



Estimating the annual maximum discharges of low probability for two small rivers in lowland Poland with various hydrological records

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The results of estimation of the probable annual flood flows for two small agricultural rivers, with significant ratio of forest, are presented in the paper. Both of the rivers are located in southern part of Mazovia region, ca 100-140 km south of Warsaw. Catchment area of the Zagozdzonka River, upstream of the Plachty gauge is 82 km² and the Zwolenka River, upstream of the Siekierki gauge is 194 km². The first catchment has 48-year-set of flow data (1963-2010), and the other one only two and half year set of flow data (2008-2010).

Two approaches were applied for the first catchment. In the first approach, the traditional statistical series is formed from the annual maximum (AM) flows of hydrological years. In the other approach, two separate series of floods are formed; of maximum annual winter season floods and maximum annual summer season floods (WS-M). A computer program, using four types of probability distribution functions (Gamma, log-Normal, Weibull and log-Gamma), and developed by IMGW (Institute of Meteorology and Water Management), was applied for frequency analysis with the use of AM and WS-M series, respectively.

Results of computations with the use of AM and WS-M data indicate clear differences in probable flood flows with low probability between the two approaches. Flood flow with return period of 100 year estimated with the WS-M data is 27% higher than the other one, and this approach has been accepted as representative for the smaller catchment.

The above-mentioned results of annual maximum discharges of low probability as well log-log discharge relationship between two catchments, based on 35 hydrometric measurements done simultaneously as well as peak discharges of corresponding flow hydrographs, allow the estimation of requested values for the larger catchment.

The carried out investigation with flow data from the two small rivers showed that ratio of 100-year flood and 2-year flood were higher than such regional ratio, estimated for larger rivers in this region of Poland.

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