



Winter-spring extreme hydrological episodes and their causes in Romanian Carpathians and Subcarpathians: case of Prahova River

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More than 30% of the maximum annual flows in the upper Prahova River in the last three decades took place in winter and spring (december-may), periods characterised by the persistence of the snow in the Carpathians Mountains. This paper aims to identify the threshold of an extreme hydrological winter-spring episode in the upper Prahova River and to characterise the weather situations that cause these episodes. The goal is the understanding of the hydro-climatic context for a better management of the transport and tourism infrastructure in the Prahova Valley.

The data used in this study are the daily mean flows (1970-2002) recorded in two hydrological stations in the upper Prahova River that are analysed using the method of the natural thresholds. The weather situations corresponding to these extreme hydrological episodes are studied using the Hess-Brezowsky classification (PIK, 2005), the reanalysis maps of Wetterzentrale (500 hPa, 850 hPa) as well as the daily mean temperatures and the daily amounts of precipitations (1970-2002) recorded in four meteorological stations within the Prahova Valley.

The hydrological threshold corresponding to the extreme episodes for the December-May 1970-2002 period is equivalent to the first natural break in the daily mean flow data series. There are 31 days in May, 5 in December, 3 in January and 2 in April when the flow exceeds the established threshold.

We are studying the weather situations of the first day of these hydrological episodes. The rain is the main cause for 92% of the hydrological episodes that are studied. The

melting snow explains only two hydrological episodes. There are three typical weather situations. A low pressure area over the South-Eastern Europe generates heavy rains (66,7%). A shallow low explains 25% of the analysed weather situations. A warm mass of air from south generates the snow melting (8,3%) and the high river flows.

The extreme hydrological episodes in the upper Prahova River represent only 0,5% of the winter-spring flows; these are associated to the weather situations from north and north-west (66,7%), west (16,7%), north-east (8,3%) and south-east (8,3%) according to the Hess-Brezowsky classification.