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Catchment Architecture – An Overview

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It is now well established that the spatial patterns of many hydrologically relevant catchment properties, such as slope gradient, connectivity, or soil hydraulic properties, are not just random, but highly organised, and that these patterns are significant for how catchments behave hydrologically. Traditionally, this information is used in a posterior way, by means of mapped hydrological response units, or the use of terrain information like DEMs. A major drawback of such an approach is new data has to be collected for every new model application, and that principles of landscape self-organisation are neglected.

An alternative approach would be to use prior understanding of how catchments are formed, and how spatial patterns of all kinds come into existence. Often, but not always, this is due to the co-evolution of the geomorphic, pedological, ecological, and hydrological processes operating within landscapes. This paper presents an overview of our current understanding of the origin of spatial patterns of hydrologically relevant catchment properties, from a landscape evolution perspective. Gaps in our current knowledge are highlighted, and potential ways forward are discussed.