



Reducing uncertainty in near-term European climate projections using a model weighting approach

Lukas Brunner, Ruth Lorenz, and Reto Knutti
ETH Zürich, Zürich, Switzerland (lukas.brunner@env.ethz.ch)

Climate change adaptation and mitigation requires reliable projections about the future state of the climate system. The upcoming Coupled Model Intercomparison Project phase six (CMIP6) aims to provide an update on such projections based on over 100 models from more than 40 institutions. Combining these projections into actionable information about near-term changes on a regional scale is, however, challenging given high internal variability and model spread.

In the European Climate Prediction system (EUCP) project we focus on changes in the European SREX regions from 2041 to 2060 for temperature and precipitation. We apply a model weighting scheme (Lorenz et al., 2018) that accounts for past model performance as well as model inter-dependence. In that, it is based on the assumption that some models perform better than others for certain settings and that many models are not fully independent from each other. Using the CMIP5 ensemble, we show that regionally weighting models by performance and independence reduces future spread and can shift the best estimate significantly compared to a simple unweighted mean. We also discuss the advantages and limitations of applying our approach to model ensembles with multiple initial-condition member in anticipation of the upcoming CMIP6 using a large ensemble of CESM.