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Application of SVEN model to estimate evapotranspiration on a coffee plantation using MODIS and Sentinel products.

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Warming conditions represent a threat to food security and livelihood in countries in which agriculture is an important share of the national income. Central America is regarded as a climate change hotspot where significant changes in temperature and rainfall have been projected. Coffee is one of the most traditional crops in the area, with Costa Rican coffee recognized worldwide for its quality. However, increasing temperatures and rainfall extremes will likely compromise coffee plantations. A similar challenge has already been faced by farmers on interannual time scales related to the El Niño-Southern Oscillation phenomena, which is associated with yield disruptions and the spread of the coffee rust. A better understanding of the weather and climate dependency of coffee crops is needed to develop water use efficiency strategies for farms. To this end, the present study centers on the integration of long-term meteorological records and a set of measurements that cover the soil-plant-atmosphere continuum. Surface fluxes derived using the eddy covariance technique and the deployment of soil moisture sensors are combined to evaluate the performance of the Soil Vegetation Energy TraNsfer (SVEN) model. One year of micrometeorological and soil measurements in a sun-exposed coffee plantation is used to assess the skills of the SVEN model using a scheme based on MODIS and Sentinel derived products. The aim of this work is to evaluate the skills of the SVEN model to reproduce the intraseasonal seasonal and diurnal variability of evapotranspiration. Given the size of Costa Rica and the scale of the crops, satellite products are often considered of limited use. Nevertheless, given the strong need, the goal of this project is to provide a detailed evaluation of the use of these products in models and support strategies that could expand the use of satellite retrievals in areas currently considered marginal.

