Remote Sensing for Crop Water Management

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Abstract

Advancements on Earth Observation science and technology in the last decades have made possible the operative use of dense time series of multispectral imagery at high spatial resolution [5-30 m] to monitor crop development across its growing season at a suitable scale. These time series of images, jointly with meteorological data are able to provide accurate maps of daily evapotranspiration and so crop water requirements by using the remote sensing-based approach crop coefficient, Kc, and reference evapotranspiration, ETo, where Kc is derived from spectral reflectances and ETo from meteorological data. A water balance in the root soil layer enables us to calculate irrigation water requirements at appropriate scale for monitoring water management near- real time. This approach could be coupled to the remote sensing-based surface energy balance which uses surface temperature as primary input. But what we could call «remote sensing-driven crop water management» requires at least two steps more to be placed into the day-to-day routine on farming irrigation: On the one hand, for planning irrigation the users require the forecasting of crop water requirements for the week ahead; it can be achieved by extrapolating crop coefficient trend and by using weather forecasting for ETo estimation. On the other hand, decision makers in charge of irrigation require access to this information in an easy-to-use way on real time. It can be achieved through leading edge webGIS tools, which facilitates co-creation and collaboration with stakeholders.

Keywords: crop water management, remote sensing, weather forecasting, webGIS