Tidal marsh vegetation modelling in the brackish and fresh water zone of the Schelde estuary

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In order to assess the impact of hydraulic and morphological changes in the Schelde estuary on tidal marsh vegetations the link between environmental factors and vegetation distribution has been studied. Salinity and position in the tidal frame are the most important gradients for tidal marsh vegetation but previous work showed evidence of more complex interactions with other factors for brackish and fresh water marsh vegetations.

Therefore an existing dataset of more than 600 vegetation relevees was used to relate abiotic habitat characteristics to brackish and fresh tidal marsh vegetations.

First, vegetation distribution patterns along the abiotic environmental gradients were analysed with ordination techniques in the four salinity zones of de Zeeschelde (brackish, oligohaline, fresh tidal with long residence time and fresh tidal with short residence time). In each zone the top five environmental variables for vegetation determination were identified.

Additionally the habitat response of the vegetations was characterised using generalised mixed models and logistic regressions (Rsoftware) for brackish and fresh tidal marshes separately. 7 vegetation groups for the brackish tidal marshes and 6 groups for the oligohaline and fresh tidal reach could be modelled as well as some key species. The position to mean high water, distance to the river mouth and to the nearest creek, the geomorfological unit and management appeared to be descriptors for the brackish tidal marsh. In the fresh tidal marshes only inundation frequency appeared to be a good descriptor. However data stratification over the gradients seemed not sufficient for good predicting model results. In all models the unaccounted variability remained relatively large. Habitat models are optimised with a better stratification in the dataset and with more detailed modelling in pilot areas adding drainage from CTD-diver data, soil profile information and more detailed topographic measurements as extra environmental variables.