Supplement 1: List of CMIP5 GCMs used in CORDEX and the number of regions where the model was selected.
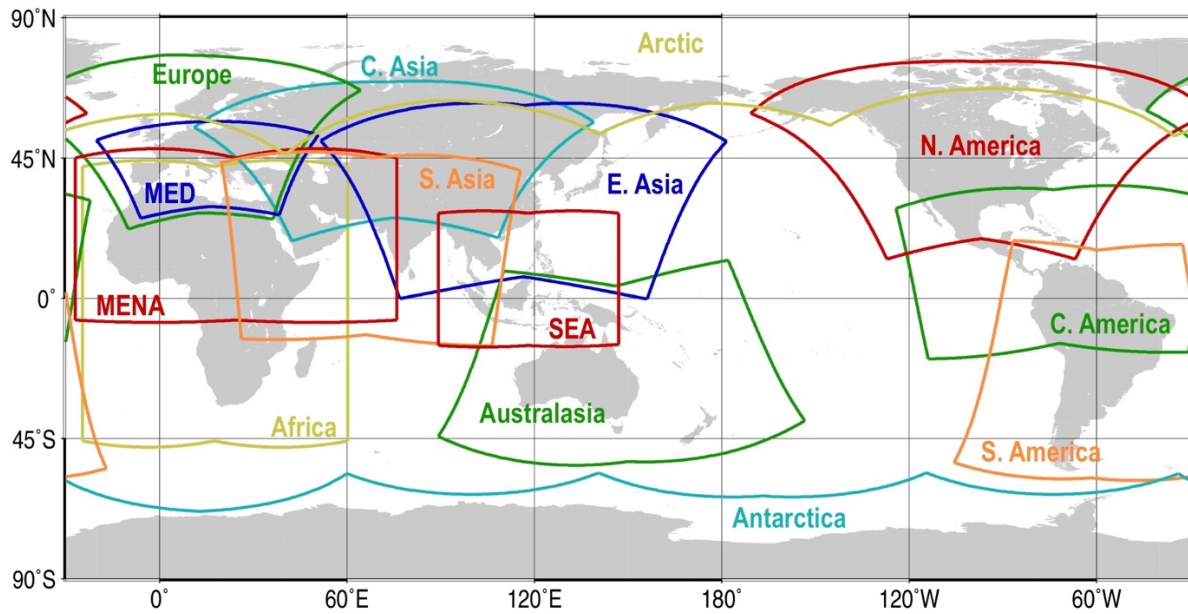
Model		Model		Model	
ACCESS1-0	4	GFDL-CM3	3	MIROC5	6
ACCESS1-3	2	GFDL-ESM2G	1	MPI-ESM-LR	13
BNU-ESM	1	GFDL-ESM2M	8	MPI-ESM-MR	5
CCSM4	5	GISS-E2-R	1	MRI-CGCM3	2
CMCC-CM	1	HadGEM2-AO	2	MRI-AGCM60	2
CNRM-CM5	10	HadGEM2-CC	1	NorESM1-M	8
CSIRO-Mk3-6-0	6	HadGEM2-ES	13		
CanESM2	9	IPSL-CM5A-LR	2		
EC-EARTH	12	IPSL-CM5A-MR	6		
FGOALS-g2	1	MIROC-ESM	2		
FGOALS-s2	1	MIROC-ESM-CHEM	1		

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5 **Supplement 2: Regional classification defined in CORDEX. (Coordinate information is available from: http://www.cordex.org/domains/; last accessed 8 Nov. 2018).**
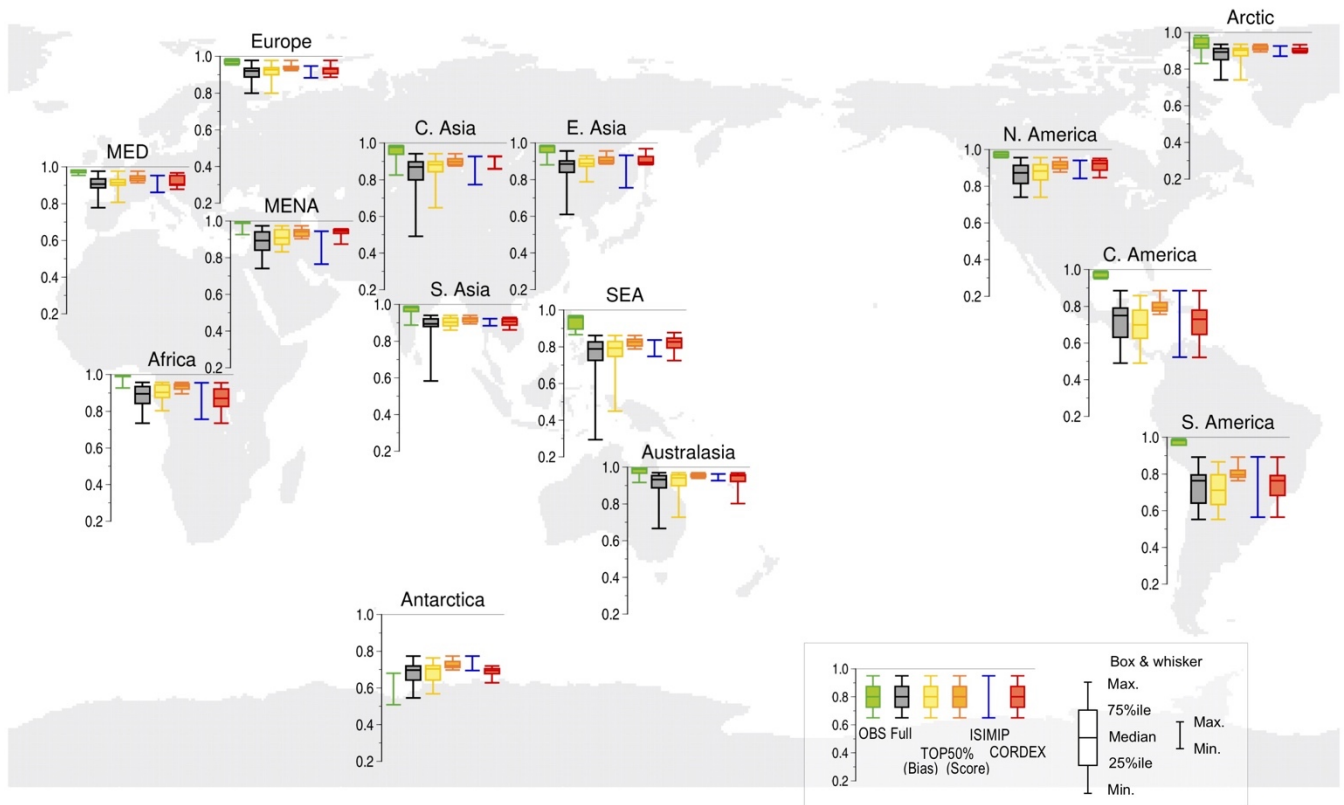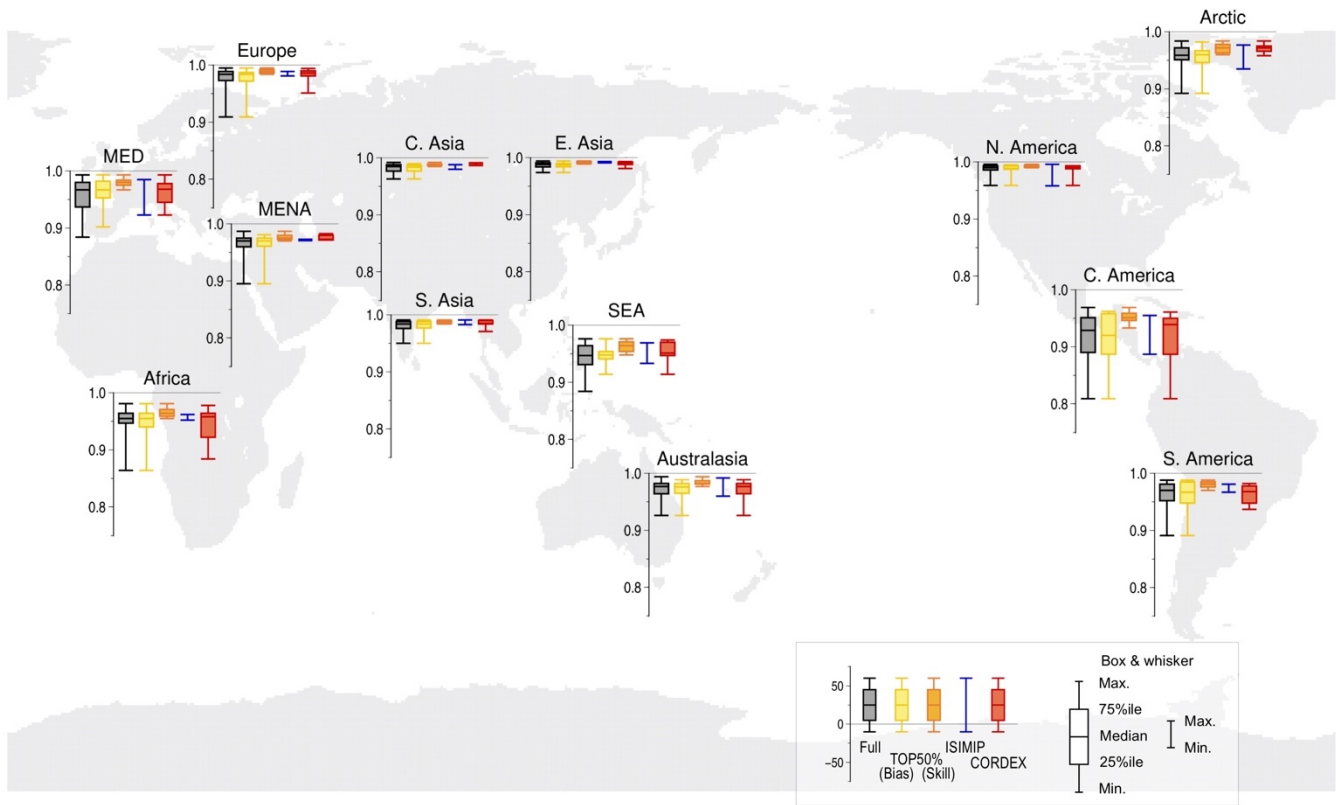
Supplement 3: Skill score for annual mean model precipitation over land. Reference data are from GPCC. The whiskers of the box plots show the range between the maximum and the minimum biases. The boxes and the lines within the boxes indicate the 25th to 75th percentile range and the median, respectively. Green plots indicate the spread of the score of six observed data; CRU, CPC, PRECL, CMAP, GPCP 1dd and MSWEP. The other plots indicate the model bias in the full set of 49 CMIP5 model set (black), the model sets with the top 50% of the CMIP5 models for the bias (yellow) or Taylor's skill score (orange) and the model sets selected for ISIMIP (blue) and CORDEX (red).
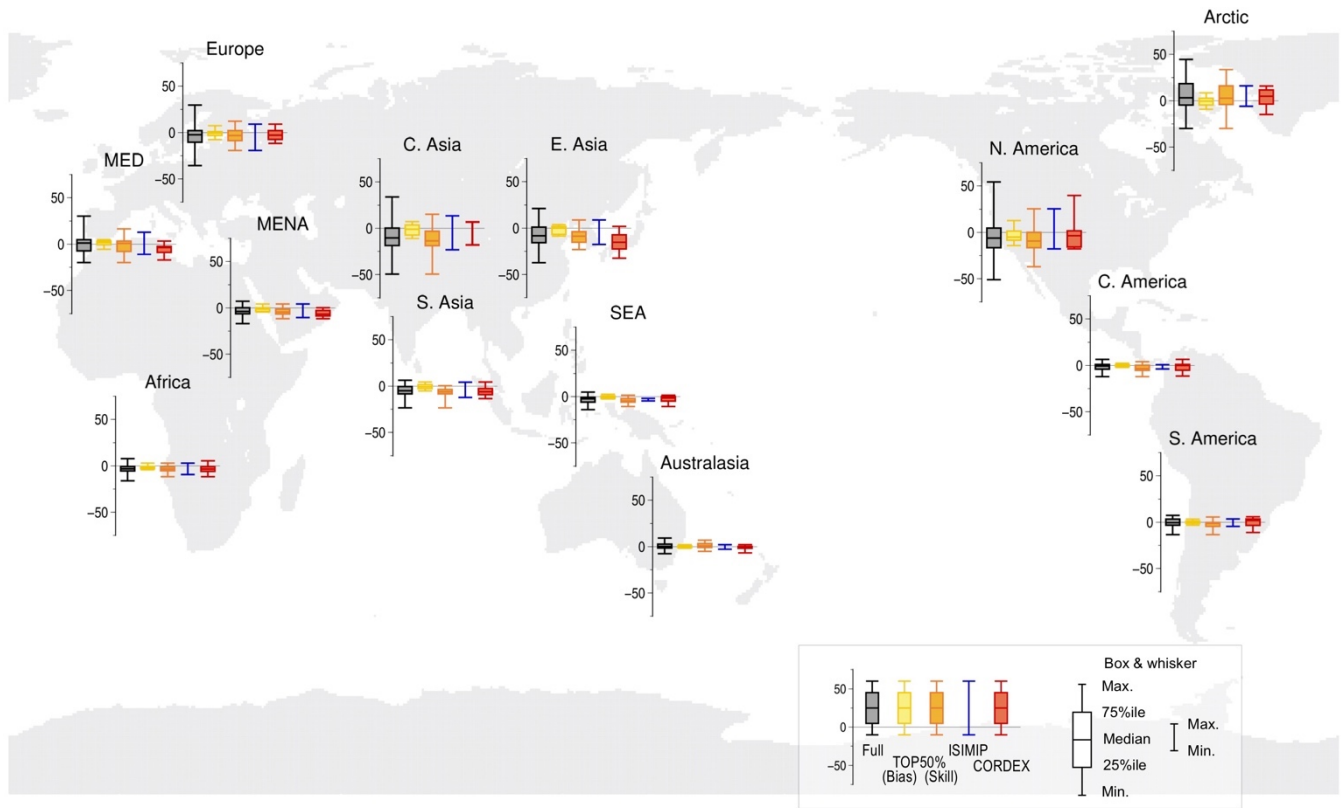
5   **Supplement 4: Annual mean model temperature bias over land (K). Reference data are from CRU TS. The whiskers of the box plots show the range between the maximum and the minimum biases. The boxes and the lines within the boxes show the 25th to 75th percentile range and the median, respectively. The other plots indicate the model bias in the full set of 49 CMIP5 model set (black), the model set with the top 50% of the full set for the bias (yellow) or Taylor's skill score (orange), and the model sets selected for ISIMIP (blue) and CORDEX (red).**

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5 **Supplement 5: As for Supplement 3, but for the skill score for the annual mean model temperature over land.**