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Detection and characterisation of deep-sea benthopelagic animals from an autonomous underwater vehicle with a multibeam echosounder: a proof of concept and description of data-processing methods

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Abstract

Benthopelagic animals are an important component of the deep-sea ecosystem, yet are notoriously difficult to study. Multibeam echosounders (MBES) deployed on autonomous underwater vehicles (AUVs) represent a promising technology for monitoring this elusive fauna at relatively high spatial and temporal resolution. However, application of this remote-sensing technology to the study of small (relative to the sampling resolution), dispersed and mobile animals at depth does not come without significant challenges with respect to data collection, data processing and vessel avoidance. As a proof of concept, we used data from a downward-looking RESON SeaBat 7125 MBES mounted on a Dorado-class AUV to detect and characterise the location and movement of backscattering targets (which were likely to have been individual fish or squid) within 50 m of the seafloor at ~800 m depth in Monterey Bay, California. The targets were detected and tracked, enabling their numerical density and movement to be characterised. The results revealed a consistent movement of targets downwards away from the