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Evaluation of Sentinel-2 SMI and Sentinel-3 SLSTR data for estimating evapotranspiration in an irrigated olive orchard in Southern Iberian Peninsula.

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Olive trees are one of the most important crops in the Mediterranean basin (10.5 Mha), accounting for 97.5% of the world's olive cultivation area with relevant social and economic benefits and ecological consequences. Concretely, it takes up 2.7 Mha in Spain, of which more than 1.6 are in Andalusia. Olive cultivation demands climate-smart management to facilitate crop adaptation to climate scenario and predictable development. A more efficient water use and management optimization is an especially important issue and, therefore, quantifying and modeling evapotranspiration (ET) is essential.

However, given the lack of a satellite thermal mission with both high spatial resolution and frequent revisit time, we have evaluated in this work a data fusion methodology (Gao et al., 2012) that combines Sentinel-2 and Sentinel-3 images with the two-source energy balance model (Norman et al., 1995) proposed by Guzinski & Nieto et al. (2019). Estimates of actual ET were produced at 20 m resolution from January 2016 to December 2019 in an irrigated olive grove in Southern Iberian Peninsula. Preliminary results have been validated (every 5-10 days depending on Sentinel images availability and cloud cover) by ground-based in situ data using Eddy Covariance (EC) technique, showing mean absolute errors between estimated values and those obtained by EC: 156 Wm⁻² (net radiation), 76 Wm⁻² (soil heat flux), 36 Wm⁻² (sensible heat flux), 210 Wm⁻² (latent heat flux).

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