



Post-fire hydro-geomorphological consequences in a semi-arid environment (Ebro Basin, Spain)

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Wildfires alter the hydro-geomorphological processes governing runoff-infiltration generation and sediment production due to the destruction of ground-cover vegetation and alteration of the physical and chemical soil properties. We studied the impacts of fire on hydro-geomorphological processes collecting data from experimental plots before and after a controlled fire. Simultaneously the monitoring of post-fire re-growth processes has been made by means of a high spatial resolution photograph in order to assess the relationship between hydro-geomorphological consequences and re-growth processes. The study area is located in Peñaflo (Zaragoza province, Spain). The climate is dry Mediterranean. The soil is a Regosol calcareous developed from a Quaternary fluvial terrace. The vegetation is a Mediterranean shrubland dominated predominantly by *Rosmarinus officinalis*. Two erosion experimental plots (control and burnt), that include a system of tipping buckets connected to data loggers, were installed in order to record continuously the runoff from December 2003 to October 2005. Controlled fire was performed on 16th October 2004 (just in the middle of the period). Changes in vegetation recovery, litter, stoniness and ashes were studied by means of the vertical high spatial resolution photograph. For this purpose it was designed a metallic structure of 3x3 m and 2 m tall. This structure was used to move a Reflex Nikon D100 digital camera. Photos were taken with a monthly frequency. Afterwards, the images were geometrically corrected and a supervised classification process was applied. Results show that runoff coefficient in the burnt plot was 1.5 times higher than before the controlled fire. Soil losses in the burnt plot were 3.5 times higher than

before the controlled fire, whereas in the control plot was only 0.5 times higher. However, regarding sediment concentration, statistically significant differences have not been observed between plots and between periods of time. Simultaneously, a decrease of vegetation cover (about 36%) and an increase of bare soil (about 28%) and stoniness (about 7%) have been detected following fire.

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