**The Western Channel Observatory: a century of physical, chemical and biological data compiled from pelagic and benthic habitats in the Western English Channel**

We are grateful to the referees for taking the time to review our submission. We would like to thank them for their positive review of our manuscript and for their constructive and helpful comments. The following edits, changes and responses have been made which have improved the manuscript: (line numbers refer to revised manuscript). In summary, we have made the link to the data operable, improved the structure and harmony between writing styles across sections, improved figure legibility, as well as attending to all the other points. Our point-by point responses are in blue below.

**RC1**: 'Comment on essd-2023-311', Anonymous Referee #1, 11 Sep 2023
The manuscript by McEvoy and co-authors presents a first database bringing together a wide range of different observations from pelagic, benthic and atmospheric observations from the Western Channel Observatory close to Plymouth (UK). A general summary of sampling methods and metadata is provided together with main trends and discussions of biotic and abiotic parameters. While many of the presented time series are published and available in different resolutions from different resources, this is the first important attempt to summarize the different datasets in an integrated way by presenting monthly averages of the observed parameters. The provided database is intended facilitating the use of the long-term observations in the Western Channel Observatory for a variety of approaches, including supporting policy and management.

The manuscript is generally well written and of high importance for the community. I could not access the data via the enclosed link, but I assume this will be possible once the manuscript is accepted.

We apologise for this, and have been advised by DASSH that some people may have restrictions on their browsers which do not allow them to open links beginning with http. Therefore, in the revised submission of the manuscript the link address has been changed to include https instead https://doi.org/10.17031/645110fb81749

Some important aspects – the long-term funding of these kind of observatories and the future of long-term ecological research are discussed. Of particular importance is the fact that the use of future automatic systems can only be meaningful if used in a complementary manner with current (classic taxonomical) long-term observations.

I assume that the text passages of the different observations were provided by different co-authors and I would have some suggestions to make them a bit more coherent: Section 5.1 would benefit from some clarifications and lacks some discussion and interpretation of the results compared to the other sections. Some

sections present detailed results, while other focus on general long-term trends – this could be presented more uniformly. Given the focus of the manuscript, the general trend/or in case of short time-series, a wider context is more meaningful here.

We agree and have edited the manuscript to describe the general trends and provided wider context by citing some of the key studies. In particular, the benthic section and the carbonate chemistry text are brought more into the style of the rest of the manuscript.

There is some general description for establishing the phytoplankton biomass in the main text included, while other methods, e.g. estimating zooplankton biomass, are only referred to in the appendix (by links that lead to other references). Because of the importance of biomass in the results presented, I would suggest to give a very short summary of the different methods of estimating biomass for the different groups in the main text body (e.g. wet weight on board, estimated by length weight relationships etc). There are a couple of formal corrections (see below).

As suggested text has been added to reflect the different methods of estimating biomass. L.177-182

Overall, I would recommend publications after minor revision.

 Detailed comments:

Line 23: please close bracket done l.25

 Line 54: please add a period at the end of the sentence – done l.49

Line 59, 63: please add blanks before station names done

Line 64: please delete blank before egg production done

Line 129: please check structure of sentence

Amended – see next comment

Line 130: The least squares linear regression indicates a constant increase in water T, however, a cooling period is indicated between 1962 and 1985. Please clarify, also, add a reference or, if it is referring to Southward et al., move reference

The last sentence of this figure caption has now been re-written to clarify that it was Southward who defined these eras of warming and cooling.

Line 185: consider rephrasing …. indicates that there are no data available

Changed from "where there are no" to "indicates" l.169

185: To benefit models, budgets and size-based approaches, biotic data are reported both in units of abundance and biomass. – repetition from line 149, please consider deleting in one place.

Text has been changed and the repetition removed on the second instance l.170

Line 180-192: Some methods for biomass estimations of phytoplankton are presented, but not for other organisms. See comment above, I would suggest to add brief descriptions for biomass estimations for the different groups.

As suggested, the text has been added to reflect the different methods of estimating biomass. L.178-182

Table 2: Please indicate reference for Nanoeukaryotes. done

The first 2 paragraphs of section 5.1 are difficult to understand, please consider rephrasing

This text has been substantially re-written. First, we describe Fig. 3 and the seasonality based on the data we provide. The wider context of describing past work interpreting the drivers of the seasonality, based on various approaches, is described afterwards. The old text also had discussion of the benthic mixed up with that on the pelagic, which was confusing. For this reason, we have now kept pelagic and benthic separate and in separate sections, and thus added a new section entitled "5.2 L4 seasonality: benthic system". For this section we have used the same structure as used for the pelagic. This text has incorporated some of the text that was in the old section "5.6 Bentho-pelagic coupling" that this referee thought did not work very well on its own. This latter section therefore has been removed.

In detail:

Line 206: what are the alternative mechanisms that have been proposed and based on what, pleas add a brief summary here, otherwise the context is a bit odd.

This has now been enlarged upon with additional references. It now forms the final paragraph of the section 5.1 on pelagic seasonality

Line 207: Please add period after bracket. done

Line 215: Please rephrase 'near limiting levels at the limit of detection'

We have simplified this statement to " near-limiting levels in the upper water column" l.198

Line 217: Please remove period after August done

Line 219: causes done

Line 220: There is no interpretation of the causal mechanisms

As per comment on old line 206, we have now described these suggested causal mechanisms in the final paragraph of section 5.1

Line 222: Please delete 'the' before autumn done

Line 222: please be more specific, what is meant by 'the averages in Fig. 3'

Have specified these are monthly mean values l.203

Line 223: inter-annual variability in what? Phytoplankton concentration? Obviously, if you only show an average, you cannot depict any variability? Please consider rephrasing.

Inter-annual variability refers to the variation in the annual magnitude and composition of phytoplankton over the time series. l.204 has been changed to make this clear.

Line 225: what do you mean by 'size boundary between phytoplankton and metazoans'? Please be more specific, the whole sentence is difficult to understand

This sentence has been removed and text changed to reflect the overlap in estimates of copepod nauplii, diatoms and dinoflagellates from the different datasets. L. 206-209.

Line 228: show important contributions to what, please rephrase or explain

Please see previous comment, text rephrased l.207

Line 232: Paradoxically to what? Please be more specific. Maybe the food baseline is high enough to sustain an early onset of secondary production?

We have now simply described the finding and not described it as paradoxical. L.212

Line 239: several blanks to much or a pdf error? Comma missing and blank deleted

Line 243: biomass instead of biomasses? Low instead of depressed? Corrections made

Line 250: Please consider moving the phytoplankton part to the corresponding paragraph in the beginning of the section

This has been solved by our restructuring of the pelagic and benthic systems

Figure caption Fig. 3: EP of Calanus was not measured from females from surface waters? Please correct. Also, please format blanks in several y-achsis labels and check units (see also Fig. 4)

Text changed to *Calanus* females collected from net samples. Y-axis labels formatted

Figure 3 f: TChl excludes chl a? Legend for this plot? From the appendix I get that TChl includes also Chl a, so Chl a would appear twice, distorting total pigment concentration?

For this graph the sum of the bars does not show the total pigment concentration. Each block shows a different pigment sum. We have added "sum" to the plot title and made it clearer in the legend that the reader is referred to Table A1 for an explanation of the different pigment sums.

Fig. 3i: how was nauplii carbon calculated?

The reader is referred to Table A1 which indicates Biomass of Copepod nauplii was calculated using the equations of Uye et al (1996).

Line 280: Biomass of plankton by flow cytometry derived from Table 2 – Do you mean using conversion factors in Table 2 (see also Fig. caption of Fig. 4)?

Changed wording to use "conversion factors". l.268

Section 5.2: I would suggest to remove detailed numbered referring to results (e.g. concentrations) to be consistent with 5.1

This has become Section 5.3. Section 5.1 has been rewritten. This brings the sections more in line with each other.

Title 5.2: This is more a comparison between E1/L5 and L4 than the overall seasonality of the former, please consider re-labelling

We agree, and have now changed the title of this section to: "5.3 Overall seasonality: E1 and L5 in comparison to L4"

Line 303: time series data do instead of time series data does? done

Line 310: Data….show instead of shows? Also, please delete 1m², 700µm, this information belongs into Table 1, where also mesh size of plankton nets is given

Correction made and mesh size moved into Table 1

Line 312: Please explain shortly why you mention Calanus data here. Also, I would assume that they are not quantitatively retained in the 700μm net, a short remark would be helpful for understanding the context

We have now expanded this very slightly to explain it and mention that this net does not catch Calanus quantitatively.  New line 297-299.

Fig. 4 d: depth? Depth added to the legend

Line 347: originate from instead of are? Changed to "cover"

Line 447: please correct: macro-nutrients corrected

Line 451: maybe the use of 'sardine' is more common than pilchard? Please consider correction throughout the text

Here we would prefer to keep the common name pilchard as this is what this fish is known as in the West Country. However, we have now explained it is more widely known as sardine where the term first appears. l.296

Line 495: rate process measurement is an unusual expression. Maybe better only rate measurements? changed

Line 500: component weekly rates- do you mean Calanus weekly rates? Please rephrase

Rephrased as " (i.e. a mean of the weekly average rates)"

Line 507: Please correct to the commonly used 'hatching success' corrected

Section 5.5: I wonder why detailed measurements are presented here, when over the rest of the variables mainly trends are provided. Is there a reason for that? Then please comment in the beginning of the manuscript when describing the different variables/time series to facilitate the focus on this section. Otherwise detailed concentrations could be removed and the focus could be more on general trends and drivers

"(-1.35 ± 1.12 μmol kg yr-1 at E1 vs. -0.78 ± 0.72 μmol kg yr-1 at L4)" has been removed. L. 462

Fig. caption Fig. 8: please add station

Station L4 added

Line 586: what is meant by triggering of biomass of diversity peaks? Please rephrase

This line is from the original section 5.6. The section did not work well. It has been removed and the information rewritten and added to a new section entitled "5.2 L4 seasonality: benthic system".

Section 5.6 is not relating to any data presented her. Please consider either presenting the relevant data or shortening this section, as it is unrelated to the data submitted

We agree: this section on "benthic-pelagic" coupling was out of place. It has been removed, the text changed and moved into a new section "5.2 L4 seasonality: benthic system". The pelagic and benthic information are separated but presented in the same section. This improves the flow of the manuscript and helps maintain the style throughout.

Line 650: Consider rephrasing, the half sentence …. or the use of eDNA and bioinformatic processing of the enormous volumes of data collected… stands in a weird context. I would maybe suggest moving this topic two paragraphs down and add a couple of sentences regarding the challenges that come with the processing and storage of these 'digital'/automatic/high resolution data.

We have made the molecular approaches a separate sentence here to emphasise this important approach (line 533-534). It is returned to in the paragraph below (lines 541-546).

**Citation**: https://doi.org/10.5194/essd-2023-311-RC1


**RC2**: 'Comment on essd-2023-311', Anonymous Referee #2, 16 Sep 2023
**General comments**

The manuscript proposed by A. J. McEvoy et al. aims giving a detailed description of a compiled monthly dataset from the Western Channel Observatory in the Western English Channel.

The presented dataset aggregates an important dataset ranging from hydrology to sharks and from microbial diversity up to benthic macrofauna and fish.

The manuscript is combining a detailed description of available data and some examples of observed trends and features observed in this region (referring to more focused published publications).

y main comment concerns the dataset access. Indeed, the proposed link http://doi.org/10.17031/645110fb81749 does not allow to access to a readable dataset (or I didn't find the way to read data). It is then an issue to solve before publication.

We apologise for this, and have been advised by DASSH that some people may have restrictions on their browsers which do not allow them to open links beginning with http. Therefore in the revised submission of the manuscript the link address has been changed to include https instead https://doi.org/10.17031/645110fb81749

Considering the limited needed improvements included in those comments and if the dataset confirms what is described in the publication, I recommend this paper for potential publication after minor revisions.

**Specific comments**

*Title*

In the title you talk about oceanographic data. Does it mean physical or hydrological data ?

We have changed the title from oceanographic to physical. This takes away uncertainty and is clearer.

p.2 / l. 38: The link does not work. We have an available landing page but when we try to get the data, we have a file named DASSHDT00000522 without extent (then the user doesn't know how to open). I tried to open as a text or Excel file and it does not work.

(see above) We have also tested the link with several people outside the field of science and everyone has reported being able to access the data.

*Figure 2*

The figure 2 illustrates the sea surface temperature large scale condition compared with E1 and L4 stations. Several point should be addressed for this figure:

- The source of SST in Figure 2a is not cited as well as the year plotted.

  The source and date have been added to the legend and recognised in the acknowledgment.

  A cooling period at L4 is mentioned but does not clearly appear in the trend. How is has been defined that the temperature is cooling during this period because it seems mainly driven by a cold year around 1985.

The last sentence of the figure caption has now been re-written to clarify that it was Southward who defined these eras of warming and cooling. L.126-7

- Why only E1 is represented on this figure ? It would have been interesting to overplot signal at L4 et L5.

We should point out that this is a large scale context figure, and E1 is the only time series with a century of temperature observations. Those from L4 only start in 1988. We wanted to keep Fig. 2 fairly simple to describe the long-term, large-scale setting. The individual temperatures of the E1 and L4 sites are portrayed in more detail in Figs 3a and Fig 4a.

p.6 / l. 135 – please provide a link to the different datasets on those repositories.

Links added l. 131

p.6 / l. 135-138 – It has been mentioned that datasets have been monthly averaged to get similar sampling for the different variables. For parameters sensitive to the tidal activity (temperature, salinity, chlorphyll concentration, ...), this choice can induce bias considering partial tidal cycle in the average. Did you investigate the impact of the monthly average on such variables compared to average considering full tidal cycle ?

Each sampling is conducted at a similar time of the day. This will encompass differing states of the tidal cycle and over the longer term the signal will be dampened down. We wanted to keep a relatively simple period over which to average (i.e. calendar month) which strikes a compromise between sufficient data coverage and seasonal resolution. Any substantial departure from this would leave a large number of data gaps (if shorter timescales were averaged) or lack seasonal resolution (if longer periods were averaged). The appendices point readers to the actual source data sets at their weekly resolution of sampling for researchers who wish to address shorter scale questions.

Figure 4

For the young fish trawl, E1 and L5 data are combined. Could you explain how those two stations are combined ?

Unfortunately, we still do not have this information to hand but are aiming to find and transcribe original logbooks to attempt to source this information in our next version of the data paper in a couple of years.

Figure 5

In the figure caption, it has been mentioned that "Trend lines are illustrative only, and do not necessarily imply statistical significance.". However, those trends are discussed in the text. It would be interesting to explain how those trends are processed.

We have expanded the final sentence of the figure caption to explain this. It now reads: "Trend lines (drawn for data with >20 y timespans) are illustrative linear regressions, and do not necessarily imply statistical significance". L.379

**Minor and technical corrections**

*Abstract*

p.1 / l. 26 – missing closing brackets after 58m. done

p.2 / l.49 – missing point at the end of the sentence - done

p.2 / l.49 – please replace "re-use" by "reusable" to follow FAIR acronym. - done

p.8 / l.207 – missing point at the end of the sentence ( …. Atkinson et al., 2018). ) - done

*Figure 5 and Figure 6*

Fonts in the figure are too small and the limited resolution of the figure does not allow to clearly read text. Please improve the resolution and the font size in the figure.

These figures have been redrafted to make them clearer.  Also, the resolution has been improved by changing the way they have been pasted into the document.

p.20 – notations for total alkalinity are not uniform (TA, AT)

Notation has been made uniform throughout using TA

p.20 / l. 555 – units for AT, DIC are missing as well as for density anomaly.

Units have been added for AT and DIC.

*Figure 8*

Please the same notation for total alkalinity in the figures (AT) and in the text (TA).

Notation has been changed to TA throughout.

p.22 – Modelling could be replaced by "Numerical modelling" -done

**Citation**: https://doi.org/10.5194/essd-2023-311-RC2