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Connectivity and complex systems in geomorphology: addressing some key challenges

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"Connectivity thinking" and related concepts have a long history in geomorphology. Since the beginning of the 21st century connectivity research experienced a huge boom in geomorphology as geomorphologists started to develop new concepts on connectivity to better understand the complexity of geomorphic systems and system response to change. However, progress in the field of connectivity in geomorphology has mostly been developing in a parallel manner, resulting in a multiplicity of definitions, concepts and methodological approaches. Nevertheless, a set of common key challenges amongst the different connectivity concepts and approaches used to understand complex geomorphic systems are also evident. In the course of a theory think tank of the COST Action ES1306 (CONNECTEUR – Connecting European Connectivity Research) the following five different key challenges were detected (Turnbull et al., in prep.): (i) defining the fundamental unit, (ii) distinguishing between structural and functional boundaries, (iii) emergent behavior, (iv) memory effects, (v) measuring connectivity. In this presentation we will a) discuss how these key challenges are addressed and approached in connectivity research in geomorphology, b) evaluate ways in which cross-disciplinary advances may be made by exploring potential for a common toolbox approach to the study of connectivity.