Geophysical Research Abstracts
Vol. 20, EGU2018-13147, 2018
EGU General Assembly 2018

Historical time series of extreme precipitation for Central European river catchments

Hilke S. Lentink (1), Lisa-Ann Quandt (1), Fanni D. Kelemen (1), Martin Kadlec (2), Benjamin Buldmann (1), Hendrik Feldmann (1), Patrick Ludwig (1), and Joaquim G. Pinto (1)

(1) Karlsruhe Institute of Technology (KIT), Institute of Meteorology and Climate Research (IMK-TRO), Karlsruhe, Germany, (2) Aon Benfield Impact Forecasting, Prague, Czech Republic

One of the main natural hazards in Central Europe is caused by extreme precipitation events leading to flooding. In cooperation with Aon Benfield, Karlsruhe Institute of Technology (KIT) is developing a stochastic meteorological data set as an input to a rainfall-runoff model in order to obtain discharge estimates and a detailed loss evaluation. Since long-term time series of extreme precipitation show a variability on the decadal time scale, it is expedient to use long-term data sets to investigate the frequency and intensity of extreme precipitation events. Unfortunately, the quality and quantity of the observed meteorological time series across Europe is quite heterogeneous. An alternative to obtain a consistent data set is to consider long-term reanalysis data as an input. Given that the common resolution of such reanalysis is too low to run hydrological models, the reanalysis are dynamically downscaled with the regional climate model COSMO-CLM (CCLM) to 25 km resolution. Selected case studies are additionally simulated at convection permitting resolution. Three different reanalysis data sets are used as boundary data, ERA-Interim, ERA-20C and 20CR. Additionally, the bias of the downscaled data is corrected.
We validated the reliability of the obtained data sets by comparing it to the gridded observational data set E-OBS. The focus hereby lies on the Danube, Elbe, Oder, Rhine and Vistula catchments. This comparison is done for selected cases of heavy precipitation and shows the added value of dynamical downscaling and bias correction, but also points to some limitations of these methods.