Overview of the Urban Researches on Latin America in the ESO-Rennes Lab
A special focus on spatial mobilities

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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
06/05/2015
### Study areas: 6 cities in SA

<table>
<thead>
<tr>
<th>Cities</th>
<th>Countries</th>
<th>Inhabitants (approx.)</th>
<th>Periods</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bogotá</strong></td>
<td>Colombia</td>
<td>8 millions (2012)</td>
<td>Since 2008</td>
</tr>
<tr>
<td><strong>La Paz / El Alto</strong></td>
<td>Bolivia</td>
<td>1.6 million (2012)</td>
<td>2007-2009</td>
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<tr>
<td><strong>Lima / Callao</strong></td>
<td>Peru</td>
<td>10 millions (2014)</td>
<td>2012-2013</td>
</tr>
<tr>
<td><strong>Quito</strong></td>
<td>Ecuador</td>
<td>2.6 millions (2014)</td>
<td>2000-2009</td>
</tr>
<tr>
<td><strong>Santiago de Chile</strong></td>
<td>Chile</td>
<td>6 millions (2012)</td>
<td>Since 2008</td>
</tr>
<tr>
<td><strong>São Paulo</strong></td>
<td>Brazil</td>
<td>20 millions (2012)</td>
<td>Since 2008</td>
</tr>
</tbody>
</table>
Two Research Programmes

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

<table>
<thead>
<tr>
<th>Urban vulnerabilities</th>
<th>My contribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Exposure to natural hazards</td>
<td>- Road and transportation networks</td>
</tr>
<tr>
<td>- Urban configurations</td>
<td>vulnerability</td>
</tr>
<tr>
<td>- Governance</td>
<td>Potential loss of accessibility</td>
</tr>
</tbody>
</table>
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)
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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The METAL Programme

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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
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- **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
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The METAL Programme
Issues I am trying to address: what are the characteristics of socio-spatial inequalities grasped in terms of access to urban resources in contemporaneous South American cities?
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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 contemporaneous 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
Figure 1: Agglomération de São Paulo : occupation du sol, réseaux de transports structurants et zones d’enquête dans le cadre du programme ANR METAL

Sources : IBGE, Secretaria Municipal Planejamento Sempla/Departamento Estatística e Produção Informação Dípro; São Paulo Transportes, Cia Metropolitana de São Paulo - Metró, EMPLASA FEHIDRO, METAL - Réalisation : Florent Demoraes - ANR METAL (SavGIS)
Focus on the questionnaire

- São Paulo: 900 surveyed households (3000 individuals)
Focus on the questionnaire

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<table>
<thead>
<tr>
<th>4-D-7. Qual é a atividade principal do negócio, firma, empresa, instituição ou entidade onde exerce seu trabalho?</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Nesta residência (ou em outro lugar do mesmo prédio) --&gt; Passe p/ 4-D-12</td>
</tr>
<tr>
<td>(2) Num lugar situado em outro prédio</td>
</tr>
<tr>
<td>(3) Na rua, num parque</td>
</tr>
<tr>
<td>(4) Porta a porta, ambulante</td>
</tr>
<tr>
<td>(5) Num veículo</td>
</tr>
<tr>
<td>(6) Outro</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4-D-8. Onde exerce seu trabalho? Se for fora de casa: Qual é o endereço?</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) A pés</td>
</tr>
<tr>
<td>(2) Bike</td>
</tr>
<tr>
<td>(3) Tr. Emp.</td>
</tr>
<tr>
<td>(4) Moto</td>
</tr>
<tr>
<td>(5) Trem</td>
</tr>
<tr>
<td>(6) Ônibus</td>
</tr>
<tr>
<td>(7) Outro, Qual?</td>
</tr>
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<thead>
<tr>
<th>4-D-9. De onde sai geralmente para ir a seu trabalho?</th>
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<tr>
<td>(1) De casa</td>
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<tr>
<td>(2) De outro lugar, Qual?</td>
</tr>
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<table>
<thead>
<tr>
<th>4-D-10. Qual meio de transporte geralmente utiliza para ir a seu trabalho? (Marque um X por opção)</th>
</tr>
</thead>
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<td>(1) A pés</td>
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<tr>
<th>4-D-11. Quantos minutos gasta em média numa viagem até seu local de trabalho (um só sentido)?</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Sim</td>
</tr>
<tr>
<td>(2) Não</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>4-D-12. Além de _____________, exerceu algum outro trabalho remunerado na semana passada (ou sem remuneração num negócio familiar)?</th>
</tr>
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<tr>
<td>(1) Sim</td>
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Passe p/ 4-E
Focus on the questionnaire

- São Paulo: 900 surveyed households (3000 individuals)
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)
Processing method: first step

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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)
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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

<table>
<thead>
<tr>
<th>Sociodemographic class number</th>
<th>Sociodemographic class short description</th>
</tr>
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<tbody>
<tr>
<td>1/5</td>
<td>Elementary students (pupils)</td>
</tr>
<tr>
<td>2/5</td>
<td>Deprived people</td>
</tr>
<tr>
<td>3/5</td>
<td>Students (undergraduated and postgraduated)</td>
</tr>
<tr>
<td>4/5</td>
<td>Middle class workers</td>
</tr>
<tr>
<td>5/5</td>
<td>Senior well-off workers</td>
</tr>
</tbody>
</table>
How to represent on a map daily mobility for groups of individuals living in different places? → Centrographic Analysis

The centrographic analysis

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

Example: daily destinations of people living in one area
The centrographic analysis

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Example: daily destinations of people living in one area

1. Mean centre (weighted)
2. Standard deviational ellipse

Place of residence (surveyed area)
Results
→ An ellipse summarises here the destinations of the inhabitants grouped according to their socio-demographic profile and their place of residence.
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).
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.
→ 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.
Destination ellipses are a bit bigger and more stretched
2nd category (inner suburb)

→ Destination ellipses are a bit bigger and more stretched
→ 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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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)
→ The workers (classes 4/5 and 5/5) have the widest space of mobility
Analysing the differences in terms of access to urban resources allows to grasp one kind of socio-spatial inequalities that can be evidenced in contemporaneous South American cities.
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 contemporaneaean South American cities.
- 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.
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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).

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- 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.
What’ next?

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- Qualitative interviews will now be analysed:
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- Apply the same approach to Santiago and Bogotá (same patterns?)
- Keep on publishing (… in English!)
References

Site ANR METAL : http://migrinter.labo.univ-poitiers.fr/programmes-de-recherche/programme-anr-metal/

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


