The effect of GCM biases on global runoff simulations of a land surface model

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Supplement

Table S 1. Basin station information

Basins	GRDC station number	Area [km^2]
Amazon	3629001	4680000
Congo	1147010	3475000
Mississippi	4127800	2964255
Lena	2903430	2460000
Volga	6977100	1360000
Ganges	2646200	846300
Danube	6742900	807000
Elbe	6340110	131950
Kemijoki	6854700	50686

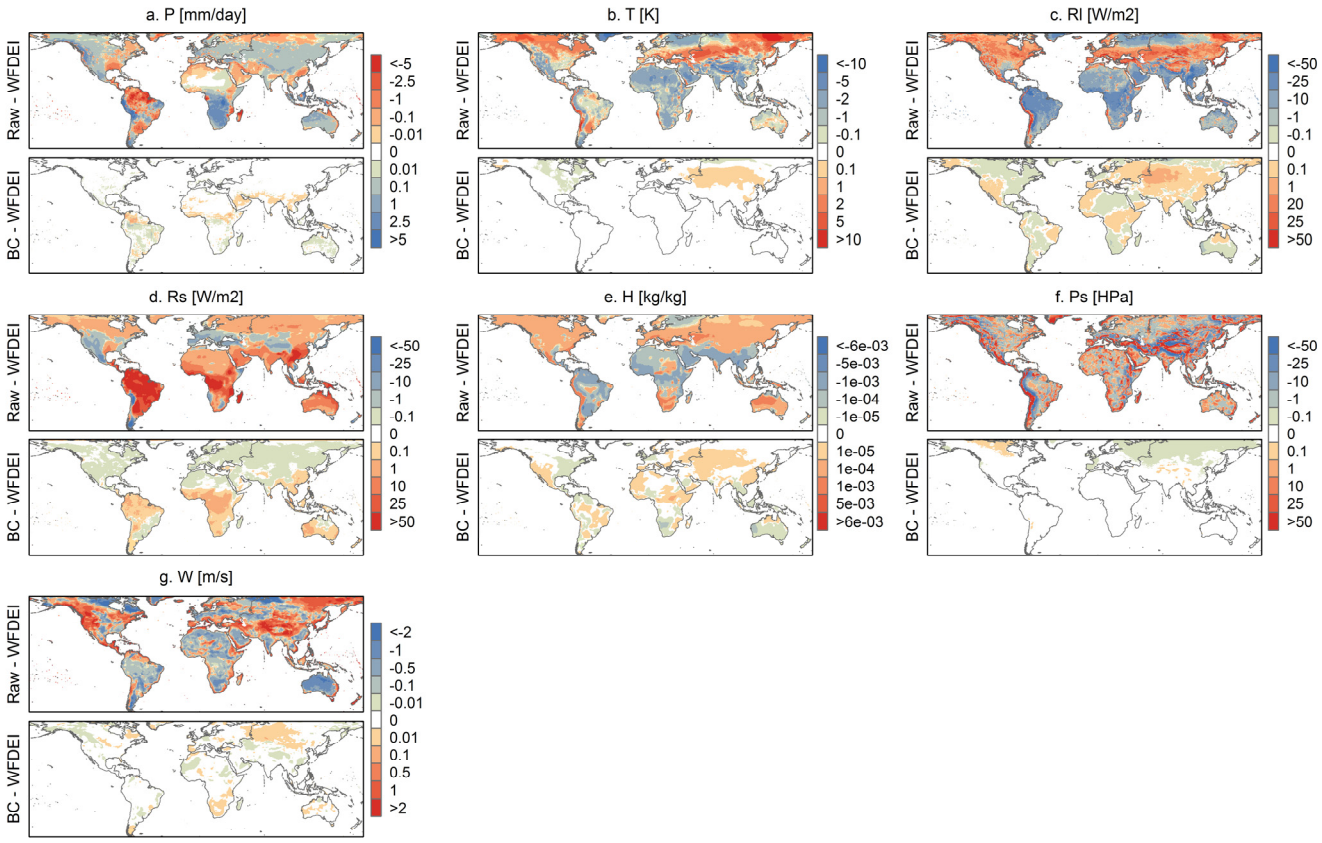

Figure S 1. Difference maps, showing initial (Raw-WFDEI) and remaining (BC-WFDEI) biases of the GCM ensemble forcing variables: a.Precipitation, b.Temperature, c.Longwave downward radiation, d.Shortwave downward radiation, e.Specific humidity, h.Surface pressure, g.Wind. Differences are calculated between the December-January-February averages (DJF) of the 1981-2010 period.

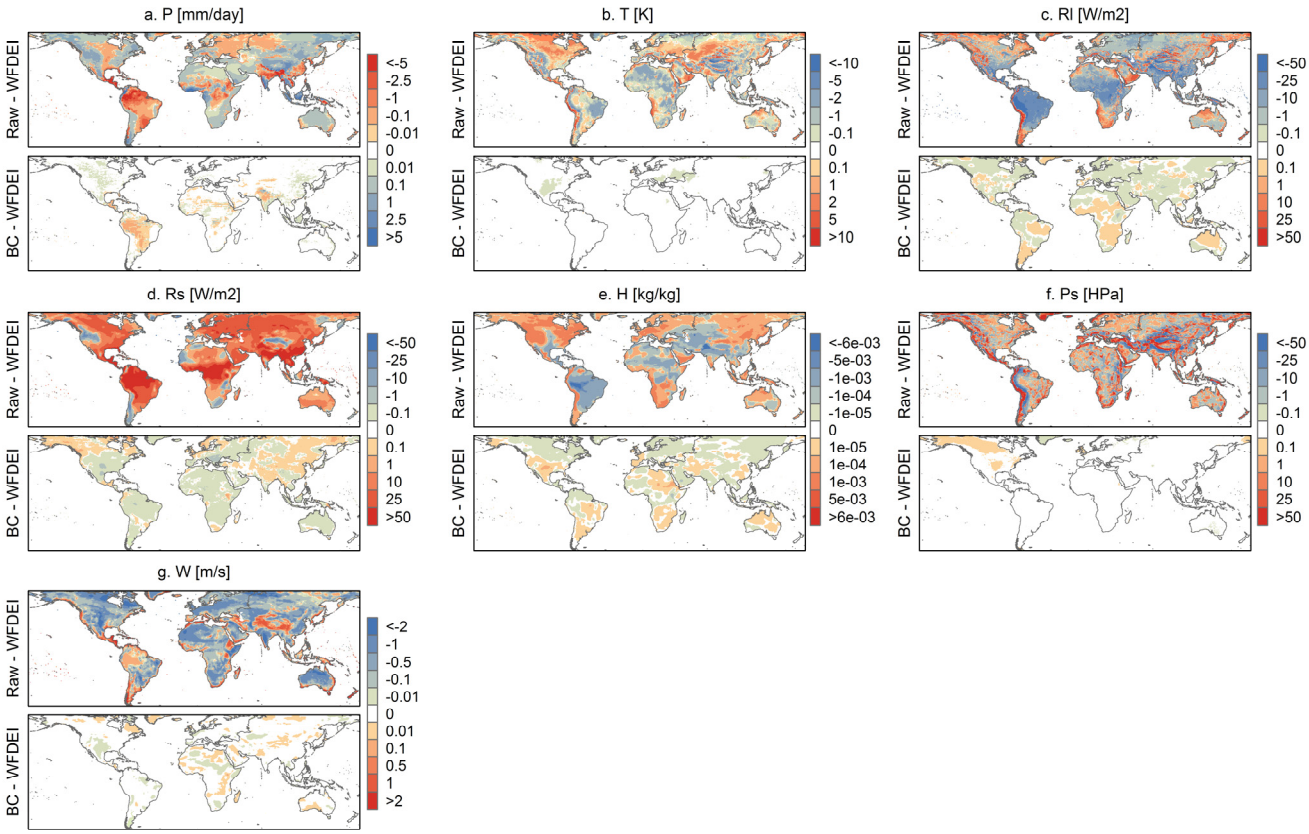

Figure S 2. Difference maps, showing initial (Raw-WFDEI) and remaining (BC-WFDEI) biases of the GCM ensemble forcing variables: a.Precipitation, b.Temperature, c.Longwave downward radiation, d.Shortwave downward radiation, e.Specific humidity, h.Surface pressure, g.Wind. Differences are calculated between the June-July-August averages (JJA) of the 1981-2010 period.

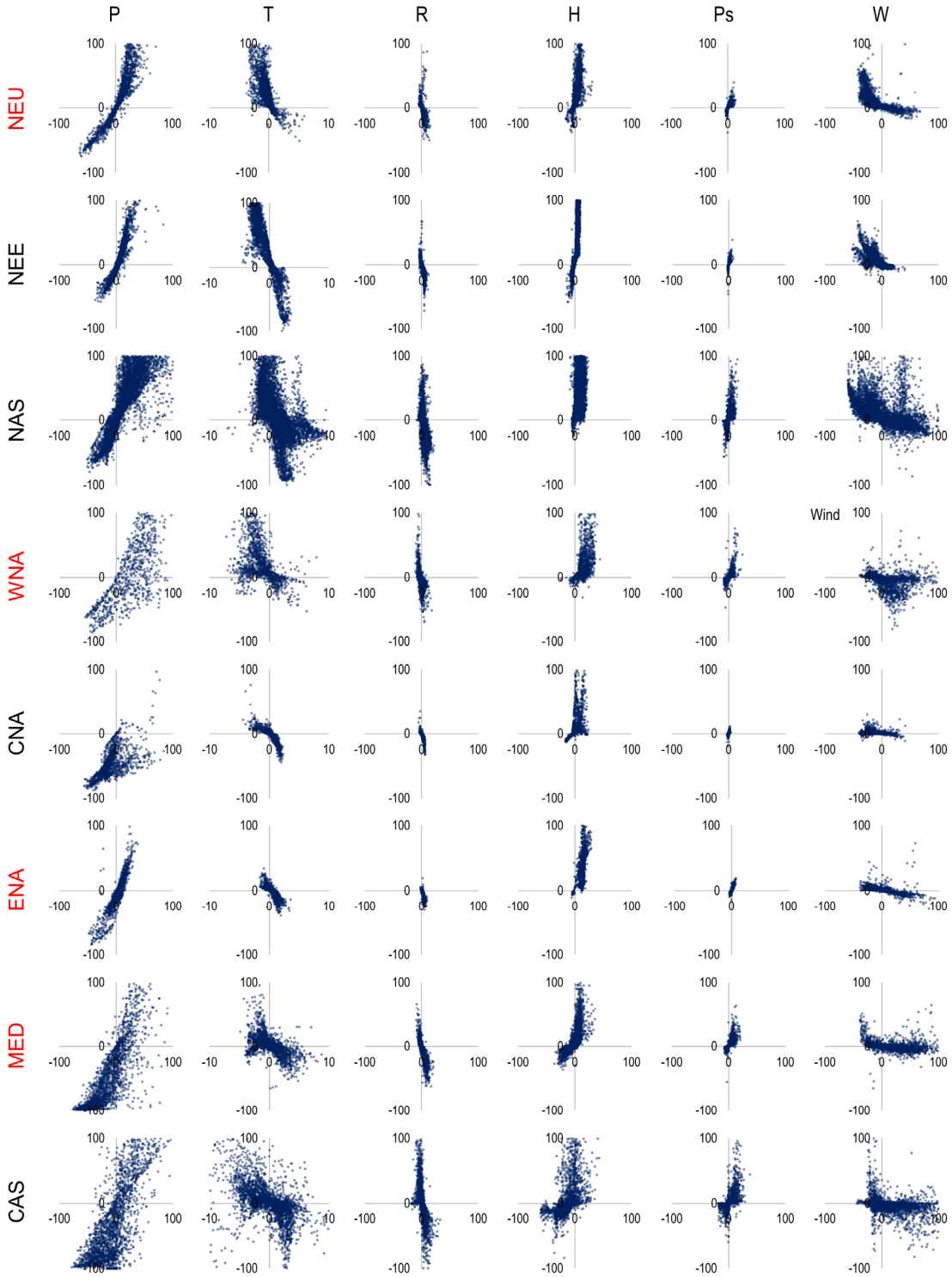

Figure S 3. Scatterplots of relative changes in forcing variable (ΔV, x axis) and corresponding relative changes in runoff (ΔRF, y axis), for all the forcing variables and for the 24 regions. In each panel, each dot represents the ΔRF/ ΔV relationship of each land grid box in the examined region.

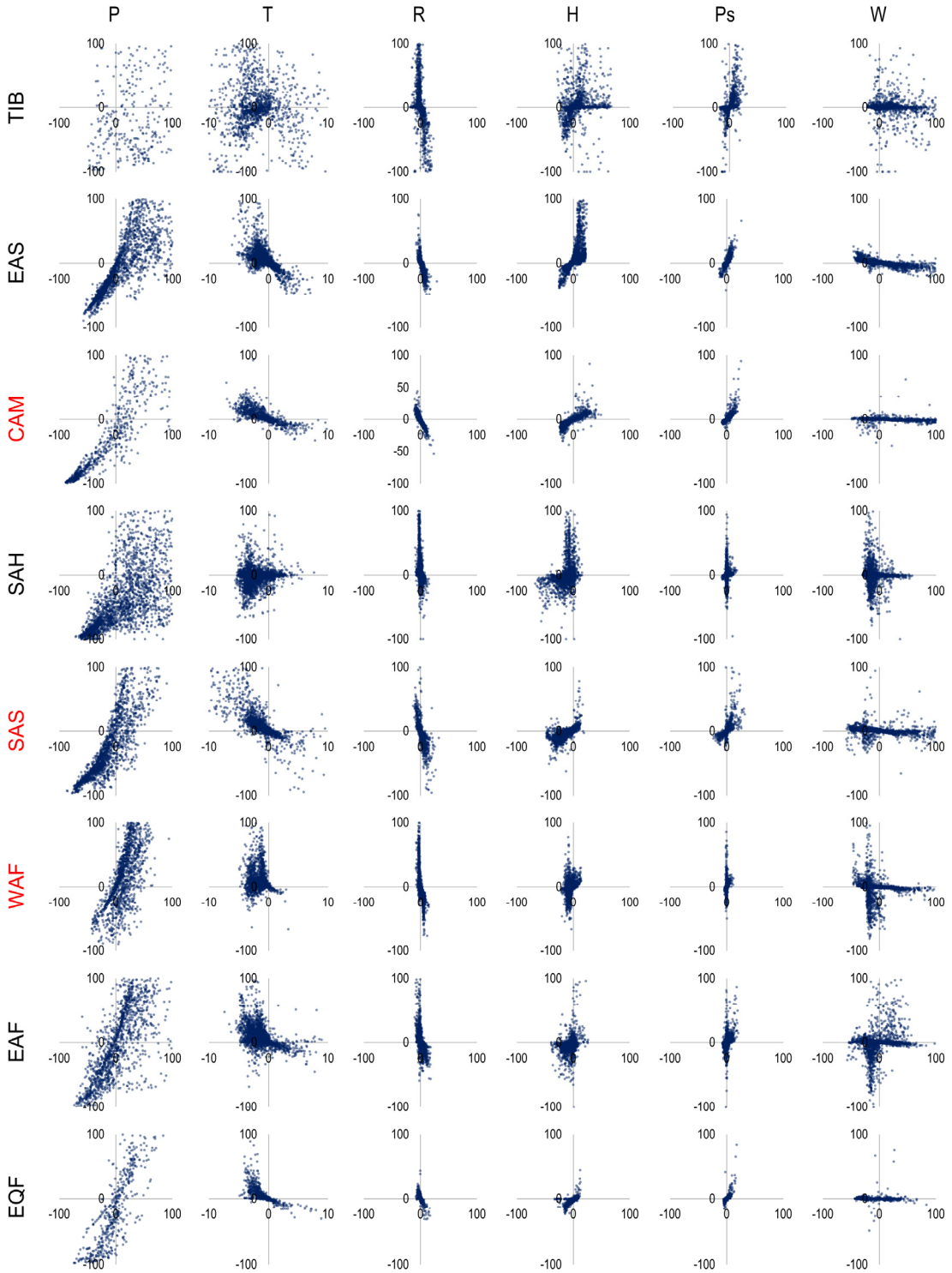

Figure S 3 (continued).

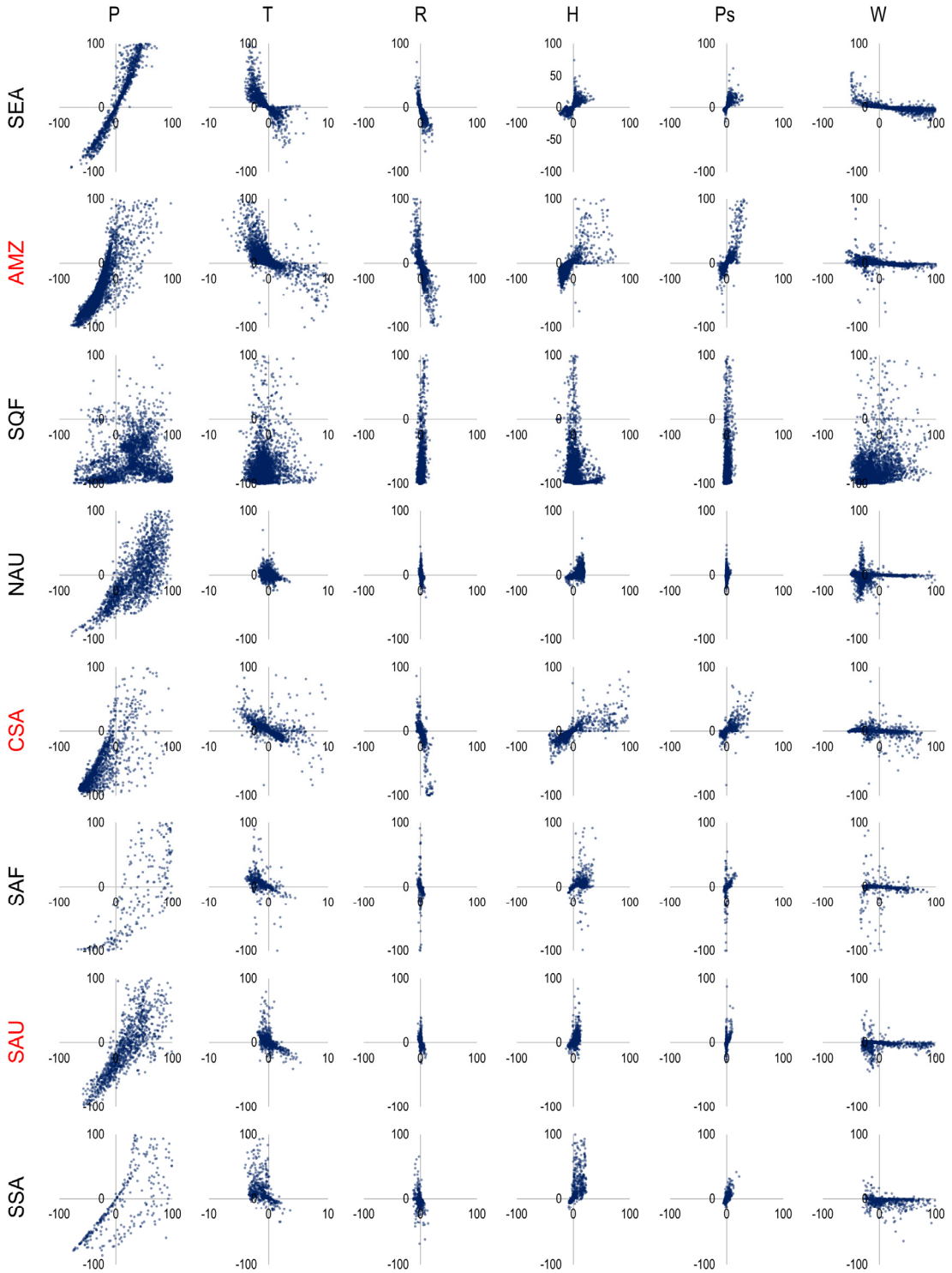

Figure S 3 (continued).

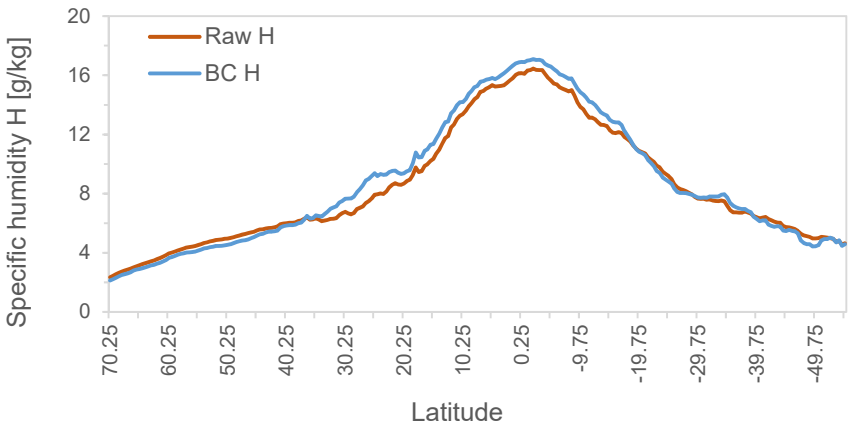

Figure S 4. Latitudinal means of raw and bias corrected specific humidity [g/kg], calculated from the 1981-2010 period.

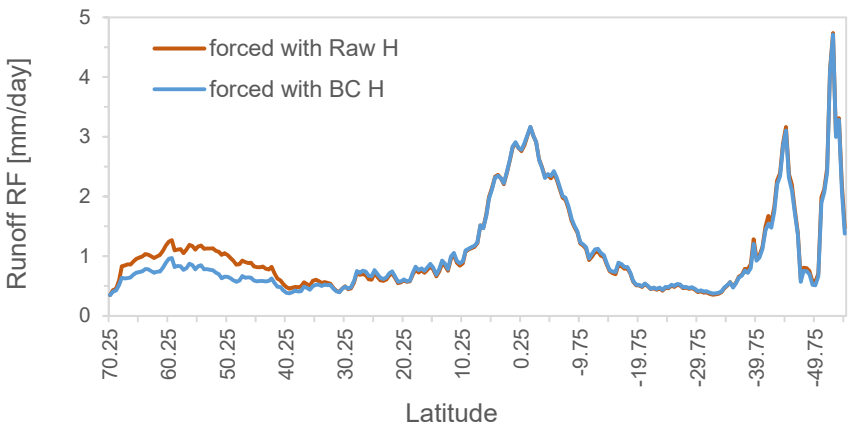

Figure S 5. Latitudinal means of JULES' runoff, forced with raw and bias corrected humidity [mm/day], calculated from the 1981-2010 period.

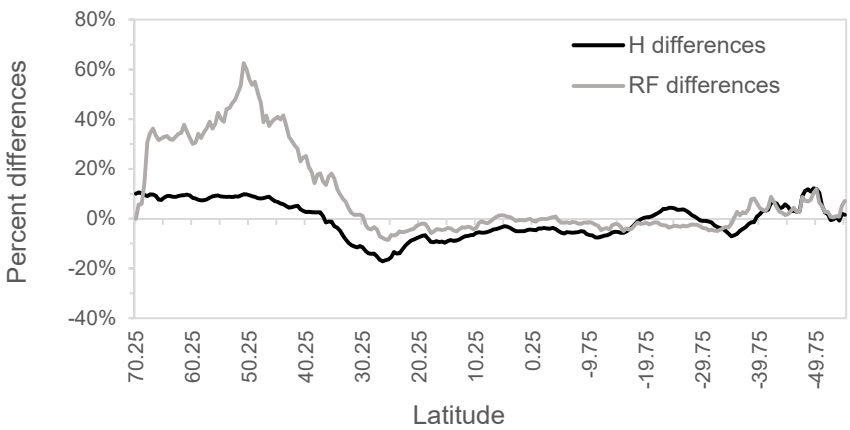

Figure S 6. Percent differences of latitudinal means. Differences are: 1) between raw and bias corrected specific humidity (ΔV) and 2) JULES' runoff, forced with raw and bias corrected specific humidity (ΔRF). Differences are calculated from the 1981-2010 period.

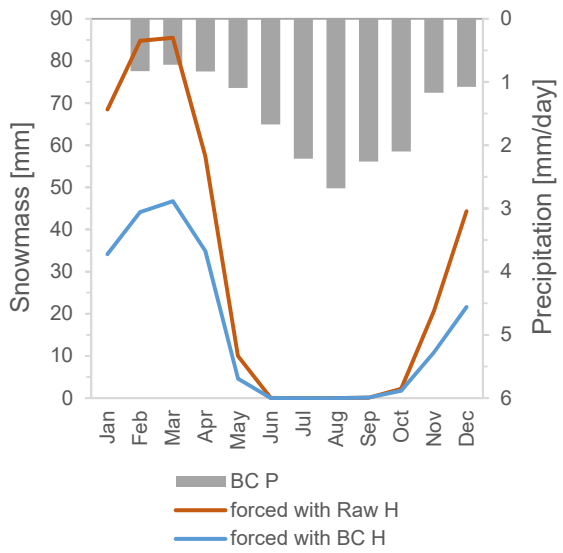

Figure S 7. Annual cycle of JULES' snowmass, forced with raw and bias corrected humidity [mm/day] and bias corrected precipitation (common forcing for both runs). Annual cycles are calculated from the 1981-2010 period, for a representative grid box with center location at 60.25 Longitude and 60.25 Latitude.

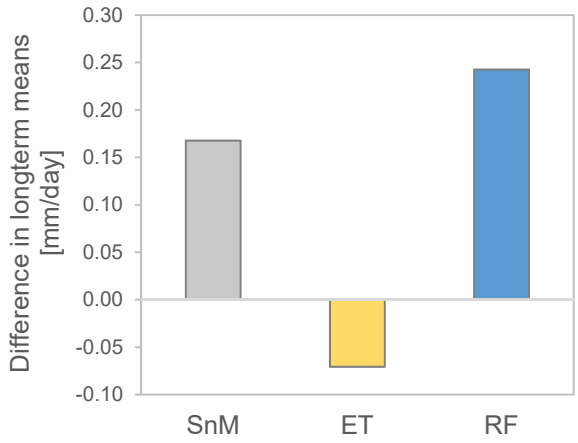

Figure S 8. Difference between the long term means (of the 1981-2010 period) of three fluxes (SnM:snowmelt, ET: evapotranspiration and RF:runoff), forced with raw and bias corrected humidity (forced with Raw H-forced with BC H). The fluxes are calculated for a representative grid box with center location at 60.25 Longitude and 60.25 Latitude.

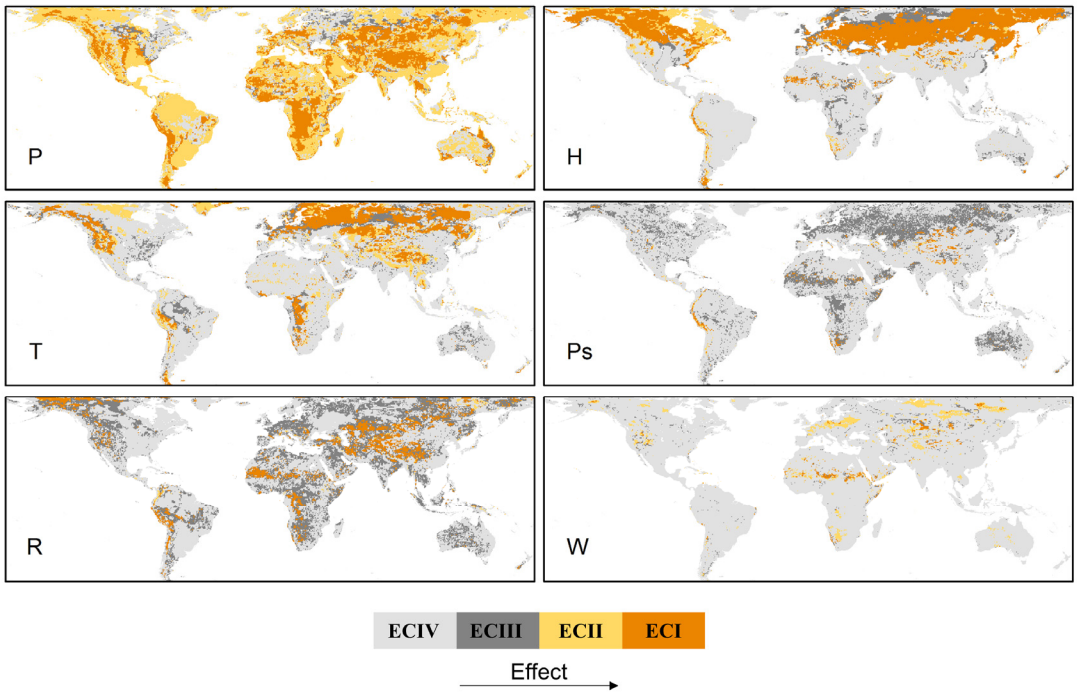

Figure S 9. Global maps of bias Effect Categories (ECs) for each forcing variable, defined using the 75th percentile instead of the median.

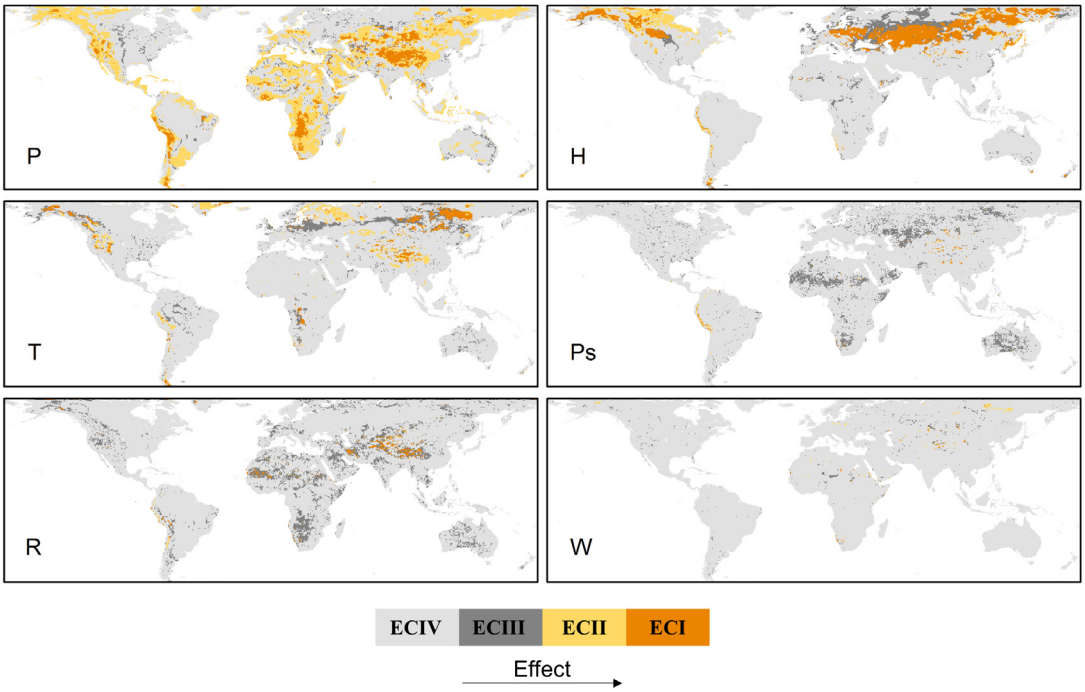

Figure S 10. Global maps of bias Effect Categories (ECs) for each forcing variable, defined using the 90th percentile instead of the median.