Geophysical Research Abstracts
Vol. 20, EGU2018-2807, 2018
EGU General Assembly 2018

Dynamical and statistical downscaling of climate projections for transport infrastructure in Germany

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The knowledge about frequencies and intensities of extreme events, triggered by climate change is one of the key issues in the project “Network of experts”, launched in 2016 by the German Federal Ministry of Transport and Digital Infrastructure. There is still a high uncertainty how extreme events will be affected by climate change. Adaptions to climate change signals and extreme events are evident in general and in particular for traffic and transport in Germany. The different transport infrastructures of roads, railways and waterways contain various vulnerabilities. Due to its heterogeneity, Germany is influenced differently by climate change. Thus, also adaption strategies of transport infrastructure have to be analysed on a regional and local scale.
High-resolution climate projections are one essential tool for providing climate information on regional and local scale. In our project, information about climate change and its impacts is gathered to aim at suggestions to develop adaption strategies for future transport infrastructure. High-resolution simulations are performed with COSMO-CLM on 2.8 km grid width for time periods of more than 30 years using the RCP 8.5 scenario, dynamically downscaled two-fold from MIROC5 global model data. We focus our interest on Germany and the neighbouring river catchment areas. Dynamical downscaling is a widely used instrument for transferring large-scale information to a nested regional climate model for high-resolution simulations. They, however, cost considerably high amount of computing time, especially for long-time periods. We apply statistical downscaling for EURO-CORDEX ensemble members by linking high-resolution dynamical simulation at 2.8 km grid width to the EURO-CORDEX simulations at 12 km grid width. For this procedure we will use the principal component analysis (PCA) method. Consequently, we aim at getting high-resolution climate information for different GCMs in order to give more robust information about possible changes of local climate in Germany.
An overview of the dynamical simulations and first results of statistical downscaling analyses for short time periods will be presented.