

Testing conventional and unconventional data sources for the validation of a real-time flash flood impact model

Josias Ritter, Marc Berenguer, Carles Corral, Shinju Park and Daniel Sempere-Torres

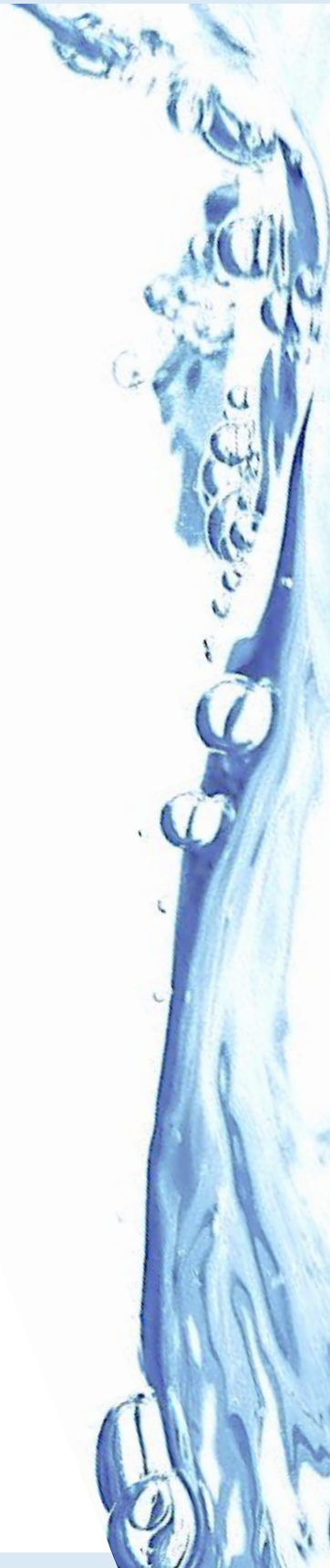
Center of Applied Research in Hydrometeorology (CRAHI)

Universitat Politècnica de Catalunya



Centre de Recerca Aplicada en Hidrometeorologia
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- Improve decision support during flash floods
 - *From hazards towards impacts*
- Our method ReAFFIRM quantitatively assesses flash flood impacts in real time and at regional scale
- Impact observations are often scattered, qualitative or incomplete
 - *Validation of impact models is not straightforward*
 - *Validation at regional scale?*
- Autumn 2018: a series of flash floods occurred in Catalonia (NE Spain)

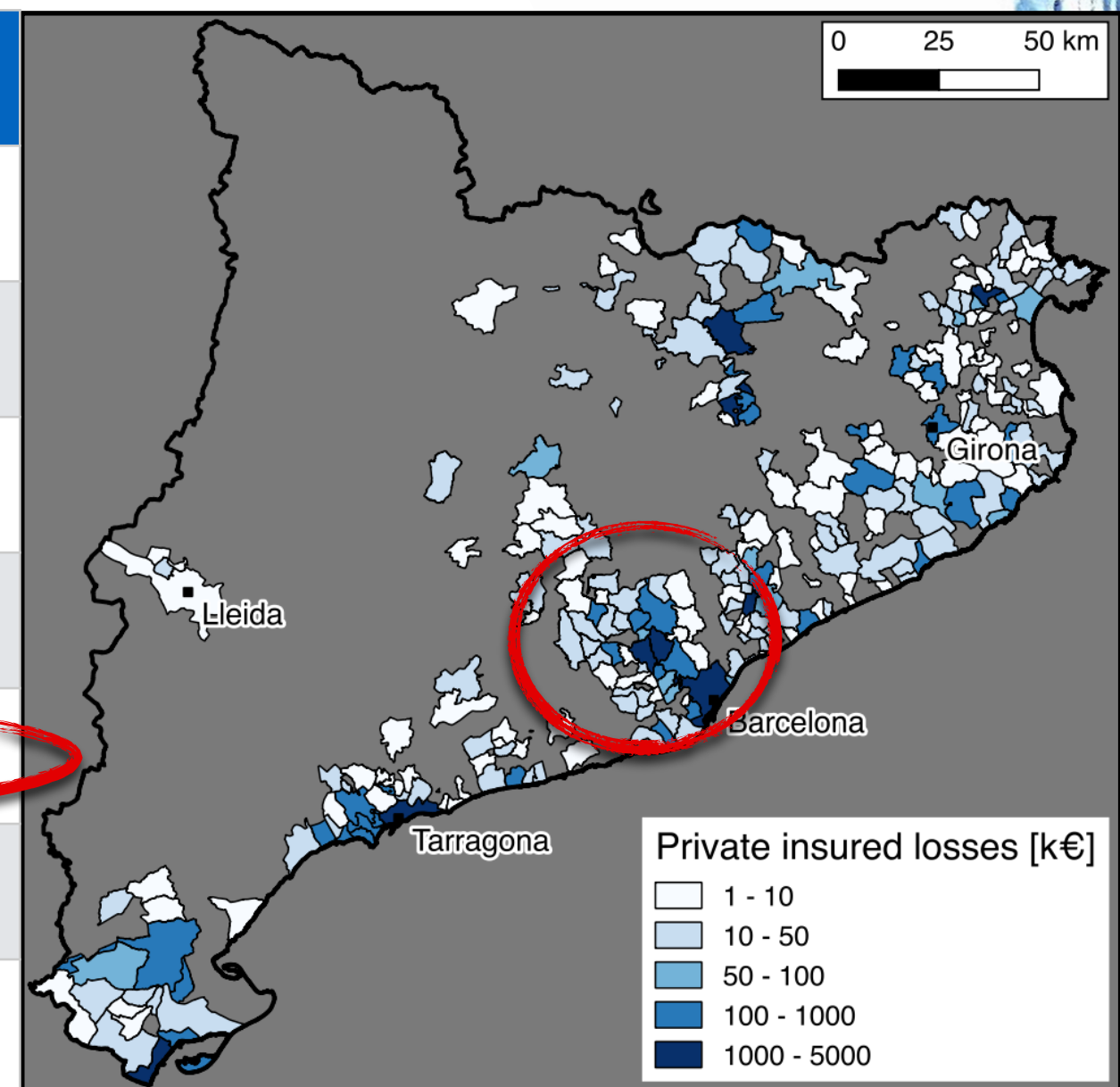


Catalonia - Flood events in autumn 2018



- Six heavy rainfall events (September - November 2018)
- Overall insured losses of 33.5 million €

Dates	Insured losses [M€]	Affected area
05.09. - 07.09.	6.1	Barcelona area
09.10. - 10.10.	3.9	Tarragona area, Barcelona
14.10. - 15.10.	8.6	SW Pyrenees
18.10. - 19.10.	2.5	Lower Ebro basins
15.11. - 16.11.	8.9	Lower Llobregat basins
17.11. - 18.11.	3.4	Alt Emporda, Daro basin
TOTAL	33.5	

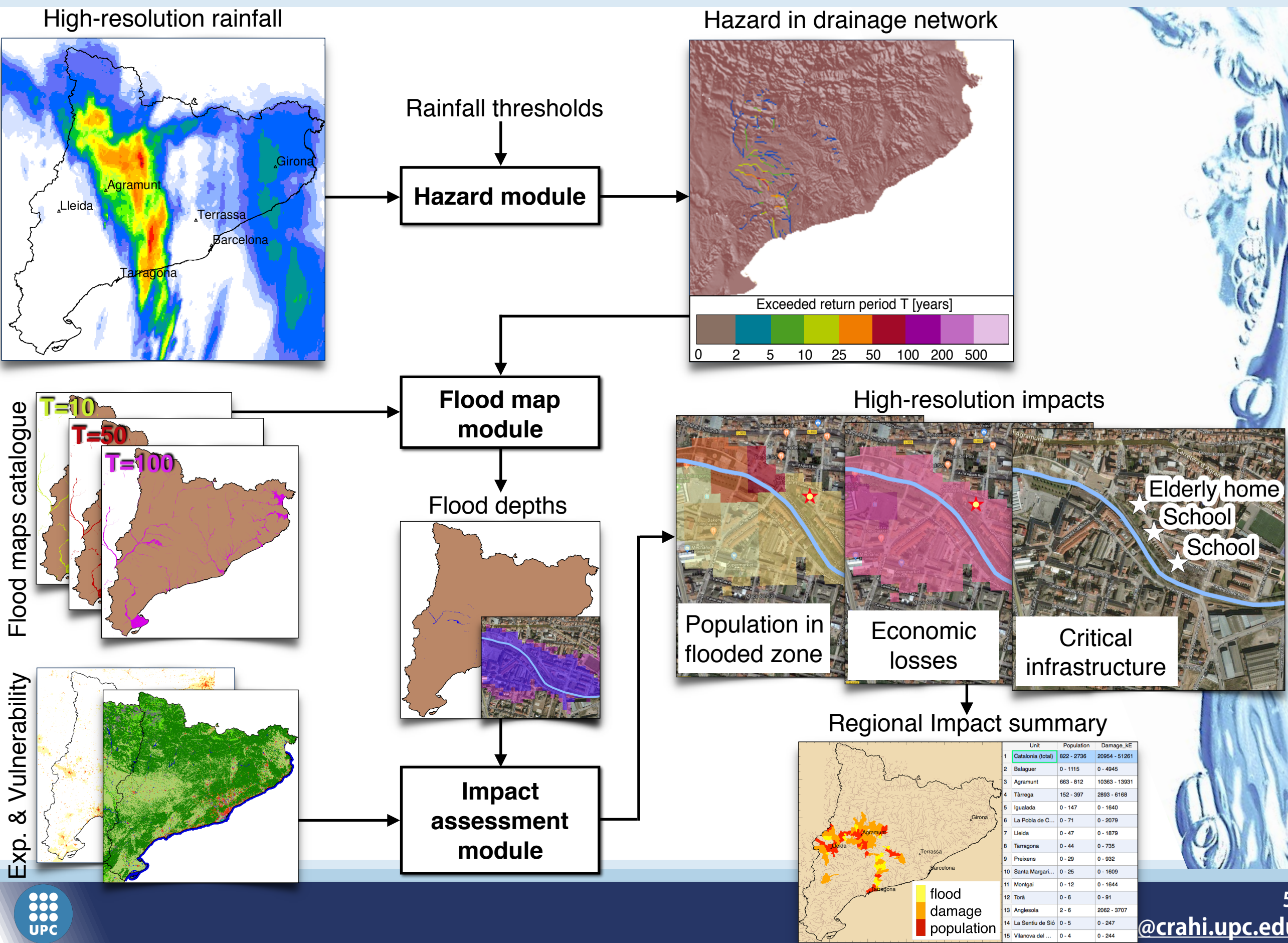


ReAFFIRM*

Real-time Assessment of Flash Flood Impacts
*- a **Regional high-resolution Method***

* J. Ritter, M. Berenguer, C. Corral, S. Park, D. Sempere-Torres (2019):
ReAFFIRM: Real-time Assessment of Flash Flood Impacts - a Regional high-resolution Method
Environmental International (in preparation)

ReAFFIRM - General concept

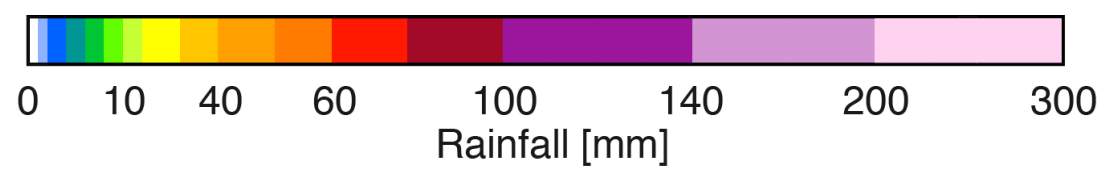
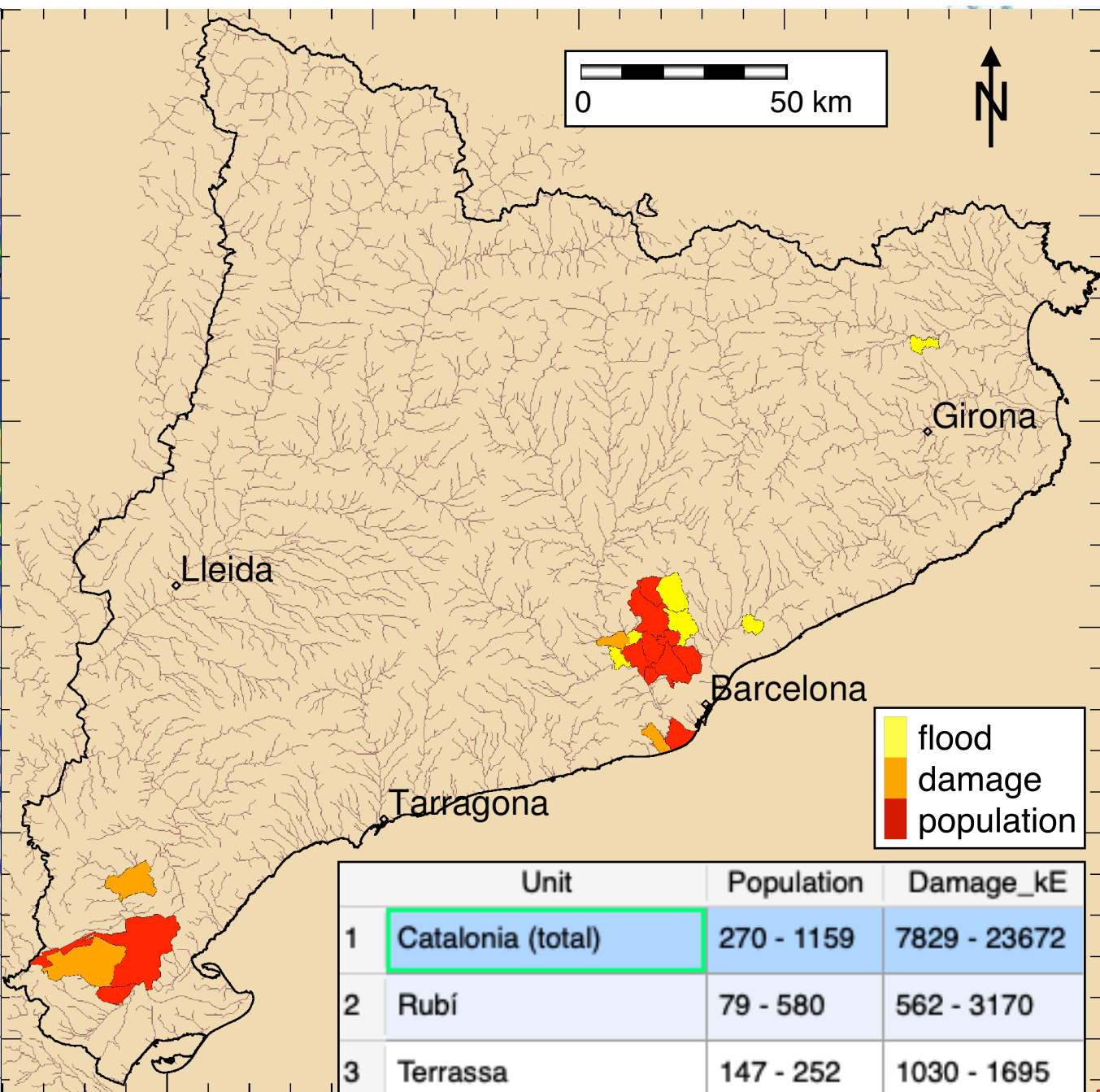
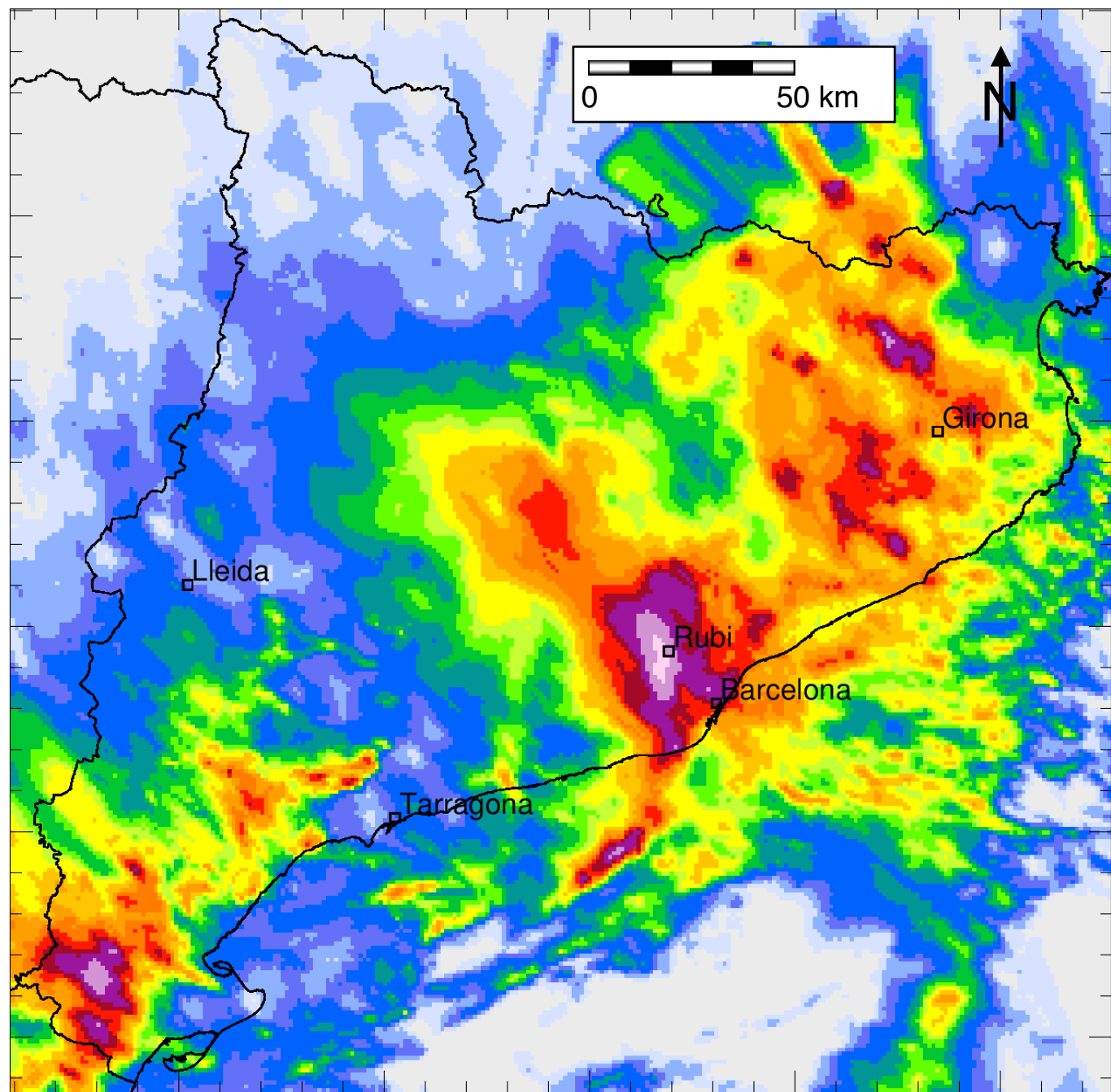


ReAFFIRM: 15 - 16 Nov. 2018



Obs. rainfall - 15/11/2018 - 16/11/2018

Simulated impact 15/11/2018 - 16/11/2018

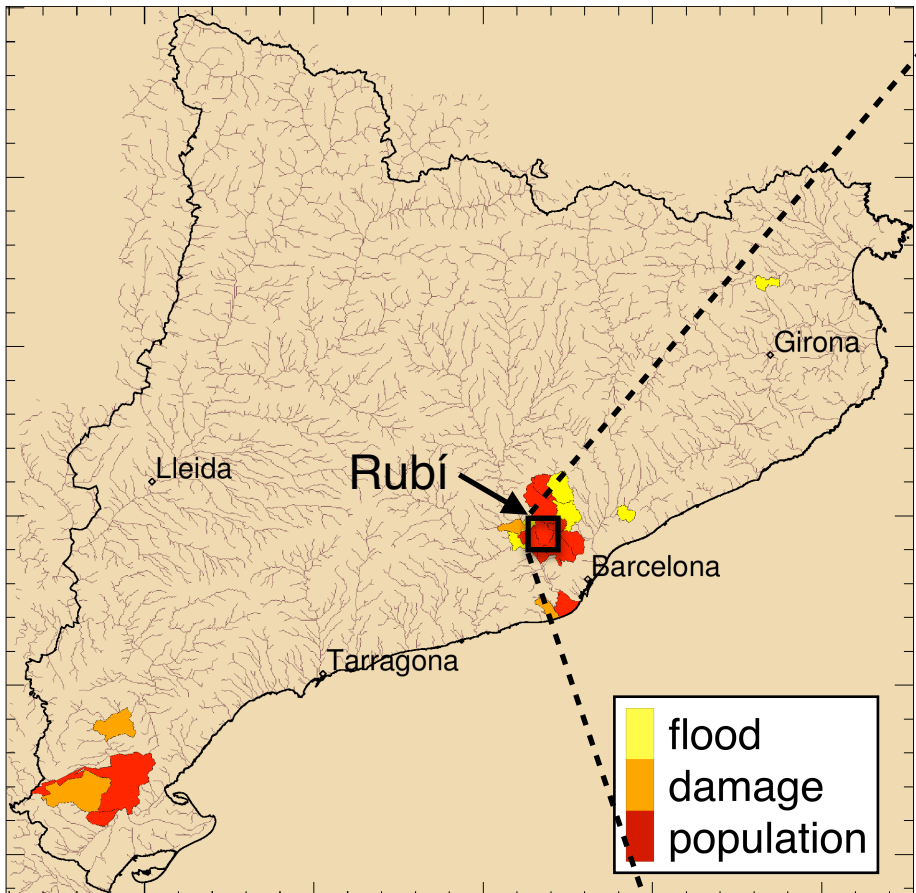


flood
damage
population

	Unit	Population	Damage_kE
1	Catalonia (total)	270 - 1159	7829 - 23672
2	Rubí	79 - 580	562 - 3170
3	Terrassa	147 - 252	1030 - 1695
4	Sant Cugat del Vallès	6 - 115	314 - 2323
5	El Prat de Llobregat	0 - 73	0 - 4303
6	Cerdanyola del Vallès	0 - 56	0 - 518
7	Sant Quirze del Vallès	6 - 40	314 - 714
8	Castellbisbal	14 - 21	2142 - 3349

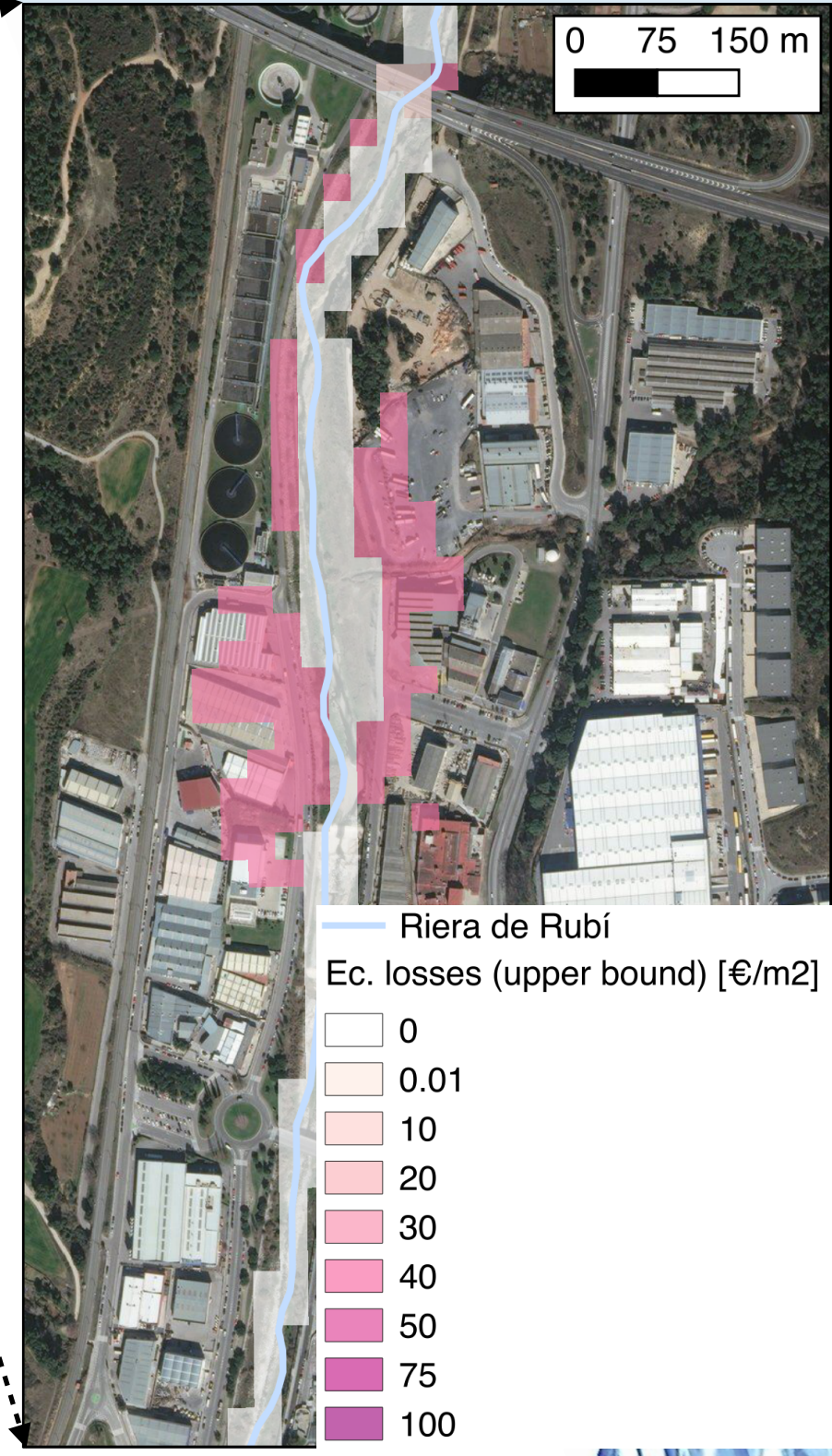
In total 21 municipalities

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In total 21 municipalities





- Raingauges
- Streamgauges
- Newspaper articles
- Scattered social media postings
- ...

- Insurance claims
(Spanish re-insurance)
- 112 emergency calls
(Catalan Civil Protection)
- Crowdsourcing from Twitter
(globalfloodwatch.com)

→ *Essential for local validation*

→ *Scattered information.*

Validation at regional scale???

→ *Systematic information*

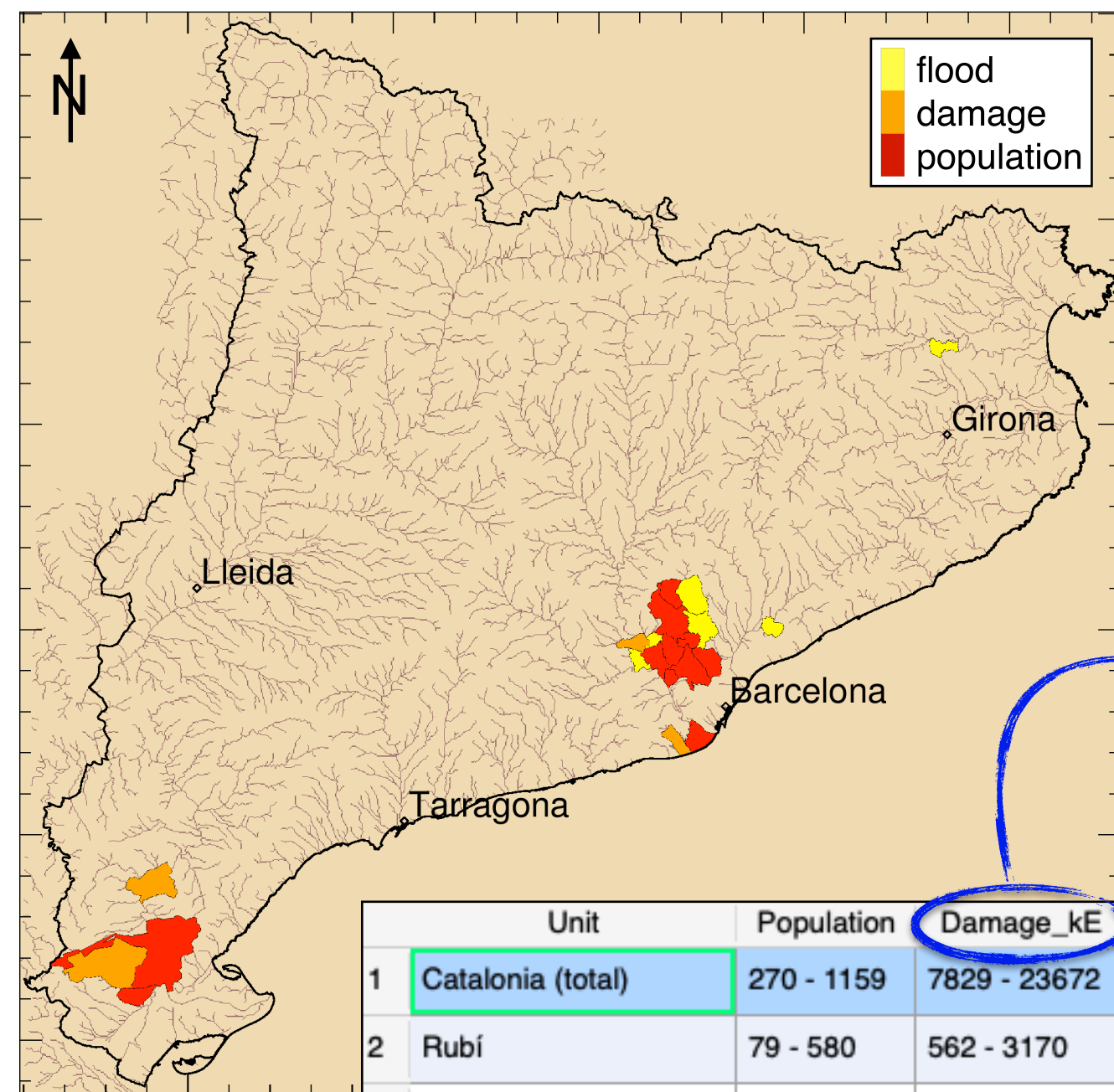
→ *Can contain significant biases
(e.g. no distinction of flood types)*

Complementary

Validation results - Economic Losses

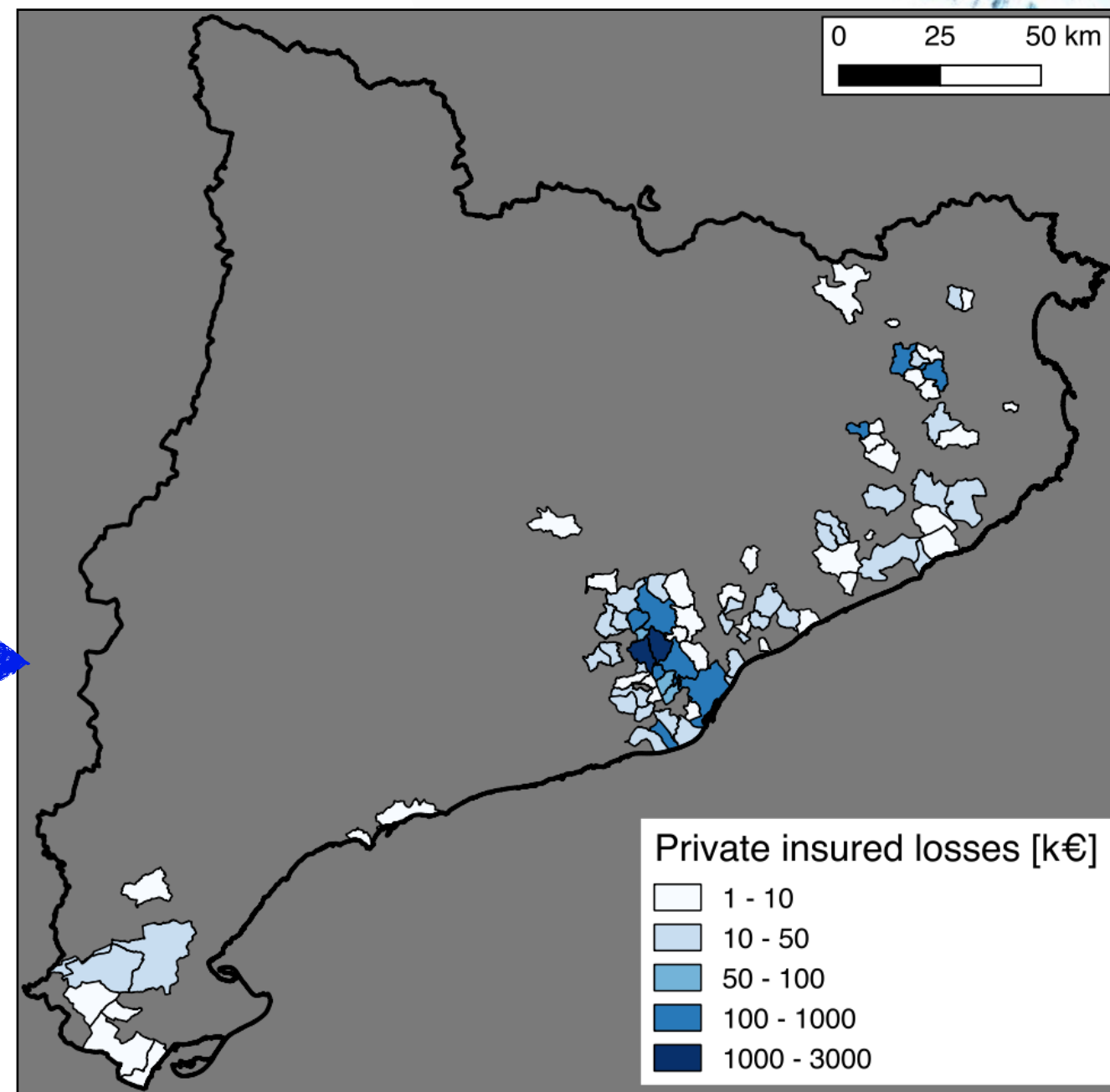


Simulated impact 15/11/2018 - 16/11/2018



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Validation results - Economic Losses



Replying to @tv3noticias

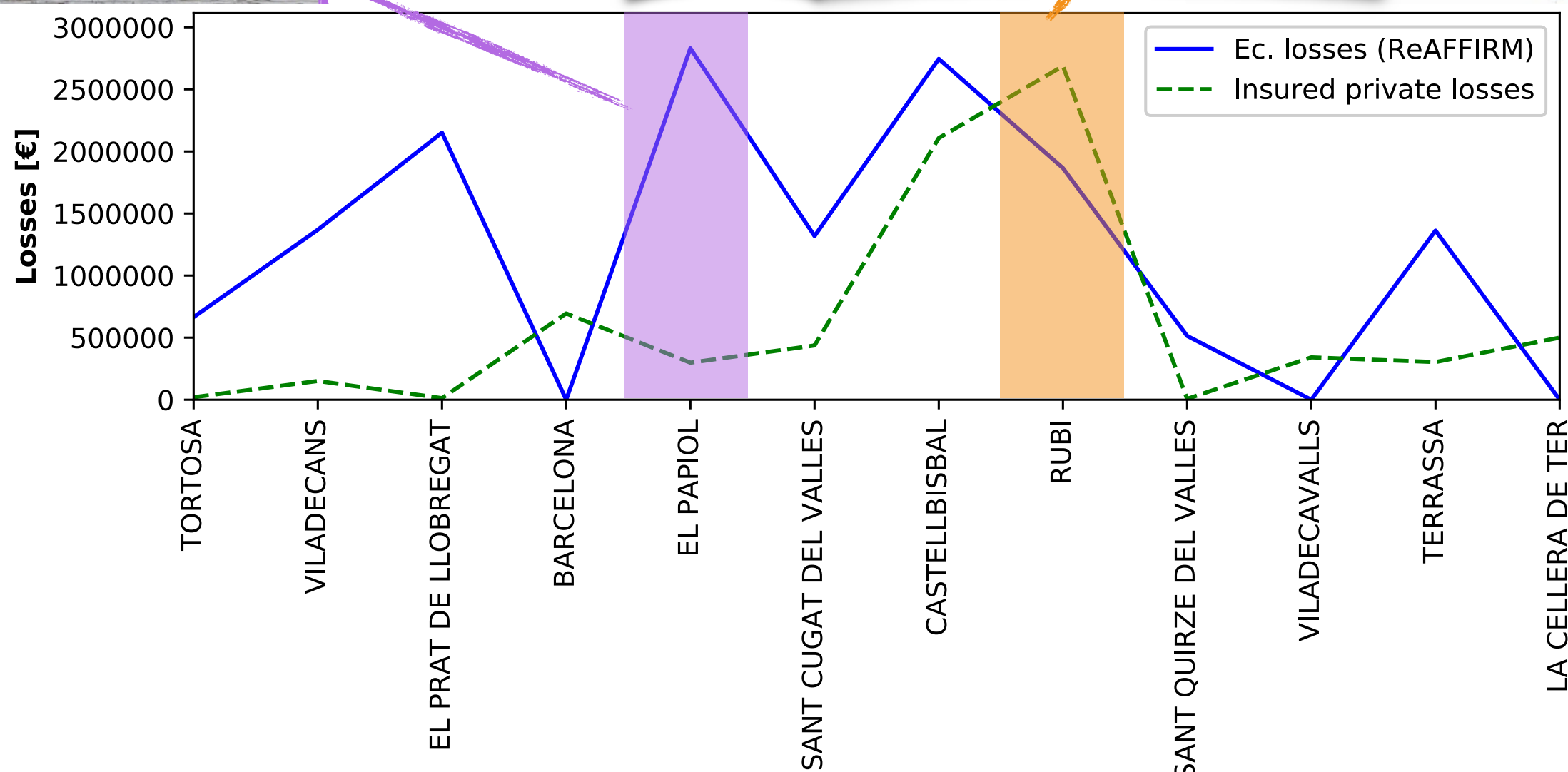
Entrada del Papiol



Overestimation
of losses??



Underestimation
of flood extent

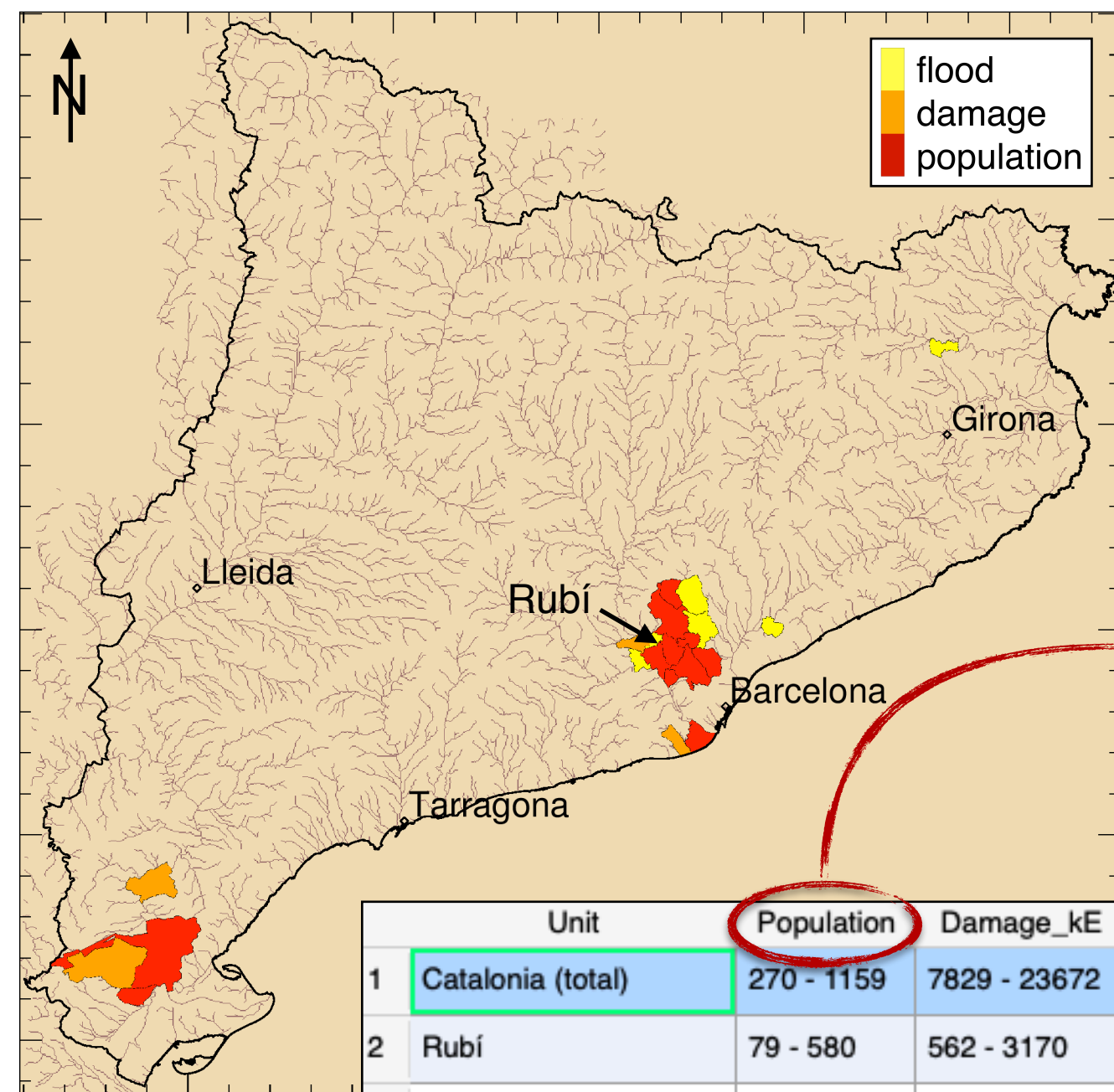


Municipalities with insured or simulated losses greater than 300000 € (S -> N)

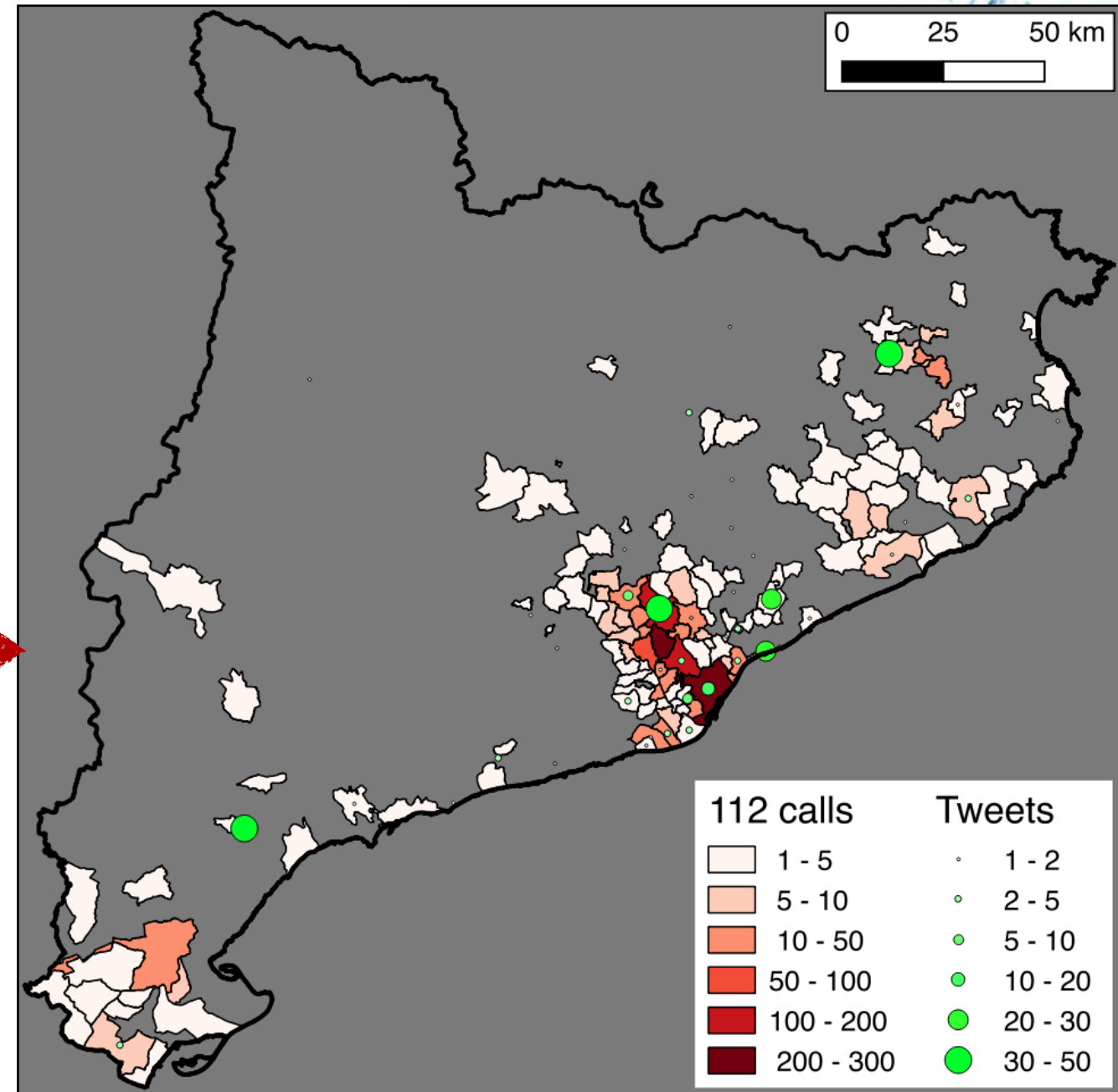
Validation results - Affected Population



Simulated impact 15/11/2018 - 16/11/2018



In total 21 municipalities

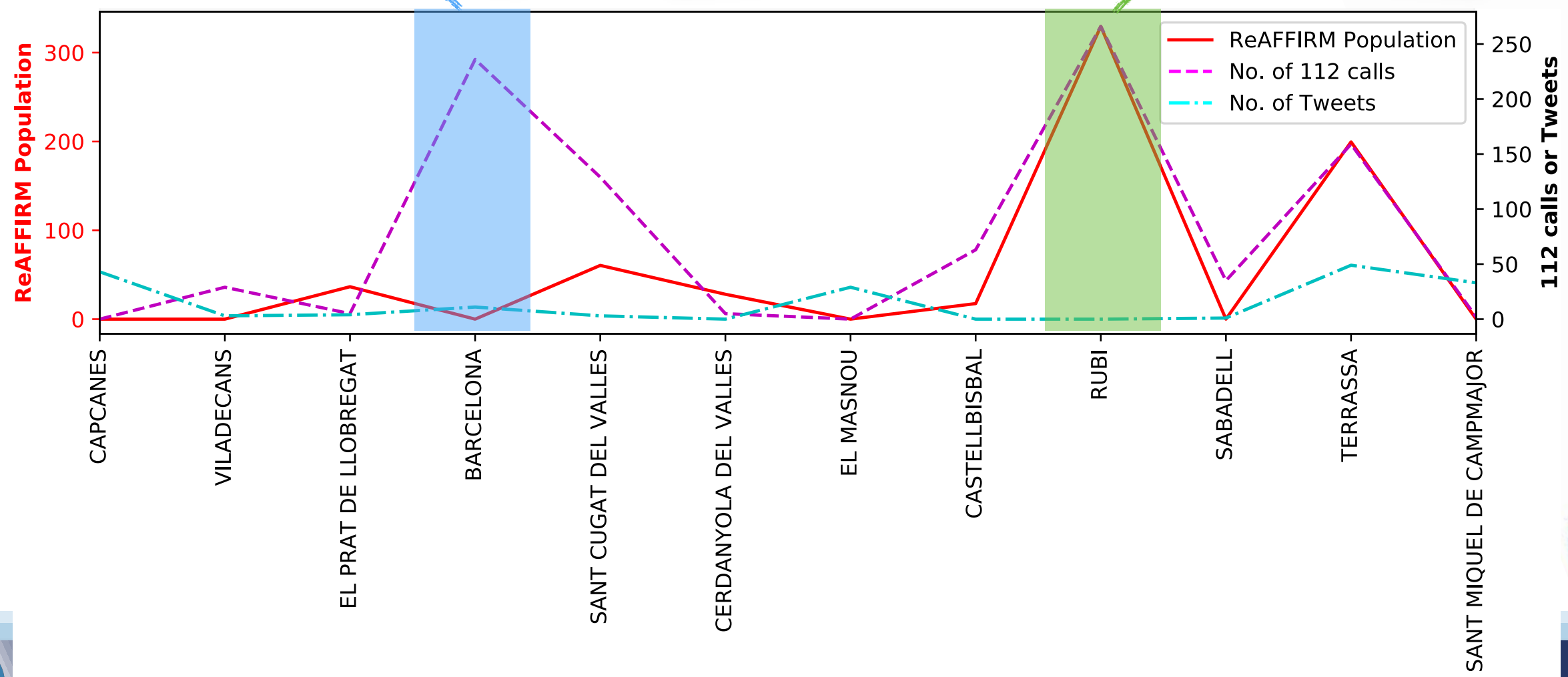




Pluvial flooding



Confirmed overflow



Municipalities with 112 calls, Tweets or ReAFFIRM Population greater than 25 (S -> N)

- ReAFFIRM identified the high-impact areas in most of the studied events of autumn 2018 in Catalonia
- Scattered validation sources alone are not sufficient for region-wide validation of impacts
 - *Systematic validation sources can add useful information*
 - *However they contain biases*
- Impact validation remains (so far) mostly qualitative



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Thank you for you attention! Questions?

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