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Self-organisation in geomorphic systems: criteria and measurability

K. v. Elverfeldt
University of Klagenfurt, Geography and Regional Studies, Klagenfurt, Austria (kirsten.vonelverfeldt@aau.at)

Since the late 1970ies, the concept of self-organisation emerged to be a (new) paradigm of natural sciences such as biology, physics, chemistry, and more recently also geosciences. Despite numerous and partly pioneering research in this direction it remains widely unsolved how self-organisation 'functions' in natural systems. For example, in laboratory experiments framework conditions can be restricted, so that mathematical solutions are possible. For geomorphic systems, however, the sheer amount of parameters and their complicated and possibly complex interrelations makes mathematical solutions rather impossible. The underlying question is: Can we distinguish specific criteria for self-organisation, and if so, which are these? One criterion, for instance, is the development of spatio-temporal structures within a system. However, these structures can as well be the result of external conditions and drivers instead of being the result of self-organisation. Another criterion for the assessment of self-organisation is the macroscopic correlation of system elements – but how is this to be measured in the field and/or assessed with long datasets? Have we collected the 'right' data to assess this?

This presentation contains 'work in progress' and thus cannot offer results, but a discussion of the implications of the concept of self-organisation for geomorphic research.