

International Workshop on Flood Risk Management  
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# Floods Statistical Prediction

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# Hydrological Hazard

- Hazard
- Physical phenomena



Chicoutimi, Québec, July 1996 (Source Time 5/8/96)

# Vulnerability

- Vulnerability :
- Land Use



Chicoutimi, Québec, July 1996 (Source Time 5/8/96)

***Predetermination*** (or ***statistical prediction***) can be defined as the announcement of the physical and statistical characteristics of a future flood event non precisely located in time. So, it is quite different of ***forecasting***, the objective of which is to give the precise date of occurrence of a specified flood event.

**Probability as a measure  
of the likelihood of a future event**

Rivière Harricana à Amos  
Log-Pearson type III (WRC)

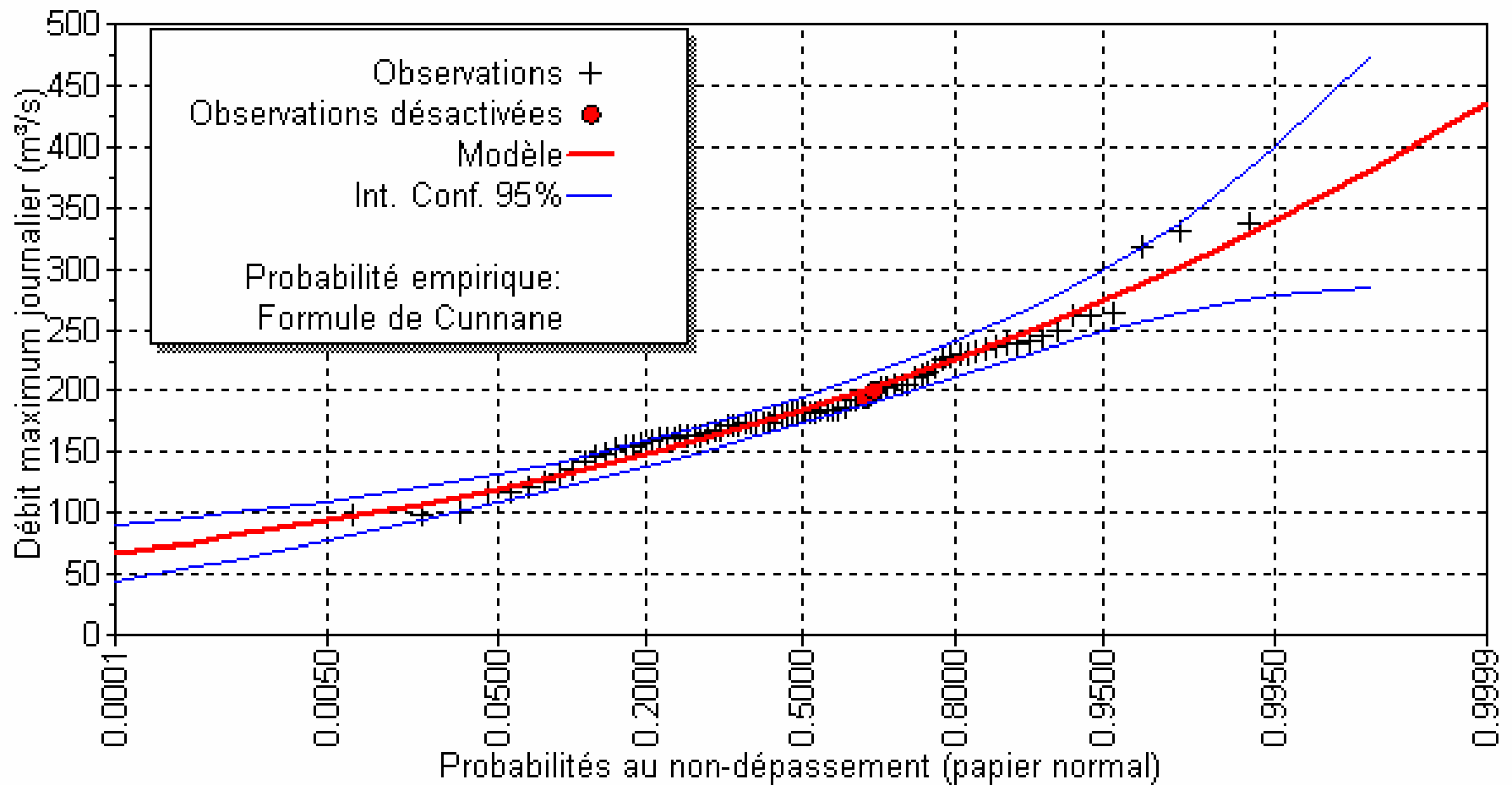


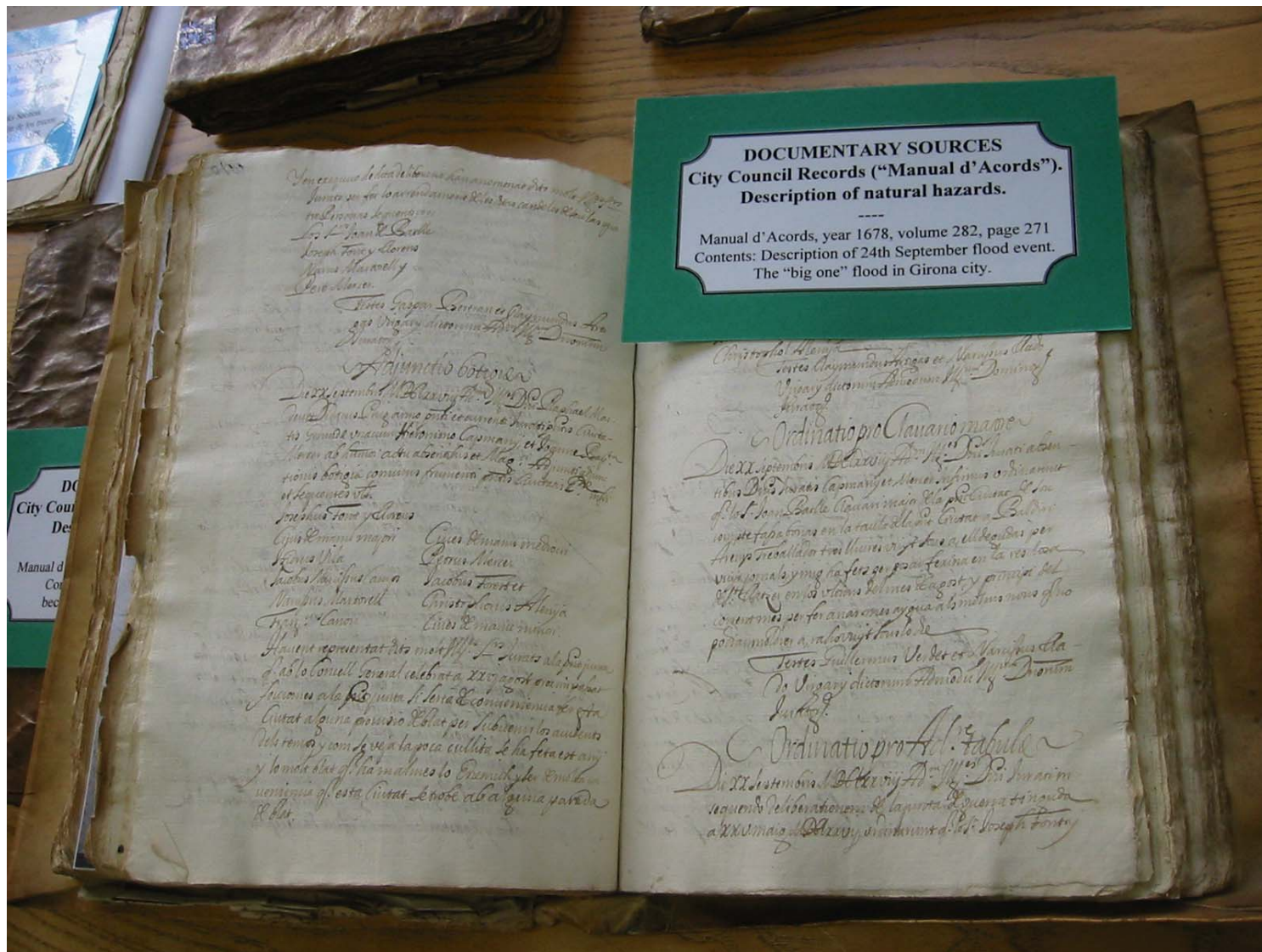


Photo V. Kotwiki

Limnigraph on  
Cooper Creek (Australia)



Gauging Station on Oued Merguellil Tunisia



# Municipal Chronicles at Girona (Spanish Catalonia)

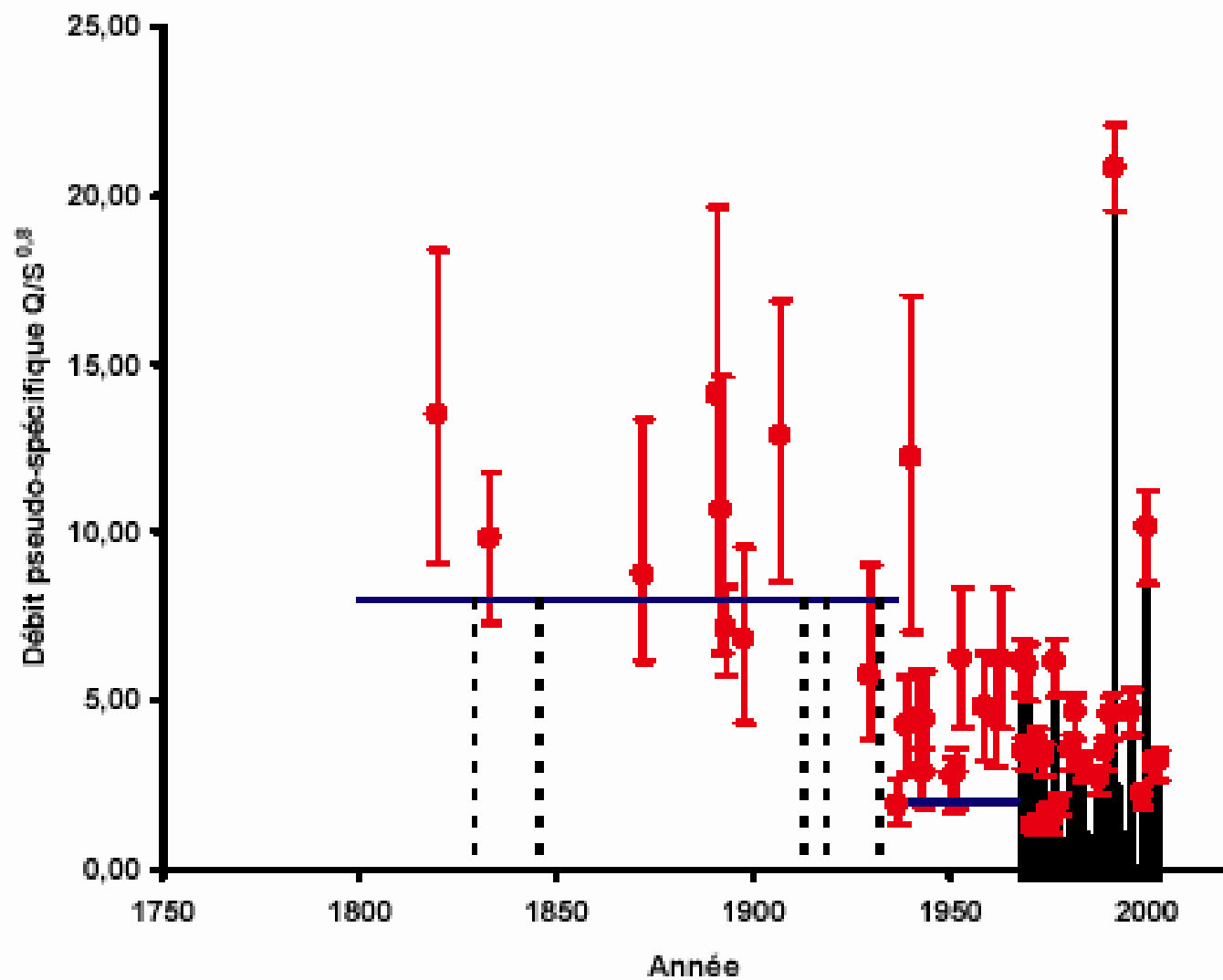


figure 30 . Résultats de la reconstitution des crues historiques de la Salz

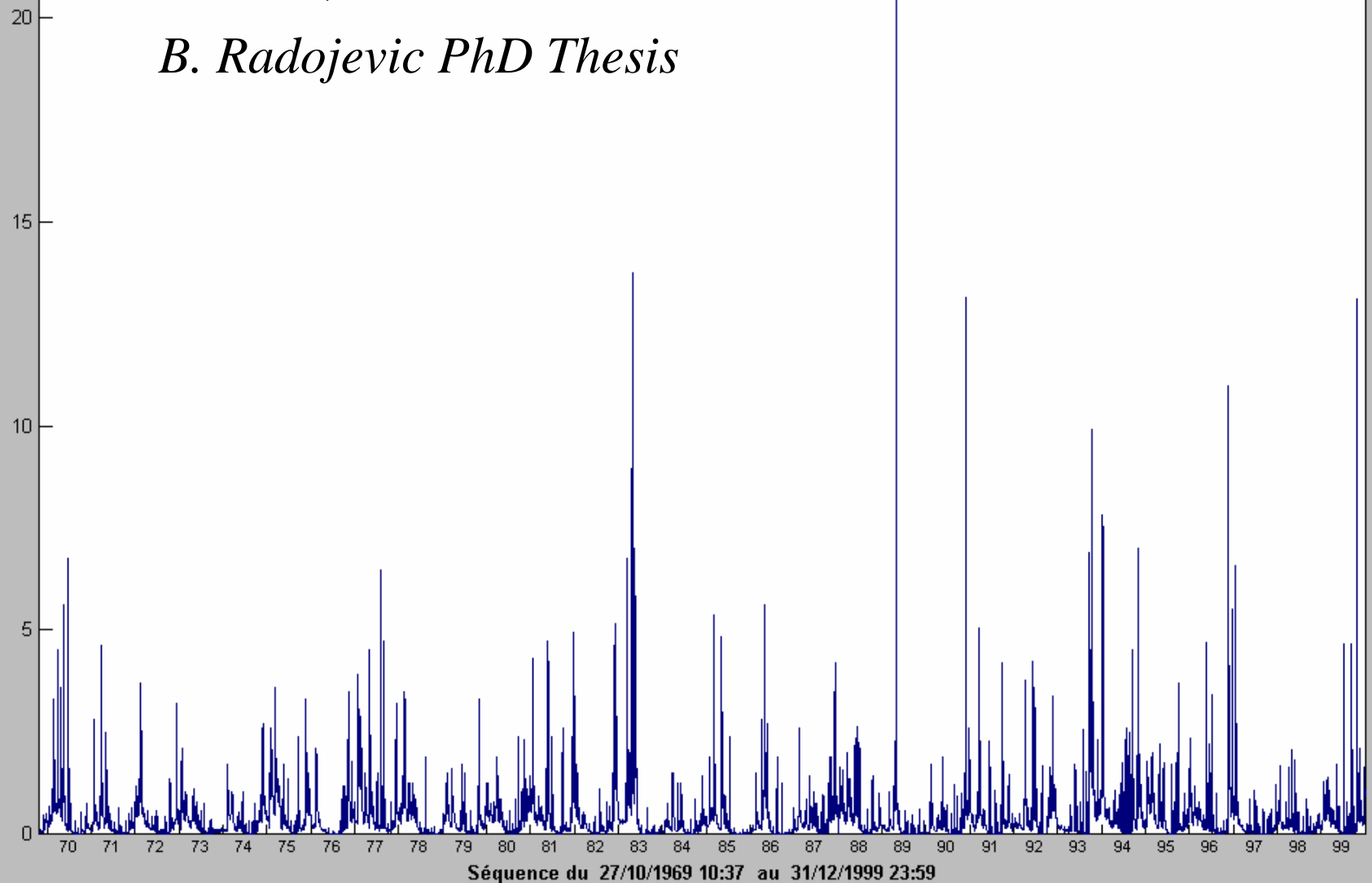


Flood Sediments, Rio Llobregat (Spanish Catalonia)

# Yzeron at Craponne (France)

49 km<sup>2</sup>, de 1970 à 1999

*B. Radojevic PhD Thesis*



# No upward trends in the occurrence of extreme floods in central Europe

**Manfred Mudelsee<sup>1\*</sup>, Michael Börngen<sup>1</sup>, Gerd Tetzlaff<sup>1</sup>  
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## Numerous laws on the market...Hyfran offers :

- ✓ **GEV**
- ✓ **Gumbel**
- ✓ **Weibull**
- ✓ **Halphen**
- ✓ **Gauss**
- ✓ **Log-Normal**
- ✓ **Gamma**
- ✓ **Generalized Gamma**
- ✓ **Inverse Gamma**
- ✓ **Pearson III**
- ✓ **Log-Pearson III**
- ✓ **Leak**

Statistical and numerical  
virtuosities, dictatorship of the  
fit, but no hydrological  
instructions for use ...while  
these supposedly technical  
choices are very fraught with  
consequences.

In the US, it is compulsory to use the Log-Pearson III law for any federal project.

$$f(x) = \frac{\alpha^\lambda}{\Gamma(\lambda)} e^{-\alpha(x-m)} (x-m)^{\lambda-1}$$

- ✓ **Standardization, *but***
- ✓ **No physics**
- ✓ **Not so much statistics**

Guidelines for Determining Flood Flow Frequency (1981, rev 1982)  
Bulletin #17B of the Hydrological Subcommittee, USGS.



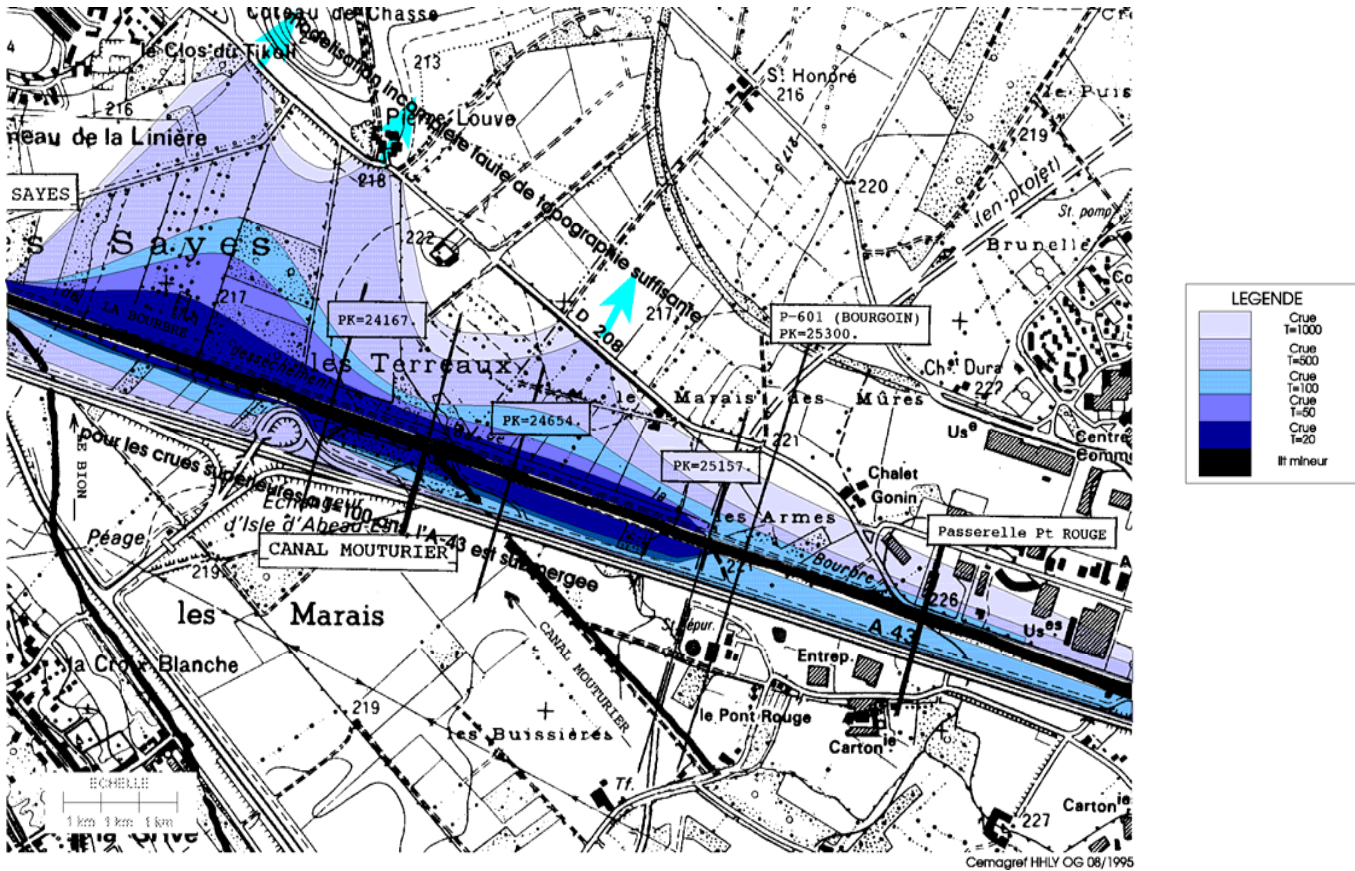
**Gumbel**

**or**

**Fréchet ?**

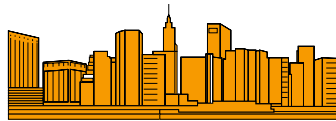


# Hazard Map



# Protection Objectives

Urban Zone



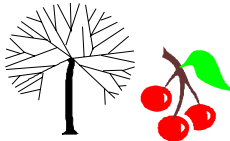
Zone urbaine  
instantanée de  $T=100$  ans

Dispersed Habitat



Habitat disperse  
instantané,  $T=10$  a 50 ans

Orchard



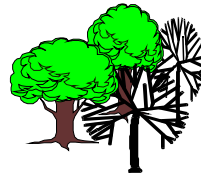
Verger  
1 jour/1 metre/5 ans

Poplars



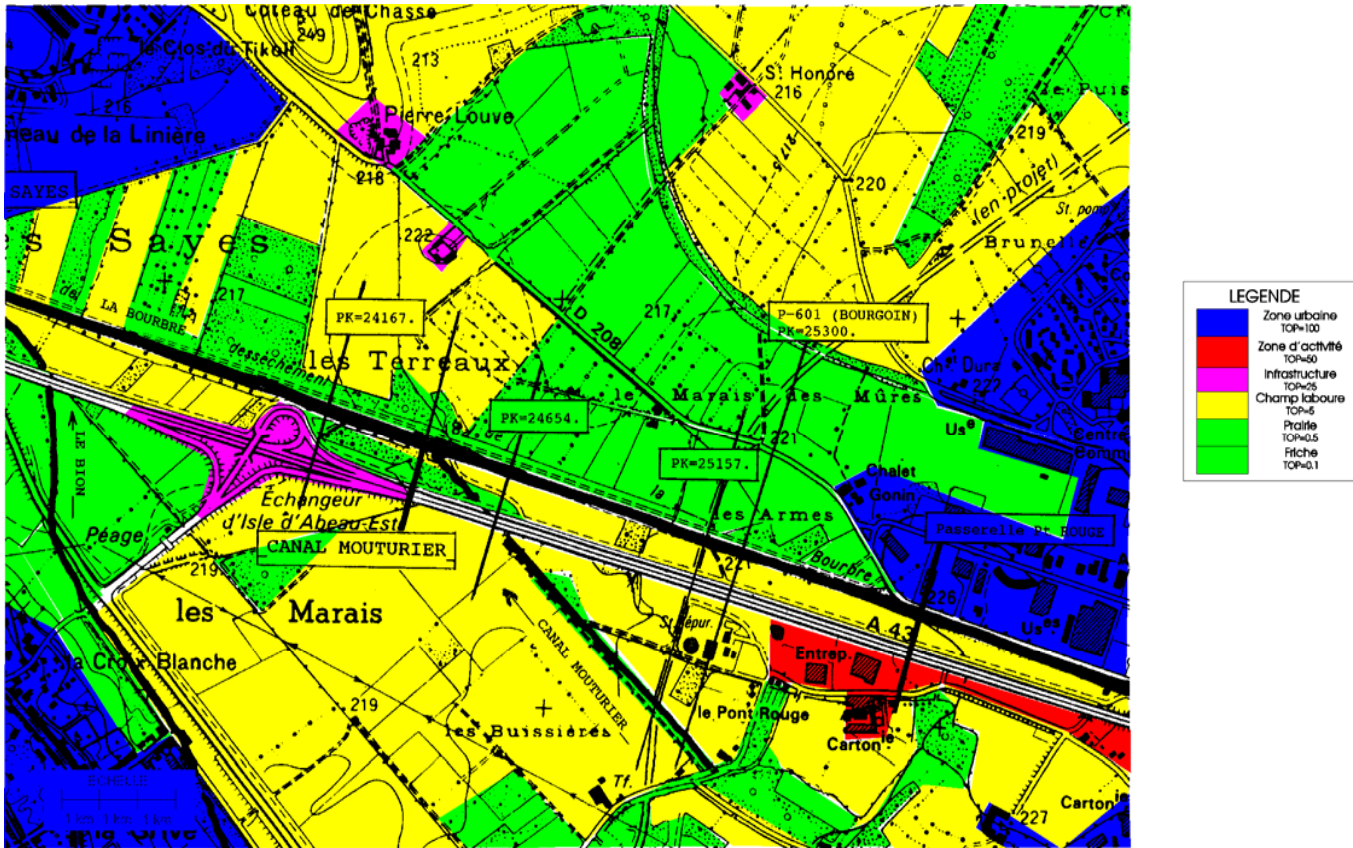
Peupliers  
3 jours 2 fois par an

Wild Land



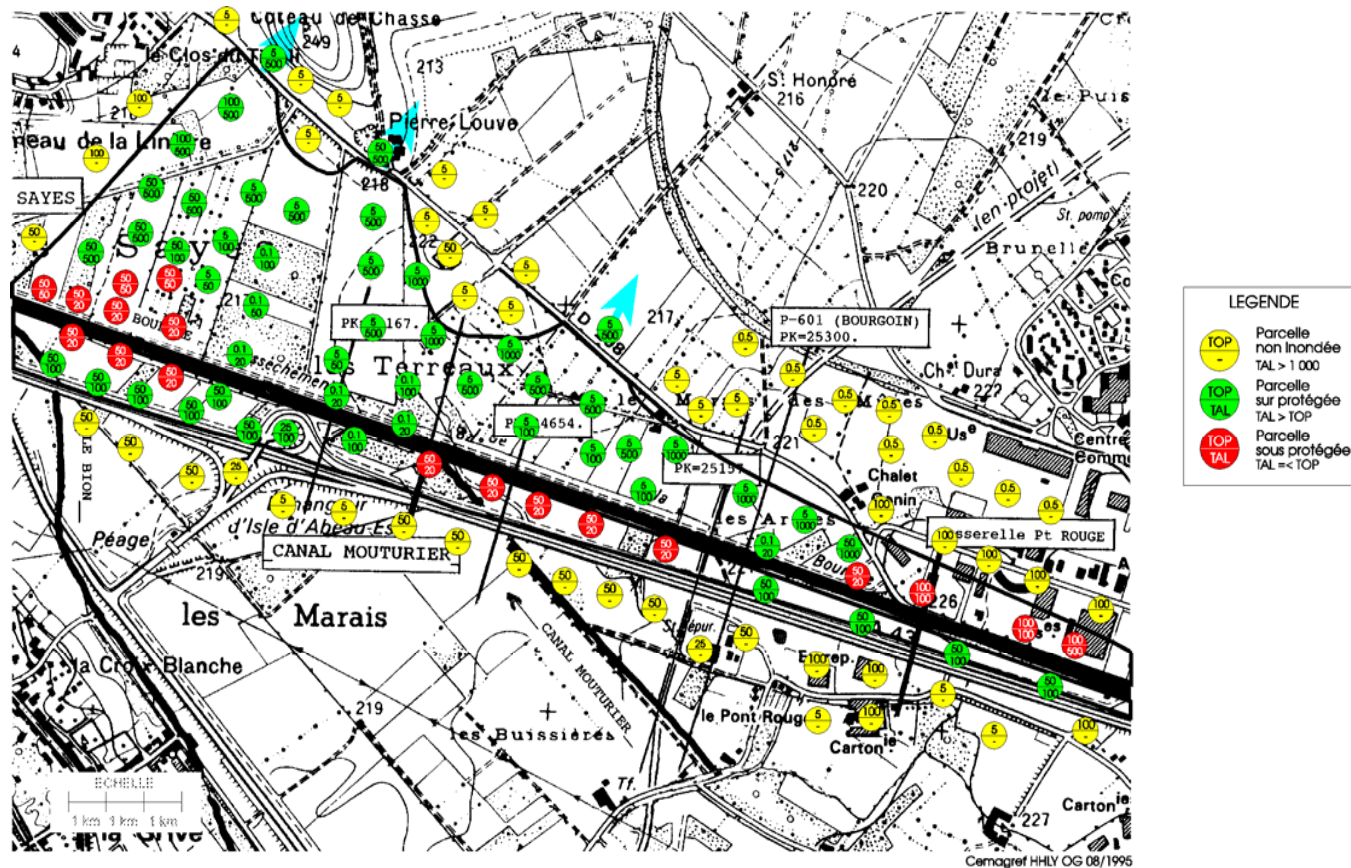
Friche  
1 semaine 3 fois par an

# Vulnerability Map

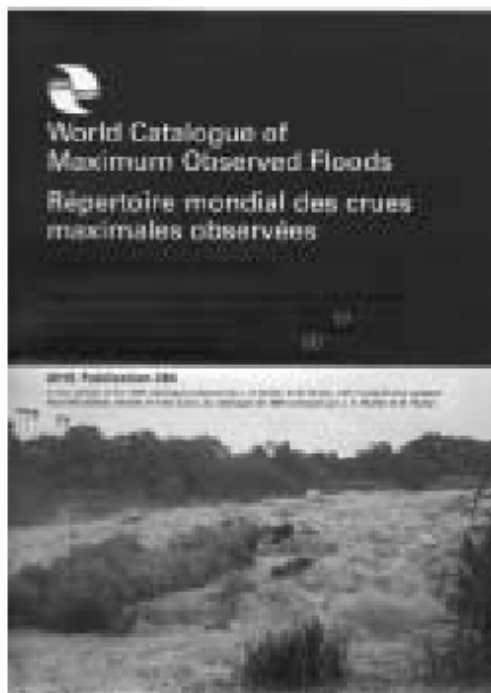


Cemagref HHLY OG 08/1995

# Synthetic Map of Risk



Practictable Basis for Negotiation



[www.iahs.info](http://www.iahs.info)

# World Catalogue of Maximum Observed Floods / Répertoire mondial des crues maximales observées

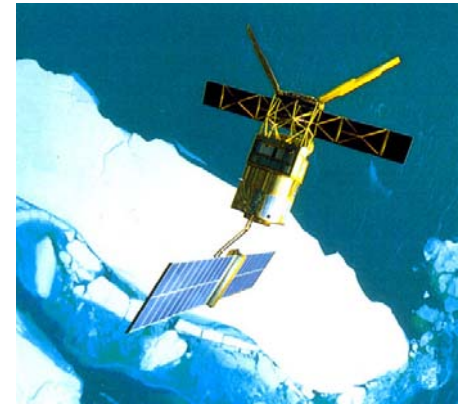
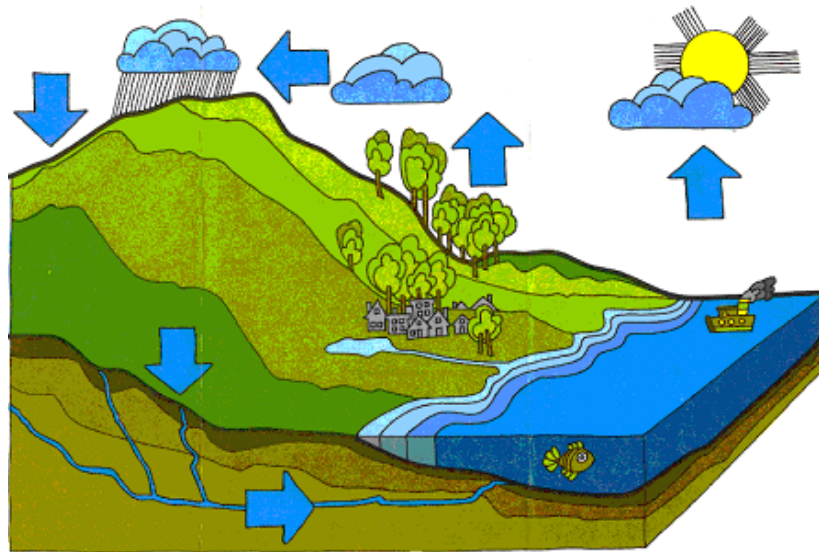
*Compiled by Reg Herschy*

**IAHS Publication 284** (December 2003) ISBN 1-901502-47-3; 320 pp. Price £80.00

A new edition of the [1984 Catalogue](#) (prepared by J. A. Rodier and M. Roche), with revisions and updates

IAHS Press with UNESCO and WMO Support.

$$\text{Prob}[\varepsilon_\lambda \geq \lambda^\gamma] \approx \lambda^{-C(\gamma)}$$



**PUB**





# Frontiers in Flood Research



**8th Kovacs Colloquium**  
**Paris 30 June -1 July 2006**  
**<http://iahs.info>**

**Thank you for your attention...**



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