

Supplementary material for “CO₂-plant effects do not account for the gap between dryness indices and projected dryness impacts in CMIP6 or CMIP5”

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Introduction

Table S1 specifies the CMIP6 models used in the main text, including figures 1-4. Table S2 specifies the CMIP5 models used in figures S3-S6. Figures S1-S2 reproduce figures 1-2 from the main text, but with each model's changes normalized by that model's year-to-year standard deviation. Figures S3-S6 reproduce figures 1-4 from the main text, but for CMIP5.

Table S1. CMIP6 climate models used for this study.

Model name	Institution	Data citations
ACCESS-ESM1.5	CSIRO	Ziehn et al. (2019a); Ziehn et al. (2019b)
BCC-CSM2MR	BCC	Wu et al. (2018); Wu et al. (2019)
CanESM5	CCCma	Swart et al. (2019a); Swart et al. (2019b)
CNRM-ESM2-1 ^a	CNRM-CERFACS	Seferian (2018a); Seferian (2018b)
GFDL-ESM4 ^a	NOAA-GFDL	Krasting et al. (2018a); Krasting et al. (2018b)
GISS-E2.1G ^b	NASA-GISS	NASA/GISS (2019a); NASA/GISS (2019b)
IPSL-CM6A-LR	IPSL	Boucher et al. (2018a); Boucher et al. (2018b)
MPI-ESM1.2-LR	MPI-M	Wieners et al. (2019); Brovkin et al. (2019)
MRI-ESM2.0 ^c	MRI	Yukimoto et al. (2020a); Yukimoto et al. (2020b)
NorESM2-LM ^d	NCC	Seland et al. (2019); Schwinger et al. (2020)
UKESM1.0-LL	MOHC	Tang et al. (2019); Jones (2019)

^a SM_d is not available.

^b We use r101 for 1pctCO₂, since it is the most up-to-date and matches 1pctCO₂-rad.

^c We use i2, since i1 lacks carbon cycle variables (S. Yukimoto, pers. comm.)

^d Base period is years 2-31, since part of year 1 is missing for some variables.

Table S2. CMIP5 climate models used for figures S3-S6.

Model name	Institution
BCC-CSM1.1	Beijing Climate Center, China Meteorological Administration
CanESM2	Canadian Centre for Climate Modelling and Analysis
CESM1(BGC)	Community Earth System Model Contributors
GFDL-ESM2M	NOAA Geophysical Fluid Dynamics Laboratory
HadGEM2-ES	Met Office Hadley Centre
IPSL-CM5A-LR ^a	Institut Pierre-Simon Laplace
IPSL-CM5A-MR ^a	
MPI-ESM-LR ^{a,b}	Max Planck Institute for Meteorology
NorESM1-ME	Norwegian Climate Centre

^a SM_d is not available.

^b SM_s is not available.

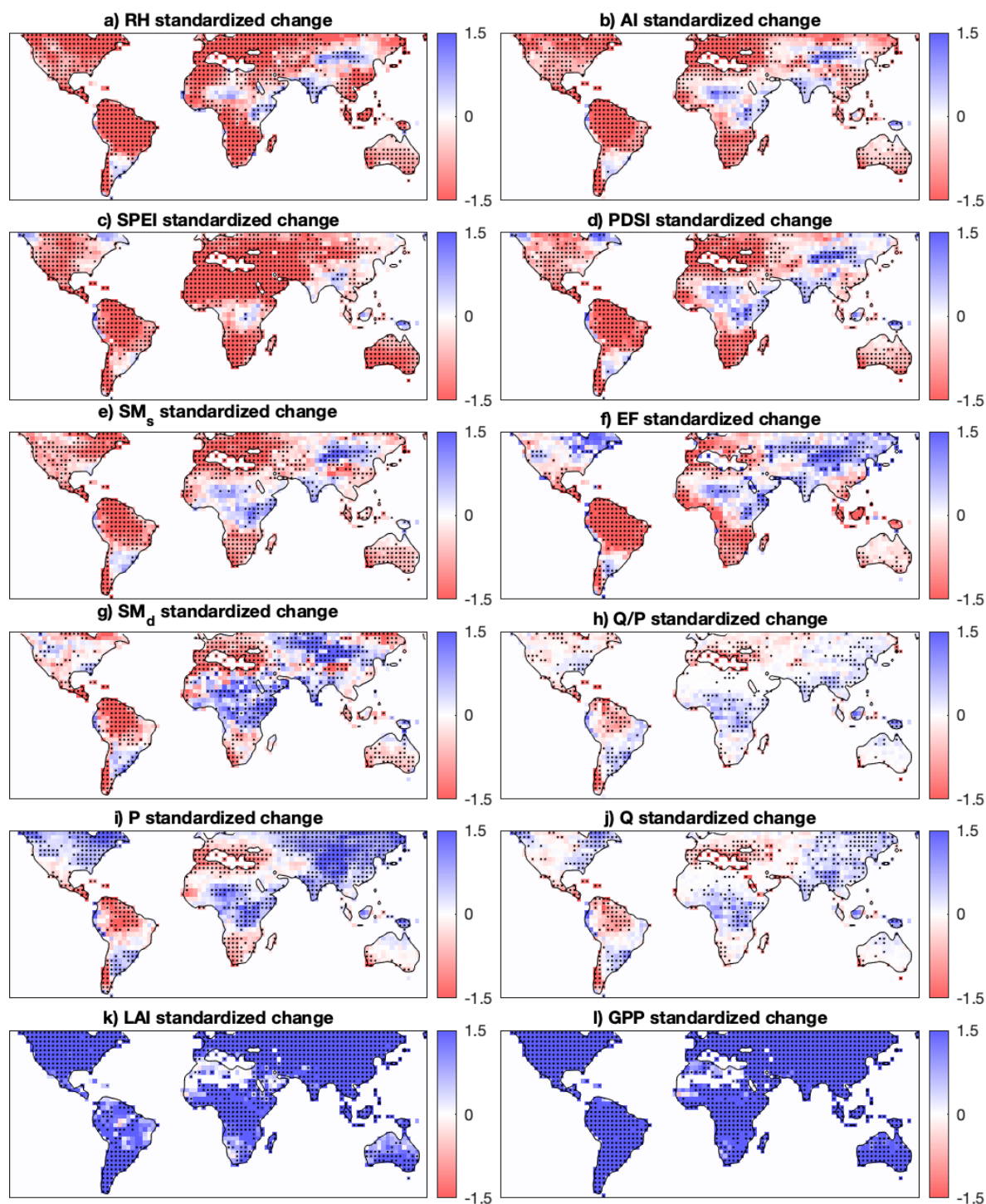


Figure S1. As figure 1 of the main text, but each model's response is normalized by that model's interannual standard deviation before the multi-model median is taken. Annual Q each year is defined as annual P minus annual ET ; this is not strictly correct (due to storage) but should capture the magnitude of interannual standard deviation of Q . Annual EF and Q/P are each defined as the ratio of the yearly values of their numerator and denominator. Interannual variability of AI is represented by interannual standard deviation of P over climatological E_0 .

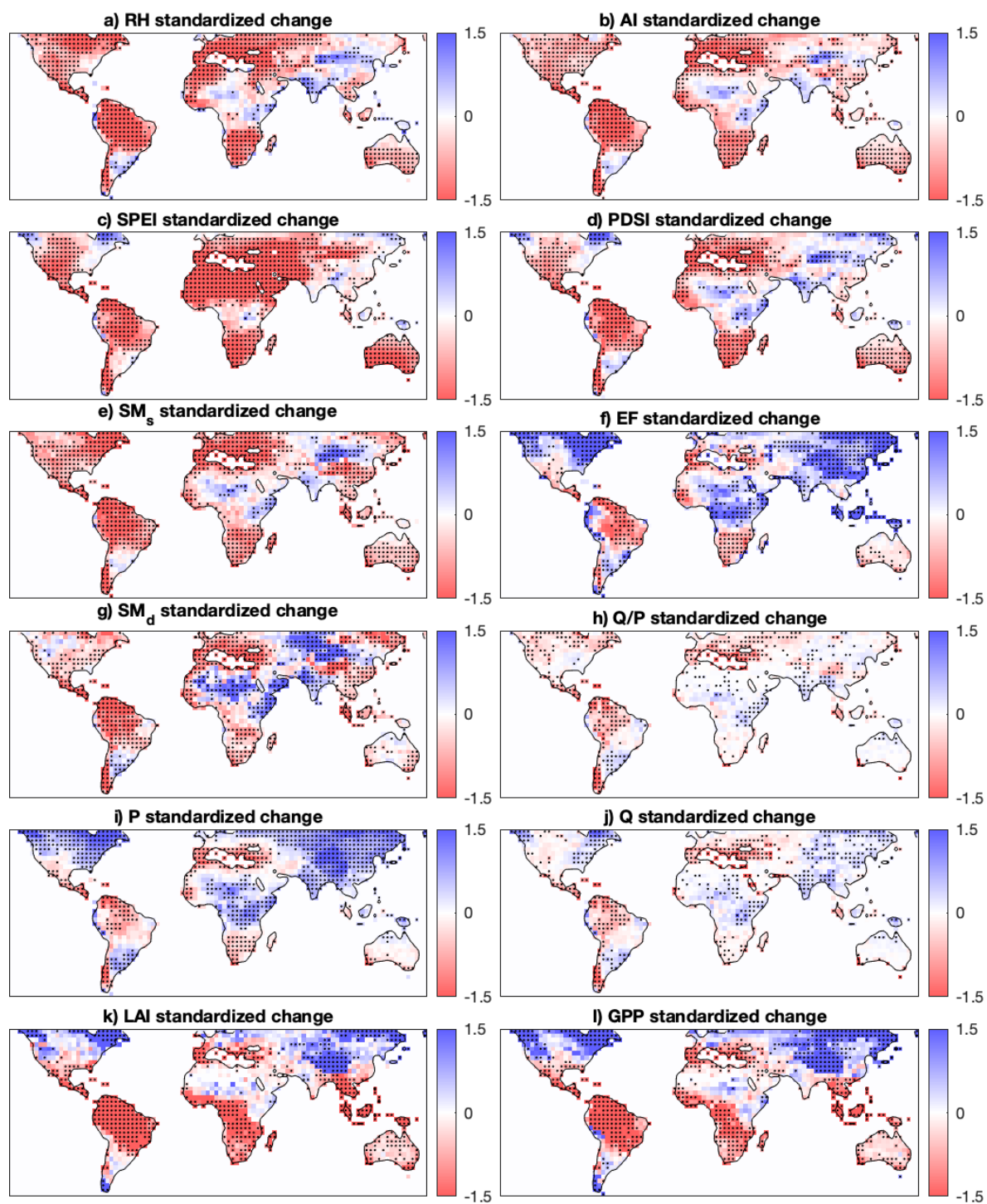


Figure S2. As figure S1, but for figure 2 of the main text (1pctCO₂-rad experiment.)

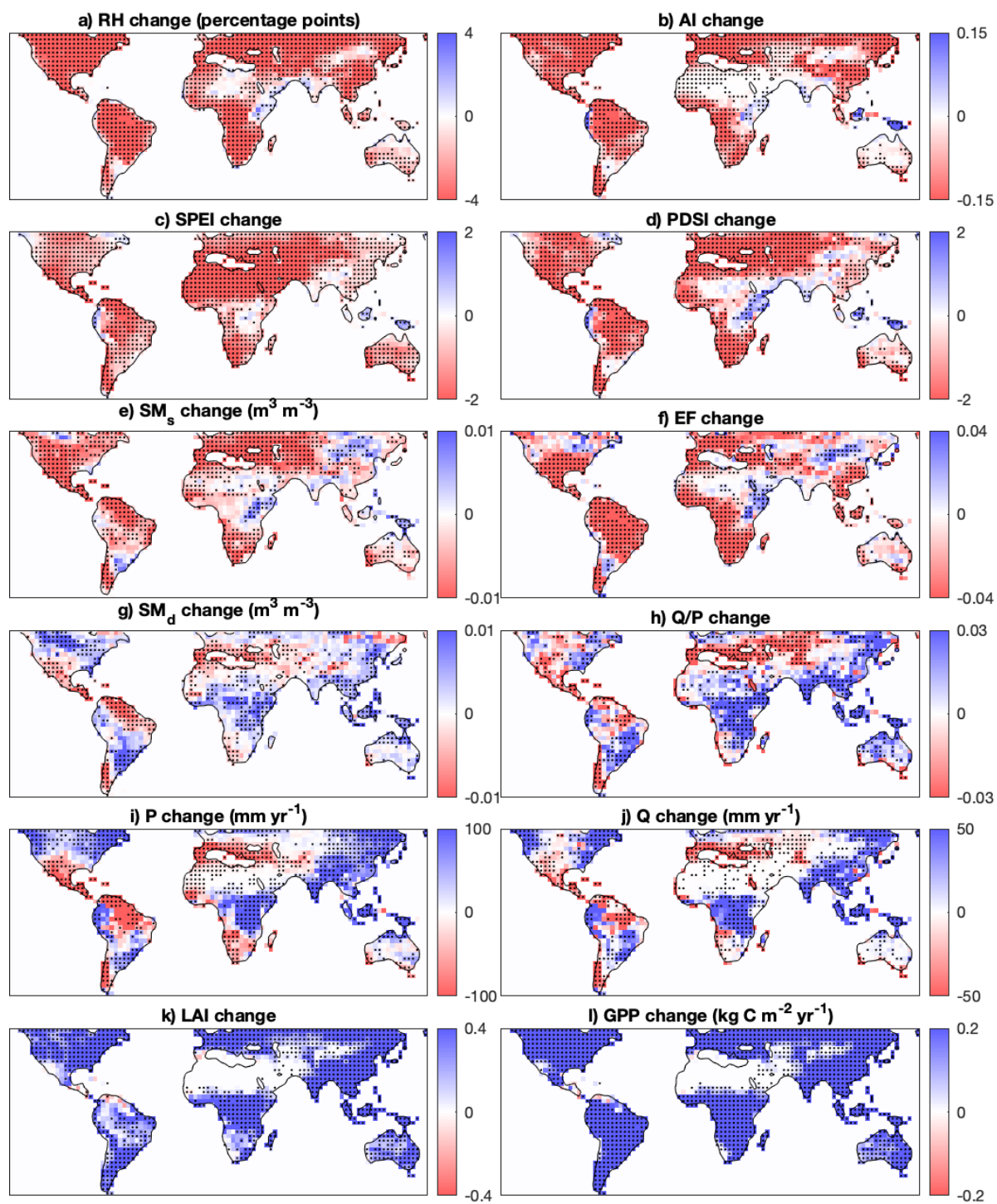


Figure S3. As figure 1 of the main text, but for the CMIP5 models in table S2.

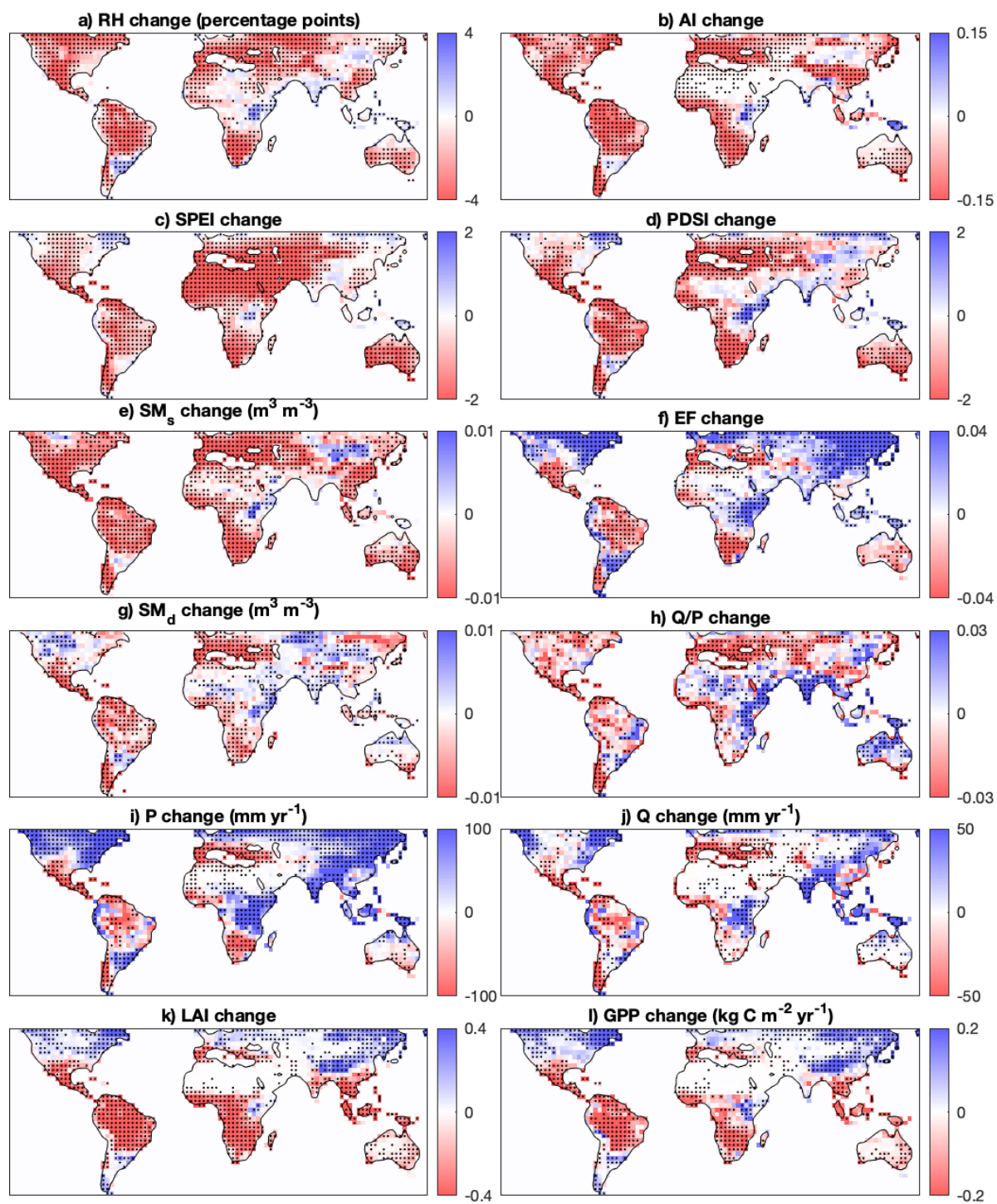


Figure S4. As figure 2 of the main text, but for the CMIP5 models in table S2, using the esmFdbk1 experiment (identical to 1pctCO2-rad, except for the name.)

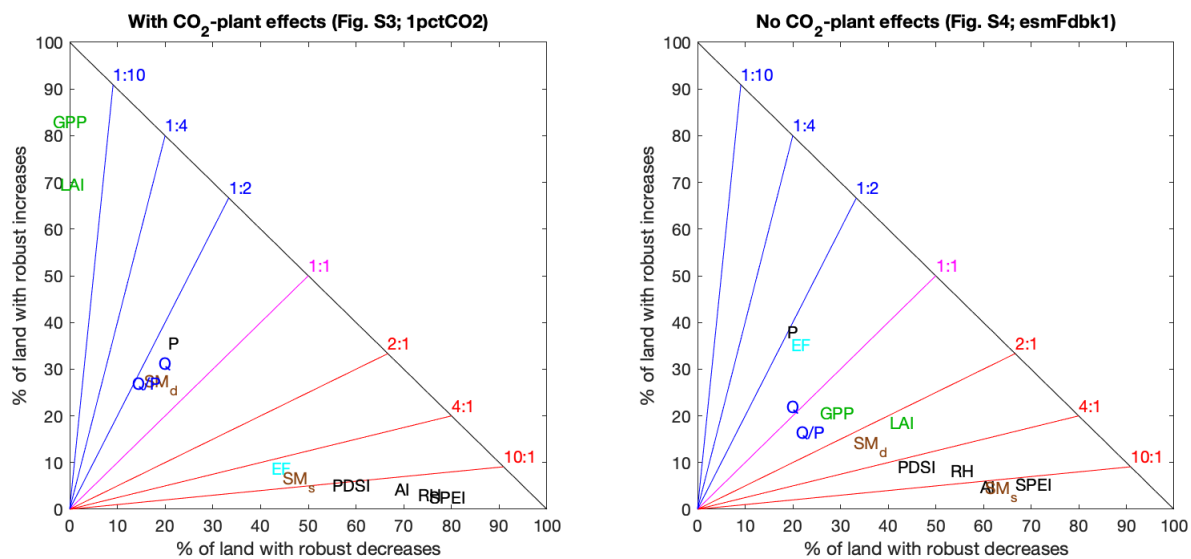


Figure S5. As figure 3 of the main text, but for figures S3 and S4.

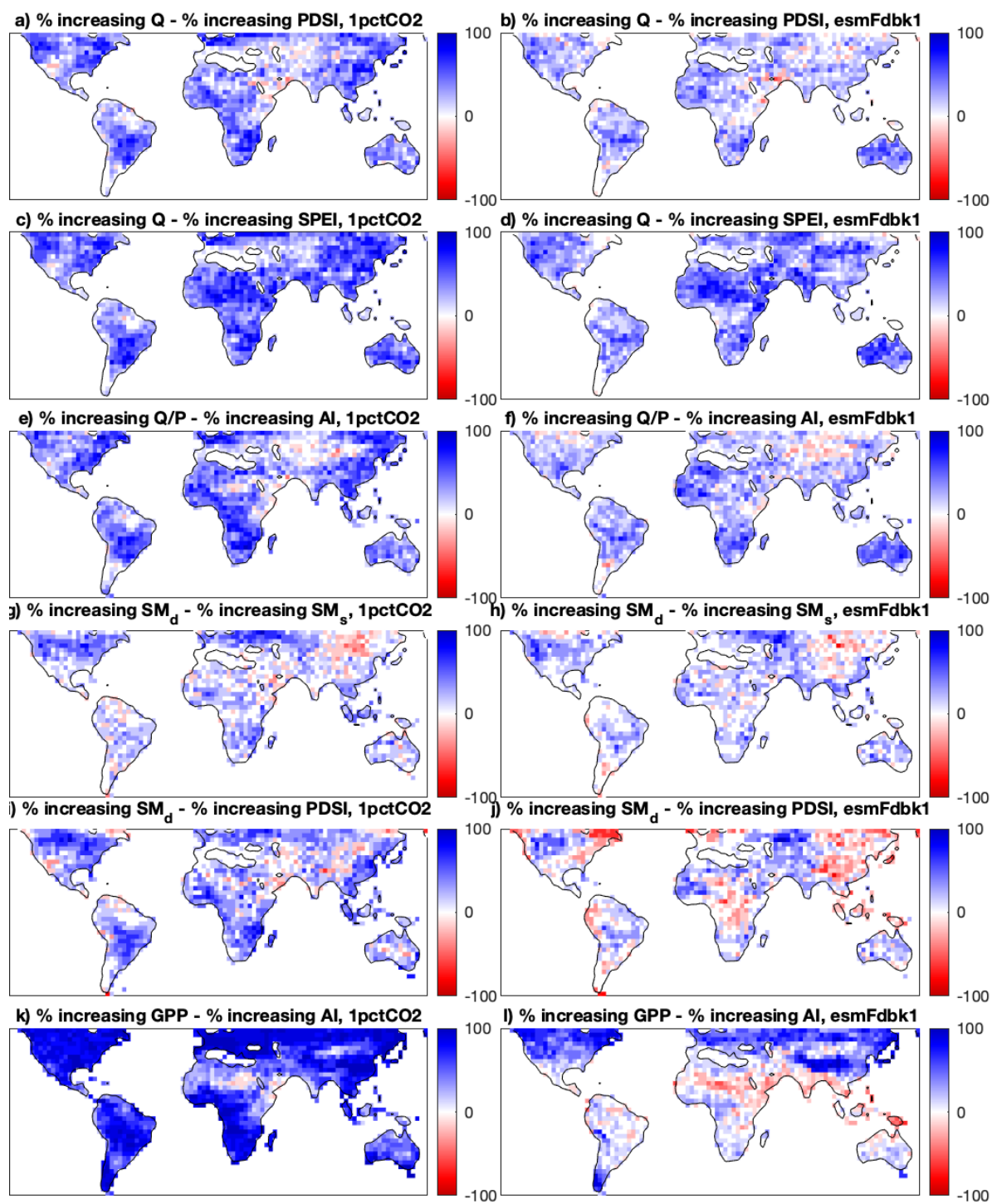


Figure S6. As figure 4 of the main text, but for the CMIP5 models in table S2.

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