



## **Quantified Uncertainties of High-Resolution Regional Climate Simulations over Europe**

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The climate patterns between 1960 and 2100 for Europe with a spatial resolution of 18 km are being generated from different ECHAM5 simulations by a dynamical down-scaling approach using the new non-hydrostatic regional climate community model CLM.

In order to quantify the uncertainties of the simulation different evaluation simulation have been conducted using different model configuration of the soil and different outputs of the global simulations (ECHAM5 and ERA40) as initial and boundary data for the regional simulations. The deviations between the climate change signals originate from different global scenario simulations (ECHAM5-A1B and ECHAM5-B1) and from different soil configurations in the regional model CLM.

The deviations between the model results are analyzed for several climate parameters (temperature, precipitation wind, moisture) and are compared with different sets of observational data for the period 1961-2000. Monthly and annual means are considered as well as annual cycles, frequencies of extreme events for selected sub-regions and spatial and inter-annual variability.

A set of objective key-parameters is defined to quantify the differences between the model results and/or their deviations from observational data and to represent the model performance in different respects (climatological means, spatial and temporal variation, energy, dynamics etc.). The values of these parameters provide quantitative ranges for the quality of the regional simulations in the future. Their knowledge is essential to assess the reliability of regional model results.

We present the key parameters and present the results of the quantification of uncertainties and of the comparison of the results with the climate change signal between

1960-1990 and 2030-2060. However, the quantified uncertainties may underestimate or overestimate the uncertainty of the climate change signal. The relevance of the results for an analysis of potential ecological or socio-economic impacts of climate change and for adaptation or mitigation strategies will be discussed also.