EMS Annual Meeting Abstracts
Vol. 10, EMS2013-195, 2013
13th EMS / 11th ECAM

Regional decadal predictions for Europe: Skill and added value.

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The German research program MiKlip aims at the development of a decadal ensemble prediction system. A module within MiKlip is dedicated to develop a regional downscaling system for the global predictions. This study will mainly focus on Europe. Previous studies indicate some potential predictability there.

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 model (RCM) COSMO-CLM is applied to establish a regional ensemble for the CORDEX-EU domain with a resolution of 0.22°. In the first instance the MPI-ESM-LR decadal ensemble experiments for CMIP5 are used to force the RCM. Ten ensemble members from five hindcasts periods between 1960 and 2010 were downscaled.

The regional baseline ensemble thereby obtained is analyzed to determine the skill of both the regional and the global experiments. Different European regions and timescales are considered as various analysis techniques are applied. The methods include continuous and categorical skill metrics to explicate predictive skill of the regional ensemble as well as the value added to global predictions. Previous studies have shown that extremes might exhibit higher predictive skill. Skillful predictions of decadal tendencies of extremes (like droughts or heat waves) also exhibit a higher value to potential users. Therefore, decadal variations of extremes apart from mean quantities are considered, too.