Geophysical Research Abstracts
Vol. 14, EGU2012-9535, 2012
EGU General Assembly 2012

Mapping Seabed Habitats and Dynamic Bedforms using Hydroacoustic Discrimination (Sidescan Sonar and RoxAnn) in the Sylt-Rømø Basin (German Wadden Sea)

F. Mielck and H. C. Hass

Alfred Wegener Institute for Polar and Marine Research, Wadden Sea Research Station, Hafenstraße 43, 25992 List/Sylt, Germany

Seabed habitat mapping is important to understand hydrodynamic processes as well as marine ecosystems. The study site (4 km^2) is located in the Sylt-Rømø Basin (German Wadden Sea). It includes deep channels that harbor strong tidal currents and shallower sublittoral areas. The investigations were performed with two different hydroacoustic devices: (1) IMAGENEX YellowFin (Model 872) sidescan sonar to take imagery of the seafloor and (2) SONAVISION RoxAnn (Model GD-X) acoustic ground-discrimination system to classify the seafloor according to its hardness and roughness properties. The devices worked with frequencies of 200 kHz (RoxAnn) and 770 kHz (sidescan sonar). For ground truthing purposes 124 sediment-surface samples were collected using a HELCOM grab sampler.

The results reveal varying environments and bedforms within this small survey site. The seafloor surface sediments range from fine to coarse sand. Bedforms include subaquatic dunes of different size, partly superimposed by smaller ripple structures. Coarser sediments characterize the deeper tidal channels (water depth $\sim$ 20 m) where also the measured roughness and hardness values strongly increase. The shallower areas reveal finer sediments and lower backscatter. The hydrodynamic processes that govern the distribution of surficial sediments are also responsible for the formation of the characteristic bedforms. Sidescan sonography makes it possible to investigate alignment and the migration direction of the bedforms which allows to reconstruct the general hydrodynamic properties of the study area and beyond.

In combination with RoxAnn data, it is possible to assign seabed habitat classes especially with regard to their hardness and roughness properties. Apparently, areas showing similar grain-size spectra can show totally different roughness and hardness values. Hence, they cannot be classified as the same habitat. Further comparison between sidescan sonography and RoxAnn results reveals that roughness and hardness parameters are good indicators for the occurrence of subaquatic dunes and in particular of small ripple marks, which are often not visible in sidescan sonar images.