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Hydrometeorological signatures of global extreme precipitation events

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Extreme precipitation events are one of the main causes of flooding, a global phenomenon with high ecological and societal impact. The current research is aimed on characterizing space-time features and weather patterns of global extreme precipitation events and on identifying the most influential parameters controlling the generation of floods from these events. This is an on-going research and results of the first part will be presented. We use the term "global extreme precipitation event" to refer to an event producing high precipitation amounts over large areas, with a scale in the order of tens of kilometers, and with a typical time interval of 1 day; further, such events have a low frequency of occurrence in the region in which they are observed. The presented analysis is based on precipitation estimates from the GPCP dataset and on atmospheric data from the ERA-Interim database. A procedure for detecting extreme events was developed and applied for a 15 years record (1997-2012). Spatial-temporal features, surface characteristics and parameters characterizing the atmospheric environment were computed for all the extreme events. Examination of the extreme events according to their seasonal and spatial distribution reveals clustering around cores that follow general circulation systems (e.g., northern and southern winter storm tracks, ITCZ, the Monsoon and others). Moreover, some unique features of these extreme cores are revealed by analyzing their sea vs. land location, comparing southern and northern hemisphere cores and others. The unique meteorological characteristics of extreme event clusters are identified using standard and centered composite analyses. The main finding of this ongoing research will be presented.