4.5 USING RADAR DATA FOR THE ANALYSIS AND DESIGN OF EXTREMAL EPISODES

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There are two possible concepts for hydrological and hydraulic modelling: one is to use continuous time series as an input the other to extract design situations from known or possible extremal episodes. Both concepts have pros and cons. Continuous simulations represent all appeared combinations of initial conditions and system load. The events are experienced and recorded. It is also possible to find the frequency of occurrence and probability of the effect means the discharge without looking at and discussing necessarily the return periods or influential time intervals of the input means the climatology data. The precondition for the assumption that the output is representative, is a long time series. Different climate periods must be included to cover significant events and to be able to find a proper probability distribution to extrapolate values for higher return periods. With design situations exaggerated from known extremal episodes it is possible to find thinkable (physically possible) situations which just not have occurred during the recorded time period or even not at the examined location. One important precondition for that concept is to know, which factors and parameters have to be used to randomly generate design storms. That means to analyse the sensitivity and relevance to describe the interested impact.

The advantage of rainfall radar data is the more detailed information about e.g. cell sizes, cell velocities and spatial distribution. The presented studies shows which parameters are more relevant to describe and understand storm events. Therefore the continuous data base of 15 years of radar data is analysed for extremal episodes and compared to the reaction of the hydrological system. To rank the rather short - time period into the local climatology conditions, nearly hundred years of point measurement and modelled discharge (with a calibrated model) are taken for comparison.

Certain characteristic values and indices are more stable for comparing different sets of date including various measurement types. Relatively frequencies and trends are more significant than to compare absolute values. Design events have to deal with uncertainties of prediction anyway. Therefore the uncertainties are analysed on their effect of the investigated discharge to give them the accurate meaning.

Both mentioned concepts are used to design measures or to find thresholds for flood forecasting. But a combination of experienced and thinkable events, like different initial conditions or more intense or longer rainfall, extract the knowledge of impact and related outcome. Therefore the local hydrological regime is more understandable and a better preparation to handle extreme episodes is possible and to improve forecast systems.