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Supplement of

Brief communication: Drought likelihood for East Africa

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Supplementary Information

Table S1. CMIP5 global circulation models (GCMs) used in this study, and their components.

Model Name	Atmospheric Model	Land surface Model	Oceanic Model	Reference
ACCESS1-0	HadGEM2 r1.1	MOSES	MOM4pl	<i>Bi et al. (2012)</i>
ACCESS1-3	Similar to GA 1.0	CABLE v1.8	MOM4p	
bcc-csm1-1	BCC_AGCM2.2	BCC_AVIM1.0	MOM4_L40	<i>Wu et al. (2012)</i>
bcc-csm1-1-m	BCC_AGCM2.2	BCC_AVIM1.0	MOM4_L40	
BNU-ESM	CAM3.5	CLM	MOM4p1	<i>Ji et al. (2014)</i>
CanESM2	CanAM4	CLASS2.7	CanOM4 and CMOC1.2	<i>Arora et al. (2011)</i>
CCSM4	CAM4	CLM4	POP2	<i>Gent et al. (2011)</i>
CESM1-BGC	CAM4	CLM4	POP2	<i>Neale et al. (2010)</i>
CESM1-CAM5	CAM5	CLM4	POP2	
CMCC-CESM	ECHAM5	SILVA	NEMO	<i>Scoccimarro et al. (2011)</i>
CMCC-CM	ECHAM5	SILVA	OPA 8.2	
CMCC-CMS	ECHAM5	SILVA	OPA 8.2	
CNRM-CM5	ARPEGE climate	SURPEXv5.1	NEMO3.3	<i>Voltaire et al. (2011)</i>
CSIRO-Mk3-6-0	AGCMv7.3.8	a soil-canopy scheme	GFDL MOM2.2	<i>Rotstayn et al. (2010)</i>
EC-EARTH	IFS	H-TESSSEL	NEMO	<i>Hazeleger et al. (2010)</i>
GFDL-CM3	GFDL-AM3	LM3	MOM	<i>Griffies et al. (2011)</i>
GFDL-ESM2G	GFDL-AM2.1	LM3	GOLD	<i>Dunne et al. (2012)</i>
GFDL-ESM2M	GFDL-AM2.1	LM3	MOM4	
GISS-E2-H-CC	GISS-E2	GISS-LSM-CC	HYCOM	<i>Schmidt et al. (2014)</i>
GISS-E2-H	GISS-E2	GISS-LSM	HYCOM	
GISS-E2-R-CC	GISS-E2	GISS-LSM-CC	Russell	
GISS-E2-R	GISS-E2	GISS-LSM	Russell	
HadGEM2-CC	HadGAM2	TRIFFID	HadGOM2	<i>Collins et al. (2011)</i>
HadGEM2-ES	HadGAM2	TRIFFID	HadGOM2	<i>Jones et al. (2011)</i>
INMCM4	INM	INM	HadGOM2	<i>Volodin et al. (2010)</i>
IPSL-CM5A-LR	LMDZ5A	ORCHIDEE	NEMO	<i>Dufresne et al. (2012)</i>
IPSL-CM5A-MR	LMDZ5A	ORCHIDEE	NEMO	
IPSL-CM5B-LR	LMDZ5B	ORCHIDEE	NEMO	
MIROC5	FRCGC-AGCM	MATSIRO	COCO4.5	<i>Watanabe et al. (2011)</i>
MIROC-ESM	FRCGC-AGCM	MATSIRO	COCO4.5	
MIROC-ESM-CHEM	FRCGC-AGCM	MATSIRO	COCO4.5	
MPI-ESM-LR	ECHAM6	JSBACH	MPIOM	<i>Ilyina et al. (2013)</i>
MPI-ESM-MR	ECHAM6	JSBACH	MPIOM	
MRI-CGCM3	MRIÓAGCM3	HAL	MRI.COM3	<i>Yukimoto et al. (2012)</i>
NorESM1-ME	CAM4-Oslo	CLM4	MICOM	<i>Tjiputra et al. (2013)</i>
NorESM1-M	CAM4-Oslo	CLM4	MICOM	

5 **Table S2.** The mean August-to-October (ASO) rainfall (mm month⁻¹) of year 2016, multi-year mean (not including 2016) and multi-year standard deviation (STD, not including 2016) over east Africa for years 1981 to 2015. The seven global precipitation data sets used are listed. Six products of CHIRPS, CRU-TS, ERA-interim, GPCP, PREC/L, CPC and TRMM are available from 1981 to 2016. These six precipitation data sets are either interpolated gauge observations only (i.e. CHIRPS, CRU-TS, PREC/L and CPC), gauge observations combined with satellite measurements (i.e. GPCP), or reanalysis data (i.e. ERA-interim). The TRMM satellite observations are available from 2001 to 2016.

ASO rainfall (mm month ⁻¹)	CHIRP S	CRU- TS	ERA- interim	GPCP	PREC/L	CPC	TRMM
2016	39.97	45.93	46.10	46.56	57.16	35.78	32.05
Climatological mean, μ (1981-2015)	53.05	55.49	70.81	62.94	62.01	44.59	60.69*
Climatological STD, σ (1981-2015)	7.09	10.20	11.55	10.68	11.72	13.33	11.83*

* TRMM satellite precipitation data is only available from 2001 to 2016. The climatological ASO rainfall averages of the period 2001-2015 is computed.

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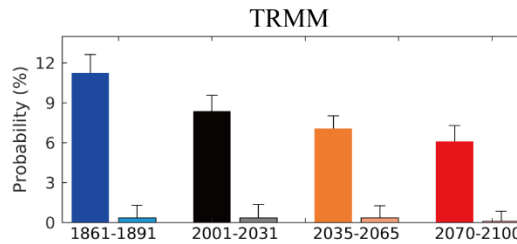
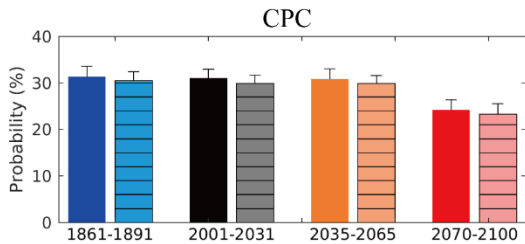
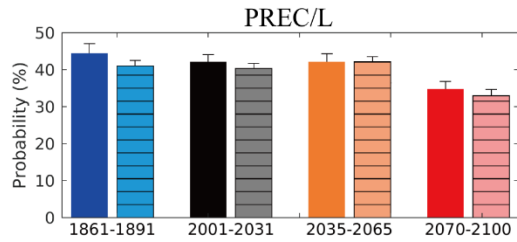
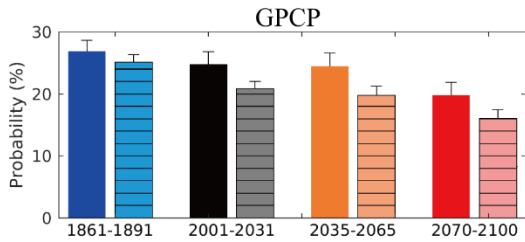
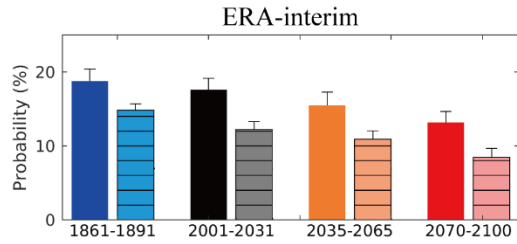
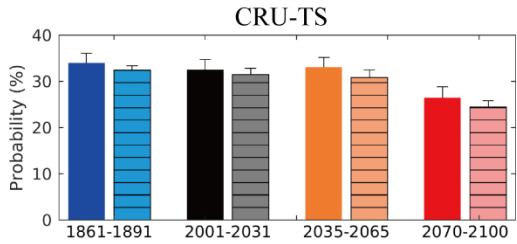
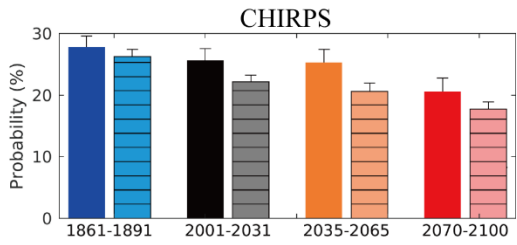


Figure S1: Same as Figure 2, but 37 GCM estimates are combined into single multi-model ensemble, and then this ensemble is bias-corrected only once by using each precipitation product.

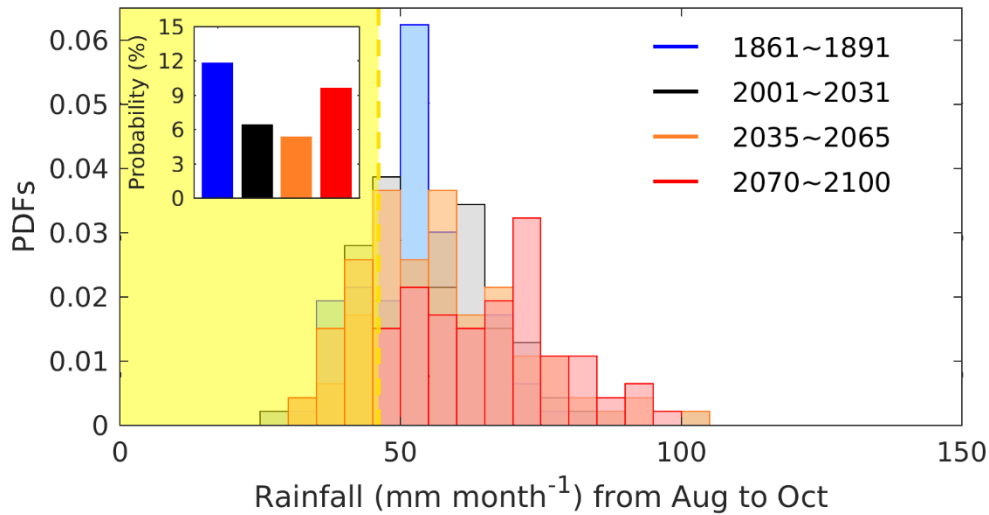


Figure S2: Following the method in Philip et al. (2017), CMIP5-based PDFs of mean ASO rainfall for periods 1861-1891 (blue), 2001-2031 (black), 2035-2065 (orange) and 2070-2100 (red). Each curve corresponds to the modelled outputs from 3 CMIP5 models (CMCC-CM, GFDL-ESM2G and MPI-ESM-MR) forced by historical emissions and RCP8.5 future scenario. GCM selection is based on the CHIRPS precipitation product. Yellow shading is mean ASO rainfall less than 40 mm month⁻¹, which is the CHIRPS 2016-based threshold (mean of ASO). Inset shows probabilities of mean rainfall of ASO falling below the threshold for the same modelled periods (colours match those of curves).

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