SEA FLOOR ANALYSES BASED ON MULTIBEAM BACKSCATTER STRENGTH

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Measurements of acoustic backscatter strength can be applied to analyse sea floor coverage on a spatial extent. They provide consistent coverage compared to analyses based on only a few surface samples. In particular the spatial validity of surface samples can be determined by analyses based on acoustic backscatter strength and sampling locations representative for the surrounding area can be determined. During the cruise ANTXVII/4 of the German RV "Polarstern", a high precision swath bathymetry survey was performed along the European continental margin in the Porcupine Seabight off southwest Ireland. Within the Porcupine Seabight a number of mound structures have been discovered earlier, most of them being carbonate mounds. The structure and genesis of these mounds are the main objective of recent investigations. The cruise and the subsequent investigations are part of the EU project GEOMOUND. They focus on the Belgica mound province. Besides the depth measurements, the acoustic intensities of the received echos have been recorded. Taking into account the transmitted and received sound level, acoustic beam patterns, and acoustic attenuation in the water column, the backscatter strength of the ensonified area was calculated. This backscatter information is used to analyse the sea floor coverage. Based on the data of the systematic survey the spatial variation of the backscatter strength was derived. Regions of equal backscatter characteristic can be combined and functions showing the dependency between backscatter strength and incidence angle of the acoustic wave can be determined. These functions help interpreting sea floor coverage. The mapping of the backscatter strength of the mound area indicates clear changes in backscatter strength. Small and shallow channels show a lower backscatter strength than their surroundings. That means the surface coverage of the channels is smooth with respect to the surroundings. One interpretation of this surface pattern points to currents that have built these structures by depositing sediments. In contrast, most of the mounds indicate a strong backscatter strength. Since other investigations showed that some of the mounds are populated by corals, these corals could cause higher backscatter strength. A detailed investigation of the mounds indicates differences of backscatter characteristics between them. There are mounds that show strong backscatter on their slopes but low backscatter on their top. Other mounds show stronger backscatter on their top but lower backscatter on their slopes. These differences could indicate varying surface coverage of those mounds. Based on this information, the mounds are separated and classified.