

28.04. Dr. Angela Lausch, UFZ, Leipzig:

Ansätze zur Quantifizierung raum-zeitlicher Landschaftsmuster für ökologische Fragestellungen

How should we analyze spatial-temporal patterns in landscapes

For quantifying and modelling of landscape patterns, the patch matrix model (PMM) and the gradient model (GM) are fundamental concepts of landscape ecology. While the PMM model has been the backbone for our advances in landscape ecology, it may also hamper truly universal insights into process–pattern relationships.

The PMM describes landscape structures as a mosaic of discretely delineated homogenous areas. This requires simplifications and assumptions which may even result in errors which propagate through subsequent analyses and may reduce our ability to understand effects of landscape structure on ecological processes. Alternative approaches to represent landscape structure should therefore be evaluated. The GM represents continuous surface characteristics without arbitrary vegetation or land-use classification and therefore does not require delineation of discrete areas with sharp boundaries. The GM therefore lends itself to be a more realistic representation of a particular surface characteristic. In the paper PMM and GM are compared regarding their prospects and limitations. Suggestions are made regarding the potential use and implementation of both approaches for process–pattern analysis.

The ecological and anthropogenic process itself and its characteristics under investigation is decisive for: (i) the selection of discrete and/or continuous indicators, (ii) the type of the quantitative pattern analysis approach to be used (PMM/GM) and (iii) the data and the scale required in the analysis. Process characteristics and their effects on pattern characteristics in space and time are decisive for the applicability of the PMM or of the GM approach. A low hemeroby (high naturalness and low human pressure on landscapes) allows for high internal-heterogeneity in space and over time within patterns. Such landscapes can be captured with the GM approach. A high hemeroby reduces heterogeneity in space and time within patterns. For such landscapes we recommend the PMM model.

(HINWEIS: Der Vortrag wird in deutscher Sprache gehalten.)