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Regional Climate Simulations with COSMO-CLM for North Africa: Model Sensitivity to Model Domain Size

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Climate predictions on decadal timescales constitute a new field of research, closing the gap between short-term and seasonal weather predictions and long-term climate projections. Therefore the Federal Ministry of Education and Research in Germany (BMBF) has recently funded the research program MiKlip (Mittelfristige Klimaprognosen), which aims to create a model system that can provide reliable decadal climate forecasts.
Recent studies have suggested that one region with potentially high decadal predictability is West Africa. Therefore, the DEPARTURE project (Decadal climate predictability in the West African monsoon region and in the cyclogeneis region of the tropical Atlantic) was established within the MiKlip program, to assess the feasibility and the potential added value of regional decadal climate predictions for West Africa. To quantify the potential decadal climate predictability, a multi-model approach with the three different regional climate models REMO, WRF and COSMO-CLM (CCLM) will be realized.
The presented research will contribute to DEPARTURE by performing hindcast ensemble simulations with CCLM, based on SST-driven global MPI-ESM-LR simulations. Thereby, one focus is on the dynamic soil-vegetation-climate interaction on the decadal timescale. Recent studies indicates, that there are significant feedbacks between the land-surface and the atmosphere, which might influence the decadal climate variability substantially. To investigate this connection, three different soil-vegetation-atmosphere-transfer module's (Svat's) will be coupled with the CCLM. Thus, sensitive model parameters shall be identified, whereby the understanding of important processes might be improved.
As a first step, the influence of the model domain on the CCLM results is examined. For this purpose, previous CCLM results from simulations for the official CORDEX domain, will be compared with CCLM results achieved by using an extended model domain to about 60°W. This sensitivity analysis is performed with two different horizontal resolutions, 0,44° and 0,22°, respectively.