the sugar content, acidity and even the taste can be estimated through the use of chemometric methods (e.g. partial least squares regression). In the case of reflection spectra, which is the common modality for imaging spectroscopy, the question arises how much of the interior of the tomato contributes to the measured spectra. An experiment was done with tomatoes of four different types, beef tomato, classic round tomato, cocktail tomato and snack tomato. The tomatoes were sliced at different thicknesses and imaged on a 98% reflective white background and a 4% reflective black background. Spectral images were acquired with VNIR (400-1000nm) and NIR (900-1700nm) imaging spectrographs. The difference between the spectra with a white and black background was used to determine the relationship between the wavelength and the light penetration depth. Results show that at wavelengths between 600 and 1100 nm light penetrates the tomatoes up till a distance of 20mm. The relation more or less follows the law of Lambert-Beer. This relation was the same for all four types of tomatoes. These results help the interpretation of chemometric models based on reflection (imaging) spectroscopy.

Classification of irrigated and rainfed croplands in Vojvodina Province (North Serbia) using Sentinel-2 data

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In the 21st century, the establishment of efficient water resource management is crucial for ensuring world water and food security. Irrigation is a significant artificial process in the hydrological cycle and presents the only way to balance between mentioned issues, where collecting knowledge is essential for developing adaptive and sustainable strategies. Considering that, the precise information about the spatio-temporal distribution of irrigated fields on a national scale is thus the initial key step for agricultural water resource management.

With a high spatial, spectral, and temporal resolution, Sentinel-2 provides new possibilities in this field. This research focuses on using multispectral satellite imagery and advanced machine learning models for detecting irrigation and rainfed fields on a plot scale. Dry year images during irrigation season were used for vegetation indices calculation for three crop types: maize, soybean, and sugar beet. These three databases were used separately for training the Random Forest classifier. The results showed high overall accuracy for each three crops where soybean reached the highest 0.91, maize 0.89, while sugar beet reached 0.76. According to the results, the assumption is that the difference in accuracy between crops could be caused by the difference in the geospatial characteristic of the area, amount of data, omission in labeling crop types and rainfed fields.

Irrigated agricultural fields present a challenge for classification and mapping considering the heterogeneity of the area, climate impact, and diverse crop types. This study showed that classification could be done using Sentinel-2 images, but further analysis including climate and soil data could improve the classification. This methodology has the potential to produce an annual irrigation map which is very important information for optimizing water use and making sustainable agricultural policy.

Integration of proximal sensor data with satellite images through signal processing on graph

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