

## **Change-vector analysis of forest succession: gradient effects on Piedmont forest dynamics.**

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Succession is a major driver of forest ecosystem dynamics, interacting with biotic and environmental (i.e., water, soil, etc.) processes, natural disturbance, and human land use. Forest succession is mechanistically well understood at fine scales, but has been described only very generally at broader scales. Time-series of categorical landcover maps derived from satellite imagery inform modern broad-scale descriptions, but insofar as succession is a continuous process, much of the relevant community information is removed by image classification. Alternatively, continuous representation of the successional community allows a nontrivial change-vector representation of succession, wherein successional rates and directions may be calculated not probabilistically over the entire population, but directly for each patch or image pixel. In this presentation, I describe the remote sensing of and initial observations from a 20-year series of thematically continuous maps of succeeding pine-hardwood forests in North Carolina. Forest patches traverse a community trajectory from persistent-leaved pine to deciduous-leaved hardwoods, with rates and directions varying in space and in response to environmental gradients. Categorical type conversions are detected as large change-vectors, but increased resolution of the community also allows monitoring of diffuse disturbances such as hurricane damage and selective timber harvest.

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