
EXTREME MULTI-ANNUAL HYDROLOGICAL DROUGHTS IN THE ELBE RIVER BASIN

KAŠPÁREK, L., KOŽÍN, R.

T. G. Masaryk Water Research Institute

Keywords: multi-annual hydrological drought – Elbe – deficit volume – extremes

The aim of the study was the evaluation of multi-year hydrological droughts in the Elbe river basin for the Děčín stream gauging station (catchment area 51 104 m²). Average monthly flows from period 1851–2000 are available for the station. For this period, we also compiled a series of average monthly precipitation and temperatures from several data sources. We calculated annual values for precipitation, temperatures and differences in annual precipitation and runoff, then we computed long-term averages and regression linear trends for change over time. The trends are only slightly upward for all three variables, but long-term fluctuations in precipitation are more significant. According to the quantified multi-year average flows and precipitation, we searched for and merged cases from which one continuous drought lasting at least 5 years is generated for both precipitation and runoff. We quantified deficit volumes for individual drought periods. The long-term average flow was chosen as the threshold flow. The hydrological drought 2013–2020 had the longest duration, almost 7 years, of all droughts since 1851 and was also characterized by the largest total deficit volume. When compared to the average annual deficit volume, it is only in fourth place. When comparing the time series of monthly flows, it turned out that cases from different periods have similar patterns and behavior.