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A statistical bias correction for climate model data: parameter sensitivity analysis.

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Water management adaptation strategies depend crucially on high quality projections of the hydrological cycle in view of anthropogenic climate change. The goodness of hydrological cycle projections depends, in turn, on the successful coupling of hydrological models to global (GCMs) or regional climate models (RCMs). It is well known within the climate modelling community that hydrological forcing output from climate models, in particular precipitation, is partially affected by large bias. The bias affects all aspects of the statistics, that is the mean, standard deviation (variability), skewness (drizzle versus intense events, dry days) etc. The state-of-the-art approach to bias correction is based on histogram equalization techniques. Such techniques intrinsically correct all moments of the statistical intensity distribution. However these methods are applicable to hydrological projections to the extent that the correction itself is robust, that is, defined by few parameters that are well constrained by available data and constant in time. Here we present details of the statistical bias correction methodology developed within the European project Ẅater and Global Change(WATCH). We will suggest different versions of the method that allow it to be taylored to differently structured biases from different RCMs. Crucially, application of the methodology also allows for a sensitivity analysis of the correction parameters on other gridded variables such as orography and land use.
Here we explore some of these sensitivities as well.