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How to use regional climate projections in climate adaptation?

S. Hänsel and J. Matschullat

TU Bergakademie Freiberg, Interdisciplinary Environmental Research Centre, Freiberg, Germany
(stephanie.haensel@ioez.tu-freiberg.de)

Regional climate adaptation programmes are often based on downscaled climate model outputs. This approach comes with obstacles that include uncertainties and bandwidths of climate projections and the inability of models to describe parameters such as extreme weather events, which are particularly relevant for many climate adaptation decisions.

Climate scientists know that model outputs are no climate data and cannot be treated like observational data were treated in the past. Still, many practitioners demand precise values for future climate to replace past CLINO-values and to run their applications. Thus, climate adaptation involves adapting the instruments and processes used in deriving climate-related decisions. Communicating the challenges arising from this need in rethinking common procedures is of outstanding significance for successful adaptation.

Dealing with uncertainties of climate projections is a constant necessity, since projections are based on assumptions on future socioeconomic development. Future climate should thus be communicated in bandwidths. Working with just one scenario, one climate model or even working with ensemble means is risky as it evokes a higher than appropriate perceived confidence in the results. It encourages using familiar tools in processing climate information, rather than caution. Consequences are suboptimal adaption and misallocation of finances. We encourage working with bandwidths and testing climate adaptation options against a broad range of possible future climates.

Climate models are simplifications of the complex climate system. They cannot represent all relevant processes and thus contribute to further uncertainty increase. The use of model outputs for impact models is often restricted by large model biases and the inability to simulate extreme events. Climate elements are often corrected separately compromising the consistency of the data. Illustrating relative changes within a model simulation instead of showing absolute signals enables the comparison of climate models with different biases.

Adaptation programmes should be flexible enough to implement new scientific results to finetune adaptation measures over different time scales. This requires established networks of decision makers and of scientists working on climate adaptation and related challenges. Climate adaptation needs to be perceived as a process and not as a result.