

EGU21-12137

<https://doi.org/10.5194/egusphere-egu21-12137>

EGU General Assembly 2021

© Author(s) 2021. This work is distributed under the Creative Commons Attribution 4.0 License.



NUKLEUS - User-relevant and applicable kilometer-scale climate information for Germany

Kevin Sieck¹, Bente Tiedje¹, Hendrik Feldmann², and Joaquim Pinto²

¹Climate Service Center Germany (GERICS), Helmholtz-Zentrum Geesthacht, Geesthacht, Germany

²Institute of Meteorology and Climate Research (IMK-TRO), Karlsruhe Institute of Technology, Karlsruhe, Germany

Given the current developments in climate science it becomes more and more feasible to provide climate information at the kilometer-scale from convection-permitting climate simulations. This progress will enable many users to directly feed high-resolution climate information into their impact-models for climate impact studies at the local scale. Examples include urban heat stress at street level or the design of drainage systems for future precipitation extremes. Within the RegIKlim (Regional information for action on climate change) consortium, the NUKLEUS (Actionable local climate information for Germany) project will not only provide climate information at the local scale, but also to co-develop interfaces between climate and impact models, in order to fulfil the needs of the impact modelling community as good as possible. Within the RegIKlim consortium, the impact modelling community is organised in six “model regions” across Germany, which cover a wide range of geographical and socio-economic conditions.

For the NUKLEUS project, the baseline will be the latest generation of EURO-CORDEX downscaled CMIP6 simulations, which will be further refined to roughly 3 km horizontal resolution and 30-year time-slices for Germany with convection-permitting climate models (ICON CLM, COSMO-CLM, REMO-NH) and statistical-dynamical downscaling approaches. A detailed analysis on the performance of the multi-model mini-ensemble is planned to assess the quality of the provided data. At the interface to the users, we will follow three different approaches to provide usable climate information at the kilometer-scale. One is to provide easy-access to data and post-processing opportunities using the FREVA system. FREVA offers various access-levels from shell to web-based, which serves different levels of user-expertise. In addition, it provides a transparent way of post-processing data by workflow sharing mechanisms. The second one is to develop appropriate additional downscaling methods for the “last mile” where needed. For this “last mile”, we will apply dynamical and statistical methods such as urban climate models and/or weather generators. With the third approach we explicitly aim at integrating a collected user-feedback into the regional modelling systems used within NUKLEUS. Specifically, we intend to identify and incorporate data processing that is best done during the simulation permanently into the models. Examples are wind speeds at rotor heights of windmills or high frequency precipitation sums. NUKLEUS is a contribution to the German research program RegIKlim funded by the Federal Ministry of Education and Research (BMBF).

