Notre information est-elle bien correcte?

Défis et opportunités des données spatiales dans un contexte de crise

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SEMINAR 10 DECEMBER 2020

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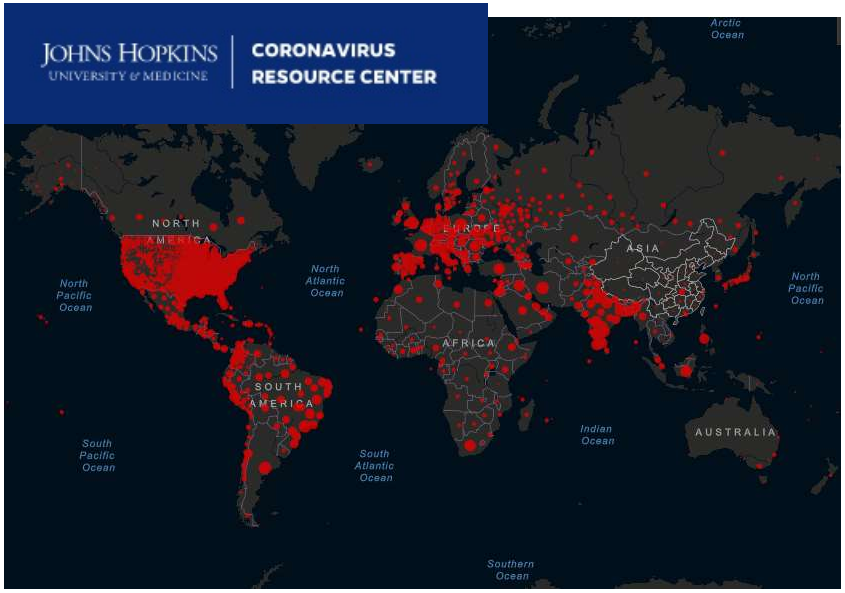
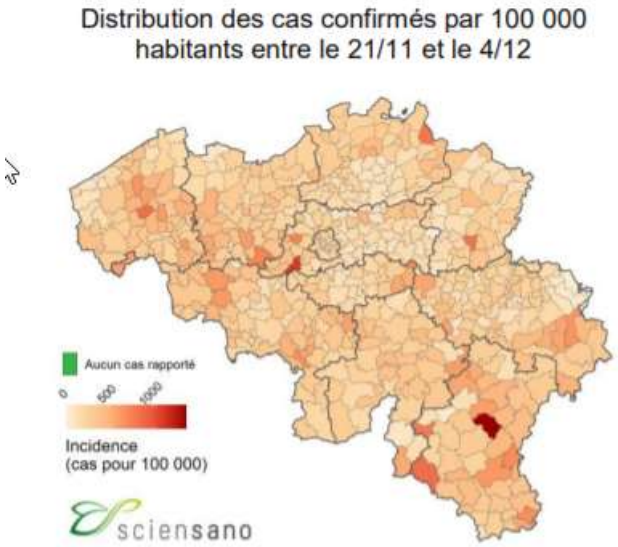
GEOGRAPHICAL INFORMATION SYSTEMS



Mapping for communication

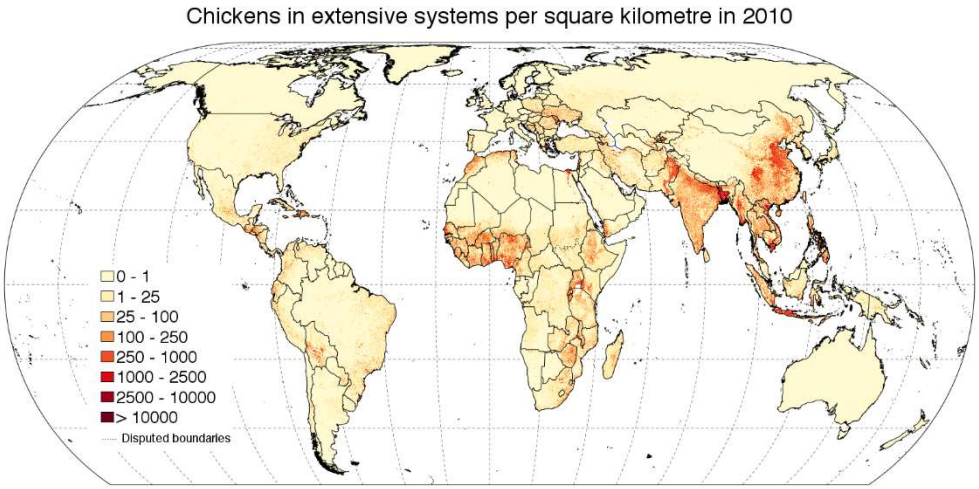


Mapping* for management

*: and associated spatial data

Maps are everywhere…

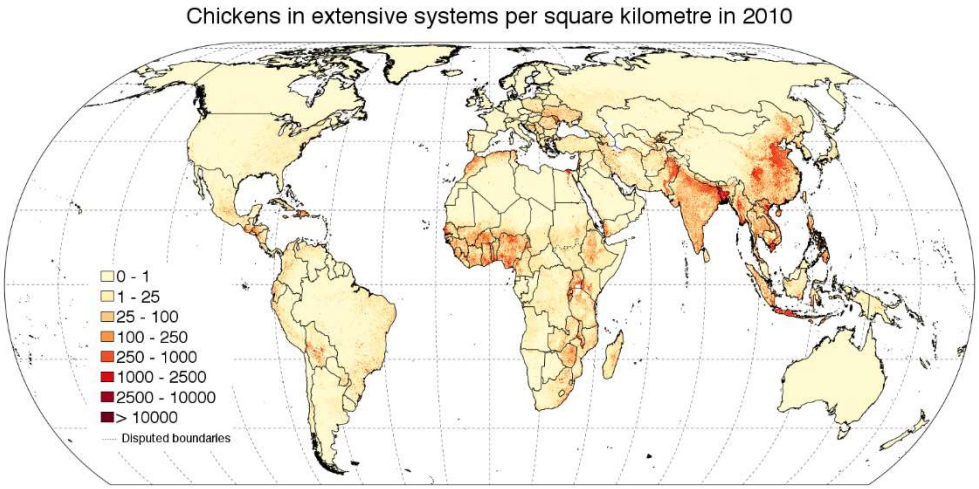
- More diverse
- More detailed
- More extensive



Gilbert et al., 2018
https://doi.org/10.7910/DVN/A7GQXG

Maps are everywhere…

- More modelled
- More imprecise
- More circular
- …?



Gilbert et al., 2018
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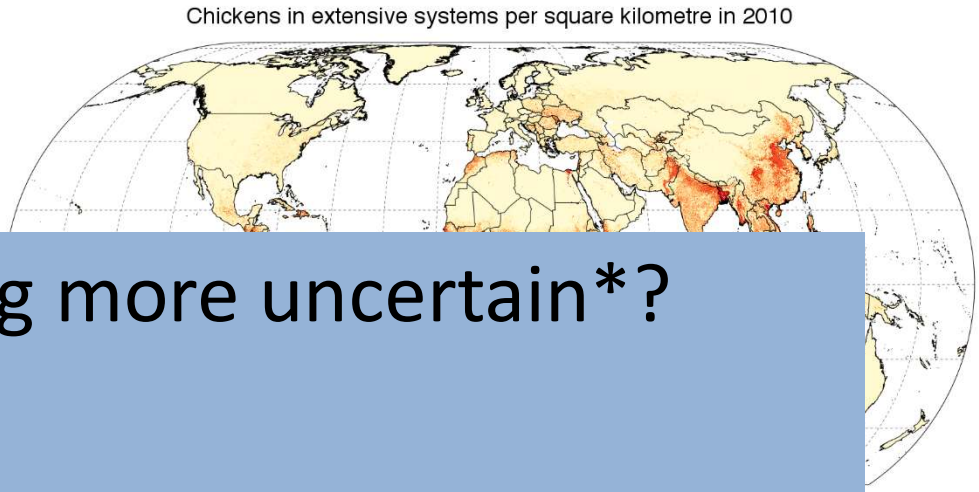
Maps are everywhere…

- More modelled
- More i
- More c
- …?

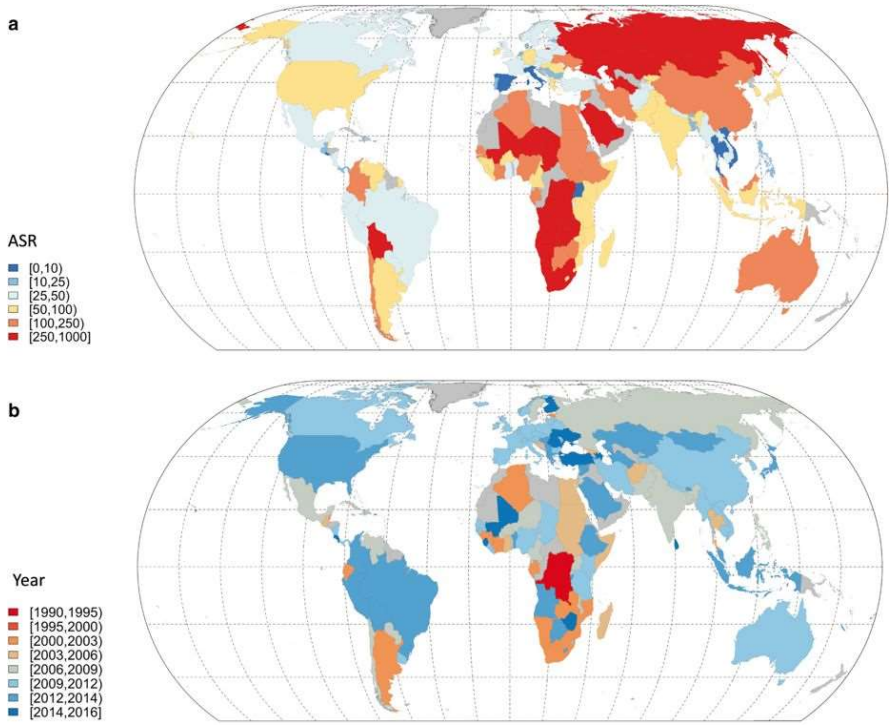


Are we getting more uncertain*?

**Uncertainty: our understanding of the difference between the real world and the dataset*

What are we really looking at?

- « Obvious » sources of uncertainty
  - Currency of data
  - Resolution
  - Error propagation
- Less obvious sources of uncertainty…

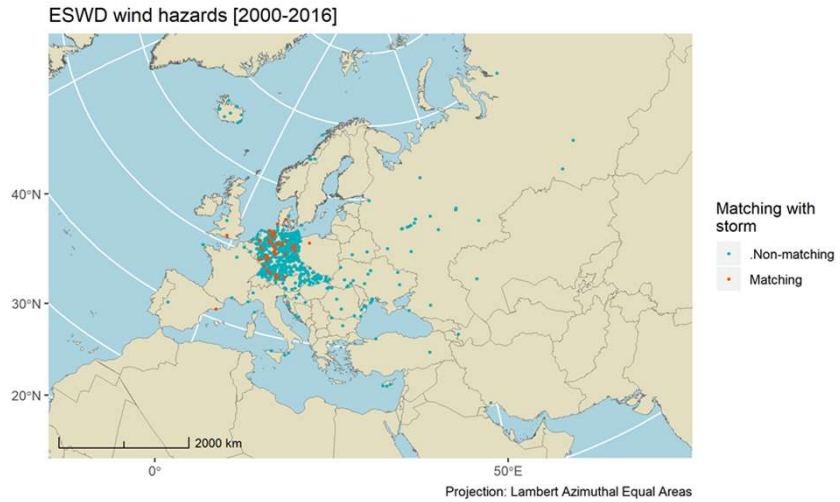


Resolution and currency in the Gridded Livestock of the World

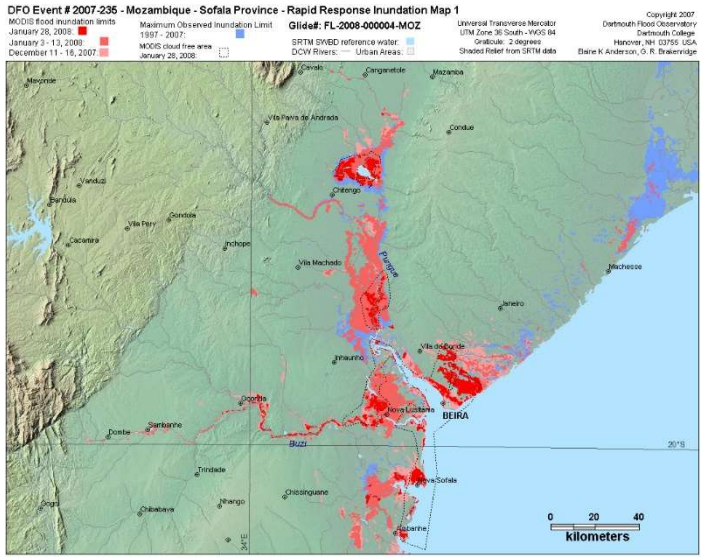
https://doi.org/10.1038/sdata.2018.227

Geographic objects (i)

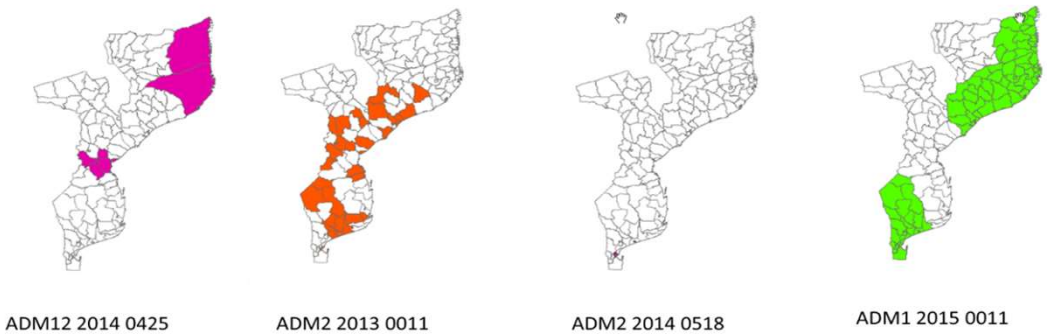
- Vagueness of geographic objects



Froment, 2019



DFO event

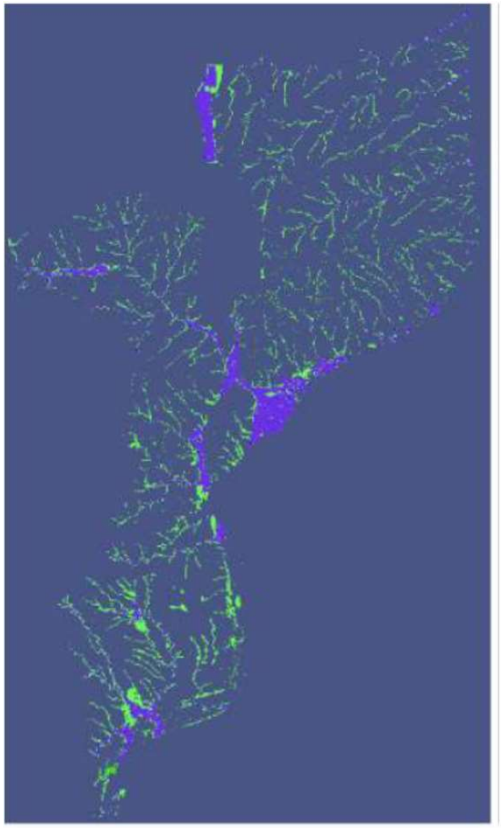


Four EM-DAT events

Geographic objects (ii)

- Boundaries matter: any zones of interest are at the interface between objects

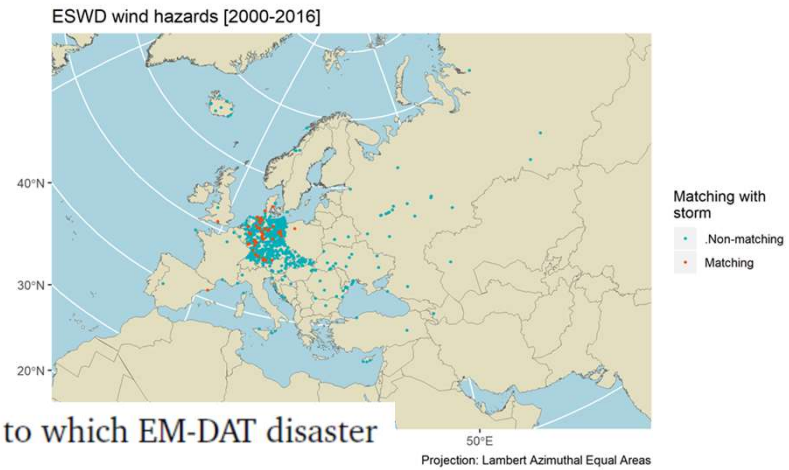
eg: the river to the flood plain



JRC vs. GAR flood risk

Geographic objects (iii)

- Ambiguous labels



Tab. 2.1: Potential relationship of which ESWD event type could lead to which EM-DAT disaster

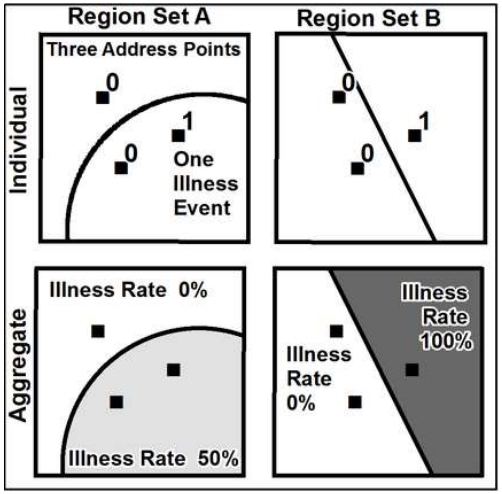
ESWD hazard	EM-DAT disaster
Wind, Tornado, Hail, Lightning, Precipitations	Storm
Precipitations	Flood
Precipitations, Avalanche	Landslide
snowfall/snowstorm, Ice accumulation	Sever winter condition (snow/ice)

Froment, 2019

Data resolution vs. process scale

- What is the scale at which a particular process is taking place?

i.e. do we have a problem with aggregated data?



Wikipedia.org: MAUP

- Beware of « scroll syndrome* »

→Analysis scale
→Cartographic scale

** « Syndrome de la roulette »source: geoportail.wallonie.be*

Data resolution vs. process scale

- Is the scale at which data is available appropriate?

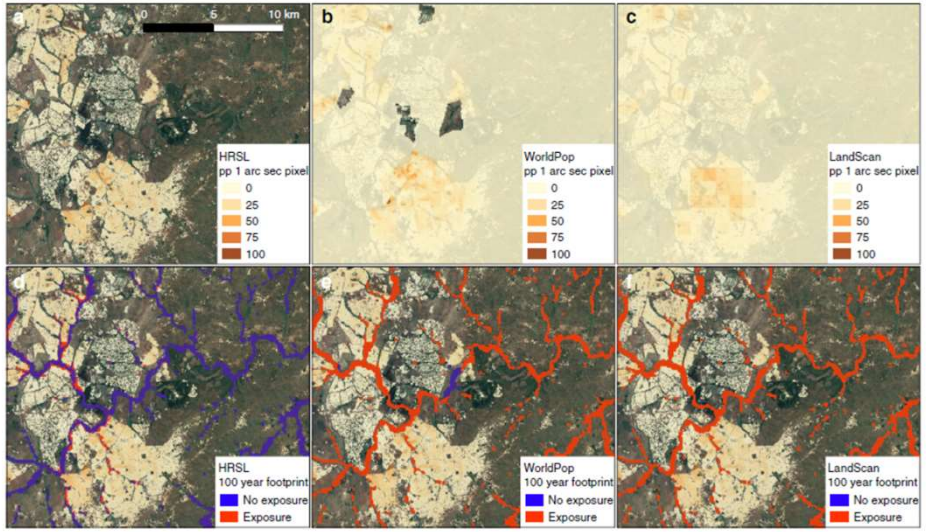
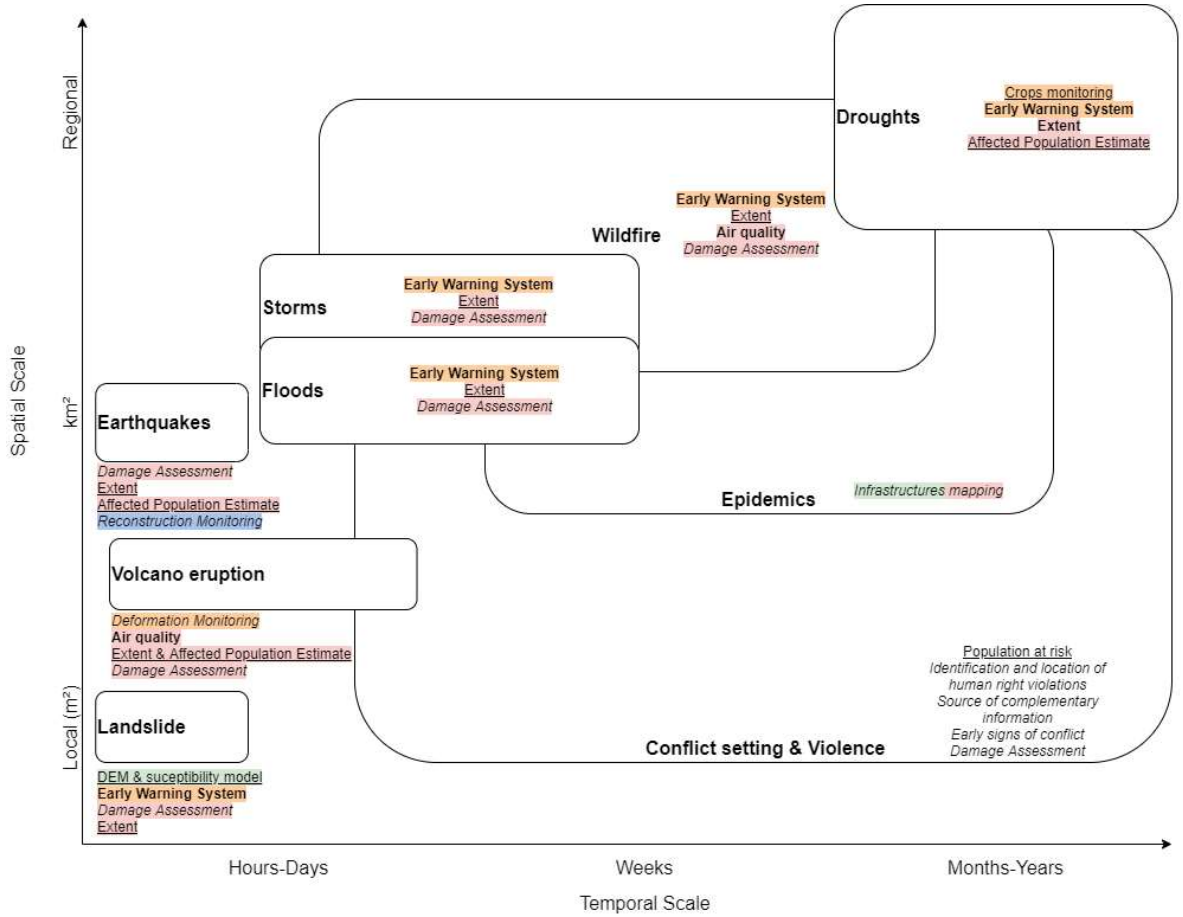


Fig. 2 Example of Exposure Mapping in Malawi. Example of population data and generated exposure maps for Lilongwe city, in Malawi. **a**, **b**, **c** display the HRSL, WorldPop, and LandScan™ population data sets, respectively. **d**, **e**, **f** show the population located in the 100 year floodplain for each demographic data set, respectively

Smith et al., 2019

https://doi.org/10.1038/s41467-019-09282-y

→*Phenomenon scale*



Legend:

Disaster management cycle:
- Mitigation
- Preparation
- Response
- Recovery

Spatial resolution:
- *Very high*
- high
- **medium**

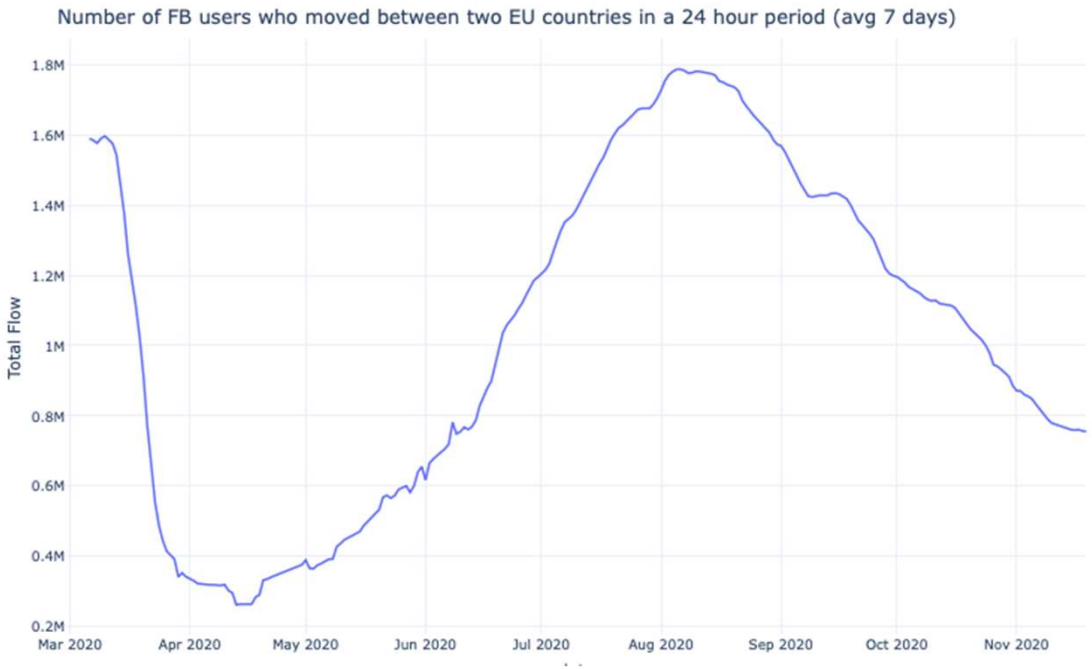
Data resolution vs. process scale

→As (spatial) data users, do we understand the data?

→As (spatial) data users, do we understand the process well enough?

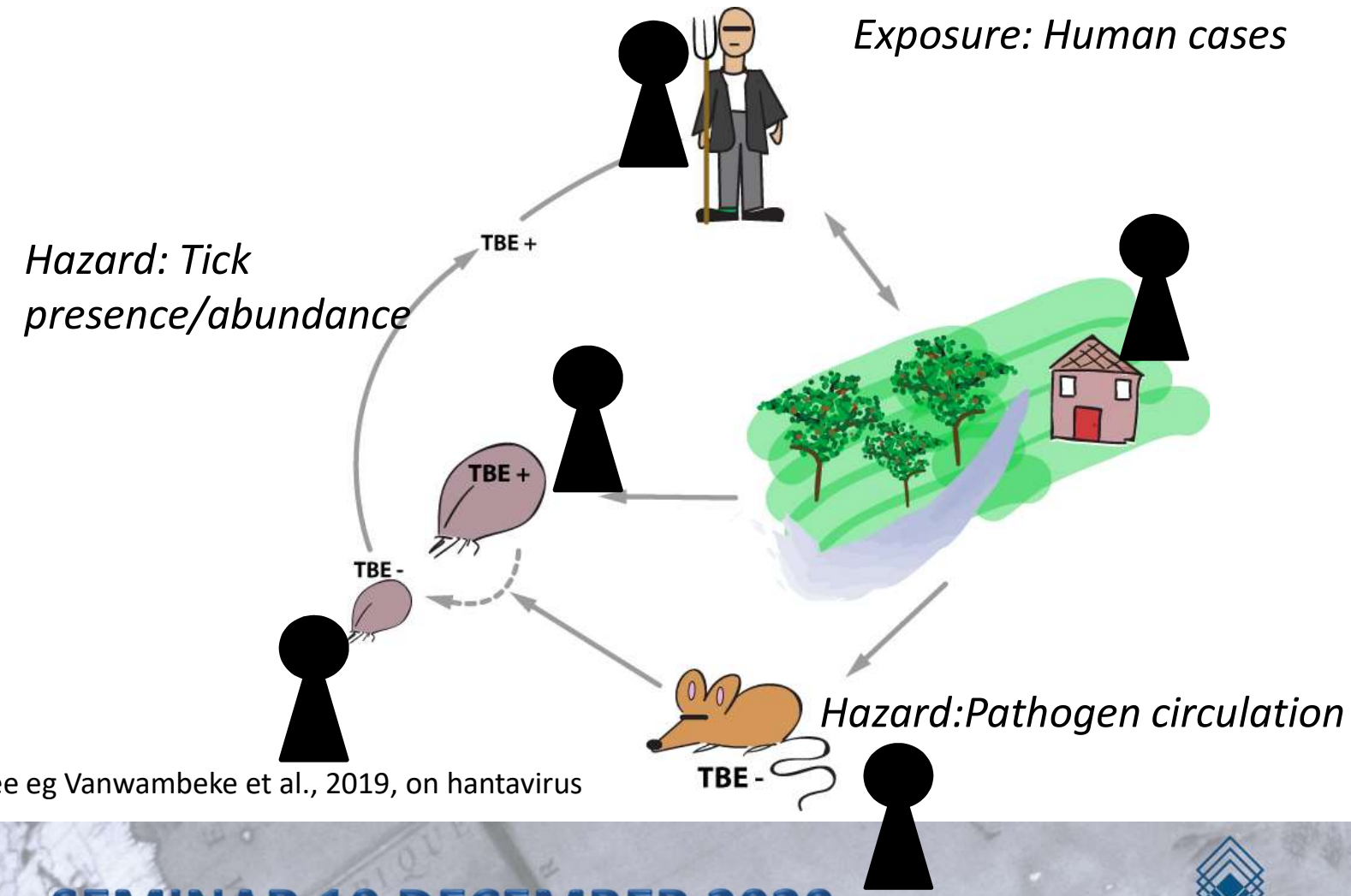
Data as by-products

- Data-driven vs. process-driven



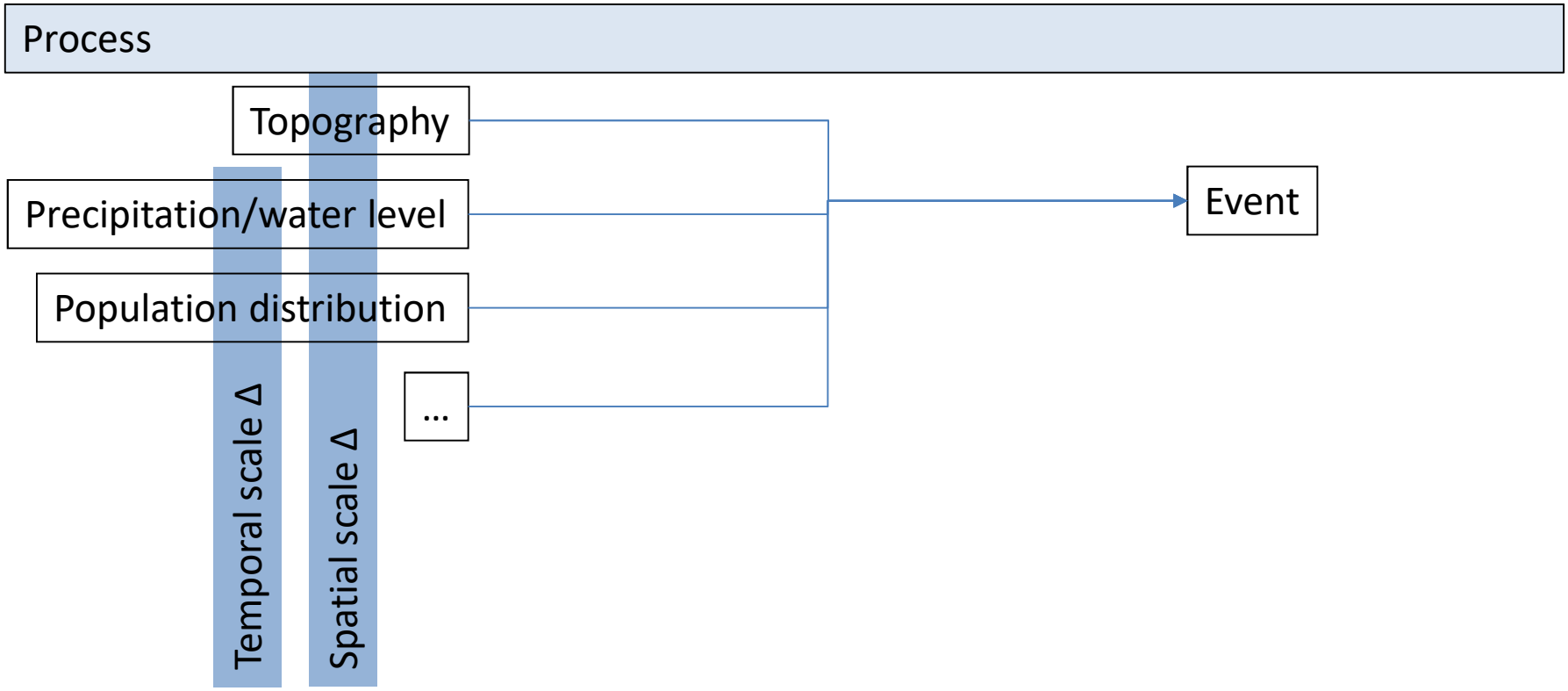
Circulation journalière des utilisateurs FB entre deux pays EU
Source: @covidata.be

Challenge : Data are keyholes



See eg Vanwambeke et al., 2019, on hantavirus

What's the matter for analysis?



What's the matter for analysis?

Data

Topography: DEM? Floodplain? Watershed? Hazard?

Precipitation/water level: Scale? Time window? Source?

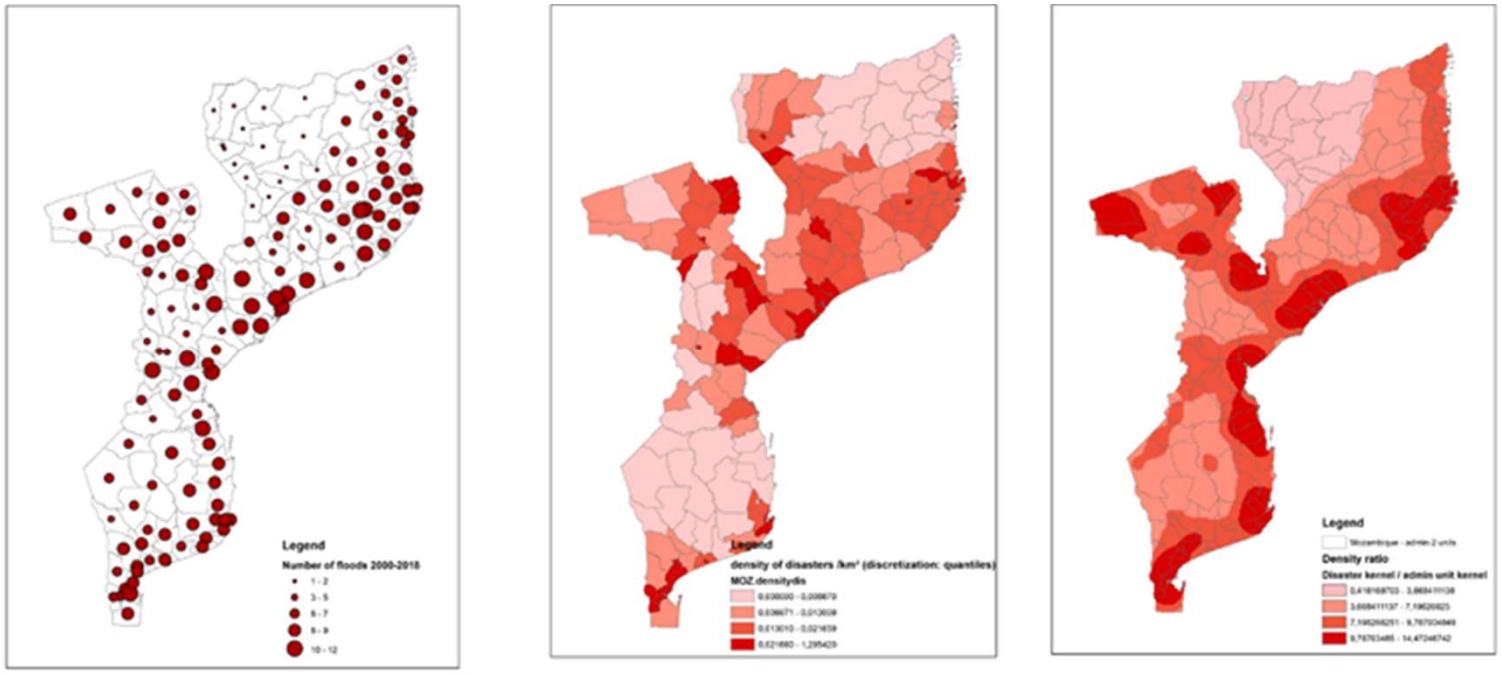
Population distribution: resolution? Source?
Overlap with other data?

Temporal scale Δ

Spatial scale Δ

...

Event:
What is recorded?
Where? Georeference?
Scale?



EM-Dat recorded floods, 2000-2016, Mozambique

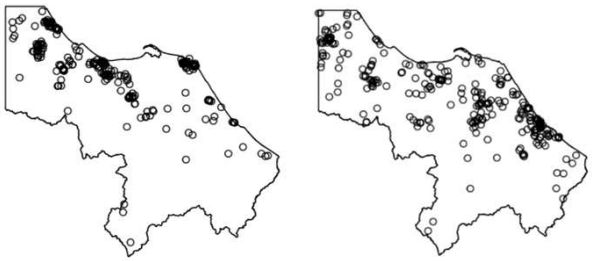
- ↗ detail ↘ « uncertainty »?
- Vagueness of geographic objects persists
- New opportunities for understanding (spatial) processes
- Data are keyholes – but of what sort?
- By-product data

Maps are everywhere… what to look for?

- Data knowledge (knowing uncertainty)
- An exact pattern vs. a realistic pattern
- Don’t skip the conceptual part

Observed pattern

Simulated pattern



Chaiban et al., 2019, 10.1016/j.agsy.2019.03.004

"I have to go. I have another coffee break on seven."

Acknowledgements

- CRED: Prof D. Guha Sapir, Dr Joris van Loehnout
- Rémi Froment

Centre for Research on the Epidemiology of Disasters CRED

Check out our brand new report on remote sensing in the humanitarian field:
https://cred.be/sites/default/files/STENTORReport.pdf