

Project:

Project title: Convection Resolving Climate and climate change in North-East Germany (CLINEG)

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### **Abstract**

CLINEG is a project of BTU Cottbus-Senftenberg aiming at understanding of regional climate and climate change in North-East Germany and provision of high quality climate and climate change data for renewable energy and hydrological cycle studies. The regional climate projections currently used are based on global climate projections produced within the Coupled Model Intercomparison Project Phase 5 (CMIP5). These global climate projections have been updated in recent years in the framework of CMIP6. The Shared Socioeconomic Pathways (SSPs) newly introduced in CMIP6 and the further development of the climate models make an update of the regional climate projections for Germany necessary. This is done in the new project *UDAG* providing a quality-checked ensemble of regional climate projections at 12 km horizontal resolution for Europe and 3 km for Germany using the ICON-CLM model. As shown by Will et al (2023) the 3km regional climate simulations are not able to simulate important local wind systems in flat terrain like Lake Breeze and Land-Lake Wind due to insufficient effective model resolution. Such wind systems can be simulated using a 1 km horizontal grid resolution and non-diffusive dynamics and numerics using the COSMO-CLM\_HOS model system (Will et al., 2023). This opens the opportunity to significantly improve the quality of climatology and climate change statistics of local wind and surface fluxes. These are of high relevance for studies of renewable energies and of hydrological cycle in regions.

It is planned to investigate

- the requirements of simulation of Lake Breeze and Land-Lake Winds at similar quality as with COSMO-CLM\_HOS using the new model system ICON-CLM,
- to provide convection resolving climate data using UDAG (3km ICON-CLM) as initial and boundary conditions,
- to analyse the expected climate change and convection resolving scales using UDAG (3m ICON-CLM) results as initial and boundary conditions.

In 2023 the focus is on the analysis of requirements of modelling of Lake Breeze and Land-Lake Wind using ICON-CLM and climatology at 1km grid resolution using COSMO-CLM\_HOS.