Seasonal characteristics of precipitation and runoff in Slovakia and Austria

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The seasonality of hydrological characteristics is one of the key factors controlling the development and stability of natural ecosystems. From a hydrological perspective, seasonality analysis of runoff and precipitation is an appealing method for inferring flood generation mechanisms, which, in turn, supports other hydrological applications, such as hydrological regionalisation. The main objective of this study is to compare the seasonality of selected precipitation and runoff characteristics in Austria and Slovakia. Monthly seasonality indices are analysed to interpret the long-term climatic behaviour, while the seasonality of extremes is analysed to understand flood occurrence. The analysis is based on mean monthly precipitation data at 555 (Austria) and 202 (Slovakia) stations, annual maximum daily precipitation at 520 (Austria) and 56 (Slovakia) stations, and mean monthly runoff and annual maximum floods at 258 (Austria) and 85 (Slovakia) gauging stations. The results suggest that the seasonality of the selected hydrological characteristics is an important indicator of flood processes, but varies considerably in space. The seasonality of extreme flood events and, hence flood processes, tends to change with the flood magnitude. This change is more pronounced in the lowland and hilly regions than it is in the mountains. Both in Austria and Slovakia, decades of flood seasonality exist.