



Assessing the impact of climate variables on reference evapotranspiration in Southern Spain

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Accurate quantification of evapotranspiration in irrigated agriculture is crucial for optimizing crop production, planning and managing irrigation and water resources infrastructures and for using water resources efficiently. The most common procedure for estimating crop evapotranspiration (ET_c) is to multiply the reference evapotranspiration (ET_0) values by a crop coefficient (K_c). The Agroclimatic Information Network of Andalusia provides daily estimations of reference evapotranspiration (ET_0 ASCE-Penman-Monteith) using meteorological data collected by nearly one hundred automatic weather stations. They are currently used for technicians and farmers to generate irrigation schedules. Andalusia is located in Southern Spain where almost one million ha are irrigated under very different conditions. This network was deployed to provide coverage to most of the irrigated areas of the region and to improve irrigation water management, including coastal and inland locations and with a high inter-annual variability in rainfall. Topography and Mediterranean climate determine the heterogeneous landscape and vegetation of this region.

The aim objective of this study is to quantify the sensitivity of the daily ASCE-Penman-Monteith reference evapotranspiration equation to climate variables across the region of Andalusia and derive daily sensitivity coefficients for each variable. These variables are: wind speed at 2m height, maximum and minimum temperatures, vapour pressure deficit and solar radiation. Geographical distribution of each sensitivity coefficient across the region and evaluation of seasonal trends are discussed too.