



How robust is bias correction under climate change? Assessing the direct approach for temperature and precipitation in a pseudo reality?

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Bias correction is applied to postprocess regional climate model simulations, when the actually simulated values are required to closely match real world values as input for impact assessment. In the context of future climate change bias correction implicitly assumes stationarity of the correction terms. Here, the robustness of this assumption for the direct approach is assessed in a pseudo reality, for seasonal mean temperature and seasonal precipitation sums. An ensemble of four regional climate models for Europe from the ENSEMBLES project is used, all driven with the same realisation of the SRES A1B scenario boundary conditions from the ECHAM5 model. Each model is in turns been taken as pseudo reality, with the others chosen as models to be corrected. Although this pseudo reality approach does not asses all possible non-stationarities of model biases, some general conclusions can be drawn for the real world: bias correction potentially improves regional climate model simulations, but should be applied carefully. Even after correction, considerable future biases have to be expected. Precipitation bias correction in general improves the results except for areas with Mediterranean and subtropical climate during summer. Temperature bias correction will deteriorate original future simulations with a high likelihood, in particular over regions where changes in sea ice cover are expected.