



Investigating blue water response to green management in a Mediterranean headwater catchment

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Although forest provides multiple ecosystem services (e.g., soil conservation, carbon sequestration, regulation of water cycle), it often cannot provide all of them simultaneously because of the trade-offs between some of them. In particular, while afforestation and reforestation have been recommended as a means of sequestering carbon in forest biomass and soils to limit climate change impacts, these practices may significantly alter streamflow and groundwater recharge, particularly in Mediterranean headwater catchments. In this context, a better understanding of forest hydrology is necessary to anticipate the undesirable trade-offs of forest management that can affect water resources.

Within the MASCC and LIFE + CLIMARK projects, which respectively aim to establish possible land cover scenarios for the next decades and to implement forest management practices to strengthen the capacity of the forest to mitigate the effects of change climate, the Vallcebre research catchments (North Eastern Spain) were selected as a reference site to assess the effect of forest (green) management on water resources (blue water) in a Mediterranean environment. These research catchments offer available medium-term (15 years) hydrological series (precipitation, discharge and water table) prior to forest management and a detailed knowledge of their hydrological response, essential for this evaluation.

In October 2018, the forest cover of a small sub-catchment (0.0248 km²) which initially represented 54% of the basin was thinned (removing between 35% and 60% of the basal area depending on the locations) to assess the effect of multifunctional forest management on streamflow. In the same way, the forest covering the contribution areas (0.0138 and 0.0139km²) of two shallow piezometers was thinned according to the same procedure to evaluate possible changes on the dynamics of the piezometric levels.

This work aims to present the general framework of the study, the type of forest management

carried out as well as a first analysis (at different temporal scales) of the water table and discharge dynamics observed during the first year after the forest management.