



Comparison of drought occurrence in selected Slovak and Czech catchments

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The presented study is focused on the analysis and comparison of hydrological drought occurrence, development and duration in six small to middle sized catchments in the Czech Republic (CZ) and Slovakia. The main questions to be answered are: (1) are there correlations between the physical conditions in the catchments and drought occurrence, and (2) does the spatial trend of drought occurrence exist.

The Žitava catchment is located in the central western part of Slovakia having runoff dominated by rainfall with the contribution of snow melting during the spring period. The Belá River catchment is located on the contact of Západné and Vysoké Tatry Mts. in the north of Slovakia. The runoff is snow to snow-rain combined type. The Lupčianka catchment is located on the northern slopes of the Nízke Tatry Mts. in the northern part of the central Slovakia. The runoff regime is snow-rain combined in the upper part of the catchment, and of rain-snow type in the rest of catchment. The Rakovnický potok brook (CZ) has its spring in Rakovnická pahorkatina hilly land. Runoff is dominated by rainfall, quite heavily influenced by water uptakes in the catchment. The Teplá River (CZ) originates in peat meadows in the western part of the Czech Republic. Runoff is dominated by rainfall. The Metuje catchment (CZ) is formed by Adršbách-Teplické stěny Upland. The headwater part is typical by deeply incised valleys, table mountains and pseudokarst caves. The discharge is fed dominantly by groundwater.

The streamflow drought was characterized using discharge data, the groundwater drought using the base flow values. The local minimum method was used for base flow separation. The threshold level method (Q80, BF80) and the sequent peak algorithm were used for calculation of drought duration in discharge and base flow time series. The data of the same three decades of the common period (1971 – 1980, 1981 – 1990 and 1991 – 2000) were used. The resulting base flow values along with the discharges were re-calculated into specific discharge and base flow.

The results showed that drought occurrence in evaluated Czech and Slovak catchment reflects very variable physical conditions in catchments, first of all the location of the catchment (latitude and altitude). The latitude difference reflects itself in starting time of drought which often propagates from the west to the east. The altitude is reflected in the seasonal pattern of drought, where drought in higher altitudes occurs much often in winter-spring period whereas in lower altitudes the summer-autumn droughts prevail. Total number of droughts with duration of more than 50 days was much higher in Slovak than in Czech catchments, which could reflect the more continental character of climate in Slovakia. Drought occurrence in Žitava catchment often followed the drought in Czech catchments; especially the drought in Teplá. On the other hand, drought occurrence in the Metuje catchment was in some cases closer to drought development in Slovakia than in other two Czech catchments. The longest drought in discharges, estimated for Rakovnický potok by the method of SPA lasting for 1569 days in 2006 – 2010 period was caused probably by the human activities, because in none of other evaluated catchments such a long drought in the same or similar period occurred.

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