We thank the reviewer (Anonymous Referee #1) for the careful reading of our manuscript and the valuable comments. Due to the limited availability of observational data we think a validation of the applicability of the statistical bias correction setting, which we applied for the ISI-MIP data set, is in general not straightforward. Nevertheless we agree that, although to shorten the reference period reduces the robustness of the parameter estimation for the bias correction, evidence for its applicability can arise from sensitivity studies with a short training and validation setup.

Following the reviewers suggestion we consider an application period from 1980 to 1999 for an additional comparison between uncorrected, corrected and observational data (Fig. 1 here). As expected in this case, the bias correction based on a reference period 1960 to 1979 yields a significant improvement of the matching of the long-term mean in most areas of the globe. There are only a few areas where the matching between the WFD and the bias-corrected GCM data is slightly worse than for the uncorrected temperature and precipitation data. Deviations occur particularly for temperature, for example, in northern Scandinavia or southern US. They are, however, small compared to the maximum values of departure that occur around the globe when we consider the uncorrected data, and could be related to variability on a time scale that is not properly sampled within the 20-yr training period. Moreover, we find a general improvement of the matching of the inter-percentile ranges, although the deviations that persist after bias correction are more extended than in the case of the long-term mean. This affects mainly North America and Asia for temperature and the equatorial region for precipitation. However, in most areas of the globe the bias correction proves to be beneficial for matching the distributions of simulations and observations.

We agree that including the results of this sensitivity test will further improve the quality of our manuscript and thank the reviewer for pointing this out. Following the valuable comment of the reviewer, we will add an additional paragraph on the described sensitivity study to our paper embedded in the former Sect. 4.2 which will swap places with the former Sect. 4.1. In the revised manuscript we will show a map analogous to Fig. 8 in the initial manuscript, but for a reference period 1960 to 1979 and an application period 1980 to 1999 as a sensitivity test (cf. Fig. 1 here).

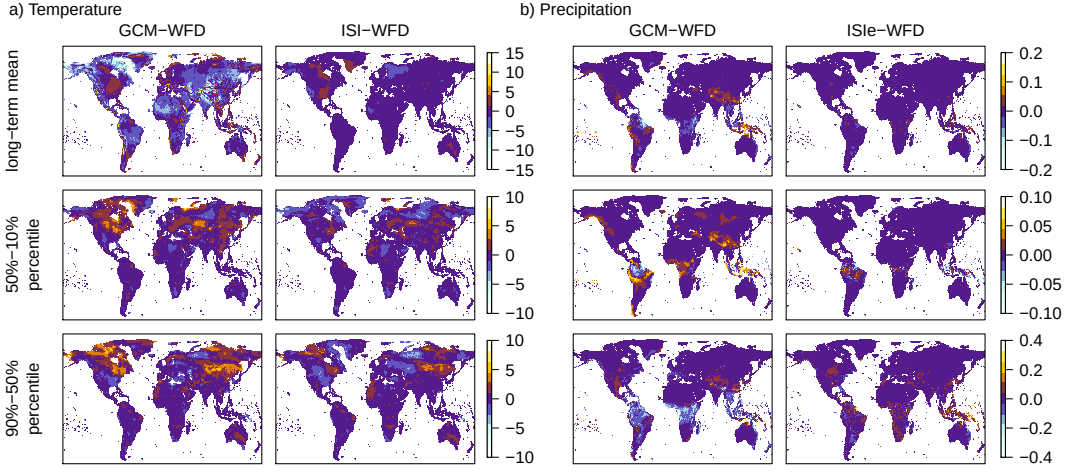

Fig. 1. The deviation of statistical properties in raw (GCM) and bias-corrected (ISI and ISIe) model data from WFD are shown. The trend-preserving ISI-MIP methodology was applied to the period 1980 to 1999 for bias correction based on a 20-yr reference period (1960 to 1979). In case of precipitation we present the results of the extended algorithm. The long-term mean, lower inter-percentile range and upper inter-percentile range of the April daily **(a)** temperature and **(b)** precipitation from 1980 to 1999 are shown. The 50–10 % percentile refers to the lower inter-percentile range, while 90–50 % percentile denotes the upper inter-percentile range. Colors refer to **(a)** temperature values in K and **(b)** precipitation values in 1000 mm s^{-1}.
figure

Moreover, we will replace the reference Piani 2010 by the more detailed one suggested by the reviewer.