

IMPACT OF TRAWL FISHERY ON SURFACE SEDIMENTS IN KIEL BAY
(WESTERN BALTIC SEA)

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Effects of trawl-fishing operations on surface sediments are little investigated compared to the resulting biological consequences. The objectives of our study concern the distribution of ground-net tracks, the mechanical disturbance of the sediments, and the reworking induced by the ploughing effects of trawl-net otter boards as processes which strongly influence the interpretation of chemical gradients and the chronology of surface layers.

The distribution of trawl-net tracks on the sea floor and their morphology were investigated by high-resolving side-scan sonar, video instruments (ROV), SCUBA diving. The mechanical effects of trawl-fishery gears were studied on X-radiographs obtained from video-controlled box-core samples. These methods were applied on older trawl-net tracks of an intensely fished area as well as on a trawl-net track specially produced in a field experiment.

Examination of the side-scan sonar records reveal that a considerable portion of Kiel Bay sediment surface is completely covered by trawl-net tracks. Morphological analyses show that different kinds of tracks with differing effects on the sediment surfaces exist. The most frequent track types are ploughing tracks generating a marginal sediment wall, which are produced by continuous motion of otter boards, and jumping tracks leaving a sequence of depressions due to a jumping motion of the boards. Three processes have been found to exert the main influences on the sediments: production and extension of a suspension cloud, generation of a marginal wall, and deformation of the overrun sediments. While the suspension cloud is spreading out only in limited areas, the marginal wall is preferably eroded by bottom currents during storm conditions, thus leading to a wide redistribution of sediments. Sediment deformation within the tracks has been observed down to a sub-bottom depth of about 25 cm. Surprisingly, besides of folding and shearing structures also laminated structures owing to smearing processes of the otter boards are generated. This may explain the fact that not-reversed (although modified) age sequences occasionally can be obtained within fished areas.