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Thresholds, Scale and Connectivity in semi-arid Catchments: Implications for eco-engineering Strategies

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Geomorphological processes in semi-arid environments are strongly influenced by the connectivity between different landscape units. This connectivity can either be established through concentrated flow in rills, gullies and channels but can also have a more diffuse flow character, where sheet flow can reach the channels. Whether connectivity is established or not, is largely dependent on the properties of the landscape units involved. Moreover, the actual connectivity is strongly dependent on the magnitude of the events generating geomorphological processes.

From two semi-arid catchments in Southeast Spain examples of events with different degrees of connectivity will be discussed. Fine, intermediate and broad scale aspects will be integrated in relation to the recurrence period of the events and their consequences for runoff generation and sediment delivery at the hillslope and catchment scale will be discussed.

This knowledge can be used to apply sustainable strategies to reduce the undesirable on- and off-site effects in order to mitigate land degradation. However, the effectiveness of revegetation and soft engineering approaches are also site specific as well as scale dependent and these aspects should be incorporated in their planning and expected sustainability.