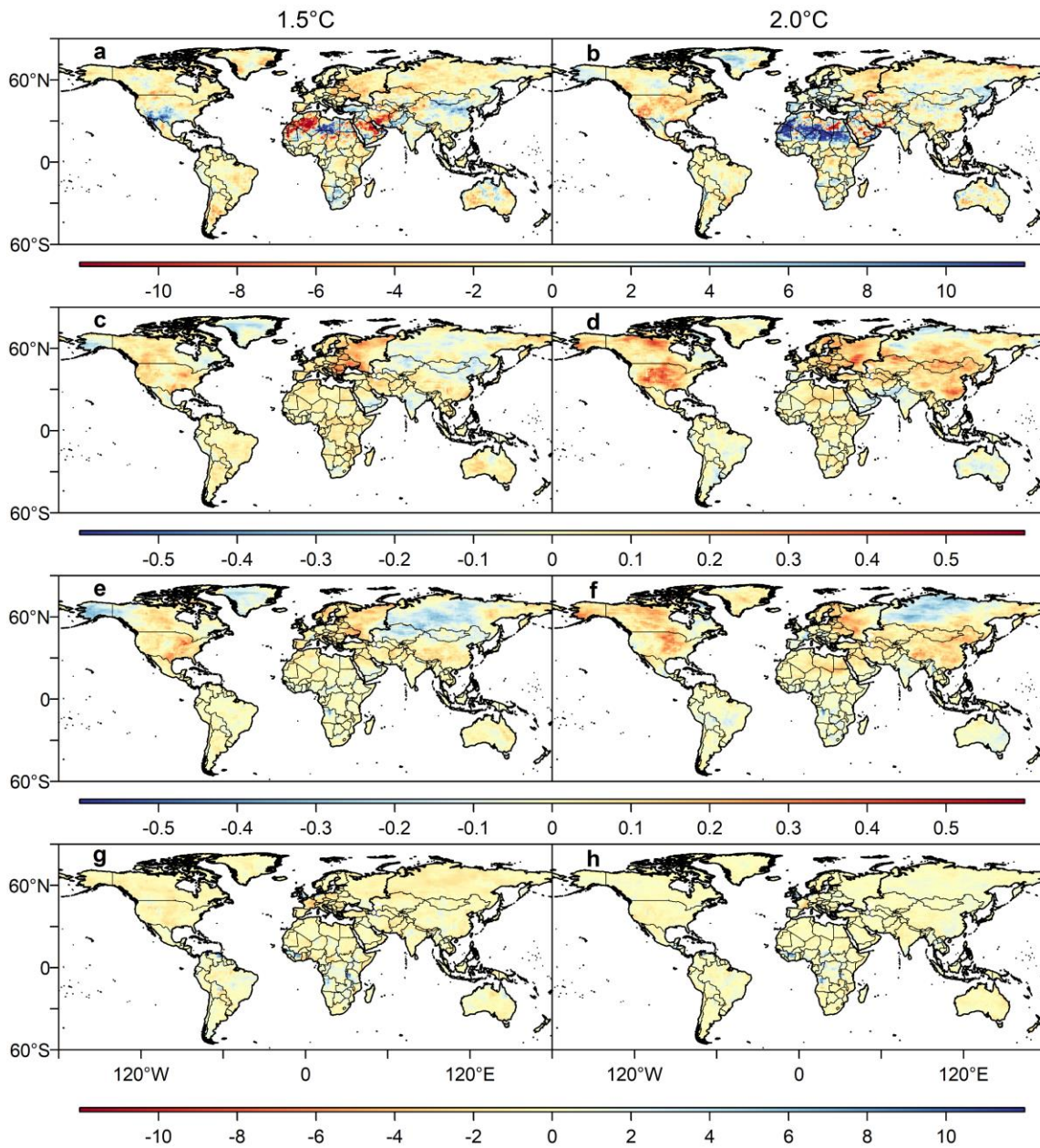
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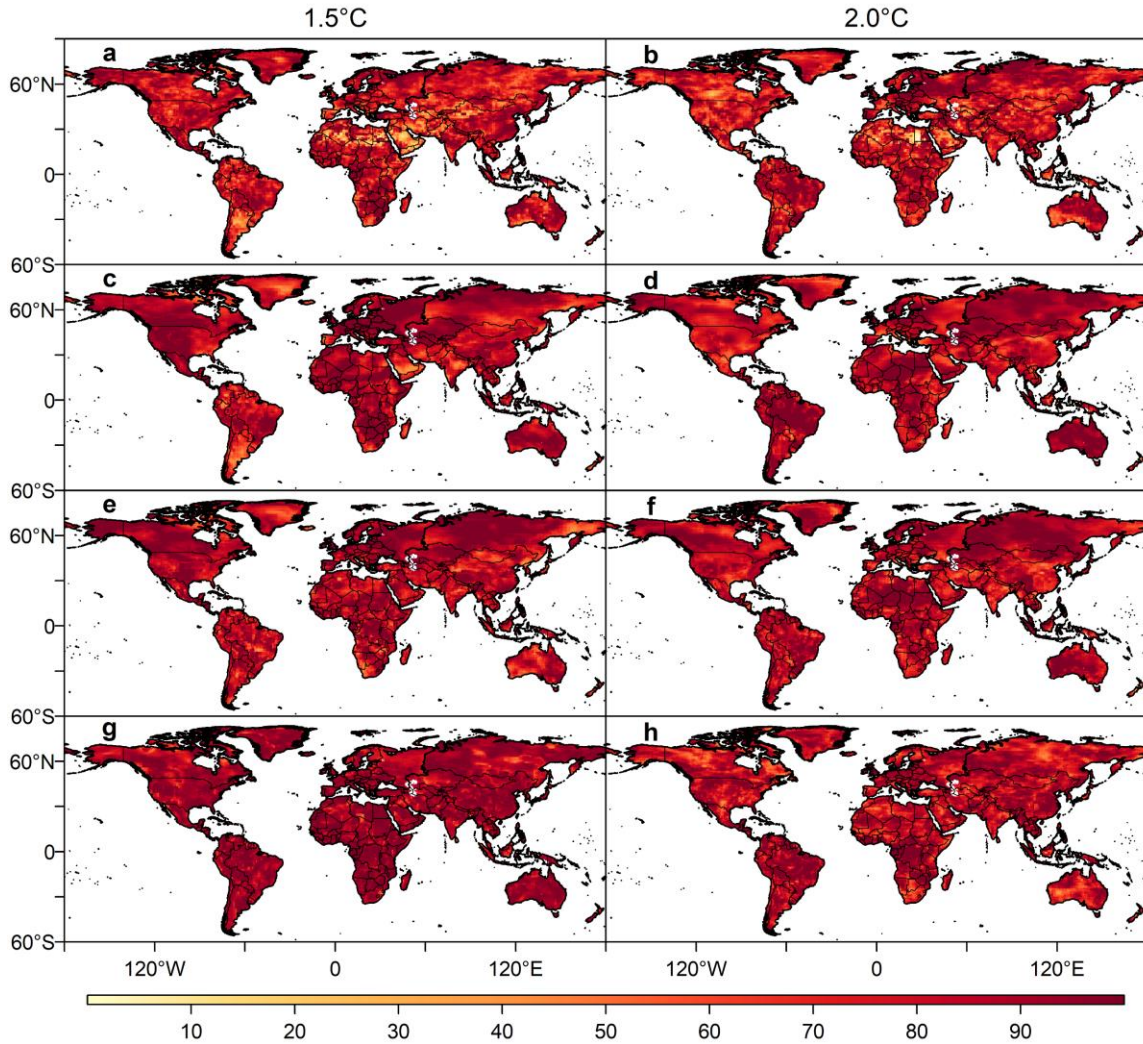
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**Table S1.** Information on the 18 basins (hydrological stations) used for calibrating and validating parameters.

Basin	Station	Latitude	Longitude	Area (km <sup>2</sup> )	Calibration period	Validation Period
Amazonas	Obidos-Porto	-1.9472	-55.5111	4680000	1980-1989	1990-1997
Amur	Komsomolsk	50.63	137.12	1730000	1978-1984	1985-1990
Congo	Kinshasa	-4.3	15.3	3475000	1960-1969	1970-1979
Danube	Ceatal Izmail	45.2167	28.7167	807000	1980-1989	1990-1999
Ganges	Farakka	25.0	87.92	835000	1953-1960	1965-1973
Lena	Stolb	72.37	126.8	2460000	1980-1989	1990-1999
Mackenzie	Arctic Red River	67.4583	-133.7447	1660000	1977-1986	1987-1996
Mekong	Pakse	15.1167	105.8000	545000	1970-1979	1980-1989
Mississippi	Vicksburg, MS Lock 9	32.315	-90.9058	2964255	1980-1989	1990-1999
Murray	Upstream (764.8 Km)	-34.1916	141.5979	991000	1973-1978	1979-1984
Niger	Lokoja	7.8	6.7667	2069197	1984-1992	1998-2001 (lack 9 months data)
Nile	Dongola	19.18	30.48	2575570	1960-1969	1970-1979
Ob	Salekhard	66.57	66.53	2949998	1980-1989	1990-1999
Rio Parana	Corrientes	-27.97	-58.85	1950000	1980-1989	1990-1999
Volga	Volgograd Power Plant	48.8047	44.5858	1360000	1980-1989	1990-1999 (lack 1991)
Yangtze	Datong	30.77	117.62	1705383	1980-1989	1990-1999
Yellow	Huayuankou	34.92	113.65	730036	1960-1969	1970-1979
Yenisey	Igarka	67.48	86.5	2440000	1980-1989	1990-1999

**Table S2.** Total ensemble members in each GCM used in this study (detailed information in Zhai et al., 2018).

GCM	Original institute ID	Ensemble member		
		2006-2015	2106-2115 (+1.5°C)	2106-2115 (+2.0°C)
ECHAM6-3-LR	MPI-M	20	20	20
MIROC5	MIROC	10	10	10
NorESM1- HAPPI	NCC	20	20	20
CAM4-2degree	ETH	20	20	20

**Table S3.** Number of finally selected ensembles in each GCM under 1.5 and 2.0°C warming scenarios.

	ECHAM6-3-LR		MIROC5		NorESM1-HAPPI		CAM4-2degree	
	+1.5°C	+2°C	+1.5°C	+2°C	+1.5°C	+2°C	+1.5°C	+2°C
Africa	3,18,1,17,10	3,17,2,18,11	6,5,2,9,10	3,8,6,5,1	3,7,15,20,9	3,6,12,9,17	11,12,19,13,8	1,18,5,19,11
Asia	16,18,13,8,12	2,13,18,1,8	5,3,6,9,7	1,8,6,3,9	10,4,14,11,5	10,15,5,13,2	14,4,8,11,19	17,8,12,5,7
Europe	19,15,13,3,4	19,17,7,6,20	1,10,9,6,5	3,1,6,4,8	6,10,3,5,1	9,17,10,6,15	15,8,13,7,11	16,6,4,5,19
North America	8,7,14,9,2	4,7,11,12,5	10,2,9,3,7	10,2,9,6,5	3,10,11,13,6	3,8,17,13,12	6,13,2,8,14	19,7,9,11,1
Oceania	5,1,8,11,10	2,20,8,10,3	10,8,2,4,5	2,4,3,7,9	4,7,12,1,5	17,20,3,1,19	16,12,20,2,7	14,19,8,5,4
South America	2,18,16,4,10	19,15,12,10,16	10,4,3,2,9	4,3,5,9,10	13,12,7,19,2	11,15,16,10,7	15,16,1,2,19	17,3,20,8,11

**Table S4.** Median changes in annual temperature, precipitation, runoff, TEWR under 1.5 and 2.0°C warming scenarios in the 18 major basins.

	Temperature change (°C)		Precipitation change (%)		Runoff change (%)		TEWR change (%)	
	+1.5°C	+2.0°C	+1.5°C	+2.0°C	+1.5°C	+2.0°C	+1.5°C	+2.0°C
AMA	0.8 (0.7,0.9)	1.3 (1.2,1.4)	-1.5 (-4.2,0.7)	-1.2 (-4.2,2.0)	-3.5 (-9.0,2.3)	-3.2 (-9.6,2.5)	-0.4 (-1.3,0.3)	-0.7 (-1.6,-0.2)
AMU	0.7 (0.3,1.1)	1.7 (1.0,2.3)	4.1 (-2.2,10.9)	7.0 (-1.2,15.2)	3.8 (-8.9,21.5)	9.2 (-8.1,22.9)	1.1 (-4.1,6.1)	0.4 (-5.9,7.8)
CON	0.8 (0.7,1.0)	1.3 (1.2,1.5)	-0.9 (-5.7,3.2)	0.6 (-3.1,7.6)	-3.3 (-16.5,10.4)	-1.1 (-21.1,20.9)	-1.1 (-3.1,-0.2)	-0.8 (-3.2,1.3)
DAN	1.0 (0.3,1.6)	1.6 (1.0,2.0)	-0.1 (-8.7,8.6)	2.4 (-13.7,9.3)	-1.4 (-14.0,18.2)	-2.5 (-24.3,10.8)	0.6 (-5.0,13.3)	-2.2 (-10.2,13.1)
GAN	0.8 (0.4,1.1)	1.3 (0.9,1.6)	2.9 (-1.6,10.3)	5.5 (-3.0,12.9)	3.1 (-5.4,20.3)	7.4 (-8.8,24.2)	-1.5 (-5.4,6.4)	-2.2 (-8.8,3.9)
LEN	1.1 (0.5,1.5)	2.0 (1.4,2.6)	2.3 (-0.9,6.2)	5.7 (2.5,14.0)	2.3 (-2.7,7.9)	7.7 (1.3,17.2)	1.3 (-4.1,12.9)	4.4 (-2.7,18.2)
MAC	1.4 (0.4,1.8)	2.2 (1.5,2.9)	5.1 (-1.3,10.7)	7.4 (-0.9,10.3)	4.4 (-3.1,13.4)	7.0 (-5.9,13.7)	0.8 (-10.0,9.0)	-2.0 (-9.4,6.5)
MEK	0.7 (0.4,1.1)	1.3 (1.0,1.6)	5.1 (-2.4,11.5)	6.7 (-1.3,18.1)	8.6 (-4.4,20.1)	10.7 (-4.4,31.3)	-0.3 (-3.0,2.0)	-0.2 (-3.0,1.7)
MIS	0.9 (0.3,1.7)	1.7 (1.0,2.3)	2.6 (-10.5,13.1)	0.0 (-11.7,13.5)	1.6 (-32.5,41.6)	-13.3 (-40.1,30.3)	-0.6 (-6.5,8.9)	2.6 (-5.3,8.0)
MUR	0.7 (0.3,1.0)	1.0 (0.6,1.5)	-4.5 (-24.0,10.6)	0.3 (-17.0,12.5)	-22.8 (-80.8,23.9)	-14.4 (-66.2,84.3)	-0.1 (-5.6,4.9)	-1.4 (-6.5,4.3)
NIG	0.8 (0.6,1.2)	1.3 (1.0,1.7)	-0.9 (-6.7,7.4)	1.5 (-6.8,15.5)	1.2 (-17.6,18.6)	4.0 (-16.9,34.7)	8.2 (-28.6,39.0)	0.3 (-20.1,32.3)
NIL	0.8 (0.6,1.3)	1.3 (1.1,1.7)	-0.8 (-10.9,2.6)	2.1 (-8.4,7.2)	-1.4 (-27.4,11.1)	7.1 (-16.3,22.7)	0.1 (-3.7,4.3)	-0.9 (-5.5,4.4)
OB	1.1 (0.0,1.8)	2.1 (1.2,2.9)	3.0 (-2.9,9.6)	4.8 (1.3,11.4)	-0.4 (-9.7,18.0)	4.6 (-10.1,18.8)	5.9 (-4.6,19.4)	7.2 (-9.9,20.9)
PAR	0.7 (0.4,1.0)	1.2 (1.0,1.5)	-2.2 (-8.6,4.8)	0.0 (-6.7,4.9)	-7.6 (-23.8,11.6)	-2.1 (-24.4,6.2)	0.0 (-1.9,1.6)	-0.4 (-3.1,2.9)
VOL	1.1 (0.4,1.8)	1.9 (1.1,2.7)	5.6 (-2.5,11.8)	6.4 (-2.8,16.9)	12.6 (-11.8,26.0)	4.5 (-13.3,29.3)	-4.8 (-15.5,7.4)	-3.3 (-12.3,5.1)
YAN	1.0 (0.6,1.4)	1.6 (1.2,2.0)	7.9 (-2.8,28.8)	4.2 (-5.4,19.9)	10.0 (-6.4,47.7)	2.8 (-12.0,27.1)	0.0 (-1.9,1.8)	-0.4 (-2.9,1.1)
YEL	0.9 (0.5,1.3)	1.7 (1.3,1.9)	9.2 (-2.5,21.5)	7.2 (-7.5,15.9)	12.0 (-36.1,101.1)	2.4 (-49.1,92.0)	-2.9 (-10.9,10.0)	-1.1 (-11.8,11.7)
YEN	1.0 (0.1,1.7)	2.1 (1.3,2.9)	2.5 (-2.3,8.3)	5.9 (0.3,11.4)	1.9 (-4.8,10.6)	7.9 (-2.0,16.8)	2.0 (-10.0,12.4)	1.3 (-8.7,15.1)

\* 5th and 95th percentile values are given in the parentheses.