



## *Supplement of*

# **Projected increases in magnitude and socioeconomic exposure of global droughts in 1.5 and 2 °C warmer climates**

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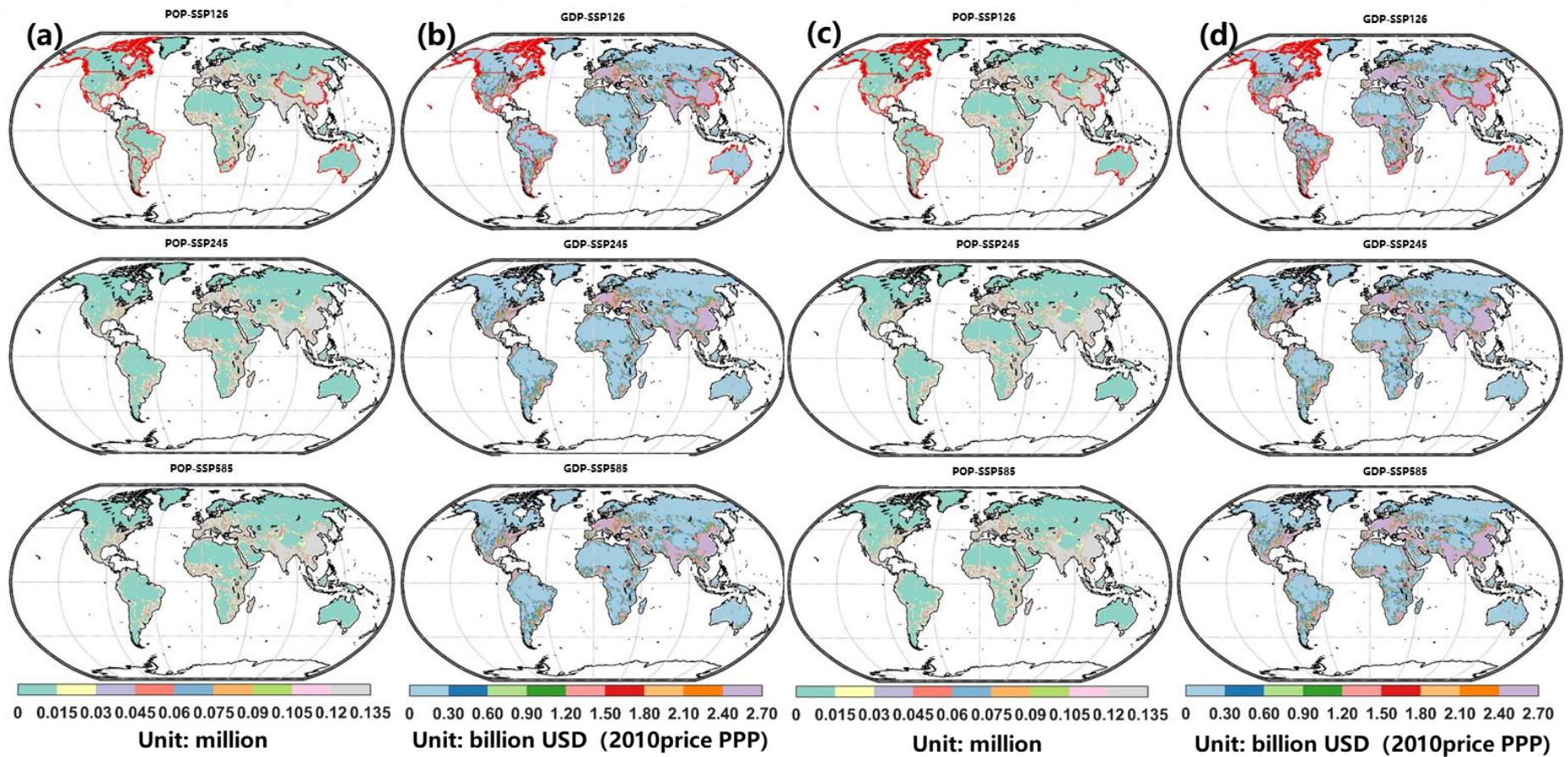
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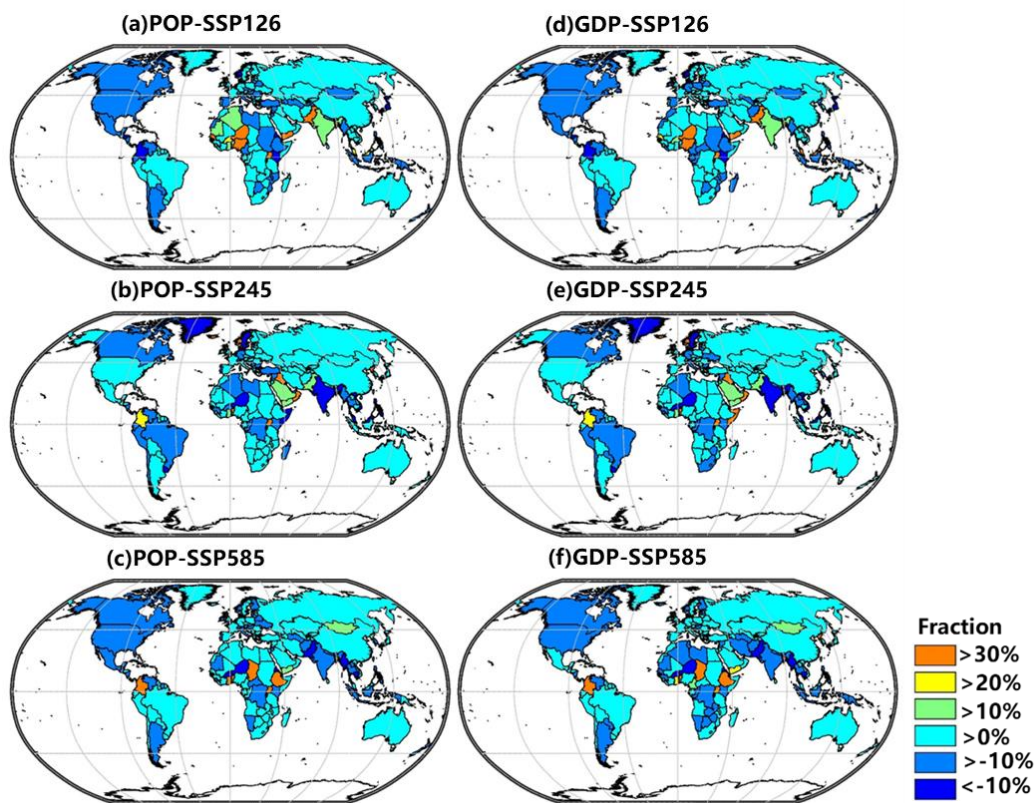
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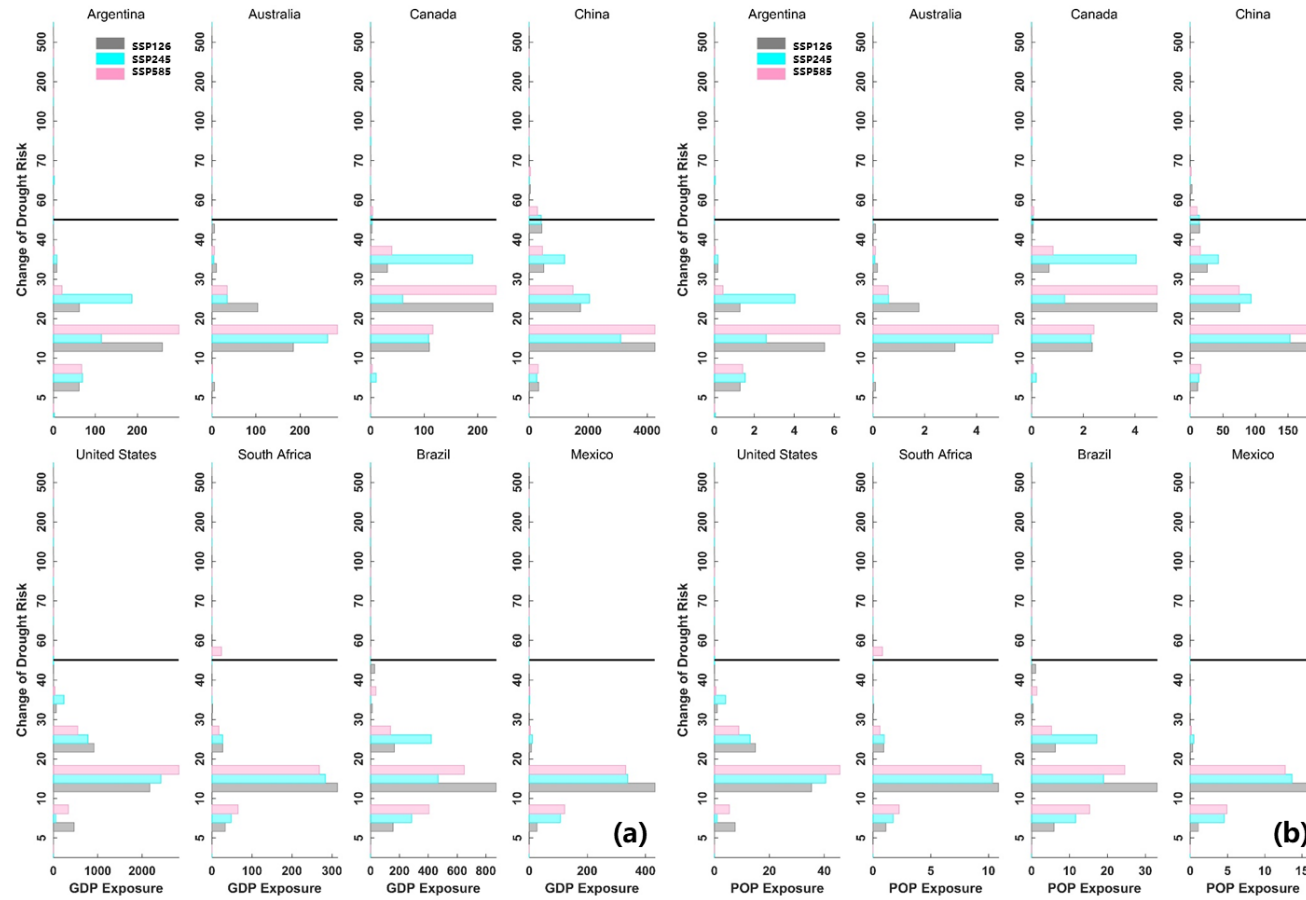
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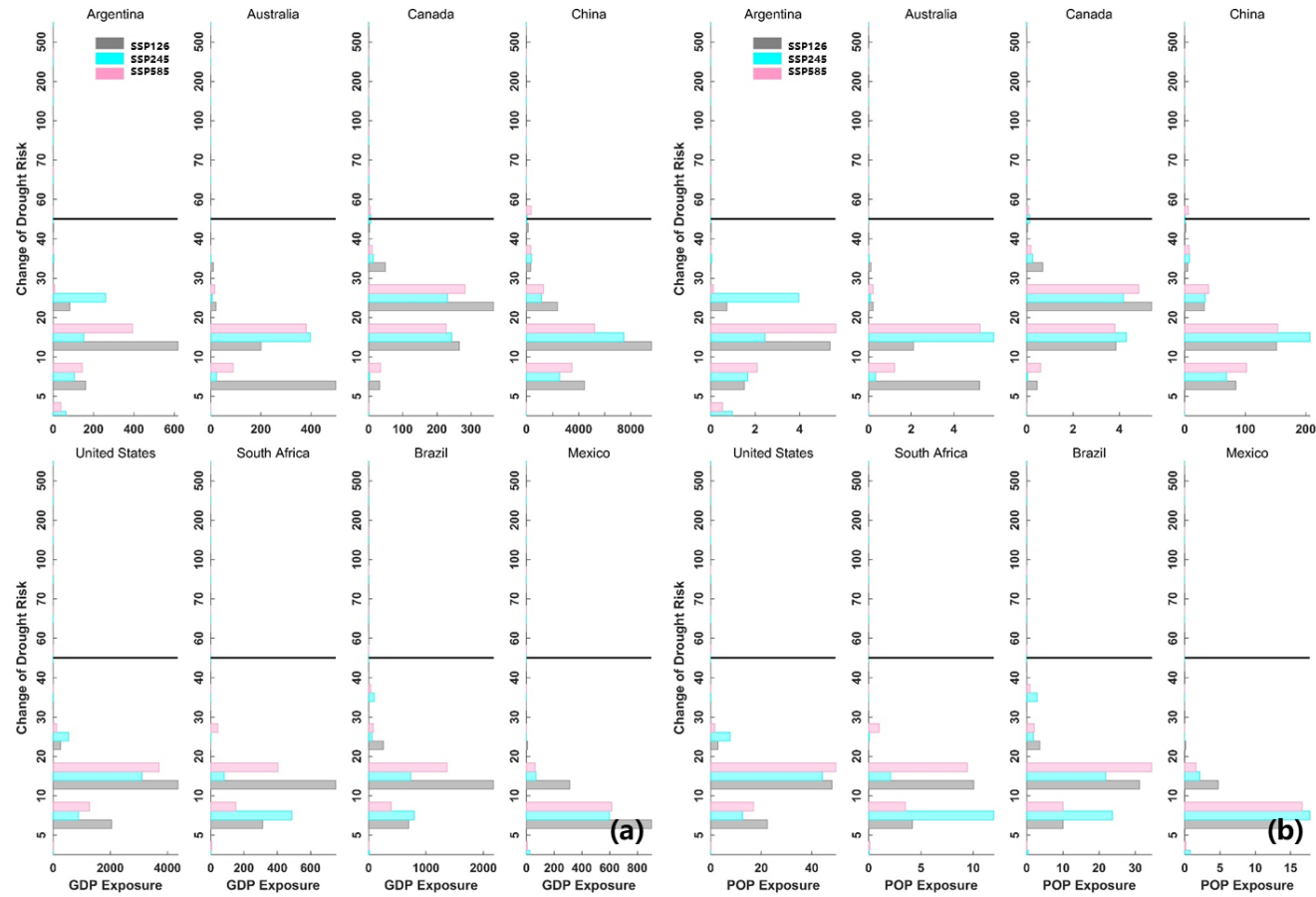
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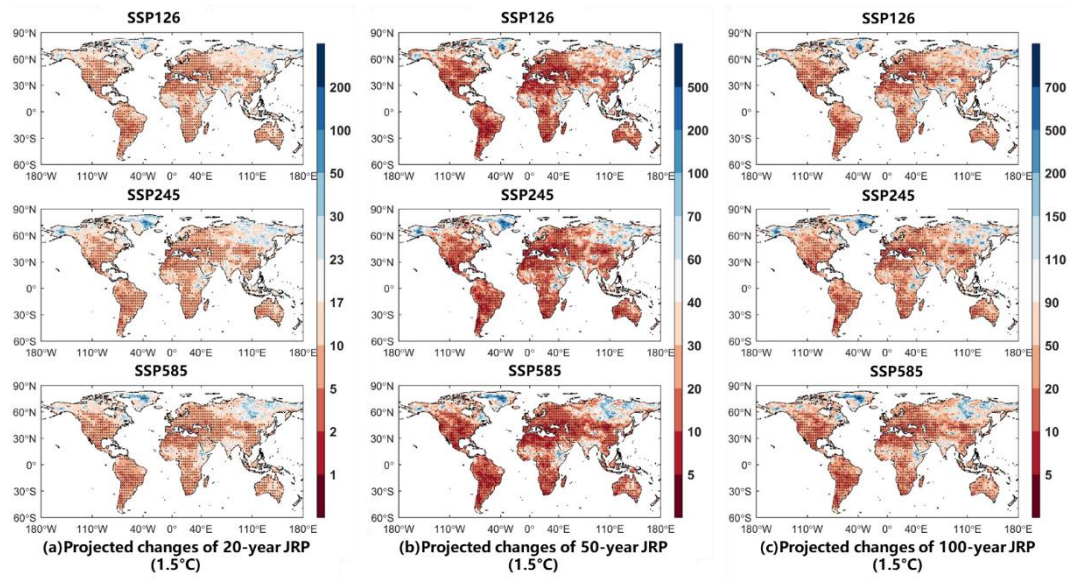
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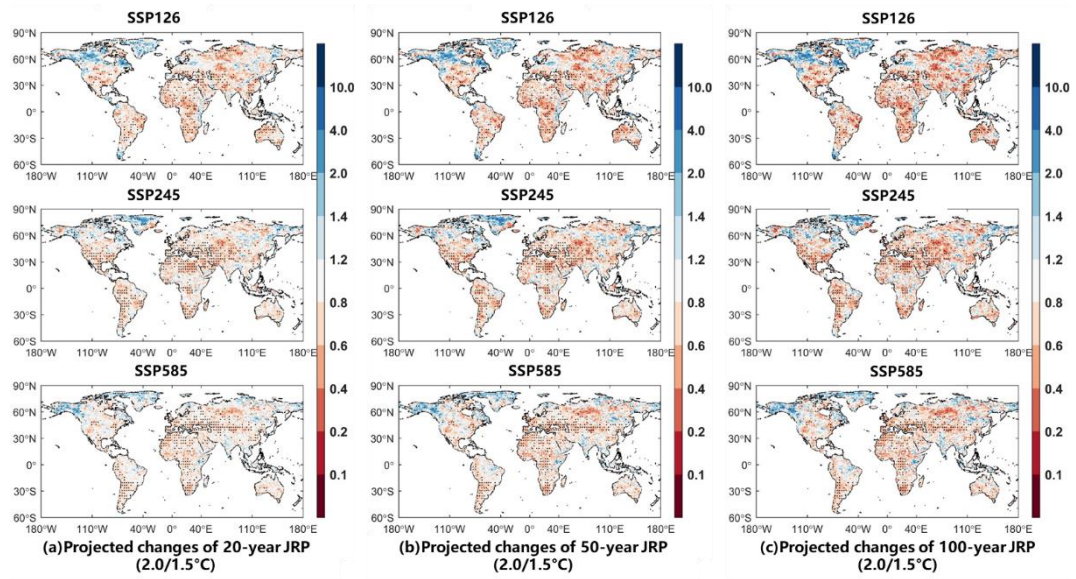
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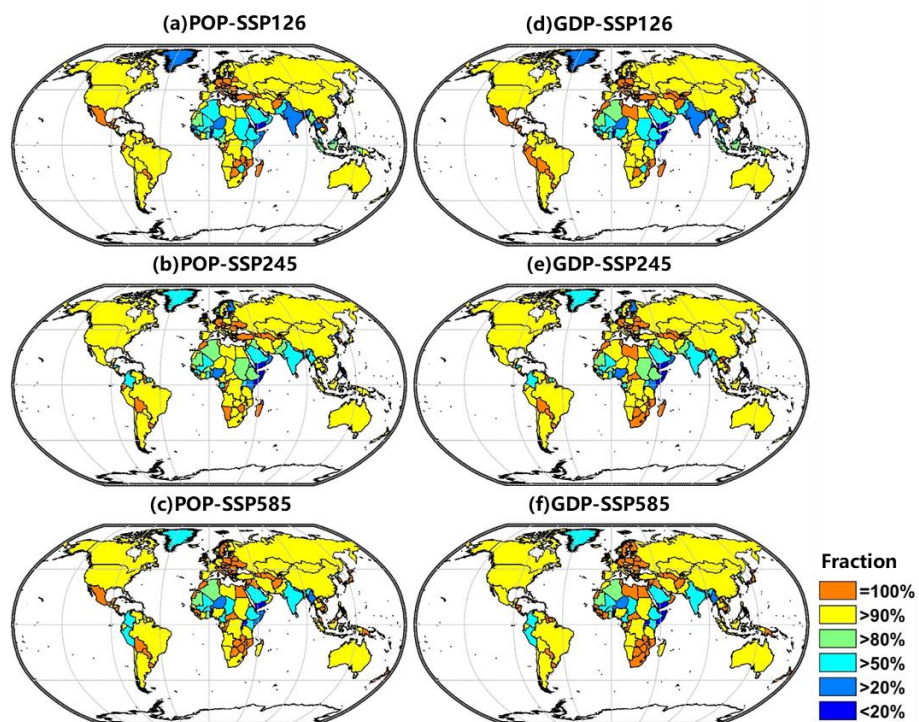


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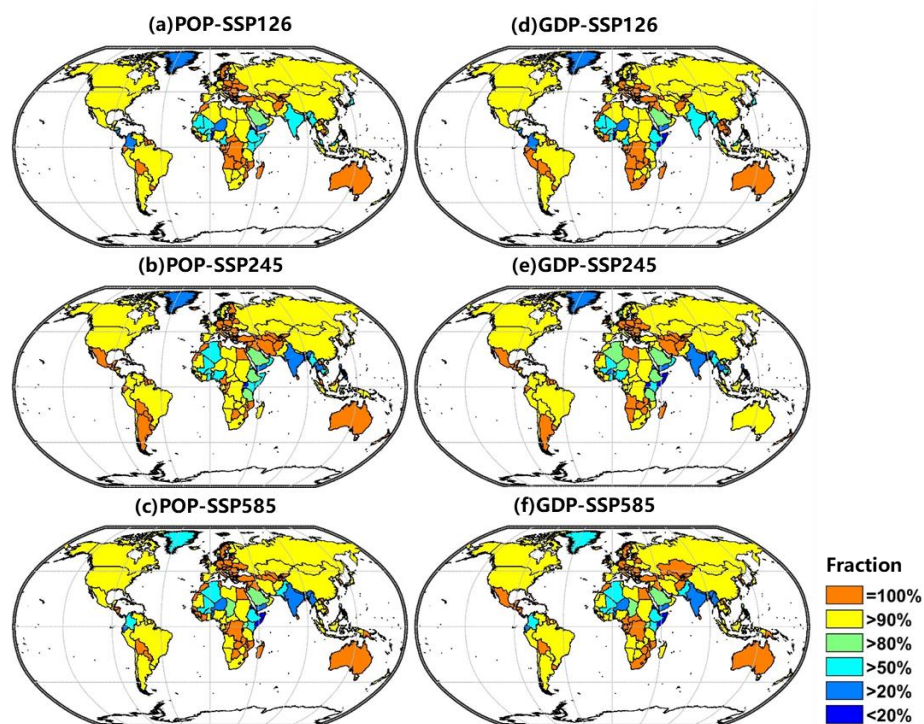


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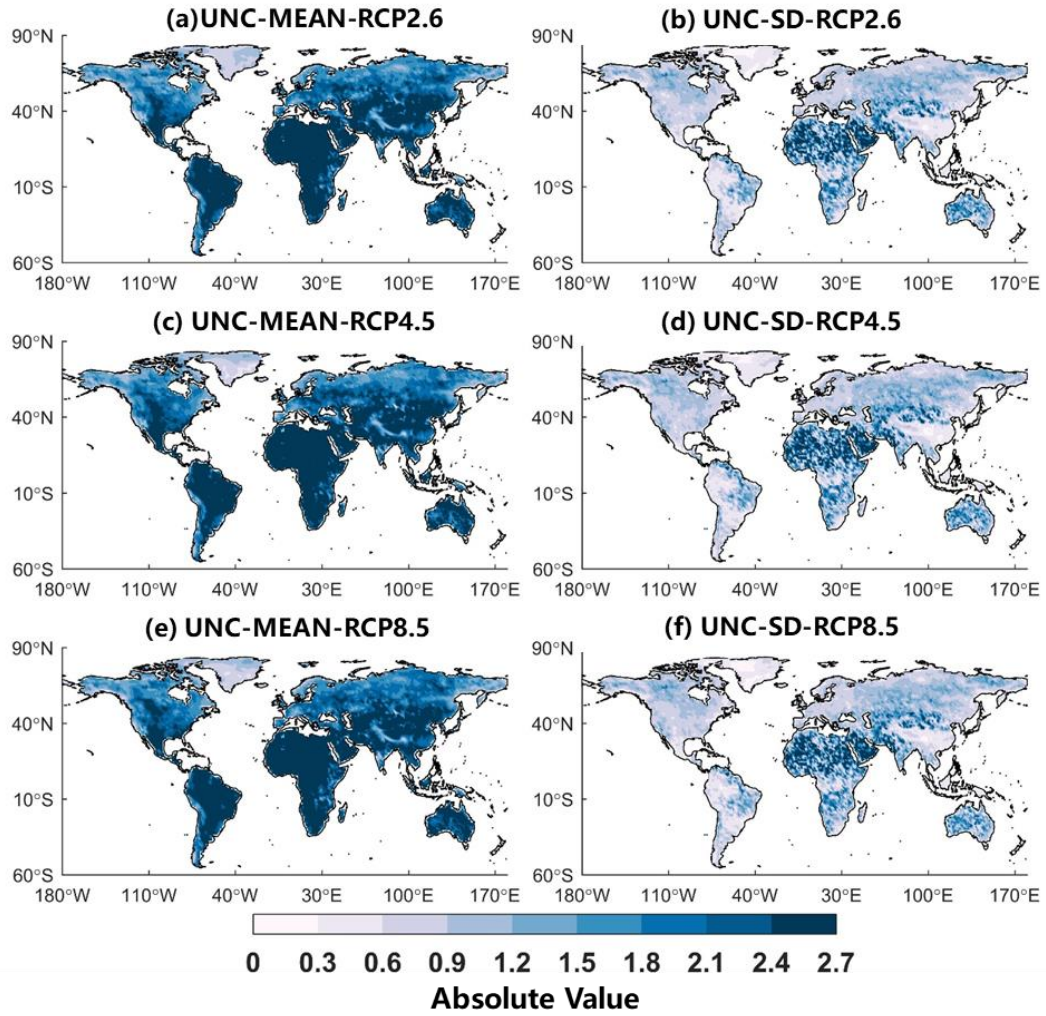




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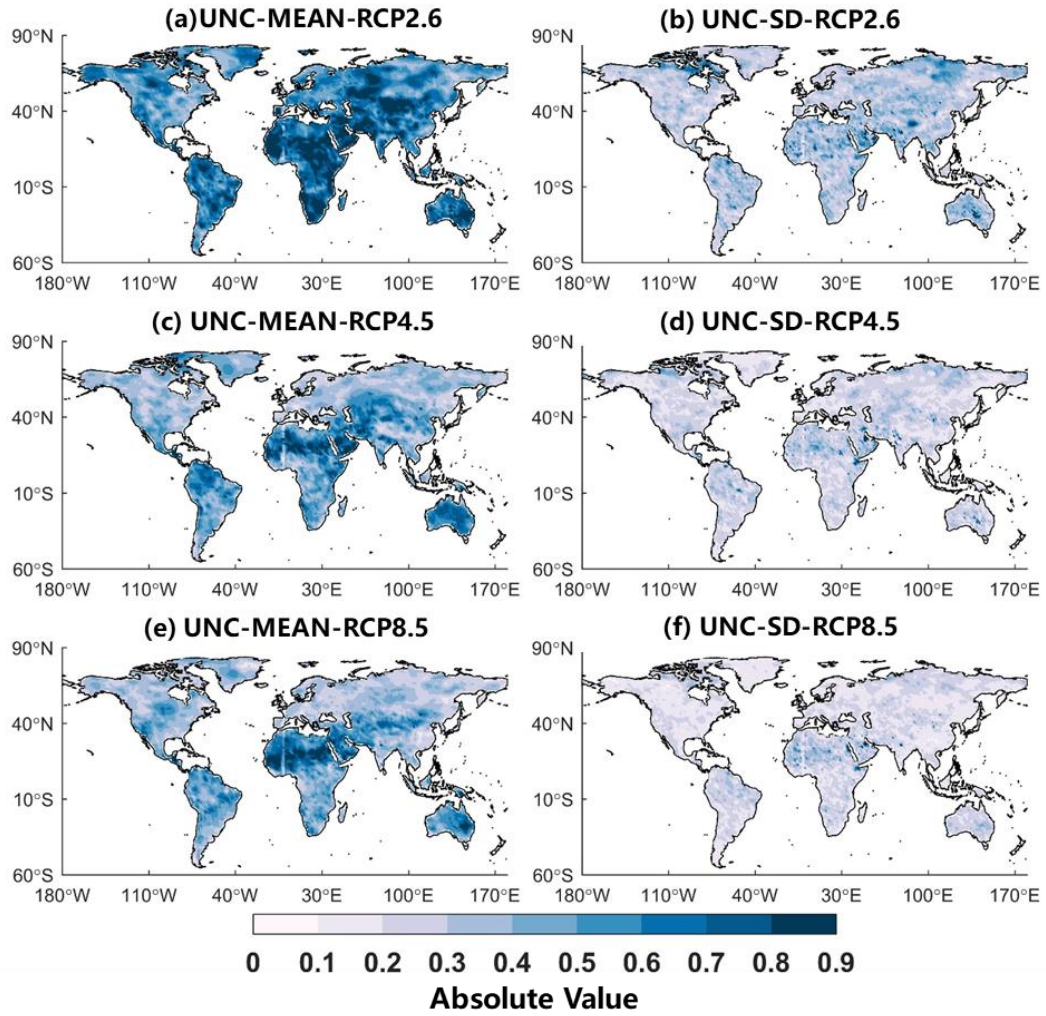


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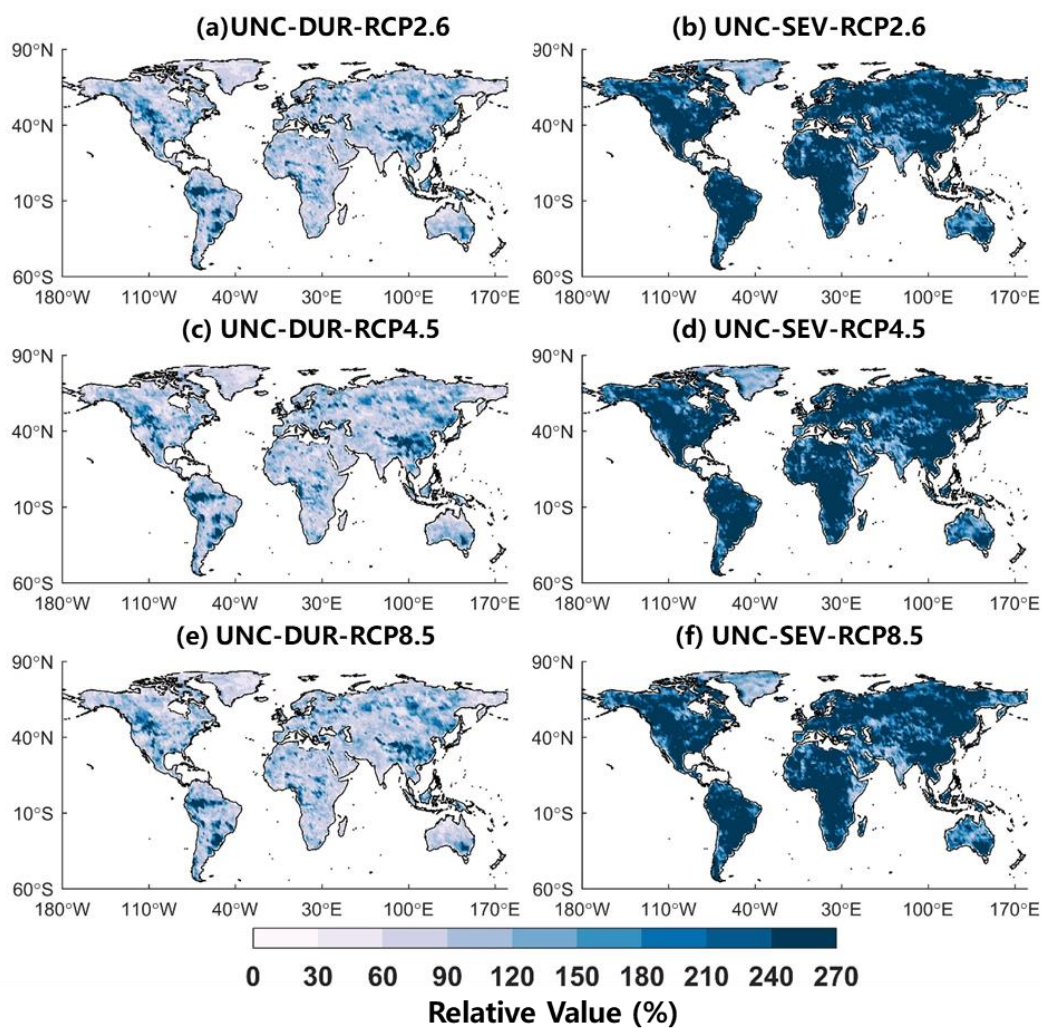
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Maps of the projected uncertainty (measured by 5-95% confidence intervals) in SPEI-3 mean (MEAN) (a,c,e) and standard deviation (SD) (b,d,f) changes under the 1.5°C warming target relative to historical period (1976-2000) for RCP2.6, RCP4.5, RCP8.5 scenarios.



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 Maps of the projected uncertainty (measured by 5-95% confidence intervals) in SPEI-3 mean (MEAN) (a,c,e) and standard deviation (SD) (b,d,f) changes under the 2.0°C warming target relative to 1.5°C warming target for RCP2.6, RCP4.5, RCP8.5 scenarios.

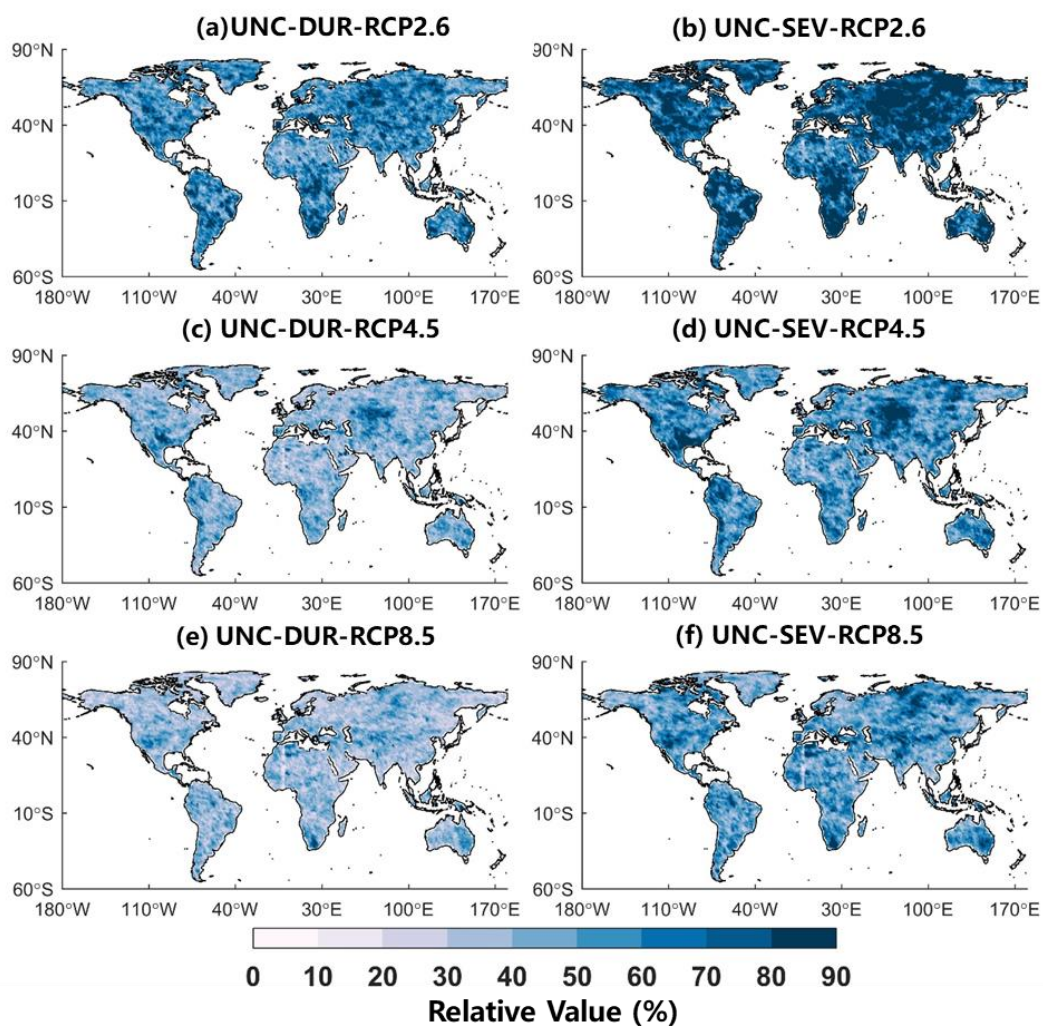




**Figure S11 Uncertainty for drought duration and severity changes under the 1.5°C warming target**

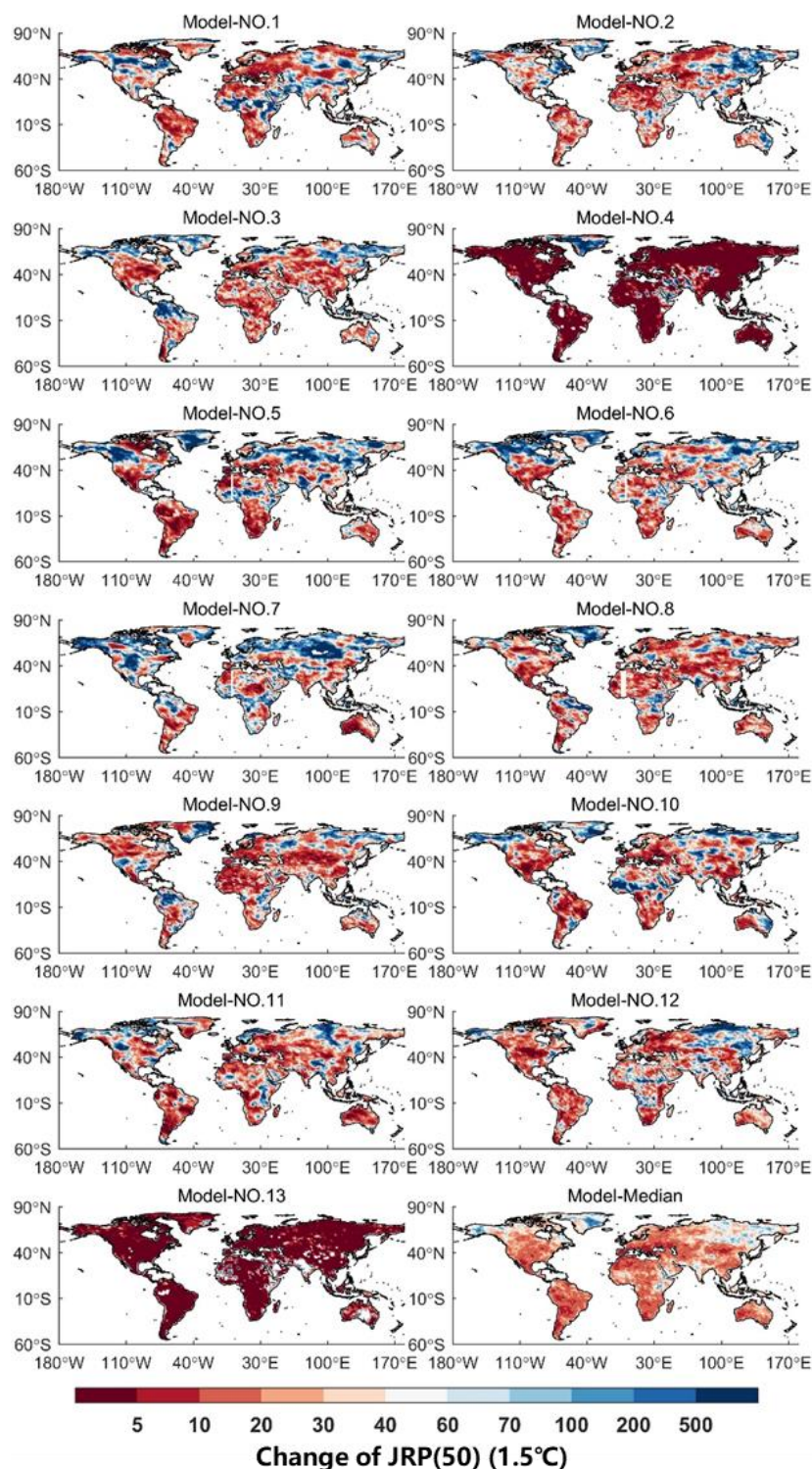
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**Figure S12 Uncertainty for drought duration and severity changes between the 1.5°C and 2.0°C warming target**

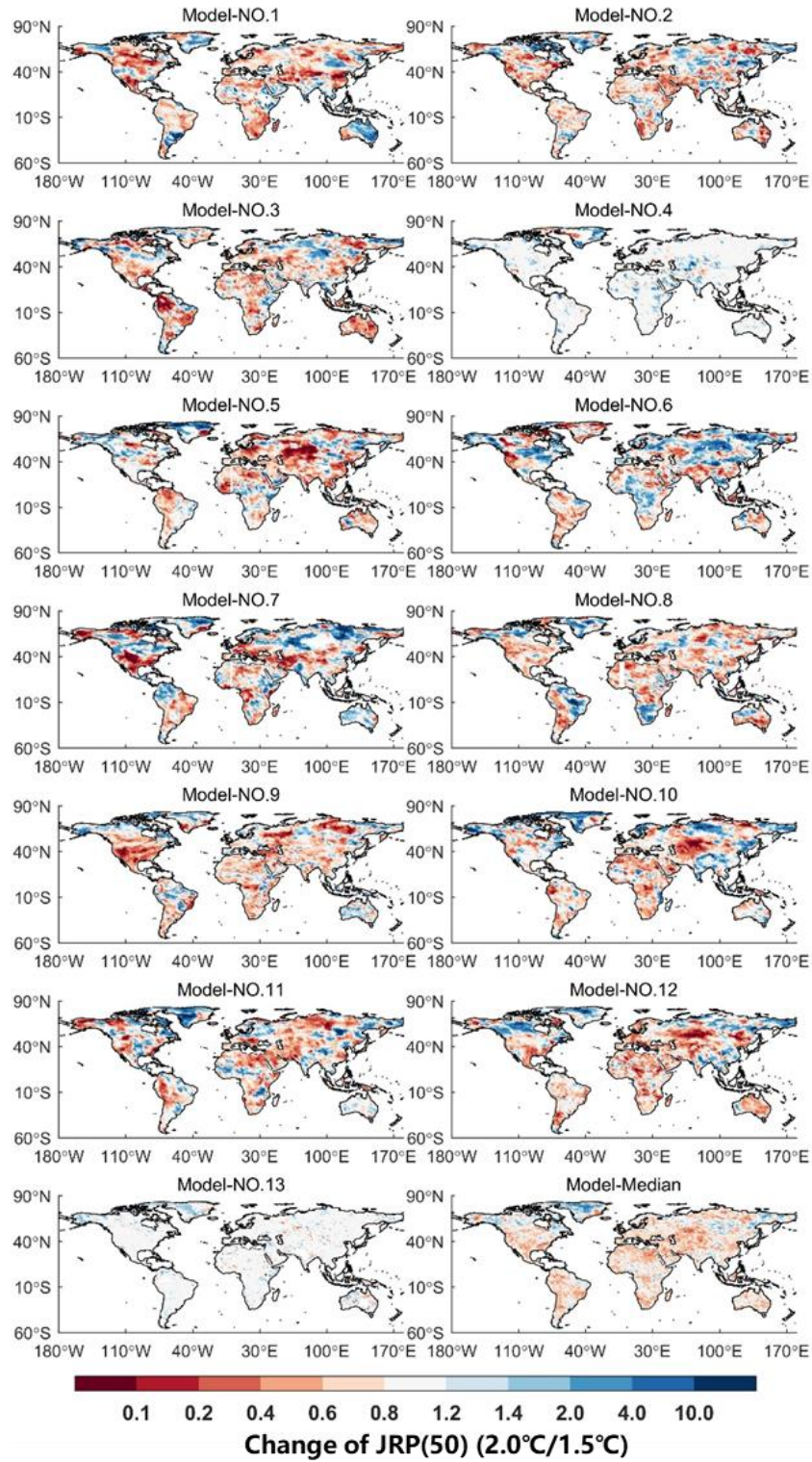
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**Figure S13 Model uncertainty for changes of 50-year joint return period (JRP) under the 1.5°C warming target**

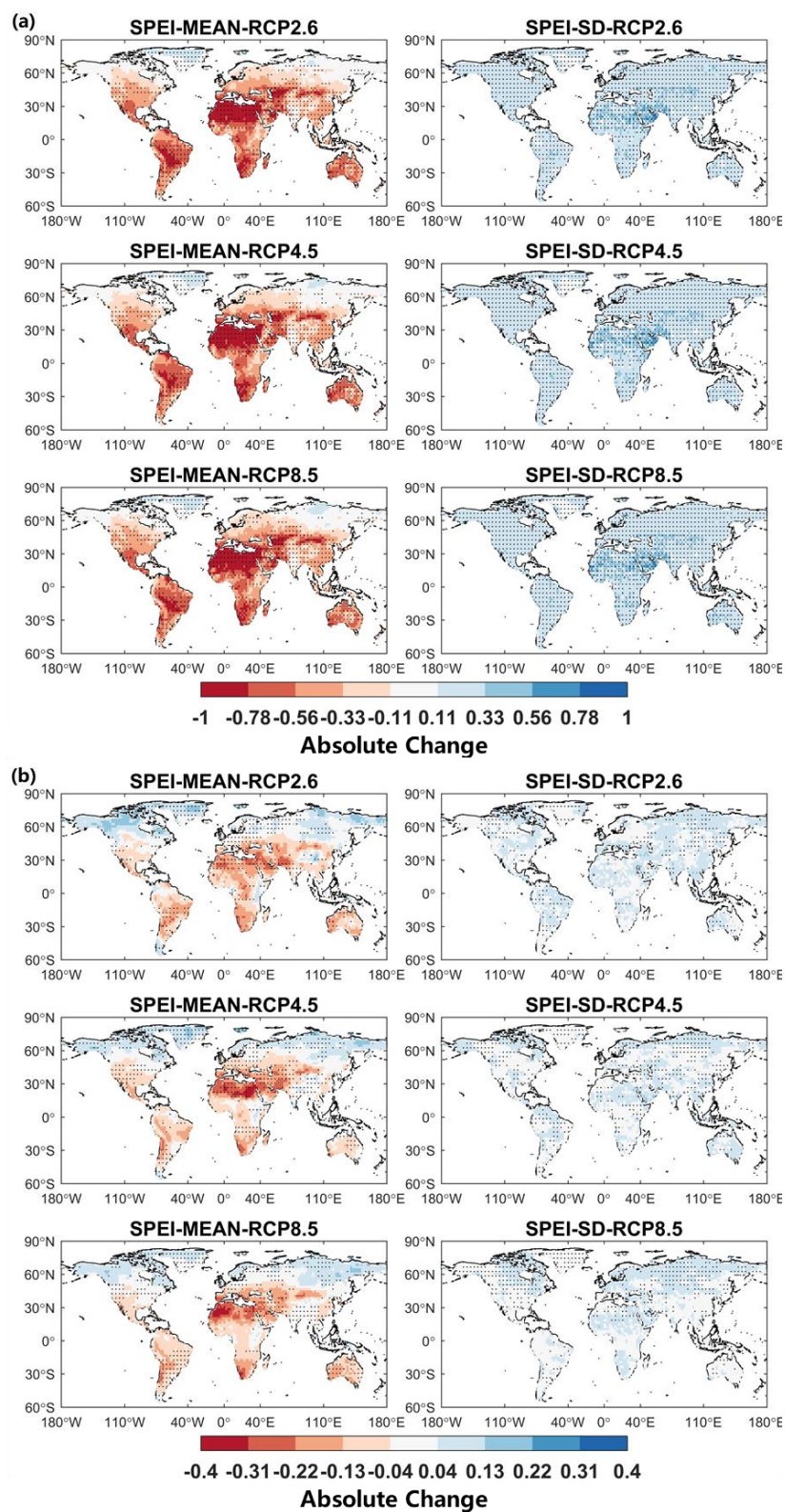
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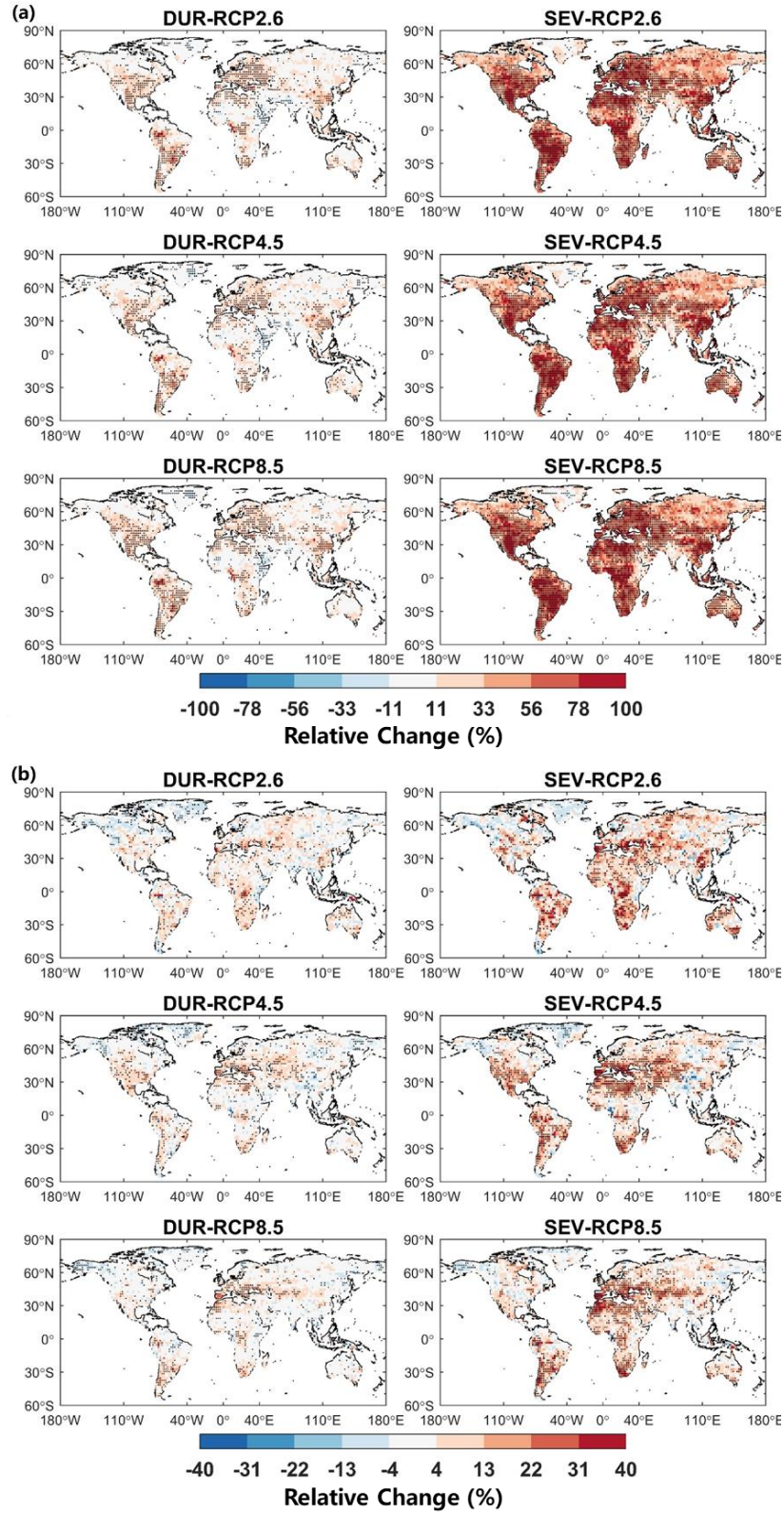
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**Figure S15** Projected changes in the mean and standard deviation of SPEI under the 1.5°C (a) and between the 1.5°C and 2.0°C (b) warming target at 2° spatial resolution





**Figure S16 Projected changes in drought duration and severity under the 1.5°C (a) and between the 1.5°C and 2.0°C (b) warming target at 2° spatial resolution**



**Table S1 Summary statistic table for changes in major variables**

<b>Summary statistic</b>			
<b>Variable</b>	<b>Explanation</b>	<b>1.5°C</b>	<b>2-1.5(°C) <sup>(1)</sup></b>
<b>SPEI<sub>3</sub>(Mean)</b>	Percentage of continental areas for decreasing mean SPEI <sub>3</sub>	85%	58%
<b>SPEI<sub>3</sub>(SD)</b>	Percentage of continental areas for increasing standard deviation of SPEI <sub>3</sub>	100%	95%
<b>Drought duration</b>	Percentage of continental areas for increasing mean drought duration	78%	65%
<b>Drought severity</b>	Percentage of continental areas for increasing mean drought severity	99%	84%
<b>50-year JRP</b>	Percentage of continental areas for increasing occurrence of 50-year drought events	88%	71%
<b>GDP exposure</b>	The number of countries exhibit a 100% fraction in GDP exposed to increasing drought risks	73	17
<b>Population exposure</b>	The number of countries exhibit a 100% fraction in population exposed to increasing drought risks	75	17

Notes:

(1) 2-1.5(°C) means differences in effects between the 1.5°C and 2.0°C warming levels.

**Table S2 Several countries suffering decreasing population and GDP exposure**

Land fraction exposing to more frequent droughts									
1.5°C			2°C			2-1.5°C			
Country	SSP126	SSP245	SSP585	SSP126	SSP245	SSP585	SSP126	SSP245	SSP585
Canada	68.35%	68.82%	71.56%	55.58%	63.36%	66.92%	-12.77%	-5.46%	-4.63%
United States	86.17%	78.93%	86.89%	85.44%	80.02%	79.84%	-0.72%	1.08%	-7.05%
Colombia	85.71%	84.62%	79.12%	75.82%	93.41%	85.71%	-9.89%	8.79%	6.59%
Japan	62.16%	56.76%	62.16%	59.46%	62.16%	62.16%	-2.70%	5.41%	0.00%
Population (million)									
1.5°C			2°C			2-1.5°C			
Country	SSP126	SSP245	SSP585	SSP126	SSP245	SSP585	SSP126	SSP245	SSP585
Canada	7.97	7.91	8.27	10.50	8.95	9.57	2.53	1.04	1.30
United States	59.13	58.82	60.75	73.56	64.86	68.20	14.43	6.05	7.45
Colombia	9.41	9.67	9.33	10.20	10.84	9.88	0.79	1.17	0.56
Japan	17.82	17.63	18.12	15.48	16.53	17.95	-2.34	-1.11	-0.17
GDP (billion USD, 2010price PPP)									
1.5°C			2°C			2-1.5°C			
Country	SSP126	SSP245	SSP585	SSP126	SSP245	SSP585	SSP126	SSP245	SSP585
Canada	373.60	373.74	398.99	719.26	499.22	563.41	345.67	125.48	164.41
United States	3639.14	3517.35	3759.94	6699.26	4554.66	5118.33	3060.12	1037.32	1358.38
Colombia	192.32	184.47	191.51	617.84	296.93	311.37	425.52	112.46	119.86
Japan	575.07	553.76	590.57	873.40	620.73	730.21	298.33	66.97	139.63
Population Exposure Fraction									
1.5°C			2°C			2-1.5°C			
Country	SSP126	SSP245	SSP585	SSP126	SSP245	SSP585	SSP126	SSP245	SSP585
Canada	99.25%	98.88%	98.77%	99.14%	98.32%	98.70%	-0.11%	-0.56%	-0.07%
United States	99.84%	99.60%	99.85%	99.82%	99.85%	99.84%	-0.02%	0.26%	-0.01%
Colombia	84.83%	77.64%	46.20%	57.22%	98.90%	80.06%	-27.61%	21.26%	33.87%
Japan	99.72%	97.95%	99.78%	72.89%	98.65%	99.78%	-26.82%	0.70%	0.00%
GDP Exposure Fraction									
1.5°C			2°C			2-1.5°C			
Country	SSP126	SSP245	SSP585	SSP126	SSP245	SSP585	SSP126	SSP245	SSP585
Canada	99.26%	98.89%	98.79%	99.15%	98.34%	98.72%	-0.11%	-0.55%	-0.07%
United States	99.84%	99.59%	99.85%	99.82%	99.85%	99.84%	-0.02%	0.26%	-0.01%
Colombia	84.85%	77.67%	46.27%	57.27%	98.90%	80.09%	-27.58%	21.23%	33.82%
Japan	99.72%	97.95%	99.78%	72.89%	98.65%	99.78%	-26.82%	0.70%	0.00%