

Overview of the Urban Researches on Latin America in the ESO-Rennes Lab

A special focus on spatial mobilities

Florent DEMORAES
ESO-Rennes Lab (UMR 6590 CNRS)
Department of Geography and Land Planning
Université Rennes 2

Seminar organised on the occasion of the Pr. Alberto Giordano's visit from the Department of Geography of Texas State University
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Study areas: 6 cities in SA



Cities Countries	Inhabitants (approx.)	Periods
Bogotá Colombia	8 millions (2012)	Since 2008
La Paz / El Alto Bolivia	1.6 million (2012)	2007-2009
Lima / Callao Peru	10 millions (2014)	2012-2013
Quito Ecuador	2.6 millions (2014)	2000-2009
Santiago de Chile Chile	6 millions (2012)	Since 2008
São Paulo Brazil	20 millions (2012)	Since 2008

Two Research Programmes

- **PACIVUR:** Andean Research and Training Programme on Urban Vulnerability and Risks

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- **PACIVUR:** Andean Research and Training Programme on Urban Vulnerability and Risks
 - **METAL:** Latin-American Metropolises in the Process of Globalisation: Territorial Reconfiguration, Spatial Mobility, Public Action
-

The PACIVUR programme

- **PACIVUR: Andean Research and Training Programme on Urban Vulnerability and Risks**
 - dir. R. D'Ercole and P. Metzger (PRODIG Lab)
 - Funded by IRD (French Development Research Institute) and DIPECHO (Disaster Preparedness Programme of the European Commission's Humanitarian Aid Department)

Urban vulnerabilities	My contribution
<ul style="list-style-type: none">■ Exposure to natural hazards■ Urban configurations■ Governance	<ul style="list-style-type: none">■ Road and transportation networks vulnerability■ Potential loss of accessibility

The METAL Programme

- **METAL: Latin-American Metropolises in the Process of Globalisation: Territorial Reconfiguration, Spatial Mobility, Public Action**
 - dir. F. Dureau (MIGRINTER Lab)
 - Participants from ESO : V. Gouëset, JM. Fournier, E. Salin
 - funded by the ANR (French National Research Agency)
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The METAL Programme

- **Three research directions:**

- Characterisation of the socio-territorial reorganisations (since 1980):
 - evolution of the settlement, changes in the social divisions of urban space;



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 - benchmark models; public action on housing and transport; interactions between local and national policies;



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 - evolution of the settlement, changes in the social divisions of urban space;
 - Analysis of public policies:
 - benchmark models; public action on housing and transport; interactions between local and national policies;
 - Understanding of mobility practices
 - Migrations
 - Residential mobility
 - Daily trips
-

The METAL Programme

- **A comparative approach**
 - 3 cities (Bogotá, Santiago and São Paulo)
 - Combining metropolitan-wide analysis + case studies on a set of selected areas that illustrate the ongoing changes
-

The METAL Programme

- **A comparative approach**

- 3 cities (Bogotá, Santiago and São Paulo)
- Combining metropolitan-wide analysis + case studies on a set of selected areas that illustrate the ongoing changes

- **Data sources**

- Micro-data from censuses
 - Biographical surveys on mobility conducted in 2009 in the selected areas
 - a questionnaire survey (about 1000 households)
 - and in-depth qualitative interviews with a hundred inhabitants, in each city
-

The METAL Programme

- **The implementation of GIS databases** (under my coordination)
 - Objectives
 - Mapping of indicators from census data ([METAL Maps](#))
 - Density, motorisation rates, percentage of immigrants, etc.
 - Household sampling (stratified on the urban morphology derived from satellite images)
 - Assessment of socio-residential segregation at different scales
 - Appraisal of daily mobility spaces
 - ...
-

The METAL Programme

The screenshot displays the ArcGIS interface with a map of a region. A data table is overlaid on the map, showing administrative units. The table has the following columns: Capeta, Eipo, Fecha observacion, Año, Descripción, Estación, Address local, Non objects, and Signos y variaciones. The data is as follows:

Capeta	Eipo	Fecha observacion	Año	Descripción	Estación	Address local	Non objects	Signos y variaciones
LOCALIDAD_MUNI04		2008	2008	10 Municipios (periférico y 18 localidades para dentro) Códigos de estudio en 2008. Se cuenta municipios de El Estero y Subarriba.	Estación DC y miembros periférico	Aldea: MARIKÓ (P.C.) Tota	30	Código = Códigos de los municipios de Bogotá DC de 1 a 19 y de los municipios periféricos. Varían = Varían de los localidades (384 DC) y municipios periféricos.
LOCALIDAD_MUNI05		2008	2008	18 Municipios (periférico y 18 localidades para dentro) Códigos de estudio en 2008. Se cuenta municipios de El Estero y Subarriba.	Estación DC y miembros periférico	Aldea: MARIKÓ (P.C.) Tota	31	Código = Códigos de los municipios de Bogotá DC de 1 a 19 y de los municipios periféricos. Varían = Varían de los localidades (384 DC) y municipios periféricos.

The METAL Programme

The screenshot displays the METAL software interface, which is used for urban planning and data analysis. The main window shows a map of Sao Paulo with various data layers overlaid. The interface includes a menu bar, a toolbar, and a main map area. A 'Relations de la base' (Database Relations) window is open, showing a tree view of the database structure. The 'Objets à visualiser' (Objects to visualize) window is also open, showing a list of objects to be displayed on the map. A data table is visible at the bottom right, titled 'CARTOGRAFIA DAS FAVELAS' (Favela Cartography).

Relations de la base:

- Doğru METAL
 - División territorial
 - 1. Sectores 1993 v2
 - 2. Sectores 2005 v2
 - 3. Centralidades
 - 4. Localidad_Mun93
 - 5. Localidad_Mun05
 - 6. Evol_sector_5005

Objets à visualiser:

- Estadocensensadas
- Sectores 2005 v2
- Map (Google)

Objets de la base:

- Sao Paulo
 - División territorial
 - 1. Municipios 1991
 - 2. Municipios 2001
 - 3+ MuniEstadoSP 97
 - 4. MuniEstadoSP 05
 - 5. DistritoRMSP2001
 - 6. Subpref RMSP 2003
 - 7. Sect Censal 1991
 - 8. Sect Censal 2000
 - 9. Area Poderes 2000
 - 10. AreaUrbanRMSP
 - 11. Favelas MSP 2000
 - 12. Quadras MSP
 - Visualizar favelas
 - 13. Linhas ferroviarias

Objets à visualiser:

- Linhas ferroviarias
- Uso do Solo
- MuniEstadoSP 97

CARTOGRAFIA DAS FAVELAS

Numero analise	Descrição	Estimada populacao	Recuperação de	NUM. favelas	Formas de ocupação	Sistema de coordenadas	Sistema de projeção	Ano	Foto
1	Area de intervenção do SP	1.000.000	Setor	912	RMSP 97	Geogra. Ansp	UTM/BR 23 Sur	2000	001
2	Município Estado SP 1991	1.000.000	Estado SP	945	RMSP 97	Geogra. Ansp	UTM/BR 23 Sur	1991	002
3	Area de intervenção do SP	1.000.000	Setor	945	RMSP 97	Geogra. Ansp	UTM/BR 23 Sur	2000	003
4	Município Estado SP 2001	1.000.000	Estado SP	945	RMSP 97	Geogra. Ansp	UTM/BR 23 Sur	2001	004
5	Area de intervenção do SP	1.000.000	Setor	945	RMSP 97	Geogra. Ansp	UTM/BR 23 Sur	2000	005
6	Município Estado SP 2000	1.000.000	Estado SP	945	RMSP 97	Geogra. Ansp	UTM/BR 23 Sur	2000	006
7	Area de intervenção do SP	1.000.000	Setor	945	RMSP 97	Geogra. Ansp	UTM/BR 23 Sur	2000	007
8	Município Estado SP 2000	1.000.000	Estado SP	945	RMSP 97	Geogra. Ansp	UTM/BR 23 Sur	2000	008
9	Area de intervenção do SP	1.000.000	Setor	945	RMSP 97	Geogra. Ansp	UTM/BR 23 Sur	2000	009
10	Município Estado SP 2000	1.000.000	Estado SP	945	RMSP 97	Geogra. Ansp	UTM/BR 23 Sur	2000	010
11	Area de intervenção do SP	1.000.000	Setor	945	RMSP 97	Geogra. Ansp	UTM/BR 23 Sur	2000	011
12	Município Estado SP 2000	1.000.000	Estado SP	945	RMSP 97	Geogra. Ansp	UTM/BR 23 Sur	2000	012
13	Area de intervenção do SP	1.000.000	Setor	945	RMSP 97	Geogra. Ansp	UTM/BR 23 Sur	2000	013
14	Município Estado SP 2000	1.000.000	Estado SP	945	RMSP 97	Geogra. Ansp	UTM/BR 23 Sur	2000	014
15	Area de intervenção do SP	1.000.000	Setor	945	RMSP 97	Geogra. Ansp	UTM/BR 23 Sur	2000	015
16	Município Estado SP 2000	1.000.000	Estado SP	945	RMSP 97	Geogra. Ansp	UTM/BR 23 Sur	2000	016
17	Area de intervenção do SP	1.000.000	Setor	945	RMSP 97	Geogra. Ansp	UTM/BR 23 Sur	2000	017
18	Município Estado SP 2000	1.000.000	Estado SP	945	RMSP 97	Geogra. Ansp	UTM/BR 23 Sur	2000	018
19	Area de intervenção do SP	1.000.000	Setor	945	RMSP 97	Geogra. Ansp	UTM/BR 23 Sur	2000	019
20	Município Estado SP 2000	1.000.000	Estado SP	945	RMSP 97	Geogra. Ansp	UTM/BR 23 Sur	2000	020

The METAL Programme

The screenshot displays the METAL Programme interface, which includes a main map window, a data table, and several toolbars. The map shows a geographical area with various features and a network of roads. The data table, titled 'CARTOGRAFIA SANTIAGO', provides detailed information about the cartographic data, including the name, year, description, extension, and source of the data.

Carta	Caja	Año	Descripción	Extensión	Responsable por	Normativa	Signos y Variables	Sistema de coordenadas	Fuente
1			Cartografía de la Región de Santiago	1:500,000	INIA	INIA	INIA	UTM	INIA
2			Cartografía de la Región de Santiago	1:500,000	INIA	INIA	INIA	UTM	INIA
3			Cartografía de la Región de Santiago	1:500,000	INIA	INIA	INIA	UTM	INIA
4			Cartografía de la Región de Santiago	1:500,000	INIA	INIA	INIA	UTM	INIA
5			Cartografía de la Región de Santiago	1:500,000	INIA	INIA	INIA	UTM	INIA
6			Cartografía de la Región de Santiago	1:500,000	INIA	INIA	INIA	UTM	INIA
7			Cartografía de la Región de Santiago	1:500,000	INIA	INIA	INIA	UTM	INIA
8			Cartografía de la Región de Santiago	1:500,000	INIA	INIA	INIA	UTM	INIA
9			Cartografía de la Región de Santiago	1:500,000	INIA	INIA	INIA	UTM	INIA
10			Cartografía de la Región de Santiago	1:500,000	INIA	INIA	INIA	UTM	INIA
11			Cartografía de la Región de Santiago	1:500,000	INIA	INIA	INIA	UTM	INIA
12			Cartografía de la Región de Santiago	1:500,000	INIA	INIA	INIA	UTM	INIA
13			Cartografía de la Región de Santiago	1:500,000	INIA	INIA	INIA	UTM	INIA

Scientific inquiries

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 - How the daily frequented areas differ according to the place of residence and individuals socio-demographic characteristics in nowadays South American cities?
-

Scientific inquiries

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 - What are the places of residence where the disparities grasped in terms of access to the city are the most pronounced?
-

Scientific inquiries

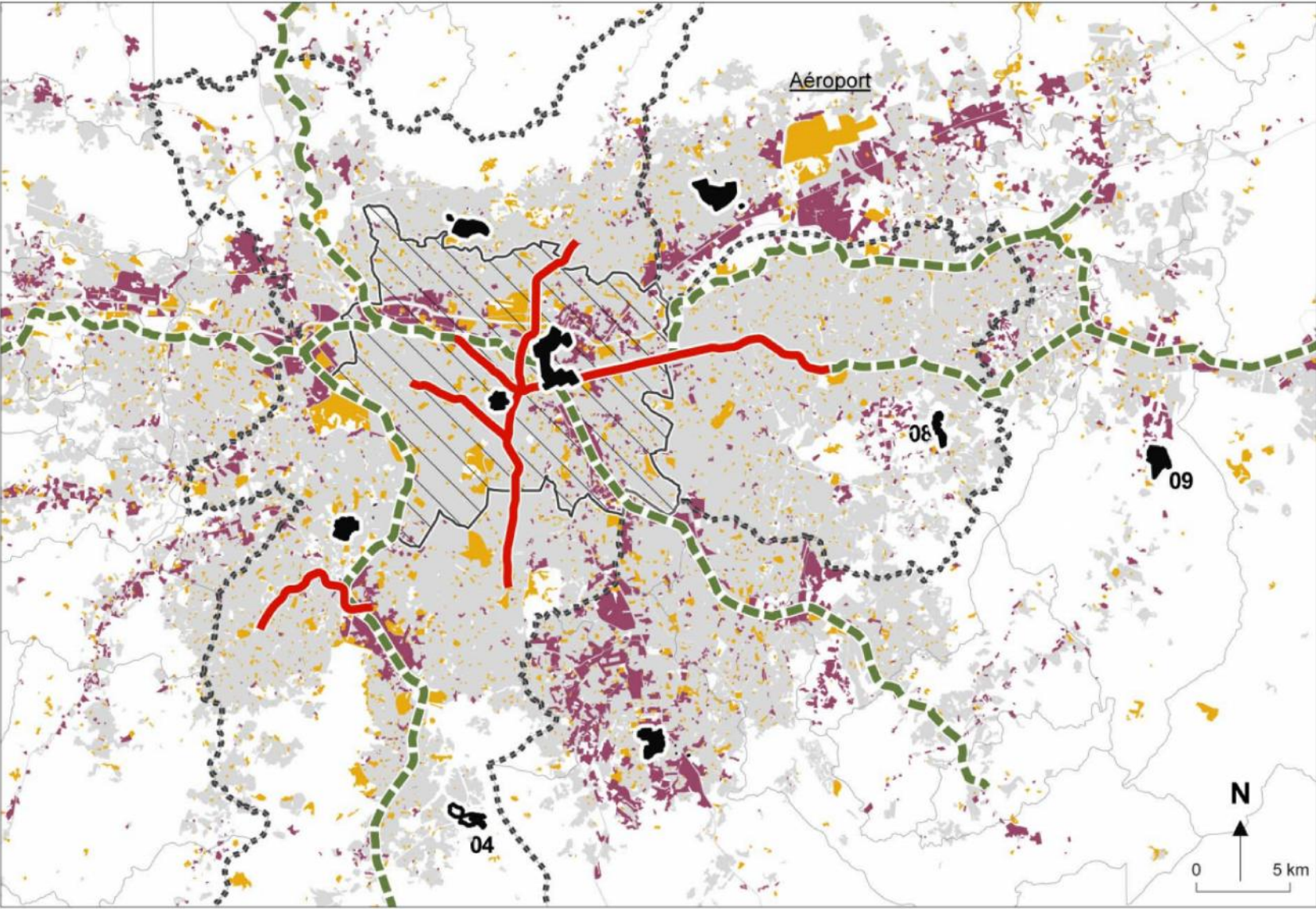
- **Issues I am trying to address:** what are the characteristics of socio-spatial inequalities grasped in terms of access to urban resources in contemporanean South American cities?
 - How the daily frequented areas differ according to the place of residence and individuals socio-demographic characteristics in nowadays South American cities?
 - What are the places of residence where the disparities grasped in terms of access to the city are the most pronounced?
 - What are the spaces of activity associated with the different stages of the individuals' life cycle?
-

The example of São Paulo

- **Context**

- Selection of 9 areas to conduct the surveys
 - Areas illustrate a wide set of the socioeconomic profiles and housing conditions found in São Paulo
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Figure 1 : Agglomération de São Paulo : occupation du sol, réseaux de transports structurants et zones d'enquête dans le cadre du programme ANR METAL



Occupation du sol

- Tissu urbain
- Équipements urbains
- Zones industrielles

Zones d'enquête

- 01 - Brás-Pari
- 03 - Paraisópolis
- 04 - Grajaú
- 06 - Vila Nova Cachoeirinha
- 07 - Guarulhos
- 08 - Cidade Tiradentes
- 09 - Suzano Jardim Leblon
- 10 - São Bernardo do Campo
- 11 - Bixiga

Centre et première couronne

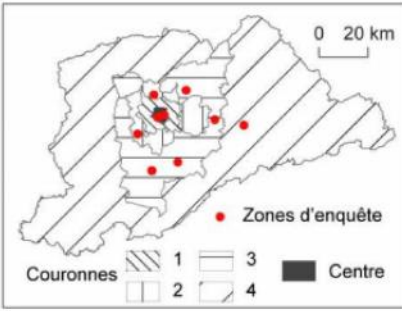
- Centre et première couronne

Réseaux de transports

- Métro
- Réseau ferroviaire

Limites

- Limites de São Paulo
- Limites des municipalités



Sources : IBGE, Secretaria Municipal Planejamento Sempla/Departamento Estatística e Produção Informação Dipro; São Paulo Transportes, Cia Metropolitana de São Paulo - Metrô, EMLASA FEHIDRO, METAL - Réalisation : Florent Demoraes - ANR METAL (SavGIS)

Focus on the questionnaire

- São Paulo : 900 surveyed households (3000 individuals)

Focus on the questionnaire

- São Paulo : 900 surveyed households (3000 individuals)

Pessoa 1

4: CARACTERÍSTICAS DAS PESSOAS DO DOMICÍLIO

4-C: EDUCAÇÃO (pessoas de 5 anos ou mais)

4-C-1. Sabe ler e escrever? 1 Sim 2 Não

4-C-2. Qual é o curso que frequentou no qual concluiu pelo menos uma série?

<input type="checkbox"/> 1	Nenhum	<input type="checkbox"/> 3	Médio	<input type="checkbox"/> 5	Técnico ou tecnológico
<input type="checkbox"/> 2	Fundam.	<input type="checkbox"/> 4	Superior	<input type="checkbox"/> 6	Outro, qual?

4-C-3. Qual foi a última série concluída com aprovação neste nível?

4-C-4. Frequenta atualmente um estabelecimento de ensino (pré-escolar, escola, colégio, univ., outro)?

<input type="checkbox"/> 1	Sim	<input checked="" type="checkbox"/> 1	Presencial	<input type="checkbox"/> 2	A distância
<input type="checkbox"/> 2	Não	-> Passe p/ 4-D			

4-C-5. Este estabelecimento de ensino é:

<input type="checkbox"/> 1	Público	<input type="checkbox"/> 2	Particular	Se a distância: --> Passe p/ 4-D
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4-C-6. Qual é o nome deste estabelecimento de ensino?
Nome :
Endereço :
.....

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
País		UF.		Município		Urb(1)Rur(2) Ar. pand.	

4-C-7. De onde sai geralmente para ir a este estabelecimento de ensino?

<input type="checkbox"/> 1	De casa	<input type="checkbox"/> 2	Do trabalho	<input type="checkbox"/> 3	De outro lugar, qual?.....
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4-C-8. Que meio de transporte utiliza geralmente para ir até este estabelecimento de ensino? (Marque um X por opção)

<input type="checkbox"/> 1	A pé	<input type="checkbox"/> 1	Moto	<input type="checkbox"/> 1	Táxi	<input type="checkbox"/> 1	Metrô	<input type="checkbox"/> 1	Outro, Qual?
<input type="checkbox"/> 1	Bicicleta	<input type="checkbox"/> 1	Auto part.	<input type="checkbox"/> 1	Transporte escolar	<input type="checkbox"/> 1	Ônibus e trolley	

4-C-9. Quantos minutos gasta em média em um percurso até este estabelecimento de ensino (um só sentido)?

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Endereço :

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 Município
 Urb(1) / Rur(2) / Ar. pand.

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 1 De casa 2 Do trabalho 3 De outro lugar, qual?

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<input type="checkbox"/> 1	Bicicleta	<input type="checkbox"/> 1	Auto part.	<input type="checkbox"/> 1	Transporte escolar	<input type="checkbox"/> 1	Ônibus e trolley	

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Focus on the questionnaire

- São Paulo : 900 surveyed households (3000 individuals)

<p>4-D-7. Qual é a atividade principal do negócio, firma, empresa, instituição ou entidade onde exerce seu trabalho?</p>	<p>.....</p>	<p>.....</p>
<p>4-D-8. Onde exerce seu trabalho? Se for fora de casa: Qual é o endereço? (1) Nesta residência (ou em outro lugar do mesmo prédio) --> <i>Passe p/ 4-D-12</i> (2) Num lugar situado em outro prédio (3) Na rua, num parque (4) Porta a porta, ambulante (5) Num veículo (6) Outro</p>	<p>.....</p> <p><input type="checkbox"/> País <input type="checkbox"/> UF. <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p> <p>Município <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p> <p>Urb(1)/Rur(2) Área de pond. <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p>	<p>.....</p> <p><input type="checkbox"/> País <input type="checkbox"/> UF. <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p> <p>Município <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p> <p>Urb(1)/Rur(2) Área de pond. <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p>
<p>4-D-9. De onde sai geralmente para ir a seu trabalho?</p>	<p>1 <input type="checkbox"/> De casa 2 <input type="checkbox"/> De outro lugar, Qual?</p>	<p>1 <input type="checkbox"/> De casa 2 <input type="checkbox"/> De outro lugar, Qual?</p>
<p>4-D-10. Qual meio de transporte geralmente utiliza para ir a seu trabalho? (Marque um X por opção)</p>	<p>1 <input type="checkbox"/> A pé 1 <input type="checkbox"/> Táxi 1 <input type="checkbox"/> Bicicleta 1 <input type="checkbox"/> Tr.empr. 1 <input type="checkbox"/> Moto 1 <input type="checkbox"/> Trem 1 <input type="checkbox"/> Auto par. 1 <input type="checkbox"/> Ônibus 1 <input type="checkbox"/> Outro, Qual?.....</p>	<p>1 <input type="checkbox"/> A pé 1 <input type="checkbox"/> Táxi 1 <input type="checkbox"/> Bicicleta 1 <input type="checkbox"/> Tr.empr. 1 <input type="checkbox"/> Moto 1 <input type="checkbox"/> Trem 1 <input type="checkbox"/> Auto par. 1 <input type="checkbox"/> Ônibus 1 <input type="checkbox"/> Outro, Qual?.....</p>
<p>4-D-11. Quantos minutos gasta em média numa viagem até seu local de trabalho (um só sentido)?</p>	<p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p>	<p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p>
<p>4-D-12. Além de, exerceu algum outro trabalho remunerado na semana passada (ou sem remuneração num negócio familiar)?</p>	<p>1 <input type="checkbox"/> Sim 2 <input type="checkbox"/> Não <i>Repita D-2 a D-11 (trab. secundário) Passe p/ 4-E</i></p>	<p><i>Passe p/ 4-E</i></p>

Focus on the questionnaire

- São Paulo : 900 surveyed households (3000 individuals)

<p>4-D-7. Qual é a atividade principal do negócio, firma, empresa, instituição ou entidade onde exerce seu trabalho?</p>	<p>.....</p>	<p>.....</p>
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<p>4-D-9. De onde sai geralmente para ir a seu trabalho?</p>	<p>1 <input type="checkbox"/> De casa 2 <input type="checkbox"/> De outro lugar, Qual?</p>	<p>1 <input type="checkbox"/> De casa 2 <input type="checkbox"/> De outro lugar, Qual?</p>
<p>4-D-10. Qual meio de transporte geralmente utiliza para ir a seu trabalho? (Marque um X por opção)</p>	<p>1 <input type="checkbox"/> A pé 1 <input type="checkbox"/> Táxi 1 <input type="checkbox"/> Bicicleta 1 <input type="checkbox"/> Tr.empr. 1 <input type="checkbox"/> Moto 1 <input type="checkbox"/> Trem 1 <input type="checkbox"/> Auto par. 1 <input type="checkbox"/> Ônibus 1 <input type="checkbox"/> Outro, Qual?.....</p>	<p>1 <input type="checkbox"/> A pé 1 <input type="checkbox"/> Táxi 1 <input type="checkbox"/> Bicicleta 1 <input type="checkbox"/> Tr.empr. 1 <input type="checkbox"/> Moto 1 <input type="checkbox"/> Trem 1 <input type="checkbox"/> Auto par. 1 <input type="checkbox"/> Ônibus 1 <input type="checkbox"/> Outro, Qual?.....</p>
<p>4-D-11. Quantos minutos gasta em média numa viagem até seu local de trabalho (um só sentido)?</p>	<p>.....</p>	<p>.....</p>
<p>4-D-12. Além de, exerceu algum outro trabalho remunerado na semana passada (ou sem remuneração num negócio familiar)?</p>	<p>1 <input type="checkbox"/> Sim 2 <input type="checkbox"/> Não <i>Repita D-2 a D-11 (trab. secundário) Passe p/ 4-E</i></p>	<p><i>Passa p/ 4-E</i></p>

Processing method: first step

- **We first had:**

- to determine the position of the surveyed individuals in their life cycle and in the social hierarchy and,
- to create homogenous classes grouping the individuals

Typological analysis (PCA+HAC) (analysis by M. Piron)

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Typological analysis (PCA+HAC) (analysis by M. Piron)

- **Sociodemographic variables** (active variables)

- Sex, age, activity, educational level, household average income, number of years spent in the surveyed house, occupancy status (owner, tenant, free-lodger)
-

Processing method: first step

- **We first had:**

- to determine the position of the surveyed individuals in their life cycle and in the social hierarchy and,
- to create homogenous classes grouping the individuals

Typological analysis (PCA+HAC) (analysis by M. Piron)

- **Sociodemographic variables** (active variables)

- Sex, age, activity, educational level, household average income, number of years spent in the surveyed house, occupancy status (owner, tenant, free-lodger)

- **Daily trip indicators** (additional variables)

- Mode of transport, time to the place of activity, destination (inner city, first outer ring, etc.), traveled distance
-

Typological analysis (PCA+HAC)

Five sociodemographic profiles

Sociodemographic class number	Sociodemographic class short description
1/5	Elementary students (pupils)
2/5	Deprived people
3/5	Students (undergraduated and postgraduated)
4/5	Middle class workers
5/5	Senior well-off workers

Processing method: 2nd step

- How to represent on a map daily mobility for groups of individuals living in different places?

Centrographic Analysis

- BACHI, Roberto (1963) Standard distance measure and related methods for spatial analysis. Papers in Regional Sciences, vol. 10, n°1, p.73-132



The centrophoric analysis

- Allows to summarise the position and the spatial distribution of a phenomenon



The centrophoric analysis

- Allows to summarise the position and the spatial distribution of a phenomenon
 - Relies on the calculation of mean (or median) centres and standard deviational ellipses (SDE)
-

The centrographic analysis

- Method abundantly applied to analyse the daily mobilities (places of destination or paths)** , all the more these last 30 years as:
 - the availability of georeferenced data increased (be they geocoded from addresses or obtained with GPS) and
 - as tools allowing to apply this method were implemented into GIS software

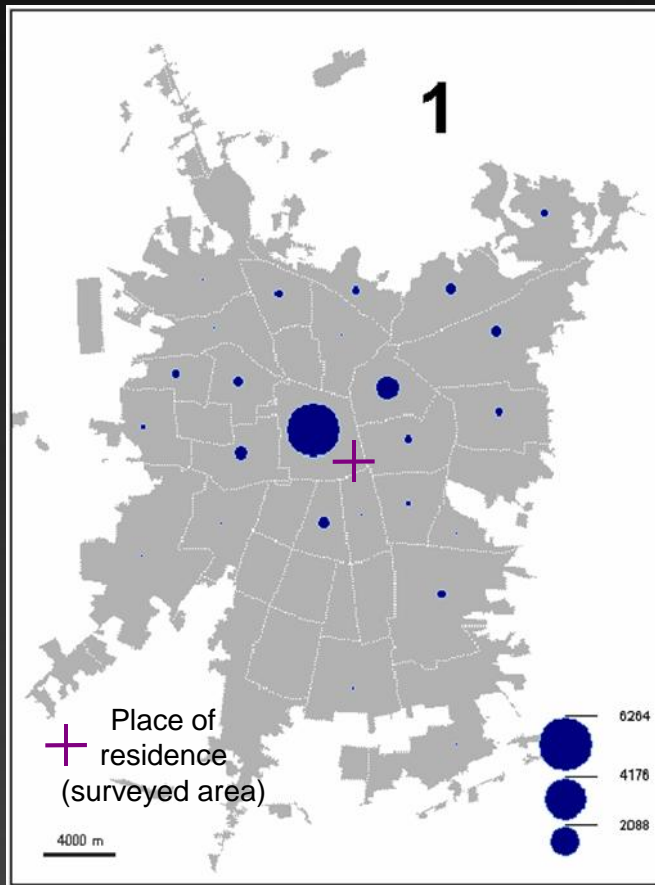
** See among others

- Donald et Goodchild (1983), Noël et al. (2001), Morency (2006), Lord et al. (2009), Imbert et al. (2009)
-

The centrophagic analysis

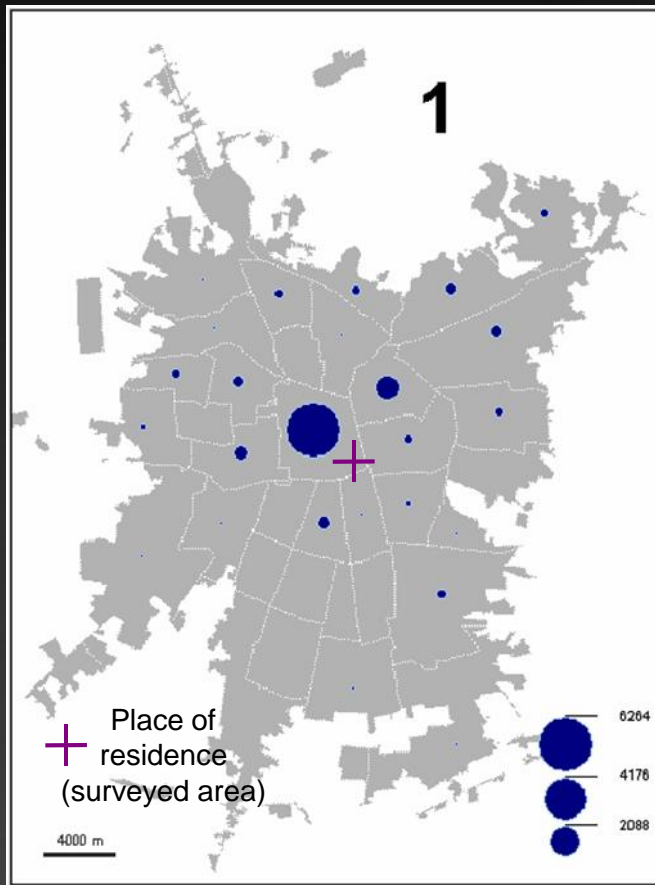


The centrophobic analysis

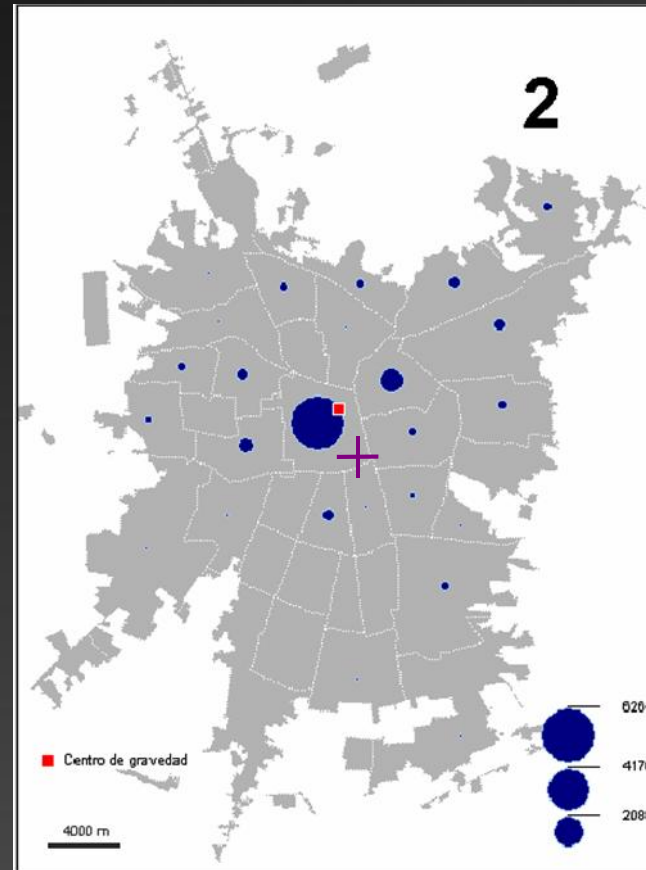


Example: daily destinations of people living in one area

The centrophraphic analysis

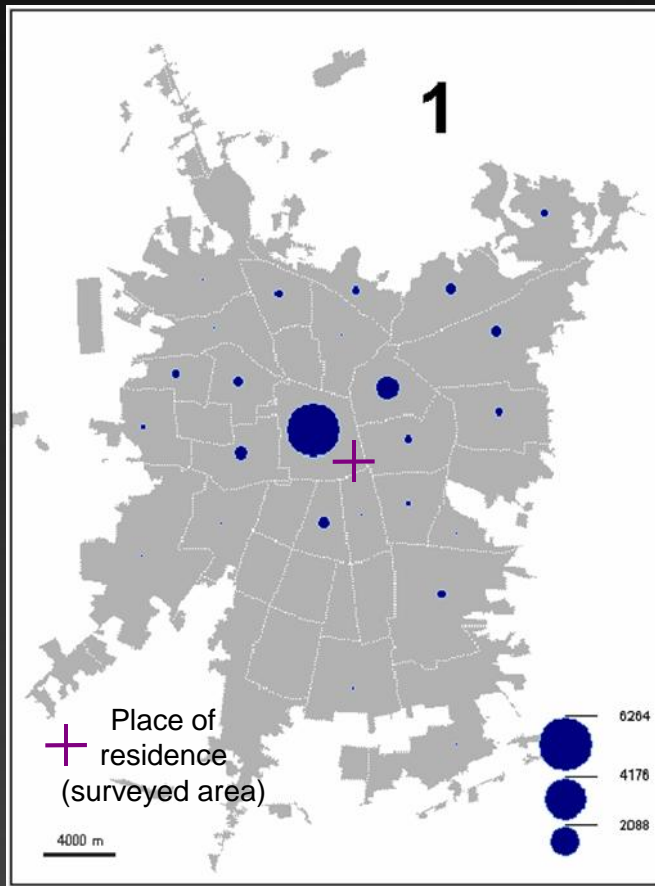


Mean centre (weighted)

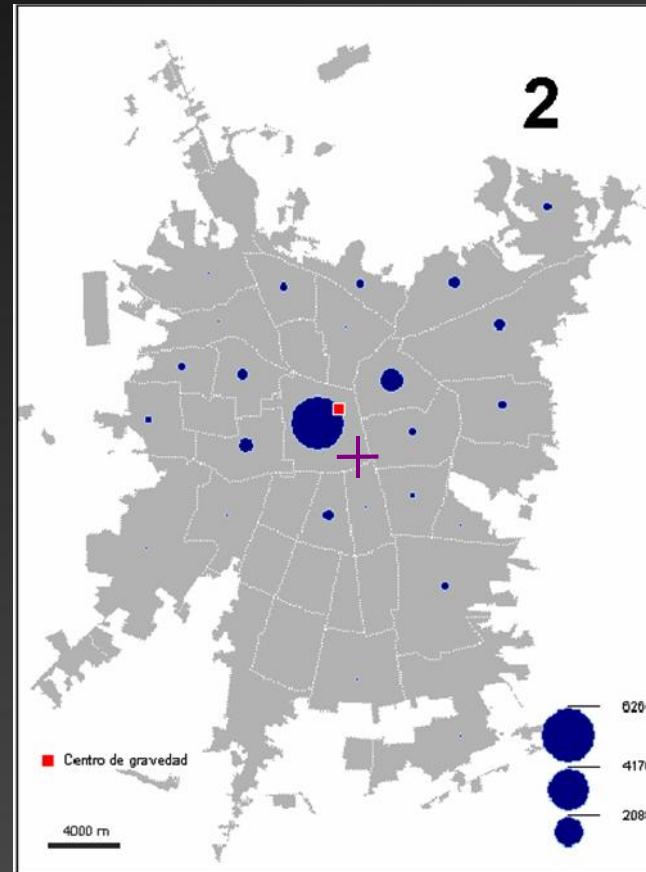


Example: daily destinations of people living in one area

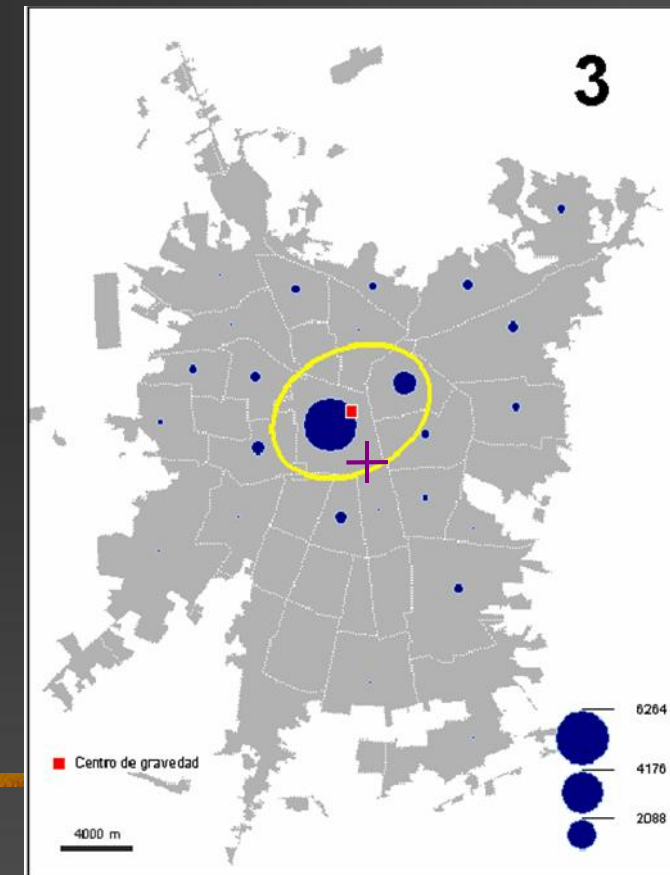
The centrophraphic analysis



Mean centre (weighted)



Standard deviational ellipse



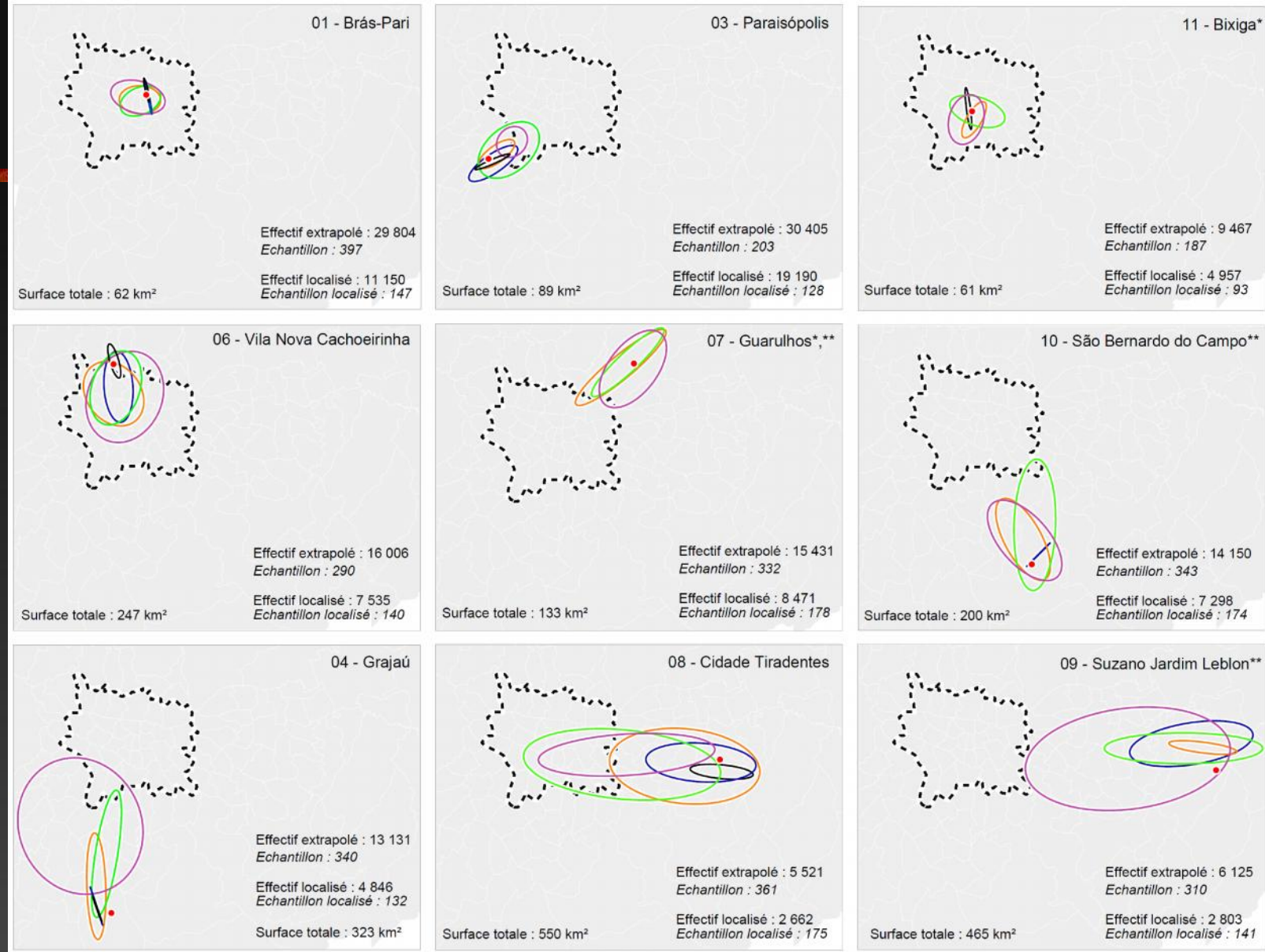
Example: daily destinations of people living in one area



Results



An ellipse summarises here the destinations of the inhabitants grouped according to their socio-demographic profile and their place of residence



Classes issues de l'analyse typologique

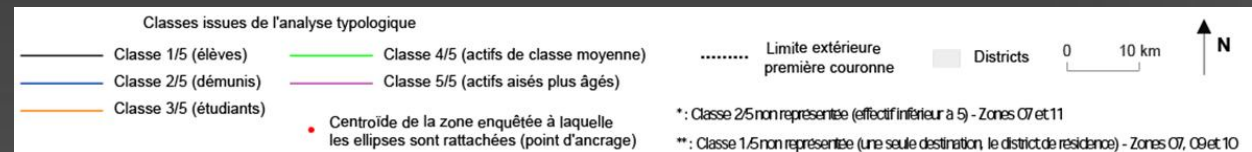
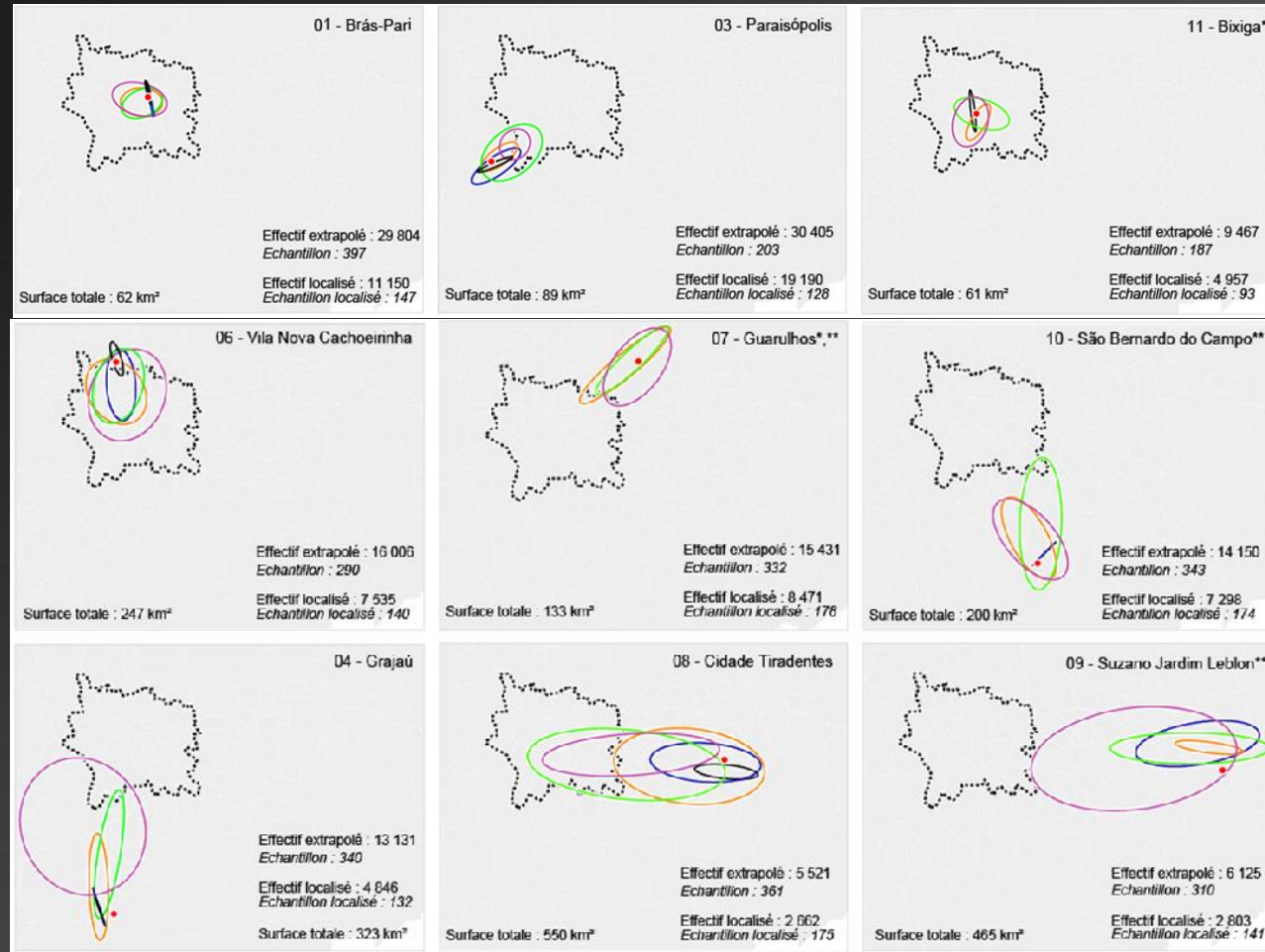
- Classe 1/5 (élèves)
- Classe 2/5 (démunis)
- Classe 3/5 (étudiants)
- Classe 4/5 (actifs de classe moyenne)
- Classe 5/5 (actifs aisés plus âgés)
- Centroïde de la zone enquêtée à laquelle les ellipses sont rattachées (point d'ancrage)

- - - - Limite extérieure première couronne
 □ Districts
 0 10 km
 ↑ N

*: Classe 2/5 non représentée (effectif inférieur à 5) - Zones 07 et 11
 **: Classe 1/5 non représentée (une seule destination, le district de résidence) - Zones 07, 09 et 10

Results

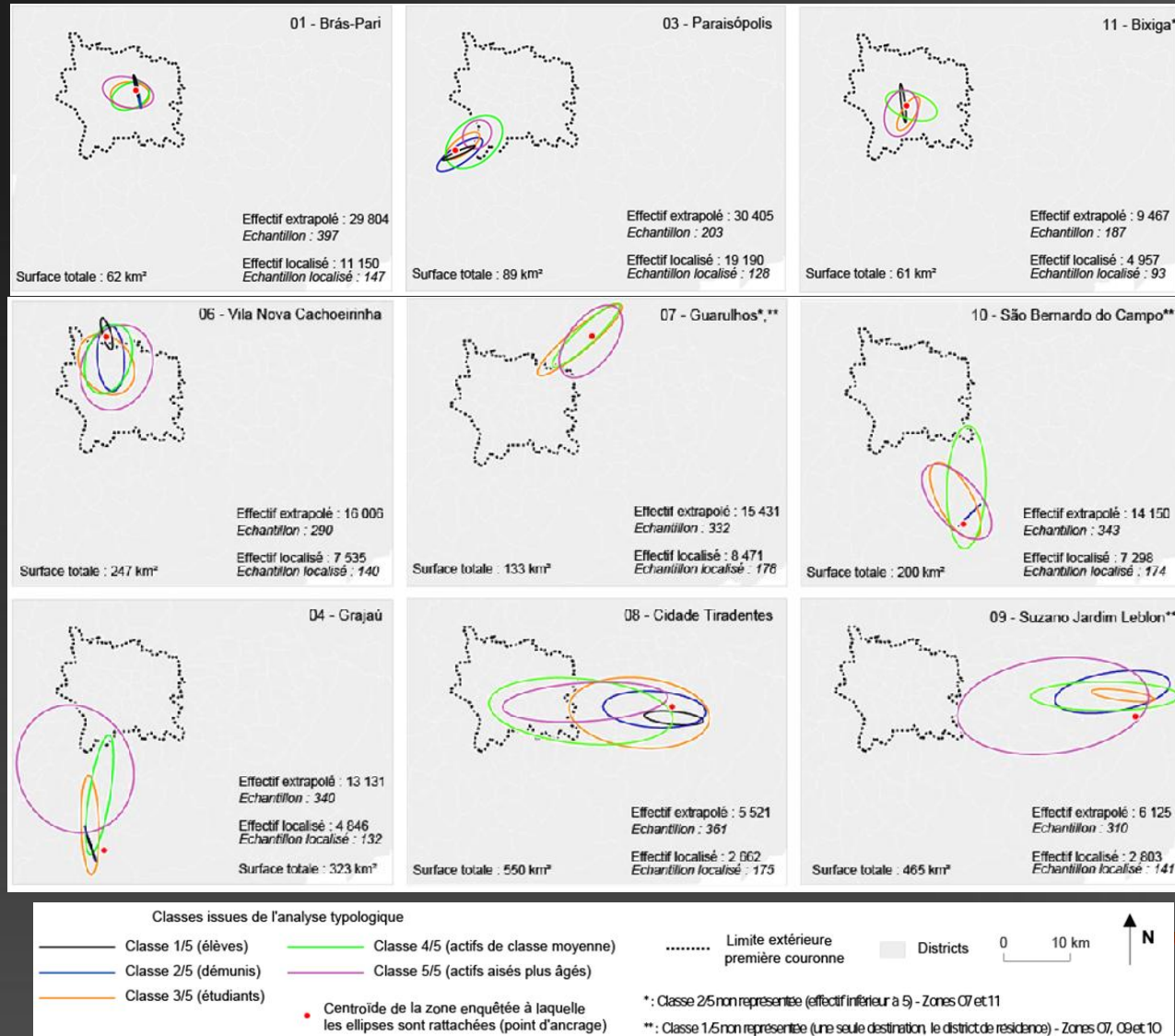
1st observation:
The spaces of daily mobility are really different according to the place of residence (the position, the shape, the orientation and the size of the ellipses differ a lot from a place of residence to another)



Results

2nd observation: For some places of residence, the destination ellipses are rather similar from a socio-demographic class to another

For some other places of residence, the ellipses are much more different from a class to another



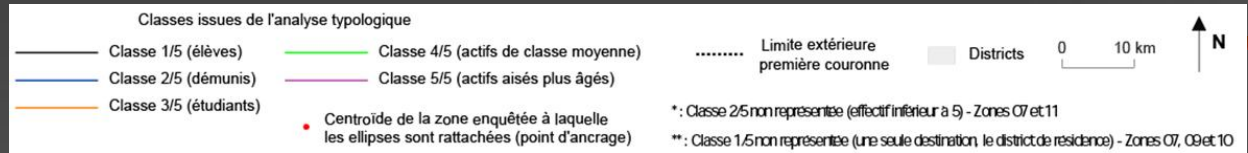
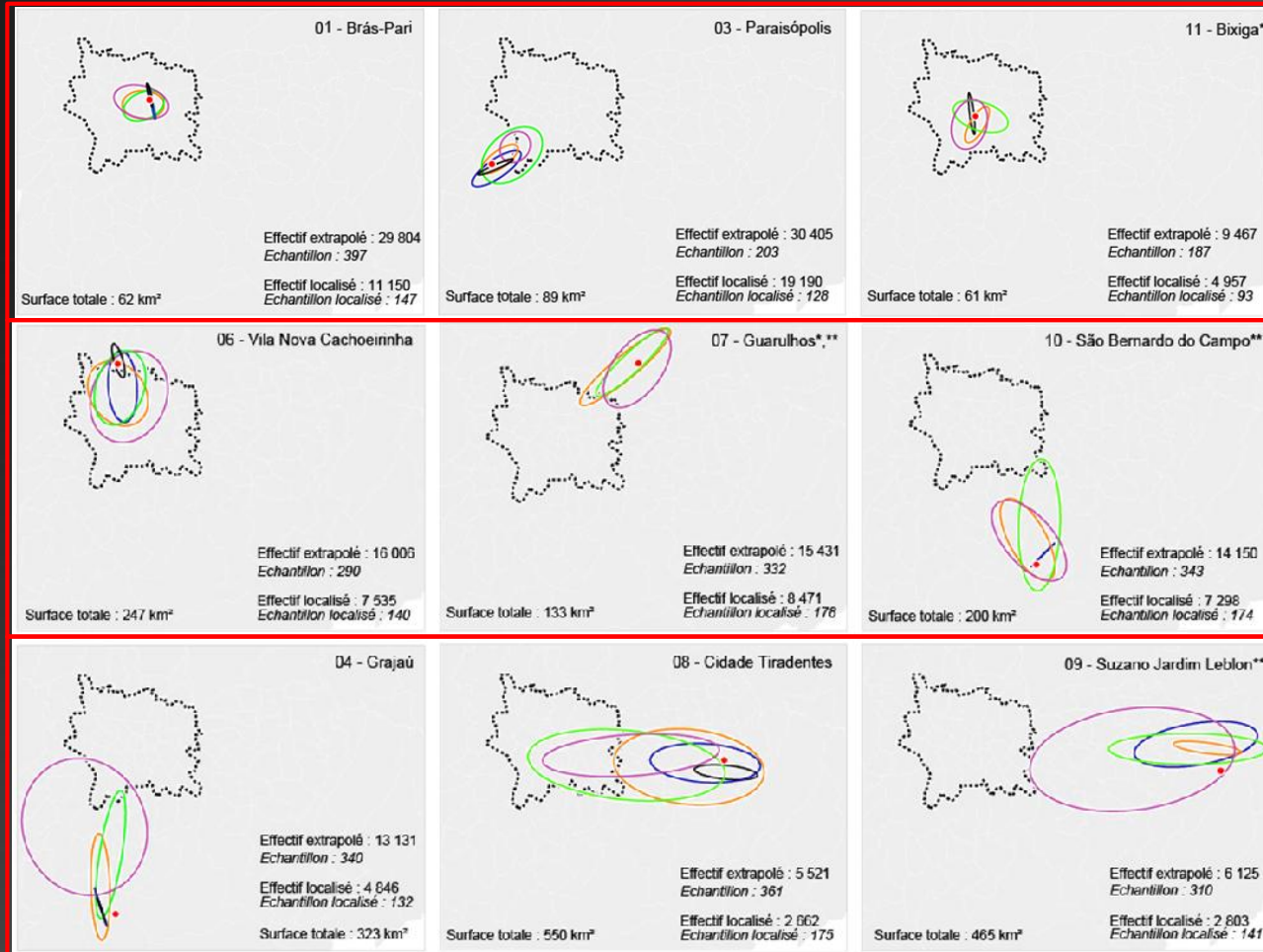
Results

We can differentiate three categories of place of residence considering the access of their inhabitants to the city

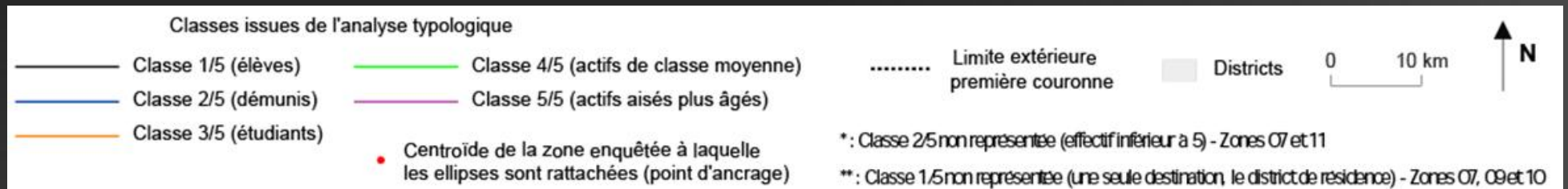
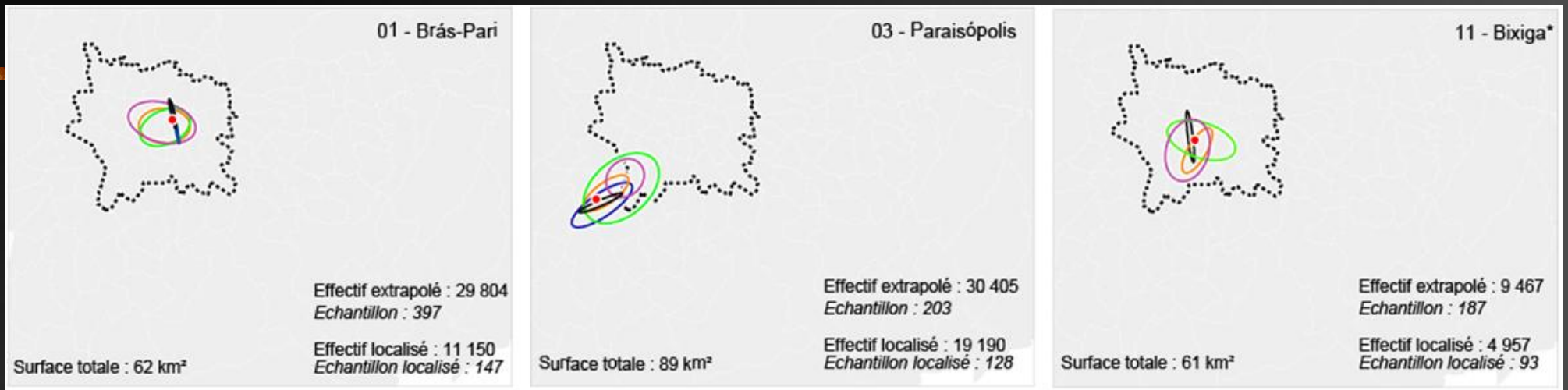
1

2

3

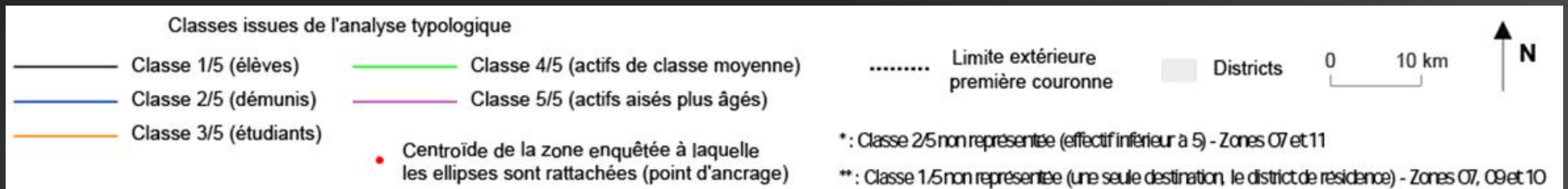
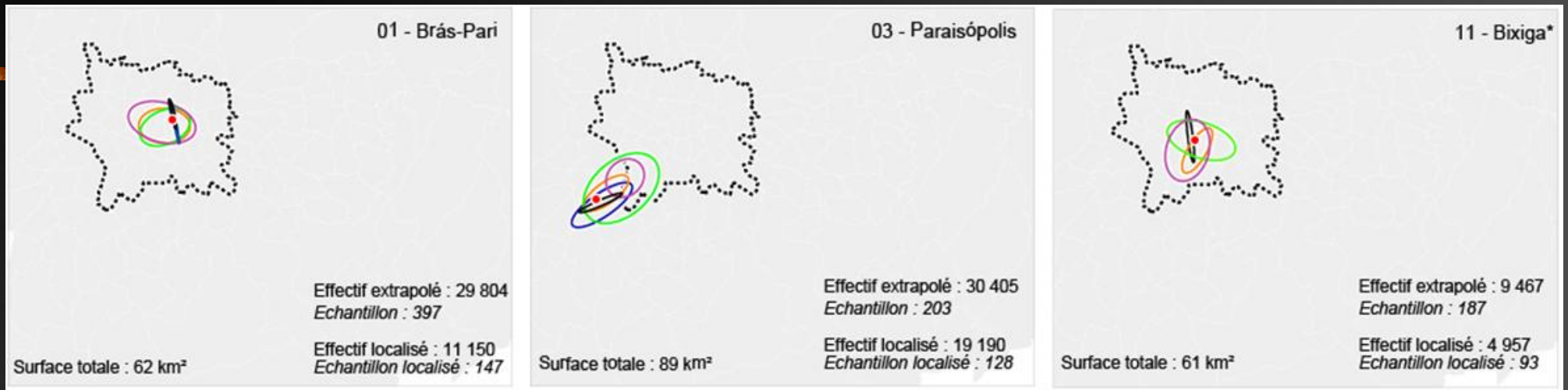


1st category (central area)



For the places of residence located in the centre (or close to it), the destination ellipses are rather similar from a class to another and rather small

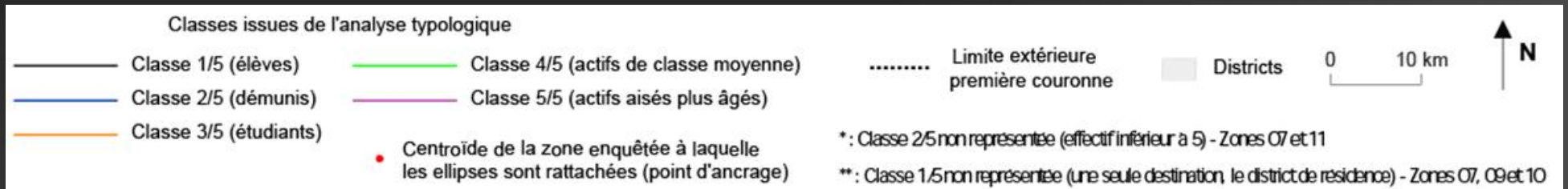
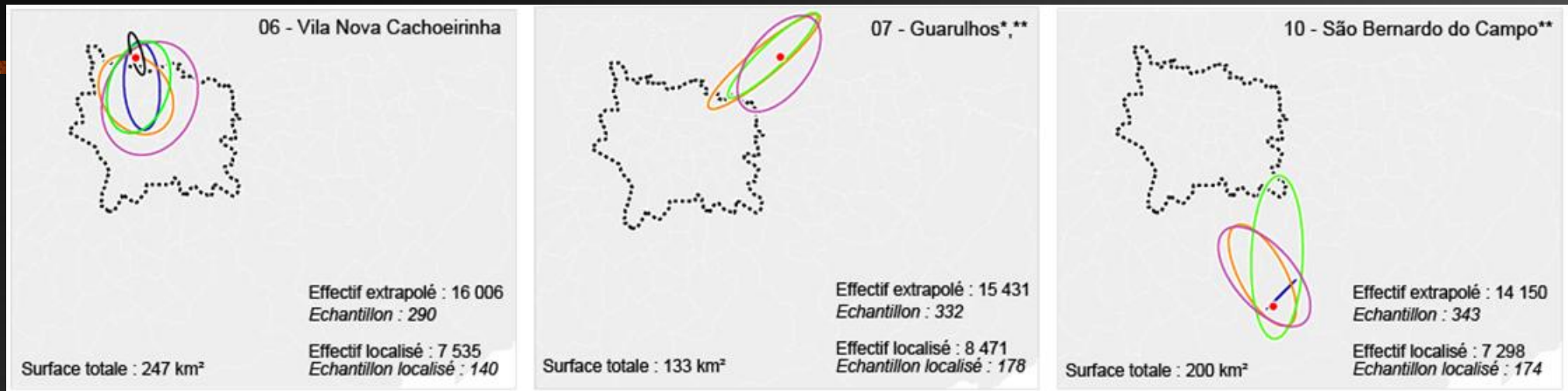
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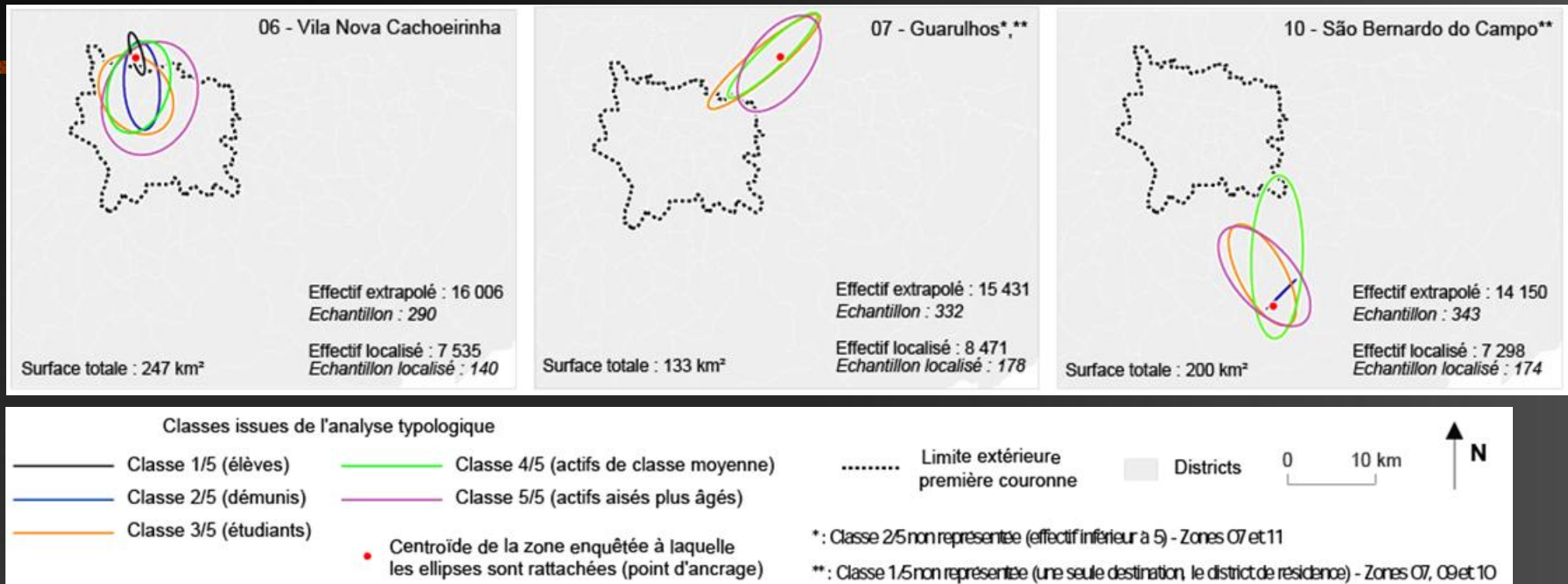
Near these places of residence, the city offers jobs and study opportunities to everybody whatever the sociodemographic class they belong to

2nd category (inner suburb)



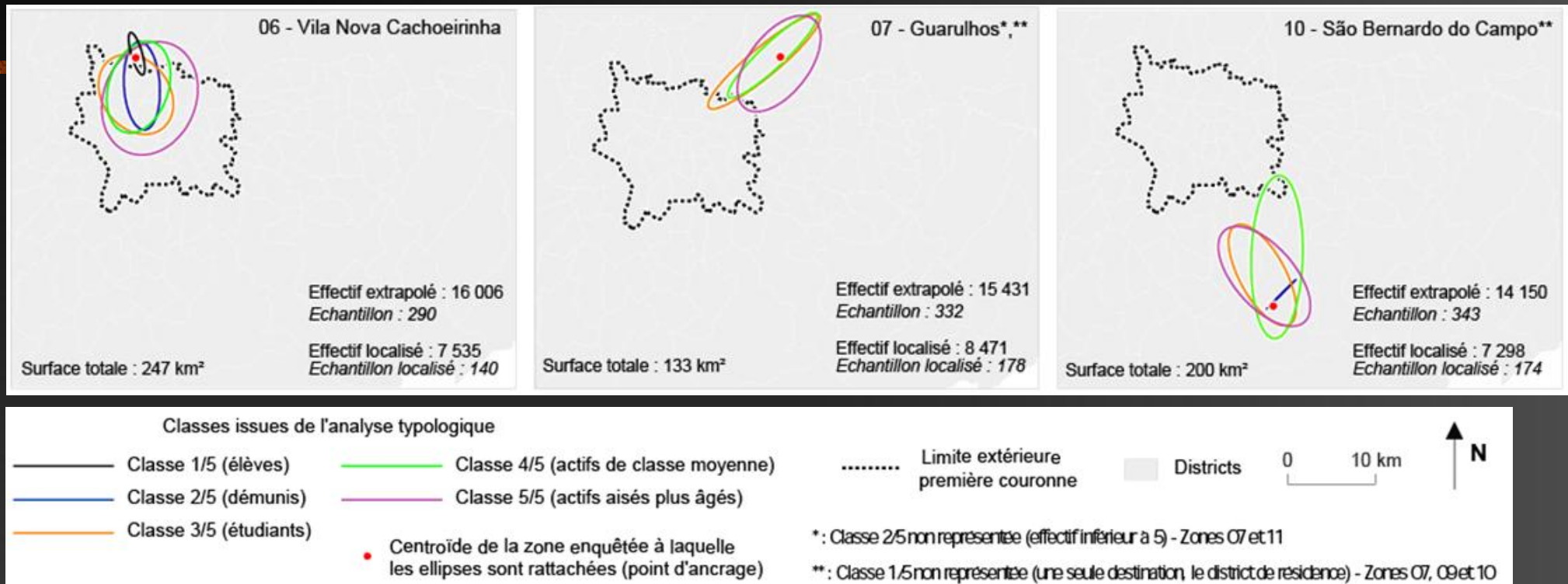
Destination ellipses are a bit bigger and more stretched

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The orientation of ellipses indicates a dependence towards the centre for the classes 3/5 (students), 4/5 and 5/5 (workers)

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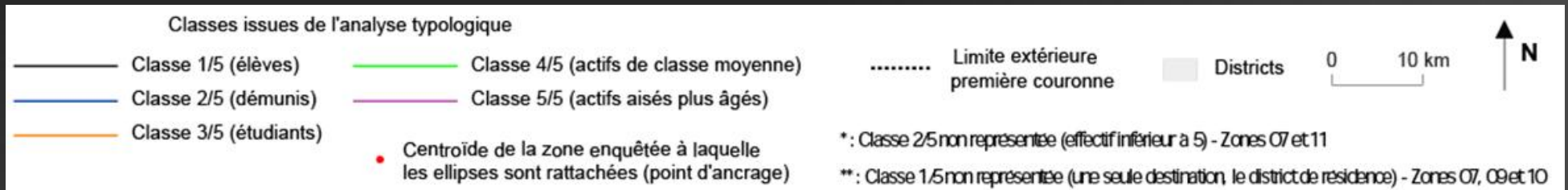
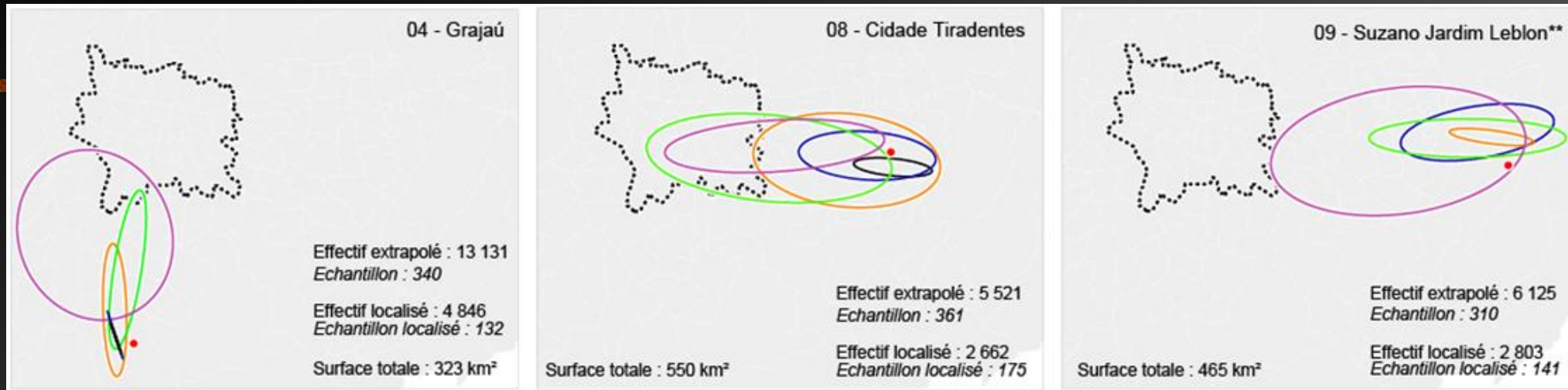


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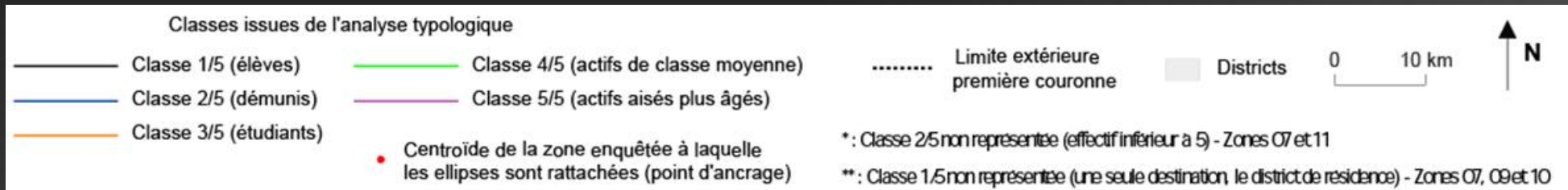
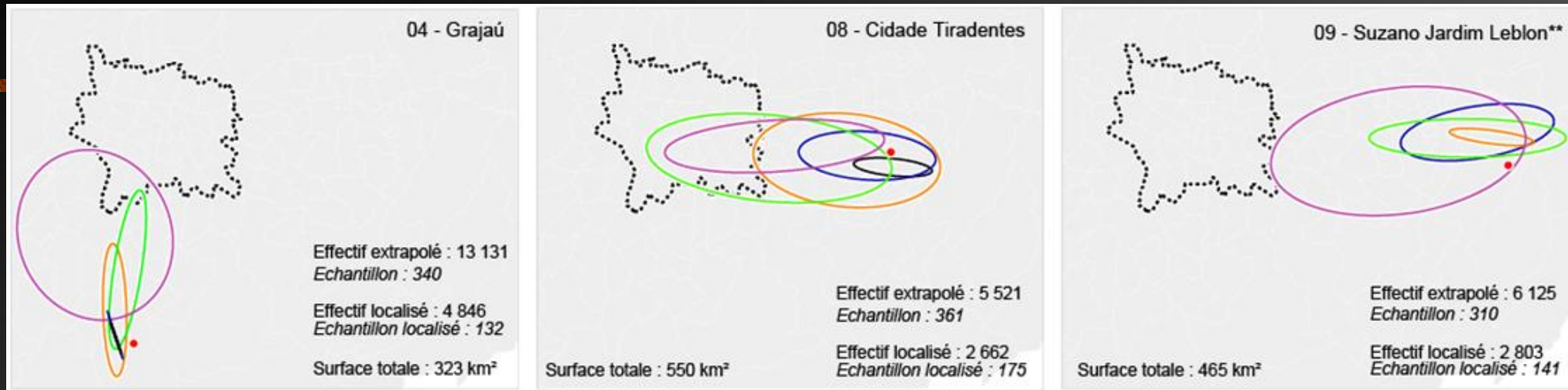
The destination ellipses are reduced for the classes 1/5 (pupils) and 2/5 (deprived people)

3rd category: the outskirts



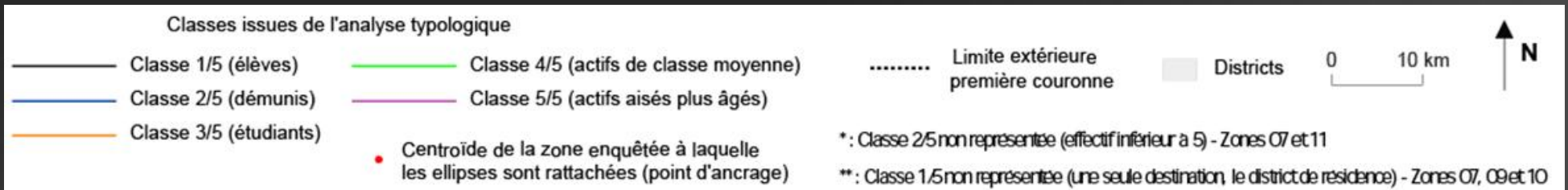
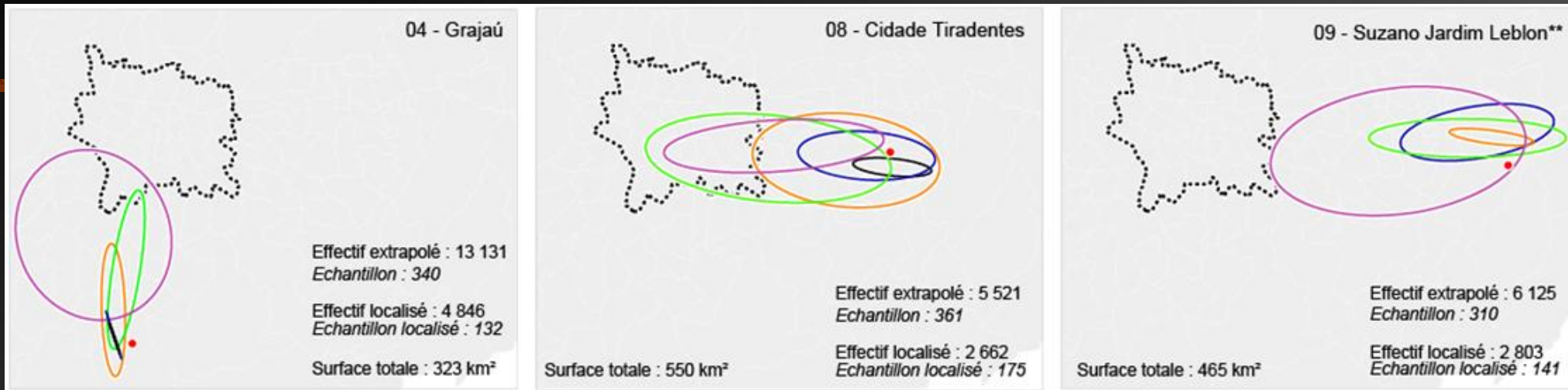
Destination ellipses are even bigger and more stretched for every classes, except for 1/5 (pupils) and are still oriented toward the centre

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 Ellipses are also more contrasted between classes (they barely overlap)

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The workers (classes 4/5 and 5/5) have the widest space of mobility

Conclusion

- Analysing the differences in terms of access to urban resources allows to grasp one kind of socio-spatial inequalities that can be evidenced in contemporanean South American cities
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 - Like in many cities, the spatial mismatch in São Paulo between places of residence and places of activity (work, school) is steadily more pronounced while living away from the centre, as the density of urban resources decreases
 - Nonetheless, this situation implies unequal daily mobility experiences (reaching a same place for a deprived person will not be as easy, comfortable and rapid as for a well-off person)
 - The gaps in terms of access to the city also steadily increase with the distance from the centre between socio-demographic classes
-

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- These first results obtained with statistical and geomatics methods are relevant but need to be further investigated
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 - Apply the same approach to Santiago and Bogotá (same patterns?)
 - Keep on publishing (... in English!)
-

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