



Probabilistic Envelope Curves for Extreme Rainfall Events

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A regional envelope curve (REC) of flood flows summarises the current bound on our experience of extreme floods in a region. REC are available for most regions of the world. Recent scientific papers introduced a probabilistic interpretation of these curves and formulated an empirical estimator of the recurrence interval T associated with a REC, which, in principle, enables us to use REC for design purposes in ungauged basins. This study extends the REC concept to extreme rainstorm events by introducing the Depth-Duration Envelope Curves (DDEC). DDEC are defined as regional upper bounds on observed rainfall maxima for various rainfall duration. Also, the study adapts the probabilistic interpretation proposed for REC to DDEC and assesses the suitability of these curves for estimating the T -year rainfall event associated with a given duration and large T values. The study illustrates an application of DDEC to annual maximum series of rainfall depth with duration spanning from 15 min. to 24 hrs. collected at 208 raingauges located in northern-central Italy.