

One plus one is three: trawling differences from multi-beam imagery

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Beam trawling causes physical disruption of the seafloor mainly due to the effect of the tickler chains that penetrate into the seabed. About 40 Dutch beam trawlers have recently replaced tickler chains by electrodes as alternative stimulation for catching flatfish. This greatly reduced fuel costs and presumably reduces benthic impacts. These newly developed fishing gears (pulse trawls) were studied in the EU-FP7 project 'Benthis' using a Before-After Control-Impact (BACI) setup. The penetration depth of the commercial 'Delmeco' pulse trawl was investigated and compared to the penetration depth of a conventional 4m commercial tickler chain beam trawl. Here we focused specifically onto the physical alteration to the seabed, illustrating one of the potentials of modern high resolution multi-beam echosounder imagery as registered onboard of the RV Simon Stevin. The experimental area was monitored prior and after beam trawl disturbance at different time intervals up to 107 hours. Additionally, the penetration depth of a single passage of a tickler chain beam trawl was characterized, as well as multiple passages of a tickler chain and pulse trawl. While our results confirmed estimates of previous studies, subtle differences indicated that one beam trawl disturbance is not the other. Trawl tracks of multiple pulse trawl passages (>3 times) reached up to 6cm (median: 1.2 cm) at one day after trawling, while tickler chain trawling penetrated up to 10.7cm with a median of 2.0cm. In contrast, a single passage of a tickler chain trawl penetrated less deep (median: 0.9cm, max: 2.9cm). Moreover, unidentified trawl marks of commercial beam trawling were overall deeper than registered beam trawl disturbances, potentially pointing at the use of yet another type of commercial beam trawl. Although the experimental study area was relatively shallow (<25m), fading of trawl marks seemed primarily due to bed and suspended load of tidal currents, rather than wave induced currents as wave heights up to 2.5m did not result in faster fading of trawl tracks. We therefore conclude that the overall significance of short-term beam trawling disturbance is of considerable importance in relation to natural disturbance for this study area, and that a distinct differentiation between beam trawl types should be accounted for. One plus one is not just two.

References

www.benthis.eu