

NUKLEUS – Actionable local climate information for Germany

What will climate change look like in your region? Which adaptation measures are necessary and useful? The new BMBF funded research program RegIKlim (Regional information for action on climate change; German: Regionale Informationen zum Klimahandeln) aims to provide answers to these questions.

The effects of climate change vary widely from region to region. However, reliable information for regions and cities is still missing. The aim of the research program is therefore to develop decision-relevant knowledge on climate change in municipalities and regions and to create a sound basis for regionally specific information and evaluation services. In a first phase of RegIKlim six so called “model regions” have been selected, which cover a wide range of geographical and social-economic conditions. The regions include Northern German coastal regions, Eastern German agricultural and forested areas as well as lower mountain ranges, a pre-Alpine region, the city of Stuttgart and its surrounding municipalities and the port of Duisburg including the Rhine. Based on climate change signals and spatial and landscape conditions, information tools for decision support for regional adaptation to climate change are developed. In addition, basic aspects of adaptation are investigated for the regions. The focus is on adaptation capacity and the integrated assessment of climate risks and options for action.

An important basis for action recommendations for adaptation measures are projections of the climatic changes that are created with regional climate models. This task is addressed by the RegIKlim cross-cutting activity NUKLEUS (Actionable local climate information for Germany; German: Nutzbare lokale Klimainformationen für Deutschland). To achieve this, NUKLEUS develops and implements a strategy to deliver an unprecedented ensemble of very high-resolution climate change simulations on a kilometre-scale for Germany. Among the requirements are up-to-date forcing data, which means using boundary conditions to the newly available CMIP6 global climate projections. Several CMIP6 simulations will be downscaled to cover the uncertainty range of these climate projections. Three regional climate models will be applied within the project to cover the uncertainty range of the representation of regional scale processes – namely REMO, CCLM and ICON-CLM.

In this way, a database for the model regions is generated. In addition, methods are developed to evaluate high-resolution climate information and further improve the reliability of the model results on a regional scale. In addition, the data will have to be more consistent and more accessible. Therefore, a common analysis and exchange platform – based on the Freva system (Free Evaluation System Framework for Earth System Modelling) will be established.