A novel approach to obtain indices of abundance of tropical tunas from echosounder buoys

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Summary

Stock assessments that rely on abundance indices derived from commercial catch per unit effort (CPUE) data assume that changes in catchability are accounted for in the CPUE standardization process. However, when significant changes in fishing efficiency occur, as is the case of the tuna purse seine FAD fishery, it is difficult to evaluate the effective effort, which may hinder the development of reliable fishery dependent indices. Echo-sounder buoys attached to FADs, provide fishers with near real-time information about the geolocation of the FADs and the biomass of tuna aggregation underneath. Acoustic records derived from echo-sounder buoys also entail a window of opportunity to develop alternative abundance indices. This work presents a novel approach to derive a Buoy-derived Abundance Index with potential for contributing to the assessment of tropical tuna stocks. This study also shows preliminary results of its implementation to obtain direct indices of abundance of juvenile yellowfin tuna in the Indian and Atlantic oceans. The model assumes that the acoustic signal from the echo-sounder, obtained in specific depth ranges, time of the day and period during the FAD drifting is proportional to the abundance of tuna. The acoustic signal was standardized using Generalized Linear Mixed Modelling approach.