Geophysical Research Abstracts,
Vol. 10, EGU2008-A-09071, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-09071
EGU General Assembly 2008

About the need for distributed flood forecast in flash flood prone areas: illustration with a road submersion forecasting tool.

P-A. Versini (1,2), **E. Gaume** (1) and H. Andrieu (1)

(1) Laboratoire Central des Ponts et Chaussées, Nantes, France, (2) Universita Politecnica de Catalunya (GRAHI), Barcelona, Spain (gaume@lcpc.fr / Fax: +33 240845998)

Flash floods are generally localized phenomena affecting small streams, very often ungauged and not covered by the standard flood forecasting systems. Considering the uncertainties of rainfall-runoff simulations, is it nevertheless possible on such streams to deliver valuable hydrological forecasts for flood event management? This has been tested on a specific application: the forecast of road submersion to facilitate the organization of rescue and evacuations in a flash flood prone region.

As part of the European research project Floodsite, a first prototype for the forecasting of road submersions in flash flood prone areas has been developed. It links a road vulnerability rating method, which takes into account the characteristics of the road and of its upstream watershed, with a distributed rainfall-runoff model, which computes flood discharges produced by the upstream watershed for all the points of the road network exposed to flooding. Vulnerability levels and discharge values are combined to evaluate a submersion risk at each exposed point of the road network and at each computation time step (15 minutes). Three risk levels have been defined to report the results on maps: moderate submersion risk (yellow), confirmed significant risk (orange), almost certain submersion (red).

The Gard region (French Mediterranean area) has been used as the application case study to develop and to test the proposed method. The Gard region is frequently affected by severe flash floods and an inventory of the road points flooded during a forty year period, the PICH, has recently been completed in part of the region, which served

as a support for the calibration and the validation of the method.

The approach has shown promising results on five recent events for which maps of observed road submersions were available. The approach appeared able to predict almost 100% of the actually flooded points with a reasonable false alarm ratio – generally less than 20%.

Beyond the specific application of road network event monitoring, these results illustrate that rainfall-runoff models, despite uncertainty in outputs especially on ungauged watersheds, provide very useful information for flood event management on the condition that their outputs are properly processed and reshaped. This opens new perspectives for the development of flash flood forecasting tools.