

CMIP6 Model-Based Assessment of Anthropogenic Influence on the Long Sustained Western Cape Drought over 2015–19

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CMIP6 simulations.

Table ES1 lists seven CMIP6 simulations that are available for multiple ensemble members (at least three). The five models used in this study are shown in **bold**. We used monthly precipitation data from the ALL, GHG, and NAT forcing runs from up to CMIP6 models. In addition, we used the CMIP6-Scenario Forcing run over 2015–19 (ssp245 or ssp370, depending on more available ensemble runs).

Table ES1. List of seven CMIP6 simulations that have at least three ensemble members for each experiment forcing runs. The five models used in this study are shown in bold.

Climate model	Original resolution		CMIP6-ALL (historical + scenario)		CMIP6-NAT		CMIP6-GHG	
	Latitude	Longitude	Ensemble members	Experiment IDs	Ensemble members	Experiment IDs	Years	Experiment IDs
	Grid Number	Grid Number						
MIROC6	128	256	3 (SSP370)	r1i1p1f1, r2i1p1f1, r3i1p1f1	3	r1i1p1f1, r2i1p1f1, r3i1p1f1	3	r1i1p1f1, r2i1p1f1, r3i1p1f1
BCC-CSM2-MR	160	320	3 (SSP370)	r1i1p1f1, r2i1p1f1, r3i1p1f1	3	r1i1p1f1, r2i1p1f1, r3i1p1f1	3	r1i1p1f1, r2i1p1f1, r3i1p1f1
CCCma-CanESM5	64	128	10 (SSP370)	r1i1p1f1, r2i1p1f1, r3i1p1f1, r4i1p1f1, r5i1p1f1, r6i1p1f1, r7i1p1f1, r8i1p1f1, r9i1p1f1, r10i1p1f1	10	r1i1p1f1, r2i1p1f1, r3i1p1f1, r4i1p1f1, r5i1p1f1, r6i1p1f1, r7i1p1f1, r8i1p1f1, r9i1p1f1, r10i1p1f1	10	r1i1p1f1, r2i1p1f1, r3i1p1f1, r4i1p1f1, r5i1p1f1, r6i1p1f1, r7i1p1f1, r8i1p1f1, r9i1p1f1, r10i1p1f1
CNRM-CM6.1	256	128	10 (SSP245)	r1i1p1f2, r2i1p1f2, r3i1p1f2, r4i1p1f2, r5i1p1f2, r6i1p1f2, r7i1p1f2, r8i1p1f2, r9i1p1f2, r10i1p1f2	10	r1i1p1f2, r2i1p1f2, r3i1p1f2, r4i1p1f2, r5i1p1f2, r6i1p1f2, r7i1p1f2, r8i1p1f2, r9i1p1f2, r10i1p1f2	4	r1i1p1f2, r2i1p1f2, r3i1p1f2, r4i1p1f2
MOHC-Had-GEM3-GC3.1	144	192	4 (ssp245)	r1i1p1f3, r2i1p1f3, r3i1p1f3, r4i1p1f3	4	r1i1p1f3, r2i1p1f3, r3i1p1f3, r4i1p1f3	3	r1i1p1f3, r2i1p1f3, r3i1p1f3
IPSL-CM6A-LR	143	144	9 (SSP245)	r1i1p1f1, r2i1p1f1, r3i1p1f1, r4i1p1f1, r5i1p1f1, r6i1p1f1, r7i1p1f1, r8i1p1f1, r9i1p1f1, r10i1p1f1, r11i1p1f1, r14i1p1f1	10	r1i1p1f1, r2i1p1f1, r3i1p1f1, r4i1p1f1, r5i1p1f1, r6i1p1f1, r7i1p1f1, r8i1p1f1, r9i1p1f1, r10i1p1f1	10	r1i1p1f1, r2i1p1f1, r3i1p1f1, r4i1p1f1, r5i1p1f1, r6i1p1f1, r7i1p1f1, r8i1p1f1, r9i1p1f1, r10i1p1f1
MRI-ESM2.0	160	320	5 (SSP245)	r1i1p1f1, r2i1p1f1, r3i1p1f1, r4i1p1f1, r5i1p1f1	3	r1i1p1f1, r3i1p1f1, r5i1p1f1	5	r1i1p1f1, r2i1p1f1, r3i1p1f1, r4i1p1f1, r5i1p1f1

Model evaluation: Seasonality of precipitation.

Figure ES1 shows the seasonality of the Western Cape precipitation from seven models that provide at least three ensemble members of ALL, NAT, and GHG simulations. After evaluating the seasonality of simulated precipitation, five models were included in this study.

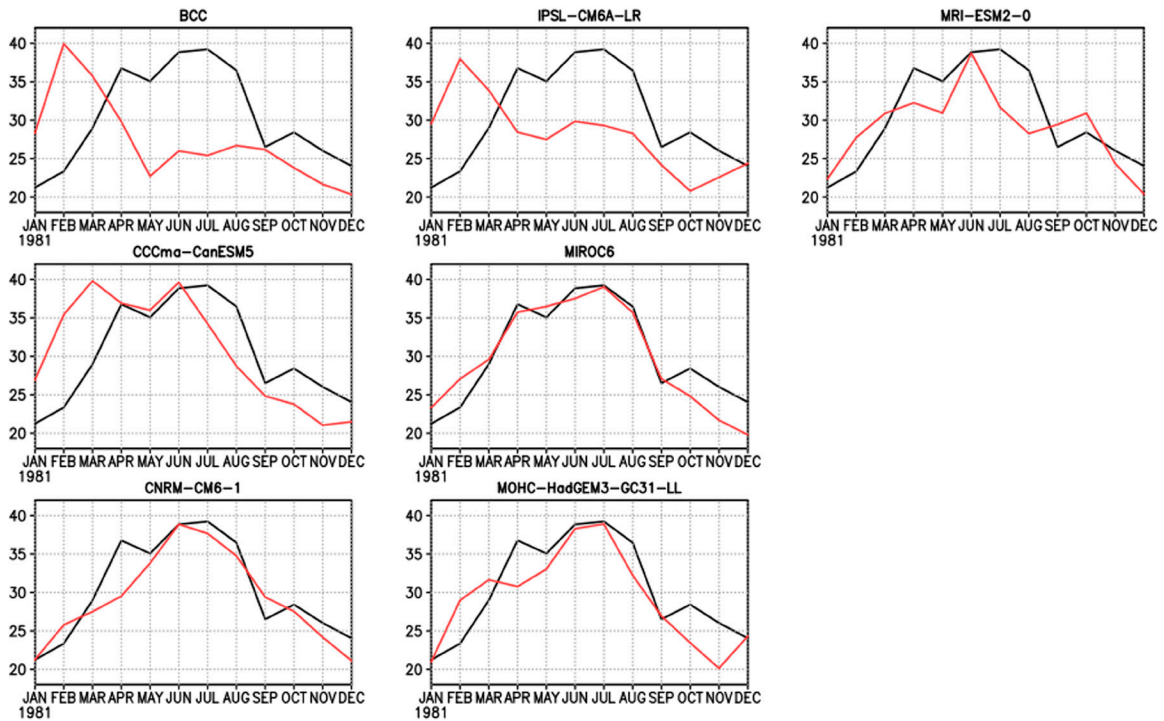


Fig. ES1. Seasonality of precipitation in the seven CMIP6 models. Black and red lines depict seasonality of CRU-based and climate model-based precipitation, respectively.

Histograms of simulated drought durations.

Figure ES2 shows the histograms of simulated drought durations from ALL, NAT, and GHG runs. Totals of 289, 324, and 233 drought events were detected in the ALL, NAT, and GHG runs, respectively. The frequency of the droughts ≥ 1 year and ≤ 2 years in ALL runs is higher than that in NAT runs even if the frequency of the drought longer than five years in the ALL runs is lower than that in the NAT runs. It resulted in almost no difference in the median drought duration between ALL runs and that in NAT runs (1.4 years in both).

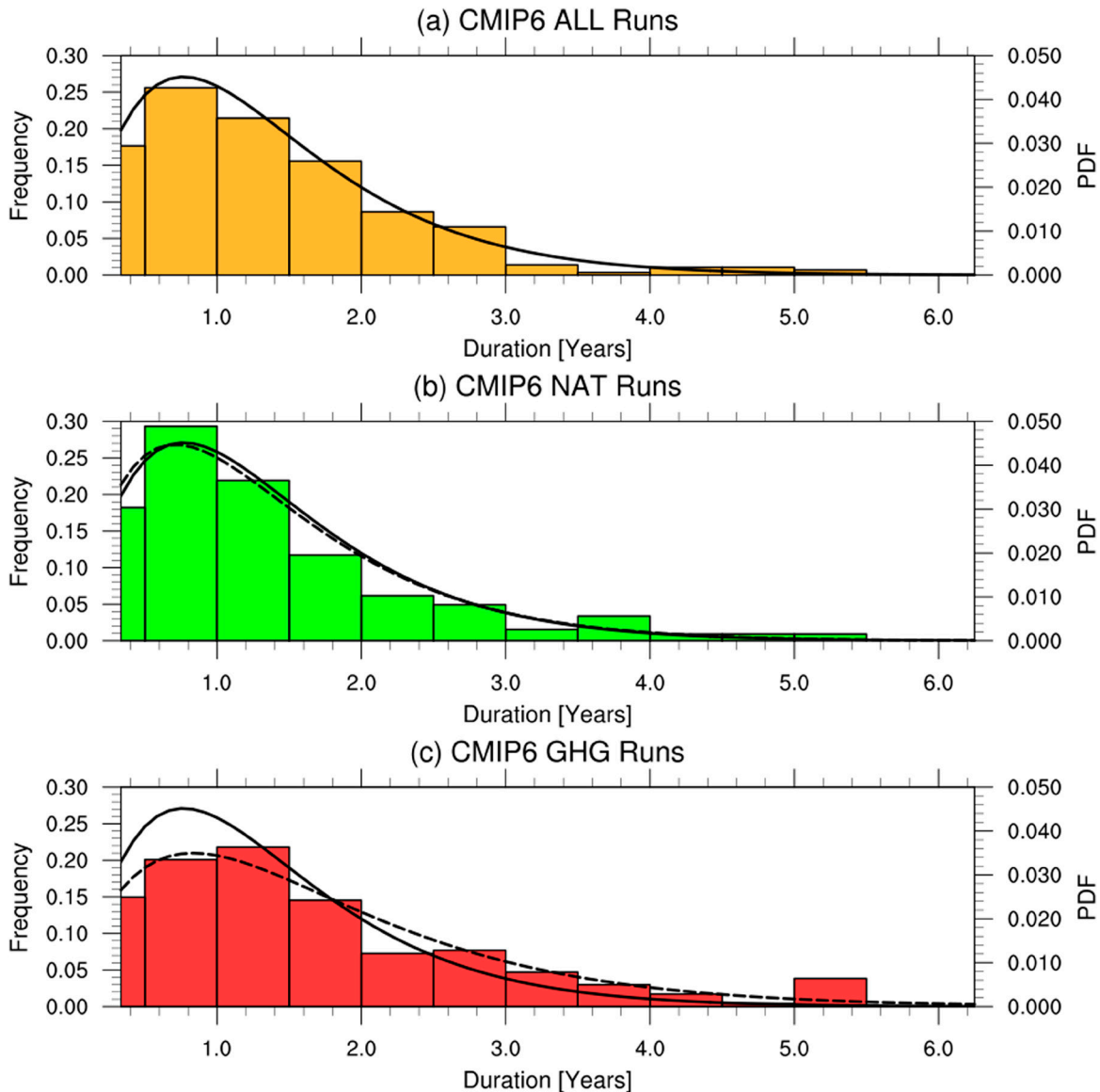


Fig. ES2. Histograms of simulated drought durations in ALL (a), NAT (b), and GHG (c) runs. Black solid lines in (a)–(c) depict the fitted gamma distribution function for ALL. Black dotted lines in (b) and (c) depict the fitted gamma distribution function for NAT and GHG, respectively. The x axis starts at four months (0.33).