Electronic Supplementary Materials to: The Super-large Ensemble Experiments of CAS FGOALS-g3*

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ESM to: Lin, P. F., and Coauthors, 2022: The Super-large Ensemble experiments of CAS FGOALS-g3. *Adv. Atmos. Sci.*, **39**(10), 1746–1765, https://doi.org/10.1007/s00376-022-1439-1.

Table S1. The names of 29 CMIP6 models whose historical and SSP5-8.5 simulations are used in the study.

Name of CMIP6 models		
ACCESS-CM2	CIESM	INM-CM5-0
ACCESS-ESM1-5	CMCC-ESM2	IPSL-CM6A-LR
AWI-CM-1-1-MR	EC-Earth3	KACE-1-0-G
BCC-CSM2-MR	EC-Earth3-CC	MRI-ESM2-0
CESM2	EC-Earth3-Veg	MPI-ESM1-2-LR
CESM2-WACCM	EC-Earth3-Veg-LR	MIROC6
CanESM5	FIO-ESM-2-0	NorESM2-LM
CAS-ESM2-0	GFDL-ESM4	NorESM2-MM
CAMS-CSM1-0	GISS-E2-1-G	TaiESM1
CMCC-CM2-SR5	INM-CM4-8	

* The online version of the paper can be found at https://doi.org/10.1007/s00376-022-1439-1.

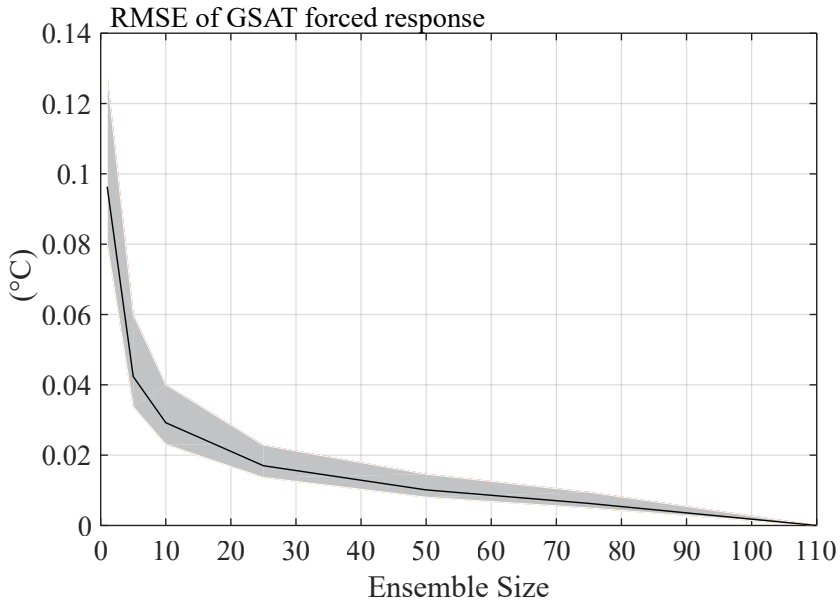

Fig. S1. The RMSE of annual global SAT (GSAT) compared with the 110-member ensemble mean of FGOALS-g3. The *x*-axis label is the sample size of subsets from the 110 members, and the *y*-axis label is the RMSE from subset-estimated GSAT compared with the 110-member estimated "true" GSAT forced response. The black line is the mean RMSE for GSAT for subset members 2 to 110. The RMSE is computed 10000 times, so the gray shaded area shows the range of 10000 RMSEs for each subset.

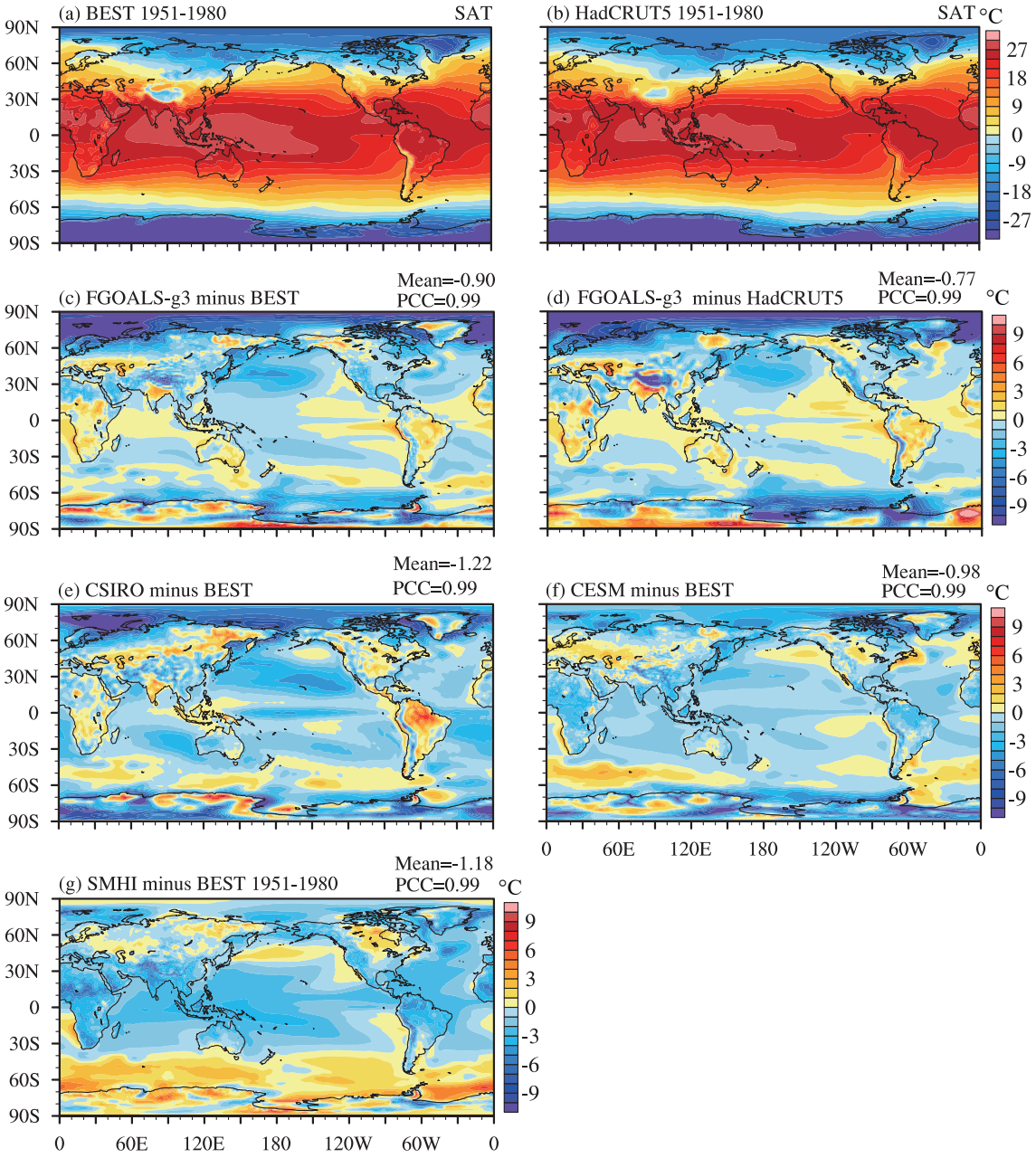

Fig. S2. The observed SAT in (a) BEST and (b) HadCRUT5 for 1951–80. The simulated SAT bias in FGOALS-g3 relative to (c) BEST and (d) HadCRUT5 for 1951–80. The simulated SAT bias in (e) CSIRO large ensembles, (f) CESM large ensembles, and (g) SMHI large ensembles relative to HadCRUT5 for 1951–80. The global mean SAT bias (ensemble mean minus observstion) and PCC for climatology between observations and the large ensemble mean of model are shown.

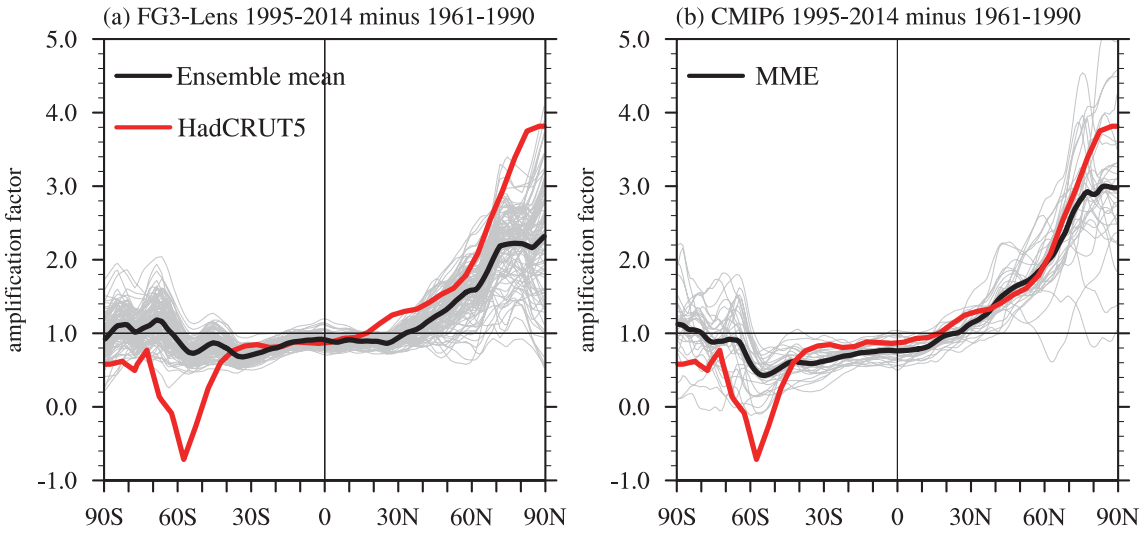

Fig. S3. The zonal averaged warming amplification factor, defined as the change in zonal average temperature relative to the global mean temperature change (Holland and Landrum 2015), for FGOALS-g3 and 29 CMIP6 models. The change is computed as the average for 1995–2014 minus the average for 1961–90. (a) FGOALS-g3 super-large ensembles, (b) 29 CMIP6 models (Models' name see Table S1). The black line in (a) is the ensemble mean in FGOALS-g3 large ensembles, and (b) is the multi-model ensemble mean (MME) in CMIP6, respectively. The red line is the HadCRUT5.

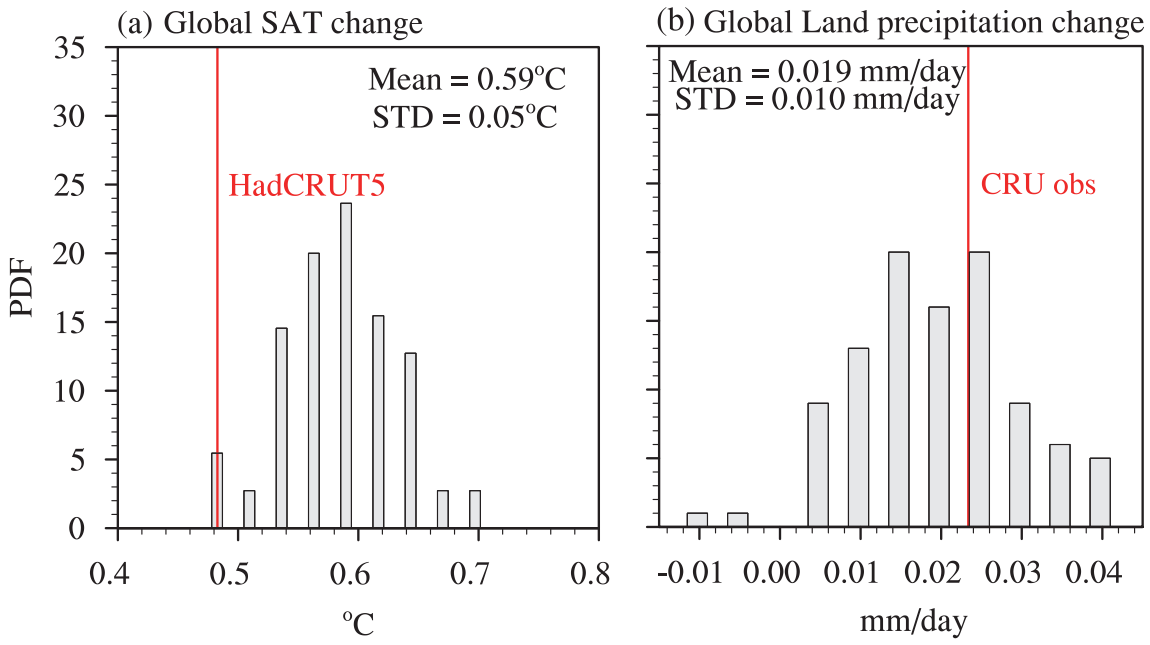

Fig. S4. The simulated (a) SAT and (b) land precipitation change (1995–2014 minus 1961–1990) over the globe in FGOALS-g3 large ensembles and observations. The observed SAT and land precipitation are from HadCRUT5 and CRU, respectively.