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Abstract title	CHANGE OF EXTREME PEAK FLOWS IN THE RHINE BASIN ACCORDING TO 8 RCM SIMULATIONS
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Climate change is expected to have an effect on the hydrological behaviour of the river Rhine and its tributaries. The effect of global warming on extreme discharges is of particular interest to the five countries of the Rhine basin. To estimate the effect on extreme river discharges, often the assumption is made that the relative change in the (monthly) mean is equal to the relative change in the extremes. However, the effect of climate change on peak discharges might as well be different from the effect on mean discharges. In this study the effect of climate change on low-probability peak discharges is analysed based on an ensemble of regional climate model (RCM) simulations. Also, the 1250 year return flow is calculated, which is relevant for the design discharge of the Dutch river system.

Within the CHR Rheinblick2050 project, 3000-year series of daily precipitation and temperature have been generated using time series re-sampling of 30-year time slices (1961-1990, 2021-2050 and 2071-2100) from 8 RCM simulations. The RCM simulations were mainly performed within the EU-Ensembles project.

For this study the synthetic 3000 year time series of precipitation and temperature, for each of the 134 sub-basins that are used in the hydrological model, have been used to force the HBV-Rhine rainfall run-off model. Return flows between 10 and 1250 years and 95% confidence intervals have been calculated for each RCM and for each of the three time slices for Lobith, Cologne, Trier, Kaub, Maxau, Raunheim, Worms, and Basel.

The results show how, according to state-of-the-art RCM simulations, peak discharges for different return periods will develop until 2100. In addition an estimation of the bandwidth is given that can be expected based on the ensemble of RCM simulations.

The bias correction and re-sampling of RCM data for the Rhine basin are presented in an accompanying paper in which different non-linear bias-corrections for precipitation have been analysed. Two other related Rheinblick2050 papers deal with a general overview of the project and with the future change in low flows of the river Rhine respectively.

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