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An entropy decision approach in flash flood warning: rainfall thresholds definition

V. Montesarchio, F. Napolitano, and E. Ridolfi
Sapienza, DITS, Hydraulics, Highways and Roads, Rome, Italy (valeria.montesarchio@uniroma1.it)

Flash floods events are floods characterised by very rapid response of the basins to the storms, and often they involve loss of life and damage to common and private properties. Due to the specific space-time scale of this kind of flood, generally only a short lead time is available for triggering civil protection measures. Thresholds values specify the precipitation amount for a given duration that generates a critical discharge in a given cross section. The overcoming of these values could produce a critical situation in river sites exposed to alluvial risk, so it is possible to compare directly the observed or forecasted precipitation with critical reference values, without running on line real time forecasting systems. This study is focused on the Mignone River basin, located in Central Italy. The critical rainfall threshold values are evaluated minimising an utility function based on the informative entropy concept. The study concludes with a system performance analysis, in terms of correctly issued warning, false alarms and missed alarms.