Geophysical Research Abstracts
Vol. 12, EGU2010-5207-4, 2010
EGU General Assembly 2010

Semi-continuous simulation for design flood estimation: the SCHADEX method

Federico Garavaglia (1), Michel Lang (2), Emmanuel Paquet (1), Joël Gailhard (1), and Rémy Garçon (1)
(1) EDF - DTG, Grenoble,France (federico-externe.garavaglia@edf.fr), (2) HHLY, CEMAGREF, Lyon , France

EDF (Électricité de France) design floods of dam spillways are now computed using a probabilistic method named SCHADEX (Climatic-hydrological simulation of extreme foods). This method aims at estimating extreme flood quantiles by the combination of a weather pattern based rainfall probabilistic model and a conceptual rainfall-runoff model.
The used rainfall model is a compound probabilistic distribution based on weather patterns sub-sampling. These weather patterns represent eight but contrasted synoptic situations for France and surrounding areas and allow rainfall extreme records to be split into more homogeneous sub-samples.
Extreme floods quantiles are estimated through a runoff generation process that combines a stochastic generation of rainfall events and a semi-continuous rainfall-runoff simulation. The semi-continuous process is a simulation based on historical observed rainfall and temperature time series. Major observed rainfall events are replaced by random synthetic events of a few time steps (min 3) generated according to the weather pattern based probabilistic model. Then, this stochastic rainfall events and observed temperature time-series are used as input of a rainfall-runoff model, which produces synthetic streamflow events. This stochastic simulation is looped numerous times to combine almost exhaustively precipitation and hydrological risks. The efficiency and the originality of this method lie in its ability to mix various hydrological data for extreme flood estimation while keeping parsimonious extrapolation hypothesis.
The SCHADEX method has been already applied on more than 60 watersheds in France and here is illustrated throughout with the example of the Agout watershed (South of France).