



Bias Correction for climate impact modeling within the framework of the HAPPI Initiative

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In its landmark Paris Agreement of 2015, the Conference of the Parties of the United Nations Framework Convention on Climate Change (UNFCCC) invited the IPCC to prepare a special report “on the impacts of global warming of 1.5°C above pre-industrial levels and related greenhouse gas emission pathways” by 2018. Unfortunately, most current experiments (including Coupled Model Inter-comparison Project (CMIP)), are not specifically designed for making a substantial contribution to this report. To fill this gap, the HAPPI (Half a degree Additional warming, Projection, Prognosis and Impacts) initiative has been designed to assess climate projections, and in particular extreme weather, at present day and in worlds that are 1.5°C and 2.0°C warmer than pre-industrial conditions? Global Climate Model (GCM) output for HAPPI will be utilized to assess climate impacts with a range of sectorial climate impact models.

Before the use of climate data as input for sectorial impact models, statistical bias correction is commonly applied to correct climate model data for systematic deviations of the simulated historic data from observations and to increase the accuracy of the projections. Different approaches have been adopted for this purpose, however the most common are the one based on transfer functions generated to map the distribution of the simulated historical data to that of the observations. In the current study, we presented results for a novel bias correction method developed for Inter-Sectoral Impact Model Intercomparison Project Phase 2b (ISIMIP2b) applied to output of different GCMs generated within the HAPPI project. The results indicate that the application of bias correction has shown substantial improvement in the results when we compared to observational data. Besides the marked improvement in seasonal mean differences for different variables, also the output for extreme event indicators is considerably improved. We conclude that the applied application of bias correction methods has improved the results significantly and the bias corrected HAPPI data can provide a reliable basis for sectorial climate impact projections.