Nonstationarities of regional climate model biases in European seasonal mean temperature and precipitation sums

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Bias correcting climate models implicitly assumes stationarity of the correction function. This assumption is assessed for regional climate models in a pseudo reality for seasonal mean temperature and precipitation sums. An ensemble of regional climate models for Europe is used, all driven with the same transient boundary conditions. Although this model-dependent approach does not assess all possible bias non-stationarities, conclusions can be drawn for the real world. Generally, biases are relatively stable, and bias correction on average improves climate scenarios. For winter temperature, bias changes occur in the Alps and ice covered oceans caused by a biased forcing sensitivity of surface albedo; for summer temperature, bias changes occur due to a biased sensitivity of cloud cover and soil moisture. Precipitation correction is generally successful, but affected by internal variability in arid climates. As model sensitivities vary considerably in some regions, multi model ensembles are needed even after bias correction.

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