

## POSTDOCTORAL POSITION OFFER FORM

1. Job Position title: Impact of microclimate conditions on the water balance in different mountain and dehesa-type areas in Andalusia
2. Keywords: microclimate, water balance, dehesa, mountain areas, Mediterranean regions
3. Researcher in charge in DAUCO:
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#### 4. Research Group description (max. 2.000 characters)

Global warming impacts on mid- to high altitude areas point out to an apparent shift towards torrentiality in the precipitation regime which, together with the increased temperature, involves significant changes on the seasonal and annual water storage in the basins in Mediterranean and other semiarid regions. The likely loss of precipitation during the late spring and summer periods directly affects the seasonal water availability downstream, with alarming risks for traditional agroforestry systems in these mountain regions, and biodiversity.

This project aims to gain insight in the hydroclimatic trends in different “mountain” areas throughout Andalusia on different time scales, and the likely impacts on the water balance at selected sites in the network of Natural Parks. For this, the importance of the microclimate conditions in the dominant ecosystems of these sites will be assessed in terms of the different water fluxes by integrating modelling and observational capabilities. The major objective is coupling modelling of the energy and water balance equations in the continuum vegetation-soil to remote sensing data sources and quantify evapotranspiration, infiltration, and runoff rates on different time scales in representative sites in the following Parks in Andalusia: Cardeña-Montoro, Subbéticas, Sierra Nevada in a north-south axis, and Grazalema and Cazorla in a west-east axis. Field and model results from each site will be merged with key information on the energy and water balance, and the vegetation state, from optical sensors, and the calibrated approach will be with local observations. DFH keeps strong links with international

research groups working on remotes sensing products that guarantee and run different funded projects that bring access to local data at these sites. The ultimate goal is to assess the potential impacts of global warming on water resource availability in these areas due to the shift towards torrentiality of the precipitation regime.

##### 5. Job position description (max. 2.000 characters)

We are looking for a goal-oriented and passionate-about-research PhD candidate, who enjoys both group and independent work. Background education in engineering or earth system sciences, with knowledge of hydrology and climate science applied to the similar ecosystems of the target study areas, especially regarding vegetation and hydroclimate interactions, and a good basis on programming, and data analysis is our demanded profile; knowledge on remote sensing sources is a grade. We also highly value expertise on field work involving weather stations, eddy covariance towers, and mountain areas experimental sites. The candidate will be involved in field and lab work, modelling tasks, and data analysis from both ground and satellite sources, and will be fully integrated in the every-day interactive work of the group. Motivation and training-through-research will be enhanced by this atmosphere, and access to transverse skills training, including outreach and transfer of knowledge actions.

DFH group has developed research on water dynamics over different mountain environments for more than fifteen years and this work is an international reference for snow and mountain hydrology in Mediterranean areas and dehesa-type areas. The candidate will have access to models and observational networks, among other resources. We offer a multidisciplinary research environment with solid links to the international community of mountain and catchment hydrology and large expertise in projects on both basic and applied topics. DFH researchers' background is engineering in Civil, Agronomy and Forestry. Collaborations with the University of Bologna (A. Montanari, Italy), SMHI (B. Arheimer, Sweden), University of Florida (R. Muñoz-Carpena, USA) in the hydrology research community, and EURAC-Research (C. Notarnicola, Italy), University of Twente (B. Su, The Netherlands) and the USDA (W. Kustas, USA) in the remote sensing field assure the international projection of the candidate's work.