Spectral response of the seagrass Zostera noltii with different sediment backgrounds

"The efficiency of vegetation indices (VIs) to estimate the above-ground biomass of the seagrass species Zostera noltii Hornem. from remote sensing was tested experimentally on different substrata, since terrestrial vegetation studies have shown that VIs can be adversely influenced by the spectral properties of soils and background surfaces. Leaves placed on medium sand, fine sand and autoclaved fine sand were incrementally removed, and the spectral reflectance was measured in the 400–900 nm wavelength range. Several VIs were evaluated: ratios using visible and near infrared wavelengths, narrow-band indices, indices based on derivative analysis and continuum removal. Background spectral reflectance was clearly visible in the leaf reflectance spectra, showing marked brightness and spectral contrast variations for the same amount of vegetation. Paradoxically, indices used to minimize soil effects, such as the Soil-Adjusted Vegetation Index (SAVI) and the Modified second Soil-Adjusted Vegetation Index (MSAVI2) showed a high sensitivity to background effects. Similar results were found for the widely used Normalized Difference Vegetation Index (NDVI) and for Pigment Specific Simple Ratios (PSSRs). In fact, background effects were most reduced for VIs integrating a blue band correction, namely the modified specific ratio (mSR(705)), the modified Normalized Difference (mND(705)), and two modified NDVIs proposed in this study. However, these indices showed a faster saturation for high seagrass biomass. The background effects were also substantially reduced using Modified Gaussian Model indices at 620 and 675 nm. The blue band corrected VIs should now be tested for air-borne or satellite remote sensing applications, but some require sensors with a hyperspectral resolution. Nevertheless, this type of index can be applied to analyse broad band
multispectral satellite images with a blue band."

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