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Hydrological silviculture effects in a natural Quercus ilex forest

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Mediterranean forests play a key role in the hydrological cycle regulation. On the one hand, its presence decreases the soil water evaporation, increasing the water availability. However, on the other hand, the forest density reduces the precipitation that reaches the soil, where an excessive forest density could induce water scarcity problems, at the forest itself as well as at the whole catchment. Hence, there should be an equilibrium that protects the soil from excessive evaporation at the same time that reduces the forest water interception.
This equilibrium can be reached by means of the Adaptative Forest Management (AFM). AFM aims to adapt the forest to water availability by means of an artificial regulation of the forest structure and density. Hence, areas under water scarcity situations, such as the Mediterranean region, might require this AFM to optimize the hydrological cycle under normal and future global change conditions.
The present study enhances the relevance of the hydrological silviculture in Mediterranean regions. A natural Mediterranean oak forest, whose density appears to be decreasing the hydrological contribution to the catchment, was selected. The forest is located in a typical Mediterranean area, at the headwaters of Rambla Espadilla catchment, within the public forest La Hunde, Valencia (NE Spain). Two contiguous plots, control and treatment, of 1800 m2 area respectively were selected. The orientation (NO), slope (30 %) and forest density (861 tree per ha) were the same for both plots. Treatment plot was thinned following the forest nursery requirements, reducing the forest density from 861 to 414 tree per ha. Control plot was not thinned. Then, the thinning effects into the hydrological cycle were characterized by means of comparing throughfall, stemflow, soil moisture and transpiration, of control and treatment plots.