



## **High spatial resolution photography and erosion plots for studying hydro-geomorphological response after an experimental fire**

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This research carried out studies the fire impacts on hydro-geomorphological processes by collecting data from experimental plots before and after a controlled fire. Fire modify the factors controlling runoff-infiltration generation and sediment production because of the destruction of ground-cover vegetation and soil properties alteration. Changes in vegetation recovery, organic debris, ashes, and stoniness were monitored using vertical high spatial resolution photography. Moreover, changes in soil properties (aggregates stability, texture and organic matter) were analyzed taking samples from micro-plots at three different depths: 0-2, 2-5 y 5-10 cm. The study area, located in Peñaflo (Zaragoza, Spain), consists of two erosion experimental plots (control and burnt), which include a system of tipping buckets connected to data loggers, which continuously recorded the runoff from December 2004 to October 2005. The controlled fire was provoked on October 2004. High spatial resolution photographs have been taken with a monthly frequency using a metallic structure in order to move the digital camera. Afterwards, the images were geometrically corrected and a super-

vised classification process was applied.

Results show an increase both in runoff coefficient (1.5 times) and in soil losses (3.5 times) in the burnt plot. However, regarding sediment concentration, statistically significant differences have not been observed between plots and periods of time. Simultaneously, a decrease on vegetation cover (36%) and an increase on bare soil (28%) and stoniness (7%) have been detected following fire. Regarding soil properties, a strongly different behaviour in the soil depth 0-2 cm has been registered related to the other intervals. Within these changes, the post-fire increase of organic matter can be highlighted, with a slight increment, even in the sub-horizon 2-5 cm. Structure stability shows fluctuating values in the time linked with geo-morphological and biological seasonal parameters. Finally, high spatial resolution photograph is a suitable method for complementing erosion plots studies.

**Keywords:** *hydro-geomorphological effects, post-fire surface materials, soil properties, experimental fire, high spatial resolution photograph.*