

We would like to thank the reviewer for his/her feedback and constructive comments. We reply to these comments individually below and will also address them in the revised version. Reviewer comments are reproduced in plain text with underline, with our explanations in *italic*

Response to reviewer #2

Specific comments

1.) The title of the paper seems to reflect the content not adequately. The research did not focus on the understanding of the (already known) biogeochemical processes but on the effects of these processes on electrical conductivity as an expression of water density in the different layers of meromictic lakes. The prominent part of the title should address this aspect. The same discrepancy is also felt when comparing the abstract with the main paper.

We agree that the position term “Biogeochemical“ may mislead from the main subject of the paper. We will change the title, and we will check the abstract for possible improvement.

2.) The introduction is not well structured. The contents of the first paragraph is repeated in the following paragraphs. It can be deleted without loss of information. The second paragraph starts to describe the formation of meromictic lakes followed by a paragraph referred to the distribution of meromictic lakes and returning to the background of their formation in the fourth and fifth paragraph.

3.) Chapter 2 should be arranged in another way. Whereas subchapters 1 and 2 can form the description of the study site, subchapter 2.3 should become part of the following methodology chapter (chapter 3). Table 1 does not provide significant information. It may be not necessary. Some of the information can be added to the text. It does not become clear if the authors considered different species of iron.

We accept that there is space for improvement. We will include the reviewer’s ideas in the improved version.

4. In the result chapter (chapter 4), some data could be presented more precisely. Especially figure 4 seems to need a revision. The figure would be more clearly with a real time scale on the x-axis. The breaks in the measurements should become visible. Furthermore, it would be useful to compare the rates of the decrease in conductivity in certain periods of the experiment to evaluate if the formation of iron precipitates is a steady process or if different steps occur.

We revised fig.4 (see appendix) by using a real time scale on the x-axis. This makes it much easier to evaluate the changes in degradation rate with time in dependence of the experiment progress and the aeration depth.

5.) In the last paragraph of chapter 4.1 the authors describe “elevated values of electrical conductivity towards the end of the experiment near the bottom” by referring to figure 5. This does not become visible from the figure that shows a permanent slight decrease in the whole lower water layer during the experiment.

We decided to replace one profile in fig. 5 (see appendix) and changed the scaling of the y-axis that it aligns with figure 4 and increased the font size as suggested. We hope that this facilitates an easier perception of increased EC-values in the range up to 1.2 mS/cm at the bottom of the column.

6.) It would be interesting to test if the assumptions drawn from the experiment results and lake measurements could be confirmed by geochemical modelling. This would also allow a more reliable assumption for the interpretation of the carbon data (chapter 4.2).

There has been a geochemical simulation of Waldsee by Moreira et al. (2011). Thank you for this comment, we should cite this publication in our paper. However, they provided no quantification of the partial re-dissolution of the precipitated iron. This is where our investigation delivers new parametrizations. Running a geochemical model is far outside the scope of this paper, but definitely an interesting challenge.

Reference: Moreira, S., Boehrer, B., Schultze, M., Dietz, S., & Samper, J. (2011). Modeling geochemically caused permanent stratification in Lake Waldsee (Germany). *Aquatic Geochemistry*, 17(3), 265-280.

7.) The conclusions expressed in the first paragraph of chapter 4.3 have to be proved by statistical analyses.

We decided to calculate the statistical moments mean and standard deviation for our results in the first paragraph of chapter 4.3 in order to justify our statements and conclusions.

8.) The chapter entitled “Conclusions” more resembles a “Summary” than what can be expected from conclusions. It should be renamed or be revised.

Changed to “Summary”

Technical Remarks

We included all suggested technical corrections within the manuscript.

Appendix

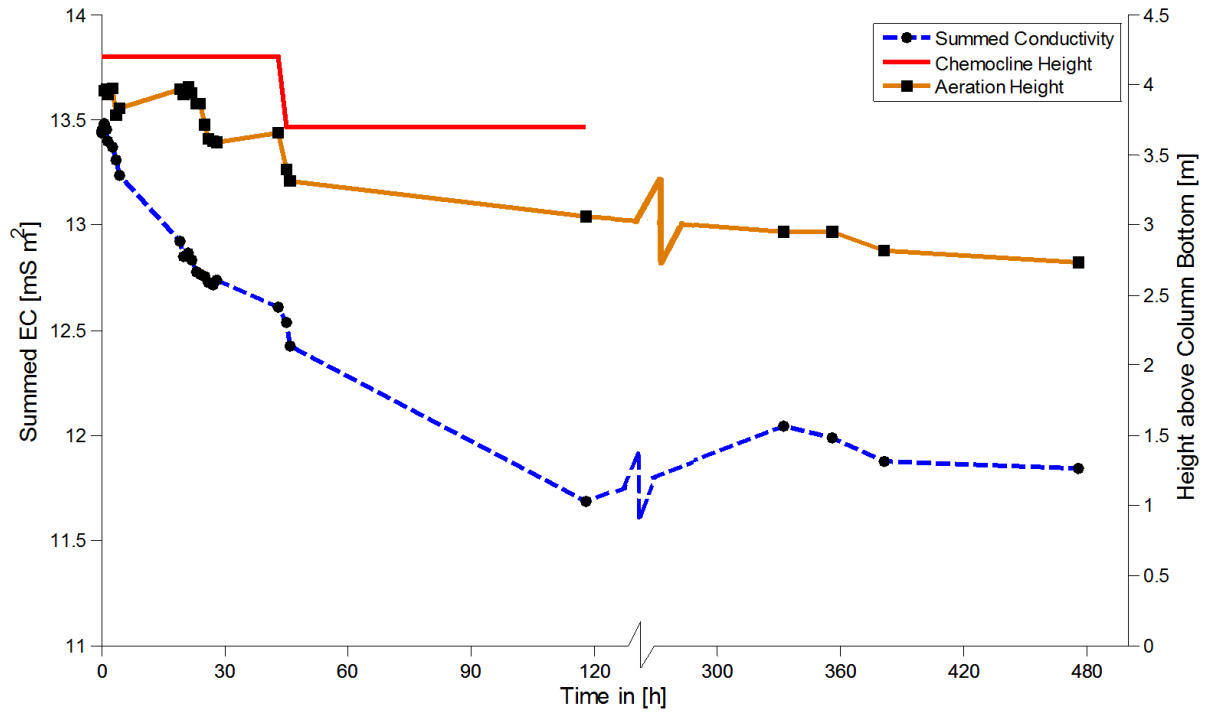


Figure 4: Temporal dynamics of chemocline height and summed conductivity during the column experiment. The scale breakage indicates the end of the hourly range sampling period of the experiment.

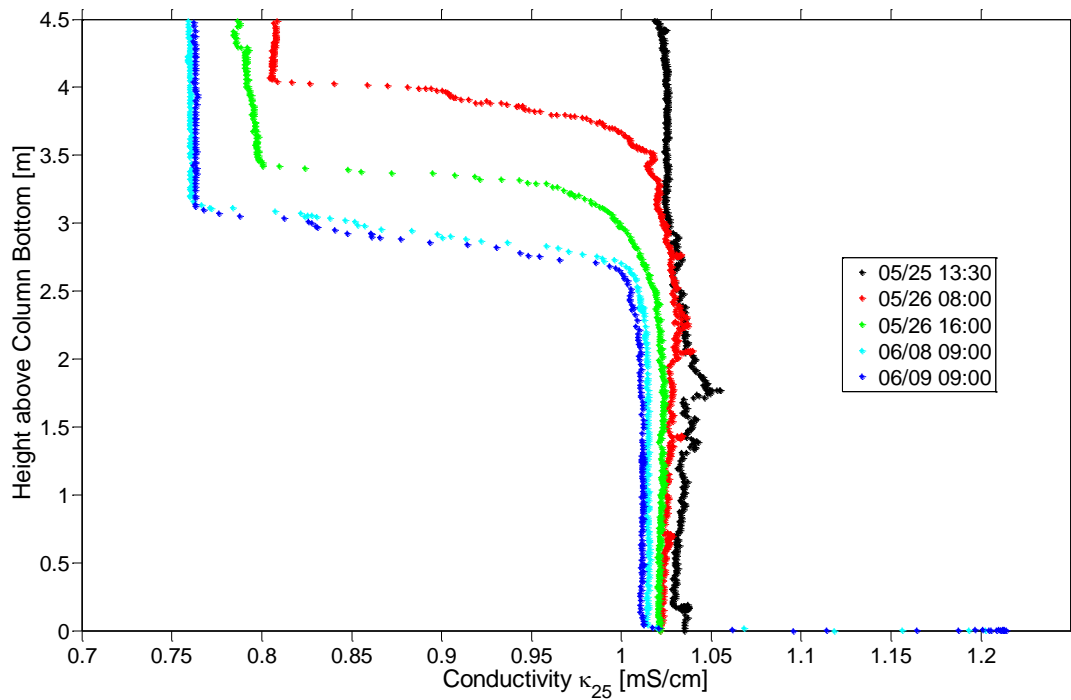


Figure 5: Selected conductivity profiles in the lab experiment