

Ph.D. grant – Call for applicants

Thesis

Maritime networks as witnesses and vectors of contemporary economic and territorial changes

Supervision

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Description and scientific background

Maritime transport currently supports more than 90% of world trade exchanges by volume. Container shipping alone concentrates about 70% of world trade value. However, there are only few works providing a detailed picture of the spatial distribution of these flows, and moreover, of their evolution, in relation with the connected places and territories. Two causes of such state of affairs can be highlighted. On the one hand, research on ports and maritime transport had become increasingly specialized and developed in isolation from wider social and economic issues. On the other hand, the only statistical source allowing such a detailed and global analysis of world maritime flows on the long-term has never been exploited systematically, mostly due to insufficient information access and technical resources. Indeed, the maritime insurer Lloyd's List reports since the late 19th century the successive port calls of a large part of the world fleet, i.e. about 80% of all operating vessels nowadays.

The World Seastems project

The main goal of this Ph.D. project, which takes place within the framework of the "World Seastems" European project (<http://www.world-seastems.cnrs.fr/>), is to better understand the interdependencies at stake between the evolution of maritime transport and the one of the world economy in general. A database is currently being constituted based on the paper versions of Lloyd's sources over the 1890-2008 period, including a description of vessel movements (ports, sailing dates) and of vessels (tonnage, cargo type, flag, etc.).

Objectives of the Ph.D.

There are three main objectives to the Ph.D. based on several questions and hypotheses:

- to propose and elaborate tools to measure and visualize world maritime flows in order to reveal the foreseeable impact of major events of all kinds taking place since the 19th century (e.g. wars, economic and financial crisis, territorial and geopolitical transformations...);
- determine the vulnerability (or robustness) of the maritime network and its components to such events, its capacity to adapt and/or anticipate: are there recurrent causes and consequences from one event to the other? What are the temporal and spatial gaps between maritime and territorial dynamics? How strong is the influence of the technological, historical and regional contexts? Can we identify certain factors that could also serve predictions, retro-simulations?
- compare empirical results with general models of network evolution: do maritime networks follow certain existing trends, how are they specific? Is it possible to decouple transport/logistic factors and political/territorial factors in their evolution?

Required skills of the candidate

The candidate is preferably at ease with the following domains:

- geography of world trade and globalization, contemporary history and economic theory
- graph theory, analysis of complex networks
- statistical analysis
- Geographical Information Systems, geomatics, spatial analysis

- visualization of spatial data and networks
- fluent written and spoken French language

The following will be considered as a plus:

- mastering one or more programming languages for the analysis of statistics and graphs (e.g. R or Python for instance), and for visualizing data (Python, R, Processing, HTML5/js, etc.)
- one experience in the field of big data, data mining, modeling, and spatio-temporal simulation

Planned calendar

Deadline for applications: 15th July 2014

Interviews of selected candidate(s): week of 15th September 2014 (to be determined)

Start of the Ph.D.: January 2015 (3-year grant)

Thank you for sending your CV and application letter to BOTH cdu@parisgeo.cnrs.fr and arnaud.banos@parisgeo.cnrs.fr as well as 2-4 pages of a well-argued project. A short reference list is provided below, which we strongly motivate the candidates to look at before writing their own project.

Reference list (to be sent to candidates upon request)

- Bernhofen D.M., El-Sahli Z., Kneller R. (2013) *Estimating the effects of the container revolution on world trade*. Lund University Working Paper 2013:4, Department of Economics, School of Economics and Management.
- Ducruet C. (2012) Ports et routes maritimes dans le monde (1890-1925), *Mappemonde*, <http://mappemonde.mgm.fr/num34/lieux/lieux12201.html>
- Kaluza P., Kölzsch A., Gastner M.T., Blasius B. (2010) The complex network of global cargo ship movements. *Journal of the Royal Society Interface*, 7(48): 1093-1103.
- Limao N., Venables A.J. (2001) Infrastructure, geographical disadvantage, transport costs, and trade. *The World Bank Economic Review*, 15(3): 451-479.
- Rodrigue J.P. (2013) *The Geography of Transport Systems*. New York: Routledge, <http://people.hofstra.edu/geotrans/>
- Tavasszy L.A., Minderhoud M., Perrin J.F., Notteboom T. (2011) A strategic network choice model for global container flows: Specification estimation and application. *Journal of Transport Geography*, 19(6), 1163-1172.