

1 Supplementary

2 The following tables provides the supporting information discussed in the paper.

3 *Table S1: Statistical indices of CMIP6 models in comparison to observational datasets.*

(I) Model Performance Respective to Berkeley Earth Data					(II) Model Performance Respective to GISTEMP Data				
Rank	Model	RMSE	MSE	r ²	Rank	Model	RMSE	MSE	r ²
1	GISS-E2-1-G	0.0000454	0.00674	0.913	1	FGOALS-g3	0.0000496	0.00704	0.899
2	FGOALS-g3	0.0000571	0.00755	0.89	2	GISS-E2-1-G	0.0000591	0.00769	0.88
3	MMM	0.0000772	0.0088	0.851	3	KIOST-ESM	0.0000699	0.00836	0.858
4	IPSL-CM6A-LR	0.0000918	0.00958	0.823	4	IPSL-CM6A-LR	0.0000819	0.00905	0.834
5	KIOST-ESM	0.0000953	0.00976	0.817	5	MMM	0.0000966	0.0098	0.804
6	GFDL-CM4	0.00012	0.0109	0.773	6	CESM2	0.000158	0.0126	0.679
7	BCC-CSM2-MR	0.000127	0.0113	0.756	7	BCC-CSM2-MR	0.000165	0.0129	0.664
8	CESM2	0.000162	0.0127	0.69	8	GFDL-CM4	0.000166	0.0129	0.662
9	NorESM2-LM	0.000168	0.013	0.676	9	NorESM2-LM	0.000181	0.0135	0.631
10	AWI-CM-1-1-MR	0.00017	0.013	0.673	10	AWI-CM-1-1-MR	0.000184	0.0136	0.627
11	E3SM-1-1	0.000367	0.0192	0.294	11	E3SM-1-1	0.000407	0.0202	0.173
12	EC-Earth3	0.00109	0.033	-1.1	12	EC-Earth3	0.00118	0.0344	-1.403

4 *Table S2: Estimation of the arrival timing of tipping points.*

(I) FGOALS-g3				(II) GISS-E2-1-G			
Region	1.5 °C	2.0 °C	2.5 °C	Region	1.5 °C	2.0 °C	2.5 °C
Global (Years)	2024 ± 2.50	2054 ± 7.90	2087 ± 10.55	Global (Years)	2024 ± 1.34	2039 ± 2.83	2057 ± 5.03
Arctic (Years)	< 2014	< 2014	< 2014	Arctic (Years)	< 2014	< 2014	< 2014
Antarctica (Years)	2020 ± 3.70	2031 ± 14.72	2060 ± 5.74	Antarctica (Years)	2024 ± 1.34	2039 ± 2.83	2057 ± 5.03
Tropics (Years)	2030 ± 4.08	2069 ± 9.8	> 2100	Tropics (Years)	2031 ± 3.24	2052 ± 3.90	2086 ± 4.45

(III) IPSL-CM6A-LR				(IV) GFDL-ESM4			
Region	1.5 °C	2.0 °C	2.5 °C	Region	1.5 °C	2.0 °C	2.5 °C
Global (Years)	2015 ± 0.97	2021 ± 2.64	2033 ± 3.26	Global (Years)	2032 ± 11.79	2051 ± 5.13	2076 ± 5.29
Arctic (Years)	< 2014	< 2014	< 2014	Arctic (Years)	< 2014	< 2014	< 2014
Antarctica (Years)	2018 ± 2.92	2022 ± 5.53	2032 ± 8.72	Antarctica (Years)	2016 ± 0.58	2025 ± 11.55	2050 ± 6.03
Tropics (Years)	2023 ± 3.75	2038 ± 4.85	2056 ± 5.07	Tropics (Years)	2034 ± 10.39	2064 ± 3.51	2099 ± 2.12

(V) CESM2				(VI) NorESM2-LM			
Region	1.5 °C	2.0 °C	2.5 °C	Region	1.5 °C	2.0 °C	2.5 °C
Global (Years)	2018 ± 4.62	2030 ± 2.08	2042 ± 3.21	Global (Years)	2039 ± 2.31	2067 ± 3.51	2092 ± 7.55
Arctic (Years)	< 2014	< 2014	< 2014	Arctic (Years)	< 2014	< 2014	< 2014
Antarctica (Years)	2016 ± 0.58	2017 ± 2.65	2026 ± 4.04	Antarctica (Years)	2027 ± 7.02	2062 ± 5.03	> 2100
Tropics (Years)	2029 ± 3.21	2041 ± 2.52	2062 ± 5.69	Tropics (Years)	2042 ± 2.65	2068 ± 1.15	> 2100

(VII) EC-Earth3				(VIII) Multi-Model Mean			
Region	1.5 °C	2.0 °C	2.5 °C	Region	1.5 °C	2.0 °C	2.5 °C
Global (Years)	2016 ± 0.97	2025 ± 4.72	2041 ± 5.53	Global (Years)	2020 ± 8.12	2034 ± 14.81	2053 ± 21.73
Arctic (Years)	< 2014	< 2014	< 2014	Arctic (Years)	< 2014	< 2014	< 2014
Antarctica (Years)	2018 ± 3.18	2030 ± 5.68	2044 ± 8.43	Antarctica (Years)	2020 ± 6.25	2031 ± 16.03	2048 ± 25.45
Tropics (Years)	2026 ± 5.10	2045 ± 5.54	2066 ± 3.57	Tropics (Years)	2028 ± 6.96	2050 ± 12.57	2075 ± 18.08