CLASSIFICATION OF SMALL WATERSHEDS FOR THE RAINFALL-RUNOFF MODELLING IN THE CZECH REPUBLIC

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This article introduces a classification of small watersheds in the Czech Republic in terms of potential hydrological response to a set of design precipitation time series. Watershed classes as well as precipitation time series were derived as a partial result of a three-year project aimed at the design of typical soil conservation measures and small water management structures. Design precipitation scenarios were derived in an analysis of radar-based rainfall measurements taking into consideration the precipitation totals, their frequency, internal intensity distribution and spatial distribution over the Czech Republic. A motivation for watersheds classification lies in the need of assessing the impacts of derived precipitation scenarios on the watersheds' response using various hydrologic models. The watersheds classification was carried out in a scale of small stream basins. The main parameters affecting a hypothetical hydrological response were calculated for each basin. The principal characteristics involved in the evaluation are basin area, drainage density, average elevation and slope. Land cover, geological and hydrologic soil properties are reflected in the average runoff curve number (SCS-CN). In terms of parameters which affect the timing and shape of runoff response the watershed shape coefficient alpha, specific maximum flow path length and the mean surface flow path length were calculated. Dependent parameters were discarded resulting in final five parameters for the subsequent grouping analysis.

For the classification a Grouping Analysis Tool using the K-means method was applied. The grouping was tested successively using from 3 to 7 classes. In the end for the final 5 classes representative watersheds were selected. These representatives will be further used in hydrologic modelling and uncertainty analyses.