



Describing and modelling the rainfall-runoff pattern of an olive orchard large catchment in Southern Spain

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Olives are a key crop in Andalusia and other Mediterranean regions. The historical expansion of the area dedicated to olive orchards has modified the soil cover and properties, affecting infiltration, runoff and, thus, the water balance. The hydrological behaviour of catchments can be studied through “in situ” measurements or/and with the help of hydrological models. In this work, the relationship rainfall-runoff is described statistically and modelled for a catchment of 308-km² in Southern Spain, where the main soil land-use is olive tree crops (79% of the area). The analysis was based on a daily data series of 4 years (2000-2004).

Firstly, simple statistical analyses were carried out to characterize the rainfall-runoff relationship at different temporal scales (from daily to annual). Then, the hydrological model at monthly scale SIMPA was calibrated (adjusting the parameters related to the threshold for runoff generation, capacity of water storage and maximum depth of infiltration).

The results showed that rainfall-runoff correlations were not significant at daily to monthly scales, while the simple linear regression model was acceptable at seasonal and annual scales (determination coefficients > 0.60). In the calibration of SIMPA, the efficiency coefficient of Nash-Sutcliffe was 0.80, while the root mean square error was 4.2 mm. Although SIMPA is simple model that provides reasonable results at temporal scale greater than a month, the results are highly sensitive to the parameter associated to subsurface water flow, which should be well-justified at the catchment scale.