

Review for Hydrology and Earth System Sciences

Oxycline oscillations induced by internal waves in deep Lake Iseo

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by Giulia Valerio et al.

This is a paper on an important topic: a detailed analysis of the dynamics and potential impacts of oxycline oscillations in a deep meromictic lake. In addition, the lake in question, Lake Iseo, is one of the five major Italian pre-Alpine lakes all of which are more or less meromictic, and which are extremely important from an economic and recreational standpoint.

The author team is well-qualified to conduct this application as the group includes scholars who are among the best European physical modelers focusing on such systems (Pilotti & Valerio), as well as two of the top researchers on lake sediments (Lau & Hupfer).

The paper is technically sound and is a major contribution to characterizing the impact of internal waves on sediment-water exchange of solutes. Although, as referenced by this paper, previous work has been conducted on the influence of internal waves in holomictic lakes, much less attention has been paid to how such oscillations effect transport at the chemoclines of meromictic systems. Because the chemocline is persistent and marks the boundary between regions with very different chemistries, this study is a major step towards eventually predicting the transport of nutrients and contaminants from the sediments back into a meromictic lake's surface waters.

Although I recommend that this paper be published, I have two general suggestions that should be addressed prior to publication.

1. I think the paper goes into too much detail regarding the results. I would suggest that the authors tighten up the text (as well as the figures and tables) to make the paper easier to follow. For example, I think some of the tables could be placed into supplementary materials.

2. Although I had no problem understanding the content and organization of the text, the authors are not native English speakers as I found lots of awkward wordings as well as typos that were frustrating. Here are a sampling of some lines that illustrate my point:

Line 67:

that under the internal wave motions of the deep oxycline, the contiguous sediments undego

Line 141:

measured internal oscillations. This required to identify the temporal evolution of the periodicity and

In the following, aside from the repetition ("the one the one"), there should be a space between the units "m" and "s":

Line 173:

of 5 ms⁻¹, whose spatial and temporal structure fit the one the one predicted by the eigenmodel for

Line 389:

there are large and periodic displacements of the oxycline. The oxycline typically oscillation in the

Line 406:

Accordingly, this works provide experimental and numerical evidence of a chemical gradient

Line 445:

basin. The analysis of its oscillations over a 3 days window provided the time series of the area

In the following, note that the two panels of Fig. 10 are not labeled (a) and (b):

Line 436:

conditions will be mainly located in the northern, southern and eastern sub-basins (see Fig. 10a),

There are quite a few other small errors of this type. If the journal does not provide very strong copyediting, I would suggest that the authors do a spellcheck and ask an English-speaking colleague to copyedit the article to smooth and make corrections to the manuscript.