

Table S1. Thermal and carbon variables for years 120 to 140 for the 9 CMIP6 and 7 CMIP5 Earth system models following a 1% annual increase in atmospheric CO₂. Model mean, intermodel standard deviation and coefficient of variation are included with the coefficient of variation defined by the intermodel standard deviation divided by the model mean.

Variable: Units:	ΔT K	F W m ⁻²	N W m ⁻²	λ (W m ⁻²)K ⁻¹	N/F	I_{em} PgC	$\Delta I_{atmos}/I_{em}$	$\Delta I_{ocean}/I_{em}$	$\Delta I_{land}/I_{em}$
CMIP6:									
BCC-CSM2-MR	3.75	6.70	1.93	1.27	0.29	3067	0.52	0.21	0.27
CanESM5	5.91	6.95	2.79	0.71	0.40	3177	0.50	0.16	0.34
CESM2	4.64	7.74	2.66	1.10	0.34	2691	0.59	0.19	0.22
CESM2-WACCM	4.38	7.39	2.72	1.10	0.37	2834	0.56	0.18	0.26
CNRM-ESM2-1	4.84	7.26	2.47	0.95	0.34	2755	0.57	0.18	0.25
IPSL-CM6A-LR	5.15	6.89	2.20	0.95	0.32	2581	0.61	0.20	0.18
MIROC-ES2L	3.35	7.50	2.31	1.49	0.31	2737	0.58	0.18	0.24
NorESM2-LM	3.01	8.09	1.91	2.18	0.24	2727	0.58	0.20	0.22
UKESM1-0-LL	5.92	6.94	2.76	0.73	0.40	2519	0.64	0.20	0.16
mean, \bar{x}	4.55	7.27	2.42	1.16	0.33	2787	0.57	0.19	0.24
std, σ_x	1.04	0.45	0.35	0.45	0.05	213	0.04	0.02	0.05
σ_x/\bar{x}	0.23	0.06	0.14	0.39	0.16	0.08	0.08	0.08	0.22
CMIP5:									
BCC-CSM1-1	3.79	6.71	1.66	1.28	0.25	2871	0.55	0.21	0.24
BNU-ESM	4.84	7.01	2.35	0.94	0.33	2530	0.63	0.17	0.20
CanESM2	4.77	7.64	2.15	1.15	0.28	2547	0.63	0.19	0.18
HadGEM2-ES	5.06	6.12	2.20	0.76	0.36	2794	0.57	0.19	0.24
IPSL-CM5A-LR	4.61	6.15	2.31	0.82	0.38	2913	0.54	0.21	0.25
MIROC-ESM	4.97	8.52	3.06	1.13	0.36	2293	0.69	0.23	0.08
MPI-ESM-LR	4.60	8.33	2.28	1.29	0.27	2965	0.54	0.19	0.27
mean, \bar{x}	4.66	7.21	2.28	1.05	0.32	2702	0.59	0.20	0.21
std, σ_x	0.42	0.98	0.41	0.21	0.05	249	0.06	0.02	0.06
σ_x/\bar{x}	0.09	0.14	0.18	0.20	0.16	0.09	0.10	0.09	0.31

Table S2. TCRE and its components for years 120 to 140 for the 9 CMIP6 and 7 CMIP5 Earth system models following a 1% annual increase in atmospheric CO₂. Model mean, intermodel standard deviation and coefficient of variation are included with the coefficient of variation defined by the intermodel standard deviation divided by the model mean.

Variable: Units:	TCRE K EgC ⁻¹	$\Delta T/\Delta I_{atmos}$ K EgC ⁻¹	$\Delta T/\Delta F$ K(Wm ⁻²) ⁻¹	$\Delta F/I_{em}$ (Wm ⁻²)(EgC) ⁻¹	λ^{-1} K(Wm ⁻²) ⁻¹	$(1-N/\Delta F)$	$\Delta F/\Delta I_{atmos}$ (Wm ⁻²)(EgC) ⁻¹	$\Delta I_{atmos}/I_{em}$
CMIP6:								
BCC-CSM2-MR	1.22	2.36	0.56	2.19	0.78	0.71	4.23	0.52
CanESM5	1.86	3.74	0.85	2.19	1.42	0.60	4.40	0.50
CESM2	1.72	2.93	0.60	2.88	0.91	0.66	4.90	0.59
CESM2-WACCM	1.55	2.77	0.59	2.61	0.91	0.63	4.67	0.56
CNRM-ESM2-1	1.76	3.07	0.67	2.64	1.06	0.66	4.60	0.57
IPSL-CM6A-LR	1.99	3.25	0.75	2.67	1.05	0.68	4.36	0.61
MIROC-ES2L	1.22	2.12	0.45	2.74	0.67	0.69	4.74	0.58
NorESM2-LM	1.10	1.90	0.37	2.97	0.46	0.76	5.12	0.58
UKESM1-0-LL	2.35	3.67	0.85	2.76	1.37	0.60	4.31	0.64
mean, \bar{x}	1.64	2.87	0.63	2.63	0.96	0.67	4.59	0.57
std, σ_x	0.41	0.65	0.17	0.27	0.31	0.05	0.30	0.04
σ_x/\bar{x}	0.25	0.23	0.26	0.10	0.32	0.08	0.06	0.08
CMIP5:								
BCC-CSM1-1	1.32	2.38	0.57	2.34	0.78	0.75	4.22	0.55
BNU-ESM	1.92	3.05	0.69	2.78	1.06	0.67	4.42	0.63
CanESM2	1.88	3.00	0.62	3.01	0.87	0.72	4.81	0.63
HadGEM2-ES	1.81	3.18	0.82	2.20	1.32	0.64	3.85	0.57
IPSL-CM5A-LR	1.58	2.91	0.75	2.11	1.21	0.62	3.89	0.54
MIROC-ESM	2.16	3.13	0.58	3.72	0.88	0.64	5.39	0.69
MPI-ESM-LR	1.55	2.89	0.55	2.81	0.78	0.73	5.24	0.54
mean, \bar{x}	1.75	2.94	0.66	2.71	0.99	0.68	4.55	0.59
std, σ_x	0.28	0.27	0.10	0.56	0.21	0.05	0.62	0.06
σ_x/\bar{x}	0.16	0.09	0.16	0.21	0.21	0.07	0.14	0.10