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Runoff and sediment production in a Mediterranean basin under two different land uses after forest maintenance

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This study analyses the influence of two different land uses on the hydrology of the Vernegà experimental basin between the years 1993 and 2012. The basin is located in the Northeast of the Iberian Peninsula and it is influenced by a Mediterranean climate, with an average annual rainfall of 688 mm. The study of rainfall distribution shows that the majority occurs during autumn and spring, with a 34% and 25% of total annual rainfall respectively. Surface runoff flows from October to June. In this catchment, flash floods may represent 70% of the total water yield, though they only occur 6% of the time. It is important to emphasize that agricultural practices within the study area have been maintained, which is the contrary to the general trend in Mediterranean rural areas. The introduction of forest management practices between 2003 and 2005 has resulted in important hydrological changes in the watershed: Between 2005 and 2012 an increase of the runoff coefficient has been detected. In Bosc the increase represents 38% while in Campàs is 12% in relation with the 1993-2005 period. Campàs yields a greater total runoff than Bosc as a consequence of a greater catchment surface, greater agricultural surface and the existence of forest roads and forest management practices. Part of this phenomenon may be due to the decrease of interception of rainfall and plant biomass in the forested area of the basin. In relation to the sediment yield, it is concentrated during floods (more than 80%) and there is an increase of available sediment after extraordinary events, as it is the case of October 2005 flood, where the total sediment yield was 7 $Tkm^{-2}yr^{-1}$ and in November 2005 it was 10 $Tkm^{-2}yr^{-1}$.