

Title of the symposium:

Deciphering environmental gradients in landscapes for a better understanding of biodiversity dynamics

Detail of organizer(s):

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Co-organizer

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Symposium abstract

For quantifying and modelling of landscape patterns, the patch matrix model (PMM) and the gradient model (GM) are the fundamental concepts of landscape ecology. While the PMM model has been the backbone for our advances in landscape ecology, the GM represents a continuous landscape characteristic, which provides crucial insights into pattern-process-functionality interactions.

For the patch/matrix representations to mosaic and to the current state of mapping gradients from different sources, Remote sensing (RS) images, from satellites, planes or drones, are a main source of information, complemented by field surveys and spatial statistics. The information from aerial photos or satellite images differ widely in terms of spatial, spectral, temporal, and directional resolution. The information is produced by biotic and abiotic attributes at any relevant scale, like landscape features (trees, forest, any land cover, land use intensity) as well as by the influence of these features on the overall landscape (climate, propagules etc.). Gradients may be spatially continuous or split into patches due to disturbances, differential management practices (land-use intensities), and phenology, as in the case of crop or vegetation type phenology or greenness where the same crop vegetation type can be at different development stages in a landscape.

As gradients do exist in space as well as in time, plant phenology, food resources, water and nutrient flows change at different rates, this implies that land cover (habitat) "quality"

dynamics proceeds according to complex spatio/temporal domains.

The objective of the symposium is to present and discuss such diversity of gradients, how their increase our knowledge of biodiversity patterns and processes across space and over time. Questions as “what are the relationships between the scale of behaviour of species, the status, the influences of stress and disturbances, in relation to the characteristics of RS information ?” or “are gradient based analysis more robust than mosaic based ones?” need to be addressed. Furthermore, we want to discuss the future methodological requirements for a better understanding of patterns-processes-functionality interactions in landscapes

How your symposia will improve landscape ecology science?

The dominant representation of landscapes as mosaic has several blind spots. First all landscape mosaic of the same type (e.g. forest) are considered similar, though their internal structure may be different. Second, the phenological lags within the same vegetation type are not taken into account. Third, the interfaces between the various elements of the mosaic are equal; though they can be sharp or smooth. The assessment of land-cover (habitat) quality and landscape permeability from a biodiversity perspective will be improved by such knowledge. More, the structure and phenology of vegetation is highly dependent on human management as well as on disturbances. Therefore, we can expect to gain means to observe the impact of biodiversity drivers such as agricultural/silvicultural practices, in terms of ecosystem functions at relevant space/time scales

Broad thematic areas

Broad thematic areas 1st choice: From landscape pattern to functions (variables, metrics, indicators, monitoring)

Broad thematic areas 2st choice: Technologies and landscape ecology (remote sensing, geomatics, ...)

Outcomes of symposium

Special issue in a scientific journal (to be negotiated)