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Rapid communication: Nonlinear sensitivity of the El Niño–Southern Oscillation across climate states

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Table S1. Values for the nonlinear Bjerknes feedback (a) and convective feeback (l) computed using the pre-industrial control simulation of each model. Values for change in niño3 index (N3 in %) and convection-centers index (D in degrees) for each simulation. MH: mid-Holocene, LIG: last interglacial; LGM; last glacial maximum; MP: mid-Pliocene; 4xCO2: abrupt-4xCO2; SSP585-23 and SSP126-23. Models in bold have met the convective feedback selection criteria (convective feedback greater than 2). ITCZ and SPCZ columns indicate the true position in the pre-industrial control simulation (PI). *a* indicates the nonlinear coefficient of the relationship between the first two principal components of SSTa anomalies in the tropical Pacific. Asterisk indicates models that meet the nonlinear Bjerknes feedback criteria ($a > 0.16$).

	PI	MH	LIG	LGM	MP	4xCO2	SSP585-23	SSP126-23
	a / *l*	N3 / D	N3 / D	N3 / D	N3 / D	N3 / D	N3 / D	N3 / D
ACCESS-CM2	-0.07 / 4.9	X	X	X	X	10 / -3.08	-59 / -7.87	11 / -0.66
ACCESS-ESM1-5	-0.02 / 3.2	-10 / 1.5	-16 / 1.2	X	X	25 / -3.2	-33 / -10.6	-8 / -0.72
CAMS-CSM1-0*	-0.26 / 2.1	X	X	X	X	1.3 / -1.51	X	X
CanESM5	0.07 / 2.2	X	X	X	X	26.5 / -4	-55 / -9.6	13 / -0.8
CCSM4	x / 3.4	X	X	X	-43 / 0.46	X	X	X
CCSM4-UTRECTH*	-0.5 / 2	X	X	X	-64 / 2.24	X	X	X
CESM2*	-0.18 / 2.8	-11 / 0.7	-20 / 1.5	X	-13 / -1.9	-67 / -12.15	X	X
CESM2-FV2*	-0.33 / 2.8	X	X	X	X	-6 / -8.51	X	X
CESM2-WACCM	-0.03 / 2.1	X	X	X	X	2 / -7.49	-68 / -12.7	10 / -4.5
CESM2-WACCM-FV2*	-0.69 / 3	X	X	-43 / 2.2	X	-26 / -8.39	X	X
CIESM	-0.19 / 2.2	X	X	X	X	-16 / -4.4	X	X
CMCC-CM2-SR5*	-0.54 / 1.9	X	X	X	X	27 / -2.86	X	X
CMCC-ESM2*	-0.63 / 2.1	X	X	X	X	26 / -2.7	X	X
CNRM-CM6-1-HR	-0.09 / 2.6	X	X	X	X	X	X	X
CNRM-CM6-1	-0.05 / 2	X	-21 / 0.9	X	X	12 / -2.84	X	X
CNRM-ESM2-1	-0.09 / 2.3	X	X	X	X	12 / -2.66	X	X
EC-EARTH3*	-0.16 / 2.2	X	X	X	X	X	X	X
EC-EARTH3-CC	-0.09 / 2.1	X	X	X	X	X	X	X
EC-EARTH3-LR	-0.01 / 2.3	-3 / 0.1	-13 / 0.9	X	-34 / 1.66	X	X	X
FGOALS-f3-L*	-0.64 / 3.4	-3 / 0.34	-25 / 1.07	X	X	3 / -5	X	X
FGOALS-g3	-0.04 / 2.7	-25 / 0.52	-24 / 0.9	X	X	X	X	X
GISS-E2-1-G*	-0.73 / 5	4 / 0.17	-9 / 0.65	X	X	-12 / -2.58	X	-5
GISS-E2-2-G*	-0.46 / 3.2	X	X	X	4.3 / 0.09	-17 / -1.37	X	X
HadGEM3-GC31-LL	-0.12 / 2.6	19 / 1.1	X	X	X	24 / -2	X	X
HadGEM3-GC31-MM*	-0.2 / 3.3	X	X	X	X	2 / -3.07	X	X
IITM-ESM*	-0.2 / 3.8	X	X	X	X	X	X	X
INM-CM4-8	0.04 / 3	13.7 / 1.14	X	33.7 / -2.73	X	-4 / -0.82	X	X

INM-CM5-0	0.08 / 2.9	X	X	X	X	-6 / -0.93	X	X
KIOST-ESM*	-0.36 / 3	X	X	X	X	X	X	X
MIROC-ES2L*	-0.57 / 2	-35 / 1.21	-53.6 / 1.27	-5.3 / -0.06	X	39 / -4.48	-13 / -8.5	X
MRI-ESM2-0*	-0.42 / 3.7	-24.8 / 1.05	X	X	-28.1 / 0.69	22 / -3.43	5 / -5.2	11 / -2
Nor-ESM1-F	-0.07 / 5.1	-6.6 / -0.56	-21 / 0.7	X	-33.2 / 0.33	X	X	X
UKESM1-0-LL	-0.04 / 2.1	X	X	X	X	-1 / -2.59	X	X
BCC-CM2-MR	-0.02 / 1.4	X	X	X	X	X	X	X
BCC-ESM1	-0.07 / 1.5	X	X	X	X	X	X	X
CCSM4-UofT	0 / 1.3	X	X	X	-29 / -0.7	X	X	X
COSMOS	-0.11 / 0.4	X	X	X	-3.2 / -0.92	X	X	X
CanESM5-CanOE	-0.12 / 1.9	X	X	X	X	X	X	X
E3SM-1-0	0.07 / 1.5	X	X	X	X	X	X	X
E3SM-1-1-ECA	-0.02 / -	X	X	X	X	X	X	X
E3SM-1-1	0.06 / 1.4	X	X		X	X	X	X
EC-EARTH3-AerChem	X / 1.8	X	X	X	X	X	X	X
EC-EARTH3-Veg-LR	X / 0.7	X	X	X	X	X	X	X
EC-EARTH3-Veg	-0.08 / 1.8	X	X	X	X	X	X	X
FIO-ESM-2-0*	-0.33 / X	X	X	X	X	X	X	X
GFDL-CM4	-0.02 / X	X	X	X	X	X	X	X
GFDL-ESM4*	-0.16 / X	X	X	X	X	X	X	X
GISS-E2-1-H*	-0.32 / 1.7	X	X	X	X	X	X	X
GISS-E2-2-H	-0.11 / 1.2	X	X	X	X	X	X	X
HadCM3	-0.06 / X	X	X	X	-41.7 / 1.89	X	X	X
IPSL-CM5A2	-0.06 / 1.2	X	X	X	-18.2 / 0.03	X	X	X
IPSL-CM5A	-0.05 / 1.4	X	X	X	-15.1 / -0.04	X	X	X
IPSL-CM6A-LR		-4.8 / 0.78	-8.5 / 0.49		-12.2 / 0.3	X	-25 / -5.4	15 / -0.1
NorESM1-L	-0.06 / 1.5	X	X	X	-29.4 / 0.24	X	X	X
NorESM2-LM*	-0.23 / 1.5	-23.3 / 1.22	-1.1 / 2.71	X	X	X	X	X