



**The Vespucci Initiative
for the Advancement of Geographic Information in Science**

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“Ontologies and models for integrated assessments of multiple-scale processes”

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PREPARATORY READINGS

MICROSIMULATION

- Hermes, K and Poulsen, M. (2012) A review of current methods to generate synthetic spatial microdata using reweighting and future directions. *Computers, Environment and Urban Systems*, 36, 281-290. <http://dx.doi.org/10.1016/j.compenvurbsys.2012.03.005>

This most reading suggested reading is a journal paper giving an overview of the state of the art in this field and discusses possible future directions (and also includes useful illustrative examples)

- Ballas, D, Rossiter, D, Thomas, B, Clarke, G.P, Dorling, D (2005), *Geography matters: simulating the local impacts of national social policies*, Joseph Rowntree Foundation contemporary research issues, Joseph Rowntree Foundation, York, ISBN 1 85935 265 0 (paperback) (free pdf copies available from: <http://www.jrf.org.uk/sites/files/jrf/1859352669.pdf>).

The text introduces spatial microsimulation in a social science context and demonstrates its relevance to social simulation and policy analysis, keeping mathematical and statistical jargon to a minimum.

- Ballas, D, Clarke, G. P. and Dewhurst, J (2006), *Modelling the socio-economic impacts of major job loss or gain at the local level: a spatial microsimulation framework*, *Spatial Economic Analysis*, vol. 1(1), pp. 127-146, <http://dx.doi.org/10.1080/17421770600697729>

This paper discusses the potential of spatial microsimulation for what-if socio-economic impact assessment using an example of a hypothetical factory closure.



- Ballas, D., Kingston, R., Stillwell, J., Jin, J. (2007) Building a spatial microsimulation-based planning support system for local policy making, *Environment and Planning A*, 39(10), 2482 – 2499. <http://dx.doi.org/10.1068/a38441>

This paper shows how spatial microsimulation was used in a planning systems support framework.

LAND COVER CLASSIFICATION

- Comber, A.J., Wadsworth, R.A., Fisher, P.F. (2008): Using semantics to clarify the conceptual confusion between land cover and land use: the example of 'forest'. *Journal of Land Use Science*

The Comber et al (2008) paper introduce the concepts of land use and land cover and discuss about the confusion between the concepts of land cover and land use and its implication for data integration for the global land monitoring and modeling.

- Gregorio, di, A. et al. (2005): Land Cover Classification System. Classification concepts and user manual

The Land Cover Classification System (LCCS) manual was developed by FAO and UNEP. LCCS was developed to enable comparison of land cover classes regardless of mapping scale, land cover type, data collection method or geographic location. In this report the authors present land cover classification definitions and the theory basis for LCCS approach.

- Herold, M., Hubald, R., Gregorio, di, A. (2009): Translating and evaluating land cover legends using the UN Land Cover Classification System (LCCS). GOF-C-GOLD Report No. 43

In the GOF-C-Gold report, Herold et al (2009) present the results of the harmonization and translation exercises of Anderson, Corine, IGBP and UMc legends using LCCS and a consistency analysis.

- Jansen, L.J.M. Groomb, G. and Carraic, G. (2008): Land-cover harmonisation and semantic similarity: some methodological issues. *Journal of Land Use Science* Vol. 3, No. 2–3, June–September 2008, 131–160

Jansen et al. (2008) examine and discuss aspects of land-cover harmonization and the LCCS methodology for land cover categorization and semantic similarity . In this paper the authors suggest that land cover harmonization should include other elements (geometric, spatial, temporal, etc.), not only semantic.



They discuss the complexity and difficulties of establishing worldwide land cover standardization and the need of the adoption of a single categorization system.

LAND USE MODELLING

<http://ies.jrc.ec.europa.eu/our-activities/scientific-achievements/Land-Use-Modelling-Platform.html>

- Batista e Silva, F (2011). Land Function: origin and evolution of the concept, *Cadernos de Geografia, Universidade do Porto*, Portugal.
- Lavallo C., Baranzelli C., Mubareka S., Rocha Gomes C., Hiederer R., Batista E Silva F., Estreguil C. (2011) Implementation of the CAP Policy Options with the Land Use Modelling Platform - A first indicator-based analysis - EUR 24909 EN. Luxembourg (Luxembourg): Publications Office of the European Union; 2011. JRC66060.
- Lavallo C., Rocha Gomes C., Baranzelli C., Batista E Silva F. (2011). Coastal Zones - Policy alternatives impacts on European Coastal Zones 2000 - 2050. EUR 24792 EN. Luxembourg (Luxembourg): Publications Office of the European Union; JRC64456.
[http://ec.europa.eu/environment/enveco/impact_studies/pdf/land_use_modelling%20adaptati on_activities_coastal.pdf](http://ec.europa.eu/environment/enveco/impact_studies/pdf/land_use_modelling%20adaptati%20on_activities_coastal.pdf)
- Lavallo C., Baranzelli C., Batista e Silva F., Mubareka S., Rocha Gomes C., Koomen E., Hilferink M. (2011). A high resolution land use/cover modelling framework for Europe. *ICCSA 2011*, Part I, LNCS 6782, pp. 60–75.
- Mubareka S., Koomen E., Estreguil C., Lavallo C. (2011). Development of a composite index of urban compactness for land use modelling applications. *Landscape and Urban Planning* 103; 303– 317. doi:10.1016/j.landurbplan.2011.08.012.



FORMAL AND APPLIED ONTOLOGY

The aim of the readings is to provide an introduction to formal and applied ontology and its role in philosophy, computer science, and information processing. [1] and [2] focus on the logic of the interrelations between three categories of entities: independent endurants (objects such as human beings, cars, cities, continents), dependent endurants (qualities of objects such as size, color, etc.), and perdurants (processes, events, lifes of human beings, movements of cars, growth of cities, etc.) [3] provides a more specific discussion of geographic phenomena: endurants such as geographic objects and fields, their qualities, the change of qualities over time, and the processes in which geographic objects and fields participate.

- [1] P. Grenon and B. Smith. SNAP and SPAN: Towards dynamic spatial ontology. *Spatial Cognition and Computation*, 4(1):69–103, 2004.
- [2] B. Smith and P. Grenon. The cornucopia of formal-ontological relations. *Dialectica*, 58(3):279–296, 2004.
- [3] A. Galton. Fields and objects in space, time, and space-time. *Spatial Cognition and Computation*, 4(1):39–68, 2004.