



Impact of storm motion and its interaction with the drainage basin properties on selected extreme flash floods in the Mediterranean area

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Storm structure, storm motion and their interaction with the drainage basins properties play an important role in shaping flood response. With this paper, we examine these characteristics for selected extreme flash flood events. High-resolution radar observations and raingauge data have been collected for ten flash floods occurred in the Western Mediterranean Region (Spain, France and Italy) in the frame of the HYDRATE EU project. First, the space and time structure of the rainfall observations are examined to identify storm motion during the various phases of the flood events. Then we use a recently developed analytical framework to evaluate the dependence of the catchment flood response on the space-time interactions between rainfall, runoff generation and routing mechanisms. This framework focuses on the first and second temporal moments of the flood response, which are used as a surrogate for time to peak and shape of the flood wave. The impact of drainage network properties, storm spatial structure and storm motion (and their interactions) are evaluated for the studied flood events, providing a metric to assess the relative contribution in shaping the flood response for extreme runoff events. Implications concerning the monitoring requirements in the frame of the flood risk management activities are discussed.