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Remote sensing based soil water balance for irrigation water accounting at the Spanish Iberian Peninsula

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Temporal series maps of irrigated areas and the corresponding irrigation water requirements based on Remote Sensing is a recognized tool contributing to water governance at different scales, from water user associations to whole river basin districts. These thematic cartographies offer a first estimation of the crop irrigation requirements, and a first instance biophysical based approach of the temporal and spatial distribution of the crop water use in the cultivated areas.

This work describes the operational application of these methodologies providing valuable information for water governance and management purposes. The basic products obtained in the whole Spanish part of the Iberian Peninsula during the period 2014 – 2017 were: i) annual maps of irrigated crops based on time series of multispectral satellite imagery; and ii) the direct remote sensing-based water accounting, by quantifying agricultural water flows (e.g. rainfall, irrigation, evapotranspiration, drainage and recharge), through a remote sensing-based soil water balance. Hence this paper provides a remote sensing based water accounting approach that relies on dense time series of multispectral imagery acquired by the multisensor constellation formed by Landsat 8 and Sentinel – 2, jointly with meteorological data and agronomic knowledge.

On these purpose and approach, annual and monthly maps of net irrigation water requirements have been elaborated at the most practical spatial and temporal scales for water governance purposes. This work summarizes the methodologies used and discuss the technical and non-technical feasibility of the proposed approach.