



The seasonal cycle of deposition and scouring in the channel network as a key process for erosion response in badlands catchments, (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. Under the Mediterranean and mountainous climate with frost in winter and high intensity rainfall in summer, it results in "badlands" topography and high solid transport during floods. Four small watersheds, from 1 000 m² to 1 km² are equipped to study and quantify runoff and erosion processes, according to the vegetation cover and basin size. The sediment production is measured at the outlet of the catchments for each storm event: the coarser part of the sediment yield is measured in a sediment trap, the finer part is sampled in the gauging section and/or monitored continuously with an optical fiber sensor.

The analyses of the data at the event scale pointed out the non-linearity of the response to a rainfall input and revealed the role of the deposition and scouring processes in the channel network. In order to study how this phenomenon control the erosion response at the outlet, field observations were carried out throughout the year in the 2 basins with scarce vegetation cover: Laval (0.86 km²) and the Moulin (0.09 km²). Several representative reaches were selected in the two basins with the measurement of cross sections after each rainfall event of some importance. At the same time, morphometric observations of nearly the entire gully network of the Moulin and a photographic survey of the main channel of the Laval were conducted.

The paper analyses the field observations and collates it to the rainfall inputs and to

the runoff and sediment supplies at the outlet for the same rainfall events or group of events. In addition, the water and sediment response of a monitored gully (The Roubine, 1330 m²) are used to evaluate the contribution of the slopes. The analysis of the sequence shows how the spring and summer rainfall events increase the temporary stocks in the gully bottoms and channel reaches even when the sediment output is high. At the beginning of autumn, the upstream part of the network begins to empty and last floods in November scoured most of the remaining stocks. These results allow building a seasonal model of the erosion and transport processes in such basins.