

Flash flood warning in mountainous areas: using damages reports to evaluate the method at small ungauged catchments

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METEO FRANCE

Toujours un temps d'avance

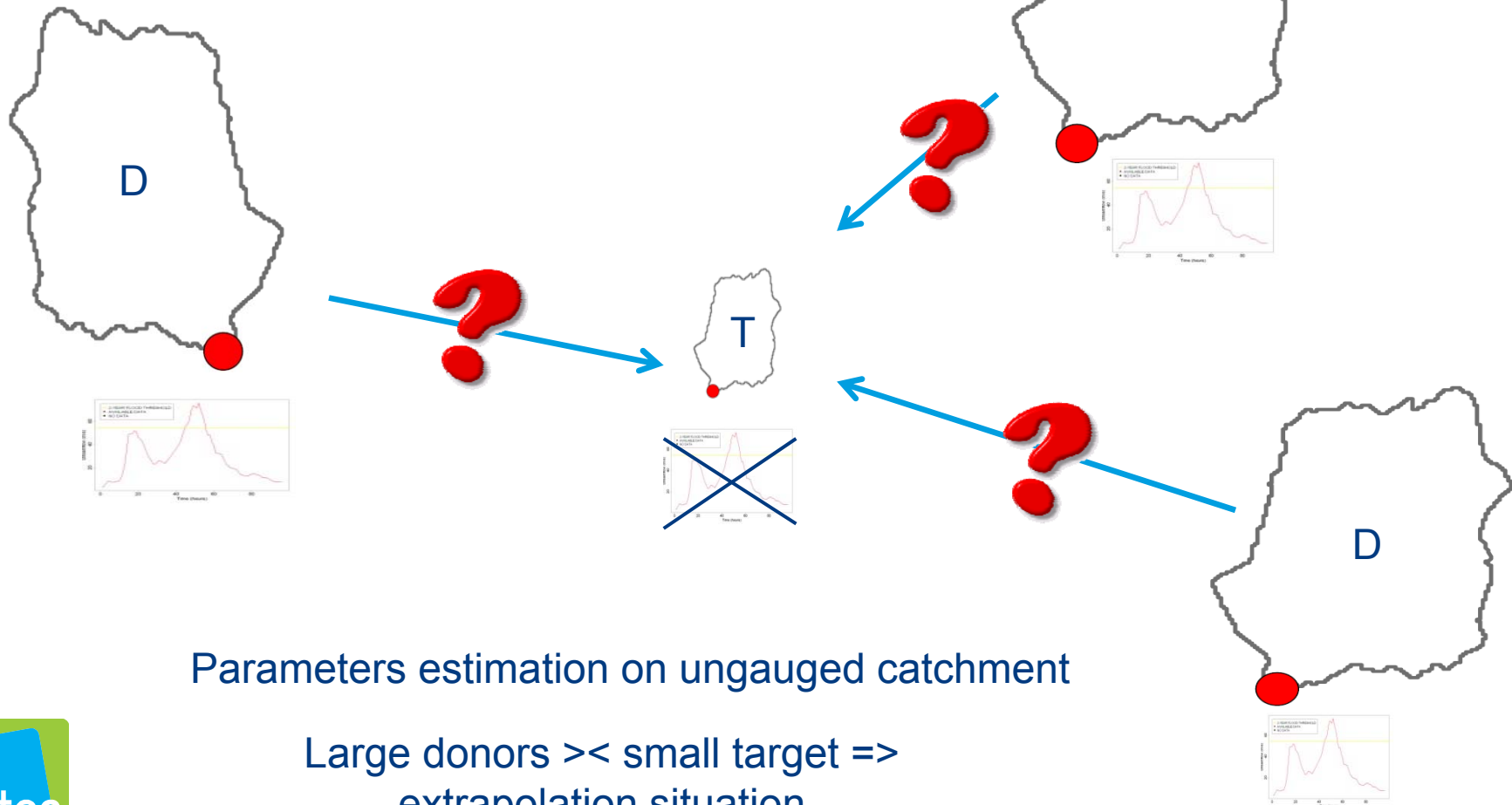


Objective

How to achieve a realistic assessment of the **flood warnings** at **ungauged locations**?

Problems

UNGAUGED CATCHMENTS

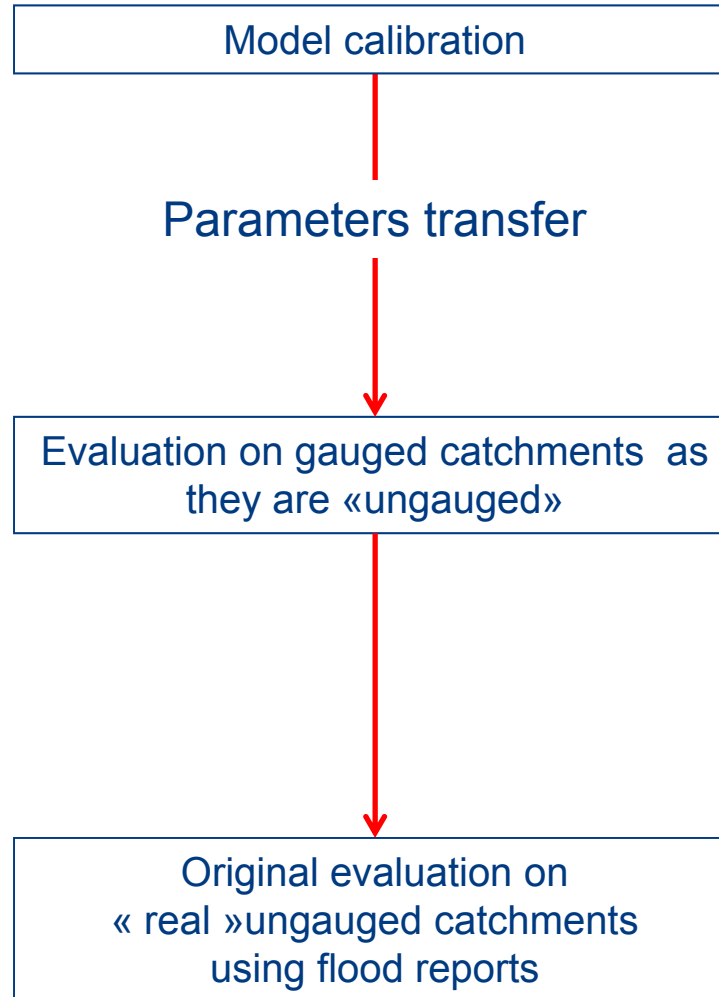


Parameters estimation on ungauged catchment

Large donors \gg small target \Rightarrow
extrapolation situation



Methodology





Available flood reports data

Provided by Mountain Area Restoration Services
(Restauration des Terrains en Montagne RTM)

- Founded in 1860
- monitoring and management of mountain torrents

Content

Date and location of historical and recent natural hazards (including floods)

Difficulties with this data

- No quantitative information (discharge)
- Only consequences: damages
- Exhaustive ?



10/05/1831
Dégâts importants en rive droite dans St Ismier. 17 maisons du hameau des Varciaux sont engravées jusqu'au premier étage ; le puit est comblé. Dans les vignes et les jardins, les dépôts atteignent 1,5 m de hauteur. La route de Grenoble à Chambéry est coupée.

15/08/1831
Débordement du Manival qui encombre plusieurs maisons de vases.

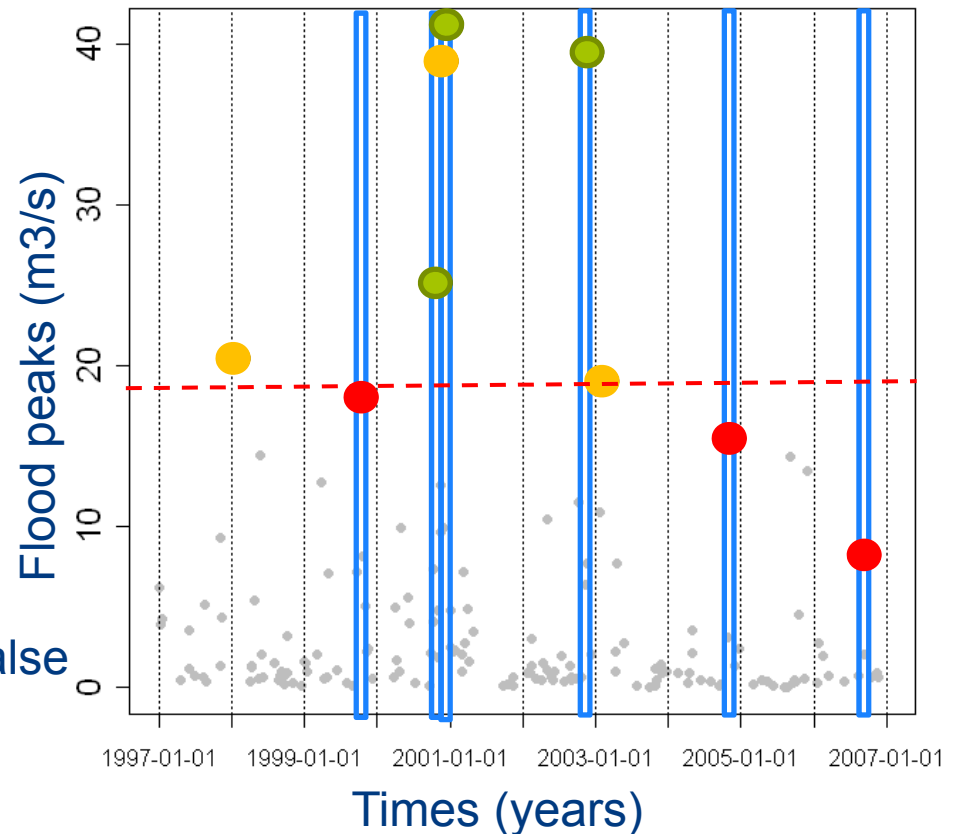
14/06/1835
Débordement du Manival sur la route de Grenoble à Chambéry.

15/08/1836
Débordement du Manival. Inondation de plusieurs habitations aux Varciaux, destruction de bétail, engravement de bâtiments et de terrains. Route de Grenoble à Chambéry impraticable pendant 4 jours.

15/08/1838
Débordement du Manival à la suite d'une averse de grêle. Le hameau des Varciaux a été couvert de pierres. Une maison a été ensevelie en partie.

How to use this data to evaluate a model?

- 1) At a location with flood reports, we simulate flood peaks over a continuous period
- 2) We identify into the flood reports data base the dates where damages were reported
- 3) We define a warning threshold such as the number of alerts is equal to the number of flood report
- 4) We determine the number of good, false and missed alerts



Model is perfect when :
HIT = nb of flood reports

HIT = 3

MISS = 3

FALSE = 3

Application on French Southern Alps over the 1997-2006 period

Precipitations

10-year continuous hourly rainfall & snow series provided by Météo-France

Evaluation data

136 basins for a total number of

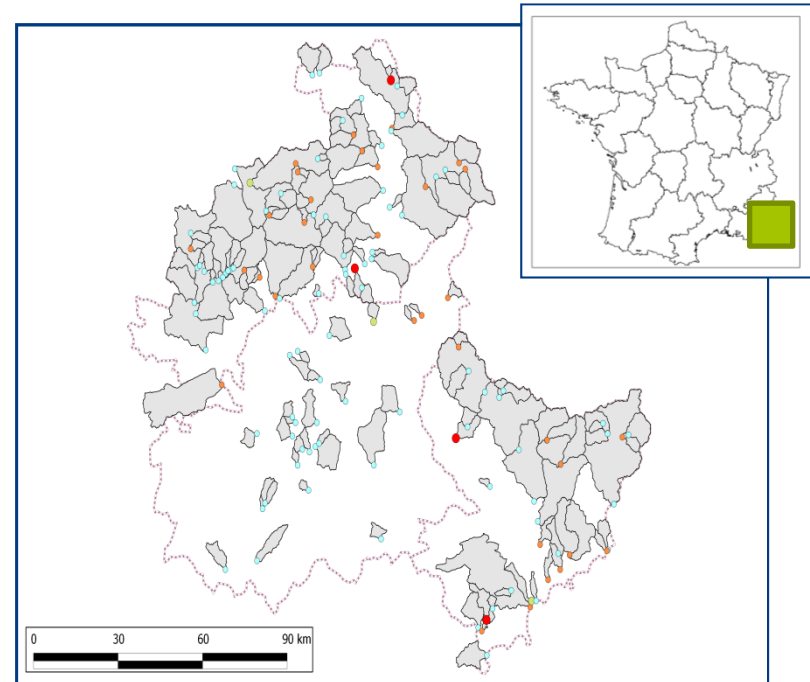
232 flood reports

Size between 5 km² and 1000 km²

Tested model

Conceptual model (AIGA method)

Some information on the poster (R253)





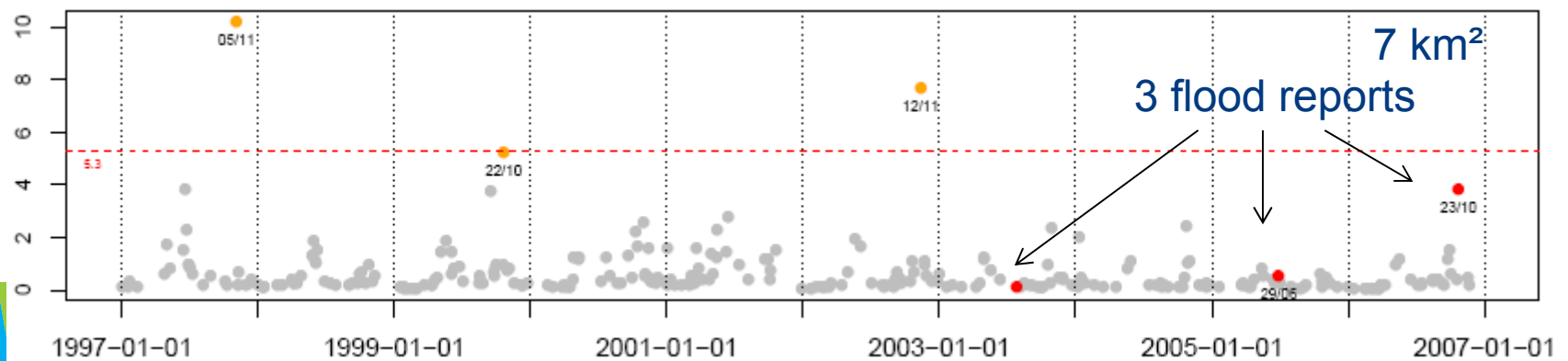
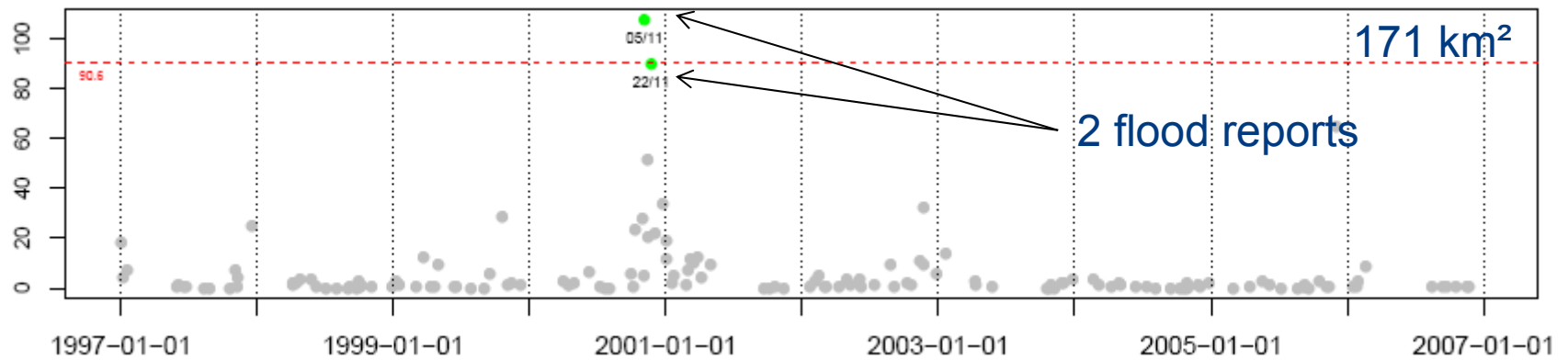
Results

Total nb of flood report : 232

Hit	Miss	False
54	178	178

Only 23% (ie 54 / 232) of flood reports were detected by the model !

Some good and bad results...



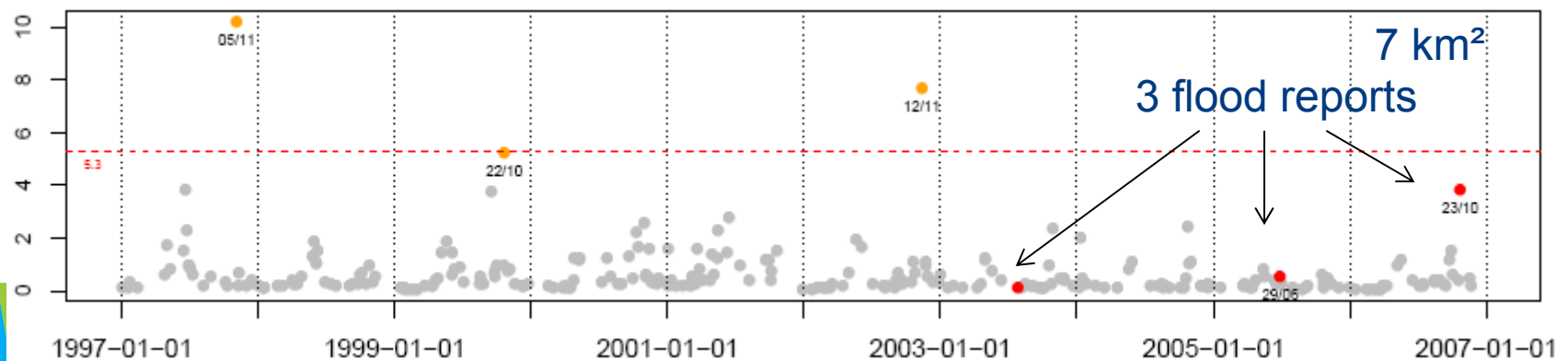
Some explanations

Problem with the tested model?

Problem with the quality of the precipitations?

Problem with the flood reports data:

Damages not necessarily linked to liquid flow but to solid flow
Some missed events in the flood reports data base ?





Additional test

To avoid the problems related to the flood reports data base:

Same evaluation method, same model, but applied on 152 basins with streamflow measurement, with maximum observed flood peak considered as a « flood report »

In this case : **48%** of detection (to be compared with **23%** previously obtained)

Better results, but still modest

**=> Pb with the flood reports data base
but not only...**



Summary

We developed a method to evaluate a model on real ungauged locations using a flood reports data base

We showed that the available data base was not always relevant (maybe not exhaustive, maybe damages linked to debris flows)

Despite that, the evaluation indicated precipitations and the tested model quality can also be improved

=> The development of exhaustive flood reports data base should be encouraged for future evaluations