

Title paper: **Analysis of multibeam echo sounding data on bed forms near the Walsoorden sandbar, a first phase in the subtidal habitat classification for the Western Scheldt**

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**Abstract:**

Within the scope of the long term vision of the Scheldt estuary, a new disposal strategy was proposed by an international expert team appointed by the Antwerp Port Authority. After the feasibility study, two in situ disposal tests were carried out near the Walsoorden sandbar in the Western Scheldt. Both tests were thoroughly monitored, both morphological as ecological. A project was defined by the Maritime Access division (Flemish government) to investigate the impact of bed forms, hydrodynamics and sediment properties on the ecological value in the shallow water area near the Walsoorden sandbar. The goal of this project is to make a habitat classification for the Western Scheldt based on its ecological value, allowing to define which areas are best suited for disposal of dredged material and which areas should be avoided.

In the first phase the multibeam echo sounding data of the winter condition (March 2007) were analysed in respect to the occurrence of bed forms. Although the project was initially set up for the shallow water areas, it was finally extended to both the shallow and deeper water areas near the Walsoorden sandbar. The analysis was executed using following steps:

1. Visual classification in sub areas, starting from the shaded view image of the area
2. Definition of several longitudinal sections (along the direction of the flow, ca. 1000 m long) within each sub area
3. Analysis of each section for following parameters: average length of the bed forms, average height of the bed forms, average asymmetry of the bed form, average steepness of the bed forms
4. Classification of the study area in a limited amount of bed form classes

The visual classification resulted in 24 sub areas and a total of 44 sections were defined. A large spatial variation was found for the analysed parameters. The average length of bed forms ranged from 5 m to 50 m, the average height from 0,10 m to almost 2,00 m, while, considering the asymmetry most of the sections were flood dominated.

In a second phase the seasonal variation of the bed forms was investigated, analysing the multibeam echo sounding data of the summer condition (September 2007). It was found that the sub areas located in the shadow (i.e. areas with lower velocities) of the intertidal sandbars during the ebb phase, were characterised by smaller bed forms in summer compared to the winter condition. The average length and height of the bed form in the sub areas located in the deeper channels did not change much. Although for some sub areas a decrease in asymmetry was found in the summer, all the flood dominant sub areas remained flood dominant and vice versa.

In the current phase of the project the relation between the occurrence of bed forms and hydrodynamic parameters (using a validated numerical hydrodynamic model) is being investigated. With the addition of sediment properties (grain sizes) a classification based on the physical parameters will be made. These "physiotopes" will then be validated with the ecological data (i.e. macrobenthos and fish), trying to make a classification in "ecotopes".