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Hydrological dynamics of a Mediterranean catchment in a global change context. (Romanyac catchment, Cap de Creus, Girona, Spain)

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Mediterranean regions are characterized by unevenly distributed water resources, and consequently a more precise knowledge of the main hydrological processes and their variability and changes is crucial for a better management of water resources. However, the lack of hydrological information and data in most areas of the Mediterranean basin greatly difficult the analyses of changes in water resources at relevant scales.
In this context, the Soil Science Unit GRCT48 from the University of Girona is conducting an integrated study of hydrological response, soil erosion and soil degradation processes in fragile Mediterranean areas undergoing changes in use and management. The study area is located in the Cap de Creus Peninsula (NE Spain), where land abandonment has been the outstanding characteristic over the last decades. The area is covered by terraced soils, most of them abandoned, and stands for a representative Mediterranean environment. Current land cover is a mosaic of areas with different shrubs according to wildfire occurrence. Residual patches of cork and pine trees are also present as well as small extensions of pastures. Finally some localized areas of vineyards and olive trees are still cultivated. The approach is based on the complementary use of plot and catchment scales to assess the effect of land cover and land use change on physical, chemical and biological parameters of soil quality and on rainfall-runoff-erosion relationships.
Along the study period, observed rainfall-runoff response at the plot scale was highly variable among sites but also for a given environment, depending on antecedent wetness conditions and rainfall characteristics. Overall, surface runoff responses were low in all environments. Soil loss associated to rainfall-runoff events showed very large variations among sites, and also for a given site, between the different rainfall events. At the catchment scale, preliminary results obtained from the monitoring, of three catchments of different sizes (0.25 to 9.36 km2). showed that catchment scale runoff represented around 17% of the annual rainfall (507 mm) and that evapotranspiration was consequently the more relevant component of the water balance. Observed runoff happened in less than two months, whereas the stream remained totally dry during half of the year. Preliminary rainfall-runoff modelling results obtained at the event scale, showed that adequate simulation of the catchment response could be achieved with a relatively simple hydrological model.