

Interactive comment on “The temporal variability of oxygen inventory in the NE Black Sea slope water” by Alexander G. Ostrovskii et al.

Anonymous Referee #2

Received and published: 24 September 2018

Ostrovskii et al use a new, high-resolution, multi-variable dataset from a moored profiler in the slope waters of the NE Black Sea to study oxygen dynamics in short time scales (hours to weeks). They find that the hypoxic boundary fluctuated mostly with two time scales: the inertial period (~17 hs) and the passage of current meanders and eddies (~5 days). The work is novel mostly due to being the first study in the region showing results from such a highly resolved dataset and the topic is quite interesting and relevant for all oxygen-inclined ocean scientists. However, the manuscript requires significant improvements. I find that several conclusions or statements made by the authors need further explanations/support. Also, and as mentioned by another reviewer (Sergey Konovalov), both the organization and the use of English language of the paper need to be improved. While I give some suggestions in my comments,

C1

the writing requires an in-depth revision beyond those suggestions; I feel many sentences/paragraphs need to be completely rewritten to improve the readability and the flow of the text. Overall, I recommend the publication of this work after major revisions are done to address the above issues.

General comments:

Abstract: it needs to be streamlined to better convey the importance of the work and its results (there are several good resources online on how to write a good scientific abstract). For instance, it should start with the big picture – the posing of the problem you are studying and its importance (rather than mentioning the importance of the methods) – and end with the main conclusions and broader implications. Furthermore, in its current form, the abstract has too many details about the sensors used. In the abstract and the main text: authors say that their study looks at time scales from hours to months. However, they have data for two months, so it would be more appropriate to say from “hours to weeks” instead.

Introduction: The first few paragraphs, where the Black Sea is described, should also include a thorough description of the horizontal and vertical structure. That information is needed later on, and sometimes it is scattered in the text or assumed to be known by the reader. In addition, all the terminology needs to be properly defined in this section (e.g. suboxic layer, hydrogen sulfide boundary, oxygen penetration layer, hypoxia onset) and used consistently in the rest of the paper.

Results, Discussion: there are some results in the Discussion section and some discussion in the Results section. Make sure each section contains only results and only discussion, or consider merging both into a “Results and Discussion” section.

Everywhere: There are many paragraphs that are one- or two-sentence long, which should be avoided. Furthermore, many citations are within parenthesis, when they should read instead “Lastname et al. (year)”.

C2

Figures: some captions tend to have a lot of information that should be presented instead (or as well) in the main text.

Specific comments:

Page2.Line1: “resistance”: probably the word you are looking for is resilience? Anyways, the sentence does not read well and should be rewritten.

P2.L8-9: “This memory affects the distribution...”: you should explain better why phytoplankton is sensitive to the properties below the seasonal thermocline. The next sentence explains it (it is a source of nutrients), but the sentence is presented as a separate concept (by starting with “In addition”).

P2.L21: suboxic layer needs to be defined.

P3.L6: hydrogen sulfide boundary has to be defined.

P3.L10-21: this paragraph is a weird way of posing the rationale for the setup of the mooring. It needs to be rewritten and bullets should be removed.

P3.L26: I don't think that “relief” is the word you are looking for. Topography? Roughness?

P3.L29: “on” the shelf or “over” the shelf

P3.L30-33: this is an example of a sentence that is too long. Aim for sentences up to 2 lines-long

P4.8-9: unless some description is added for each section, this sentence should be removed.

P4.10: Odd heading. Maybe just “Methods” or “Observations”?

P4.17: if profiles occur every 2 hours, how can you obtain 24 profiles in a day? Did you mean 12 profiles per day? Otherwise, please explain better

P5.17: “seasonal”: talking about seasonality with two months of data is a bit of a

C3

stretch. Remove “seasonal”. Furthermore, the trend is hard to see in figure 2, maybe a different color scale would help.

P5.18: refer to Fig 3 at the end of the sentence

P5.rest of the page: the authors start with the conclusion (temporal variability linked to meandering jet and eddies, line 19-20) but present some kind of evidence later on (lines 28-30). The logic and flow here need to be streamlined.

P6.L5 and rest of the manuscript: instead of a long dash “–“ we see a “Å”

P6.L6-7: Please explain more explicitly how you get to the total number of 33 – 34 mol m⁻²

P6.L12-15: Please explain here the chosen vertical axes for figures 6 and 7, otherwise the reader starts to wonder why the authors did not choose just depth. Also, introduce in the main text the same notation as used in the figures and their caption (or remove said notation from the figures).

P6.L17: shouldn't Fig 2 be cited at the end of the sentence?

P6.L18: About the 89%: there is information explaining this number in the caption of figure 7 that should be moved here.

P6.L22: suggest removing seasonal or replacing by something more appropriate.

P6.L23: remove “follows.”

P6.L29-30: belongs to Discussion rather than Results

P6.L30: “as a result of horizontal advection”→ this statement seems like a reasonable assumption, but it should be better justified. Or even better, would it be possible to prove it using your velocity data and/or knowledge of surrounding water masses?

P7.L8: replace “is” by “was”

P7.L26: remove “layer of”

C4

P7.L30-34: belongs to Results rather than Discussion

P8.L1-8: How do the studies mentioned here relate to this work?

P8.L11-12: merge both paragraphs.

P8.L29-33: some of these summarized results were not mentioned in the Results section (e.g. “11% of profiles” part – I found it in Fig 6 caption, but not in the main text). In addition, why is the winter of 2016 warm? The “warm winter” statement in line 20 should be described early on (in the Results if it can be proved with the profiler data or in the Introduction if other references are used to describe it) – note that it should be proven specifically for 2016, not just generically claiming that global warming has warmed the Black Sea.

P9.L8-9: “water in this new CIL is rather warm” – I find this confusing, because earlier you mentioned that it was colder than the old CIL. Is the new CIL warm or cold?

P9.L10: what essential changes in plankton migration may occur? Please expand

P9.L19: Show Kerch Strait on map in fig 1.

Fig 1: As mentioned above, show Kerch Strait if you are mentioning in the main text. It would be beneficial to have an inset showing the whole Black Sea and a little box showing the location of the map in the figure.

Fig 3: along –shore axis is 50deg and cross-shore axis 310deg → why are they not perpendicular? (Also, this information belongs also to the main text)

Fig 4, 8: If possible, always try to choose colors that are color-blind safe (i.e., avoid red and green in the same figure).

Fig 6, 7, 10: I already mentioned the Y axes and that its description should be properly given in the main text. Also, there is info if Fig 6 that belongs to the main text.

Interactive comment on Ocean Sci. Discuss., <https://doi.org/10.5194/os-2018-91>, 2018.