



## **Experimental and modelling investigation of hydrologic and sediment connectivity across the hillslope-floodplain interface**

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The connectivity between hillslope and floodplain elements is of critical importance in controlling hydrological and sediment-transport processes of catchments. In recent years there has been an increasing interest in understanding these linkages and their effects on processes at all scales. However, despite the significant controls these linkages exert and the recent widespread recognition of their importance little process-based work has been carried out on how water and sediment move across the interface between elements. In this paper we present experimental and modelling results to investigate the way that hillslopes connect with floodplains during a rainfall event, both in terms of water and sediment transfers. Data on sediment connectivity from hillslope to floodplain are provided from a series of laboratory experiments on the TRACE (Test Rig for Advancing Connectivity Experiments) facility in which we have used chemical tracers to quantify sediment transport and deposition and assess the resulting patterns of sediment redistribution across the boundary between hillslope and floodplain during a single rainfall event. Data on the hydrological connectivity between hillslope and floodplain have been obtained from the laboratory experiments and from numerical modelling using the hydrological model COUP2D. Results indicate that despite high soil-erosion rates on the slope, there is low sediment connectivity across the floodplain as indicated by high sediment deposition at the slope-floodplain interface

and lowered sediment transport rates on the floodplain element. The modelling data demonstrate the importance of the floodplain properties in controlling the connectivity of water and sediment across the hillslope-floodplain domain.