Mapping flooding regimes in Camargue wetlands using seasonal multispectral data

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Résumé en anglais	Reflectance data from multiseasonal SPOT-5 imagery was combined with monthly measures of water levels collected in the Rhône river delta (Camargue) in 2005 and 2006. Classification tree and regression models using monthly values of 17 multispectral indices and 4 bands, as well as their seasonal variations, were used for predicting the presence and levels of water, independently of vegetation type and density in shallow marshes. Accuracy of the classification model was estimated by cross-validation and by calculating the percentage of correctly classified pixels on the resulting maps using an independent sampling. Goodness-of-fit of the regression model was assessed by calculating the coefficient of correlation between predicted and observed values. Predictive accuracy of both models was estimated by calculating NRMSE for the independent validation sample. Regression model robustness was also tested using Scheffé post-hoc analyses on the residuals. Biophysical parameters of Camargue marsh vegetation were used to interpret misclassifications and model deficiency. Both models were composed of a single variable consisting of a multispectral index using the mid-infrared band. The resulting classification tree provided a cross-validation accuracy of 76% and a map validation accuracy of 83%. With an R = 0.5, the regression model predicted water level with a 6-cm precision up to 20 cm of water depth. For both approaches, the predictive power of model was most affected by close canopy. This study highlights the usefulness of data mining for long-term monitoring of wetland hydrology based on multispectral indices using the mid-infrared band.
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