

Table S1 The 39 CMIP5 GCMs from which data are analysed. * indicates GCM that represents both the oceanic and terrestrial carbon cycles.

Modelling Centre	Institute ID	Model Name
Commonwealth Scientific and Industrial Research Organization (CSIRO) and Bureau of Meteorology (BOM), Australia	CSIRO-BOM	ACCESS1.0 ACCESS1.3
Beijing Climate Center, China Meteorological Administration	BCC	BCC-CSM1.1* BCC-CSM1.1(m)*
College of Global Change and Earth System Science, Beijing Normal University	GCESS	BNU-ESM*
Canadian Centre for Climate Modelling and Analysis	CCCMA	CanESM2*
National Center for Atmospheric Research	NCAR	CCSM4
Community Earth System Model Contributors	NSF-DOE-NCAR	CESM1(BGC)* CESM1(CAM5)
Centro Euro-Mediterraneo per I Cambiamenti Climatici	CMCC	CMCC-CESM* CMCC-CM CMCC-CMS
Centre National de Recherches Météorologiques / Centre Européen de Recherche et Formation Avancée en Calcul Scientifique	CNRM-CERFACS	CNRM-CM5
Commonwealth Scientific and Industrial Research Organization in collaboration with Queensland Climate Change Centre of Excellence	CSIRO-QCCCE	CSIRO-Mk3.6.0
LASG, Institute of Atmospheric Physics, Chinese Academy of Sciences and CESS, Tsinghua University	LASG-CESS	FGOALS-g2
The First Institute of Oceanography, SOA, China	FIO	FIO-ESM*
NOAA Geophysical Fluid Dynamics Laboratory	NOAA GFDL	GFDL-CM3 GFDL-ESM2G* GFDL-ESM2M*
NASA Goddard Institute for Space Studies	NASA GISS	GISS-E2-H GISS-E2-H-CC GISS-E2-R GISS-E2-R-CC
National Institute of Meteorological Research/Korea Meteorological Administration	NIMR/KMA	HadGEM2-AO
Met Office Hadley Centre (additional HadGEM2-ES realizations contributed by Instituto Nacional de Pesquisas Espaciais)	MOHC (additional realizations by INPE)	HadGEM2-CC* HadGEM2-ES*
Institute for Numerical Mathematics	INM	INM-CM4*
Institut Pierre-Simon Laplace	IPSL	IPSL-CM5A-LR* IPSL-CM5A-MR*

		IPSL-CM5B-LR*
Japan Agency for Marine-Earth Science and Technology, Atmosphere and Ocean Research Institute (The University of Tokyo), and National Institute for Environmental Studies	MIROC	MIROC-ESM* MIROC-ESM-CHEM*
Atmosphere and Ocean Research Institute (The University of Tokyo), National Institute for Environmental Studies, and Japan Agency for Marine-Earth Science and Technology	MIROC	MIROC5
Max-Planck-Institut für Meteorologie (Max Planck Institute for Meteorology)	MPI-M	MPI-ESM-MR* MPI-ESM-LR*
Meteorological Research Institute	MRI	MRI-CGCM3 MRI-ESM1
Norwegian Climate Centre	NCC	NorESM1-M NorESM1-ME*

Fig. S1 As Fig. 1 but excluding the BNU-ESM, FGOALS-g2, MIROC-ESM and MIROC-ESM-CHEM GCMs (i.e. data are from 35 CMIP5 GCMs)

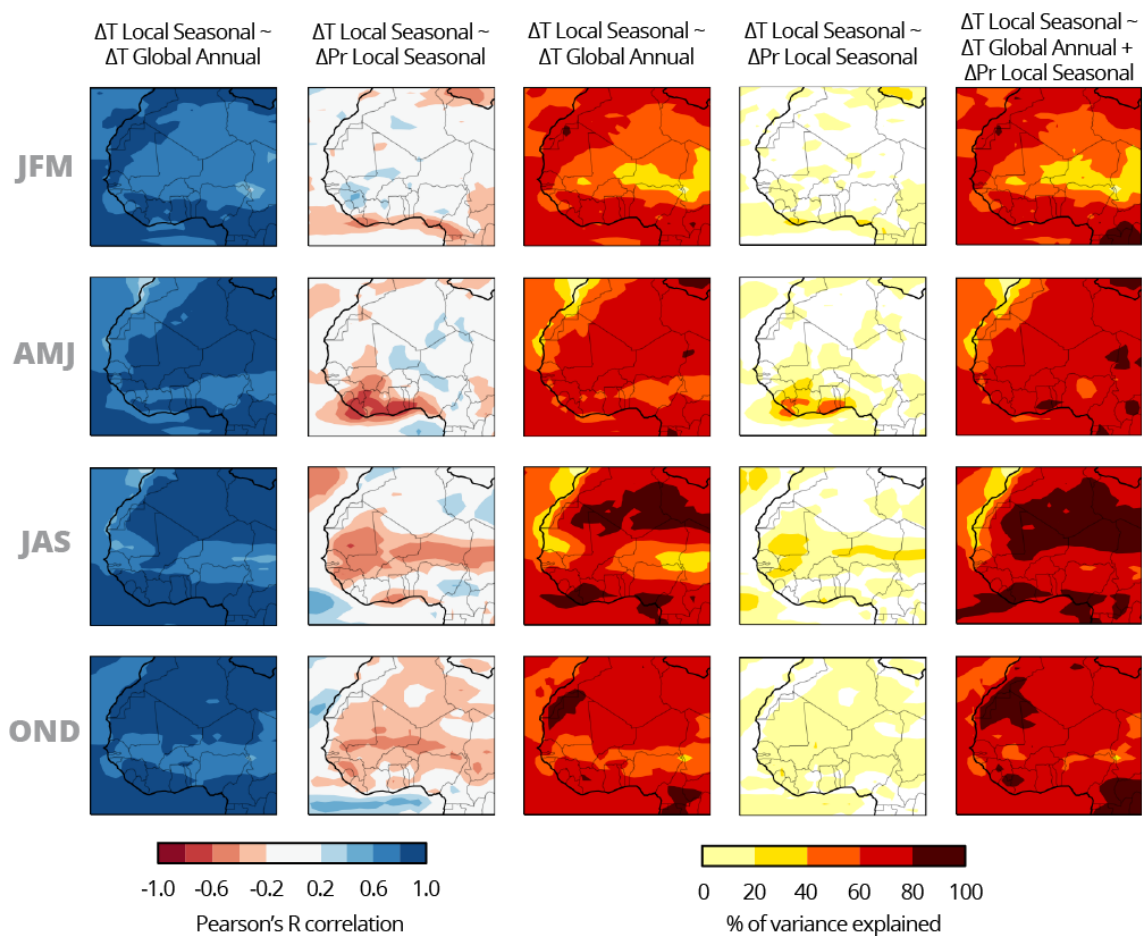


Table S2 Scaling factors that map the global warming values of the CMIP5 CDF to those of the M18 CDF. Two sets of scaling factors are calculated - one set for the full ensemble of 39 GCMs and one set for the ensemble of 35 GCMs that excludes BNU-ESM, FGOALS-g2, MIROC-ESM and MIROC-ESM-CHEM. Cumulative probabilities marked with **bold** font.

Cumulative Probability	39 GCMs	35 GCMs	Cumulative Probability	39 GCMs	35 GCMs	Cumulative Probability	39 GCMs	35 GCMs
0	-0.10	-0.10	0.34	0.88	0.89	0.68	1.04	1.09
0.01	0.44	0.44	0.35	0.89	0.89	0.69	1.04	1.10
0.02	0.52	0.53	0.36	0.90	0.90	0.7	1.05	1.10
0.03	0.57	0.58	0.37	0.91	0.91	0.71	1.05	1.10
0.04	0.60	0.61	0.38	0.91	0.92	0.72	1.04	1.10
0.05	0.62	0.63	0.39	0.92	0.93	0.73	1.03	1.10
0.06	0.64	0.64	0.4	0.93	0.93	0.74	1.03	1.10
0.07	0.66	0.66	0.41	0.93	0.94	0.75	1.03	1.11
0.08	0.68	0.68	0.42	0.94	0.95	0.76	1.04	1.11
0.09	0.69	0.70	0.43	0.95	0.95	0.77	1.05	1.11
0.1	0.70	0.71	0.44	0.96	0.96	0.78	1.06	1.10
0.11	0.71	0.72	0.45	0.97	0.97	0.79	1.07	1.10
0.12	0.73	0.73	0.46	0.97	0.98	0.8	1.07	1.10
0.13	0.74	0.74	0.47	0.98	0.99	0.81	1.07	1.11
0.14	0.74	0.76	0.48	0.98	0.99	0.82	1.08	1.12
0.15	0.74	0.77	0.49	0.99	1.00	0.83	1.08	1.13
0.16	0.74	0.77	0.5	0.99	1.01	0.84	1.09	1.14
0.17	0.75	0.77	0.51	0.99	1.01	0.85	1.11	1.15
0.18	0.77	0.77	0.52	0.99	1.01	0.86	1.12	1.16
0.19	0.78	0.78	0.53	0.99	1.02	0.87	1.14	1.17
0.2	0.79	0.79	0.54	1.00	1.02	0.88	1.13	1.17
0.21	0.80	0.80	0.55	1.00	1.02	0.89	1.14	1.17
0.22	0.81	0.82	0.56	1.01	1.02	0.9	1.14	1.17
0.23	0.82	0.83	0.57	1.02	1.03	0.91	1.16	1.17
0.24	0.82	0.84	0.58	1.02	1.04	0.92	1.18	1.19
0.25	0.82	0.84	0.59	1.03	1.04	0.93	1.19	1.21
0.26	0.83	0.85	0.6	1.04	1.05	0.94	1.21	1.23
0.27	0.83	0.85	0.61	1.04	1.06	0.95	1.23	1.25
0.28	0.84	0.85	0.62	1.04	1.07	0.96	1.27	1.28
0.29	0.85	0.86	0.63	1.04	1.07	0.97	1.31	1.31
0.3	0.86	0.86	0.64	1.05	1.08	0.98	1.36	1.36
0.31	0.86	0.86	0.65	1.05	1.09	0.99	1.45	1.45
0.32	0.87	0.87	0.66	1.05	1.09	1	2.18	2.18
0.33	0.88	0.88	0.67	1.05	1.09			