Supplementary Information for

The Effects of Anthropogenic and Volcanic Aerosols and Greenhouse Gases on 20th Century Sahel Precipitation

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Figure S1 shows the scaled power spectra (PS) from Figures 5c and 5d in the style of Figures 5a and 5b, where the PS for each model (averaged over the runs for that model, and in the case of the piC, over different sections of the long piC run) are represented separately, colored by the rainfall bias of that model's ALL runs relative to observations. While the correction seems to completely get rid of the stratification by total rainfall bias at medium and low frequency in the ALL simulations, it seems to overcorrect the power in the simulations of the driest models at high frequency in the ALL simulations, and at all frequencies in the piC simulations. This is perhaps not surprising, as when a model is particularly dry, normal variability may make up a larger fraction of the total rainfall. As this correction is imperfect, we do not use it in the calculation of the MMM; rather, only to facilitate comparison of the models in Figure 5.

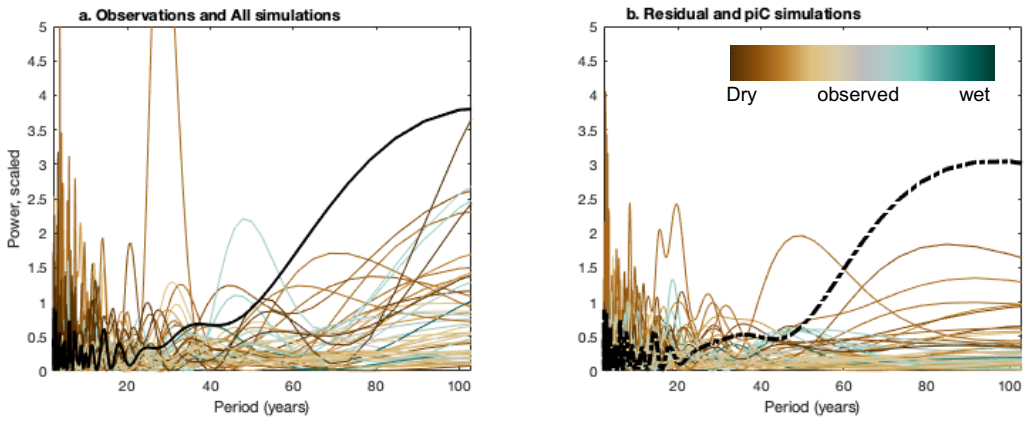

Figure S1. Scaled Stratification: Same as Figures 5c and 5d but displayed as in Figures 5a and 5b.

Power spectra (PS) of observed 20th century Sahel rainfall (solid black, a) and the residual after removing the ALL MMM (black dotted-dashed, b), and mean PS by model of individual ALL (a) and piC (b) runs which were first rescaled by model so their corresponding ALL runs match 20th century observed JAS rainfall, colored by original simulated average JAS rainfall bias of the ALL runs compared to 20th century observations, where observed rainfall is grey, wet models are turquoise, and dry models are brown. piC PS are averaged over multiple segments of the simulations.

Table S1 displays the models and runs used in this study, as well as their institution classifications.

	ALL				AA				GHG				NAT	
Models	p	Num runs used	runs excluded	reason	p	Num runs used	runs excluded	reason	p	Num runs used	runs excluded	reason	p	Num runs used
ACCESS1-0	1	1												
ACCESS1-3	1	1							1	1			1	3
bcc-csm1-1	1	3							1	1			1	1
bcc-csm1-1-m	1	3												
BNU-ESM	1	1							1	1			1	1
CanCM4*	1		all	no data										
CanESM2	1	5		before 1961	4	5			1	5			1	5
CCSM4	1	6			10	3			1	3			1	4
					14									
CESM1-BGC	1	1				2	r6i1p14	access						
CESM1-CAM5	1	3			10	3		error	1	1	r1i1p1,	contain	1	3
CESM1-CAM5-1-FV2*	1	4									r2i1p1	NaN		
CESM1-FASTCHEM	1	3												
CESM1-WACCM	1	1	r4i1p1, r3i1p1, r2i1p1	no data										
CMCC-CESM	1	1		before 1955										
CMCC-CM	1	1												
CMCC-CMS	1	1												
CNRM-CM5	1	10							1	6			1	6
CNRM-CM5-2	1	1												
CSIRO-Mk3-6-0	1	10			4	5			1	5			1	5
EC-EARTH	1	1												
FGOALS-g2	1	4	r2i1p1	no data	1	1			1	1			1	3
FGOALS-s2	1	3		before 1902										
FIO-ESM	1	3												
GFDL-CM3	1	5			1	3			1	3			1	3
GFDL-ESM2G	1	3												
GFDL-ESM2M	1	1			5	1			1	1			1	1
GISS-E2-H	1	6			107	5			1	5			3	5
	2	5			310	5							1	5
GISS-E2-H-CC	1	1												
GISS-E2-R	1	6			107	5			1	5			3	5
	2	5			310	5							1	5
	3	5												
GISS-E2-R-CC	1	1												
HadCM3*	1	10												
HadGEM2-AO	1	1												
HadGEM2-CC	1	1	r3i1p1, r2i1p1	no data										
HadGEM2-ES	1	4		before 1960					1	4			1	4
inmcm4	1	1												
IPSL-CM5A-LR	1	6			3	1			1	3			1	3
IPSL-CM5A-MR	1	3							2	3				
IPSL-CM5B-LR	1	1												
MIROC-ESM	1	3							1	3			1	3
MIROC-ESM-CHEM	1	1							1	1			1	1
MIROC4h	1		all	no data										
MIROC5	1	5		before 1950										
MPI-ESM-LR	1	3												
MPI-ESM-MR	1	3												
MPI-ESM-P	1	2												
MRI-CGCM3	1	3							1	1			1	1
	2	2												
MRI-ESM1*	1	1												
NorESM1-M	1	3			1	1			1	1			1	1
NorESM1-ME	1	1												
Total Models used	51				14				21				22	

*Table S1. Models and runs used in this paper for the different forcing experiments. "p" is the physics number – different physics numbers within the same model are treated as different models. Blank spaces exist in the chart where there were no runs from that model under that forcing experiment. *no accompanying piC run. Doubled lines divide different research institutions.*