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# Variation of IUH shapes with size of rainfall-runoff events in a small agricultural catchment

Kazimierz Banasik (1), Leszek Hejduk (1), and Jerzy Banasik (2)

(1) Warsaw University of Life Sciences - SGGW, Dept. of Water Engineering, Sedimentation Laboratory, Poland (kazimierz_banasik@sggw.pl), (2) Environment Agency, Anglian Region, Northern Area Office, Lincoln, Lincolnshire, LN2 5HA, UK

Instantaneous unit hydrograph (IUH) is one of the key components in many procedures for design flood estimation. The IUH defined by gamma pdf, called also Nash model, has been estimated for each of the over 30 recorded rainfall-runoff events, in a small (A=82.4 km2), lowland, agricultural catchment located in central Poland, in the period 1980-2010 (Banasik et al., 2011). Variability of the IUH characteristics (such as lag time, time to peak, maximum ordinate) vs. rainfall-runoff parameters (such as peak discharge and runoff depth) will be presented. A larger variability of the IUH characteristics for smaller events was noted. Two methods for estimating, empirically based, representative IUH, for the catchment and for the design flood estimation, are presented. The first one is based on mean values of time to peak and peak ordinate of all individual IUHs, and the other one is taking into account only the largest events when the lag time has tendency to decrease with runoff depth increasing.
The empirically estimated representative IUHs are compared with unit hydrograph of FSSR and ReFH (Kjeldsen 2007). Results of single event model application, with the IUH incorporated in it, are compared with results of FFA for this catchment.

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Kjeldsen T.R., 2007. Flood Estimation Handbook, Supplementary Report No. 1. The revitalized FSR/FEH rainfall-runoff method. Centre for Ecology & Hydrology, Wallingford, UK.

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