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Backscattered acoustic energy from a target contains information about its shape, size, orientation, and material properties. The high uncertainties in the worldwide biomass estimates of mesopelagic fish limits our understanding of their actual importance and role in the ocean ecosystems. The major proportion (~99%) of the volume backscattering of deep scattering layers measured by a 38 kHz vessel-mounted echosounder can be due to the gas-bearing organisms, even if these organisms might make up a small fraction of the total biomass. Morphological features of the gas-filled organs have noticeable effects on the backscattering. Improved knowledge about the volume and actual shape (elongation) of swimbladders of mesopelagic fishes has been identified as important factors to reduce the overall uncertainties in acoustic survey estimates of mesopelagic biomass. Here, using the first and second resonance frequencies of a gas bubble's TS frequency response, a method is suggested to estimate its elongation. The method was applied to the *in situ* measured wideband (33-380 kHz) TS of single mesopelagic gas-bearing organisms from two stations in the North Atlantic (NA) and Norwegian Sea (NS). For the selected targets, the elongation of gas-bladder from the NS and NA stations were 2.86±0.50 and 1.49±0.52, respectively.

A bi-frequency discrimination method of copepods in the Senegalese coast

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The Canary Current Large Marine Ecosystem (CCLME) is one of the most productive marine ecosystem worldwide and is key for food security for numerous African countries. Nevertheless, its function remains poorly described and ecosystemic data collection are rare. Copepods are the key macrozooplankton group in the CCLME but their dynamic, their distribution and even their abundance remain poorly documented. Multinet net data allowed identifying large Copepod in CCLME. As small pelagic fish assessment acoustics survey were routinely done using 38 and 120 kHz frequencies, we used the same frequencies to propose a bi-frequencies inversion method to discriminate Copepod. We identified copepod backscatter using differences in volume backscattering strength (S_v). A close significant relationship were found between the size values of Copepod from multinet samples with those calculated by the acoustic highpass model. The correlation between copepod abundance and corresponding S_v were positive. This work showed that 38-120 kHz frequency can be used on Copepod and thus open the way to retrospective analysis in the CCLME. These results were important to better understand marine ecosystem, and constitute a first step for Copepod biomass estimation in the context of ecosystemic approach of small pelagic fish management and climate change.

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