



Morphological analysis of state and trends of digital image objects

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Morphological Spatial Pattern Analysis (MSPA) provides an intuitive, repeatable, and scale independent description of the configuration and pattern of image objects. Dedicated additional routines describe and quantify the connectivity network, including key nodes and links defining connectedness in raster images. Moreover, these tools can be applied to setup appropriate input files for enhanced graph theory analysis using the freeware Conefor Sensinode (<http://www.conefor.org>). A morphological based change analysis aims to reliably detect coherent change areas by excluding uncertainties due to differences in image quality, ortho-correction, and classification accuracy of the input images. These and other tools are geared to provide utilities for a comprehensive quantitative analysis of digital images. They may facilitate a holistic assessment or contribute to studies conducted with other software packages. Based on geometric concepts only these tools can be applied in any field, for example to generate GoogleEarth image overlays (<http://forest.jrc.ec.europa.eu/download/data/>). Complemented by pre- and post-processing routines and a complete GIS environment (<http://www.qgis.org>) these tools are available in the portable freeware GUIDOS Toolbox (<http://forest.jrc.ec.europa.eu/download/software/guidos>).

The principal features are explained and illustrated on sample data sets in forest landscape studies where pattern, connectivity, and spatial fragmentation are the key drivers. The reliable assessment of the configuration of forest patches and its change in time is a prerequisite for a meaningful understanding and interpretation of forest landscape dynamics. As an additional benefit it permits measuring progress in biodiversity and landscape planning projects. The provision of tools for monitoring and especially quantifying the impact of human activities on forest landscapes facilitates the design of efficient and assessable forest resource policies and risk assessment studies.