



Terrestrial photography for monitoring eco-hydrological variables in Mediterranean mountain areas

Pedro Torralbo , Javier Herrero, Ana Gilabert, Carlos Gallego-Galán, Pedro Gómez-Giraldez, María J. Pérez-Palazón, Jose L. Quero, Carmen Galán, and María J. Polo

University of Cordoba, Interuniversity Institute of Investigation of the Earth System in Andalusia, Department of Agronomy, Spain (p12tomup@uco.es)

Mediterranean mountain areas constitute reservoirs of biodiversity due to the variability of the climate and hydrological regime, among other factors. Different works show the current trends towards an enhanced torrentiality and aridity in these areas, which poses some risk for their ecosystems. Particularly, vegetation distribution and phenology is strongly dependent on the climatic conditions and shifts in the hydrological regime may impact significantly such patterns.

This work presents the potential of terrestrial photography for monitoring selected eco-hydrological variables in two Mediterranean mountain systems in South Spain: a “dehesa” site in northern Andalusia (Natural Park of Sierra-Cardena and Montoro), and a high mountain site in south-eastern Andalusia (National Park of Sierra Nevada). The results show the capability of this technique, coupled to conventional weather stations, to monitor weather states relevant for the ecosystems further than the standard precipitation and temperature variables (fog, hail, snowfall or frost), vegetation development states (greenness, cover fraction, height), and phenological states (bud formation, blooming, fruiting), and other variables on a qualitative level (soil colour, rill formation, . . .). The flexible to fix snap frequency and the possibility of automated treatment of the images make of this method a cost-effective approach to understand the nature of changes in the ecohydrological regime in these areas on different time scale, and complement standard monitoring networks.

(This work has been funded by Spanish Ministry of Agriculture and fisheries, Food and Environment, Biodiversity Foundation, Project "Control and early warning of critical ecohydrological states in areas of Dehesa and high mountains through terrestrial photography")