From the Auvergne commuting network to every commuting network

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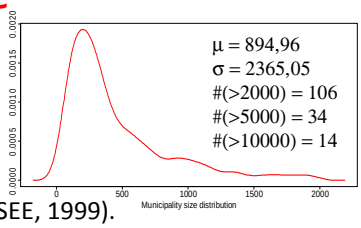
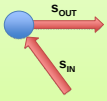
The municipalities of the Auvergne Region, France

NODES = 1310 MUNICIPALITIES
A **LINK** exits between 2 municipalities if someone commutes between them.
Number of un-oriented links = 31.722; number of reciprocal links =6451



Data: French Census, 1999; delivered by the Maurice Halbwachs Center (INSEE, 1999).

To each node are associated:
1- the number of workers looking for a job outside the municipality (out-commuters)
2- the number of available jobs (in-commuters)



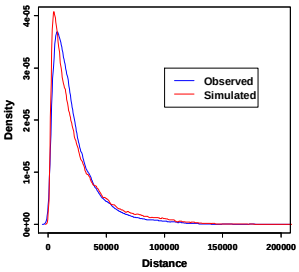
At each time step:
1- one municipality is selected
2- one of the out-commuters is selected
3- the selected commuter chooses the working destination between the municipalities where some jobs are available according to:

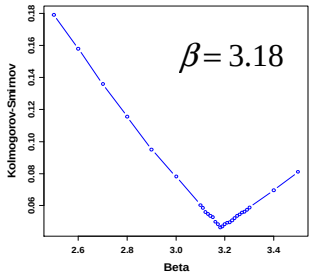
$$P_{i\in I\to J} = \frac{\left(\frac{\langle d\rangle}{d_{IJ}}\right)^{\beta}}{\sum_{J\,|\,S_{IN}\neq 0}\left(\frac{\langle d\rangle}{d_{IJ}}\right)^{\beta}}$$

d=distance

Model description and calibration

MODEL CALIBRATION using the distance distribution

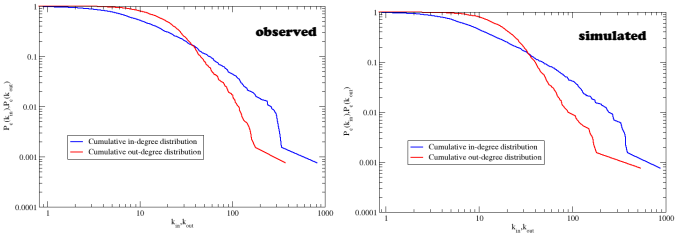




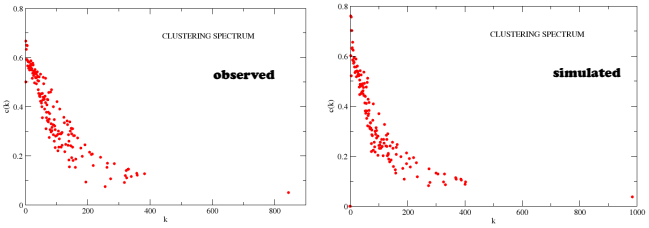
Observed versus simulated network

A well globally simulated network

In and out degree distributions

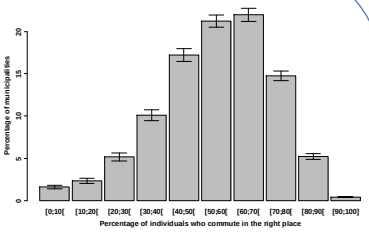


Clustering coefficient as a function of the degree

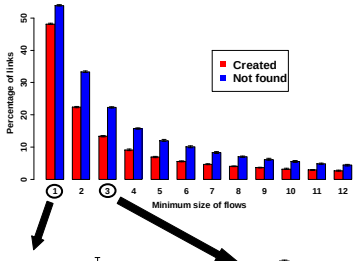


67,94±0,33% of individuals commute in the right place.

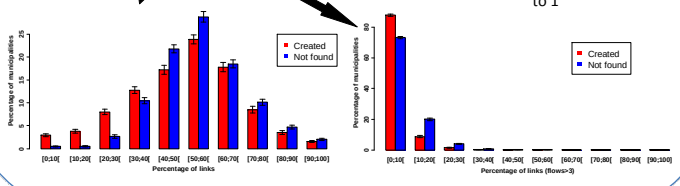
	Observed	Simulated
Link created		
Link not found		



A well locally simulated network



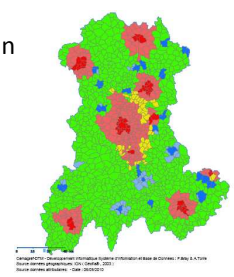
- A high percentage of individuals who commute in the right place
- A weak percentage of created and not found links
- But the created and not found links have **mostly** a weight equal to 1

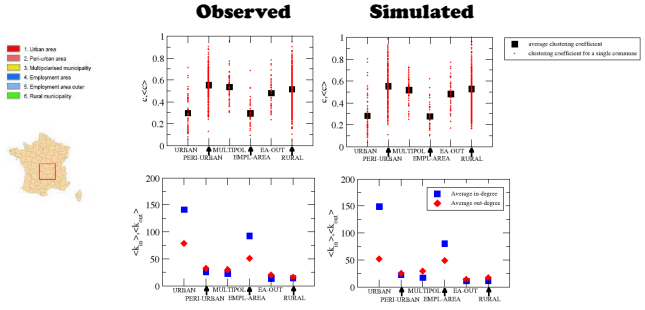


Mean ± standard deviation for 100 replicats

The ZAUER Typology respected

1. Urban area (≥ 5000 jobs)
2. Peri-urban area (≥40% pop. employed in urban area)
3. Multipolarised municipality (≥ 40% pop. employed in several urban areas)
4. Rural employment area (≥ 1500 jobs)
5. Rural employment area outer (≥40% pop. employed in rural area)
6. Rural municipalities





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