



## **Has the frequency of floods in Wallonia increased?**

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In 2008, Milly et al. wrote that stationarity was dead and should no longer be a default assumption in water management. The changes in the means and extremes of hydroclimatic variables such as precipitation, evapotranspiration and river flow are mainly due to anthropogenic changes of Earth's climate. Over the past decade, researchers worldwide have studied changes in hydrological data. In Wallonia, extreme events seem to have occurred more frequently in recent years; however, this has not been verified statistically yet.

For this study, data from around 50 gauging stations with a record length of at least 30 years is available. The first step will be to quality check the data and carry out an exploratory data analysis using graphs. Annual maximums and peaks over threshold will then be extracted for each station. In order to detect a change in the frequency of high flows, frequency analyses will be performed on data series of 20 years (overlapping by 10 years). Flows of different return periods will be calculated for each 20-year time period and compared. The Mann-Kendall test will then be used to confirm the trends in both frequency and magnitude. For those catchments showing a trend, a more detailed analysis will be completed to try to understand the factors responsible for the change (climate change, land use changes, etc.). Non-stationary frequency analysis will also be carried out. Results from frequency analyses are used in many applications, such as the design of flood storage areas. Comparing the results of stationary and non-stationary frequency analyses is therefore essential to help us understand the impact of non-stationarity on flood risk management in Wallonia. Preliminary results of this study will be presented on the poster.

### Reference:

Milly, P.C.D., Betancourt, J., FalkenMark, M., Hirsh, R., and Zbigniew, W. (2008). Stationarity is Dead: Whither water management? *Science* 319, 573–575.