

Interactive comment on “Anoxic monimolimnia: Nutrients devious feeders” by Areti Gianni and Ierotheos Zacharias

Anonymous Referee #2

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The manuscript presents results from a two-year time series study and a post-storm case study of a coastal, semi-enclosed basin off western Greece. The Aitoliko basin is connected via small channels to a shallow Lagoon which isolates it from the deep Patraikos Gulf. The Aitoliko basin features an anoxic deep layer. The intended focus of the ms is on the role of nutrients (and H₂S) accumulated in the bottom layer of Aitoliko for surface processes (PP of phytoplankton) (a) after a winter storm event and (b) under regular stratified conditions.

The manuscript suffers from a very poor English, including basic grammar and vocabulary. Throughout the text it is often very difficult to be sure what the authors intend to say. Hence this review can only be based on the reviewers best guess of the latter.

Major issues:

1) It is unfortunate that the time series data presented do not include T, S or O₂ data. The only such data are from the post storm cruise. Hence the authors seem to lack urgently needed reference data, in particular to make their points about total mixing etc..

2) The ms (text and data) is unclear/contradictory about the feature of 'total mixing' during the storm event (also referred to as the 'holomictic period' or 'holomictic event'; Section 3.2). This fact is claimed several times in the text (and I seems to be an important, if not the major, aspect of this ms) (starting in Intro, p2, l 27, p3 l 13; see details in the attached pdf!), but I do not see evidence from the presented data of total mixing (convective overturning). In particular T, S and density plots shown from the cruise just four days after the storm show strong gradients (e.g. 0.75 deg C colder surface waters compared to the intrusion seen between 8 and 17 m water depth; strong salinity and density gradients below 8m.) do not support that the storm cause a total mixing (overturning) of the basin. Holomictic refers to uniform (!) T and density from top to bottom. There are also strong oxygen gradients above the anoxic layer observed during the post storm event. This also speaks against 'total mixing'.

It rather seems that the hydrographical observations indicate mixing down to 8m water depths and some lateral intrusion of denser (potentially also warmer ?) water below the surface layer. This can nevertheless cause mixing of H₂S (and NH₄) rich water with oxygenated water at the interface.

Also the post storm nutrient profiles by no means support a holomictic period.

Lacking, however, any data from before the storm (the time series ended almost a year earlier) or from the source region, this is all very speculative. Hence, I think, much of the paper stands on a weak data base.

3) The poor English, long list of unclear sentences and phrases.

In conclusion, I suggest to reject the paper in its present form. The study needs ad-

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ditional data (which seem not to be available), is based on improper (at least very unclear) reasoning (the total mixing issue) unsupported by the presented data, and, finally, needs a complete rewriting.

Some minor comments (but see also the attached pdf, the original ms with additional minor comments and textcorrections)

Title: 'Anoxic monimolimnia': is this tautology needed? Isn't a monimolimnic lake always anoxic? What do you mean by Nutrient devious feeders?? I don't understand this at all!

Intro: Additional references are needed, also several terms should be properly defined here. (See the attached pdf for more details.)

MM: (see attached pdf in addition)

p6/13 indicates that you also measured O₂, T, S during the monitoring activity. These should be provided in the ms.

section 2.3: is very detailed (and at times wordy) for fundamental procedures in oceanography (on the other hand: you do not provide details on e.g. calibration of your sensors for O₂, Eh)

Results:

The authors report nutrients in mg/l; please turn to molar units (umol/l). Weight units tend to be unclear: for example, do you report mg/L PO₄ (mass 95) or mg/L P-PO₄ (mass 31)?

The section on chlorophylls is very lengthy! (p 11-12). Is this detail needed?

I don't see convincing evidence presented concerning a 'holomictic event' with uniform e.g. temperature profiles, although the cruise took place a few days after the storm.

and much more in the pdf ...

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Discussion: see the pdf

Data availability statement is missing!

No Acknowledgment section?

Note: I don't have the time and patience to provide a **full** listing of the language issues of the text. At times almost every sentence seems affected, at least formulations are clumsy, but often awkward, i.e. the meaning is not clear.

The authors definitely need the help of either a native speaker colleague who is willing to correct the text very carefully, or a respective professional service. This needs to be done before the text is submitted for any additional review (to this journal, or elsewhere).

In the attached pdf I have tried to mark as much as possible of unclear text 'in yellow'. Note that usually I also provide related comments (comment symbol attached to yellow mark) with related suggestions (best read with Acrobat Reader, I think).

Please also note the supplement to this comment:

<https://www.biogeosciences-discuss.net/bg-2019-349/bg-2019-349-RC2-supplement.pdf>

Interactive comment on Biogeosciences Discuss., <https://doi.org/10.5194/bg-2019-349>, 2019.

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