

Supporting Information

Medeiros and Nuijens 10.1073/pnas.1521494113

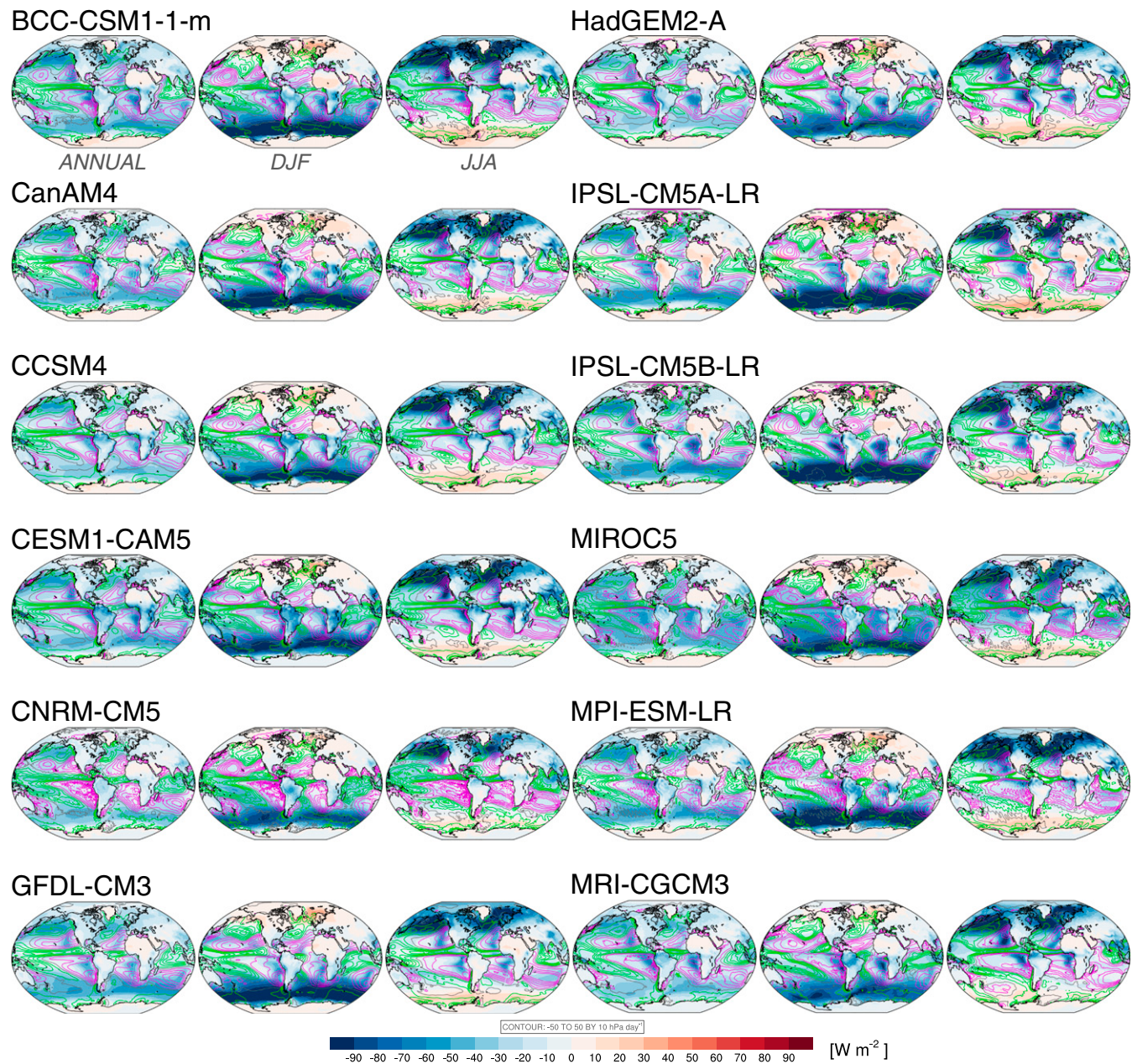


Fig. S1. As in Fig. 1, but for each AMIP simulation (nominally 1979–2005).

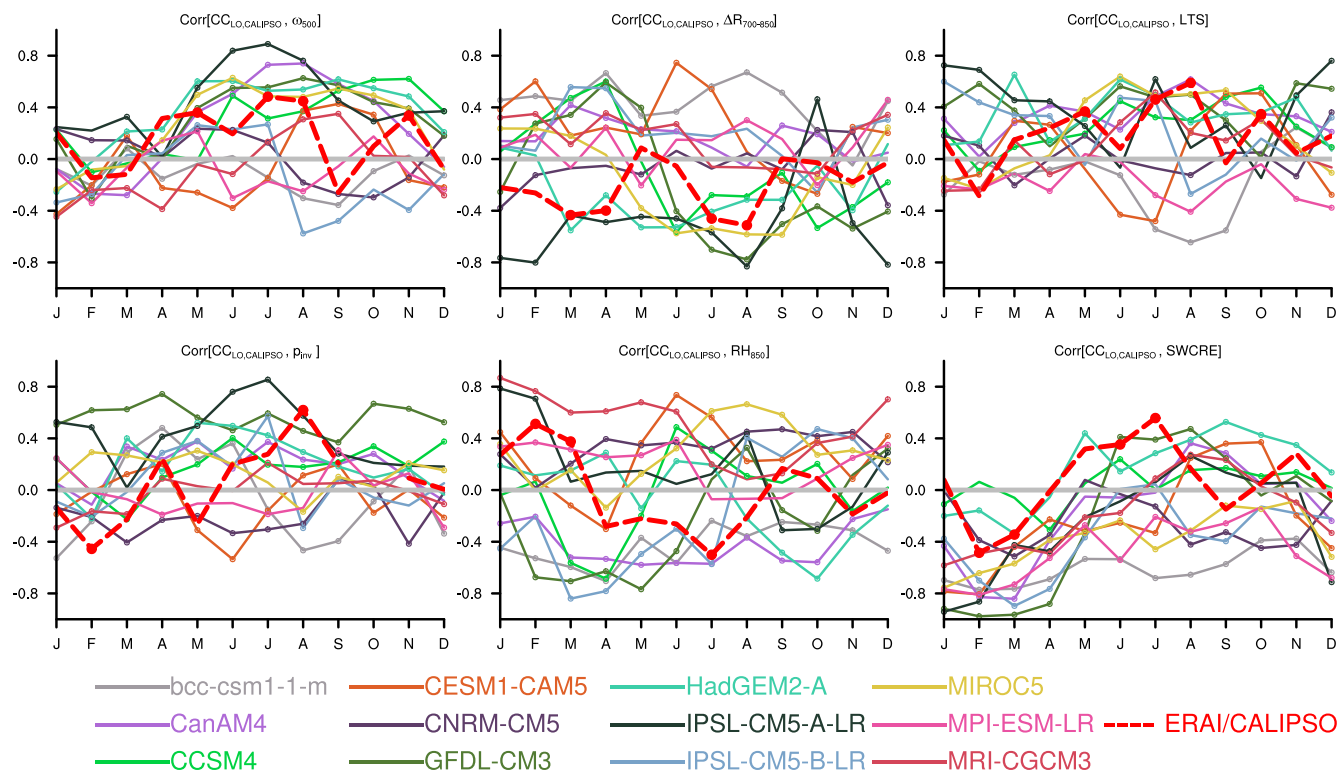


Fig. S2. Correlation coefficients between low-level CC and vertical velocity, humidity mixing, LTS, inversion level, 850-hPa relative humidity, and SWCRE (left to right and top to bottom) for the Barbados region. Correlations are calculated using monthly means for each calendar month for all available months during the AMIP simulations; observational correlations are regressed to the CALIPSO-GOCCP horizontal grid and calculated for the overlapping temporal period. Markers along the lines denote statistical significance at the 95% level.

Table S1. Diagnostic quantities displayed as the mean and SD within the moderate subsidence regimes ($18 \leq \omega_{500} \leq 28 \text{ hPa} \cdot \text{d}^{-1}$) over tropical oceans ($35^\circ\text{S} - 35^\circ\text{N}$)

Model	SWCRE	LCL	CF _{LCL}	CF ₈₅₀	LTS	RH ₈₅₀	$\Delta RH_{700-850}$	P_{inv}
ERAI/Satellite	-37 ± 11	957 ± 7	17.4 ± 8.9	6.8 ± 6.17	16.2 ± 1.12	60.6 ± 7.50	-29.2 ± 9.0	811 ± 56
BCC-CSM1-1-m	-50 ± 13	954 ± 13	21.0 ± 7.19	14 ± 4.11	16.1 ± 1.42	63.7 ± 7.03	-28.4 ± 9.2	775 ± 71
CanAM4	-38 ± 13	950 ± 12	20.8 ± 7.87	3.75 ± 3.04	14.7 ± 1.29	56.6 ± 9.06	-23.8 ± 11.1	808 ± 67
CCSM4	-40 ± 16	946 ± 20	16.5 ± 5.82	16.2 ± 4.7	15.7 ± 1.2	69.7 ± 7.06	-33.0 ± 10.2	741 ± 62
CESM1-CAM5	-37 ± 10	925 ± 18	19.3 ± 5.46	7.87 ± 4.86	15.2 ± 1.24	66 ± 8.04	-19.6 ± 6.9	756 ± 68
CNRM-CM5	-26 ± 11	938 ± 22	7.48 ± 4.13	6.86 ± 3.74	15.6 ± 1.07	61.9 ± 8.38	-34.5 ± 10.5	815 ± 49
GFDL-CM3	-35 ± 12	945 ± 17	10.9 ± 6.36	8.09 ± 5.31	16.7 ± 1.33	65.5 ± 8.71	-35.1 ± 11.8	816 ± 55
HadGEM2-A	-37 ± 12	953 ± 15	9.97 ± 6.06	8.51 ± 4.14	15.3 ± 1.31	58.4 ± 8.25	-27.1 ± 10.7	796 ± 72
IPSL-CM5A-LR	-41 ± 14	957 ± 16	15.3 ± 9.07	2.16 ± 2.07	15.4 ± 1.24	59.4 ± 8.54	-20.6 ± 12.4	745 ± 71
IPSL-CM5B-LR	-41 ± 15	948 ± 14	20.3 ± 11	2.3 ± 2.5	14.1 ± 1.16	65.4 ± 8.35	-20.7 ± 9.7	704 ± 60
MIROC5	-58 ± 12	914 ± 18	21.6 ± 6.78	14.1 ± 6.13	14.4 ± 1.33	68.2 ± 9.69	-29.3 ± 12.3	821 ± 47
MPI-ESM-LR	-35 ± 15	960 ± 16	10.8 ± 8.67	2.49 ± 2.61	14.6 ± 1.38	64.9 ± 7.41	-23.4 ± 10.5	758 ± 60
MRI-CGCM3	-41 ± 16	944 ± 13	8.42 ± 5.38	7.13 ± 3.7	15.4 ± 1.29	65.5 ± 7.11	-24.4 ± 9.1	754 ± 60

From left to right are SWCRE, pressure of diagnosed LCL, CF at that model level, CF at the model level nearest 850 hPa, LTS, relative humidity at 850 hPa, $\Delta RH_{700-850}$, and the inversion level (P_{inv}). The variability reported is the area-weighted average of the temporal SD; the average area-weighted SD is larger for all quantities because of the spatial variability.

Table S2. As in Table S1, but for the weak convection regime ($-15 \leq \omega_{500} \leq -5 \text{ hPa}\cdot\text{d}^{-1}$)

Model	SWCRE	LCL	CF_{LCL}	CF_{850}	LTS	RH_{850}	$\Delta RH_{700-850}$	P_{inv}
ERA1/Satellite	-51 ± 12	959 ± 6	9.4 ± 4.9	6.5 ± 4.6	14.4 ± 0.85	72.1 ± 5.4	-23.9 ± 6.8	720 ± 72
BCC-CSM1-1-m	-67 ± 15	949 ± 14	19.2 ± 6.47	13.5 ± 3.79	13.8 ± 1.14	69.1 ± 6.06	-20.5 ± 7.9	682 ± 58
CanAM4	-52 ± 16	949 ± 12	14.7 ± 6.32	6.61 ± 3.97	13.1 ± 0.946	68.3 ± 7.13	-23.5 ± 8.1	753 ± 69
CCSM4	-59 ± 19	952 ± 22	14.6 ± 4.03	15.4 ± 3.6	13.6 ± 0.865	75.5 ± 5.22	-20.7 ± 7.7	658 ± 44
CESM1-CAM5	-54 ± 11	924 ± 16	20.5 ± 4.49	13.9 ± 4.54	13.1 ± 0.876	76.9 ± 5.48	-15.3 ± 5.2	669 ± 44
CNRM-CM5	-55 ± 13	920 ± 21	12.3 ± 4.84	12.4 ± 4.15	14 ± 0.912	73.4 ± 6.78	-28.9 ± 10.0	787 ± 55
GFDL-CM3	-53 ± 13	945 ± 19	8.4 ± 4.74	8.6 ± 4.68	14.3 ± 1.03	74.3 ± 6.23	-24.8 ± 9.4	722 ± 71
HadGEM2-A	-49 ± 12	954 ± 13	7.77 ± 4.61	11 ± 3.56	13.6 ± 0.95	66.7 ± 5.9	-19.5 ± 7.7	709 ± 67
IPSL-CM5A-LR	-43 ± 15	972 ± 12	4.82 ± 5.4	1.62 ± 1.63	13.5 ± 0.84	67.4 ± 6.31	-8.9 ± 8.1	648 ± 46
IPSL-CM5B-LR	-53 ± 15	943 ± 13	10.9 ± 6.85	4.2 ± 2.9	12.6 ± 0.904	76.9 ± 6	-17.4 ± 7.6	644 ± 43
MIROC5	-73 ± 13	910 ± 17	19.1 ± 5.65	14.3 ± 5.3	12.7 ± 1.01	77.8 ± 6.76	-22.8 ± 9.8	798 ± 52
MPI-ESM-LR	-48 ± 16	955 ± 16	9.41 ± 8.41	3.27 ± 2.45	13.2 ± 1.09	72 ± 5.97	-17.3 ± 8.4	726 ± 59
MRI-CGCM3	-60 ± 17	943 ± 13	5.03 ± 3.64	10.7 ± 3.84	13.9 ± 1.01	72.9 ± 5.7	-15.6 ± 6.8	697 ± 51