



The artificial catchment ‘Chicken Creek’ (‘Huehnerwasser’) as a new research tool for hydrological and ecological studies

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The most important framework of many ecological studies are watersheds as landscape units for water and element budgets. However, internal structures of natural catchments are often not well known due to natural heterogeneity and difficult boundary conditions. Important information has to be extrapolated from point measurements or indirect exploration methods. In contrast, artificial watersheds have the advantage of better defined boundaries and internal structures. Both local boundary conditions, e.g. the accordance of the surface and the groundwater catchment or hydrologic parameters like drainage patterns, discharge points and stratification can be designed and precisely documented during site construction.

A recently launched German-Swiss Collaborative Research Centre is investigating the ‘Chicken Creek’ watershed which can be seen as one of the largest artificially created catchments for scientific purposes worldwide. The main hypothesis of the Collaborative Research Centre is that initial structures define and shape the development of an ecosystem as well as its later stages. Against this background the artificial catchment was designed to offer manifold opportunities for hydrological oriented as well as ecological studies of an initial ecosystem. As internal structures are well known and the surface and subsurface boundaries are well defined compared to natural catchments the site offers high potentials for improving hydrological and ecological models.

The catchment ‘Chicken Creek’ in Lusatia (Germany; 150 km SE from Berlin) has an area of 6 ha. It was constructed as a 2-4 m layer of post-glacial sandy to loamy sediments overlying a 1-2 m layer of Tertiary clay that forms a shallow pan and seals the whole catchment at the base. No further measures of restoration like planting, amelioration or fertilization were carried out to allow natural succession and undisturbed development. At the bottom of the catchment a small lake with a diameter of 70 m and a maximum depth of 3 m was established. The site was fenced in completely to avoid disturbances and vandalism particularly by human visitors but also by abundant game animals in the area. The construction operations were completed in September 2005 which can be defined as the ‘point zero’ of the ongoing development of the site.

A comprehensive monitoring programme has been started immediately after completion to investigate the development and differentiation of structures during the initial phase of ecosystem genesis. All spatial information on structures and processes will be brought together in the central integrating structure and process model that has to be developed within the project. This model will be the most important tool to differentiate and to elucidate different development phases. The objective of this structure and process model is the visualization of temporal and spatial dynamics and the interpretation of structure-process-interactions.