

Interactive comment on “Regional circulation patterns of Mediterranean Outflow Water near the Iberian and African continental slopes” by Álvaro de Pascual-Collar et al.

Anonymous Referee #1

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GENERAL COMMENTS:

The manuscript "Regional circulation patterns of Mediterranean Outflow Water near the Iberian and African continental slopes" by Pascual-Collar et al. shows an application of CMEMS-IBI reanalysis to study the behaviour of Mediterranean Outflow Water (MOW) in that region. It is an example of the strong potential being developed at CMEMS for studying climate-ocean processes with a regional high spatial resolution taking into account mesoscale features.

The topic is fully within OS fields of interest, and authors present an application of a novel and powerful tool, CMEMS high-resolution ocean reanalysis. The manuscript is

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well structured, and it has a sound methodology and provides interesting results. As scientific novelties authors report the ability of resolving mesoscale features of MOW circulation, allowing to study the influence of topography in MOW spreading and the MOW interaction with surrounding water masses. However, there is a way too large number of typos, spelling and grammatical mistakes, which do require a careful proof-reading and correction. Also, I have some specific comments/suggestions, which I think can improve the overall good quality of the manuscript after a minor/moderate revision.

SPECIFIC COMMENTS:

INTRODUCTION

1. The state of the art is adequately described in the Introduction. However, there are at least two recent works that should be included. These are the works of Carracedo et al. (2014) and Izquierdo and Mikolajewicz (2019) (the latter is just published, so it is clear that authors could not be aware of it).

Carracedo et al. (2014) described the circulation in the Azores-Gibraltar strait-Canary region by means of climatological data. Their box analysis shows the relative importance of the MOW northward and westward advective branches and their seasonality, as well as the interplay between the different water masses present in the region (including mixing). Izquierdo and Mikolajewicz (2019) present a process study based on a high-resolution (similar to the presented here) model output. They also show mesoscale features of MOW circulation in the region and stress the importance of topography (through tide-topography interaction) in MOW spreading. These all are very relevant topics for this study and taking them into account in the discussion of the obtained results will improve the manuscript.

SECTION 4:

2. How are volume transports computed? I have not found indication about it, nor

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about the upper and lower limits for the vertical integration. In the Conclusion (page 11, line 22) there is a mention of 500-2000 m depth, but clearly it must be explicitly indicated before.

3. Please, provide confidence intervals for the calculated mean quantities.

SECTION 5:

4. The interannual variability in the Horseshoe Basin is discussed without taking into consideration the possible variability of MW outflow rate and properties at the Strait of Gibraltar. A plot showing the temporal evolution of the MW outflow at the Strait, and the salinity anomalies would provide arguments to neglect this potentially relevant factor.

5. I would add a figure showing the salinity distribution at the maximum salinity depth for the mean state and the positive and negative anomalies (for example, salinity color-coded and maximum salinity depth with overlaid contours).

SECTION 6:

6. In general, I personally prefer a separate section dealing with the discussion of the results. However, I understand that other options are possible. In any case here or in a corresponding previous section, I suggest authors to discuss the circulation features, the net volume transports and mixing processes details taking into account the results from Carracedo et al. (2014) and Izquierdo and Mikolajewicz (2019) where possible.

TECHNICAL CORRECTIONS:

The list is not exhaustive. Please, check spelling and grammar carefully.

P1L9: Strait of Gibraltar instead of Gibraltar Straight P1L11: remove "depth" P1L11: plays a key role instead of is a key role P1L13: Remove "of this" P1L13: do instead of does P1L19: reveal i.o. reveals P2L3: Danieault i.o. Denieault (and elsewhere). P2L28: Iorga i.o. Iorga P3L18. reveal i.o. reveals P3L28: shelf i.o. self P3L31: "exceeding the 500 m depth" is wrong sense. Reword it P4L7: 1999b i.o 199b P7L5-

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7: Use . i.o , P7L8: Please, homogenise the writing of Cape St-Vincent (see line 19) P7L21 mass i.o. masses (or change the verb third person) P9L8: Figure 4b i.o. Figure 3b P9L20: south i.o. South P10L16: This statement is redundant, tautological. P10L32: delete 0.75. I do not appreciate such difference in Fig. 6

References: Carracedo, L., Gilcoto, M., Mercier, H. Pérez F. (2014) Seasonal dynamics in the Azores-Gibraltar Strait region: A climatologically-based study. *Progress in Oceanography* 122, 116-130.

Izquierdo, A. , Mikolajewicz U. (2019) The role of tides In the spreading of Mediterranean Outflow Waters along the Southwestern Iberian Margin, *Ocean Modelling* 133, 27-43.

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