

IUGG23-0491: **An assessment of water deficit and design characteristics of low flows along the river Vistula**

E. Bogdanowicz<sup>1</sup>, E. Karamuz<sup>1</sup>, J.J. Napiórkowski<sup>1</sup>, T.B. Senbeta<sup>1</sup>

<sup>1</sup>Institute of Geophysics Polish Academy of Sciences, Department of Hydrology and Hydrodynamics, Warsaw, Poland.

In Poland, two types of low flows of different origins were observed. The summer and summer-autumn low flows, preceded by atmospheric and soil drought, begin with a depletion of the catchment retention resources. They are generally long-lasting, large-scale, and dominant in the lowland part of the country. Winter low flows are typical for mountain rivers, although they can also occur in lowland rivers. Their occurrence is associated with longer periods of negative air temperature. In those conditions, the surface runoff is stopped, and groundwater inflows to the riverbeds are severely limited. Due to global warming, winter low flows in Polish rivers rarely occur. Summer and autumn droughts do not change their origin and character.

This study aims to assess water deficits in the dry periods and their tendency of change in the stations along the River Vistula and to calculate the most commonly used design characteristics of low flows: mean minimum annual flow (MLQ) and the flow non-exceeded in 10 days with probability 50% (Q10, 50%). Water deficit analysis along the Vistula for the most severe events enables us to indicate reaches and their catchments strongly vulnerable to droughts. The calculations of Q10, 50% were performed by means of the QdF (discharge-duration-frequency) method and compared with MLQ values. The research was performed on the basis of observation data (years 1951-2018).

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