



Connectivity and scale effect on sediment fluxes dynamic from the hillslope to the river basin

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The phenomena of erosion and sediment transport are often observed with a time lag and / or space within a watershed, especially between the upstream and downstream areas. This difference between runoff and erosion assessments that depends on the size of observation is commonly called the "scale effect". This effect has often been studied globally and reduced runoff and erosion rates are generally reported as one moves from the local to the regional level.

To quantify the scale effect, local erosion models are often linked to the empirical concept of SDR (Sediment Delivery Ratio): the ratio of exported sediment at the outlet of a drainage system on the gross erosion that occurred locally. This empirical parameter is used as a connectivity factor to estimate the contribution of net soil losses to sedimentary basins exports. A recent renewed interest on these topics has led the development of more or less elaborate variants that propose a conceptualization of the (es) connectivity (s) of the landscape to describe the sedimentary flows within watersheds.

In general, these concepts allow apprehending the spatial variability of flow in heterogeneous environments and for events / climates not too extreme. Their use is more difficult when the flows are constrained by the production process. A limit also appears when trying to cover too large a range of spatial scales, because beyond a spatial succession of (re) detachment and deposition processes a new nature of process can emerge.

We will rely on several measured database of erosion / sediment transport at different scales and in diverse geomorphological contexts to illustrate and discuss the relevance of these concepts.