

Interactive comment on “Temporal variations of zooplankton biomass in the Ligurian Sea inferred from long time series of ADCP data” by R. Bozzano et al.

Anonymous Referee #3

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General comments The article analyses a time series of ADCP data collected during almost 3 years in the Ligurian Sea. The study focusses on the time variability of the volume backscattering strength. The work lacks of concurrent sample collection to be used as a ground truth for validation. Instead, the manuscript relies on previous published research to bridge the gap and relate the acoustic information to the dynamics of the biological population. To this regard, the study cannot be considered fully conclusive. However I think it provides very helpful information about the methodology to follow to extract from ADCP data information about vertical migration of biological species. I would like to highlight that authors are conscious of the limitations found due to the lack of concurrent biological samples and try to mitigate them by supporting their

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results with previous works. I value positively this effort to understand ADCP results in the context of previous experiences. To summarize I would consider that the article merits publication. I add below some issues to be considered.

Specific comments Point 3.1 Seasonal variability. It is referred the existence of relative maximum in January-February in the monthly mean backscatter strength. However, Figure 3 is confusing because it represents the monthly mean with bars indicating the maximum and minimum values of the backscatter strength. A reader could derive from the figure that the relative maximum mentioned is not significant. Notice that the uncertainty in the estimation of the mean of a set of samples (standard error of the mean) is the standard deviation of the sample divided by the root square of the number of samples. I guess that the error bars of the mean estimation are much smaller than the ones represented in the picture and it would justify to speak of a relative maximum. It seems to be a relative maximum also in December 2003 (corresponding to a local maximum in November 2013, Fig 4), any comment about it? There is a significant jump of 10dB between the last value in figure 3b and the first value in fig3c although there is only a difference of 4 days. Could you explain this in terms of the re-deployment/calibration?

Point 3.4 Spectral analysis Are the differences in the peaks 24h and 12h of the power spectrum found between the samples significant? If so, would you provide an explanation? Is it related with the depth of the backscatters or with the presence of different proportion of stationary/migrating organisms in the samples? Point 3.5 Vertical velocities and changes in the zooplankton population It is not clear from the text how the vertical velocity is used to identify differences between stationary/migrating species. Specifically, the influence of environmental factors would difficult the approach as the individuals would be vertically advected by the bulk vertical velocity (as it is shown in the text and figures with strong wind events). Are vertical speeds of ± 1.5 cm/s assigned to migrating species and ± 0.5 cm/s characteristics of stationary ones? Could you provide an estimate from references of the vertical speed that characterized mi-

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grating species under calm conditions?

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