



## **Meteorological and hydrological characteristics of severe flash flood in Romania**

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Flash floods represent one of the most severe hazards in Romania, causing important damages and casualties. Most of the flash flood cases occur in mountain and hill watersheds, with deep valleys, deforested slopes and significant elevation range.

Heavy precipitation events in Romanian region typically occur downstream of a significant cyclone aloft, often exhibiting „cutoff” cyclone characteristics. Mediterranean and Black Sea proximity provide a source of moisture for Romanian territory and S-shape of Carpathians Mountains provide forcing. At low levels the ways by which atmospheric parameters for heavy precipitation are brought together can vary substantially from case to case and in different parts of the country. Heavy rainfall may or may not result in a flash flood, depending on the hydrological and geographical characteristics of the watershed where rainfall accumulates.

The climatology of the rainfalls triggering flash floods has been extensively approached based on the peak-over-threshold concept, and statistic of the sub-daily amounts. The results highlight noteworthy regional variations that eventually should result in a better understanding of the causes that carry the severe flash floods.

The paper presents an analysis of the representative flash flood events which took place in Romania. This work has been carried out for the HYDRATE project, which is a currently ongoing EC funded project that is aiming to improve techniques for flash

flood forecasting.

The ten severe flash flood cases analyzed in this paper can be divided in three categories: 1) those resulting from intense rainfall in superior part of the natural watershed in the mountain regions, 2) those resulting from intense rainfall in catchments altered by humans conductive of dam or levee failure and 3) those resulting from excessive rainfall in natural watershed in the plain regions.

The analysis of these flash floods was made differentiated, taking into account that some events occurred in ungauged basins. In these cases, primarily a post event survey was realized and after that, through hydraulic methods, the main hydrological parameters have been detected. A synthesis of the main characteristics of the analyzed flash floods is also presented.