

Interactive comment on “Environmental parameters of shallow water habitats in the SW Baltic Sea” by Markus Franz et al.

Markus Franz et al.

mfranz@geomar.de

Received and published: 5 June 2019

We would like to thank the referee for the constructive and useful comments. Below you will find the detailed replies to all comments and in the supplement the revised version of the manuscript with tracked changes (Manuscript_revised_1.pdf).

Best regards

Markus Franz on behalf of the authors

Response to referee comment 2

General comments

Franz and colleagues provide environmental parameters, i.e. dissolved inorganic nu-

C1

trient concentrations as well as temperature, salinity and dissolved oxygen, for parts of the German coast in the south-western Baltic Sea, over a two-year time frame. The manuscript is well written and structured, as is the provided data. The data is hosted on PANGEA and stored in a convenient to use and easily accessible format. All necessary information is provided as indicated in the manuscript. Overall, the manuscript and data can be a valid contribution to the field and seem of good quality. However, I do have some concerns that would need to be addressed before I can fully recommend the manuscript for publication. Please see these comments in the section below.

Specific comments

Page 1, L 9-10: Most of local environmental monitoring in the Baltic Sea and elsewhere is not performed by large research vessels, and the potential scarcity of the data is very unlikely linked to the lack of accessibility by those vessels but rather by efforts to make available data public. Coastal data in the Baltic Sea is in fact not that scarce. I recommend to rephrase this sentence.

Reply: We deleted this sentence from the abstract, since it was not contributing to summarize the study.

Changes in the manuscript: See changes on page 1, lines 9–10.

P2, L2: I don't understand how local short-term and fine scale variability of environmental data can improve the predictions of climate change impacts. Please rephrase or elaborate.

Reply: This sentence was already changed in response to referee 1.

Changes in the manuscript: See changes in response to referee #1 (blue highlights) on page 1, line 29 and page 2, lines 1–8.

P2, L11: The authors state that shallow areas are generally not affected by oxygen depletion. Especially in the Baltic Sea this is not true. Please see e.g. Conley et al. 2011 Environmental Science & Technology 45 (16), 6777-6783. Hypoxia in shallow

C2

coastal areas is rather common phenomenon, which is not only fueled by upwelling but rather by local sediment and physical conditions as well as respiratory processes due to excess organic content. This should be mentioned and addressed.

Reply: The sentence was clarified and the respective reference was added.

Changes in the manuscript: See changes on page 2, lines 17–19.

P2, L12 and following: When only referring to changing environmental conditions induced by upwelling events, this may be true. However, benthic and demersal species are also facing the opposite effects induced by climate related impacts, which the authors miss to report here, i.e. higher temperature and lower salinities. As climate related impacts and the usefulness of this study to understand them better are mentioned several times in the manuscript it would be important address this here as well and not only refer to upwelling.

Reply: We added sentence to clarify that climate related impacts are occurring in these areas and that upwelling events might shift some drivers into the opposite direction, over short durations.

Changes in the manuscript: See changes on page 2, lines 22–24.

P2, L18: Here and elsewhere (e.g. P1 L11, P15 L4) in the manuscript the authors make it sound like the study covers the south-western coast of the Baltic Sea. However, in fact the study is quite local and only covers a fraction of the German coast. I believe the authors should mention this more clearly besides in the specific material and methods part to avoid misleading information and generalization.

Reply: The respective parts were changed to “the Baltic coast of Schleswig-Holstein, Germany”, to make clear that the monitoring was performed at a rather local scale.

Changes in the manuscript: See changes on page 1, line 11, page 2, lines 27–28 and page 16, line 4.

C3

P4 L5 and L23: How did the person taking the water sample reach the sites where loggers were deployed at 2.5 m depth wearing a chest wader? Or did she/he take the samples located away from the loggers? The sampling procedure is unclear for those cases. Please clarify.

Reply: The water samples for nutrient analysis were always taken at a depth of 1.2 m. In case stations were also serving as logger stations, the person walked into the direction of the logger station, to take the water sample as close as possible to the logger station. To clarify, the depth is mentioned again in the description.

Changes in the manuscript: See changes on page 4, line 8.

P5, L14: As a reader I would like to know more about the irregular cleaning intervals (approximate time frames, degree of fouling and its potential impact in the measurements). As biofouling during peak summer season can have an impact on loggers within days this would be important information.

Reply: Additional cleanings (besides during read-outs) were mostly done in the months June–October. Since the cleanings also required diving activities, weather conditions and staff availability did not allow repeated cleanings within weeks. Therefore, in some cases loggers were cleaned only once within this period. However, as the reviewer is indicating, fouling occurs within days in summer, an interval that would be impossible to maintain. To compensate for this, different quality control procedures were applied to the data. Among them, visual inspection of the entire dataset helped to identify suspicious data. This procedure was already described in more detail in response to referee #1.

Changes in the manuscript: See changes in response to referee #1 (blue highlights) on page 7, lines 3–10.

P6, L21: How were the threshold values for the tests defined and based on what information criteria?

C4

Reply: This question has been addressed in the response to referee #1: “Thresholds were chosen to be at least 2–times higher than the accuracy of the respective logger, to avoid misclassification of data that varied just as a result of the accuracy of the logger.”

Changes in the manuscript: See changes in response to referee #1 (blue highlights) on page 5, lines 20–21 and on page 7, lines 5–8.

P11 and in general: The manuscript is presenting shallow coastal areas as dynamic and variable systems that can undergo rapid and large changes, which is true and important. However, what is clearly missing in the presentation of the data, and one of the biggest issues in the current version, is the highlighting of the temporal variation within each site. There are only vague site-specific trends shown in figures 5 and 6. To fully appreciate the magnitude of short-term and site-specific variability, the sites would need to be plotted over time so that the reader gets an impression on what is happening at which scales. Interesting would for example be to see if there are differences in variability over seasons and in between years. How do diurnal, seasonal and annual differences in variation scale?

Reply: Since referee #1 raised a very similar point, a comparison of stations 2 and 13 was already included in the previous version manuscript. Temporal variations in temperature, salinity and dissolved oxygen concentration are described in the results section and discussed in the conclusions. The plot (Fig. 7) highlights seasonal fluctuations of the measured parameters and shows that site-specific differences were observed. To keep the number of plots acceptable, we exemplarily chose the two stations. In addition, a full interpretation of the obtained data is not intended for this type of publication (but see reply to last comment).

Changes in the manuscript: See changes in response to referee #1 (blue highlights) on page 12, lines 17–22; page 13, lines 1–4; page 14 (plot); page 16, lines 6–24.

P12, L9: Instead of making the reader guess a trend over the box-plots, I would encourage the authors to provide a regression slope to highlight trends across stations.

C5

Also, is this a true geographical gradient following the salinity gradient of the Baltic Sea or is this rather because of the location of sites 10, 11 and 13, reflecting a local gradient towards the inner Lübeck Bight?

Reply: A linear regression between the straight-line distances from Station 2 to Station 13 (NW to SE) and salinity was applied. The resulting regression slope and the expected change in salinity over distance are now reported. Also, in the frame of the exemplary comparison between Stations 2 and 13, the driving forces of differences in salinity (geographical gradient or local factors) are discussed.

Changes in the manuscript: See changes on page 12, lines 9–10 and on page 16, lines 9–14.

L11. Although this is a descriptive manuscript, some of the highlighted results would need to be put into perspective and be explained. What was this large change in salinity attributed to? How long did it last? Was it a specific upwelling event? Did this coincide with a change in temperature and the other measured parameters? How do the authors explain such dramatic changes?

Reply: The strongest diurnal fluctuations (highlighted in Sect. 4.2) have now been discussed in the conclusions within the frame of the exemplary comparison of Stations 2 and 13. As all of the presented diurnal fluctuations were found in the data of Station 13, this appeared as the most natural way to discuss these results. The reviewer already highlighted that the manuscript should be rather of a descriptive nature and we think that an exemplary discussion of the results is the best tradeoff between a pure methodological description and an extensive interpretation of the entire dataset.

Changes in the manuscript: See changes on page 16, lines 6–24

Please also note the supplement to this comment:

<https://www.earth-syst-sci-data-discuss.net/essd-2018-159/essd-2018-159-AC2-supplement.pdf>

C6

