

Towards real time assessment of flood risk damage: an application of the AIGA method in the south of France.

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1



2



3



PICS

Integrated nowcasting of
flash floods and related
socio-economic impacts

Pico session tomorrow pm

Flash floods



2014



2015



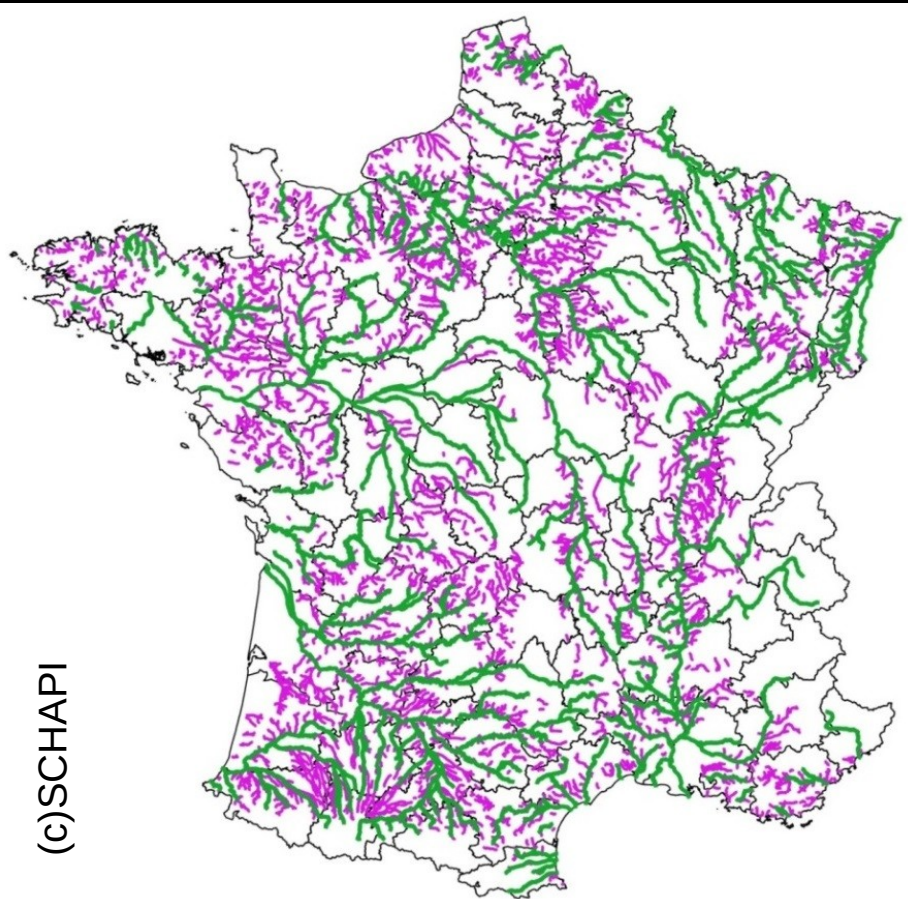
2018

Very short response time, at small scales, potentially anywhere

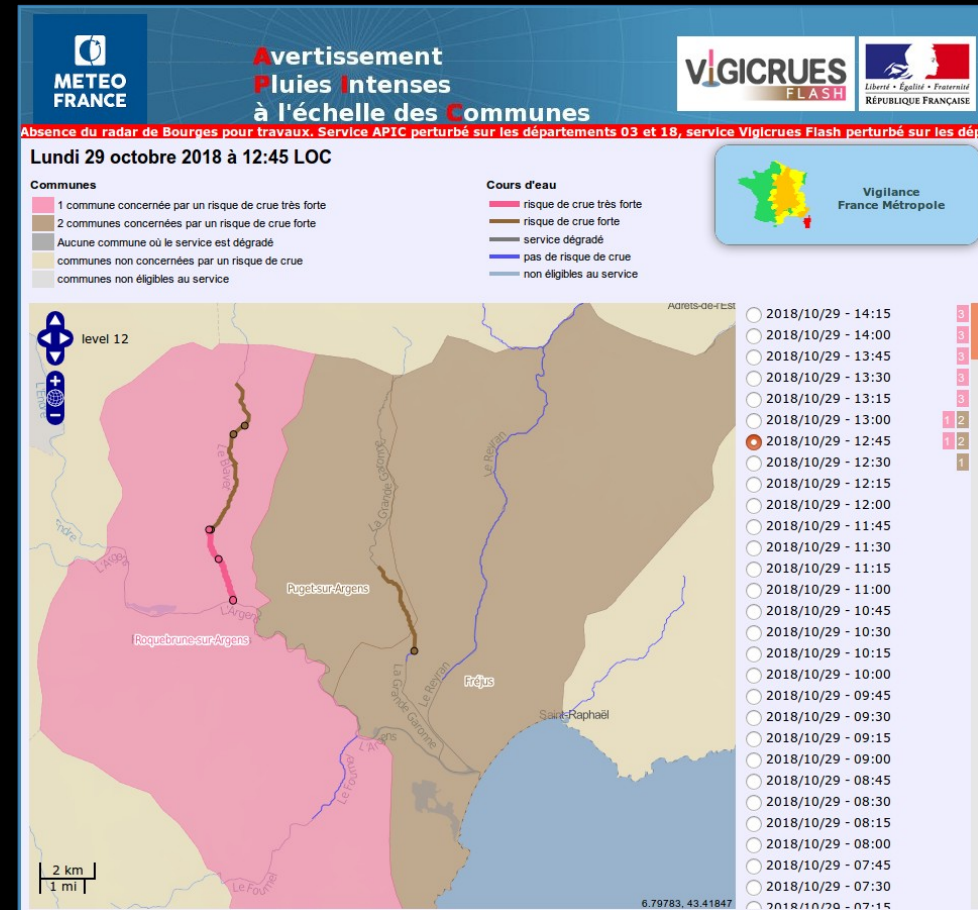
Almost every year, important human and economical losses

Need for efficient warning systems

Launched in 2017

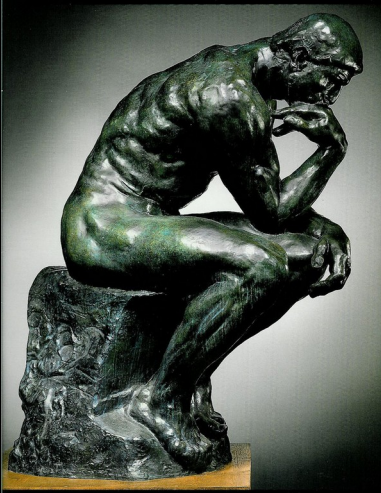


(c)SCHAPI



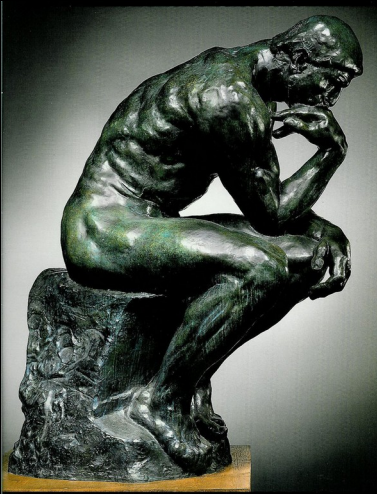
Covers 30,000 km of river network (=>ungauged)
Complements the national monitored network (=>gauged)

Research issues

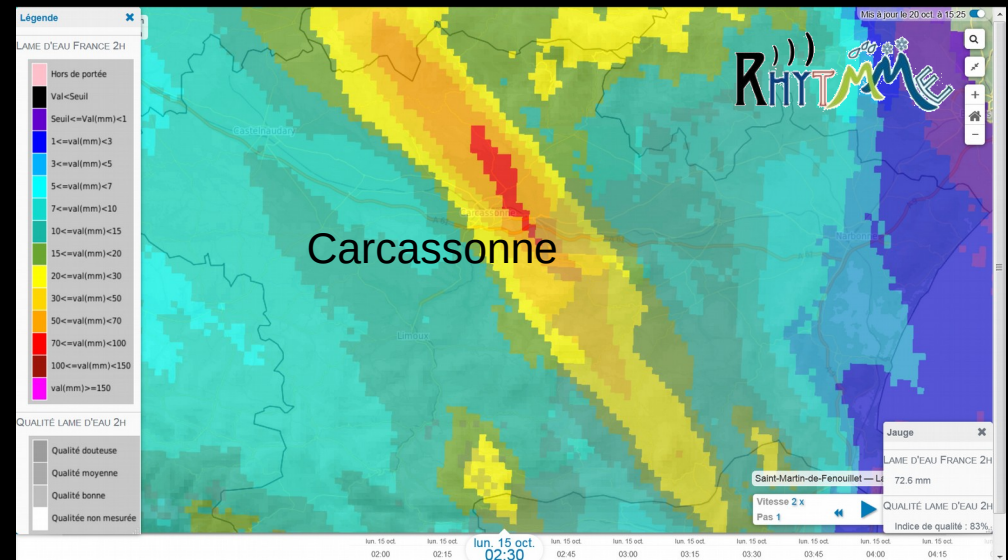


Research issues

How to forecast flash floods anywhere?

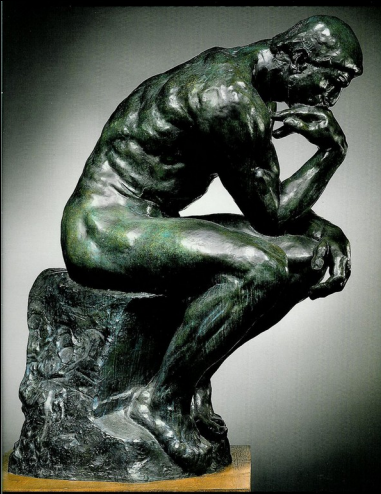


15 oct. 2018 flood near Carcassonne



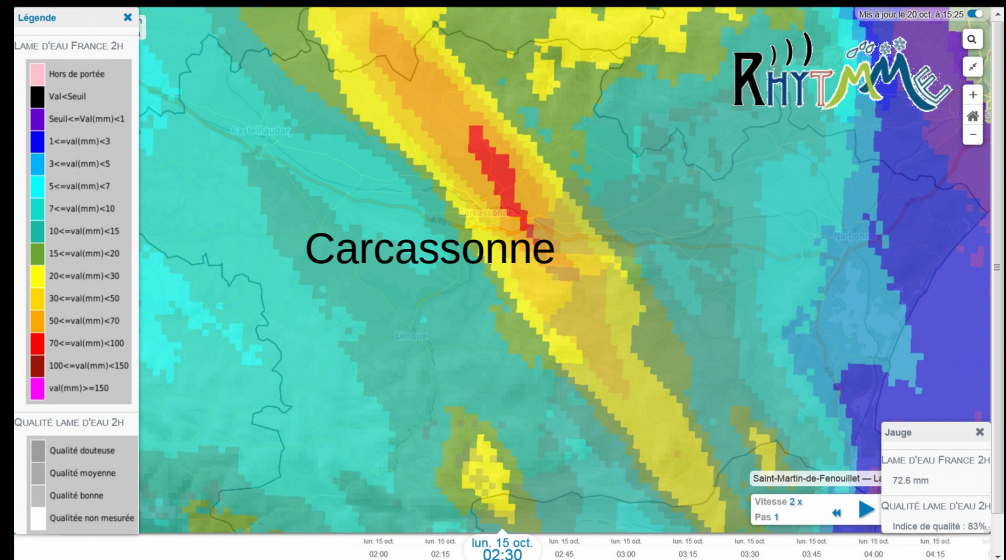
Research issues

How to forecast flash floods anywhere?



How to assess the potential damage?

15 oct. 2018 flood near Carcassonne



franceinfo: vidéos radio jt magazines

politique faits divers société éco/conso monde culture sports santé sciences tech/web animaux météo vrai ou fake LE LIVE

♦ / Météo / Intempéries / Inondations dans l'Aude

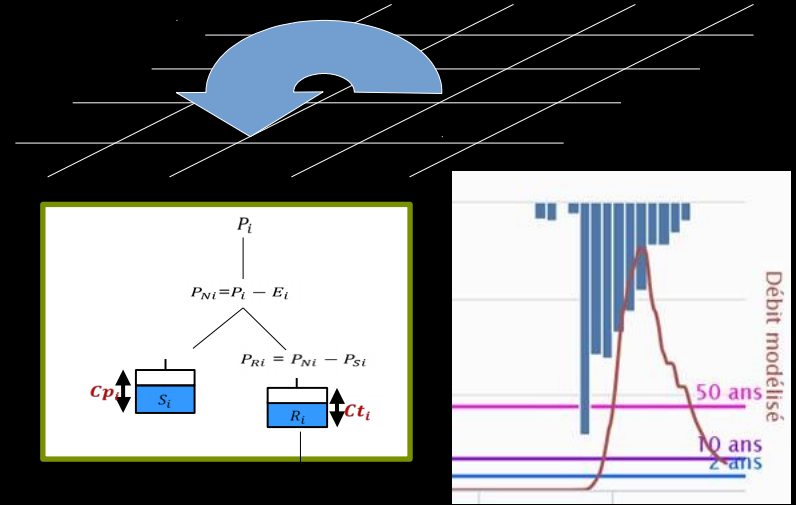
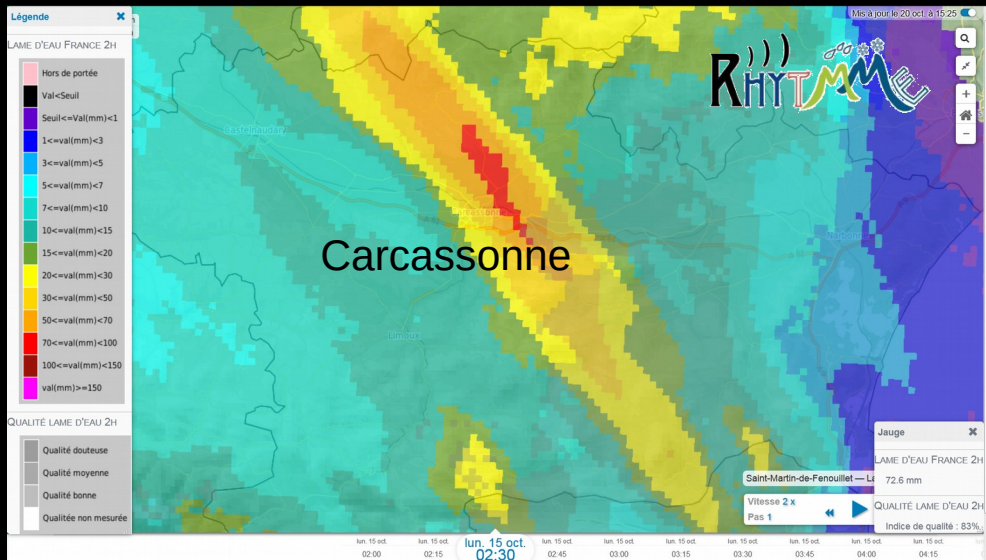
A Villegailhenc, dévastée par les eaux du Trapel, le réveil est difficile

Le village de l'Aude a été ravagé dans la nuit de dimanche à lundi par les pluies et le Trapel, le ruisseau qui dans sa crue a emporté un pont.

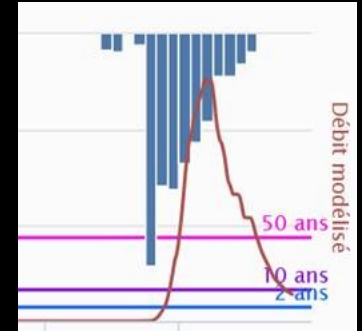
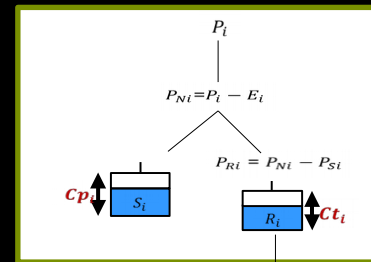
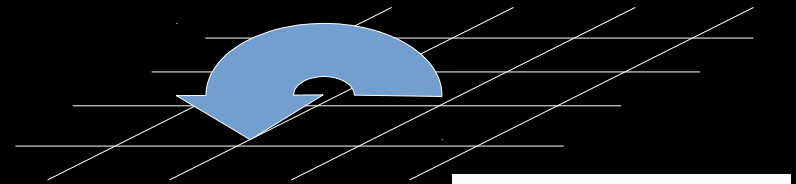
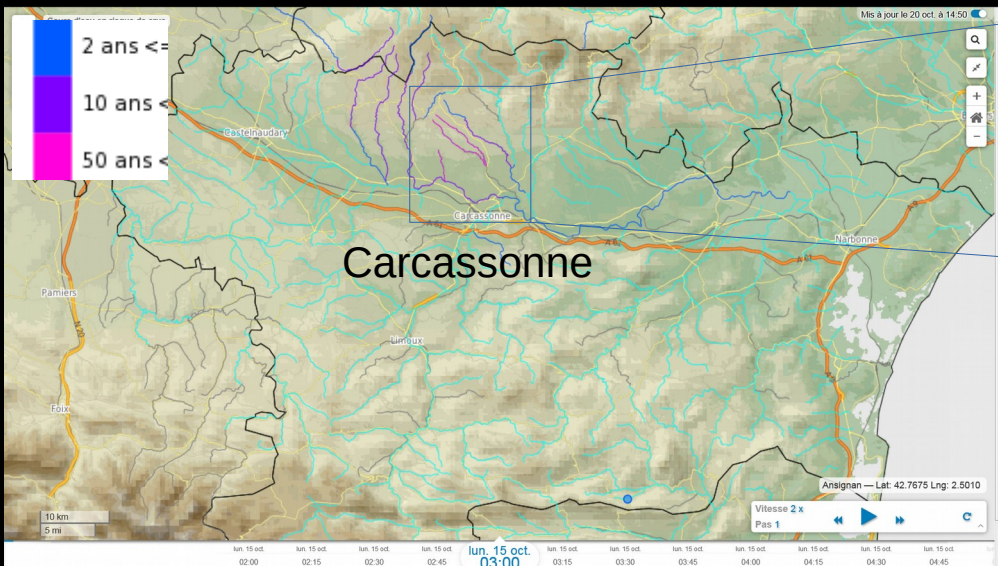
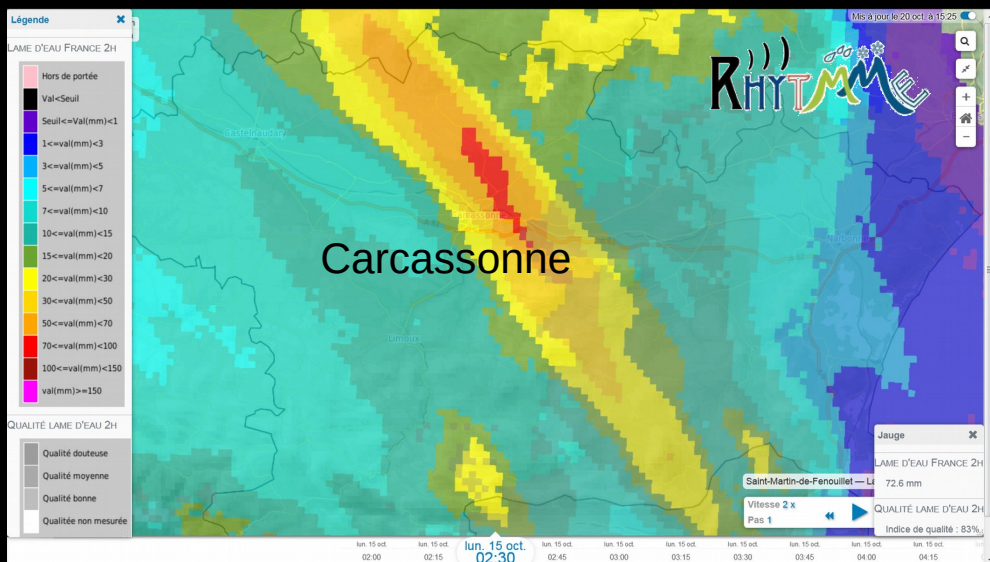
Alain Gastal franceinfo

A Villegailhenc, la nuit de lundi 15 au mardi 16 octobre a été beaucoup plus calme. L'image rassurante, que décrit l'envoyé spécial de franceinfo au petit

The AIGA method

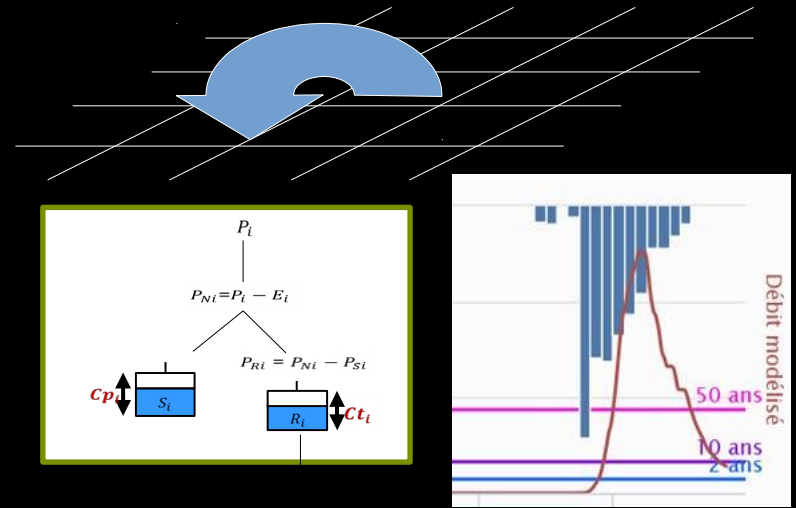
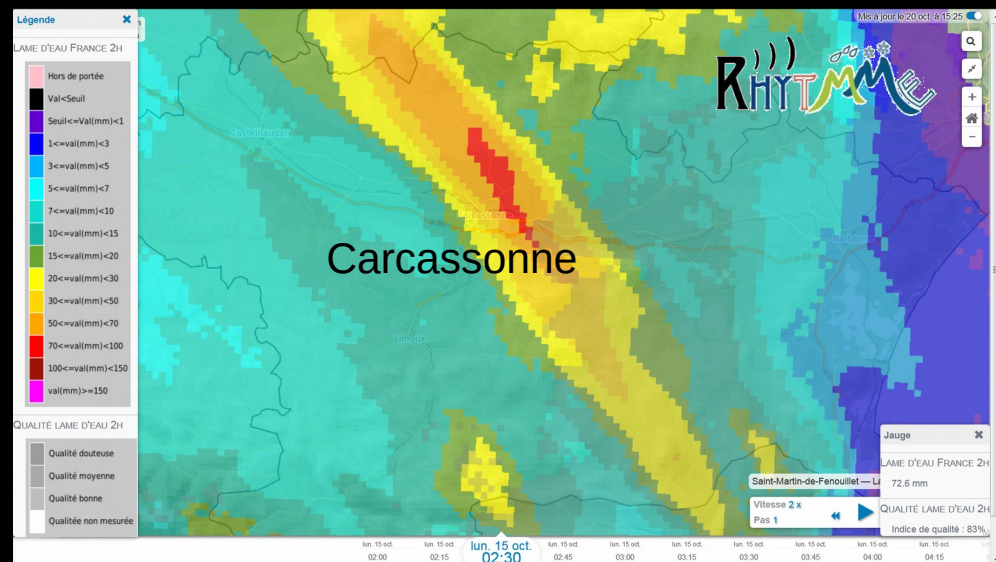


The AIGA method



More details in Session
HS4.1.3/NH1.32 – Flash floods
Tomorrow 3:45pm
by Julie Demargne

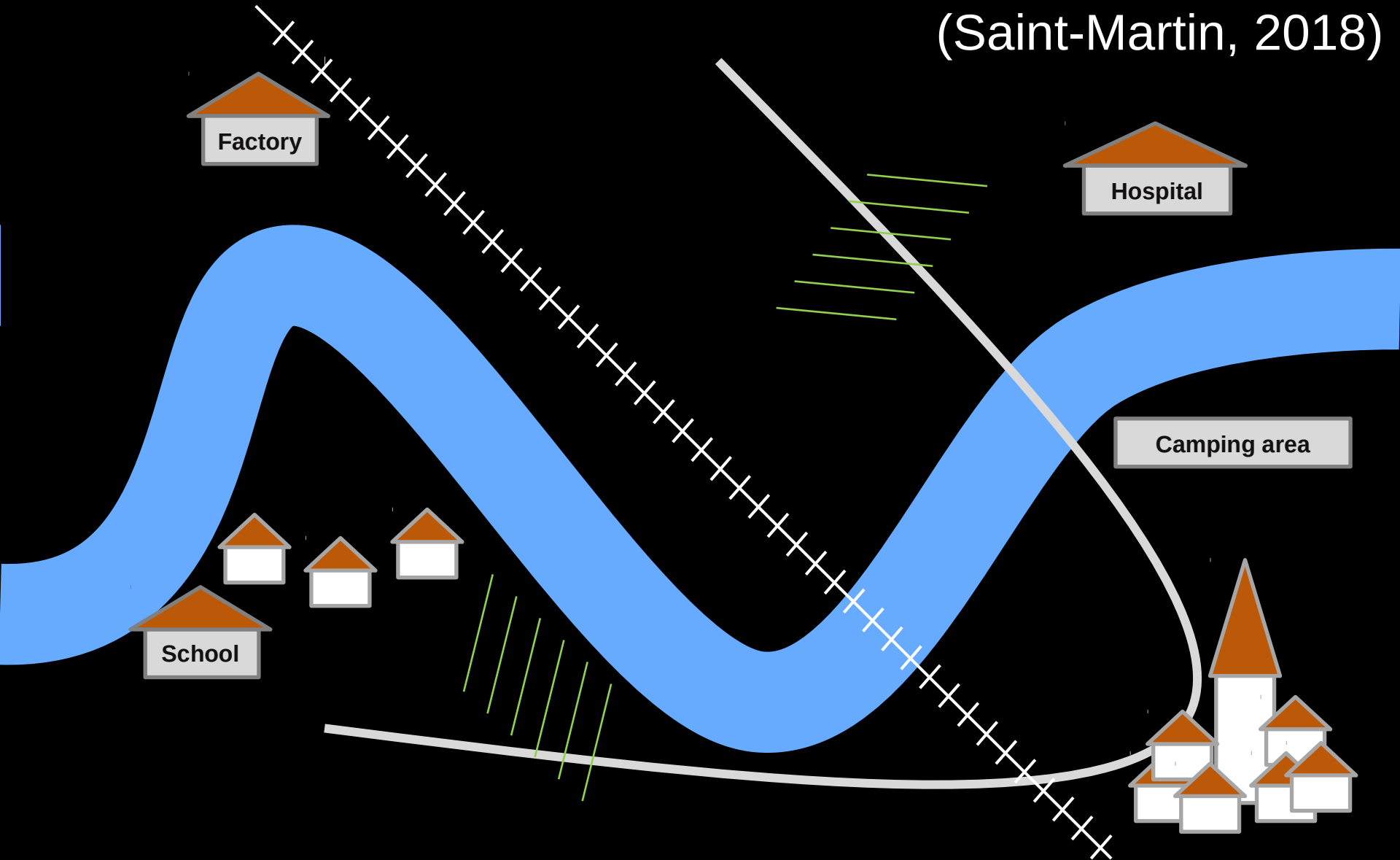
The AIGA method



...but: only hazard,
No impact assessment

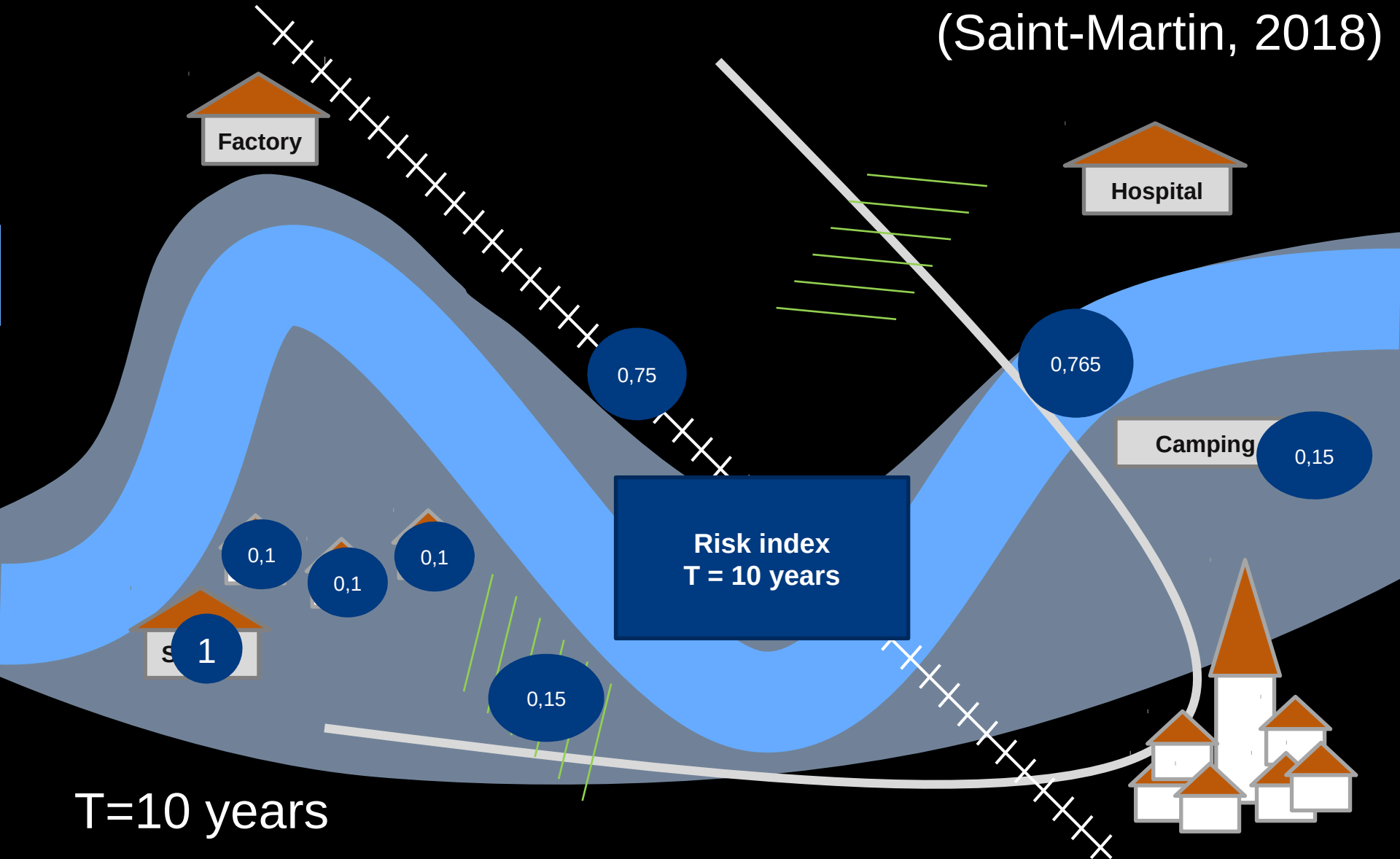
Risk index

(Saint-Martin, 2018)



Risk index

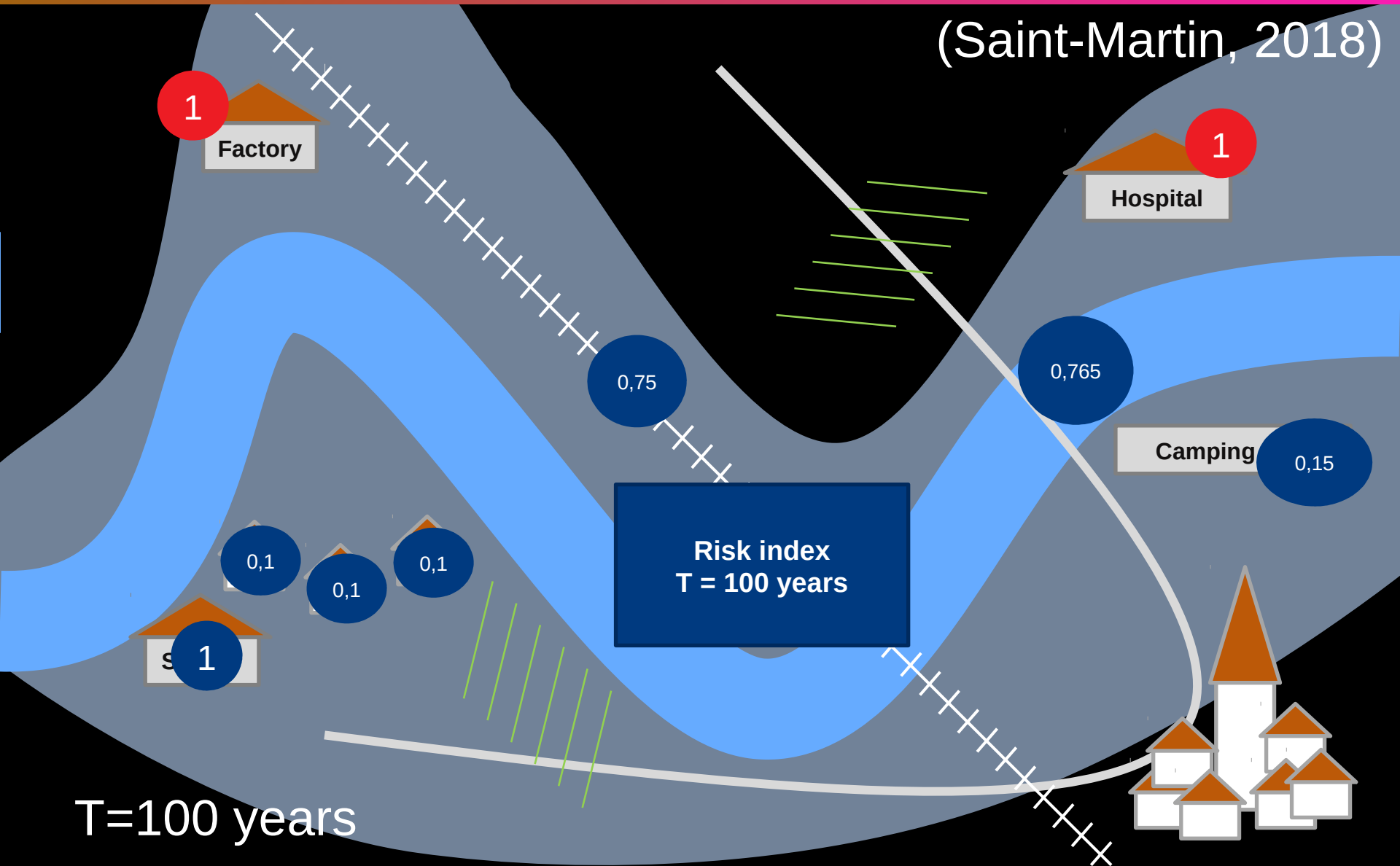
(Saint-Martin, 2018)



Risk index

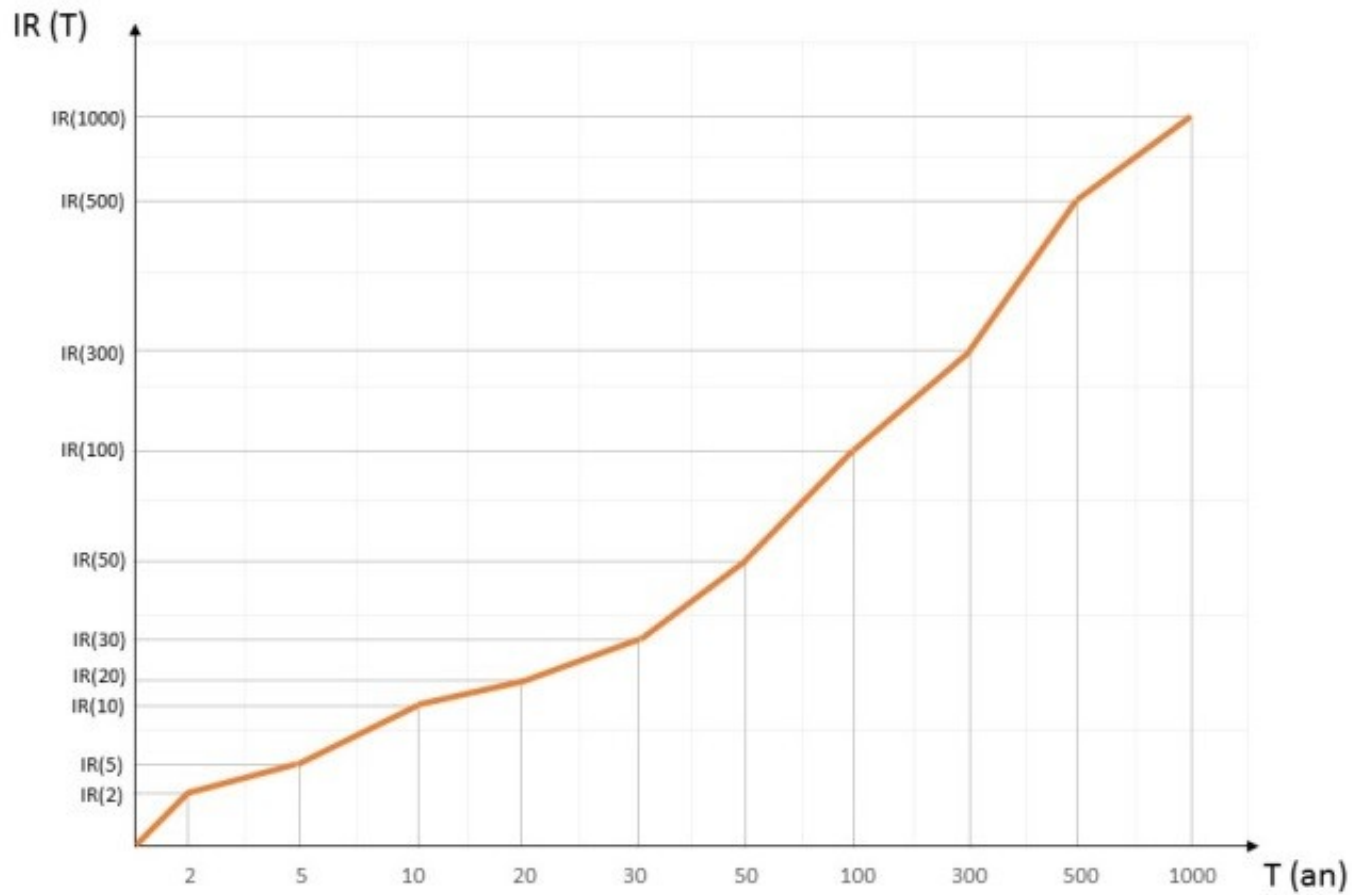
(Saint-Martin, 2018)

T=100 years



Risk index

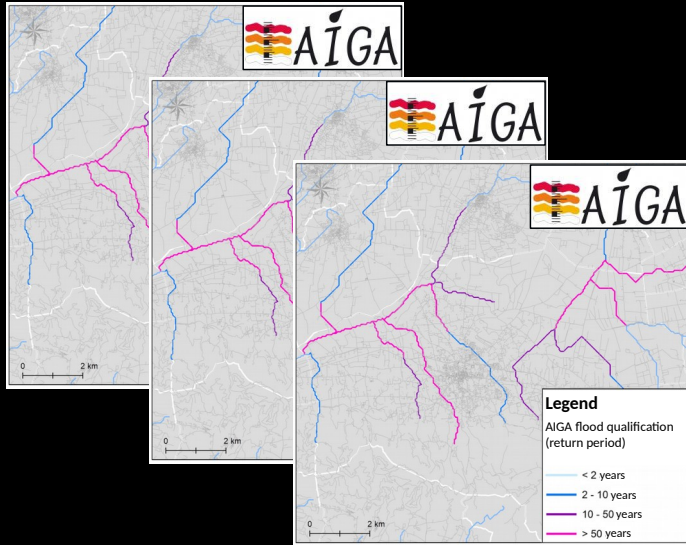
(Saint-Martin, 2018)



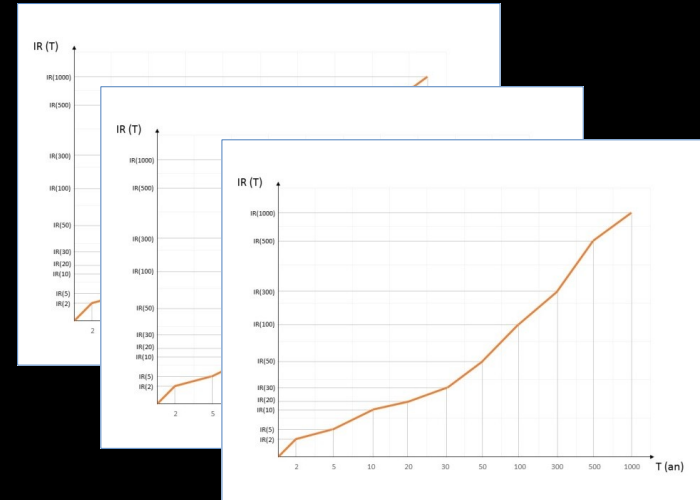
$T=1$

Return period (year)

How to « validate » ?

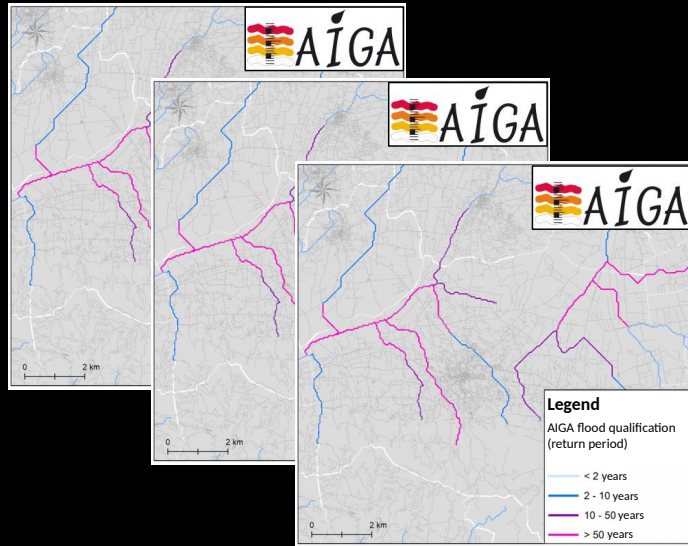


Hazard maps in real time

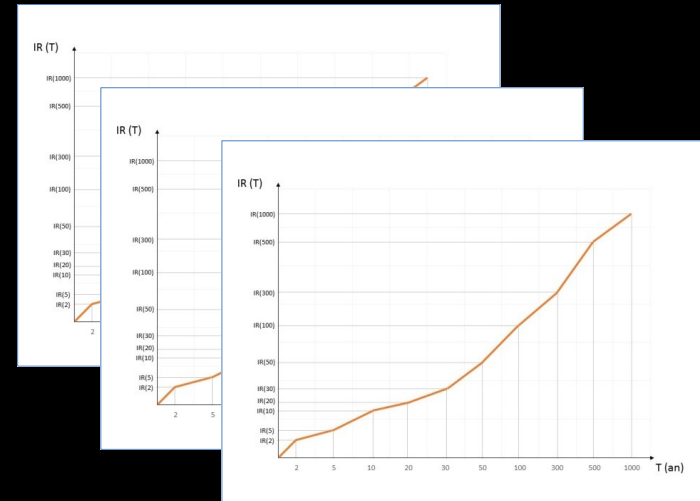


Risk index curve for each river reach

How to « validate » ?



Hazard maps in real time



Risk index curve for each river reach



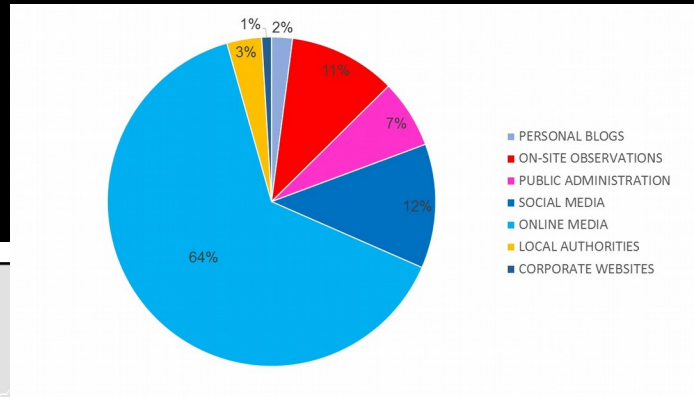
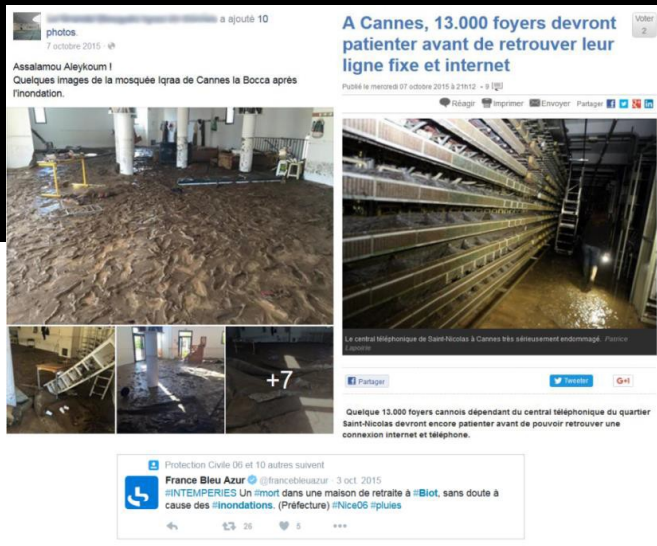
Comparison with
observed damage



DamaGIS database

DamaGIS Database

Saint-Martin, C. et al (2018). DamaGIS: a multisource geodatabase for collection of flood-related damage data. *Earth Syst. Sci. Data*, 2018, 1-18. doi:10.5194/essd-2018-28

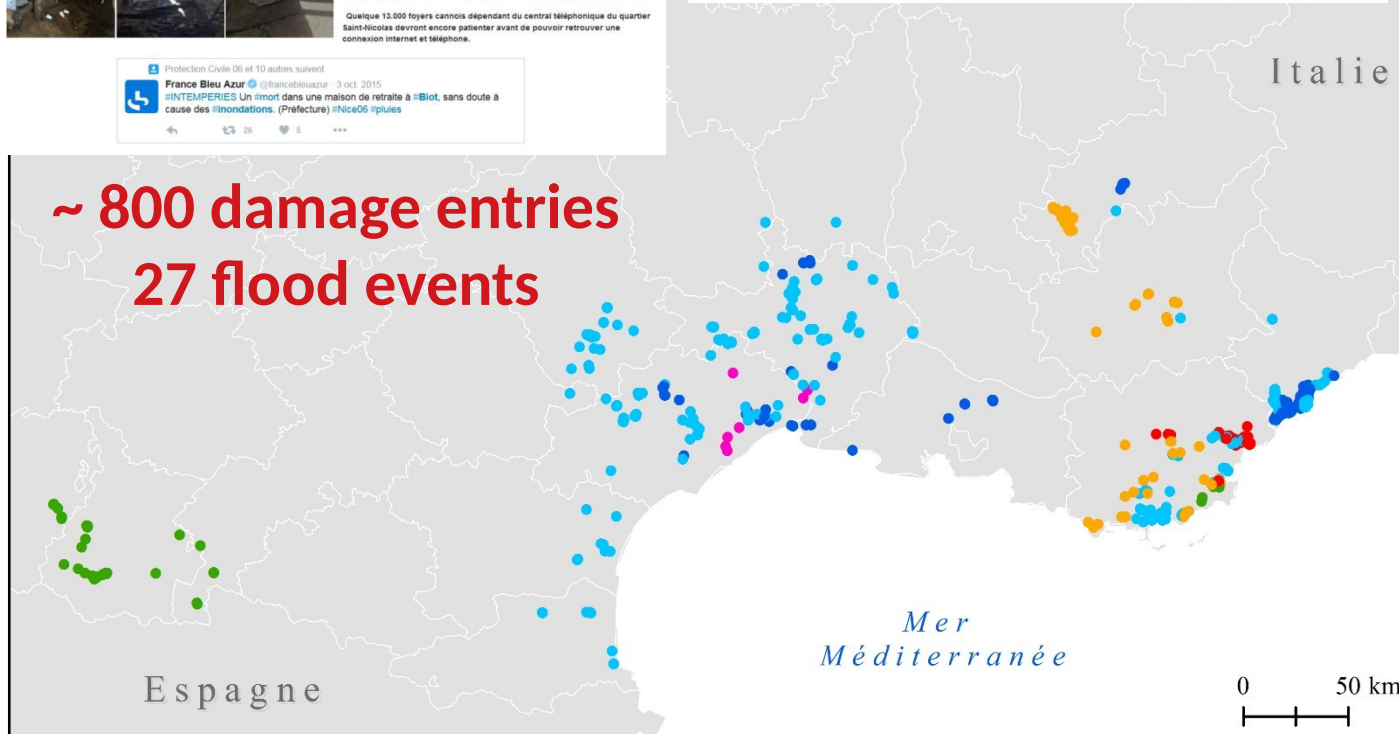


Dommage par année

- 2011
- 2012
- 2013
- 2014
- 2015
- 2016

Limite de département

~ 800 damage entries
27 flood events

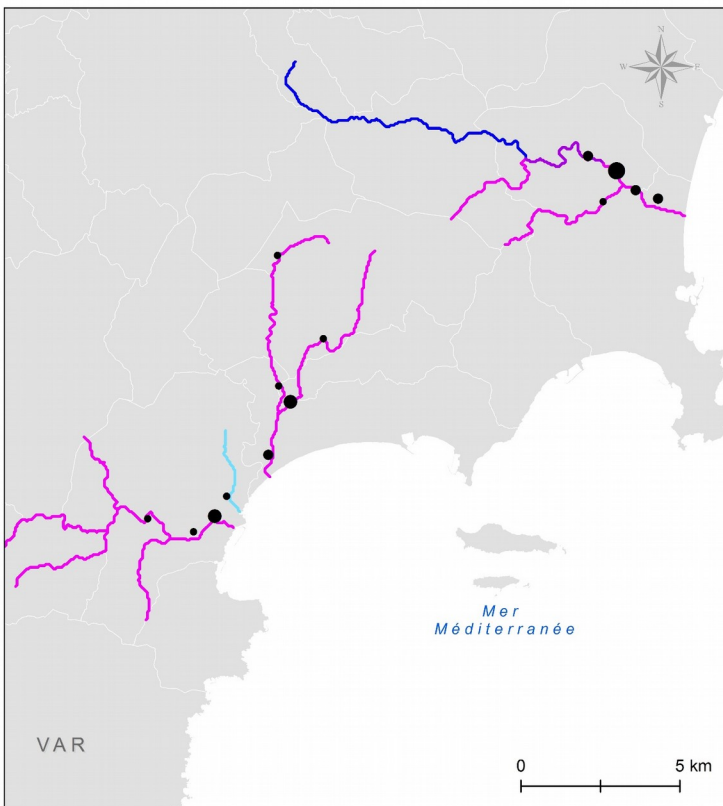


Sources : DamaGIS (2017), IGN (2016)
Conception : C. Saint-Martin (2018)

Results

DamaGIS Event #23

Hazard



Evènement du 3 octobre 2015

Période de retour estimée de la crue (en années)

- <2 ans
- 2 < T < 10 ans
- 10 < T < 50 ans
- > 50 ans

Nombre de dommages (DamaGIS)

- 1
 - > 5
 - >10
- Limite de commune

Conception : C. Saint-Martin (2016)
Sources : BNBV (2017), IGN (2016)

Results

Hazard

Risk index

Evènement du
3 octobre 2015

Risque de dommages

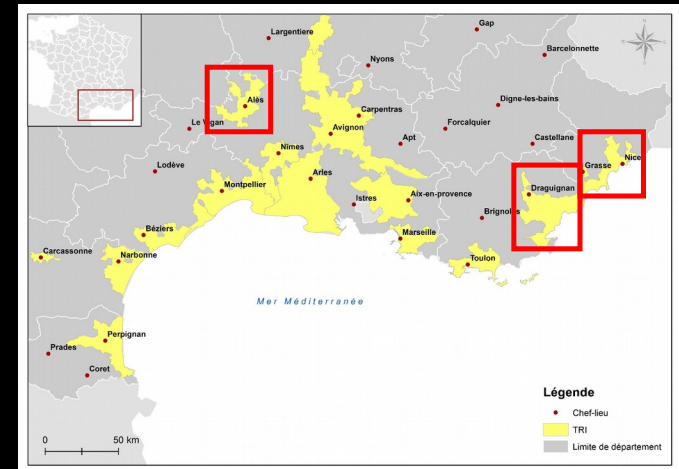
- Faible
- Modéré
- Fort
- Très fort

Nombre de dommages (DamaGIS)

- 1
- > 5
- >10

Limite de commune

Contingencies (9 events, 3 study area)



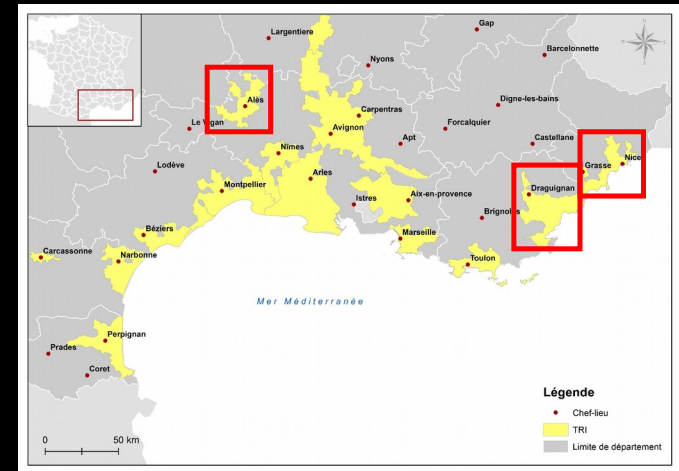
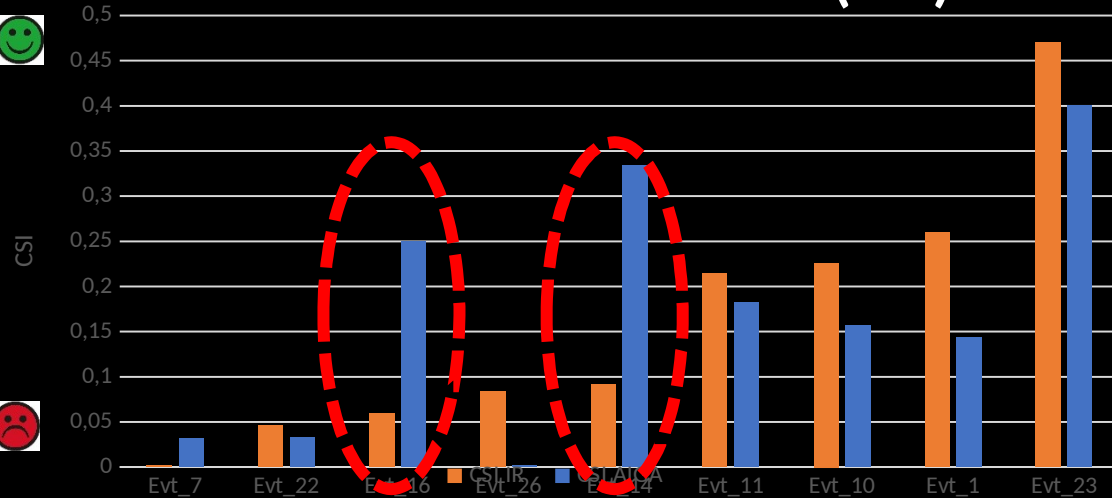
	Damaging flood event	No damaging flood event
Warning	HIT	FALSE ALARM
No warning	MISS	CORRECT NEGATIVE

By river reach

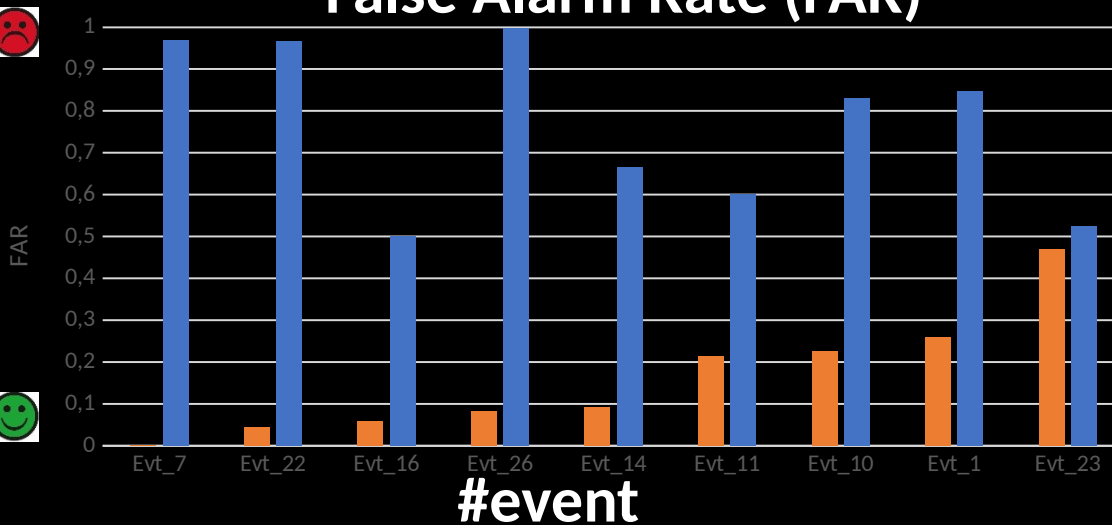
Contingencies (9 events, 3 study area)

 Hazard  Risk index

Critical Success Index(CSI)



False Alarm Rate (FAR)



	Damaging flood event	No damaging flood event
Warning	HIT	FALSE ALARM
No warning	MISS	CORRECT NEGATIVE

By river reach

To summarize



FF warnings based on hazard are not sufficient



We defined a simple risk index to characterize potential FF impacts



Results showed a better consistency with observed damage



<http://pics.ifsttar.fr>

Thank you for your attention