

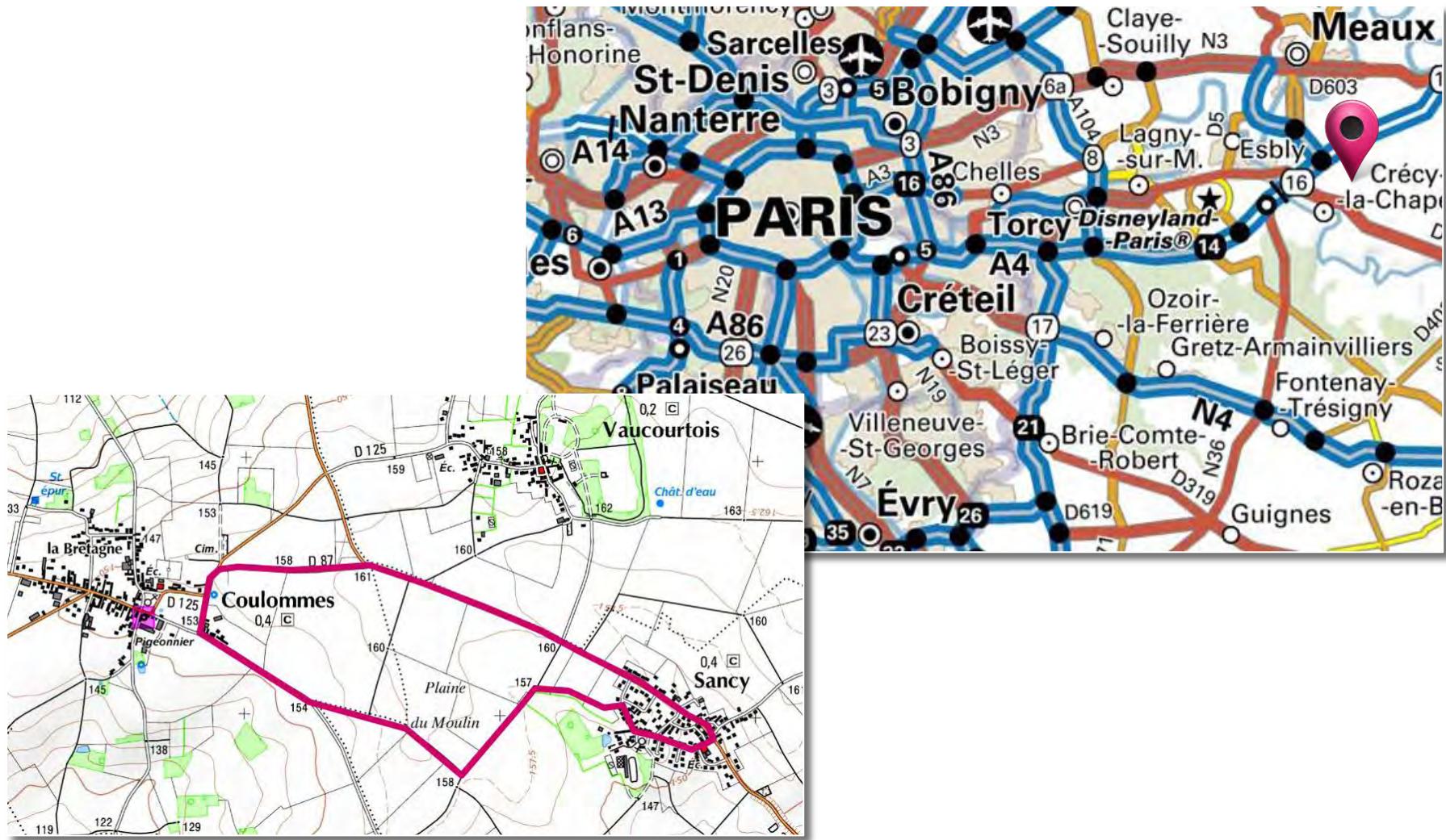
Automated generalisation of intermediate levels in a multi-scale pyramid



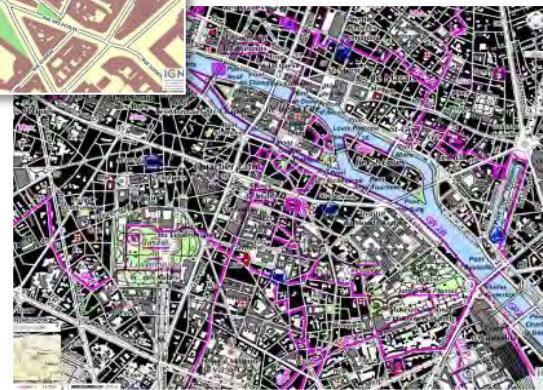
Marion Dumont, Guillaume Touya, Cécile Duchêne
COGIT – IGN France

Motivations

Motivations



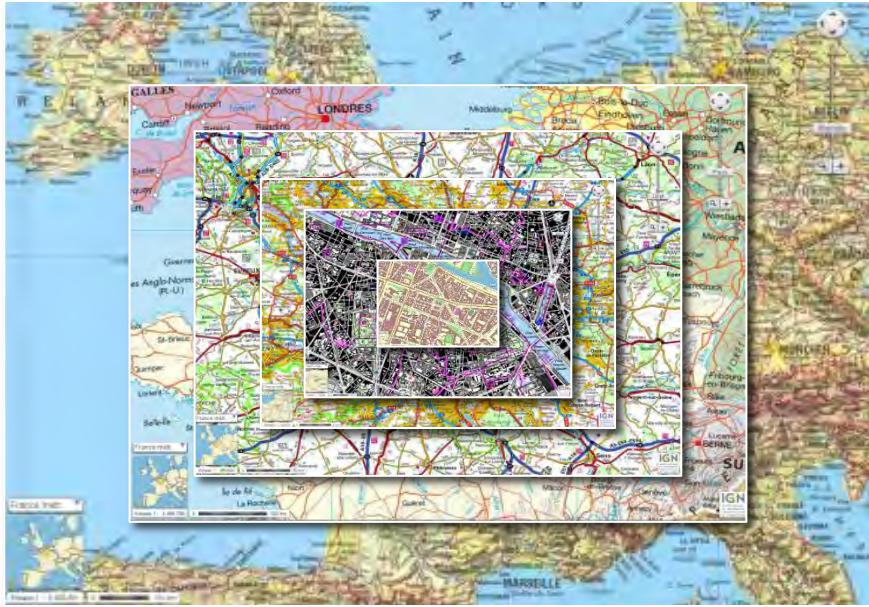
Motivations



Motivations



Multi-scale pyramid



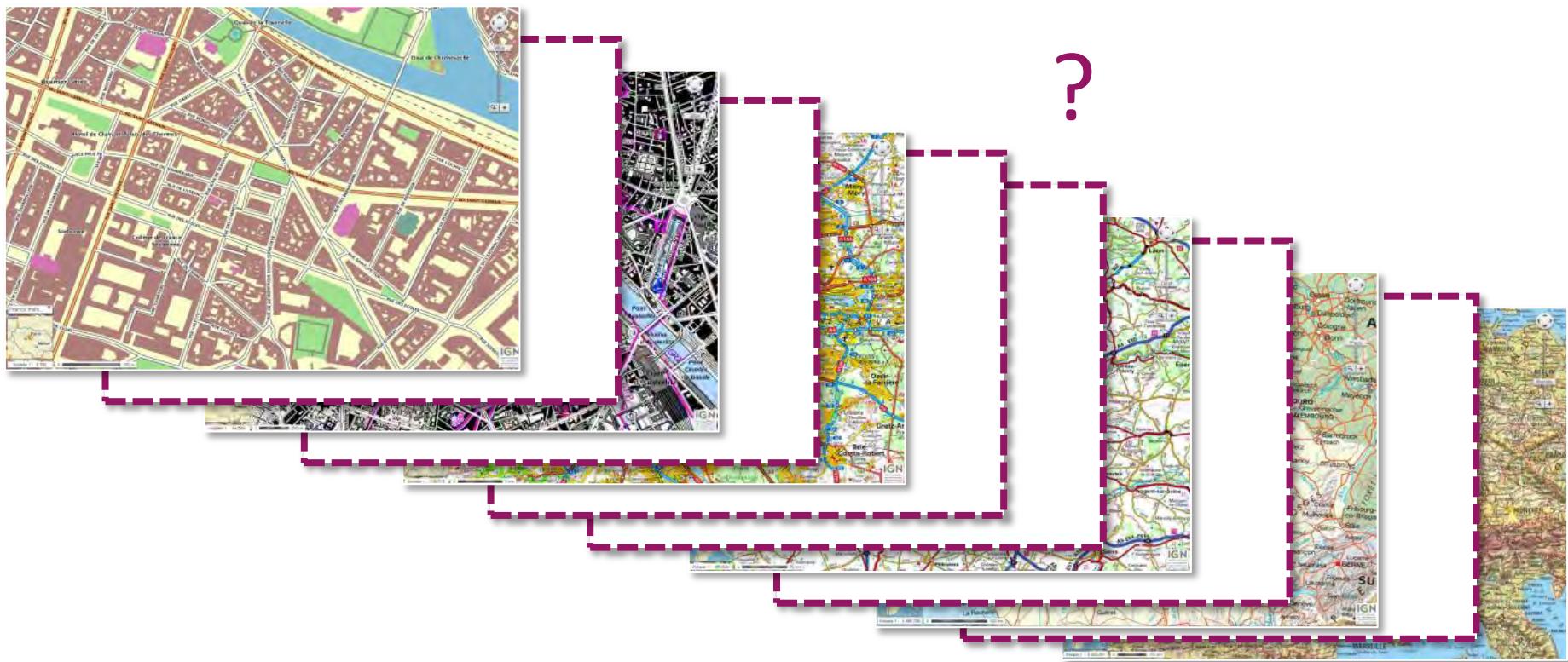
Multi-scale pyramid



Hypothesis

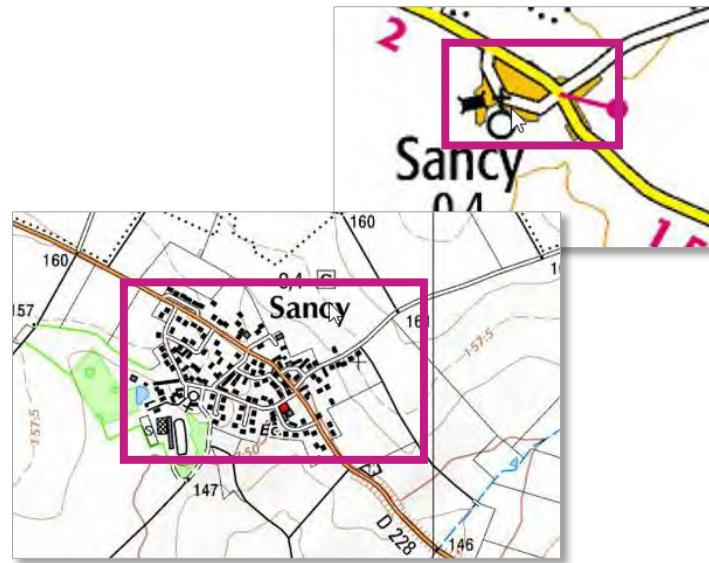


Hypothesis

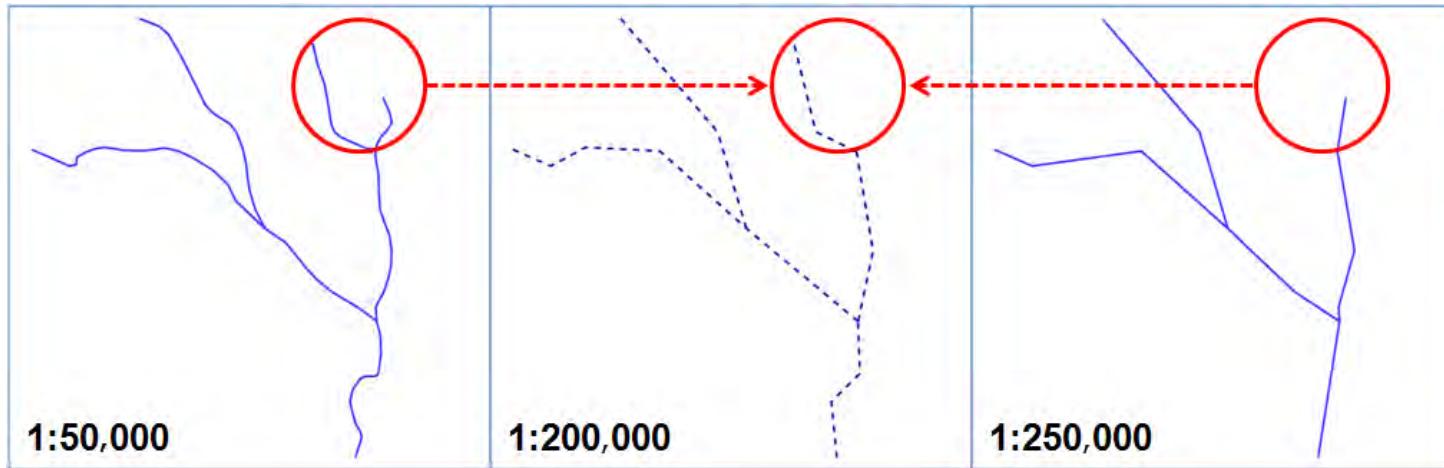


Potential sources of disorientation

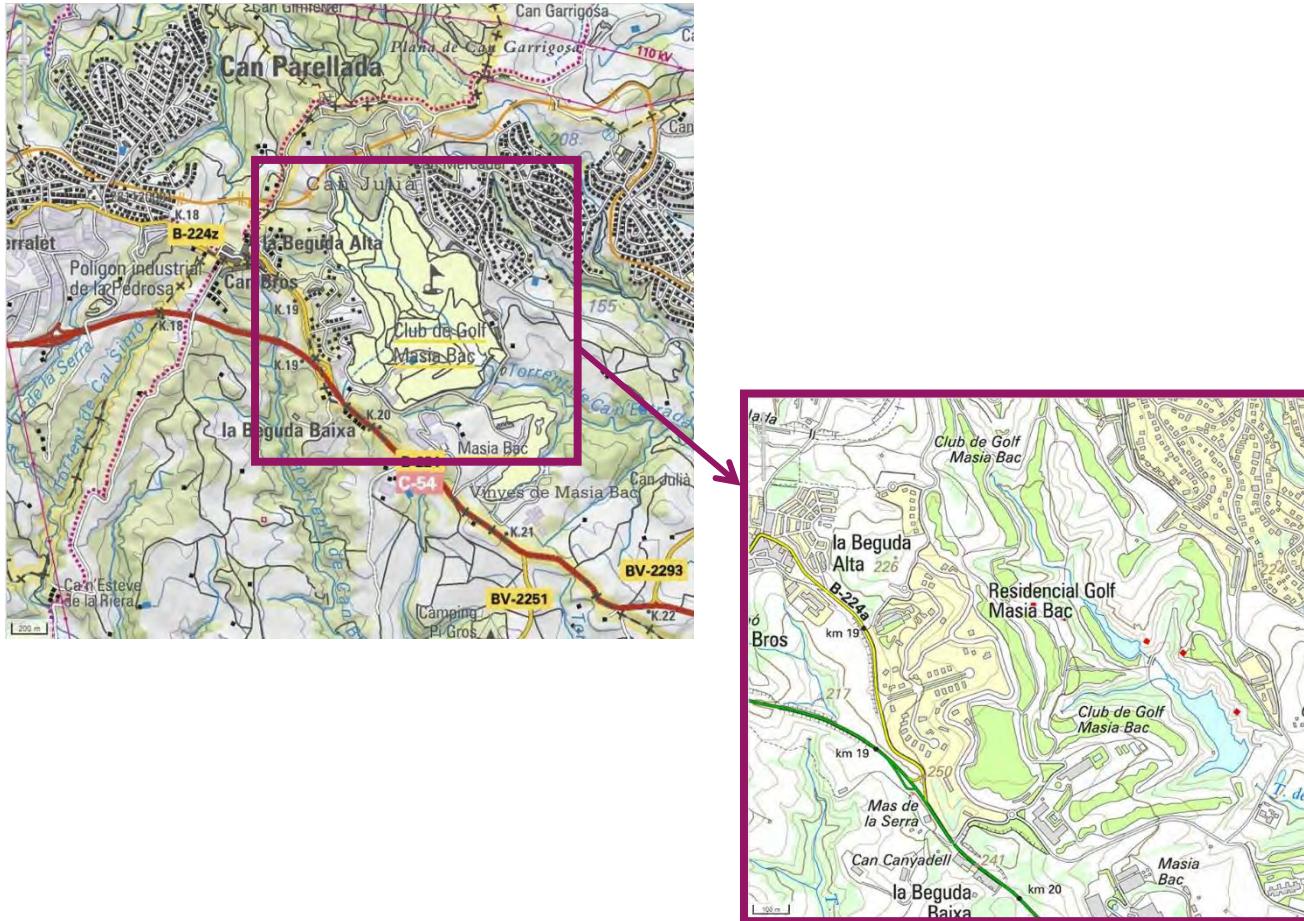
Discontinuities



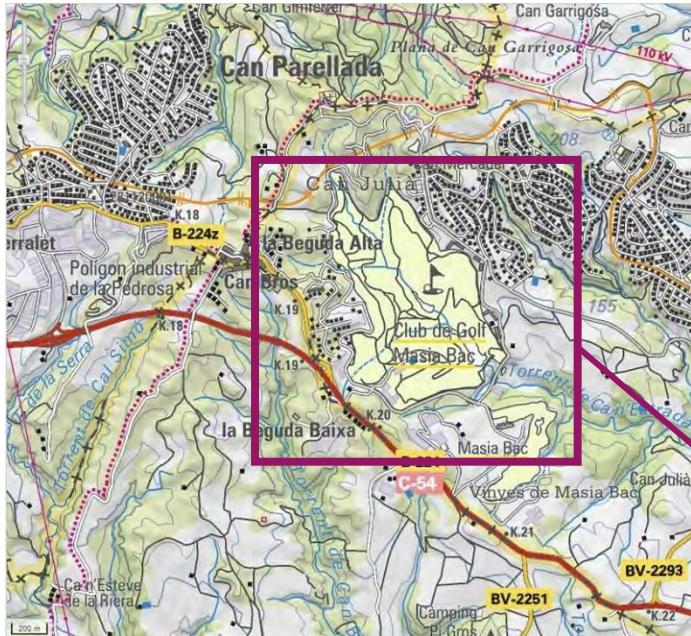
Inconsistencies



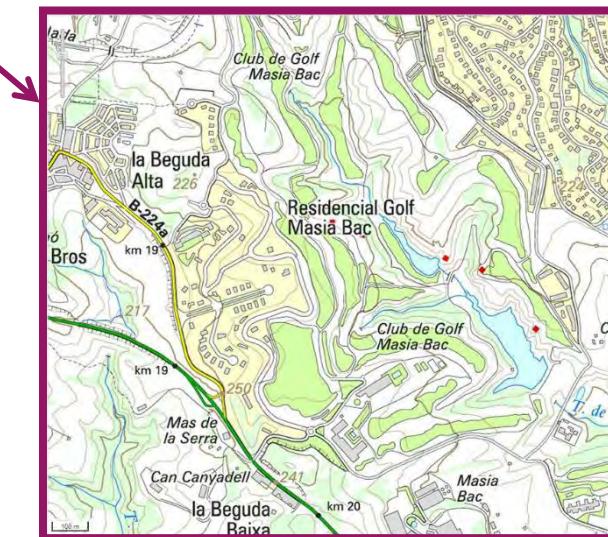
Symbolization discontinuities



Symbolization discontinuities



How can we interpolate the intermediate representation?



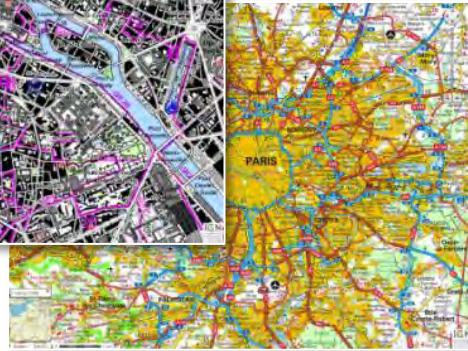
Symbolization discontinuities



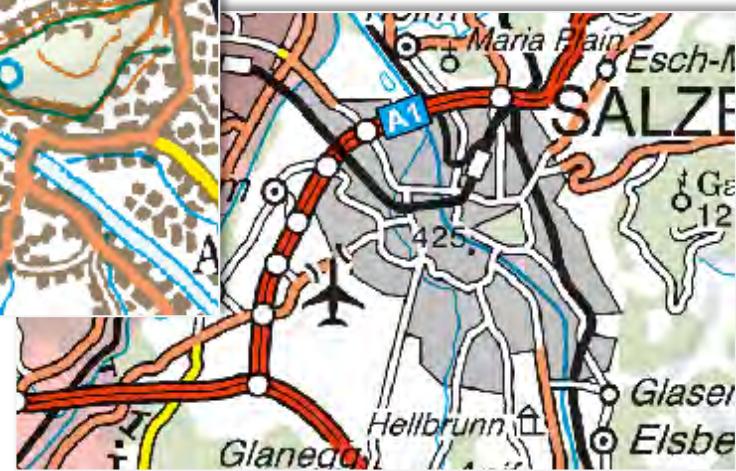
Source: IGN France

Symbolization discontinuities

Is the use of a single style required?



Content discontinuities



Content discontinuities

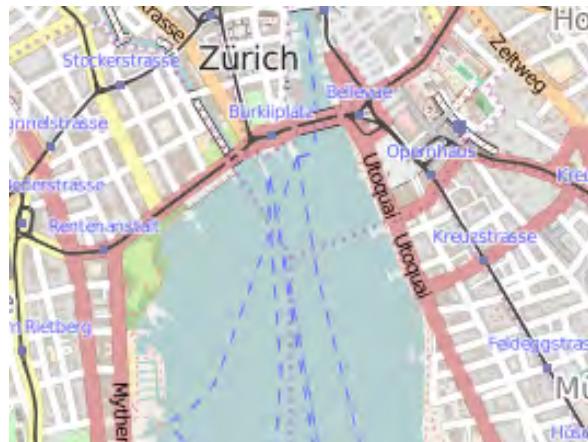
How can we improve these transitions?

-> adding intermediate representations

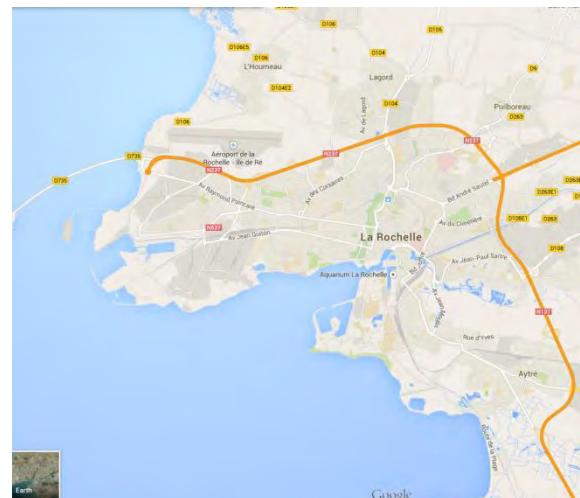
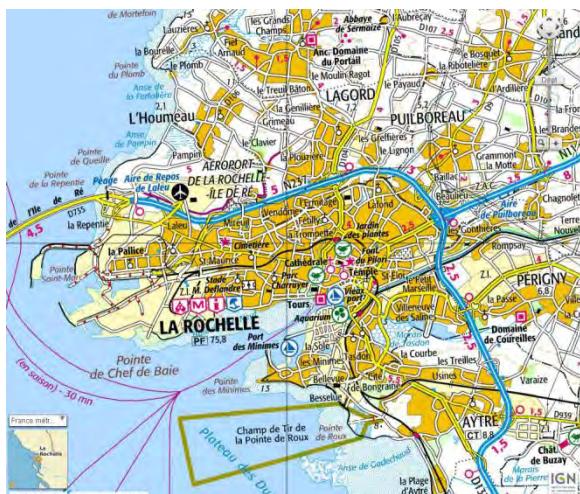
-> How design them?



Content discontinuities



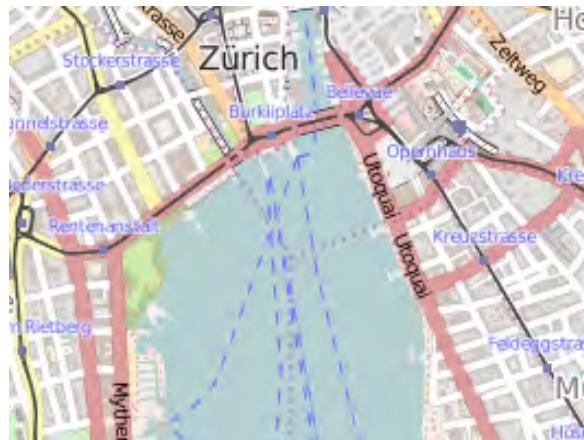
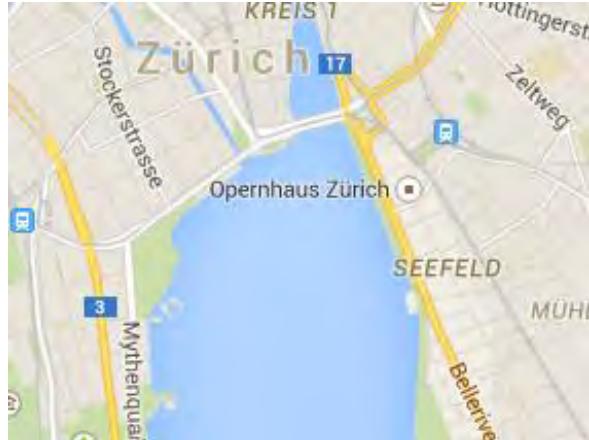
Source: Google Maps, OpenStreetMap, Swisstopo



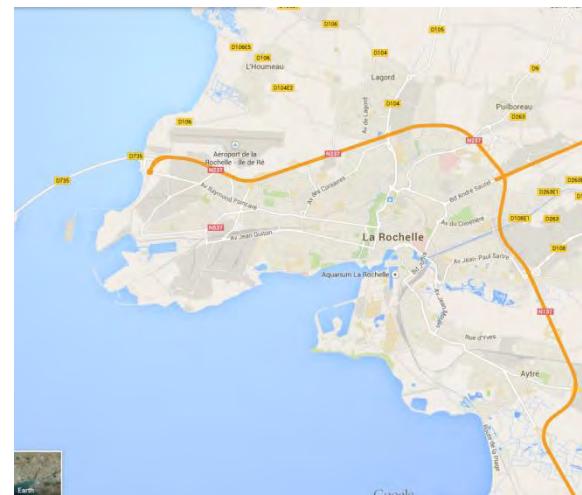
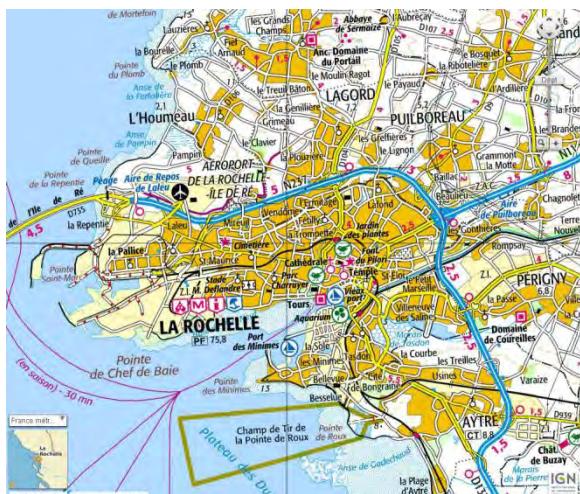
Source: IGN France, Google Maps

Content discontinuities

How should evolve the density ?
At which scale a LoD should be shown?

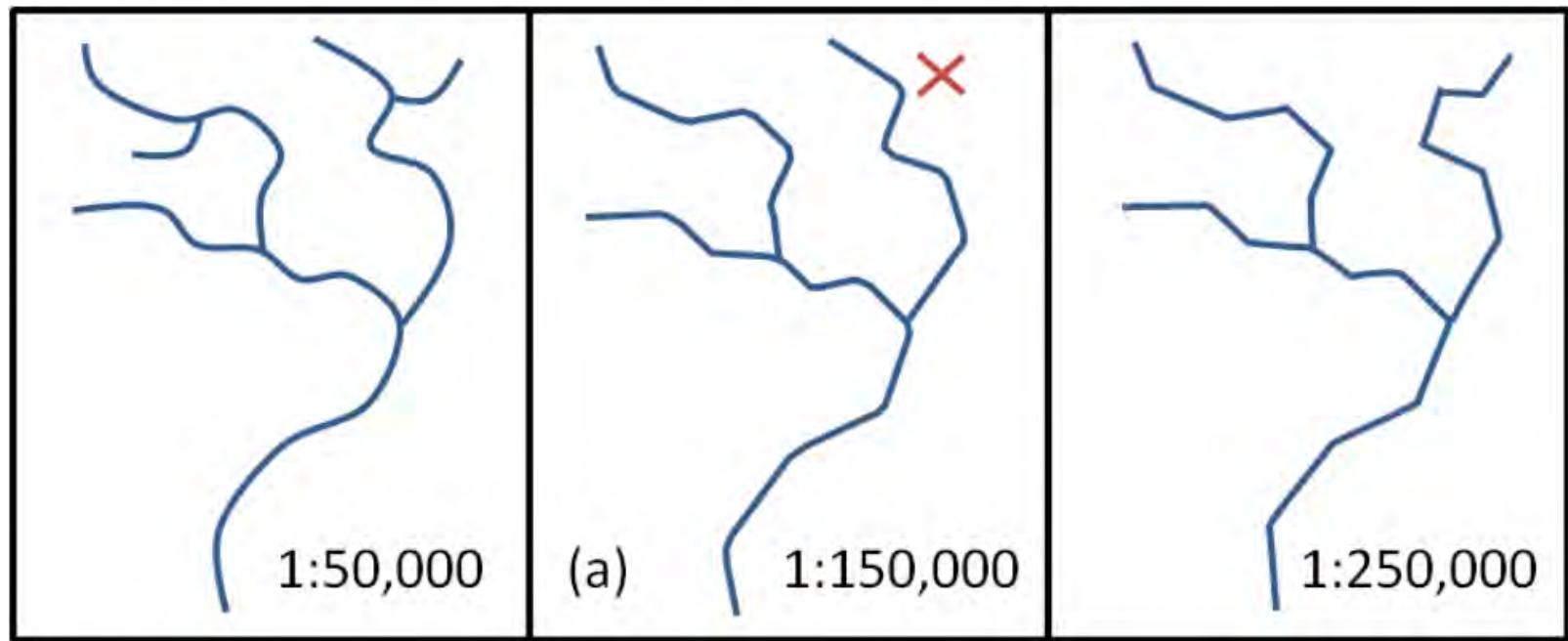


Source: Google Maps, OpenStreetMap, Swisstopo

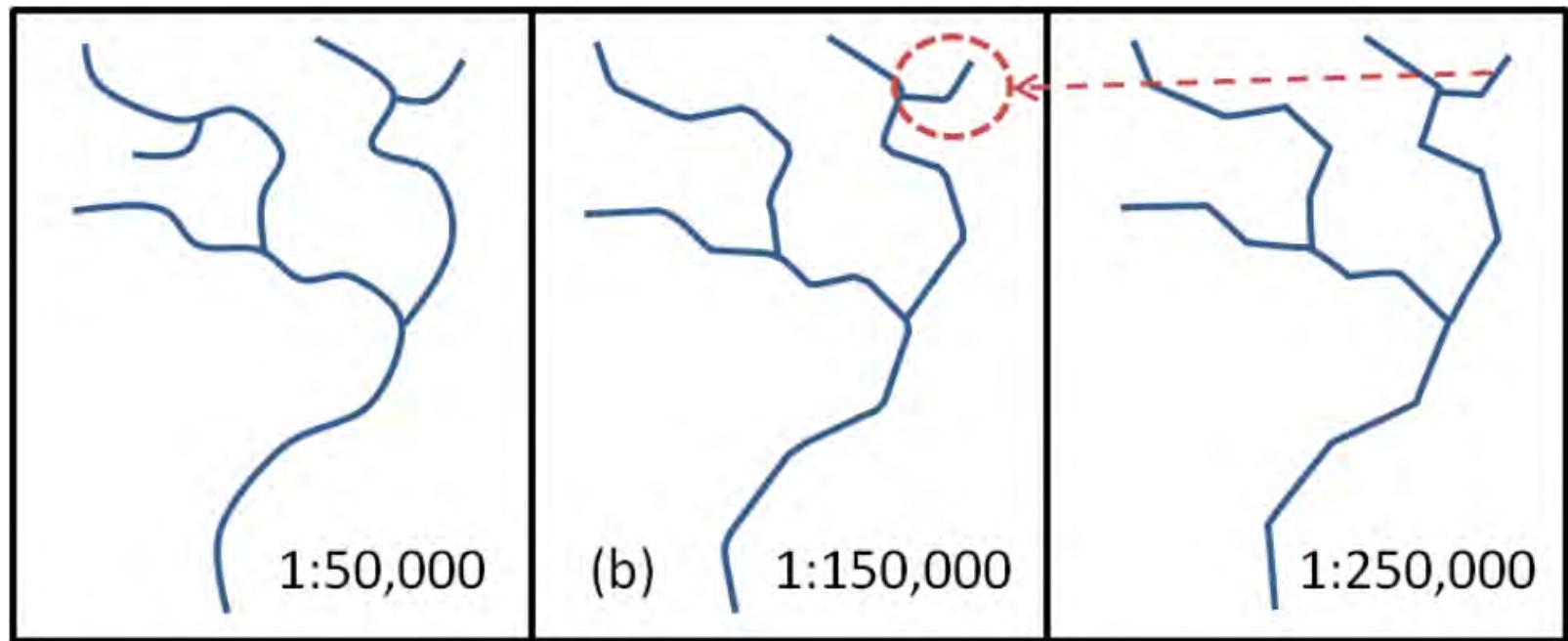


Source: IGN France, Google Maps

Content inconsistencies



Content inconsistencies



Research issues What is a good intermediate level?

At which scale?

ACT-Luxembourg

IGN-NLS-Finland

GoogleMaps

ICGC

IGN-Spain

BingMaps

IGN-France

GDI-Germany

Catalonia

NGI-Belgium

BEV-Austria

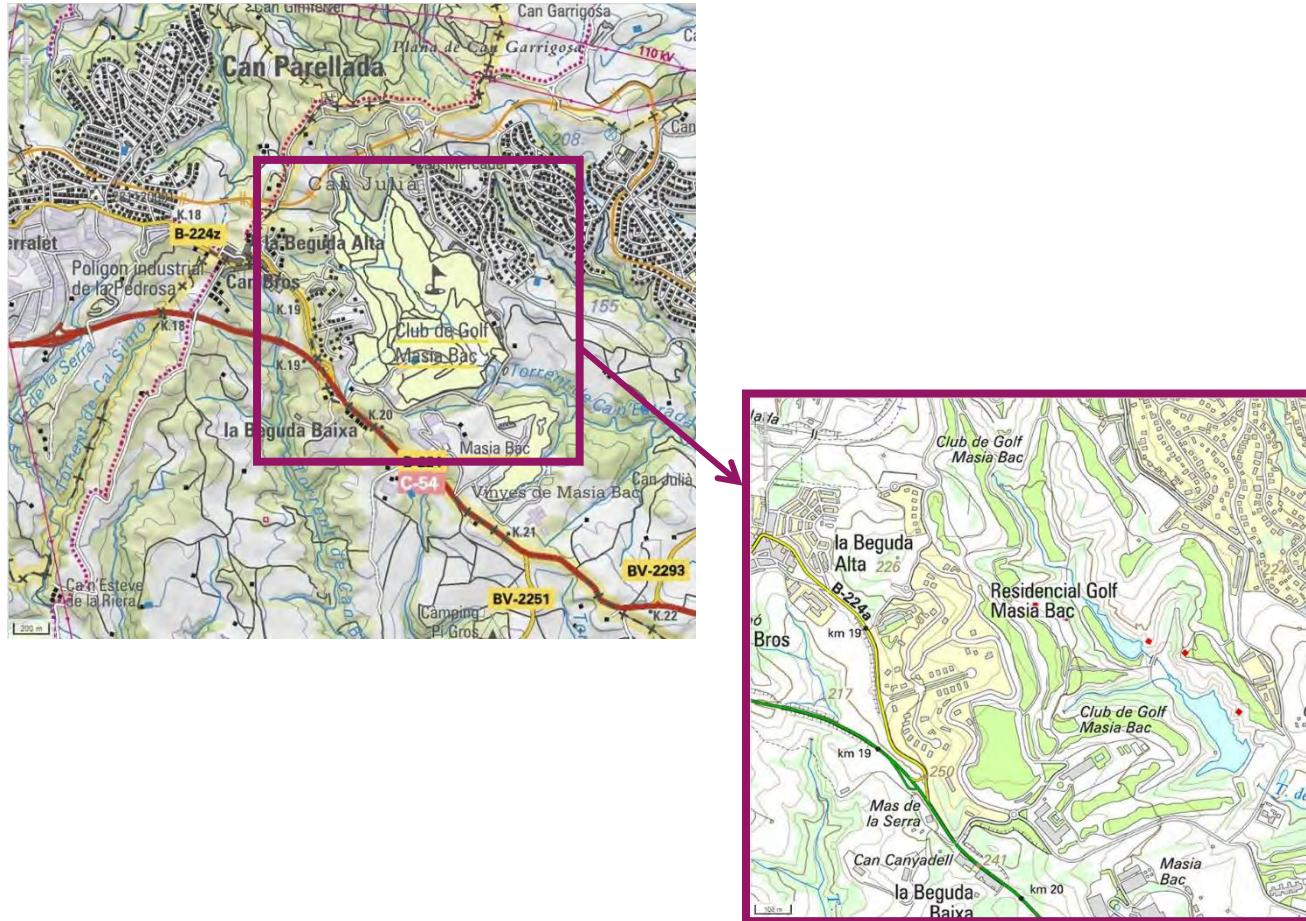
OS-Irlande

Swisstopo-Switzerland

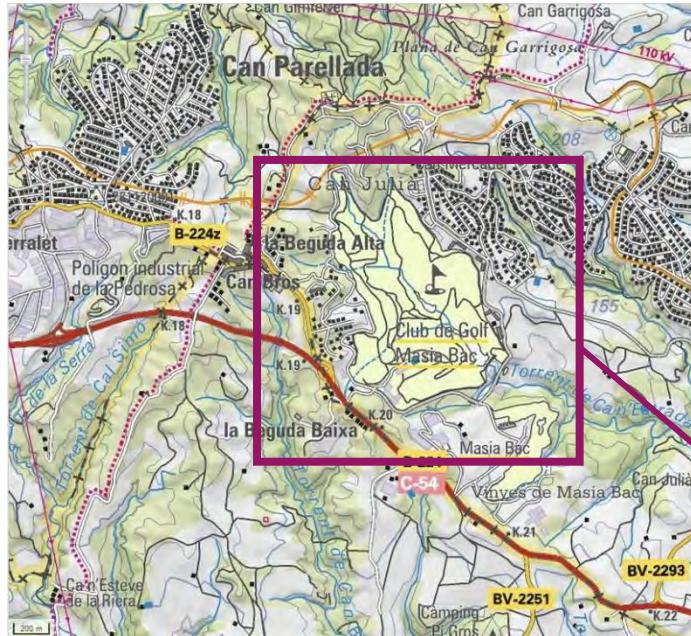
OpenStreetMap

Lantmäteriet-Sweden

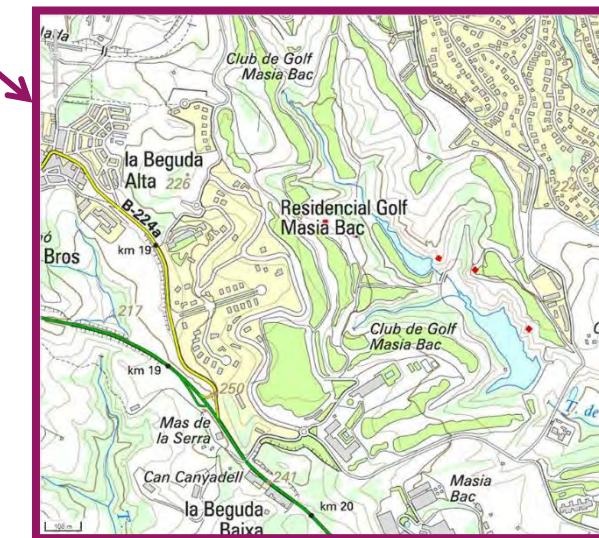
At which scale?



At which scale?



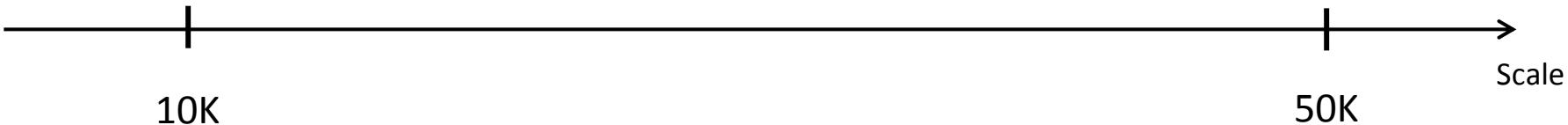
Problem => intermediate level



At which scale?



Problems



At which scale?

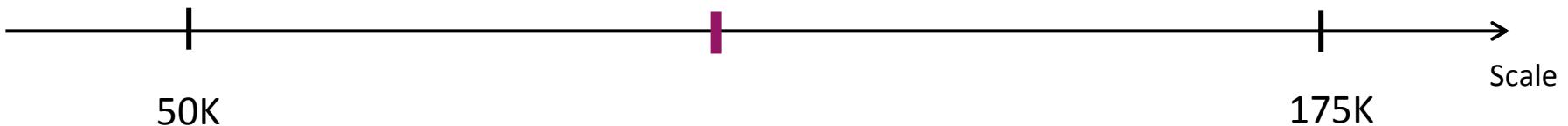
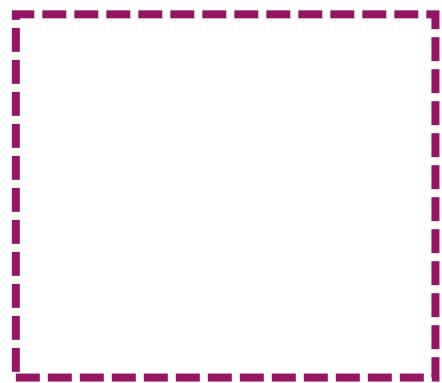
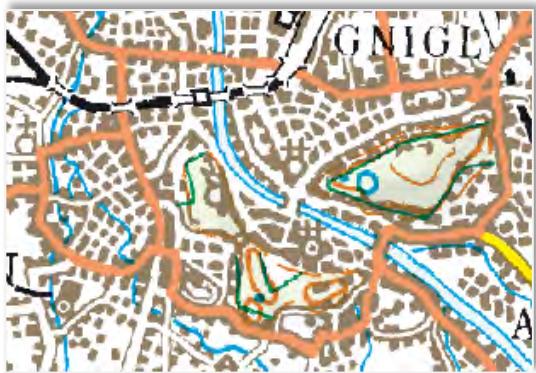


10K

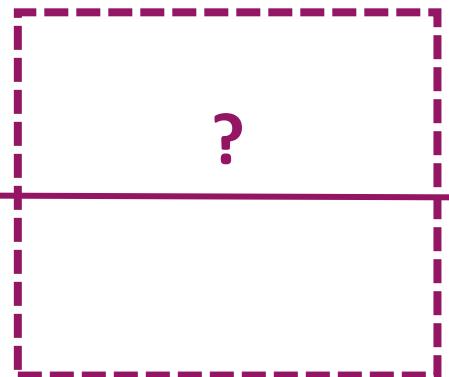
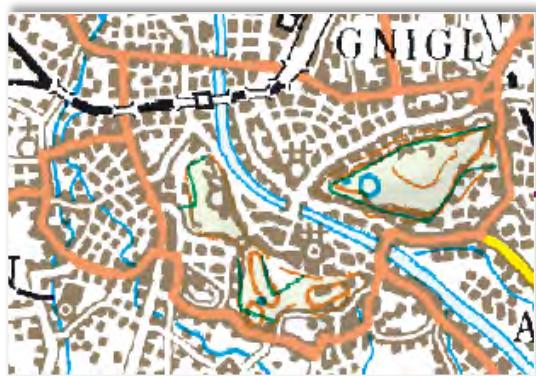
50K

Scale

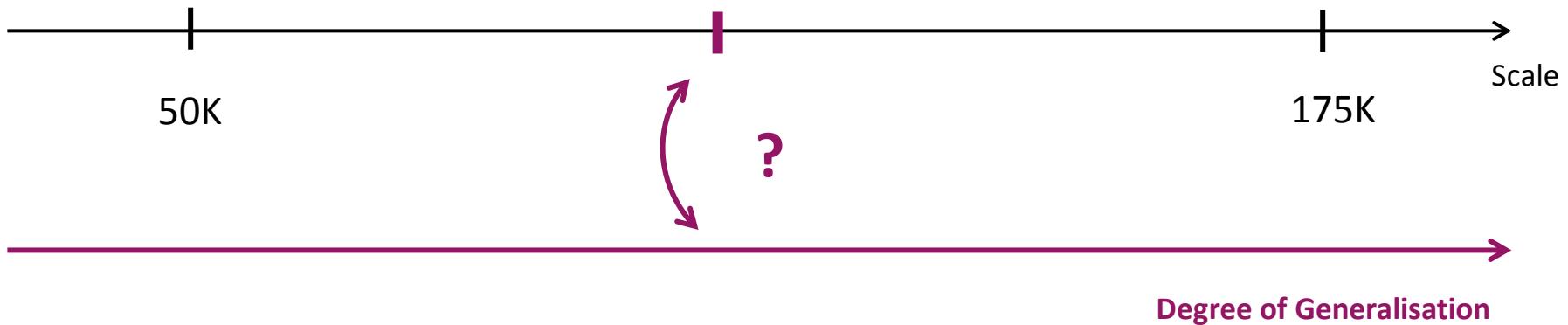
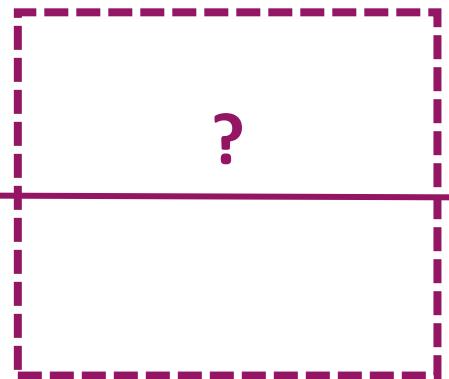
Which constraints?



Which constraints?



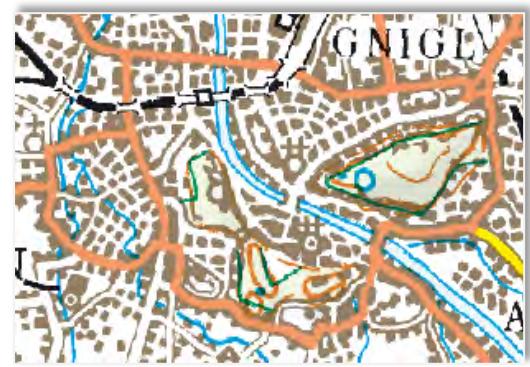
Which constraints?



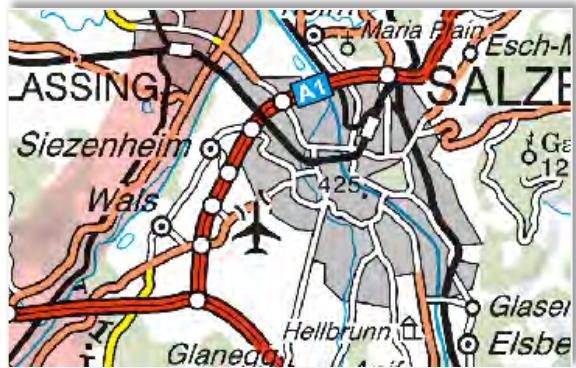
Which constraints?



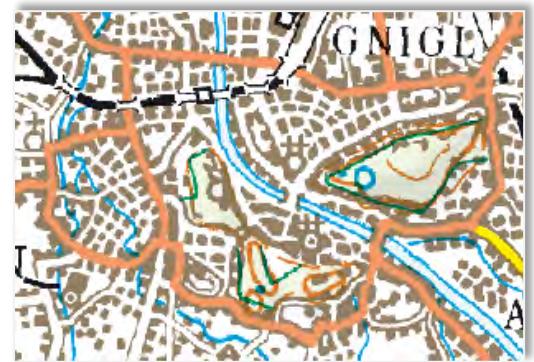
Distance?



Which constraints?



Distance?

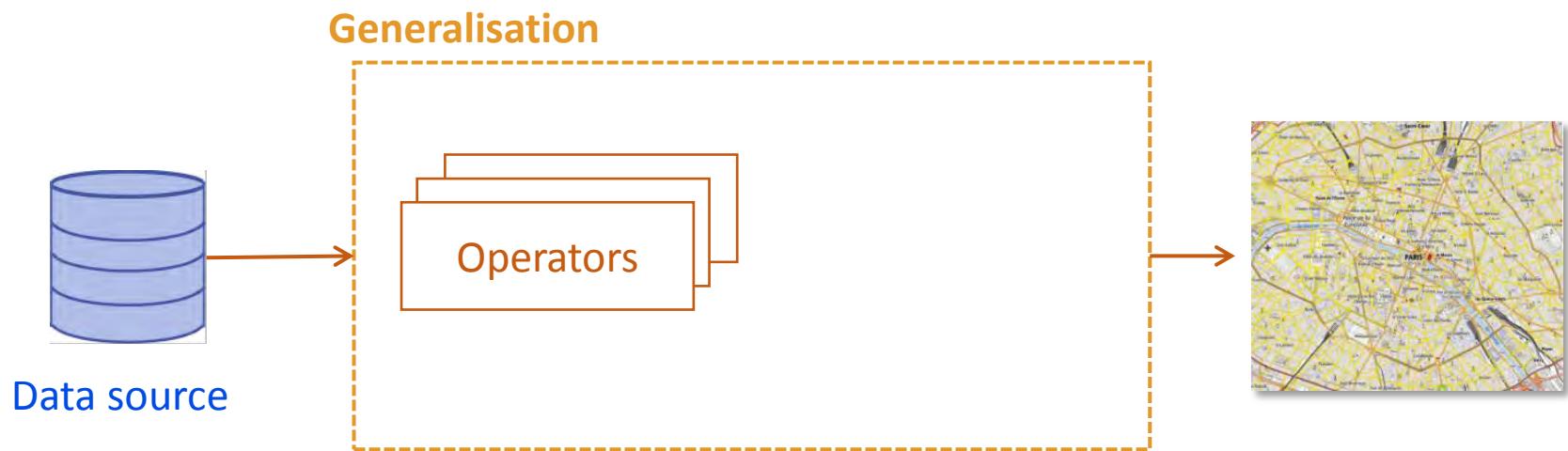


Distance = f(DoG, symbolization, data quantity, etc...)

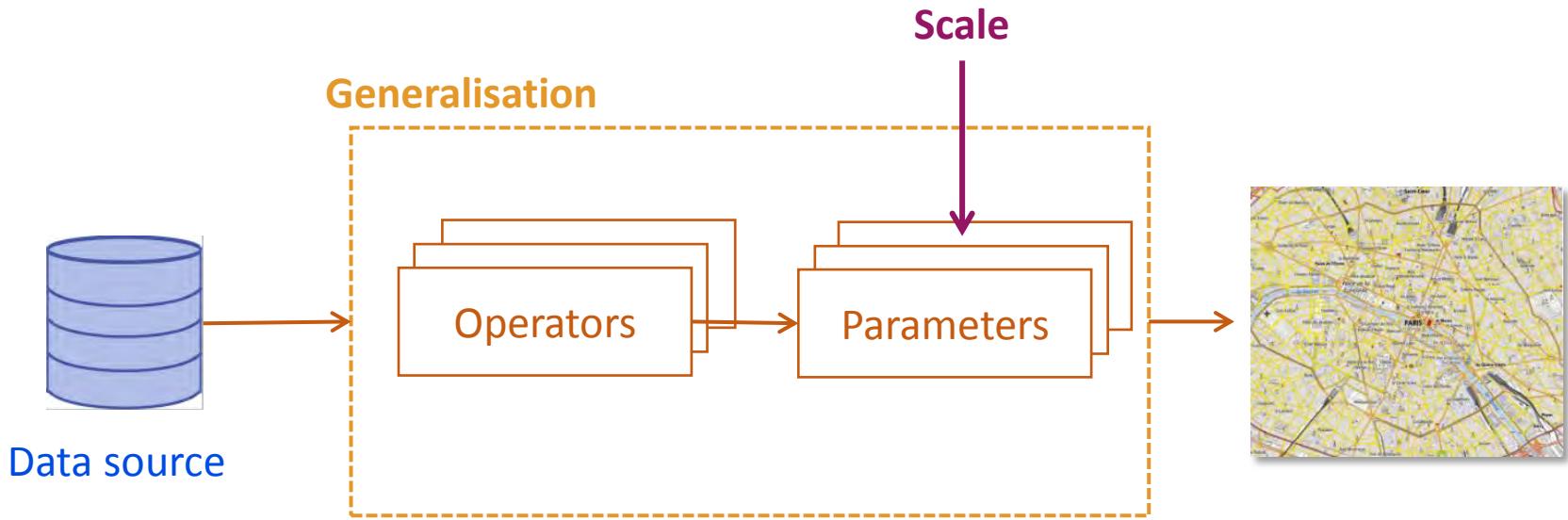
How to automatically generalise it?



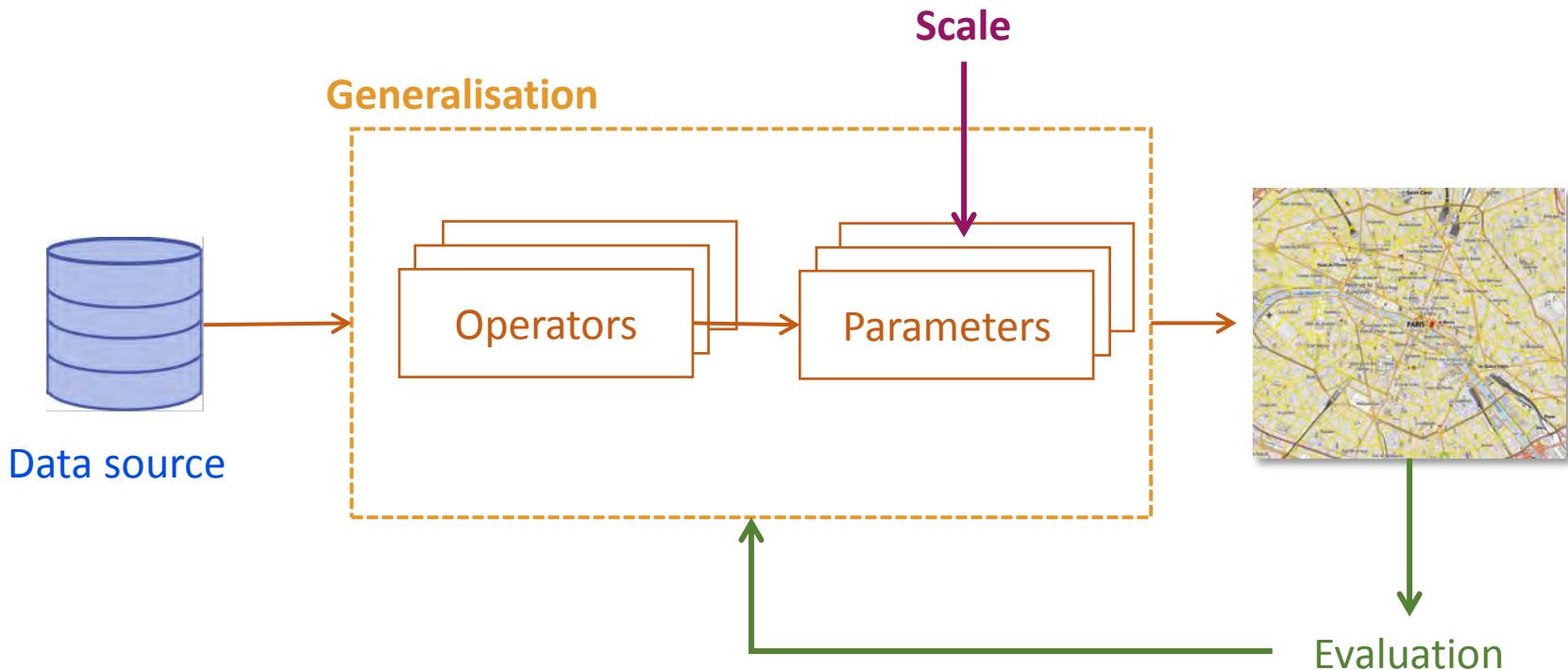
How to automatically generalise it?



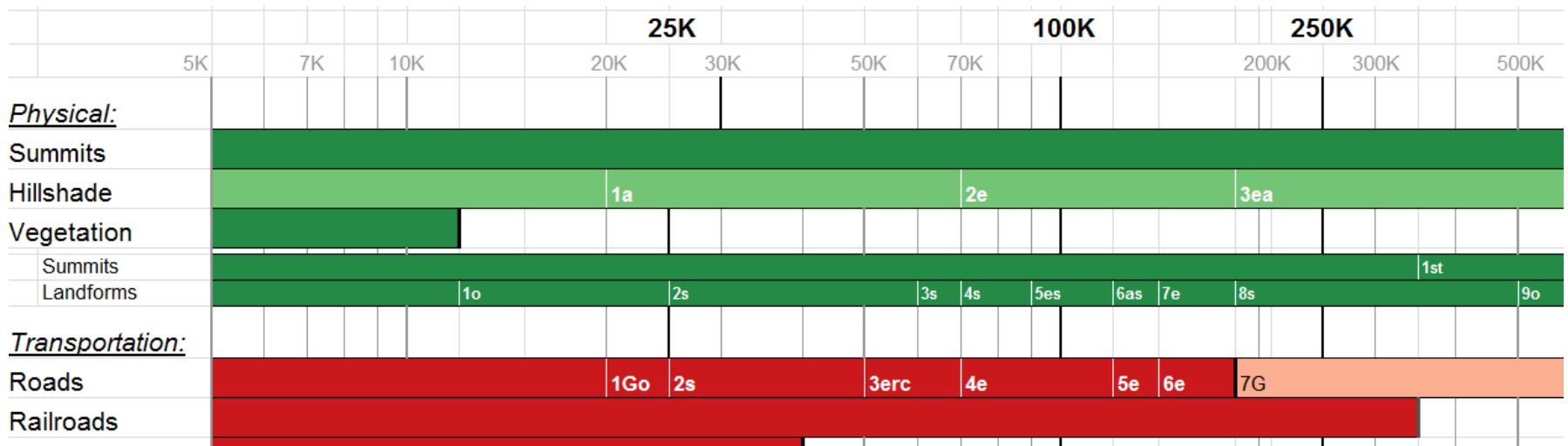
How to automatically generalise it?



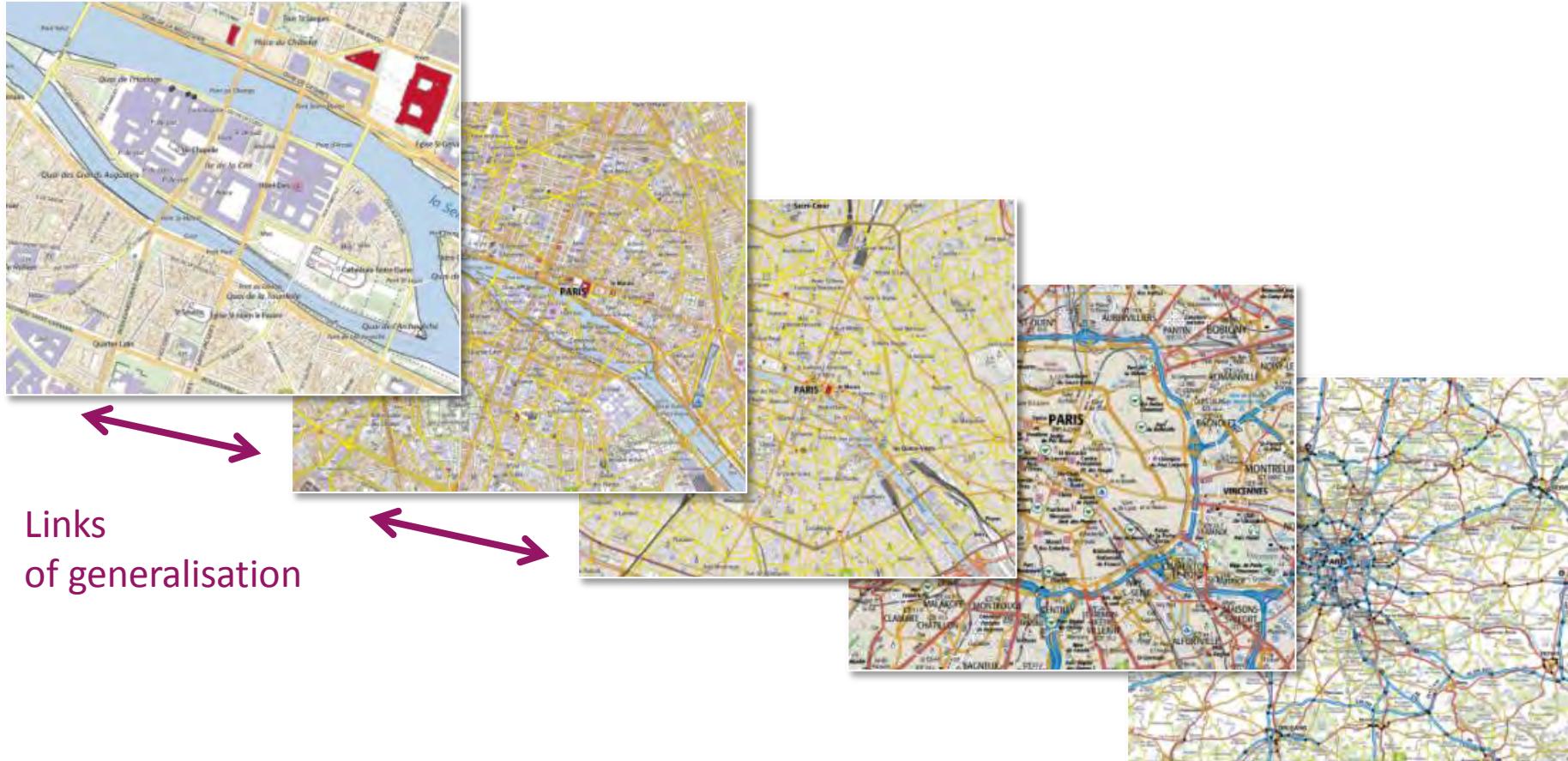
How to automatically generalise it?



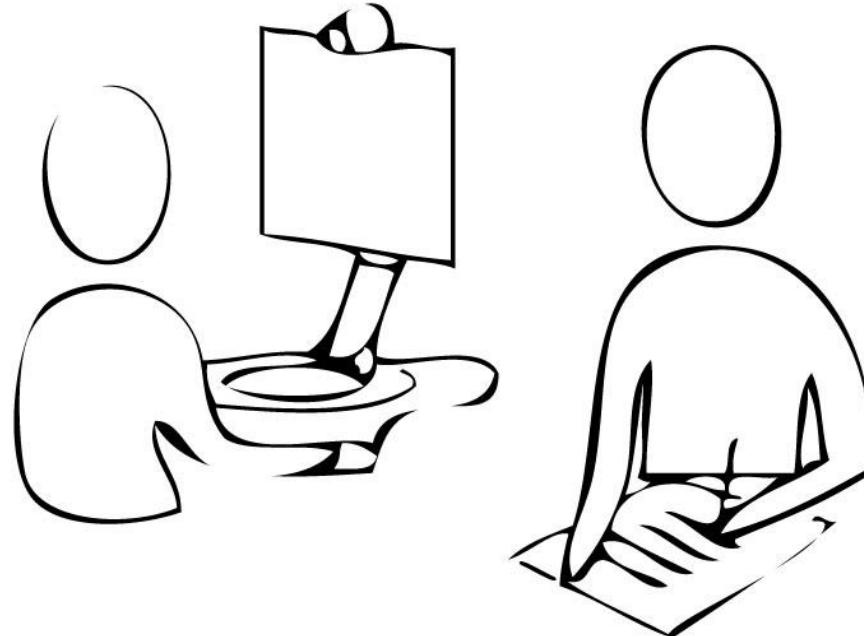
How to automatically generalise it?



How to automatically generalise it?



How to validate our results?



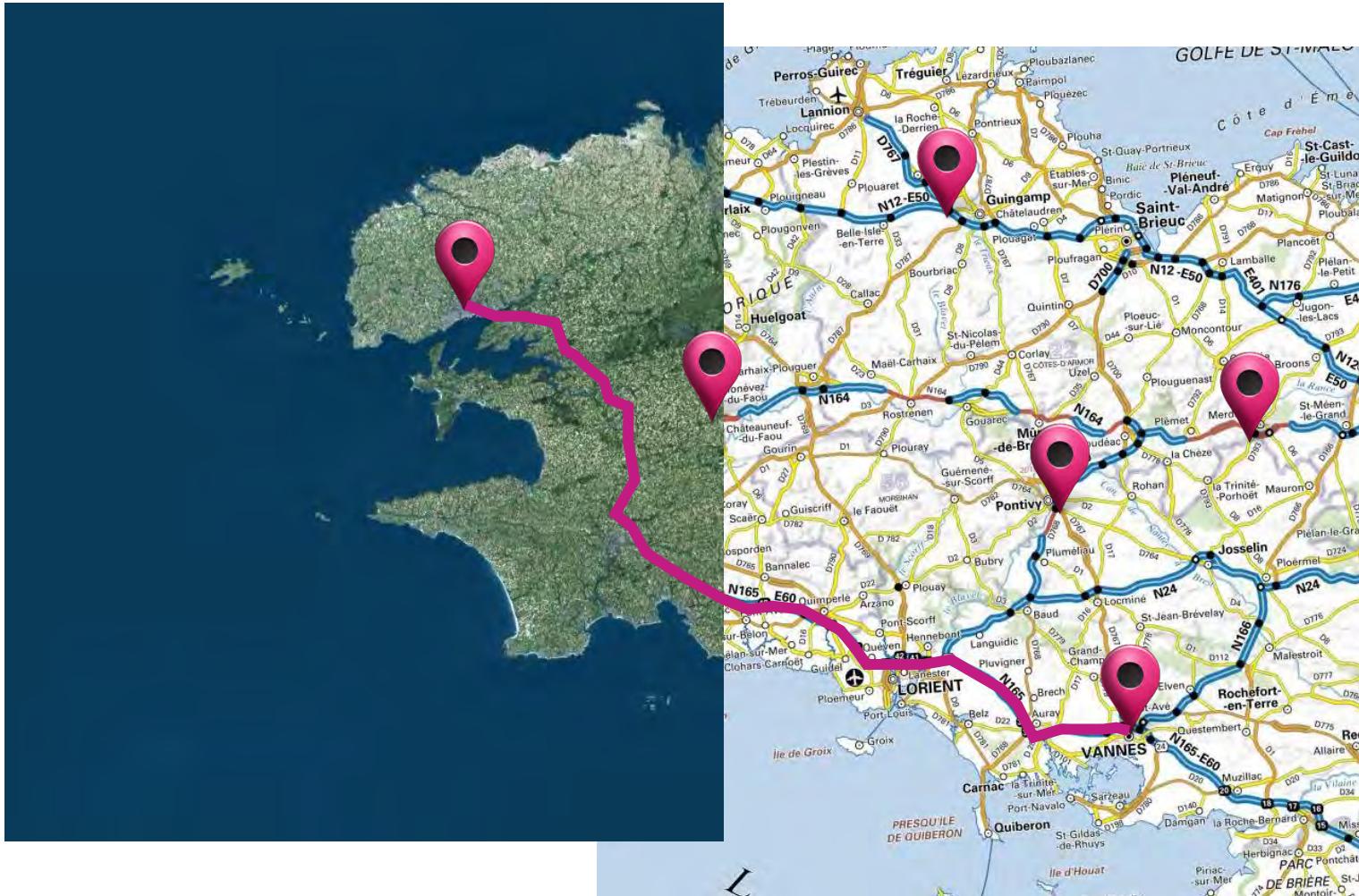
Thank you for your attention

References

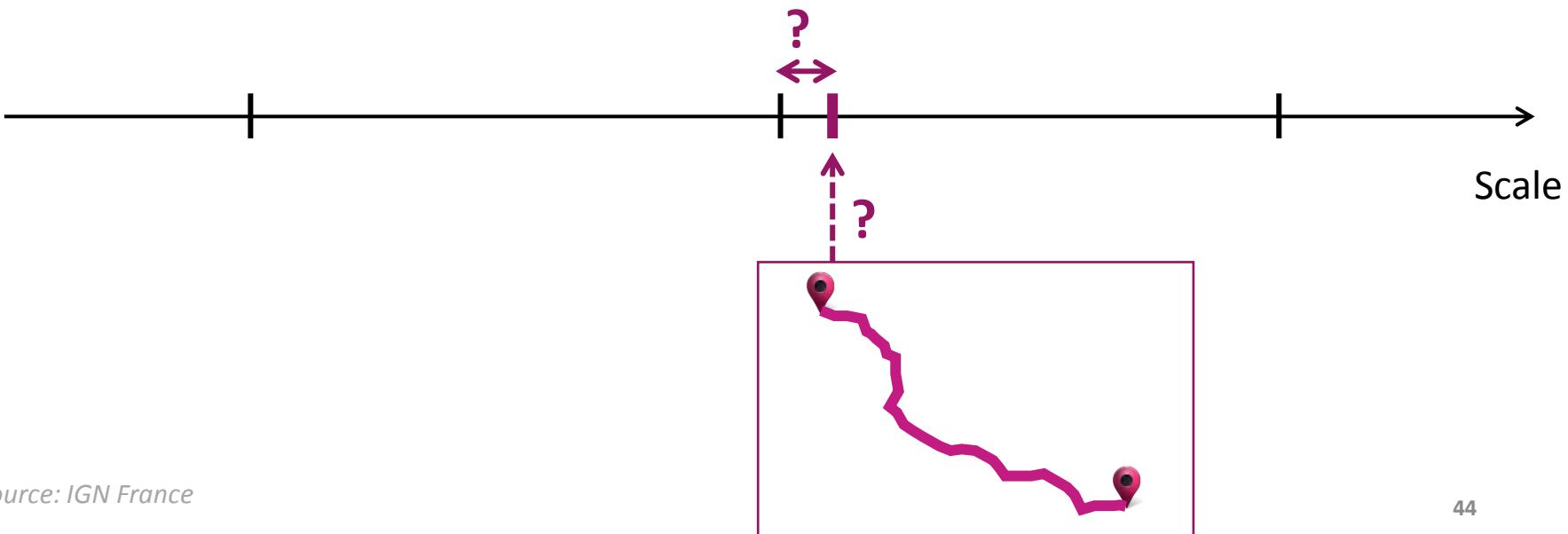
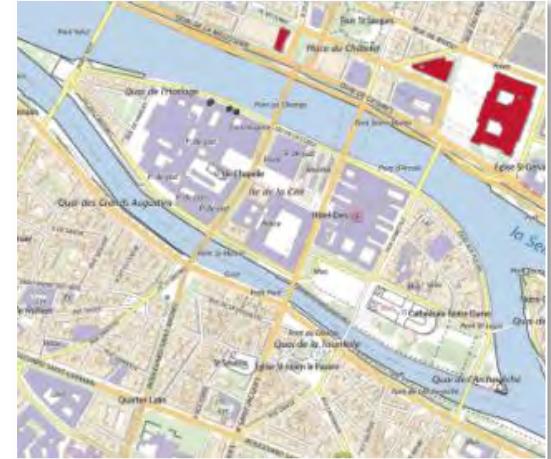
- Existing Multi-Scale Maps
 - BEV Austria <http://www.austrianmap.at/amap>
 - Google Maps <http://www.google.fr/maps>
 - ICGC Catalonia <http://www.icc.cat/vissir3>
 - IGN France <http://www.geoportail.gouv.fr/accueil>
 - OpenStreetMap <http://www.openstreetmap.org/>
 - Swisstopo <http://map.geo.admin.ch/>
- Literature
 - **Brewer C, Buttenfield B (2007)** Framing Guidelines For Multi-Scale Map Design Using Databases At Multiple Resolutions, *Cartography and Geographic Information Science*, Vol. 34, No. 1, pp. 3-15
 - **Girres JF, Touya G (2014)** Cartographic Generalisation Aware of Multiple Representations, *Proceedings of GIScience 2014 - Poster session*, (Eds) Duckham M, Stewart K, Pebesma E
 - **Schwartges N, Allerkamp D, Haunert JH, Wolff A (2013)** Optimizing Active Ranges for Point Selection in Dynamic Maps, *16th ICA workshop on generalisation*, Dresden
 - **Touya G, Girres JF (2013)** ScaleMaster 2.0: a ScaleMaster extension to monitor automatic multi-scales generalizations, *Cartography and Geographic Information Science*, Vol. 40, No. 3, pp 192-200

Annexes

Thematic data

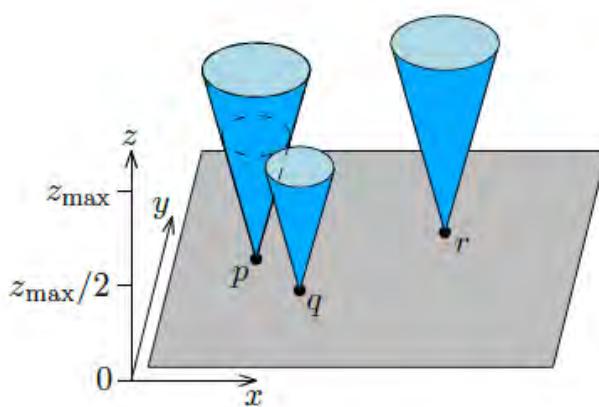


Thematic data



Source: IGN France

Use of existing consistent generalisation methods



Source : [Schwartzges et al, 2013]



Source : [Brewer & Buttenfield, 2007; Touya & Girres, 2014]

Levels of abstraction distribution

