



Indices of hydrological and sediment connectivity – state of the art and way forward

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Digital elevation models (DEMs) describe the landscape topography, which is both a product and a control of the activity of geomorphic processes. In the same way, the connectivity of landscape units with respect to water and sediment fluxes can be seen as both a driver and an emergent property of the spatiotemporal interaction of hydrological and geomorphic processes. As DEMs are available with increasing quality, resolution and spatial coverage, they form an important basis for the quantitative assessment of connectivity through indices.

The “ideal” connectivity index represents a means of delineating spatial and temporal patterns of runoff and sediment pathways that govern the delivery of eroded sediments to the channel network (“hillslope-channel coupling”) and finally to the outlet of a catchment. Thus, connectivity indices can be useful for assessing runoff generation and routing, soil erosion and sediment transfer, and communicating these issues to land managers and stakeholders. However, despite promising results achieved with existing indices, several issues remain open to further development; these include, for example, the temporal dimension of connectivity indices, and the issue of scales, as connectivity appears to be relevant on the plot, channel reach and catchment scale.

This contribution reports the results of a workshop conducted within the framework of the COST action CONNECTEUR (CONNECTing European Research on connectivity; <http://connecteur.info>). We investigate and discuss the strengths and shortcomings of existing connectivity indices, and outline modifications and new approaches to index-based connectivity assessment.