Geophysical Research Abstracts
Vol. 15, EGU2013-11132, 2013
EGU General Assembly 2013

Impact of temporal and spatial resolution on extrem rainfall event statistics

Bastian Eggert (1), Peter Berg (2), Jan Haerter (3), Christopher Moseley (1,4), Daniela Jacob (1,4)

(1) Helmholtz Zentrum Geesthacht, Climate Service Center, Hamburg, Germany, (2) Rossby Centre, Swedish Meteorological and Hydrological Institute, Norrköping, Sweden, (3) Center for Models of Life, Niels Bohr Institute, Copenhagen, Denmark, (4) Max Planck Institute for Meteorology, Hamburg, Germany

The distribution function of precipitation intensity is very sensitive to the temporal and spatial resolution of the applied data. Especially extreme convective events, that occur on short temporal and spatial scales, are averaged out at lower resolutions. State of the art regional climate models operate at a horizontal resolution of 10 to 50 km. Only for small domain sizes and under high computational costs it is currently possible to dynamically downscale to even higher resolutions. There is an increasing demand for very high resolved datasets from the users side, especially when it comes to precipitation.
For assessments of changes in precipitation characteristics and the further use in impact modeling, it is important to know at which scales the model simulated precipitation is valid.
Here, we used a high temporal (five minutes), and spatial (1x1 km) horizontal resolution radar data set for Germany, to determine the impact of spatial and temporal resolution on precipitation characteristics. The radar data was aggregated in time and space. The spacial aggregation is performed by combining a certain amount of neighboring grid boxes of the higher resolved grid (2x2, 3x3, ... 50x50) and averaging over it. Afterwards the precipitation distribution over Germany is analyzed for each of these aggregated datasets with emphasis on extreme values. The result of this analysis shows the loss of information that comes from averaging over time and space which can be seen as the minimum error that is to be expected given a perfect model.
Further, synoptic observations are used to distinguish between predominantly convective, and predominantly stratiform cloud conditions before the precipitation distributions are calculated. This provides information about the synoptic conditions under which the highest data lose is to be expected. Such information would aid climate modelers to set up their model for specific tasks.