

General comments

I like the paper a lot, especially the detailed data of day-night, the “lost with discrete sampling alone” and of short spatial resolution. I congratulate the first author as I think is graduate student and I appreciate the sampling effort and technology preparation.

My General comments are:

- Maybe more to the Editor than to the authors. Key point of this paper is this link between limnologist and oceanographers (l. 34). As far as I can say, all authors, editor and myself are in the oceanography site. If the other reviewer is too, it might be good to have a limnologist reading it. I know it is difficult, more in this times, but worth to check it otherwise it will again be a bias and we are again only talking to the same people.
- I understand and agree about the differences methods between ocean and lakes but I think measurement in the Baltic Sea use same methods as oceanic and have the same quality. Just need to rewrite some of sentence when refers to it, because as it reads now I look three complete different “words” and I would say we have two
- General organization might be improved, for example there is quite a lot of discussion in the result section (lines 283-284, lines 295-298...) and results on the discussion (l. 279-384). From figure 11 on, there have been not presented in the result section.
- Statistics. Figure 10 both data sets (oxygen measured and Hydroflash included uncertainty, there is not one dependent controlled and the other one independent) and therefore a model II regression should be used (see for example Legendre, 2014)
- I am not sure what the journal policy but I recommend all data to be available via PANGAEA.

Specific comments and technical corrections

L. 9 Define what NDIR and TDLAS are.

L. 23 what is TS? Probably reference editor Problem.

L. 37 something not right with this sentence “due to using” (?)

L. 46 there are more studies reporting high pCO₂ values, for example in Guadalquivir River (Ribas-Ribas et al., 2011).

L. 60-61 Again something not right with this sentence and the , used in between.

L. 75 define NDIR

L.80 I’m not completely sure you do not discuss biogeochemical implications. I am also not sure why not to do it.

L. 82 is water flow an ancillary data?

L. 95 (in wrong place

L. 100 what is the frequency for the other measurements?

Figure 1. I do not understand how do you define the flow. What is the 9 referring to?

Table 1. You are showing conductivity, not salinity. In the RT, what is 1:32 and 22:46? Careful with number-space-unit (5 L min in pCO₂ RT) and subscript in 63.

L. 118 such as ??

L. 124 Fig. 2, Table 2 and section Number

Figure 3. Unify how you refer to Falklands in all the figures. In Fig. 3c it will be nice to have the details on where you did the diurnal cycles and all other features you describe in the test.

L. 129 German date style (different from the figures, unify). Also in line 153, table 2

L. 135. Where was the SBE21 located?

L. 134 What happen to the other half of the brackish cruise. Did you improve the method on the spot? Same question I have in line 150.

L. 152 Probably a question to an English native speaker but "Excursions" does not sound good.

L. 154-157 Add all this details to Fig. 3b.

L. 158 Were the discrete samples collected before or after the sensor? Will pump/flow modify the carbonate chemistry?

L. 163 I do not understand why there were not SBE data... the system is design to measure in parallel, right?

L. 164 use same decimal places for the standard deviation

L. 168 100 mL (capital L, you did good with the 500 mL ☺)

Table 2. Vessel size would not need decimal places. Confusing how the ranges are reported, consider to add a ":" like in the header or "-"

L. 172-174 So now I am curios, were there differences? But more important for the paper, if they are not reported or need it, you do not need to say it ☺

L. 182 VINDTA and APOLLO had difference accuracies and precisions, report both. See (Tynan et al., 2016)

L. 183-185. What about the other constant used?

L. 192 First define and the (MESS)

L. 195 Again here, if only one is reported, why mention?

L. 198-199 Here and elsewhere in the ms, unify the units of methane and CO₂ (sometimes ppm, some other μatm). I think this is another thing oceanographers and limnologist do different ☺. Also in line 229, 238

L. 205 Is RT already mention and defined?

Section 2.5 I like this section a lot. I think it will benefit to separate the corrections in subheaders: 1 (or 2.5.1)) sensor drift; 2) warming...

L. 218 Explain better what info the shape of the zero drift give to you.

L. 224 Define SST and the depth of this "surface"

Equation 1 and 2. Unify how do you write insitu.

Line 228 at in situ ?? (I guess temperature but need to be stated)

Line 295 Replace believe for think

Line 303-305. Figure 5 b is discussed before 5a

Figure 6. If I only read the captions (which a lot of readers do) I do not know what it is the true. I would also change the word, how do you know it is true? Maybe reference

Line 317 A few lines before you say biofouling was not an issue.

Figure 7 miss a), b), c)... Also the caption is not clear enough. Maybe too many information for only one figure (?)

Line 326. You have filtered and unfiltered samples to know if this TA bias was from that.

Figure 8 also miss a) and b). Do not use left and right, or bottom (in line 345)

Figure 9 c x-axis miss (dd/mm/year). Unify throughout the figures (also figure 11 is missing it). Also it is really difficult to see the difference in the lower scale. Consider to do a break in the y-axis

Figure 10. how do you re-calibrated, with which data?

Line 359 long deployment is a bit relatively, compare with other really long deployment (more than a year ☺)

L. 384-388 This info will be better if state in the map of the study area. Where the stations on grey in Figure 11 are in the map in figure 3c

Figure 11. Why show three times the same temperature. Consider to add and extra subplot.

End of section 4.1 is excellent, probably the main part of the paper. You mention that diel cycles in inland are scare. I will say that we do not know a lot on what happen during night. We recently published a paper that open more questions than answers (Stolle et al., 2020).

Figure 12. Same comments about a), b) and date format

L 409 Strange sentence with the verb between “,”

Figure 13. Transect if from Cape Town to Falkand but these two place are in different panels and it is somehow confusing. It seems like a relatively straight line, could you use longitude instead of distance

Figure 14. Where is St. George. Unify decimal places in all axis (44.900 and no 44.9). Also unify how you report Latitude and longitude (map is different from transect). Miss a), b)... Same for figure 15

Line 445-446 “it gives light to one way to access” (?)

References I haven't go through all of them but please pay attention to reference format. Examples: line 492 East China Sea (with strange spaces) and line 512 (Control Procedures..., all capital)

Ribas-Ribas, M., Gómez-Parra, A., and Forja, J. M.: Air–sea CO₂ fluxes in the north-eastern shelf of the Gulf of Cádiz (southwest Iberian Peninsula), *Mar. Chem.*, 123, 56-66, 2011.

Stolle, C., Ribas-Ribas, M., Badewien, T. H., Barnes, J., Carpenter, L. J., Chance, R., Damgaard, L. R., Quesada, A. M. D., Engel, A., Frka, S., Galgani, L., Gašparović, B., Gerriets, M., Mustaffa, N. I. H., Herrmann, H., Kallajoki, L., Pereira, R., Radach, F., Revsbech, N. P., Rickard, P., Saint, A., Salter, M., Striebel, M., Triesch, N., Uher, G., Upstill-Goddard, R. C., Pinxteren, M. v., Zäncker, B., Zieger, P., and Wurl, O.: The MILAN Campaign: Studying Diel Light Effects on the Air–Sea Interface, *B Am Meteorol Soc*, 101, E146-E166, 10.1175/bams-d-17-0329.1, 2020.

Tynan, E., Clarke, J. S., Humphreys, M. P., Ribas-Ribas, M., Esposito, M., Rérolle, V. M. C., Schlosser, C., Thorpe, S. E., Tyrrell, T., and Achterberg, E. P.: Physical and biogeochemical controls on the variability in surface pH and calcium carbonate saturation states in the Atlantic sectors of the Arctic and Southern Oceans, *Deep Sea Research Part II: Topical Studies in Oceanography*, 127, 7-27, <https://doi.org/10.1016/j.dsr2.2016.01.001>, 2016.