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Sediment supply during flow events in a small experimental upland catchment

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The monitoring of scour and fill processes in alluvial stores of a 9 ha experimental upland catchment, the Moulin (Environmental Research Observatory of Draix, Southern French Prealps), concomitantly with the integrated measurement of coarse sediment output, allows the back calculation of the sediment supply from hillslopes during flow events. Sediment erosion and deposition in channels are measured with a set of 79 scour chains positioned along 38 cross sections. The chains were deployed along the main trunk of the catchment and the downstream part of the main tributaries to monitor all reaches affected by substantial sediment storage fluctuations. Headwater channels were not equipped since they generally exhibit bedrock channels with transport capacity in excess of sediment supply. Coarse sediment output is measured by means of a sediment trap located at the mouth of the catchment. The Moulin is also equipped for rainfall and water discharge recording. Preliminary results during two rainfall periods in September and November 2007 show very distinct sediment sources. During the long lasting and low intensity rainfall period of November, the sediment supply from hillslopes was insignificant; the sediment yield was supplied by channel scouring. The short duration and high intensity rainfall period of September shows a more important sediment contribution from hillslopes (half of the sediment supply from channels). These observations are confirmed by data from a 0,1 ha catchment, used as a surrogate for hillslope sediment production assessment. Field survey of in-channel sediment stores also permits a characterization of the spatial distribution and volumes of alluvial stores.