Geophysical Research Abstracts, Vol. 8, 09665, 2006
SRef-ID: 1607-7962/gra/EGU06-A-09665
© European Geosciences Union 2006

Exploring flood's behaviour and consequences : application to the Eure Basin (France).

E. Masson

UFR Geography, Lab. TVES, University of Sciences and technologies of Lille, France (eric.masson@univ-lille1.fr)

In France, most of the main rivers have been monitored during the last century. The result of this field acquisition is a large hydrological database of water level measures that is not already in numerical format (i.e. old gauges). The french flood prevention services are now trying to develop a better flood knowledge based on this historical data.

In the Eure basin (Paris Basin, France), a database has been built for a research led on flood consequences at basin scale. Based on the old paper format records of 23 gauges it compiles 154000 daily measured water levels. Extracting information from those data was one of the research goals, in order to define floods characteristics and their consequences in the recently urbanized areas. As every flood event is a complex reaction between spatial rainfall impact and the basin physical components, another issue was to identify the specific flood behaviour for each recorded event in order to create a typology that could help in flood management and crisis response. To succeed in this task, eight flood characteristics were extracted from the original database for each flooding event :

Flood duration : sum of submersion days (days) ;

Flood size : sum of submersion heights (meters) ;

Flood intensity : flood size divide by duration (meters) ;

Flood height : maximum flooding value (meters) ;

River response : level difference between the first flooding day and the day before (meters) ;

Flood complexity : number of peak(s) per flood event ;

Flood progression : number of day to reach the maximum height(days) ;

Flood regression : number of day to reach the flood end from the maximum (days).

From those characteristics and using PCA analysis, it has been possible to define flood behaviours to build a typology and then to identify the most representative flood events for the Eure basin. It has also been possible to estimate the period return for each characteristic and develop a global knowledge on the Eure basin's behaviour during extreme hydrologic events.

From the previous results, the next step was to focus the analysis on three events (i.e. December 1966, Mars 1988 and January 1995) that appeared to be the most representative floods and that extended to the all basin (a 6000 sqkm watershed). The methodology used for this second step was to spatialize rainfall at basin scale and flood extension at local scale with GIS in order to create a risk memory for the decision makers at local and basin scale.

This case study provides a good exemple of experience return at local and basin scale, based on a hydrological data analysis. This approach is really usefull for the prevention of slow flood because most of the flood peaks need several days to reach the maximum height. During those days, it is possible to optimize crisis and post crisis strategies to reduce flood consequences at basin scale.