EGU2020-16320
https://doi.org/10.5194/egusphere-egu2020-16320
EGU General Assembly 2020

Effects of a new land surface parametrization scheme on thermal extremes in a Regional Climate Model

Felix Pollinger, Katrin Ziegler, Daniel Abel, and Heiko Paeth
Institute of Geography and Geology, Julius-Maximilians University Wuerzburg, Wuerzburg, Germany (felix.pollinger@uni-wuerzburg.de)

The EFRE project Big Data@Geo aims at providing high resolution environmental information for the Lower Franconian region in Bavaria, Germany, including climate change simulations suitable and relevant for adaptation. Hence, it is a crucial tasks within this interdisciplinary project to enhance the regional climate model REMO, both by substantially increasing the spatial resolution as well as by including further processes in the model, which must be resolved on this new spatial scale.

For the first time, we successfully coupled REMO's version 2015 (REMO15) with a superior land surface parametrization scheme (iMOVE) based on JSBACH. REMO15-iMOVE's core feature is the interactive vegetation, represented on subgrid level via discrete classes. These plant functional types do not only respond to atmospheric forcing but in turn also affect numerous near-surface climate variables. In contrast, the standard version of REMO15 employs an idealized, constant seasonal cycle. Preliminary results indicate that REMO15-iMOVE vegetation's dynamic is in good agreement with observational data and hence the atmosphere's lower boundary conditions should be more realistic than in REMO15.

To estimate the effects of the enhanced model on the simulation of thermal extreme events typically affecting Lower Franconia, we analyze for both versions one simulation with 0.1°x0.1° and one with 0.44°x0.44° horizontal resolution forced with ERA-Interim for the decade 2000-2009. We evaluate the occurrence of extremely warm (minimum temperature of 20.0°C or above or maximum temperature above 30.0°C) and cold days (maximum temperature below 0.0°C) as well as the spatio-temporal pattern of the European Heat Wave 2003 in comparison to E-OBS data. While the spatial resolution is clearly the main factor affecting the quality of the simulations, we also find significant effects of the land surface scheme on warm events.

Based on these first results, REMO15-iMOVE appears to be a capable and flexible tool for transient climate change simulations as well as for studies focussing on thermal extremes.