ÉCOLE NATIONALE DES PONTS ET CHAUSSÉES

INSTITUT POLYTECHNIQUE DE PARIS

Which spatial meshes to accommodate the population and organise mobility?

Situation of the French metropolitan territory in 2020

Anne GUILLEMOT & Fabien LEURENT

Mobility & Territory

CIRED

Centre international de recherche sur l'environnement et le développement — Unité mixte de recherche CNRS - ENPC - Cirad - EHESS - AgroParisTech — www.centre-cired.fr Twitter: @cired8568

Overview

1. Context of the research
2. Research questions and objective
3. Methodology
4. Results
5. Conclusion

Context of the research

- Matching institutional and functional territories: a key challenge for local public action
  - Widespread mismatch between spatial dynamics and administrative boundaries
    = casts doubt on the efficiency of public action
- Functional territories for everyday mobility:
  - Urbanised area : contains homes and jobs
  - Functional urban area: urbanised area + the surrounding area under influence (commuting)
- Organising public mobility services at the right scale
  - Different scales for different mobility patterns: consider the periphery of cities
  - From « Urban transport organising authorities » in the largest cities (1970s) to « Mobility organising authorities » throughout France (2019)

Research questions and objective

Investigate the right perimeter for organising everyday mobility, based on a detailed and compared examination of functional and institutional territories

- Which spatial meshes accommodate the population and jobs?

  ⇨ Which urban and metropolitan reality do they reveal?

- Which territorial jurisdictions have been established to organize everyday mobility?

  ⇨ How do they match the urban and metropolitan realities?

- Which existing perimeters could better fit for purpose?

Methodology

3 geographical meshes to be analyzed

- « **Urban units** » (INSEE study zoning)
  = a municipality or group of municipalities with a continuous built-up area […] and at least 2,000 inhabitants.
- « **Functional urban areas** » (INSEE study zoning)
  = a group of municipalities […] consisting of a population and employment hub, and a ring of municipalities where at least 15% of the active population work in the hub
- « **Mobility organizing zones** » (local policy zoning)
  = a group of municipalities […] which form the territorial jurisdiction of a Mobility organizing authority

Open-source statistic data provided at the municipal scale

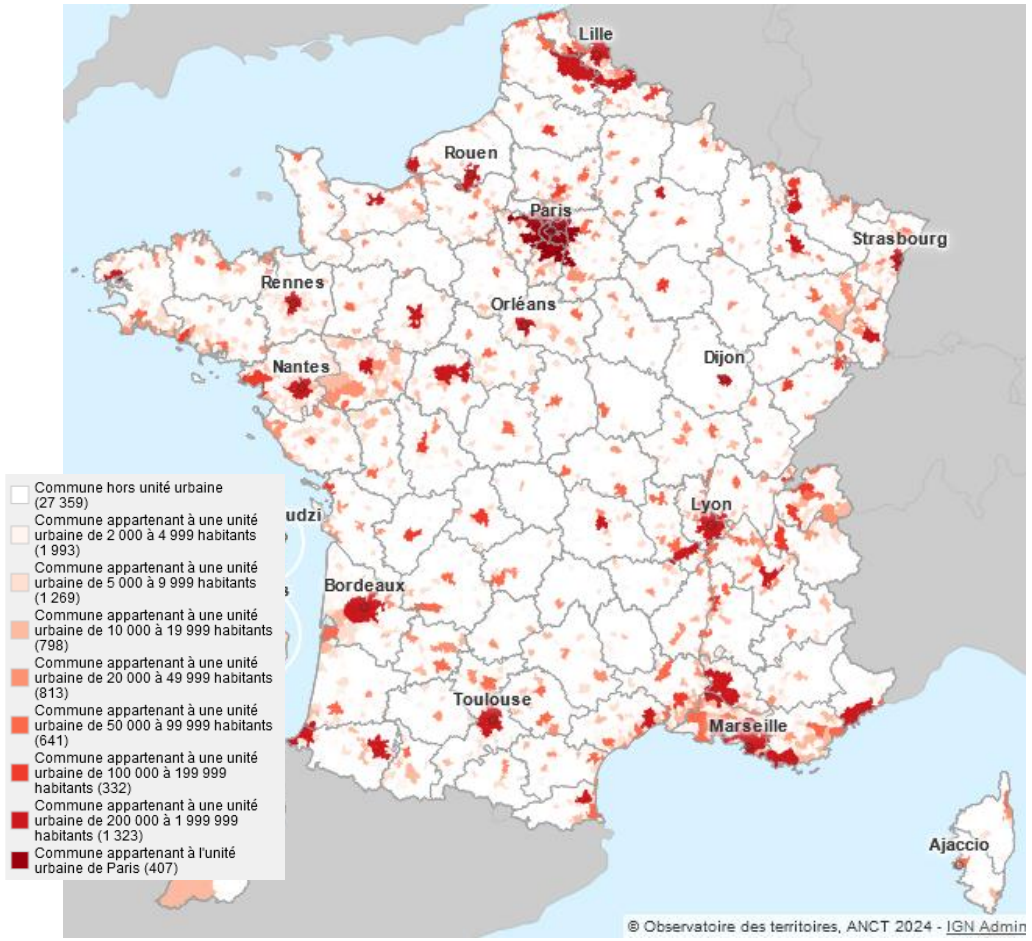
INSEE (2020), CEREMA (2023)

Data processing: ranking, characterizing, comparing & establishing typologies

Key metrics:

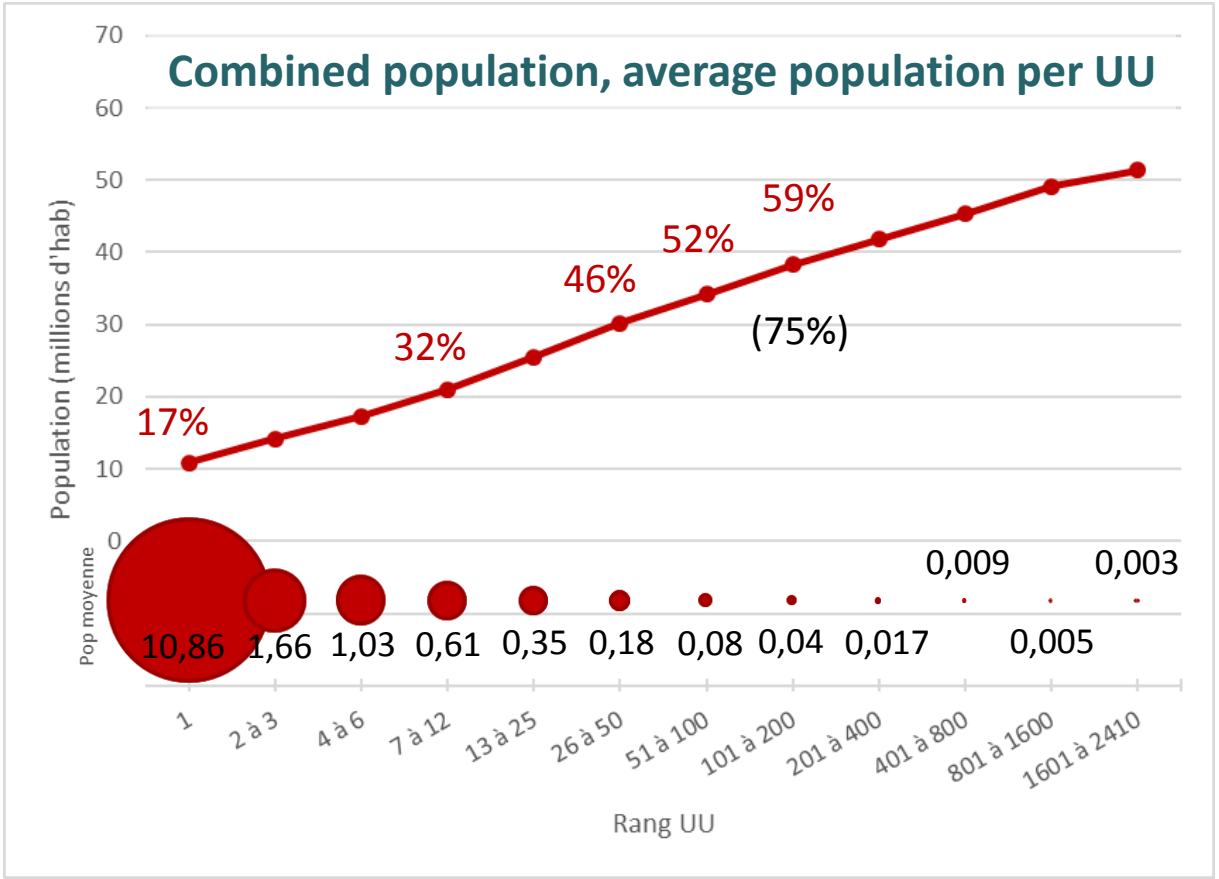
- population size
- surface area
- density of population

Urban hierarchy



2411 Urban units (UU)

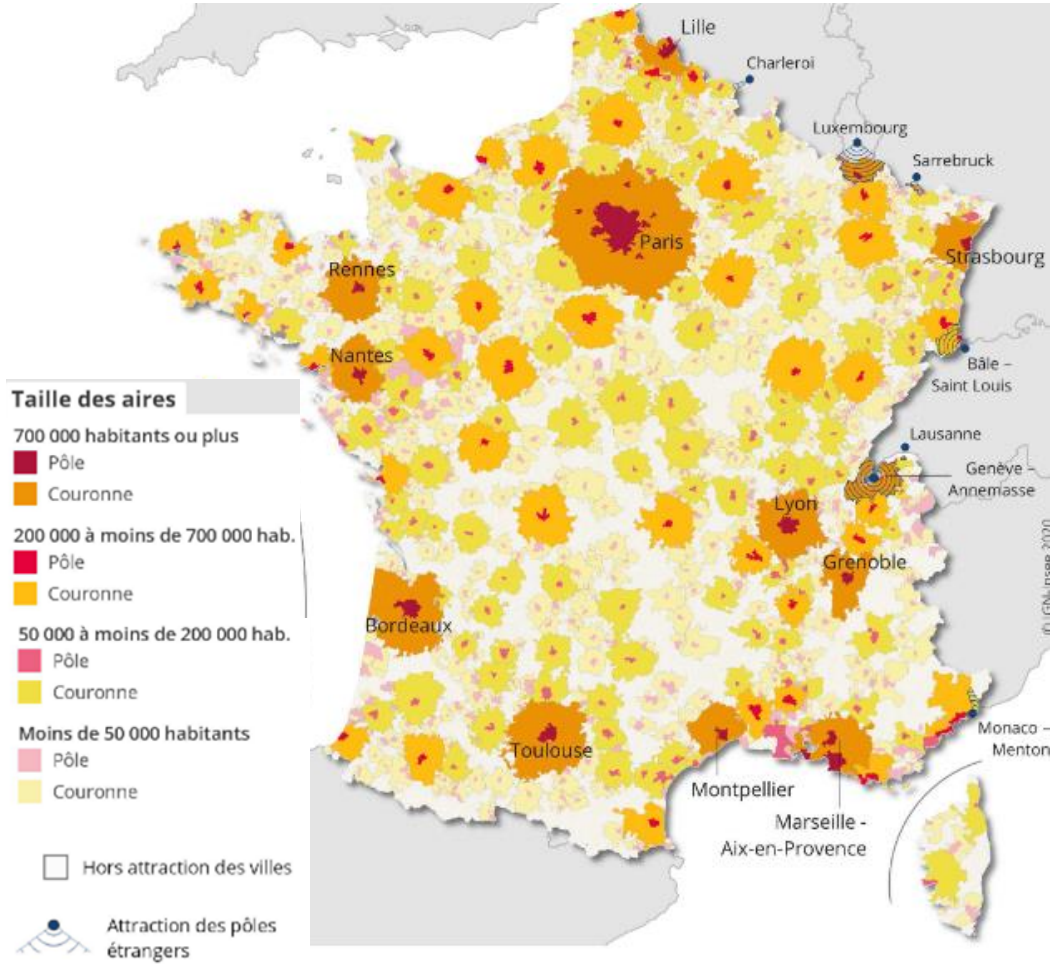
21% of the 35,000 municipalities
79% of the population
24% of the surface area

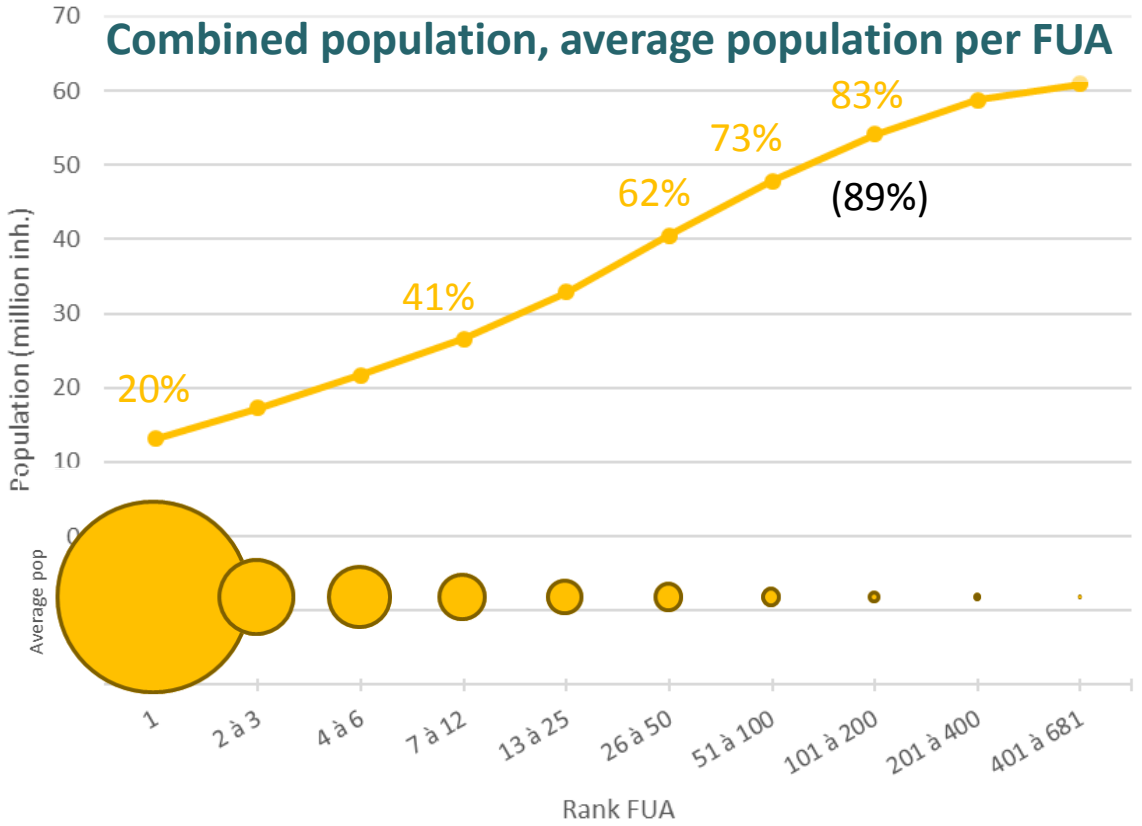


Metropolitan hierarchy

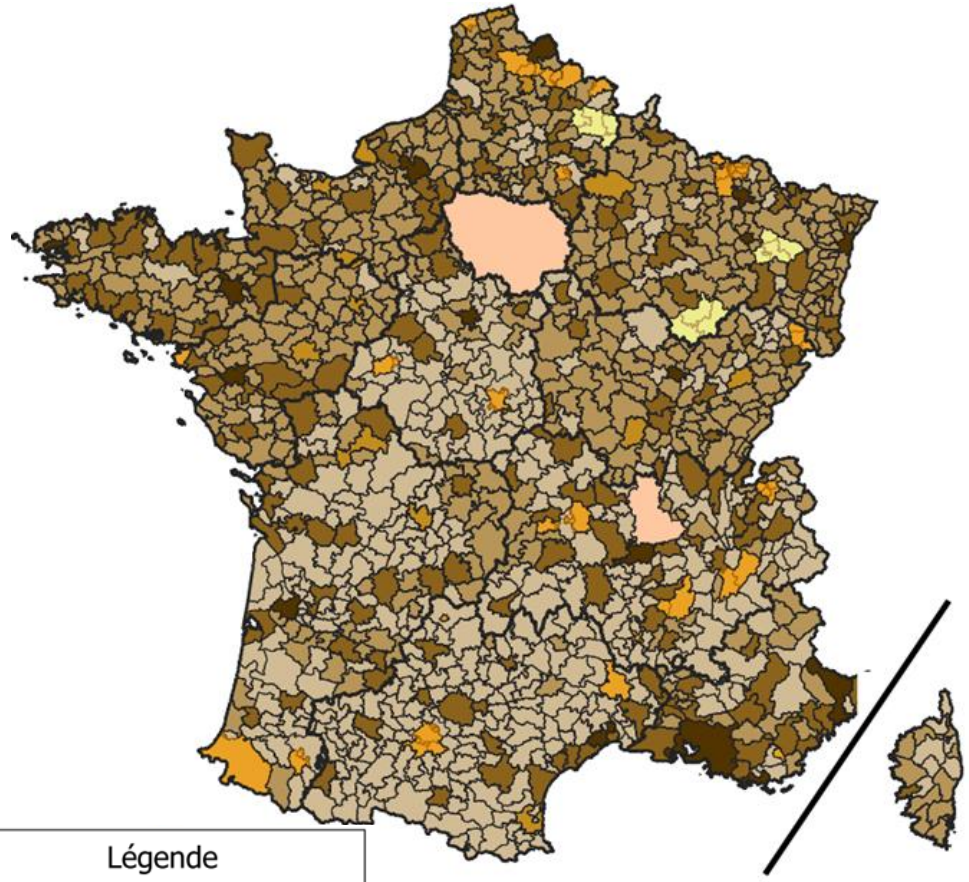
682 Functional urban areas (FAU)

74% of the municipalities
93% of the population
70% of the surface area



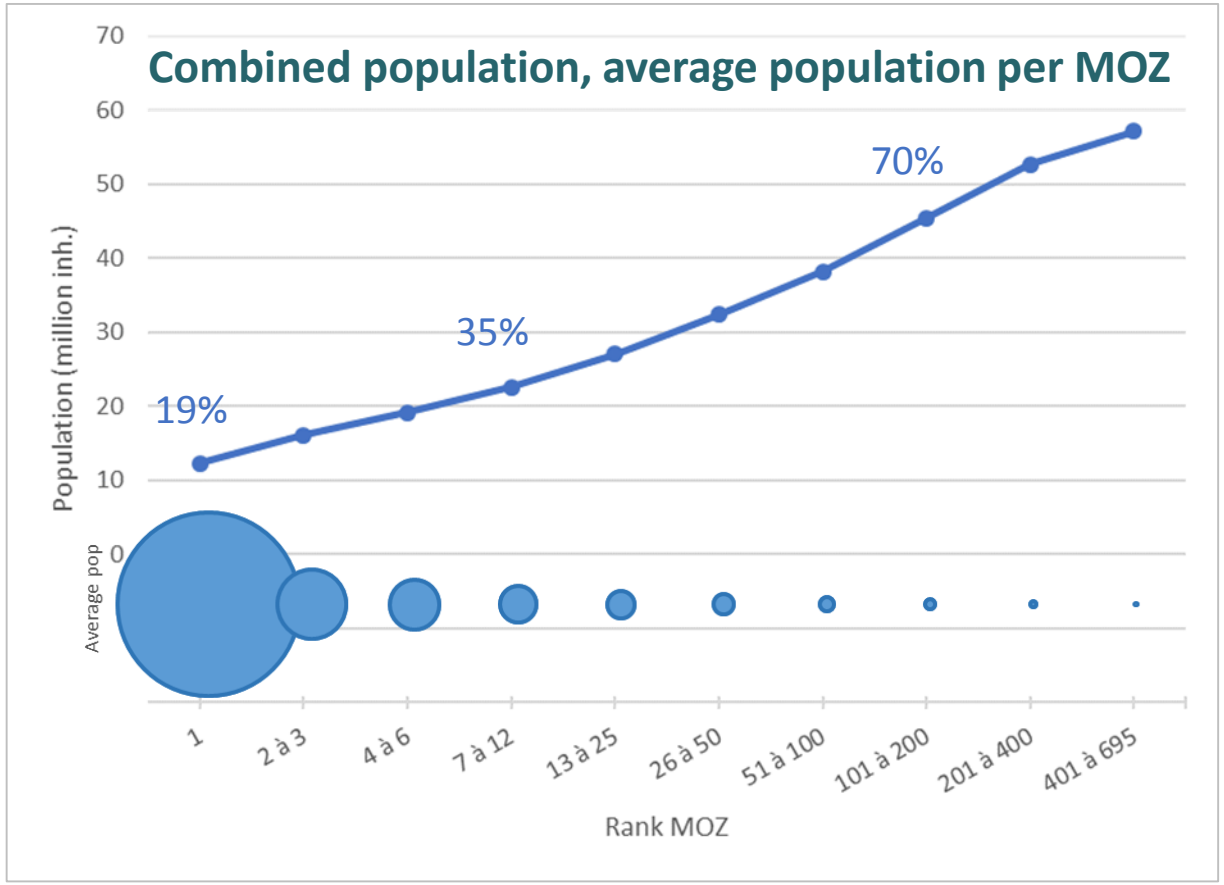


Mobility jurisdictions hierarchy



696 Mobility organizing zones (MOZ)

67% of the municipalities
88% of the population
63% of the surface area

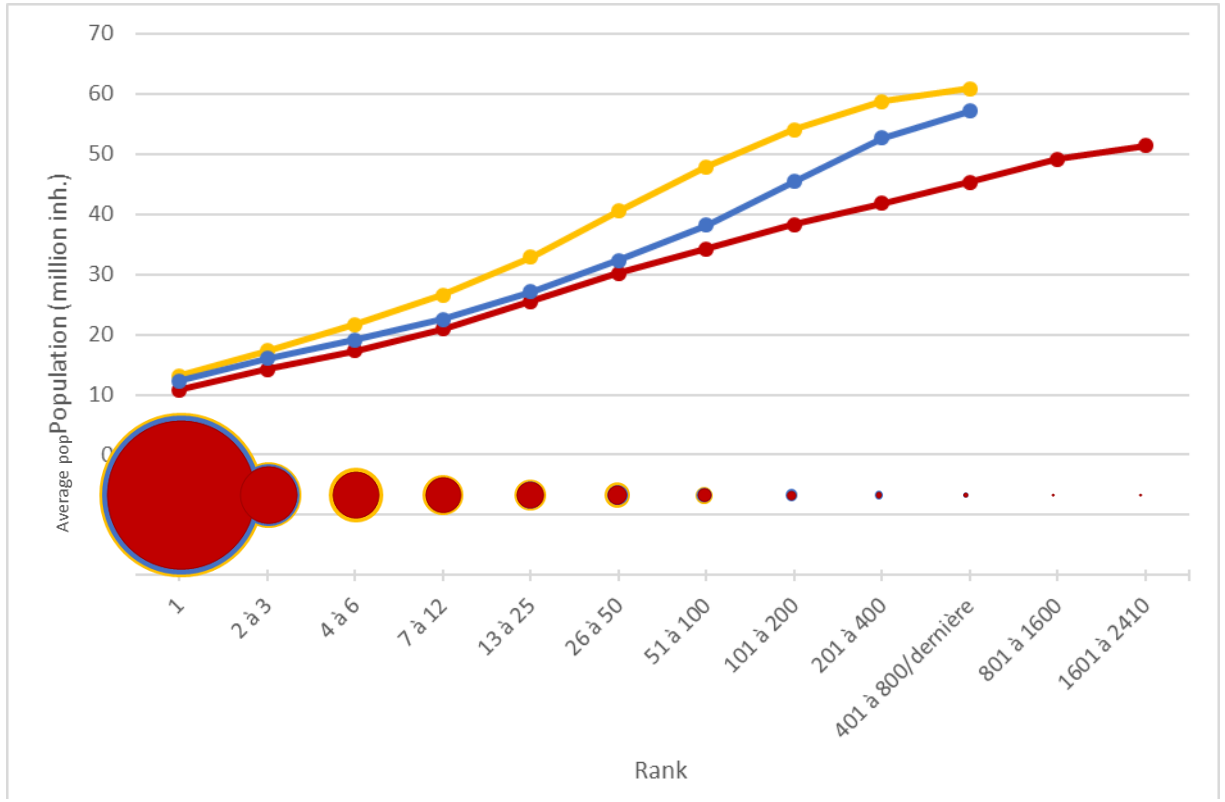


Measuring amplification

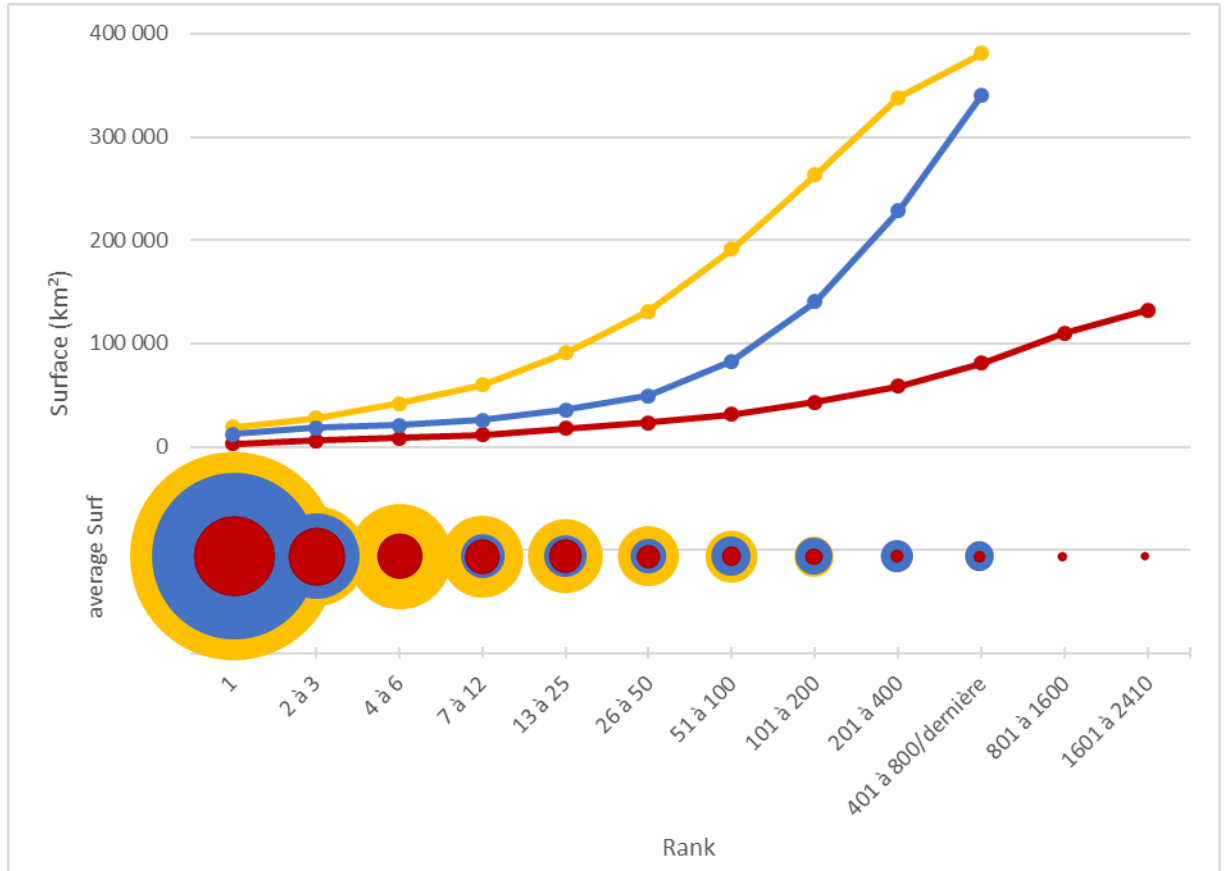
MOZ vs FUA (population & surface)

First 200: 70% & 26% vs 83% & 48%
Last 500: 18% & 37% vs 10% & 22%

Population

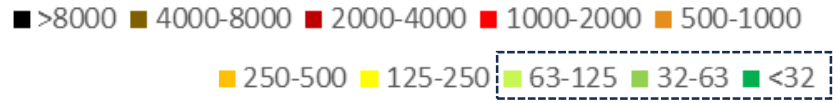


Surface

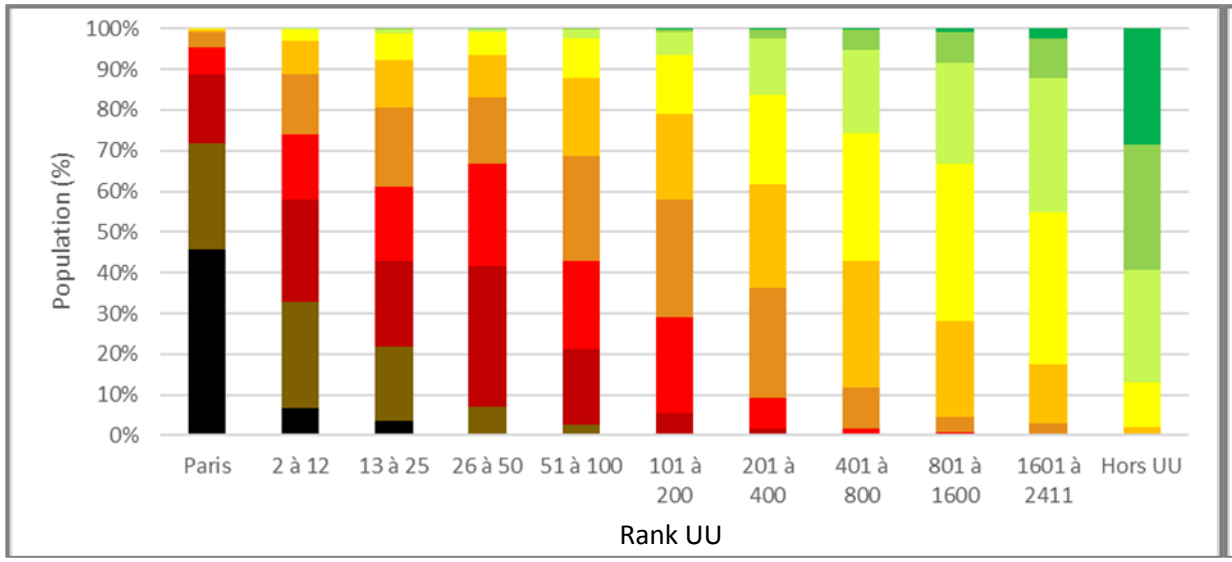


FUA MOZ UU

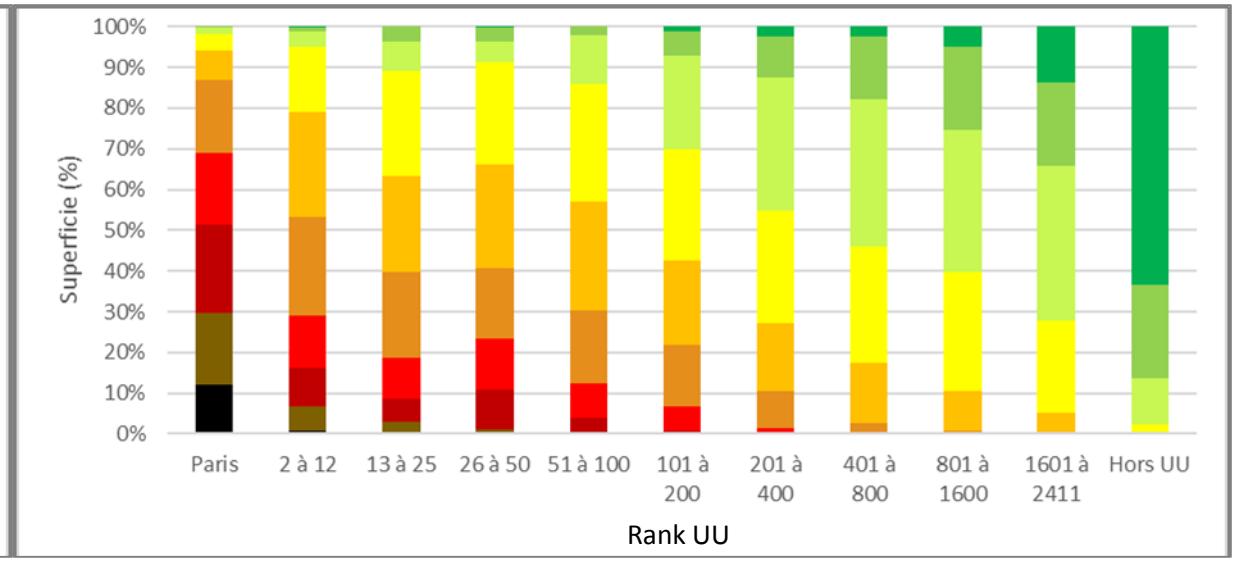
Urban heterogeneity



Population

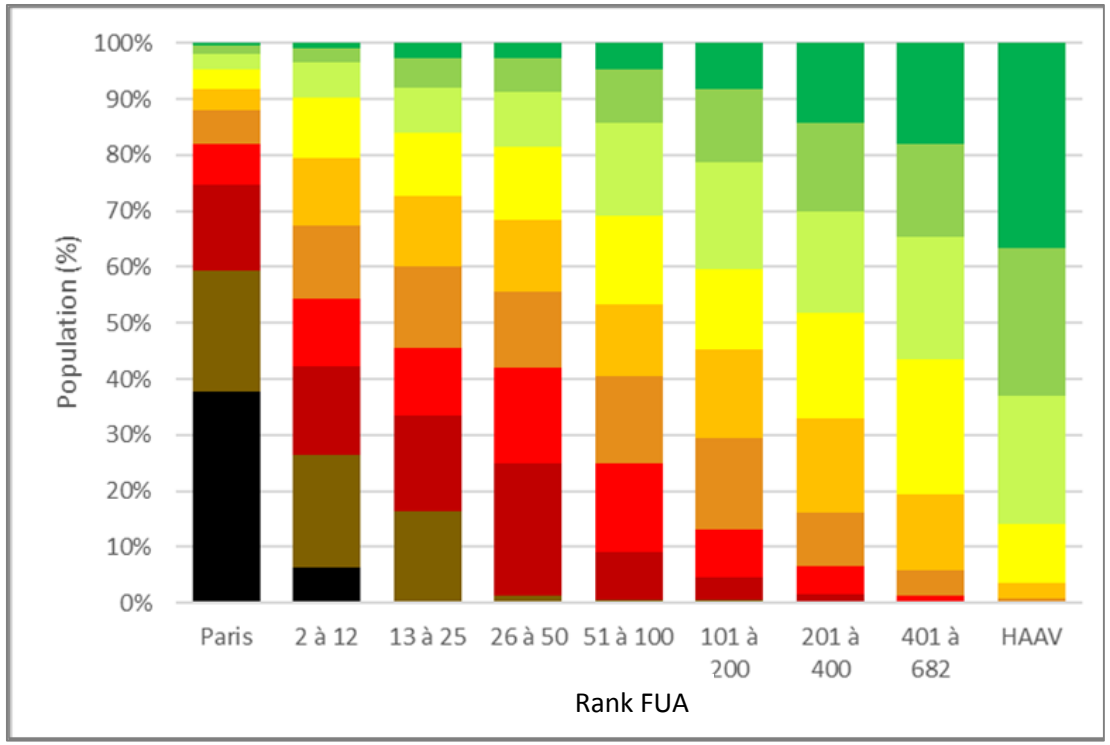


Surface

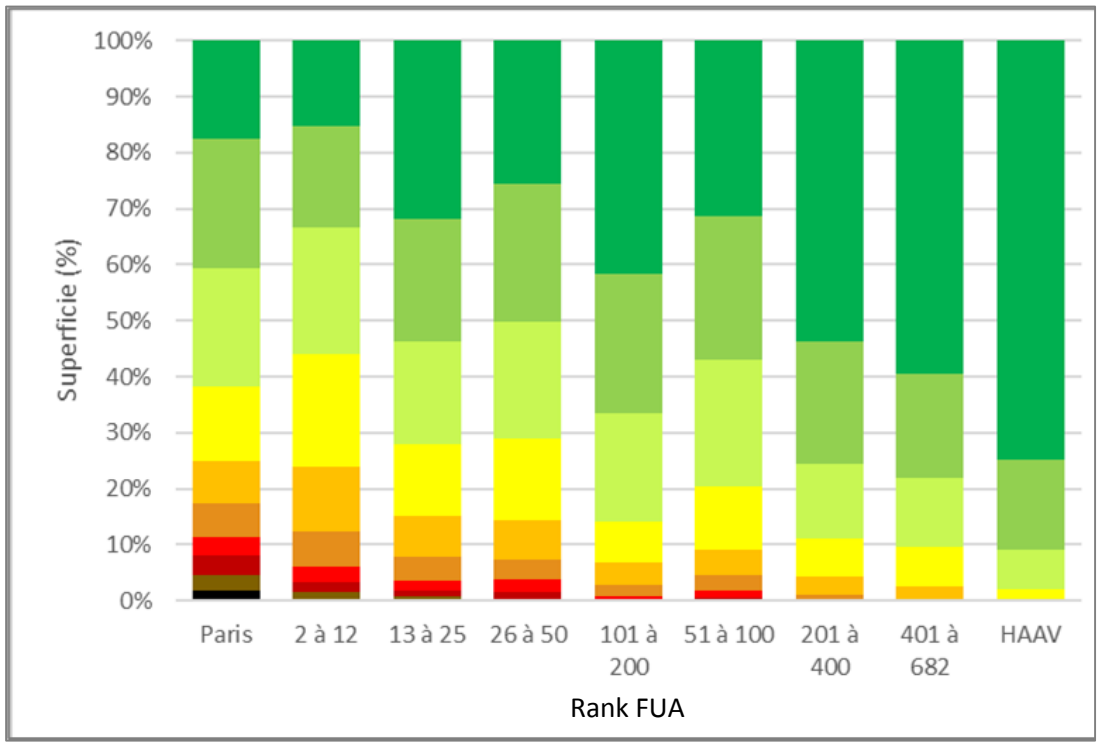


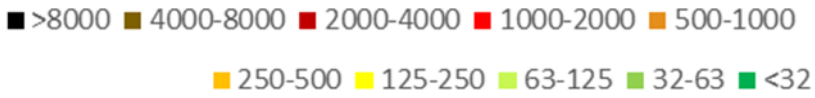
Metropolitan heterogeneity

Population



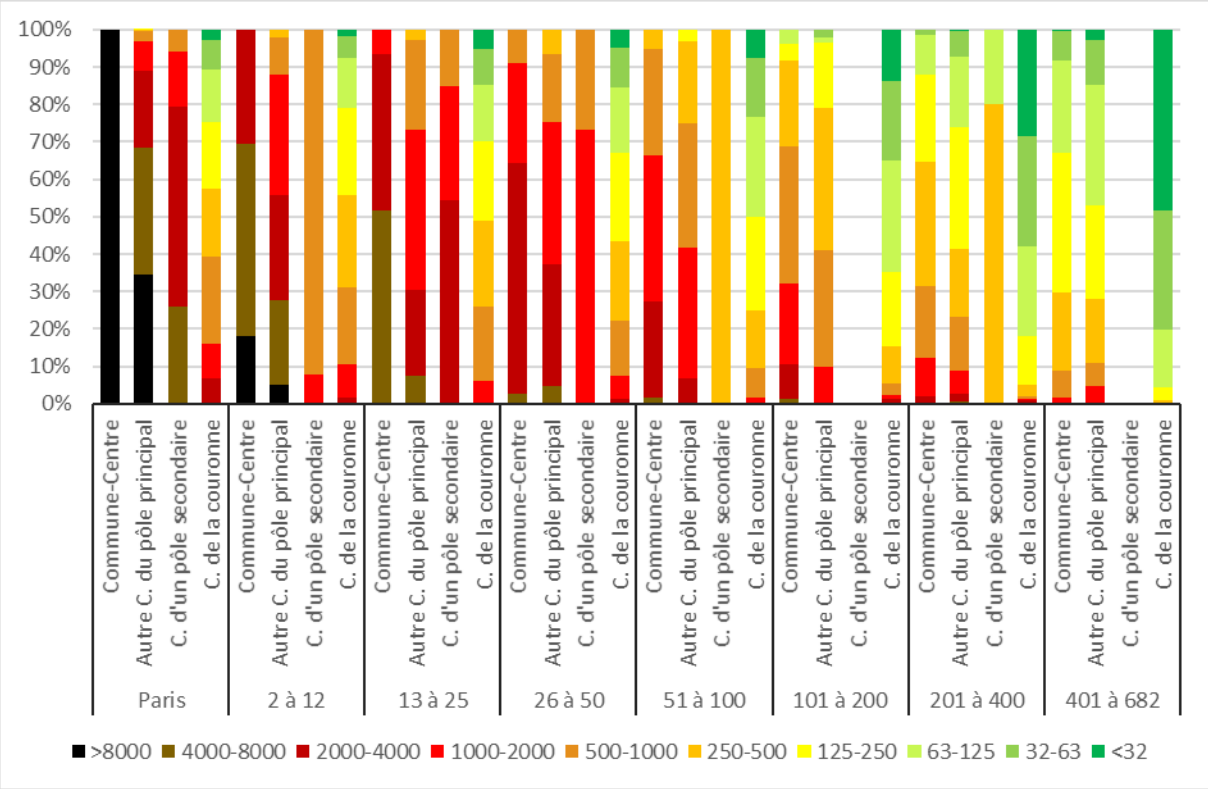
Surface



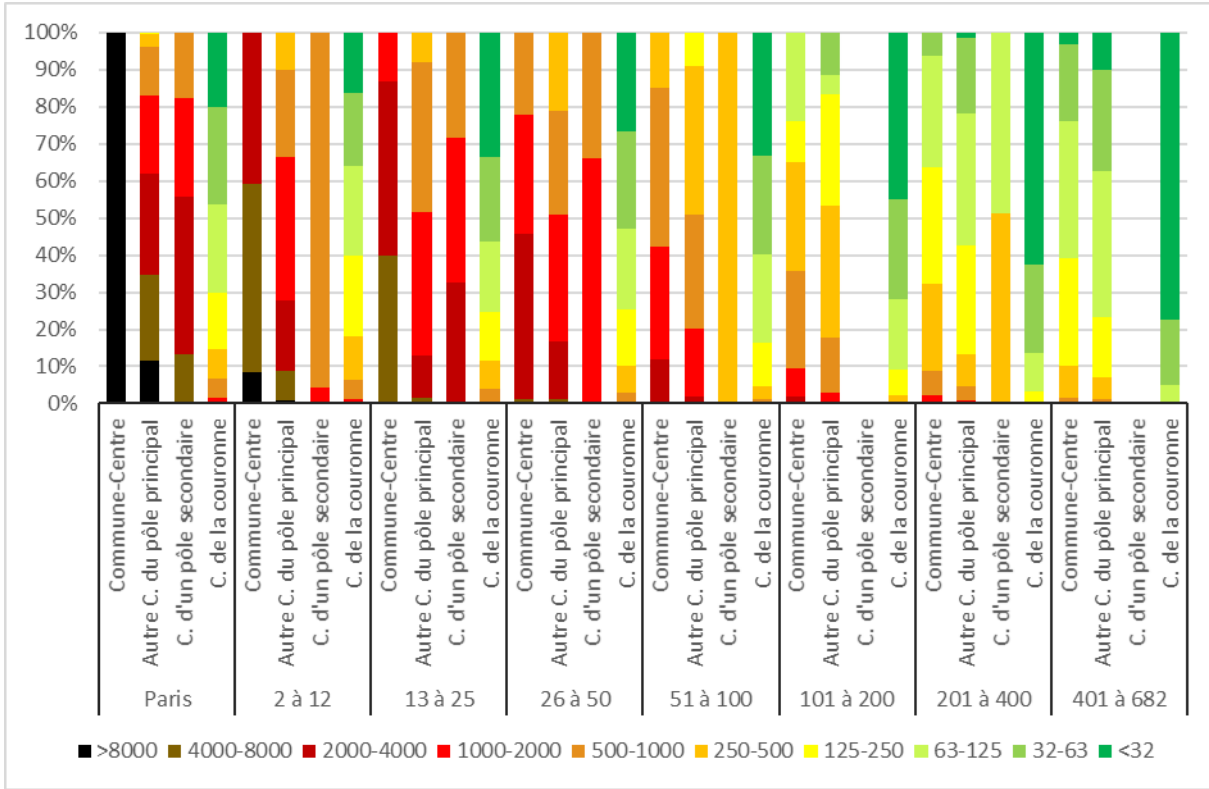


Metropolitan heterogeneity in detail

Population

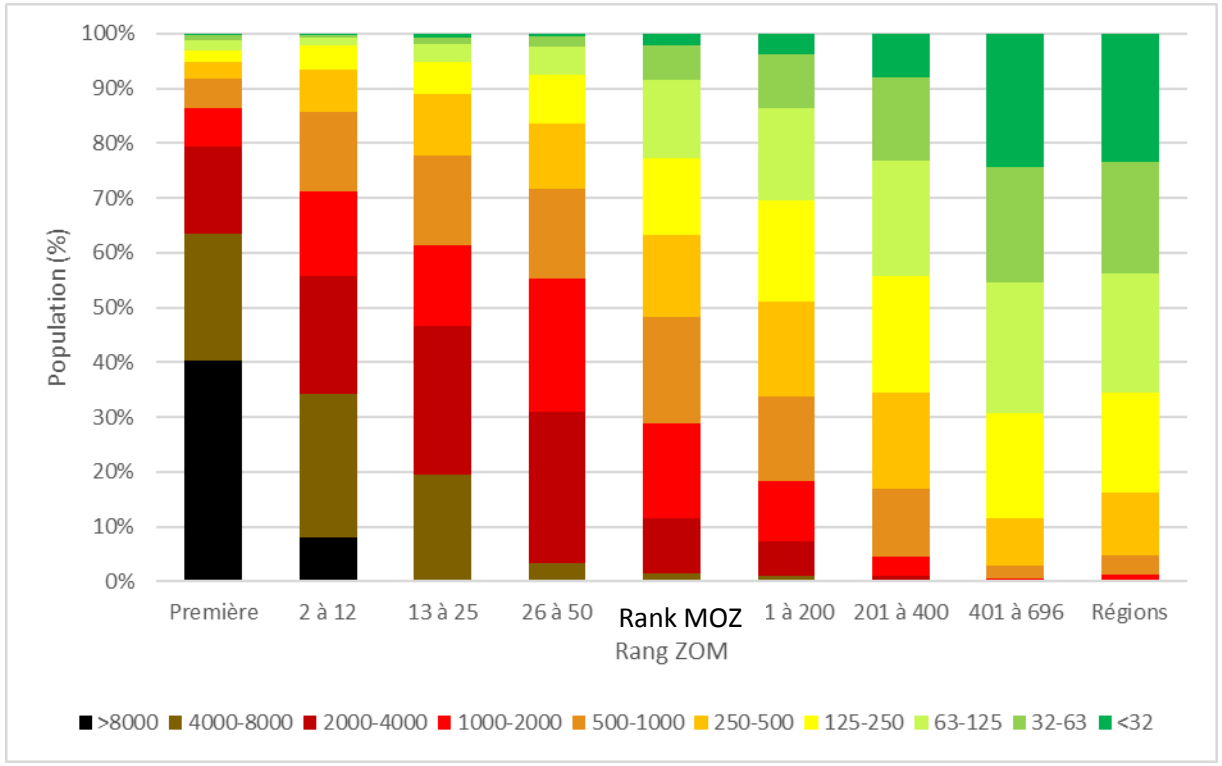


Surface

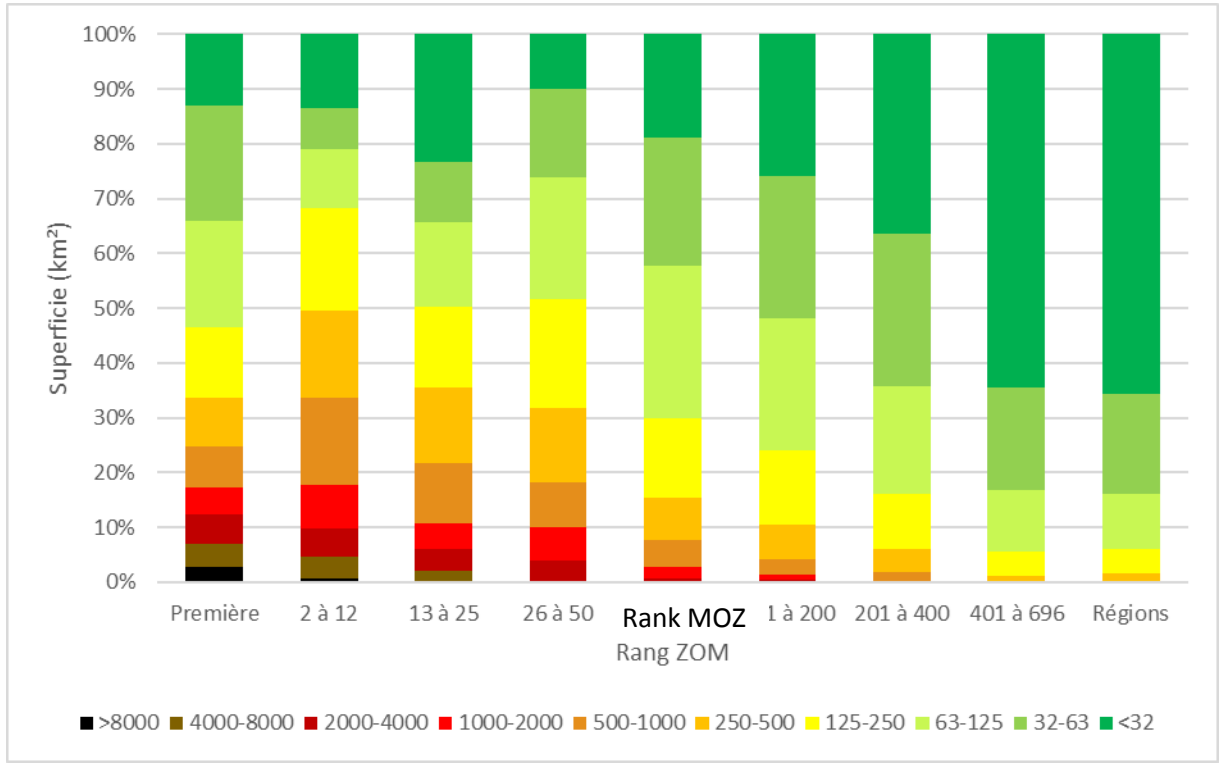


Mobility zones heterogeneity

Population



Surface



A tentative typology

Based on the size of the population & the share of the population living in a dense municipality

Urban Units	Urban areas	Mobility zones
Large: 1-100 (>60,000 inh.; 100%) • Paris • 1-12: regional admin. centers • 1-25: over 250,000 inh.	Large: 1-100 • 1-50: metropolises - consistent with EUROSTAT definition • 51-100: sub-metropolises	Large: 1-100
Medium: 101-200 (>27,000 inh.; 90%)	Medium: 101-200	Medium: 101-200
Small: 201-400 (>12,000 inh.; 80%)	Small : 201-400	Small: 201-400
Very small: 401-800 (>6,500 inh.; 75%)	Pseudo-urban areas (rural): over #400	Rural: over #400
Pseudo-cities (rural): over #800 (<6,500 inh.; <70%)		

Everyday mobility crosses all perimeters

- Average commuting distance: 14 km (Liang et al., 2024)
- MOZ* extension: 400-800 km² - radius of 12 to 17 km
  - ⇨ Larger than UU (if any) but too small to address commuting:

    A significant minority of trips will cross the MOZ boundaries
- Are FUA a more appropriate scale?
  - Large FUA could be used as a gauge to delineate large MOZ
  - Medium FUA extension hardly exceeds the average commuting distance
  - Small and smallest FUA are even smaller than corresponding MOZ
  - ⇨ A majority of trips will cross the FUA boundaries
  - ⇨ Few inhabitants per entity, but a high number of entities

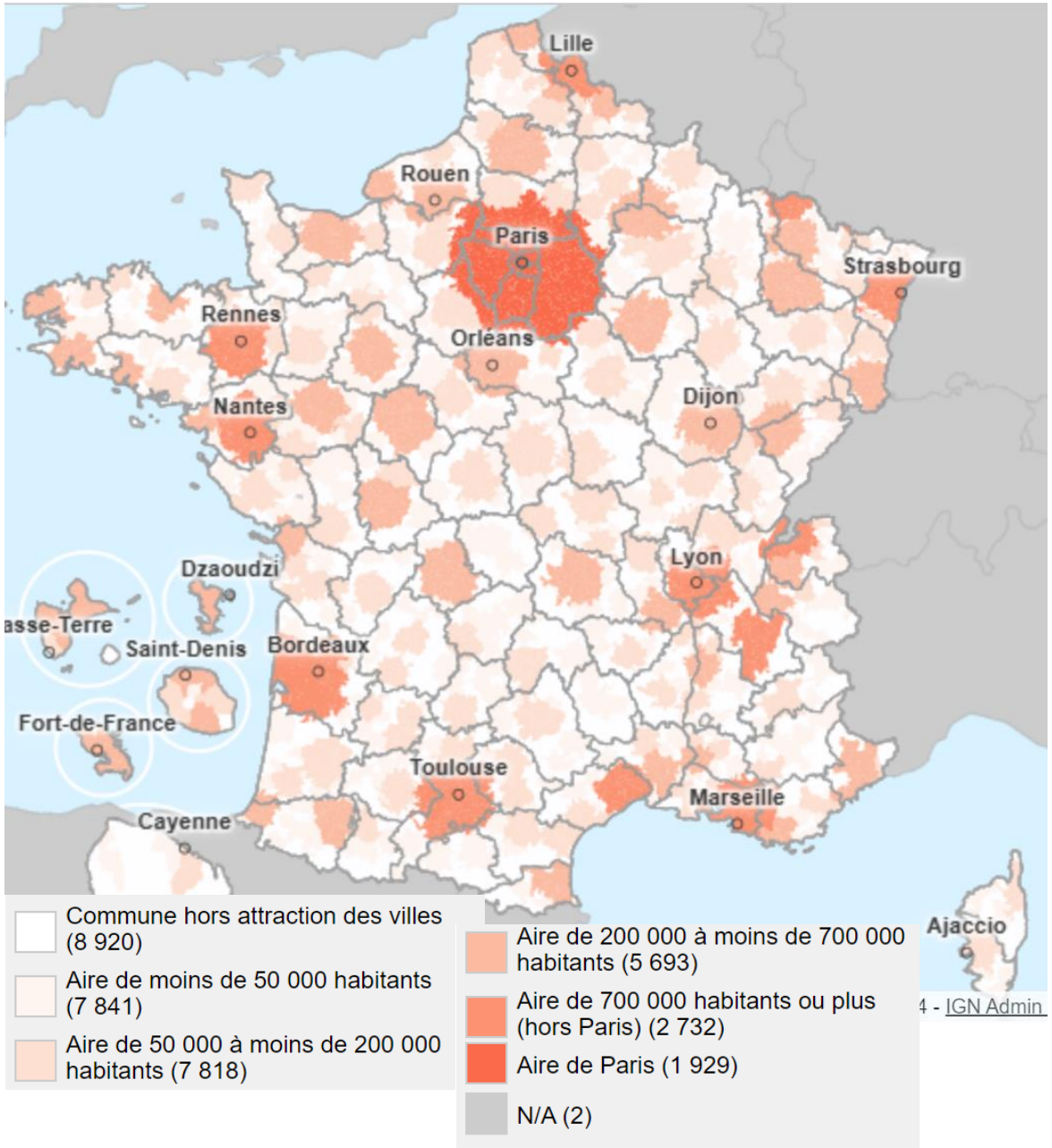
    = a significant issue at the national scale

*smaller than rank #12

Departments: the right scale to organize everyday mobility?

The metropolitan reality matches the department meshing

- Same number of large FUA (100) and departments (96)
- FUA are contained in the departments boundaries
- Most (sub-) metropolises are administrative centers of departments:
  - 45/50 metropolises
  - 40/50 sub-metropolises



Conclusion

- We have provided a detailed overview of the urban and metropolitan realities by questioning the functional zones defined by INSEE
  - different categories
  - pseudo-cities, pseudo-urban areas
- We have provided an overview of the variety of MOZ and associated authorities – including rural ones
- We have shown that neither UU, nor FUA, nor MOZ are fully relevant to organize everyday mobility: departments could be a more appropriate scale.

Thank you for your attention!

anne.guillemot@enpc.fr