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Connectivity from source to sink in a lowland area: the Loire river basin (France)

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Sediment connectivity relates to the transfer of sediments from sources to sinks via runoff and in channel transport. It is highly dependent on spatial variability of landscape properties such as differences in morphology, land use and infiltration/runoff characteristics but may also vary in time due to differences in rainfall amount/intensity and changes in vegetation cover throughout the year.

In the Loire river basin, we found that sediment fluxes displayed strong variations in space but also at the interannual and seasonal time scales (Gay et al. 2013). In this context, our goal is to better understand and quantify hillslope sediment redistributions within this lowland area thanks to the use of semi distributed connectivity approach. To this aim, Borselli's index of connectivity (IC, Borselli et al., 2008) is selected to assess hillslope connectivity at annual and seasonal time scales. Several improvements are proposed to take into account the coupling of the structural landscape connectivity and its hydro-sedimentary response. Parameters such as rainfall intensity and differences in seasonal land cover are integrated into the model to account for landscape variations through time. Infiltration and runoff indices were also tested.

Preliminary results confirm the variability of landscape connectivity throughout the year. The integration of the index of infiltration and runoff properties of landscape (IDPR) as defined by Mardhel et al. 2004 seems to improve the IC model outputs. From this first step, in-stream sediment connectivity index should be developed for a better understanding and assessment of sediment redistributions at the entire catchment scale.

L. Borselli L., Cassi P., Torri D. Prolegomena to sediment and flow connectivity in the landscape: a GIS and field numerical assessment. *Catena*, 75 (2008), pp. 268–277

Gay A., Cerdan O., Delmas M., Desmet M., Variability of sediment yields in the Loire river basin (France): the role of small scale catchments (under review).

Mardhel V., Frantar P., Uhan J., Mio A. Index of development and persistence of the river networks as a component of regional groundwater vulnerability assessment in Slovenia. *Int. Conf. groundwater vulnerability assessment and mapping*. Ustron, Poland, 15-18 June 2004.