

## **The constructed catchment 'Chicken Creek': feedback mechanisms between soils, surface structures, vegetation and hillslope hydrology during initial ecosystem development**

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Over a period of eight years, we investigated the initial development of the constructed catchment 'Chicken Creek', south of Cottbus, Germany (Gerwin et al., 2009). Since the boundary conditions and inner structures of the hillslope are well known and documented (Gerwin et al., 2011), the site offers unique possibilities to study the relevant processes of ecosystem development interacting with various structures and patterns.

We observed considerable changes within the catchment (Elmer et al., 2013). Both internal and external factors could be identified as driving forces for the formation of structures and patterns in the artificial catchment. Initial structures formed by the construction process and initial substrate characteristics were decisive for the distribution and flow of water. External factors like episodic events triggered hillslope processes like erosion and dissection during this initial phase, promoted by the low vegetation cover and the unconsolidated sandy substrate (Schaaf et al., 2013). With time, secondary structures and patterns evolved and became more and more important. Invading biota and vegetation succession initialized feedback mechanisms resulting in pattern and habitat formation, and generally in increased differentiation, heterogeneity and complexity that are typical characteristics of ecosystems (Schaaf et al., 2011).

The processes and feedback mechanisms in the initial development of a new landscape may deviate in rates, intensity, and dominance from those known from mature ecosystems. It is therefore crucial to understand these early phases of ecosystem development and to disentangle the increasingly complex interactions between the evolving terrestrial and aquatic, biotic, and abiotic compartments of the system.

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