

This study searches for relations between large-scale circulation patterns and extreme rainfall events. One of the major issues in hydrological impact investigations of climate change is the gap in spatial and temporal scale between the output of climate models (GCM and RCM) and the local scale at which input is needed for the hydrological impact models. Much work is put into creating downscaling techniques that bridges this gap.

Severe rainfall events over Denmark are investigated using an objective clustering analysis. Combining reanalysis data with rain gauge data covering 96 stations in Denmark from the Danish Meteorological Institute (DMI) outlines historical severe rainfall events in the years 1960-2010. The reanalysis data of the mean sea level pressure provides information about the large-scale circulation pattern at the time of the local rainfall.

The days are clustered by the k-means method and the behavior of the extremes in each cluster is analyzed. The weather regimes are found to have different precipitation distributions. Extreme rainfall through the time period is compared to frequencies of the different weather regimes and the connection with larger patterns, like the NAO, is investigated.

Using a RCM forced by reanalysis data covering the study area, a comparison is made between the relationship of atmospheric circulation and precipitation in both observations and models.