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Erosion and sediment yield in mountain Mediterranean badlands catchments: processes and factors observed in the Experimental catchments of Draix, (Alpes-de-haute-Provence), France

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In the Southern French Alps, the Black Marls formation, or "Terres Noires" in French, covers a large area. This formation is very susceptible to weathering and erosion. Under the Mediterranean and mountainous climate with frost in winter and high intensity rainfall in summer, it results in "badlands" topography with steep and dissected slopes. The solid transport during floods is very high, both for suspension and bedload transport.
The experimental site of Draix was created in the period 1983-1984 and aim principally at studying erosion processes and flood generation in this area. Six watersheds, from 1 000 m2 to 20 km^2 are equipped to study and quantify runoff and erosion processes, according to the vegetation cover and basin size. Seven rain gauges record the precipitation in different locations of the area, ranging from 850 to 2200 m in elevation. Discharge is measured in calibrated sections for the 5 smaller watersheds (up to 1 km^2) and since 2008 in natural section for the largest (The Bouinenc river). The suspended sediment yield is sampled in the gauging sections and monitored continuously with an optical fiber sensor. Except for the Bouinenc, the bedload sediment yield is measured in a sediment trap, just upstream the gauging stations.
The analyses of the 25 year datasets for runoff and erosion in the 5 small badlands catchments pointed out the non-linearity of the response to a rainfall input and the scale effects in sediment production. Temporal and spatial patterns are presented and discussed.
The recent monitoring of a larger catchment (The Bouinenc) allows the analysis, for a few events, of the sediment fluxes transferred downstream of such a badlands area.