Regional decadal prediction for Europe: First results

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The German research program MiKlip aims at the development of a decadal ensemble predictions system. A module within MiKlip is dedicated to develop a regional downscaling system for the global predictions. The regional focuses of the downscaling experiments are Europe – which is the main focus here – and Africa. Previous studies indicate some potential predictability for both regions.

The global prediction system consists of the Max-Planck-Institute for Meteorology earth-system model MPI-ESM. For the regional downscaling over Europe the regional climate models (RCMs) COSMO-CLM and REMO are applied in several MiKlip projects to establish a joint regional ensemble for the CORDEX-EU domain with a resolution of $0.22°$.

During the first phase of the research programme the MPI-ESM-LR decadal ensemble experiments for CMIP5 are used to force the RCMs. Ten ensemble members from five hindcast periods between 1960 and 2010 were downscaled to create a regional baseline ensemble.
The main scientific questions posed in this study are:

- At which temporal scales and in which regions can a predictive skill be achieved?

- Is there an added value of the regionalization compared to the global predictions?

Different analysis techniques are applied to determine the basic skill of both regional and global experiments over different European regions. These methods include continuous and categorical skill metrics as well as tests of the potential predictability and the ensemble spread. Some previous studies indicate that extremes might partly show a higher predictive skill than mean precipitation or temperatures. Skilful predictions of decadal tendencies of extremes (like droughts, heat waves or storms) also exhibit a higher value to potential users than variations of mean quantities.