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Assessing Satellite Monitoring of IRrigation software (SAMIR) for closing the water budget of the Algerri-Balaguer basin, Spain using two NDVI data sets of different temporal and spatial resolutions, a comparison study

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Optimal agricultural management requires precise calculations of the water budget in order to reach maximum water use efficiency. The water budget can be closed at regional scale levels through employing remote sensing data. Various satellites has been lunched for imaging the earth with various temporal and spatial resolution such Moderate Resolution Imaging Spectroradiometer (MODIS). Furthermore, Sentinel-2A and Sentinel-2B satellites recently launched on June 23ed, 2015 and on March 7th, 2017 respectively increased the availability of high resolution and high repetitively images. This enabled monitoring the water budget at the regional levels especially with developing well designed models. SAMIR software (Satellite Monitoring of IRrigation) employs high resolution NDVI images time series estimating the actual basal crop coefficient and vegetation fraction for running the FAO-56 dual crop coefficient water balance model.

In this work we assessing SAMIR for closing the water budget of the Algerri-Balaguer basin, Spain where two data sets are used with different temporal and spatial resolutions. In particular, 47 images of NDVI MODIS products (250 m) and 43 images of NDVI images calculated from Band 4 and band 8 data acquired by Sentinel 2 are used for calibrating and validating SAMIR during 2016 and 2017 respectively. In addition to calculating the actual basal crop coefficient and vegetation fraction, the two NDVI data sets are used for segmenting the crop rotation into sub seasons for each the water budget is calculated.

The model outputs are evaluated against the in situ measurements Results showed that both data sets lead to high performance of SAMIR while the Sentinel-2 NDVI data set gives better spatial distribution of soil moisture at the profile depths.

Furthermore, SAMIR performance is investigated by blending the two data sets which increased the temporal resolution of NDVI and related parameters. Results show that SAMIR performance significantly improved.