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Analysis of low flow seasonality in Slovakia

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The aim of the study was to examine seasonality indices for their potential in the pooling of low flows in Slovakia. For this purpose the annual, summer and winter minimum discharges lower than q95 (i.e. the specific discharge that is exceeded on 95% of all days) were collected from 211 small and mid-sized catchments with an area ranging from 4 to 500 km2 from the whole territory of Slovakia. The period of observations was selected longer than 20 years in all stations.

The seasonality analysis was based on the Burn methodology and the seasonality indices as the mean day of the occurrence of low flow and the seasonal concentration index were calculated for the annual, summer and winter low flows.

As following the pooling groups with similar seasonality regime in Slovakia were determined. The pooling groups were constructed using various hierarchic and non-hierarchic k-means clustering methods. To test the appropriate number of clusters statistical tests were used. The achieved pooling schemes were mapped, and the location of typical low flow regime in certain parts of Slovakia was compared and discussed. Finally, in the derived pooling groups the design low flows were estimated using regional regression methods.