

Figure S1: Tas seasonal absolute differences (°C) against EWEMBI data across different GCMs. For each GCM, upper and lower panels show the results of bias corrected and original (non-bias corrected) data respectively.



Figure S2: Tasmin seasonal absolute differences (°C) against EWEMBI data across different GCMs. For each GCM, upper and lower panels show the results of bias corrected and original (non-bias corrected) data respectively.





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lower panels show the results of bias corrected and original (non-bias corrected) data respectively.



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Figure S4: Pr seasonal relative differences (%) against EWEMBI data across different GCMs. For each GCM, upper and lower panels show the results of bias corrected and original (non-bias corrected) data respectively.



Figure S5: SfcWind seasonal relative differences (%) against EWEMBI data across different GCMs. For each GCM, upper and lower panels show the results of bias corrected and original (non-bias corrected) data respectively.



Figure S6: Rsds seasonal relative differences (%) against EWEMBI data across different GCMs. For each GCM, upper and lower panels show the results of bias corrected and original (non-bias corrected) data respectively.



Figure S7: Rlds seasonal relative differences (%) against EWEMBI data across different GCMs. For each GCM, upper and lower panels show the results of bias corrected and original (non-bias corrected) data respectively.



Figure S8: Hurs seasonal relative differences (%) against EWEMBI data across different GCMs. For each GCM, upper and lower panels show the results of bias corrected and original (non-bias corrected) data respectively.



Figure S9: Tas seasonal ensemble standard deviation across different GCMs. For each GCM, upper and lower panels show the results of bias corrected and original (non-bias corrected) data respectively.



Figure S10: Tasmin seasonal ensemble standard deviation across different GCMs. For each GCM, upper and lower panels show the results of bias corrected and original (non-bias corrected) data respectively.



Figure S11: Tasmax seasonal ensemble standard deviation across different GCMs. For each GCM, upper and lower panels show the results of bias corrected and original (non-bias corrected) data respectively.



Figure S12: Pr seasonal ensemble standard deviation across different GCMs. For each GCM, upper and lower panels show the results of bias corrected and original (non-bias corrected) data respectively.



Figure S13: SfcWind seasonal ensemble standard deviation across different GCMs. For each GCM, upper and lower panels show the results of bias corrected and original (non-bias corrected) data respectively.



Figure S14: Rsds seasonal ensemble standard deviation across different GCMs. For each GCM, upper and lower panels show the results of bias corrected and original (non-bias corrected) data respectively.



Figure S15: Rlds seasonal ensemble standard deviation across different GCMs. For each GCM, upper and lower panels show the results of bias corrected and original (non-bias corrected) data respectively.



Figure S16: Hurs seasonal ensemble standard deviation across different GCMs. For each GCM, upper and lower panels show the results of bias corrected and original (non-bias corrected) data respectively.

Figure S17: Annual Cycle for different variables averaged over the land areas for ECHAM6. Red, green and black curves represent original (non-bias corrected), bias-corrected and EWEMBI data. The respective coloured band around original and bias corrected curves represent the spread of the 20 Ensemble member for each variable.

Figure S18: Annual Cycle for different variables averaged over the land areas for CAM4-2degree. Red, green and black curves represent original (non-bias corrected), bias-corrected and EWEMBI data. The respective coloured band around original and bias corrected curves represent the spread of the 20 Ensemble member for each variable.

Figure S19: Annual Cycle for different variables averaged over the land areas for NorESM1. Red, green and black curves represent ensemble median for original (non-bias corrected), bias-corrected and EWEMBI data. The respective coloured band around original and bias corrected curves represent the spread of the 20 Ensemble member for each variable.

Figure S20: Annual Cycle for different variables averaged over the land areas for MIROC5. Red, green and black curves represent ensemble median for original (non-bias corrected), bias-corrected and EWEMBI data. The respective coloured band around original and bias corrected curves represent the spread of the 20 Ensemble member for each variable.

Figure S21: Seasonal discharge at the outlet of 6 additional major river systems with a basin of at least 500000 km² for 2006 - 2013 for the analysed GCMs. The black line represents the reference simulation forced with EWEMBI, whereas the green and red coloured lines represent the bias corrected and the original (non-bias corrected) ensemble mean. The coloured bands around original and bias corrected curves show the spread of the 20 ensemble members.