Agricultural landscape segmentation: a stochastic method to map heterogeneous variables

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Proposal for abstract (oral presentation) – maximum 300 words and 5 references

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Advances in Spatial Typologies: How to move from concepts to practice?

Symposium 1 – Models and methods: What are the most recent methodological developments? What methods and tools are available? How to define categories for multiple purposes – linking social, economic and environmental processes? How much "simplification" is acceptable? How to best integrate different types of knowledge?

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Agricultural landscapes are segmented into land management units, whose definition changes according to the concerned stakeholders or the research focus (Rizzo et al., 2013). Innovative approaches are needed to describe and model time-space dynamics of these units by using multipledata sources. Various methods proposed so far in literature mainly differed for disciplinary backgrounds and study targets(e.g. environmental protection, conservation of cultural features, etc.). In this context, agronomy appears to have a marginal role because of a small interest in spatially-explicit and context-wise issues of agriculture. Accordingly, the landscape agronomy perspective claims for an improved understanding of the interaction between farming practices and natural resources at the landscape level (Benoît, Rizzo et al., 2012). Our aim in this paper is to presenta method capable to define land management units by handling heterogeneous spatial data. We tested a stochastic data mining methodthat was originally developed for the time-space modelling of agricultural land uses(Mari, Lazrak, &Benoît, 2013). We stressed the Markov random field(MRF) assumption of this

method assuming that the characteristics of a spatial unit depend on the characteristics of the neighbouring ones. The study was carried out on the Monte Pisano, a Mediterranean terraced system (62 km^2, central Italy). Different sets and classification of variables were tested stressing natural and management issues. Finally, the landscape was segmented using 6 variables: geology, aspect, morphology, land cover, terrace type and proximity to road. The layers were sampled on a regular point grid then the MRF was approximated to a hidden Markov model bymeansofa space-filling curve. The results consisted in a set of maps of agro-environmental management units and a hierarchy of related landscape characteristics. This exploratory method can improve the landscape assessment by providing a rapid appraisal of heterogeneous data in a spatially-explicit way.

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KEYWORDS (maximum 3)

Landscape agronomy, data mining, terraced landscape