



Mapping highly heterogeneous sediment distributions: the need for a multi-method approach

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Sediment distribution maps are usually the basis for biotope mapping and modeling. The standard method to generate sediment maps is the interpretation of area-wide backscatter data from e.g. sidescan sonar or multibeam, or the interpretation of single beam data from acoustic ground discrimination systems (e.g. RoxAnn). In areas of homogeneous sediment distributions with clear sediment boundaries, one data set combined with ground truthing is often sufficient for the spatial demarcation of specific sediment types. Mapping campaigns in the offshore area of the German Bight, where the seafloor is characterized by moraine deposits partly covered by Holocene mobile fine sands, have shown that accurate mapping is only possible with high resolution backscatter data (at least 25 cm resolution). With low resolution data (1 m) it is principally possible to differentiate between sands (low backscatter) and coarse grained sediments (high backscatter). However, high resolution data show that the high backscatter areas can be further differentiated by means of texture analysis. Winnowed lag deposits (fine gravel) characterized by large ripples and moraine relict sediments (sand, gravel, stones) characterized by stone signatures are lying closely together. They differ in their biological functions and are thus worth to differentiate. Also ground discrimination data were not able to distinguish both coarse grained habitats. Since the acquisition of data with appropriate resolution is related to small beam swath widths and is thus very time intensive, we followed a multi-method approach by combining different simultaneous recorded data sets. The combination of low resolution sidescan sonar data and parametric sediment echo sounder data (used for detecting stones) enabled a fast and reproducible method to distinguish stony grounds from gravelly substrates in highly heterogeneous environments.