Prediction in cases with superposition of different hydrological phenomena, such as from weather "cold drops", or with other external actions

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The authors have been involved in Model Codes for Construction prior to Eurocodes now Euronorms, and in a Drainage Instruction for Roads for Spain that adopted a prediction model from BPR (Bureau of Public Roads) of USA to take account of evident regional differences in Iberian Peninsula and Spanish Isles, and in some related studies. They used Extreme Value Type I (Gumbell law) models, with independent actions in superposition; this law was also adopted then to obtain maps of extreme rains by CEDEX. These methods could be extrapolated somehow with other extreme values distributions, but the first step was useful to set valid superposition schemas for actions in norms. As real case, in East of Spain rain comes usually extensively from normal weather perturbations, but in other cases from "cold drop" local high rains of about 400mm in a day occur, causing inundations and in cases local disasters. The city of Valencia in East of Spain was inundated at 1,5m high from a cold drop in 1957, and the river Turia formerly through that city was just later diverted some kilometers to South in a wider canal. With Gumbell law the expected intensity grows with time for occurrence, indicating a value for each given "return period", but the increasing speed grows with the "annual dispersion" of the Gumbell law, and some rare dangerous events may become really very possible in periods of many years. That can be proved with relatively simple models, e.g. with Extreme Law type I, and they could be made more precise or discussed. Such effects were used for superposition of actions on a structure for Model Codes, and may be combined with hydraulic effects, e.g. for bridges on rivers. These different Gumbell laws, or other extreme laws, with different dispersion may occur for marine actions of waves, earthquakes, tsunamis, and maybe for human perturbations, that could include industrial catastrophes, or civilization wars if considering historical periods.