



Identification of critical circulation patterns in head catchments

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Owing to the global changing climate and increase in mean earth surface temperature, variations in local scale weather are commonly observed. The variations in weather are more important when they are considered with respect to extreme weather conditions as slight changes in them may incur high costs and/or affect human life. Close relationship between atmospheric circulation and meteorological variables has been established thus surface weather variables such as temperature and precipitation on a certain day can be directly linked to prevailing atmospheric circulation.

This study identifies and investigates critical circulation patterns (CP's) responsible for the historical floods in the four head catchments in southern Germany. Given the small size of catchments under study, CP's are classified with respect to daily discharge differences on 1 day lag instead of daily precipitation. This way the quick reaction time of the catchment could be captured in the CP definition. Daily Mean sea level pressure has been used as large scale predictor. Identified CP's are investigated for extreme wet and dry precipitation indices such as maximum number of days exceeding certain thresholds, maximum number of consecutive wet and dry days, greatest 3 and 5 day precipitation amounts, mean wet-day persistence and different percentiles of precipitation.