

# ***Interactive comment on “Fine-scale vertical structure of sound scattering layers over an east border upwelling system and its relationship to pelagic habitat characteristics” by Ndague Diogoul et al.***

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Received and published: 19 June 2019

The authors present an interesting data set on coastal hydroacoustics in an African upwelling area. However, despite CTD measurements, additional measurements have not been undertaken. Thus no information on zooplankton or fish composition is made, and additional frequencies to 38kHz that could be used for a relative frequency response analysis to indicate the differential contributions of the main hydroacoustic compartments fluid-like species, fishes with swim-bladder etc. have not be sampled. One such paper is mentioned in the ref list (Behagle et al 2017). At least, the authors should

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comment

consider presenting Sv histograms where possible. Altogether, this imposes some limitations on the overall scope of the analysis. Significant clarifications should be done. In line 126, the authors indicate some relationship to ichthyoplankton, eggs and larvae, whichs needs some clarification given the properties of this features: Larvae with or without swim bladders, and how do the authors suggest fish eggs to be detected in an echogram. I know that one of the authors has undertaken significant research in indicating fish schools by shape in echograms, no mention of this work is indicated here. The authors should please consider the following 4 points in detail and improve the English: 1 Physico-chemical properties and analysis of water massess (line 135) Dissolved oxygen was measured with a sensor - was this sensor calibrated by chemical measurements? It is further mentioned, that DO concentrations did not satisfy criteria for hypoxia (line 392) as defined as 1.42 ml l-1. However, looking at pages 24/25 the DO profiles clearly indicate layers with DO concentrations of 1 ml l-1 and below, which indicate local hypoxia. Accordingly, the vertical variability of water mass properties with regards to DO and others questions the approach to cluster stations only based on their properties at 10 m water depth.

2 Definition of terms and surrogate variables and correlations with physicochemical properties (line 147) SSL thickness and maximum depth are returned by the algorithm "layer" - however, it is not mentioned, what criteria are applied to measure this or how thickness is defined in terms of sA vertical distribution. The pseudo code at least should be shown in the appendix, and the respective analytical equations/definitions should be part of Material&Methods. (see negative statement in line 457). For "ComparEchoProfil", one 0.1 nmi unit is used for calculation around the CTD cast position, but in the figures several units are shown (normally 5). Since these are not averaged in "ComparEchoProfil", so I would leave that out so that the reader is not confused by the variability. Figure legends on echogram pages 22-25 contains strong statements like "The peak of Sv match the CHL...", which need some clarification, since already in the figure for station station 12 the Sv peak is < 40 m and the CHL peak is > 40 m depth, so they do not match.



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comment

3 Model building It is unclear, how the ANCOVA models were developed - are the calculations been carried out bin-wise or averaged over station - the residual plots indicate the latter. This needs justification, line 177 indicates some kind of 'profile coupling'.

4 Features of relevance In the abstract (line 34) no significant relationship to DO is indicated, however, considerable emphasis is attributed to this feature despite being non-significant. In the first place, models for G2 indeed indicate significance of DO, so the statement in the abstract is not clear. Secondly, if non-significant terms are discussed broadly, this needs better justification.

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Interactive comment on Ocean Sci. Discuss., <https://doi.org/10.5194/os-2019-23>, 2019.

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