

Ocean Sci. Discuss., referee comment RC1
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Comment on os-2021-68

Anonymous Referee #1

Referee comment on "Characterization of the Atlantic Water and Levantine Intermediate Water in the Mediterranean Sea using 20 years of Argo data" by Giusy Fedele et al., Ocean Sci. Discuss., <https://doi.org/10.5194/os-2021-68-RC1>, 2021

Review of the Manuscript OS-2021-68 "Characterization of the Atlantic Water and Levantine Intermediate Water in the Mediterranean Sea using Argo Float Data" by Fedele et al

General comment to the Authors and the Editor:

The ms presents an analysis, based on in situ data ARGO profiles over almost 20 years the evolution in space and in time of the thermohaline properties of the surface and intermediate water masses in the Mediterranean. The authors assess the different positive/negative trends they found in different subbasins, but without trying to attribute them to potential causes.

The ms is well organized, clearly written, with a logical structure that guides the reader through the author's reasoning. However it lacks a bit of a deeper and detailed discussion on what might have induced the temporal changes of water masses. This is a bit misleadingly assessed by a wavelet analysis (see detailed comments below).

I recommend publication of the ms after moderate revision

Some more detailed comments are:

L49 I don't think Millot and TL is the appropriate reference here, you should replace it with one concerning the modification of Atlantic circulation due to the MOW

L65 add references for these values

L98 write climate with low-case "c"

L111 should be "a clear positive salinity trend"

L138 write "30 000"

L191-203 concerning the method of defining the AW and LIW, I have concerns that using the same method in the Alboran and in the Levant might give artifact results (same method and same depth ranges). These concerns are also about the same value of prominence (0.01) that you use for both water masses and in all regions. These concerns found justification later on, when I read that there are regions where you were forced to remove a very high amount of available profiles (up to 40%), which for me demonstrates that the method is not adequate enough. The profiles that were removed in fact for sure contained AW/LIW in a pattern that should suggest you to modify you criteria (either depth range, or prominence value, or something else). You should also show a seasonal distribution, per subbasin, of the remaining profiles.

L213-218 I think this part could go into the caption of fig.2

L225-232 you don't give any reason in the introduction and in the list of the paper's aims on why you should look at the wavelets...

L236 should be "mentioned before"

L292 "more profiles"...more than what or than where?

L301 "trend".....trend for me is something temporal, while here you are talking about spatial variations.

L340 "In the EMED....in the Tyrrhenian", but the Tyrrhenian is part of the WMED not of the EMED

L354 higher than where?

L359 should be "also found by Zu et al., 2014"

L371 should be "show heterogeneous trends"

L375 unit is missing to these numbers

L394 you report that LIW in the Cretan and Levantine becomes colder, which is not at all in agreement with Kassis & Korres. This discrepancy should be commented on. Furthermore a few sentences below (L397) you say something about the "warming trend in the Cretan and Levantine", so it is not clear to the reader if the LIW warms up or cools down....In addition "visual inspection" to detect such an overlapping does not seem to be an adequate statistical method to make any claim...

L433 In the introduction of the section 3.2.2., you state that you want to discover the causes behind these trends, but then you apply a spectral analysis and in the AW and LIW section you start speaking about oscillations. This is in contrast to the rest of the paper where you have only be discussing about trends and not oscillations. Further you don't give any insights on the causes either of oscillations, nor of the trends. For these reasons I would completely eliminate the part on the wavelets, and instead try to explain the trends, even if only based on literature. Overall, neither for AW nor for LIW, this section does not give any hint to understand the causes behind the trends you described.

L497 when talking about these agreements, you should mention all the studies that you mentioned in the introduction as studies who address the temporal TS trends

L503 I guess you meant "Nile damming" not "dumping"

L516 abrupt shifts in which parameter? Depth?

L520 the whole paper was about trends, not oscillations, and no hint on the causes of the trends is given through this analysis, which in my opinion should be removed (and maybe write a paper just on that in the future)

Table1: add the standard deviations in each column, not just in the last one

Fig.2 caption: replace "effective" with "retained"