Supplement of Hydrol. Earth Syst. Sci., 22, 611–634, 2018
https://doi.org/10.5194/hess-22-611-2018-supplement

Hydrology and Earth System Sciences
Open Access
EGU

Supplement of

A large set of potential past, present and future hydro-meteorological time series for the UK

Benoit P. Guillod et al.

Correspondence to: Benoit P. Guillod (benoit.guillod@env.ethz.ch)

Supplementary Figures

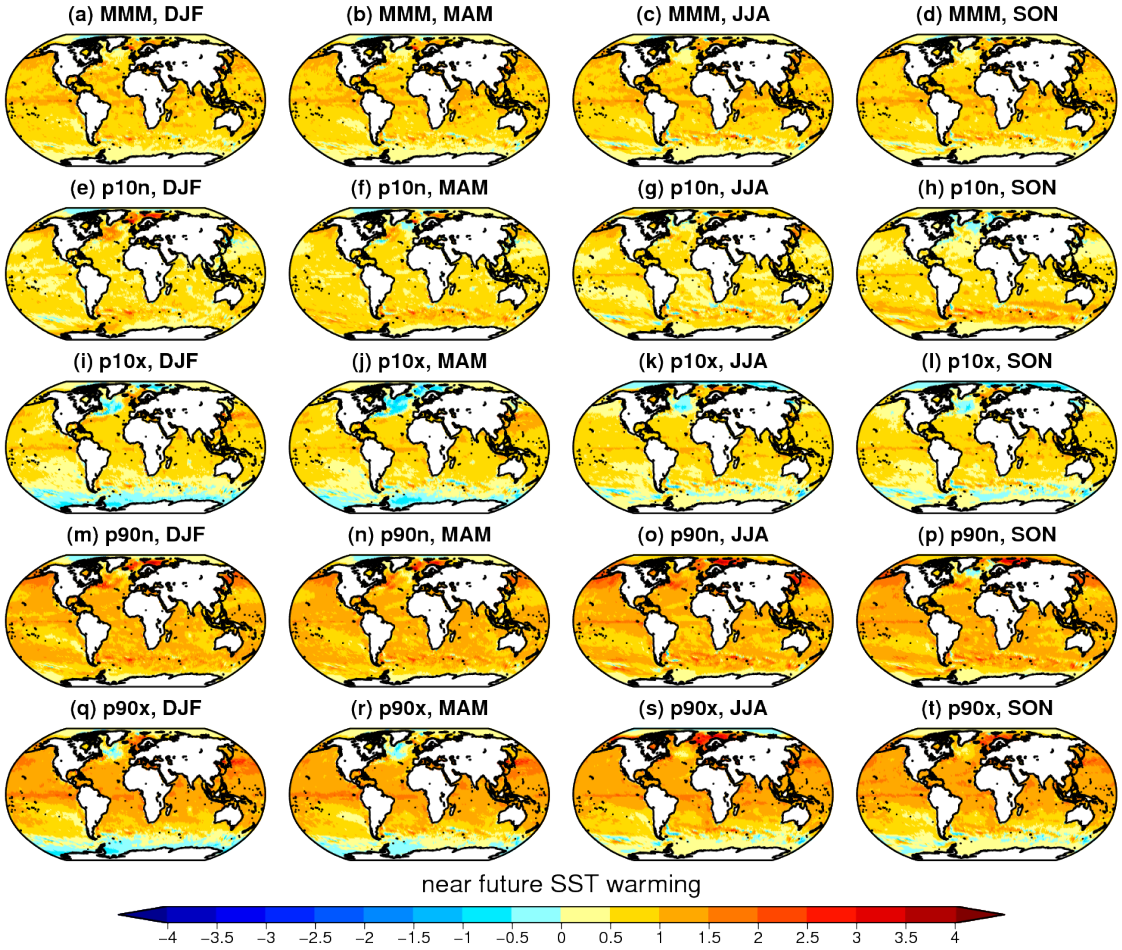

Figure S1: Sea surface temperature warming imposed in the near future time slice for each scenario (rows) and season (columns), with respect to the baseline (1975–2004). MMM refers to scenario "nf", with CMIP5 multi-model median SST warming pattern (see Table 2 in the main text).

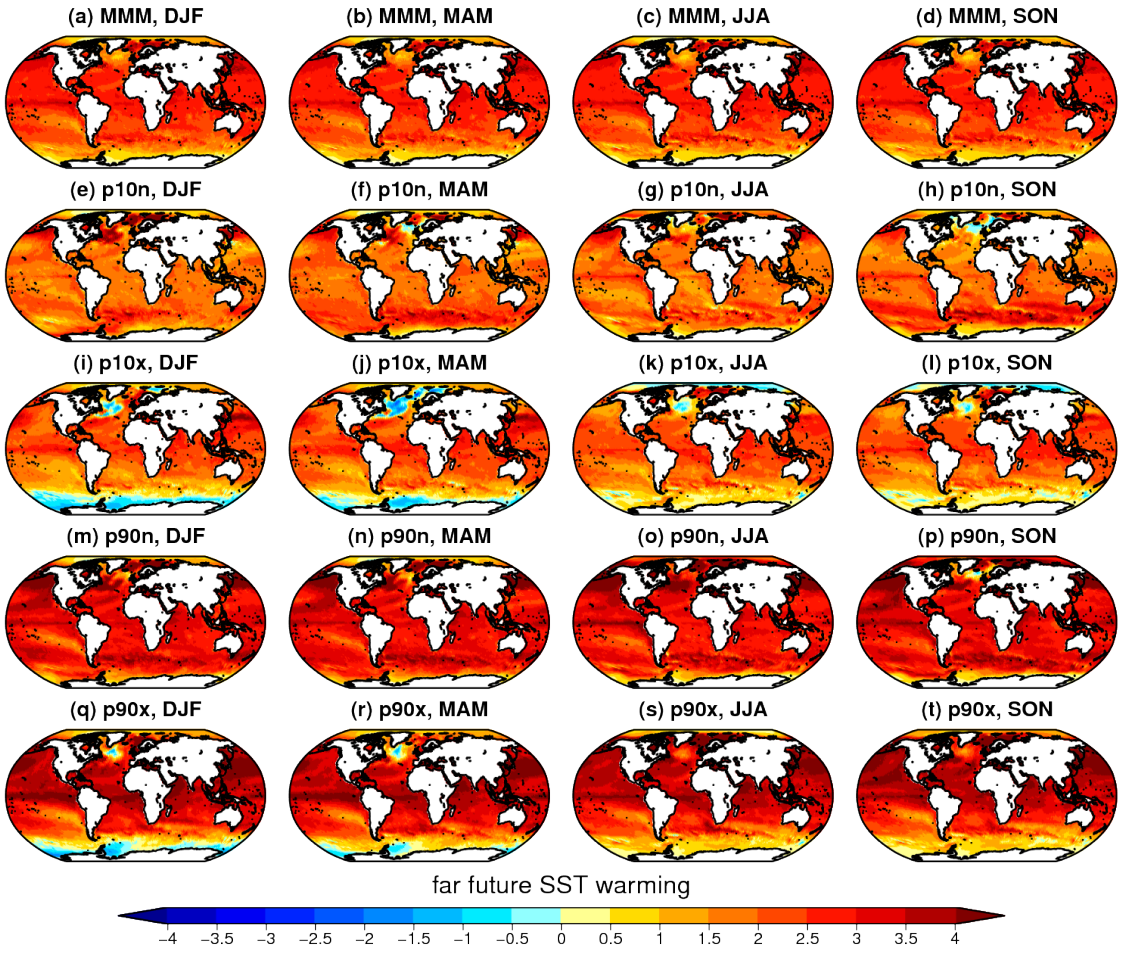

Figure S2: Sea surface temperature warming imposed in the far future time slice for each scenario (rows) and season (columns), with respect to the baseline (1975–2004). MMM refers to scenario "ff", with CMIP5 multi-model median SST warming pattern (see Table 2 in the main text).

Figure S3: The 19 UKCP09 water basin regions in Great Britain used in the analysis.

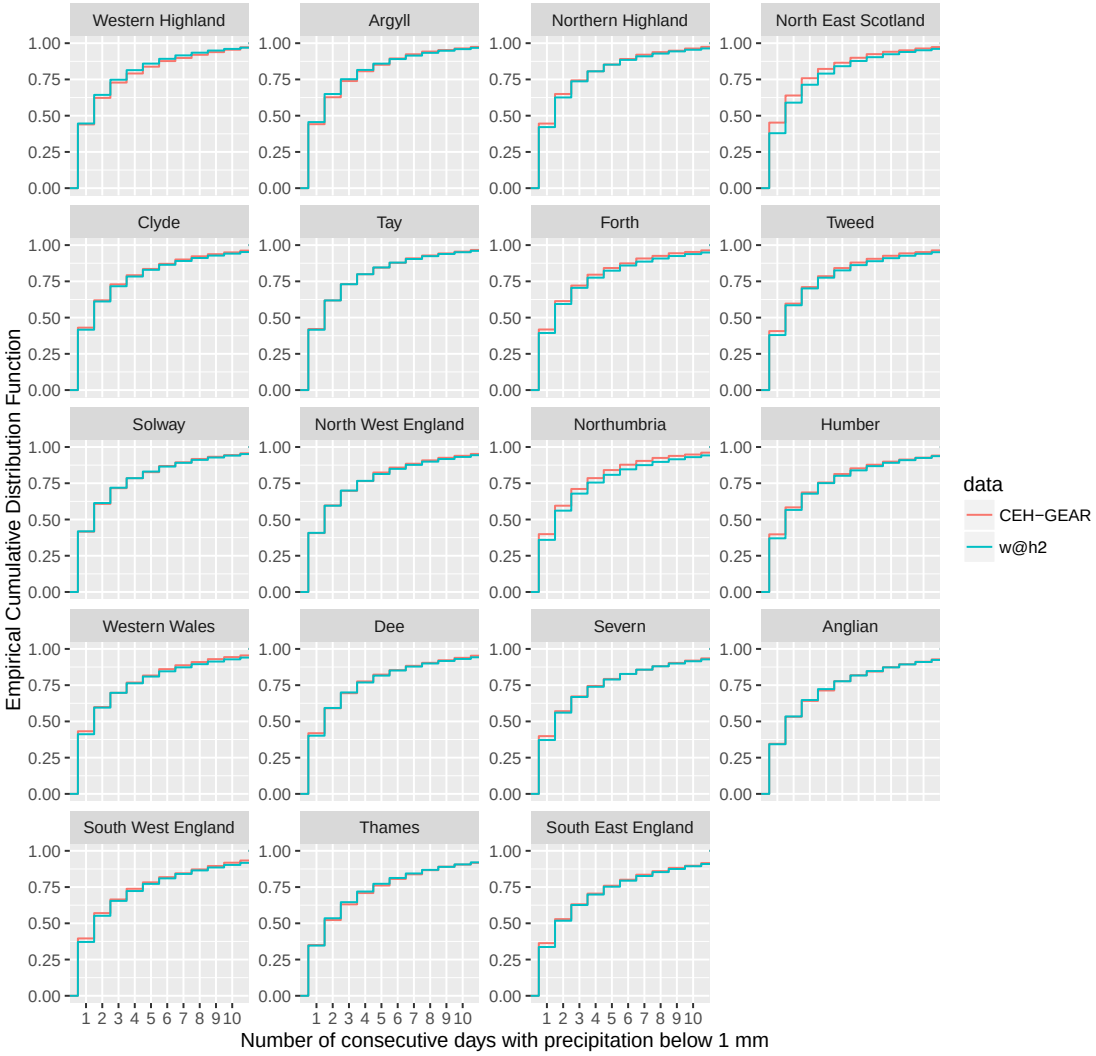

Figure S4: Distribution of dry spell duration for different regions: Empirical cumulative distribution function of the number of consecutive days with regionally-averaged precipitation below 1 mm.

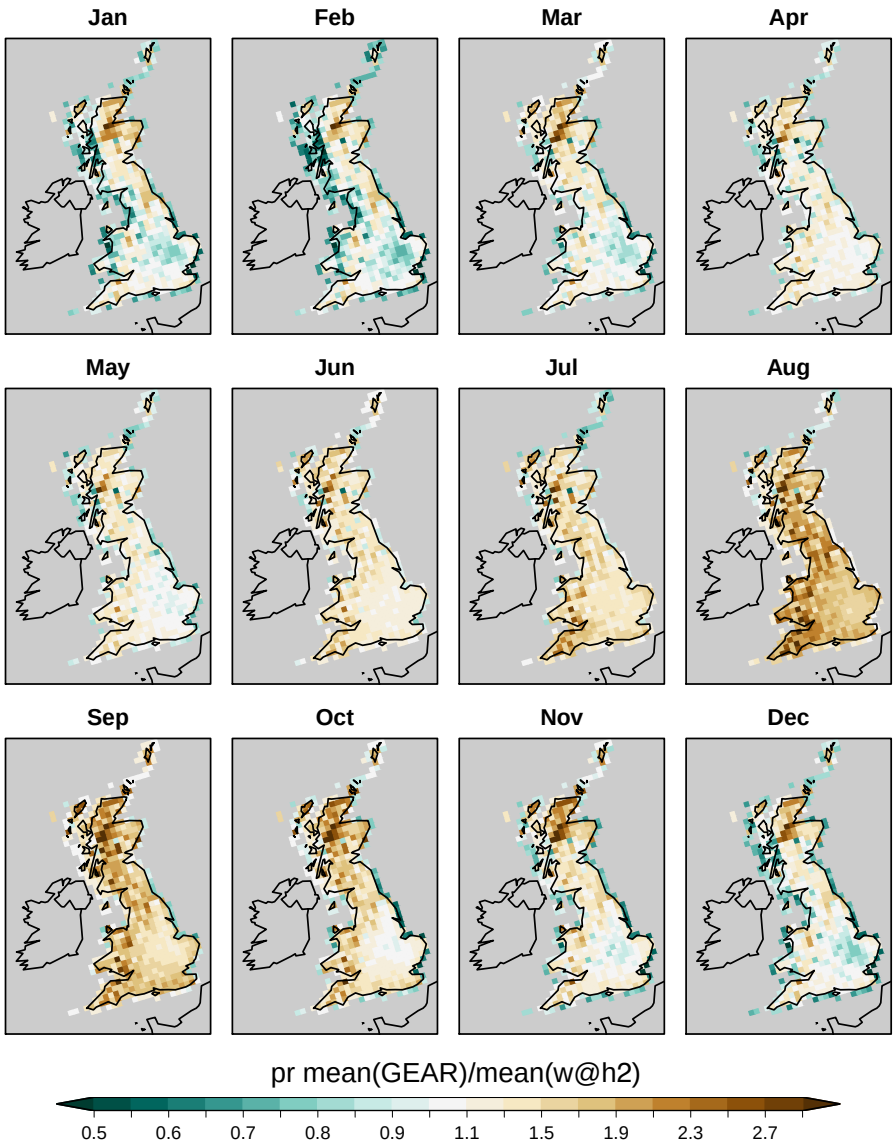

Figure S5: Ratio between observed (GEAR) and modelled (w@h2) 1961–2006 monthly averaged precipitation.

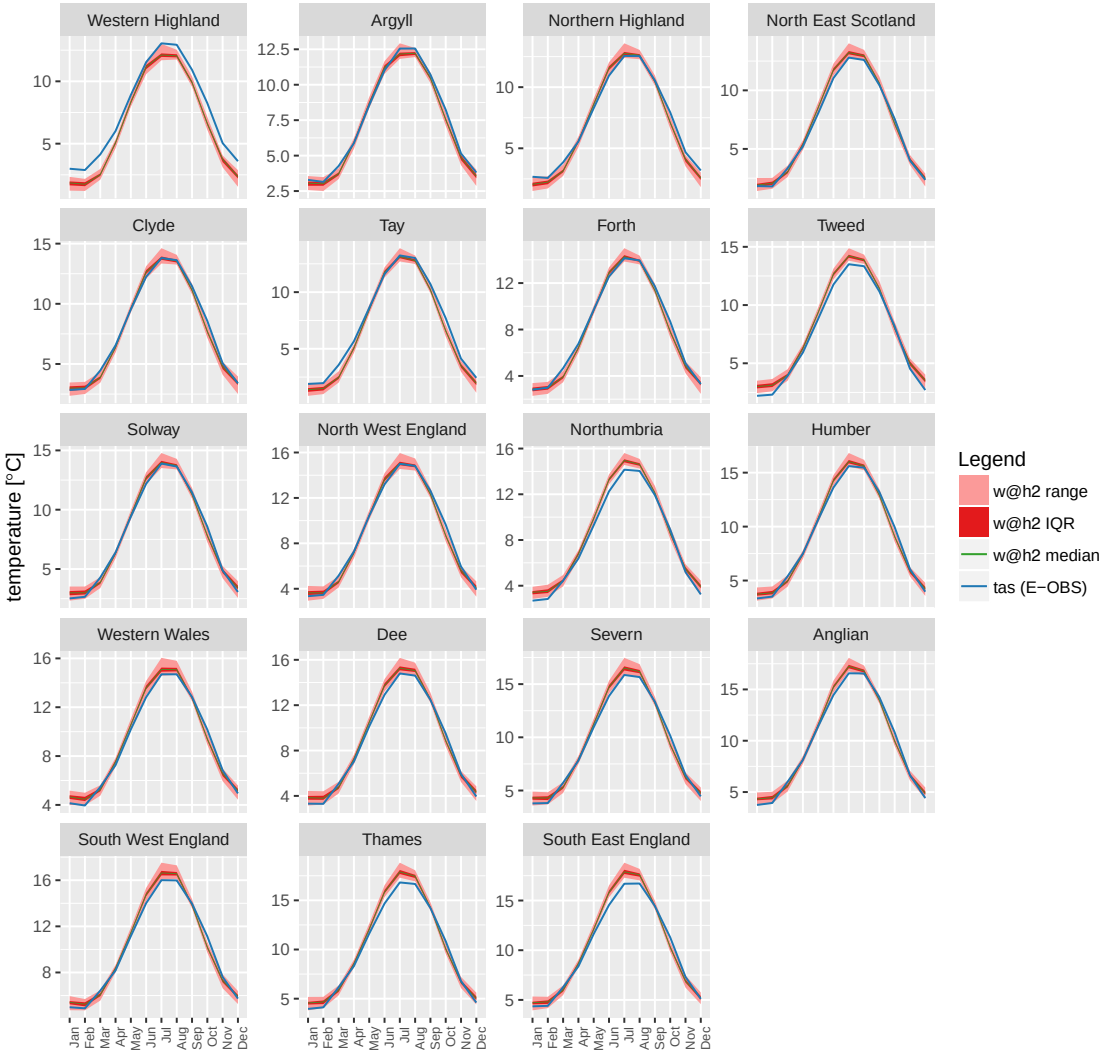

Figure S6: Mean seasonal for regionally-averaged temperature from individual baseline time series (dark red: interquartile range; light red: range; green: median) and observations (E-OBS; blue).

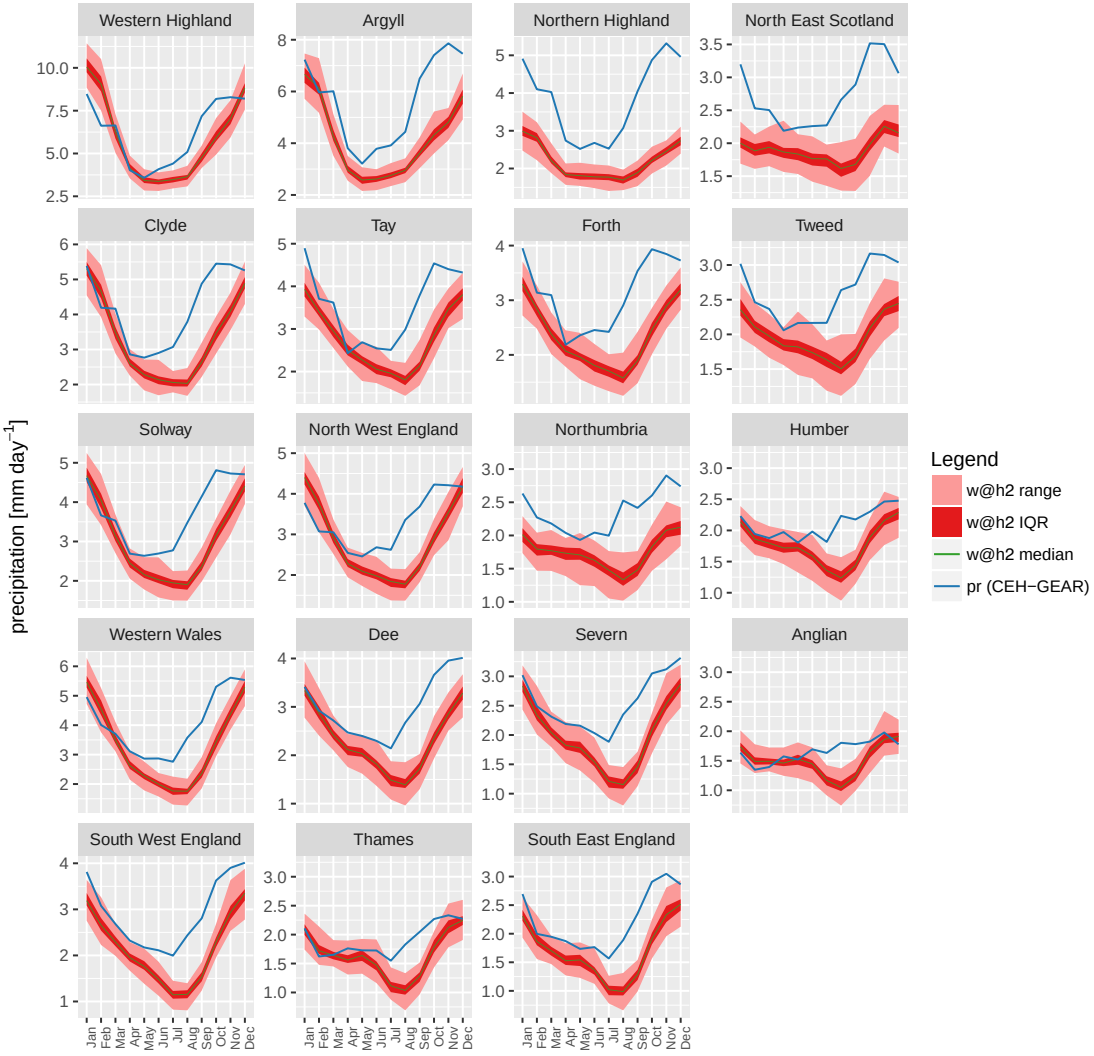

Figure S7: Mean seasonal for regionally-averaged precipitation (raw) from individual baseline time series (dark red: interquartile range; light red: range; green: median) and observations (CEH-GEAR; blue).

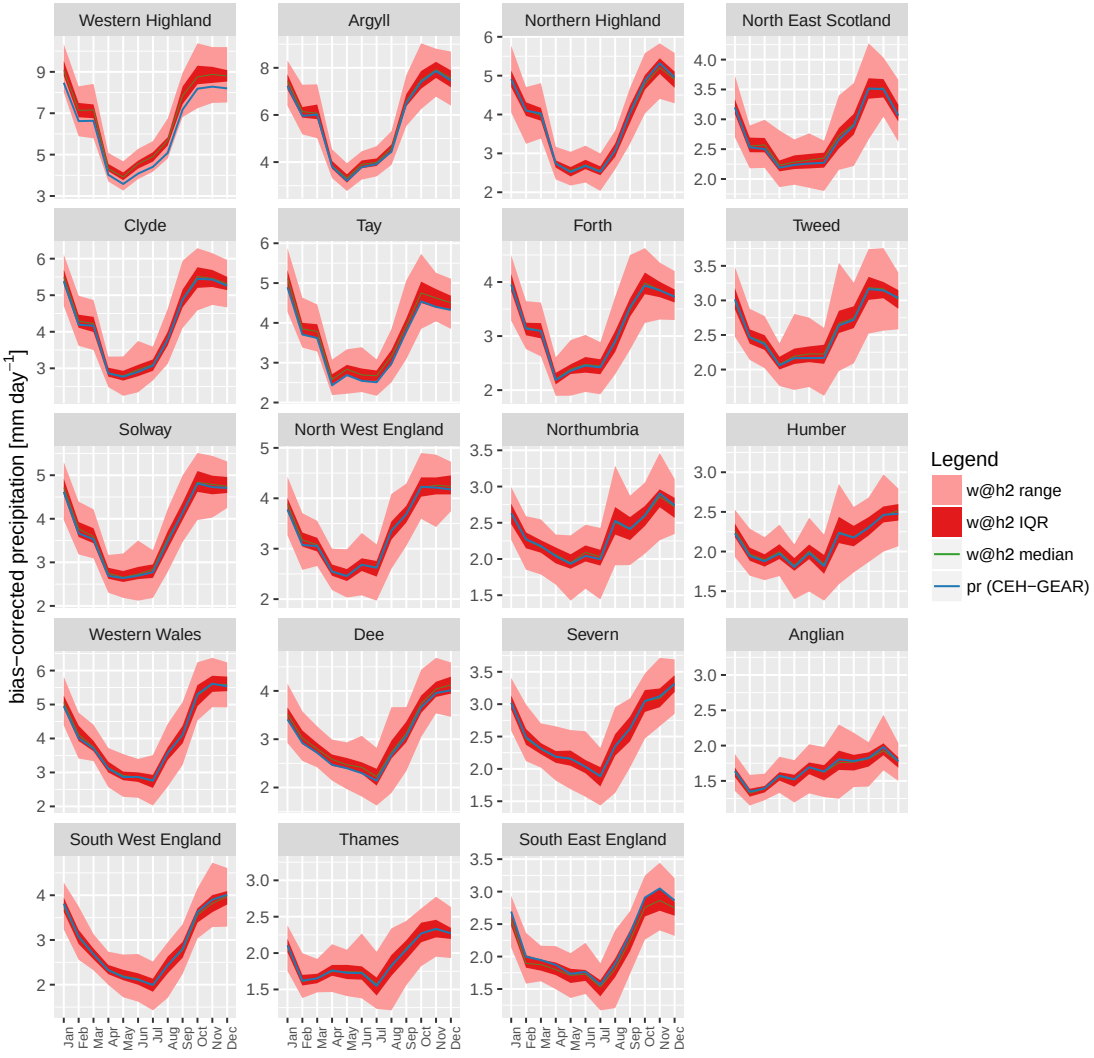

Figure S8: Mean seasonal for regionally-averaged precipitation (bias-corrected) from individual baseline time series (dark red: interquartile range; light red: range; green: median) and observations (CEH-GEAR; blue).

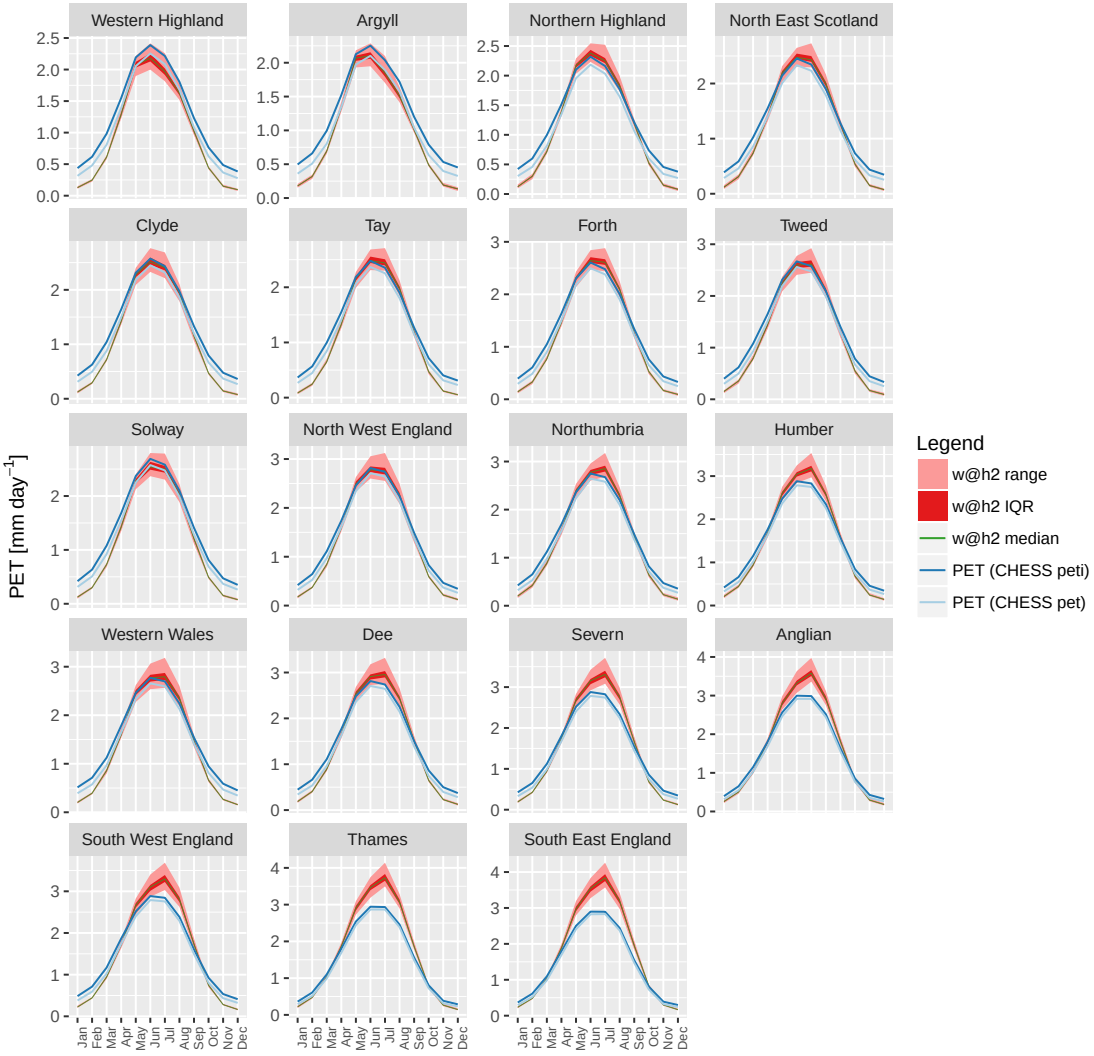

Figure S9: Mean seasonal for regionally-averaged E_{pot} from individual baseline time series (dark red: interquartile range; light red: range; green: median) and observations (CHESS-PE; blue, with and without interception correction).

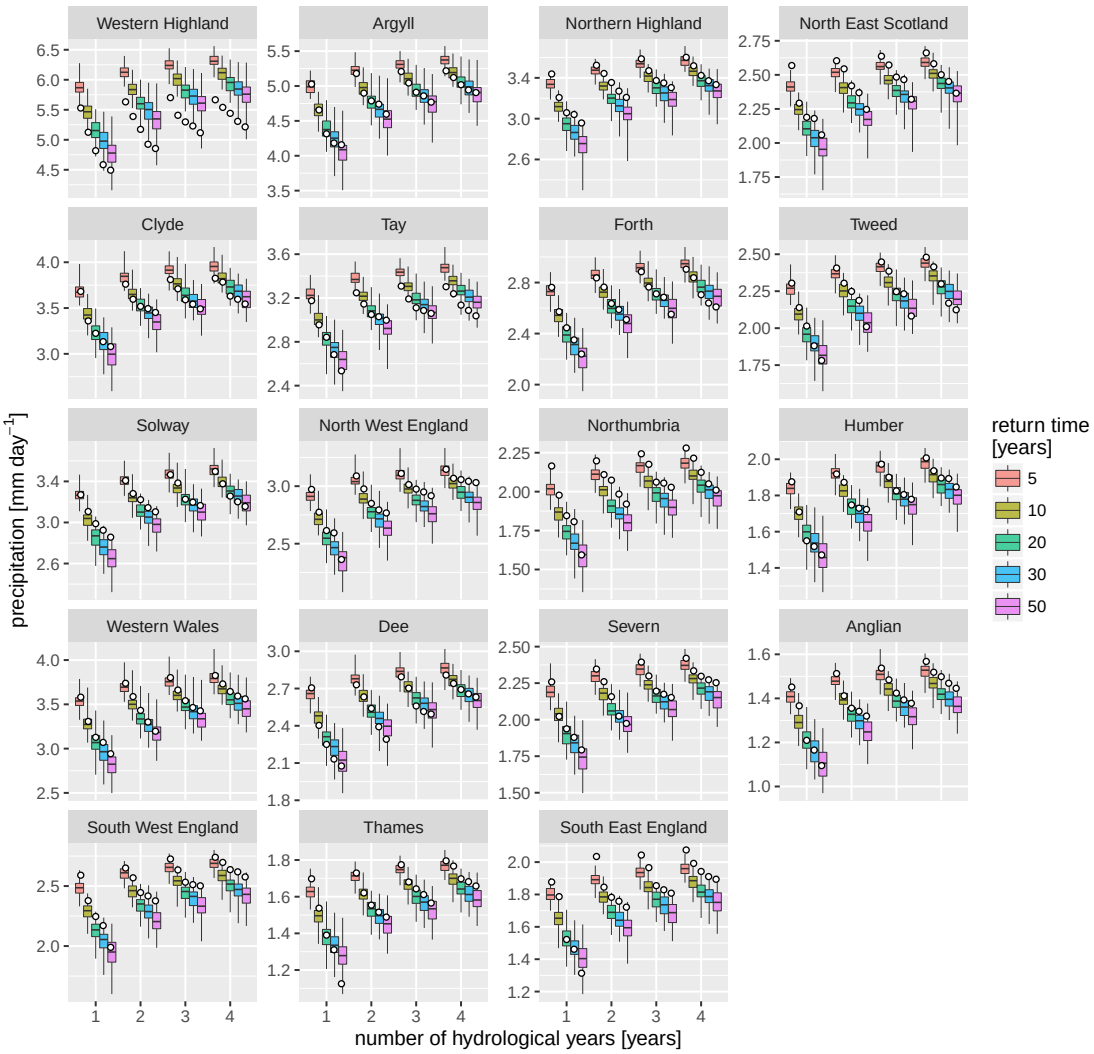

Figure S10: As Fig. 8 in the main text but for all UKCP09 water basin regions: Return values of low precipitation accumulated over 1–4 hydrological years in the 100 baseline time series (boxplot) and in CEH-GEAR (white dot) for each region (panel) and season (group), for return times of 5–50 years.

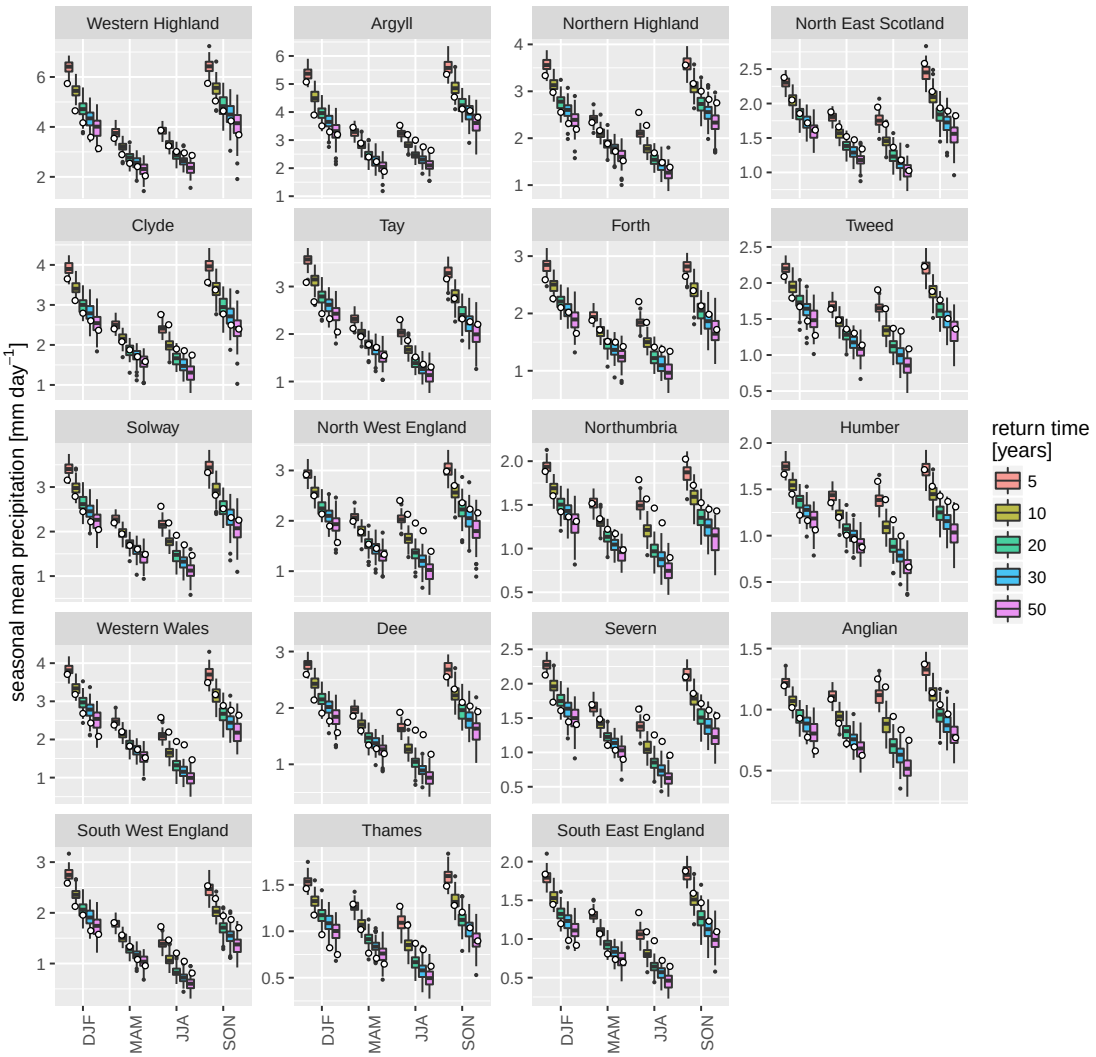

Figure S11: As Fig. 8 in the main text but for seasonal precipitation: Return values of low seasonal precipitation (accumulated over 3 months) in the 100 baseline time series (boxplot) and in CEH-GEAR (white dot) for each region (panel) and season (group), for return times of 5–50 years.

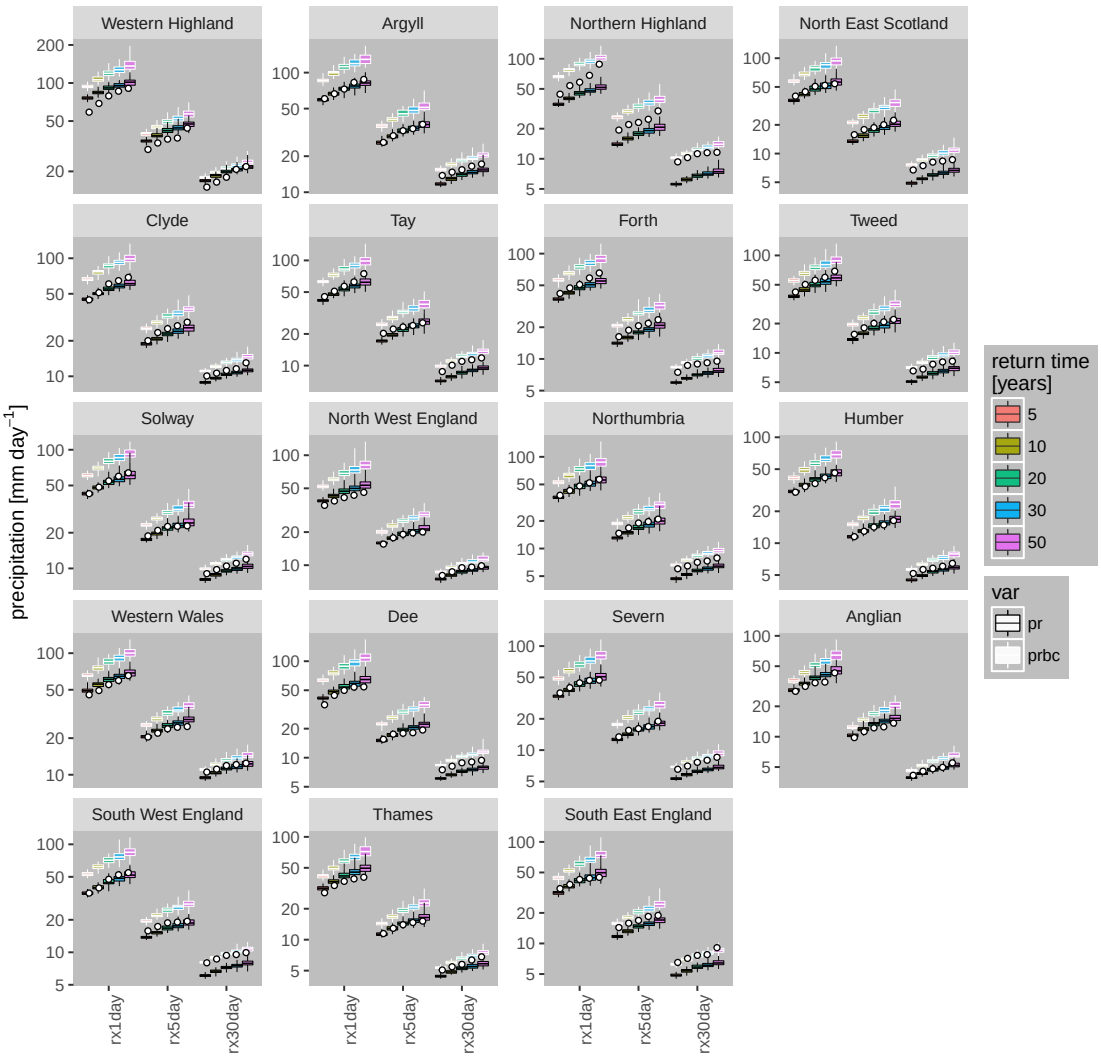

Figure S12: As Fig. 9 in the main text but for all regions: Return values of high precipitation indices rx1day, rx5day and rx30day (x-axis) in the 100 baseline time series (boxplot) and in CEH-GEAR (white dot) for each region (panel), for return times of 5–50 years (colour). Bias-corrected precipitation data is boxed in white (raw precipitation data in black). Whiskers display the range from individual time series.

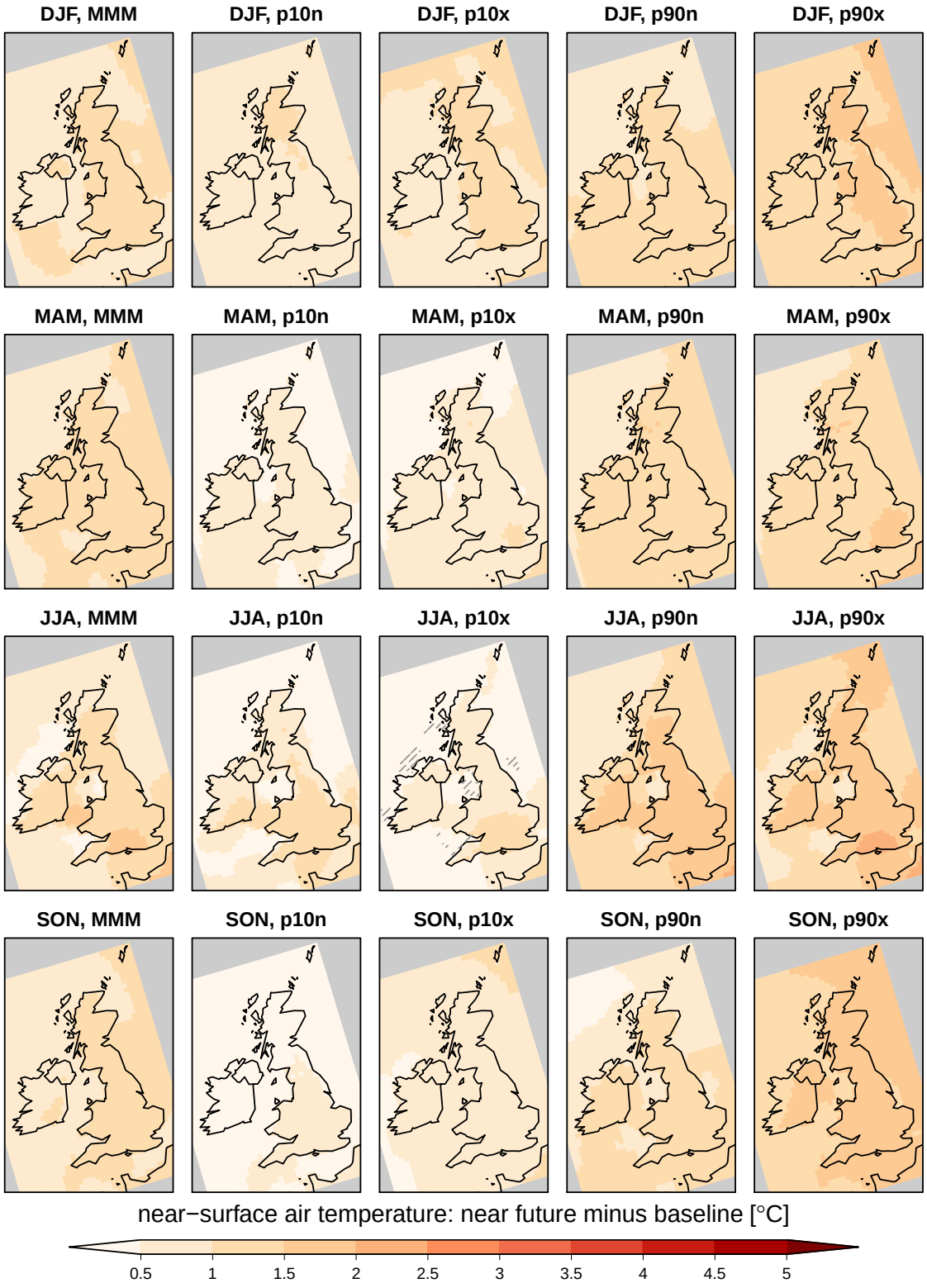

Figure S13: As Fig. 10 in the main text but for the near future time slice: difference in near-surface air temperature with respect to the baseline for each season (row) and scenario (column). Hatching indicates grid-cells with statistically non-significant changes at the 5% level according to a two-sided T-test (almost all grid cells are significant here).

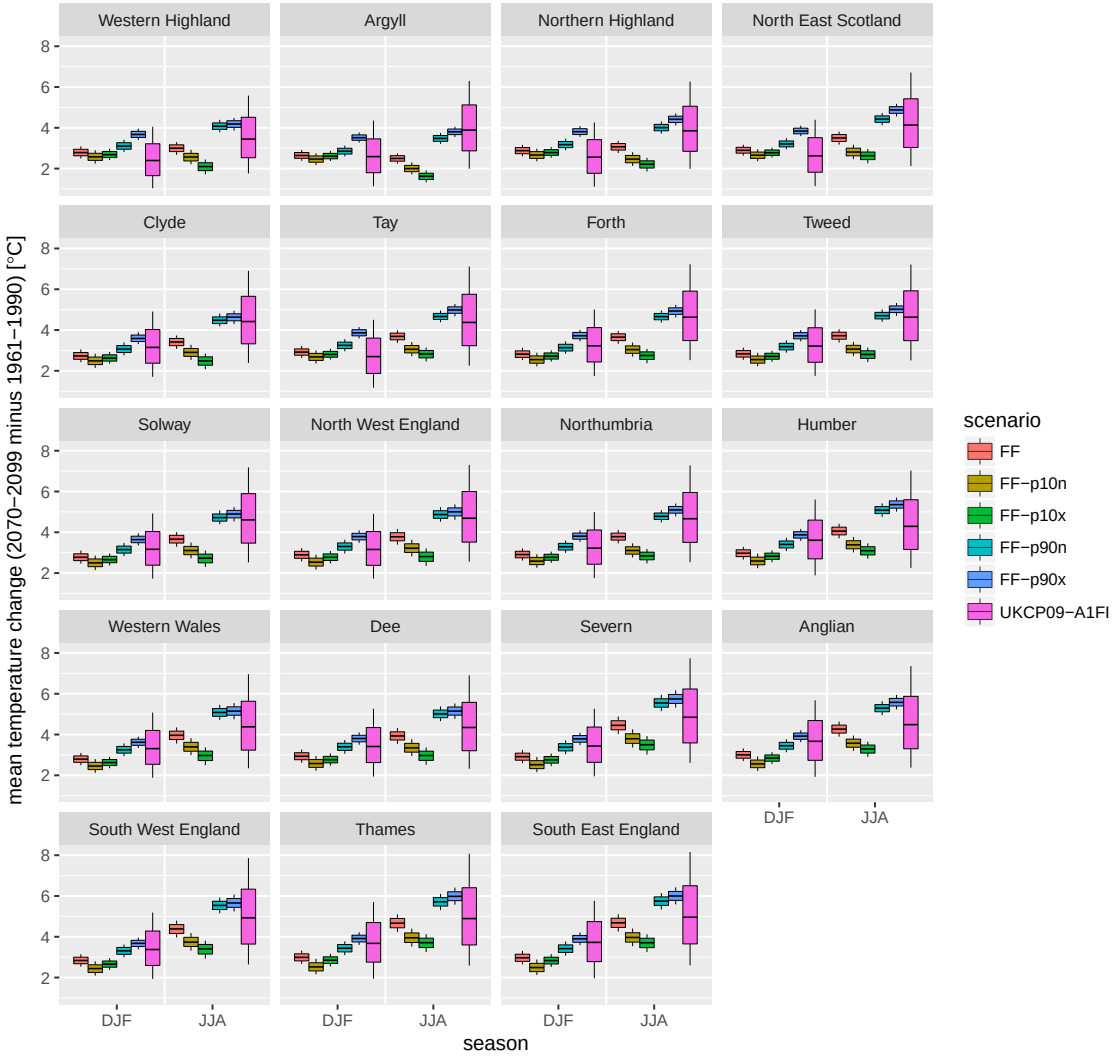

Figure S14: Same as Fig. 11 in the main text but for all regions: Comparison of temperature projections with UKCP09: For each region, boxes show changes (2070–2099 minus 1961–1990) in JJA (left boxes) and DJF (right boxes) in the 5 sets of MaRIUS time series and in UKCP09 (high emission scenario: SRES A1FI; 10000 values available). Whiskers display the 10–90% range from each group.

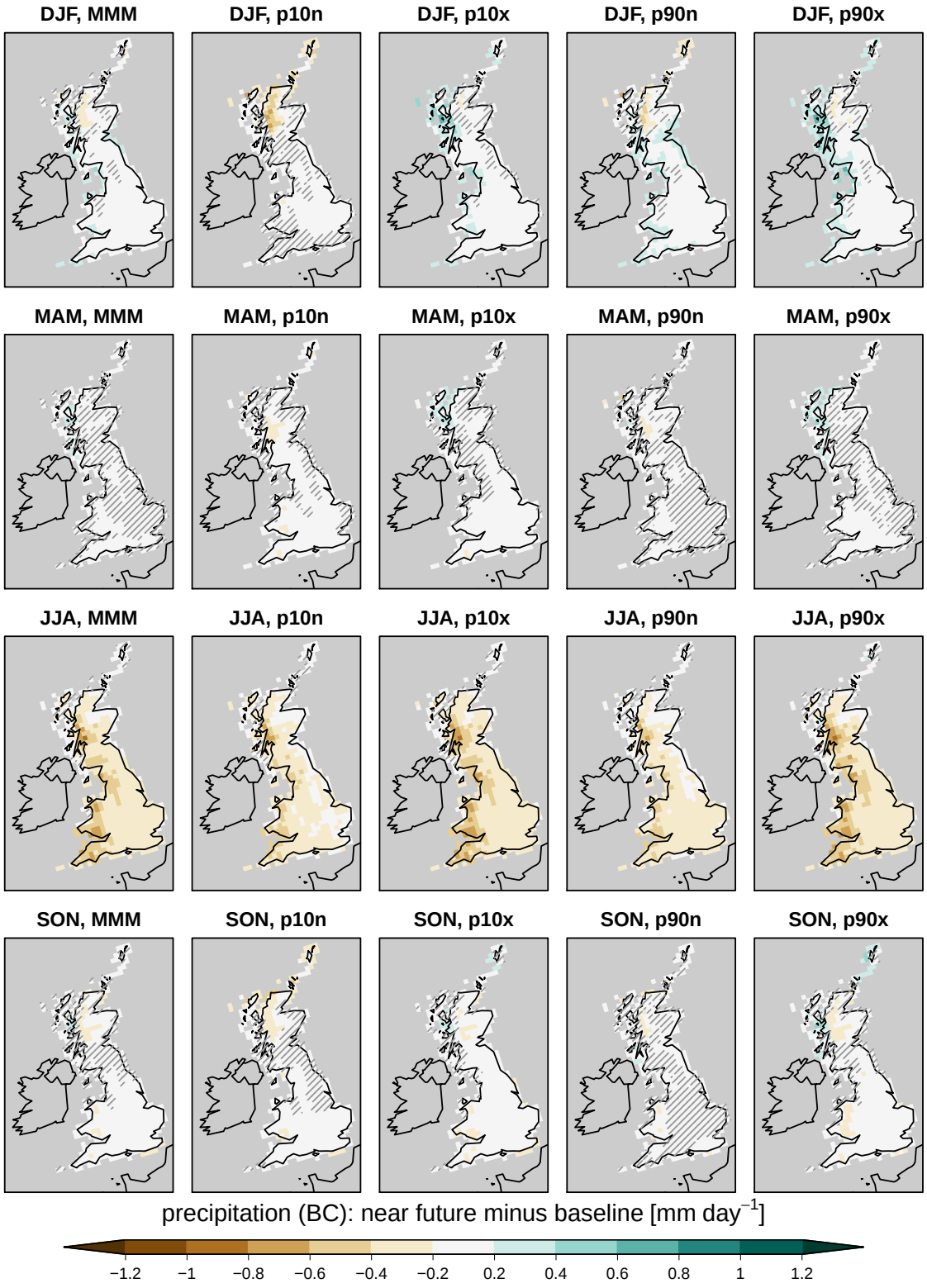

Figure S15: As Fig. 12 in the main text but for the near future time slice: difference in precipitation (bias-corrected) with respect to the baseline for each season (row) and scenario (column). Hatching indicates grid-cells with statistically non-significant changes at the 5% level according to a two-sided T-test.

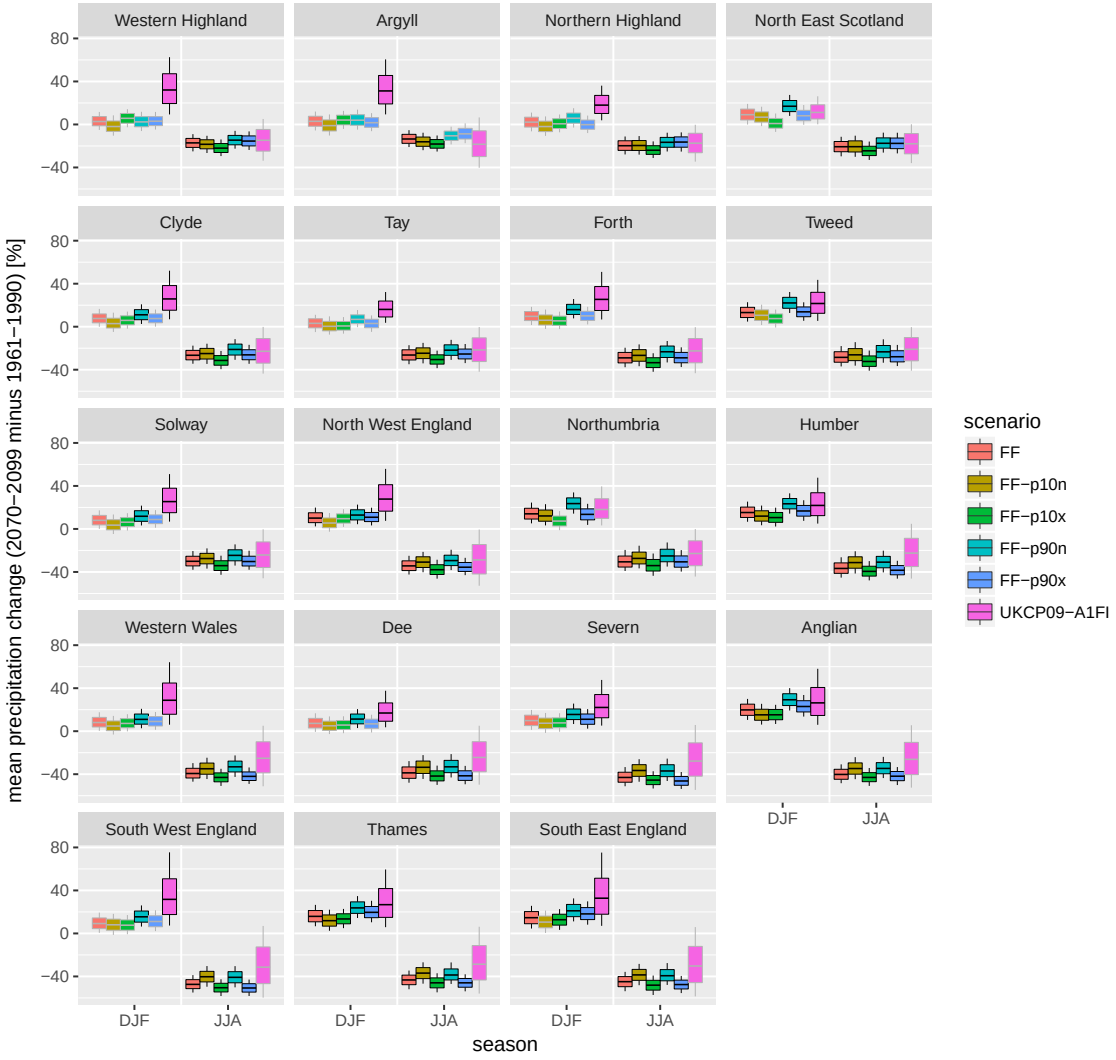

Figure S16: Same as Fig. 13 in the main text but for all regions.

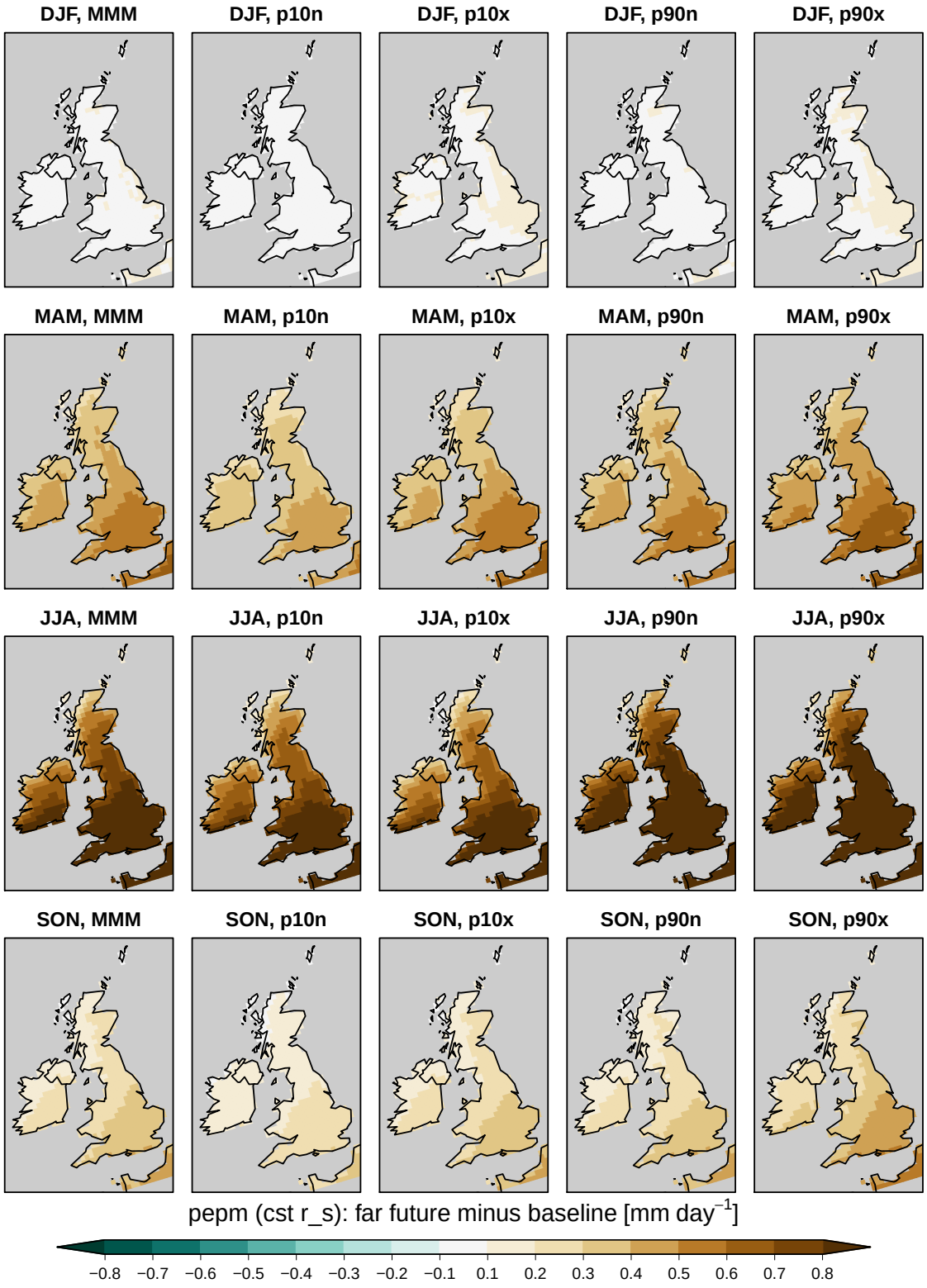

Figure S17: As Fig. 14 in the main text but for E_{pot} without adjusting future stomatal resistance to future CO_2 concentrations. Hatching indicates grid-cells with statistically non-significant changes at the 5% level according to a two-sided T-test.

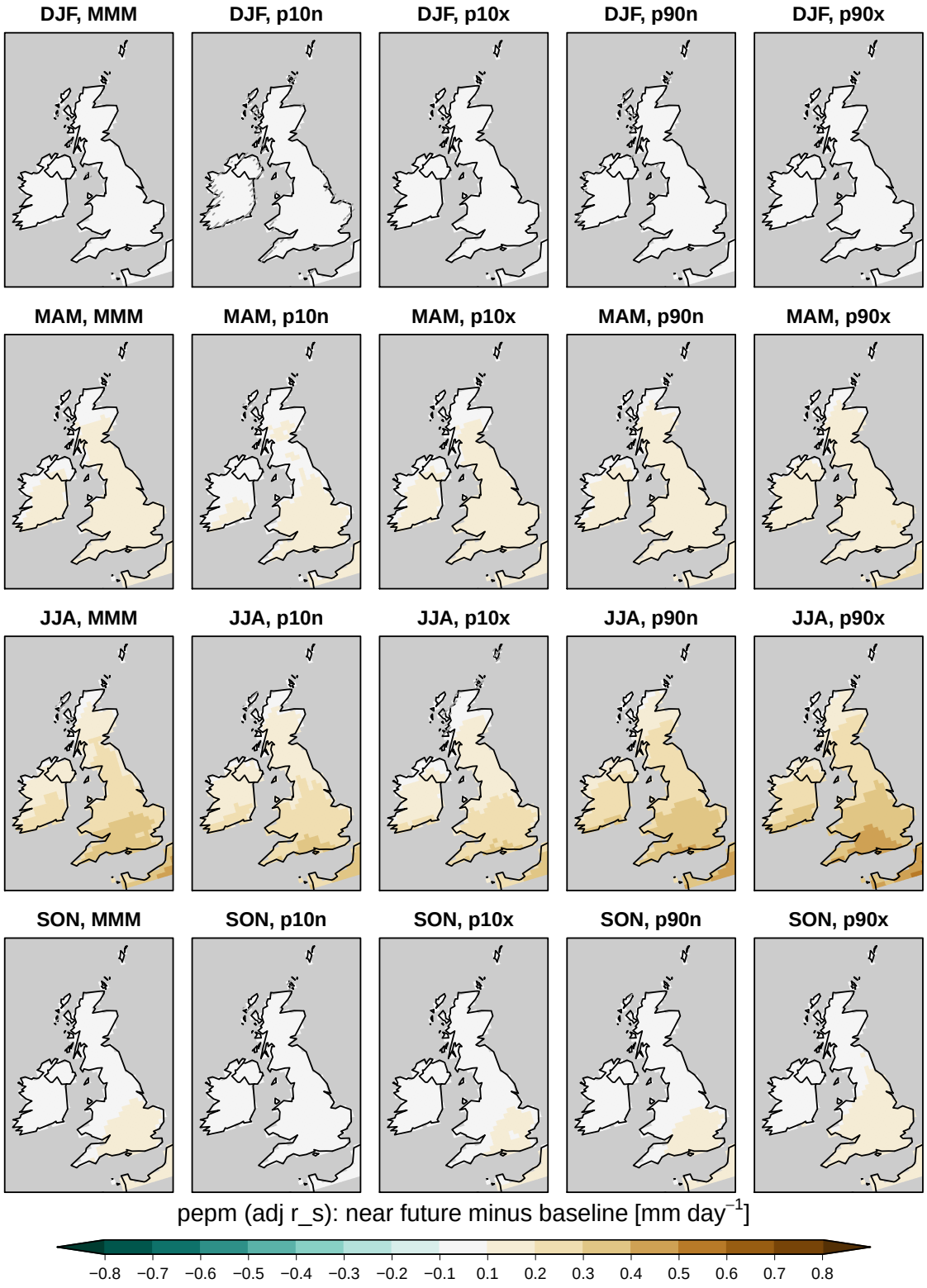

Figure S18: As Fig. 14 in the main text but for the near future time slice: difference in E_{pot} with respect to the baseline for each season (row) and scenario (column). Hatching indicates grid-cells with statistically non-significant changes at the 5% level according to a two-sided T-test.

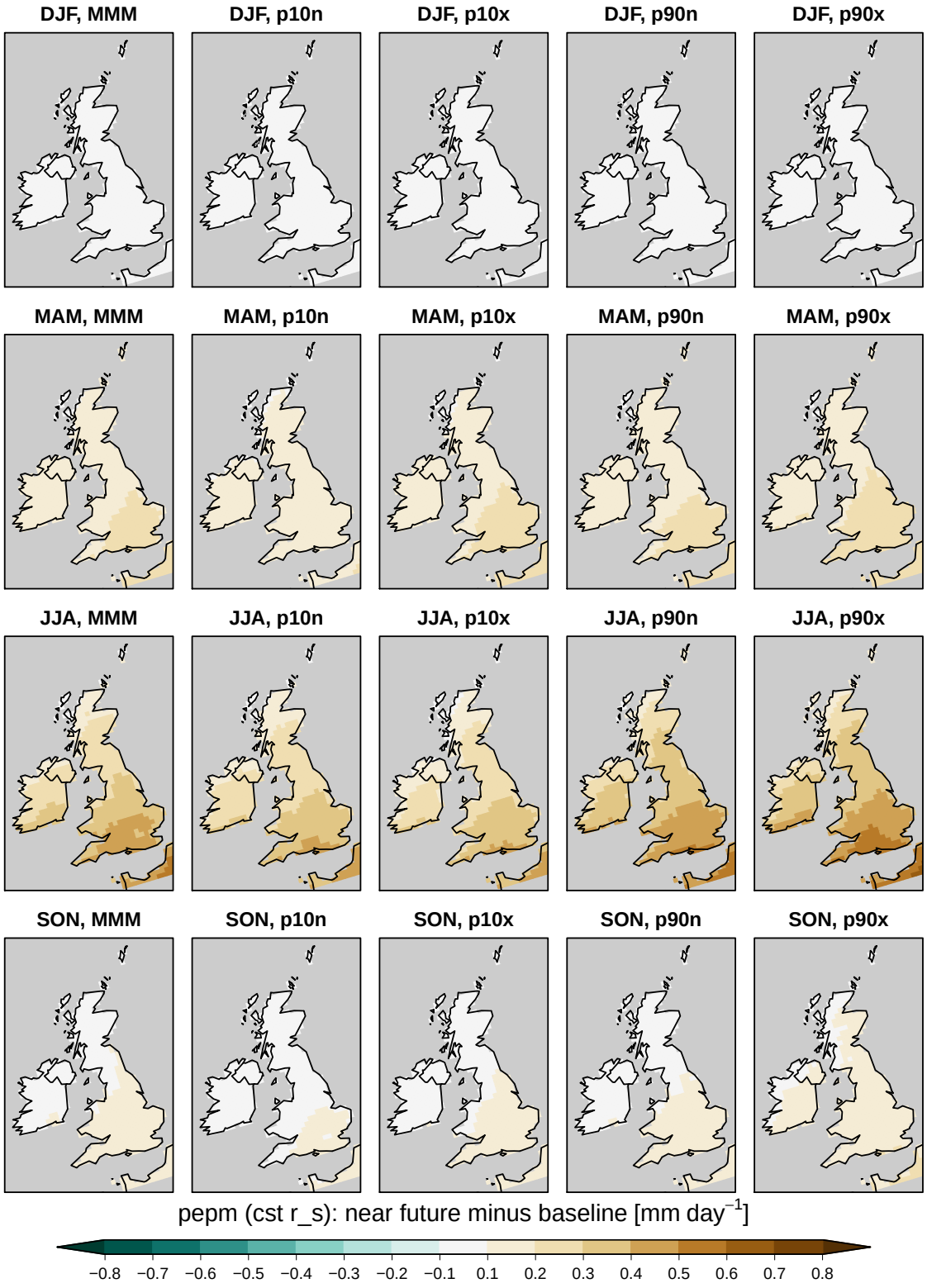

Figure S19: As Fig. S17 but for the near future time slice: difference in E_{pot} without adjusting future stomatal resistance to future CO_2 concentrations. Hatching indicates grid-cells with statistically non-significant changes at the 5% level according to a two-sided T-test.

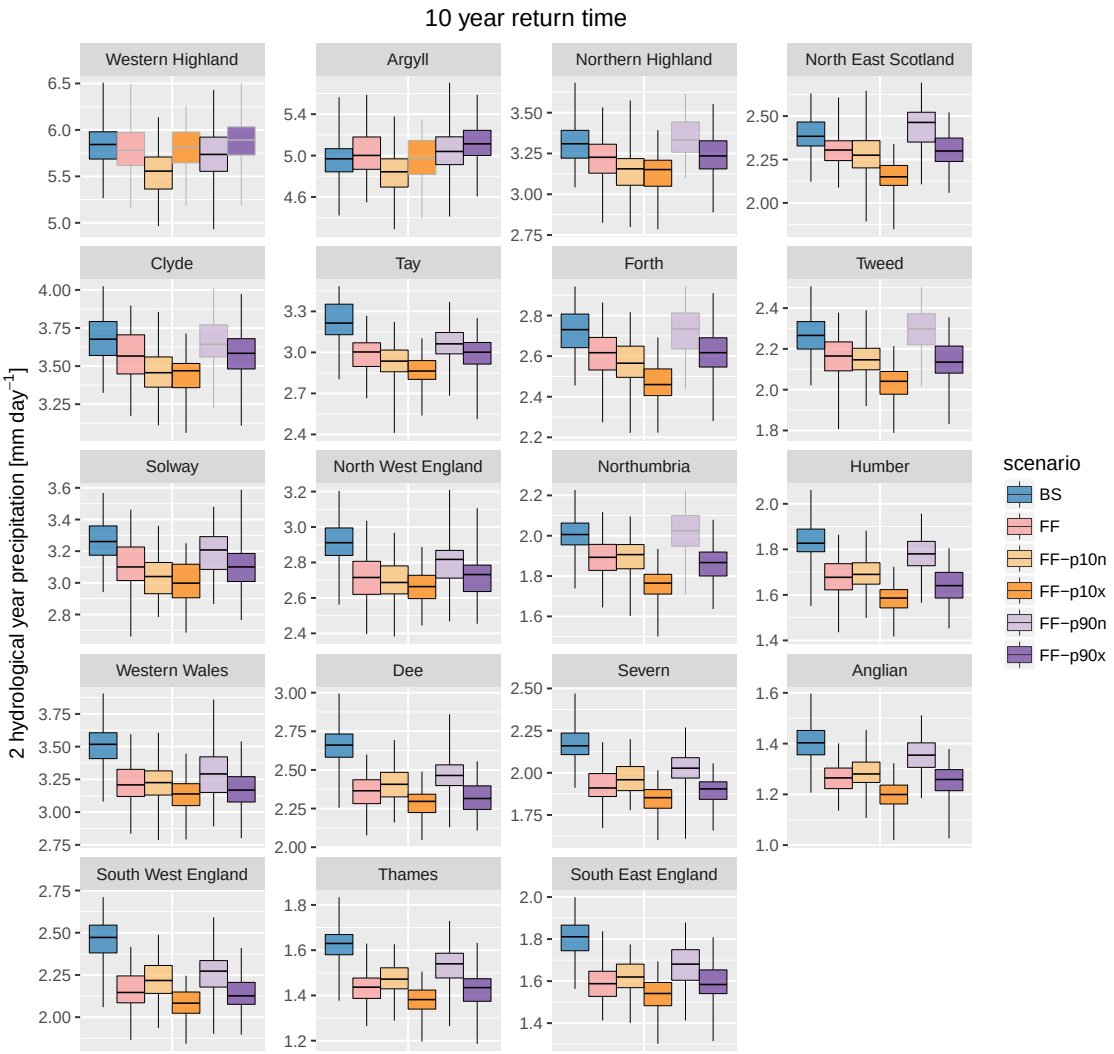

Figure S20: As Fig. 15 in the main text but for all regions.

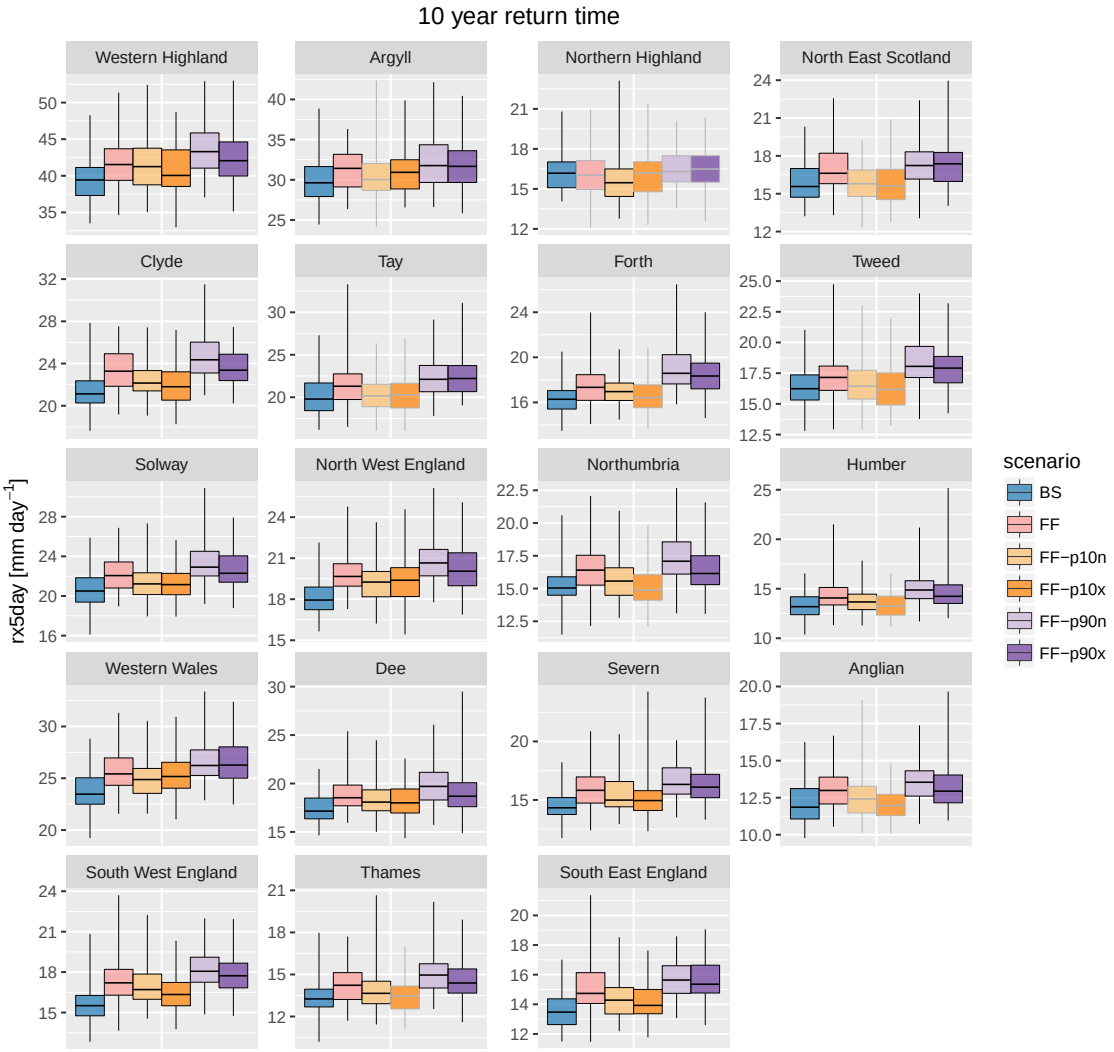

Figure S21: As Fig. 16 in the main text but for all regions.

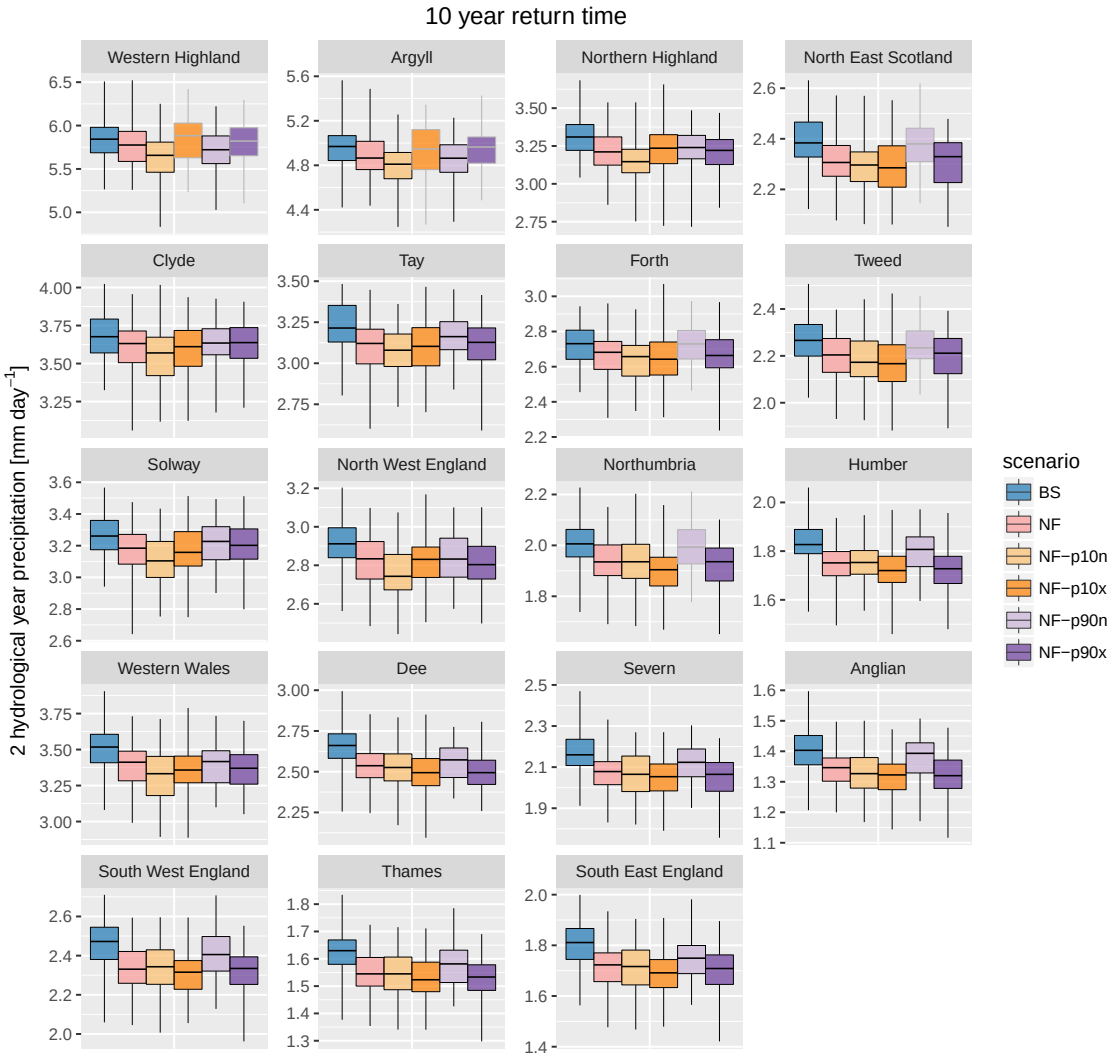

Figure S22: As Fig. S20 but for the near future time slice: Distribution of return values of 10-year event for low precipitation on two consecutive hydrological years (boxplot) for each region (panel) and scenario (colour). Whiskers display the range from individual time series. Grey boxes for future scenarios indicates statistically non-significant change in mean return value with respect to the baseline at the 95% level according to a two-sided T-test.

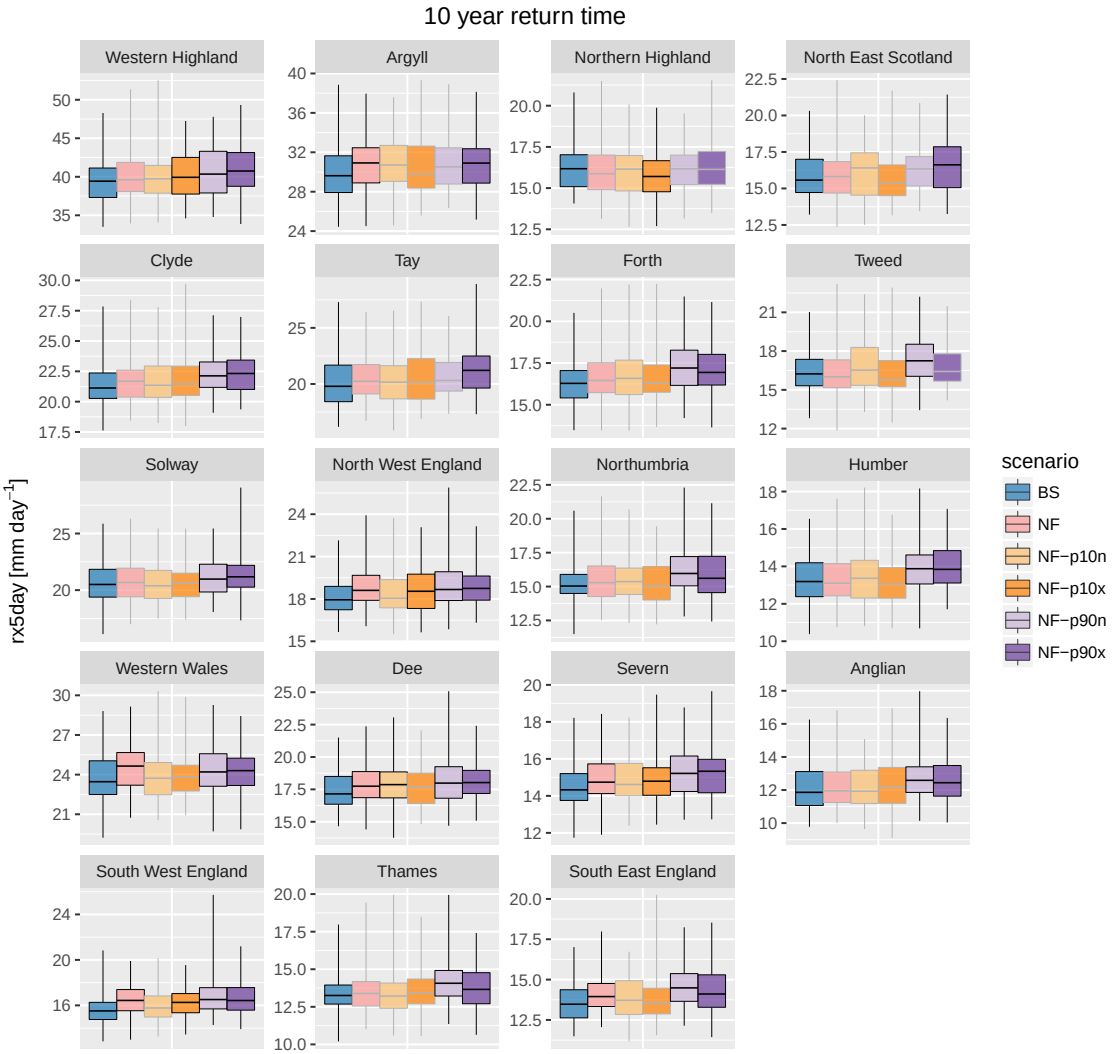

Figure S23: As Fig. S21 but for the near future time slice: Distribution of return values of 10-year event for rx5day (boxplot) for each region (panel) and scenario (colour). Whiskers display the range from individual time series. Grey boxes for future scenarios indicates statistically non-significant change in mean return value with respect to the baseline at the 95% level according to a two-sided T-test.