

**ENSO feedback biases common to atmosphere-ocean coupled and atmosphere-only simulations of CMIP6 climate models**M. Hayashi<sup>1</sup><sup>1</sup>Earth System Division, National Institute for Environmental Studies, Tsukuba, Japan.**Contents of this file**

Tables S1 to S2

**Introduction**

This supplementary information contains the model list used in this study (Table S1) and the linear regression coefficients of various atmospheric anomalies onto the Niño-3.4 sea surface temperature (SST) and equatorial Pacific precipitation anomalies averaged in the observational datasets and the CMIP6 historical and AMIP simulations (Table S2).



**Table S1.** Model list used in this study.

	Model name	Realization	Unavailable*
1	ACCESS-CM2	r1i1p1f1	
2	ACCESS-ESM1-5	r1i1p1f1	
3	BCC-CSM2-MR	r1i1p1f1	
4	BCC-ESM1	r1i1p1f1	
5	CESM2-WACCM	r1i1p1f1	Us
6	CESM2	r1i1p1f1	Us
7	CMCC-CM2-HR4	r1i1p1f1	
8	CMCC-CM2-SR5	r1i1p1f1	
9	CNRM-CM6-1-HR	r1i1p1f2	
10	CNRM-CM6-1	r1i1p1f2	
11	CNRM-ESM2-1	r1i1p1f2	
12	CanESM5	r1i1p2f1	
13	E3SM-1-0	r1i1p1f1	Us
14	EC-Earth3-AerChem	r1i1p1f1	
15	EC-Earth3-CC	r1i1p1f1	
16	EC-Earth3-Veg	r1i1p1f1	
17	FGOALS-f3-L	r1i1p1f1	
18	FGOALS-g3	r1i1p1f1	Us
19	GFDL-CM4	r1i1p1f1	
20	GISS-E2-1-G	r1i1p1f1	
21	HadGEM3-GC31-LL	r1i1p1f3	
22	INM-CM5-0	r1i1p1f1	
23	IPSL-CM6A-LR	r1i1p1f1	
24	KIOST-ESM	r1i1p1f1	Q, Q <sub>LH</sub>
25	MIROC-ES2L	r1i1p1f2	
26	MIROC6	r1i1p1f1	
27	MPI-ESM1-2-HR	r1i1p1f1	
28	MPI-ESM1-2-LR	r1i1p1f1	
29	MRI-ESM2-0	r1i1p1f1	
30	NESM3	r1i1p1f1	
31	SAM0-UNICON	r1i1p1f1	Us
32	UKESM1-0-LL	r1i1p1f2	

\*The surface zonal wind (Us), net surface heat flux (Q), and surface latent heat flux (Q<sub>LH</sub>) are not available in some models due to data limitation.



**Table S2.** Ensemble averaged regression coefficients (observations, historical, AMIP) with units and relative values to observations on average (historical/obs, AMIP/obs).

X variable*	Y variable*	Unit	observations	historical	AMIP	historical/obs	AMIP/obs
Niño-3.4 SST	EqPac P	(mm day <sup>-1</sup> )/°C	1.71	1.28	1.74	75%	102%
Niño-3.4 SST	CPac U	(0.01 N m <sup>-2</sup> )/°C	1.06	0.58	0.90	55%	84%
Niño-3.4 SST	CPac Us	(m s <sup>-1</sup> )/°C	1.00	0.60	0.86	59%	85%
Niño-3.4 SST	CPac U850	(m s <sup>-1</sup> )/°C	2.00	1.33	1.82	66%	91%
Niño-3.4 SST	Niño-3 Ω500	(0.01 Pa s <sup>-1</sup> )/°C	-0.95	-0.58	-0.85	61%	89%
Niño-3.4 SST	Niño-4 Ω500	(0.01 Pa s <sup>-1</sup> )/°C	-2.05	-1.65	-2.38	81%	116%
Niño-3.4 SST	EqPac Q	(W m <sup>-2</sup> )/°C	-15.13	-8.19	-13.59	54%	90%
Niño-3.4 SST	EqPac Q <sub>SW</sub>	(W m <sup>-2</sup> )/°C	-9.18	-4.87	-8.79	53%	96%
Niño-3.4 SST	EqPac Q <sub>LW</sub>	(W m <sup>-2</sup> )/°C	0.96	1.11	1.33	115%	138%
Niño-3.4 SST	EqPac Q <sub>SH</sub>	(W m <sup>-2</sup> )/°C	-1.54	-0.38	-0.90	25%	58%
Niño-3.4 SST	EqPac Q <sub>LH</sub>	(W m <sup>-2</sup> )/°C	-5.37	-3.96	-5.18	74%	96%
EqPac P	CPac U	(0.01 N m <sup>-2</sup> )/(mm day <sup>-1</sup> )	0.48	0.32	0.38	67%	80%
EqPac P	CPac Us	(m s <sup>-1</sup> )/(mm day <sup>-1</sup> )	0.47	0.36	0.39	76%	83%
EqPac P	CPac U850	(m s <sup>-1</sup> )/(mm day <sup>-1</sup> )	0.95	0.79	0.81	84%	86%
EqPac P	Niño-3 Ω500	(0.01 Pa s <sup>-1</sup> )/(mm day <sup>-1</sup> )	-0.62	-0.48	-0.55	78%	89%
EqPac P	Niño-4 Ω500	(0.01 Pa s <sup>-1</sup> )/(mm day <sup>-1</sup> )	-1.09	-1.28	-1.30	117%	119%
EqPac P	EqPac Q	(W m <sup>-2</sup> )/(mm day <sup>-1</sup> )	-7.32	-6.07	-7.13	83%	97%
EqPac P	EqPac Q <sub>SW</sub>	(W m <sup>-2</sup> )/(mm day <sup>-1</sup> )	-5.50	-4.55	-5.37	83%	98%
EqPac P	EqPac Q <sub>LW</sub>	(W m <sup>-2</sup> )/(mm day <sup>-1</sup> )	0.76	1.04	0.92	137%	121%
EqPac P	EqPac Q <sub>SH</sub>	(W m <sup>-2</sup> )/(mm day <sup>-1</sup> )	-0.75	-0.30	-0.45	40%	60%
EqPac P	EqPac Q <sub>LH</sub>	(W m <sup>-2</sup> )/(mm day <sup>-1</sup> )	-1.83	-2.20	-2.23	120%	122%

\*The Y anomalies are regressed onto the X anomalies. See the main text for the variables and averaged regions.