Climate Services for the River Rhine: focus on low flows

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The aim of the case study "SOSRhine", in which the German weather service DWD, the Dutch weather service KNMI and the German Federal Institute of Hydrology (Bundesanstalt für Gewässerkunde – BfG) cooperated, is to support logistic decisions for inland waterway transport on the River Rhine. The period of interest is in the low-flow seasons from early summer to late autumn as well as in ice early warnings for the impounded river sections in winter time.

In developing this service, the ECMWF System 4 seasonal forecast data for the period 1981-2010 is used which is bias-corrected using the Quantile mapping approach. The observational dataset was E-OBS v12.0 for both mean daily precipitation and mean daily temperature. The seasonal forecast data were first interpolated to the E-OBS grid resolution (0.25 deg. regular grid) and then bias corrected. Bias correction of all seasons and for all lead times was done and here we present results for summer precipitation and temperature. Focusing on the Rhine and Meuse basin (over Netherlands, Germany, Switzerland, France, Luxembourg and Belgium) there is overall a wet bias, with North Italy having the strongest bias. However, there is no distinct spatial pattern of the bias, with the exception of south Germany where the dry bias could be cause due to topography. After bias correction the bias is successfully removed. For temperature, similarly succesful results were obtained.

The biascorrected seasonal forecasts were used to drive a hydrologic model which is used operationally at BfG to predict low flows in the River Rhine. In the presentation, the skill of these forecasts is presented.