HYPERSPECTRAL MAPPING OF MUDFLATS: 'DE IJZERMONDING' (BELGIUM)

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The erodibility of mudflats is strongly determined by the biophysical characteristics of the sediments. Clay content that defines the cohesive properties of the sediment, and moisture content are the most important physical characteristic of the sediments (Mitchener and Torfs, 1996). Benthic microalgae increase the erosion threshold by forming a biofilm. On the other hand, sites dominated by macrofauna are more easily eroded, because of their grazing activities on benthic diatoms and the pelletization of the surface material (Austen *et al.*, 1999).

Models that predict the erodability and erosion rate of mudflats use these biophysical parameters as input data. Point sampling in field is tedious and time-consuming and often inadequate to represent the spatial and temporal heterogeneity. Airborne hyperspectral remote sensing is identified as a cost-effective tool that may be used to provide accurate synoptic maps of estuarine sediment distributions and biotic associations.

CASI (Compact Airborne Spectrographic Imager)-images of the nature reserve 'de IJzermonding' at the Belgian coast are qualitatively classified using an unsupervised method based on Principal Component Analysis (PCA). The classification resulted in the discrimination between water flooded areas, vegetation, sandy and clayey areas, and the presence or absence of benthic diatoms. The PCA method is compared with the more subjective Spectral Angle Mapping (SAM) method of ENVI. A method is presented here that combines PCA and SAM.

The use of hyperspectral data promises to become effective for the quantification of bio-physical characteristics of sediments in large and often inaccessible mudflats. For the quantification of sand, clay, and chlorophyll a as a measure of benthic diatoms, more research about the interaction of electromagnetic radiation with matter using controlled laboratory experiments is suggested.

References

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