



Natural Hazards characterisation in industrial practice

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The definition of rare hydroclimatic extremes (up to 10^{-4} annual probability of occurrence) is of the utmost importance for the design of high value industrial infrastructures, such as grids, power plants, offshore platforms. The underestimation as well as the overestimation of the risk may lead to huge costs (ex. mid-life expensive works or overdesign) which may even prevent the project to happen. Nevertheless, the uncertainty associated to the extrapolation towards the rare frequencies are huge and manifold. They are mainly due to the scarcity of observations, the lack of quality on the extreme value records and on the arbitrary choice of the models used for extrapolations. This often put the design engineers in uncomfortable situations when they must choose the design values to use. Providentially, the recent progresses in the earth observation techniques, information technology, historical data collection and weather and ocean modelling are making huge datasets available. A careful use of big datasets of observations and modelled data are leading towards a better understanding of the physics of the underlying phenomena, the complex interactions between them and thus of the extreme events frequency extrapolations. This will move the engineering practice from the single site, small sample, application of statistical analysis to a more spatially coherent, physically driven extrapolation of extreme values. Few examples, from the EDF industrial practice are given to illustrate these progresses and their potential impact on the design approaches.