Remote and proximal sensing surveys on olive tree

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**Abstract.**

Spectral data acquisition in olive orchards can be performed applying different technologies, essentially depending on the camera type (multispectral or hyperspectral) and acquisition platform used. The main platforms include Unmanned Aerial Vehicles (UAVs) and the one used in the inter-row. UAVs are often associated with multispectral cameras, while acquisition platforms in the inter-row (side-view) are increasingly associated with spectroradiometers. The aim of the study was to compare hyperspectral data obtained from a side-view spectroradiometer to the multispectral data acquired from a UAV platform in an olive grove. A spectroradiometer with a spectral range of 325 - 1075 nm was used for the hyperspectral data acquisition. The surveys were manually carried out on the four exposures (North, South, East and West). The Phantom 4 Multispectral platform was used for multispectral acquisition at 50 m a.g.l. with a 6-band multispectral camera. The spectral information was compared on the four exposures using the three main vegetation indices mainly used in olive trees: NDVI (Normalized Difference Vegetation Index), MSAVI (Modified Soil Adjusted Vegetation Index) and NDRE (Normalized Difference Red-Edge Index). The results showed very good correlations between the two data sources. In addition, the hyperspectral data allowed to better discriminate the spectral differences of the different canopy portions, despite the considerable presence of noise and uncertainty depending on the exposure and wavelengths used. UAV images appeared to have higher linearity allowing to better describe the average health status of the whole plant.