Biogeosciences Discuss.,
doi:10.5194/bg-2016-329-RC2, 2016

Biogeosciences Discussions
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Interactive comment on "Spatio-seasonal variability of chromophoric dissolved organic matter absorption and responses to photobleaching in a large shallow temperate lake" *by* María Encina Aullo-Maestro et al.

Anonymous Referee #2

Received and published: 11 September 2016

General comments: The study has investigated the spatial and seasonal variation of chromophoric DOM in a lake at several stations leading away from an inflow from a River supplying allocthonous DOM. Various methods were used to capture change in DOM over time and spatially including analysis of the absorption coefficient spectral slope, E2:E3 ratio, SUVA and Spectral Fluorescence signals. The study shows that the absorbance coefficient and DOC values were highest and most variable near the inflow to the lake, whereas other basins further located from the inflow had more stable values with more seasonal variability in the spectral slope of CDOM.

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Discussion paper

While the study has performed what seems like a well-planned study there are some very strong statements that over reach the scope of the study. I suggest major revisions especially of the discussion.

Specific comments:

Line 84: What platforms are these? Please explain.

Line 86: Please remove “the” in the part of the sentence which reads “However, CDOM is the arguably most challenging. . .”

Line 118: There are quite a few studies on temperate lakes, including seasonal work, see Müller et al 2014 “Hourly, daily and seasonal variability in the absorption spectra of chromophoric dissolved. . ..”

Line 174: Mention the time of the year samples occurred to represent seasonal variability.

Line 187: Instead of referring to the summer campaign as “intensive summer campaign” change to “spatial variability” in the whole manuscript.

Lines 190 and 193: Explain why two different instruments were used for the different campaigns.

Line 194-195: It is not clear when the reference sodium azide was used. Please make this clear.

Line220: What was the temperature in the lake during this 7 day incubation?

Line 211: Instead of writing “this wavelength” specify which wave length “this” refers to.

Line 233: Was CDOM measured to know the start value? Give further explanation.

Line 263: A seasonal variability in aCDOM, which was used to determine change in CDOM quantity, is not clear from figure 2. Either present statistical data backing this up or rephrase the statement.

Line 263-269: The seasons are not shown in table 1, so the information that is referred to cannot be seen in the table. Add this information to the table.

Line 270: What is the relevance of comparing August values of sCDOM with June? Do the authors mean that these are the lowest and highest values? Please make this statement more clear.

Line 292: When stating something is significantly lower the statistical data must be presented. Please add this data.

Line 295: This sentence regarding figure 4 does not present data and should be part of the methods section.

Line301: Are the values of min and max mentioned in the text also in the table? Please review.

Line304: can this statement that there was a marked variability be made with a change of what seems to be of 0,002 on a nm scale?

Line 309: Where is the statistical data backing up the statement that it "varied significantly"? Please add this data.

Line 310-311: Refer to table 2 for the SUVA data.

Line 314: this statement about DOC data availability should be in methods since this cannot be seen in table 2 it is misleading to refer to it.

Line 319: Is the correlation significant for all basins? It seems like Basin I has a strong correlation, how would it look like if they were analyzed separately?

Line 324: where is the data for these "marked alterations"? Does this refer to aCDOM ? Rewrite and connect the sentences better.

Line 325: What was the temperature during this incubation? Can you really be sure that there was no bacterial degradation, 7 days is a long time for bacteria to degrade

DOM although you filtered through 0.2μm there are always some bacteria that are small enough to get through and grow to higher abundance over time, perhaps a portion of the DOM that cannot be measured with aCDOM was taken up like what is shown in figure 10?

Line 327: where the reductions statistically significant?

Line 330: Why was there an increase in the Dark controls? Please discuss this.

Line 337: When stating no "significant variation" this implies statistical significance and thus data has to be presented. Present statistical data.

Line 341: same requirement as the previous comment. Show statistical data.

Discussion section:

Line 362: Why is it surprising that the range has not been captured in the northern latitudes? Please explain.

Lines 364-365: This statement is contradictory to your results. From figure 2 it rather seems like the aCDOM and DOC values were quite stable in most basins with variation only in Basin I at station 1 probably due to the inflow of the Zala River. Please re-write this part.

Lines 365-367: This correlation was not shown in the results and also does not seem consistent in all basins. Where is the data for this statement?

Lines 369-373: Re-write this statement since it bases its argument on the previous statement that there could be coupling between aCDOM and DOC due to rainfall events, which was not observed in this study.

Line 372: Isn't the Keszthely basin the same basin that is closest to the inflow of the Zala River and thus repeating what was stated in the previous sentence?

Line 385-386: Please add the reference for the water residence time.

Line 395: Please add the statistical data to back-up the statement made that it was “significantly higher”.

Lines 395-397: This information belongs in results since it is not a discussion.

Line 398: Which studies are referred to in the statement “these studies”?

Line 418: Some references needed here about photobleaching and sCDOM, this sentence seems lost here.

Line 428-429: Please complete the sentence “influenced by both the provenance and subsequent transformations. . ..” of what?

Lines 454-457: I’m not convinced that this was due to photobleaching, this section refers to figure 2, however this figure does not back-up this claim how do you rule out a dilution effect? Re-phrase.

Line 461: Please add a reference to this paragraph.

Line 465: This data needs to be compared with the control and statistical confirmation presented in the results section.

Line 481: Here if referring to allochtonous it should be less susceptible instead of more. Please change.

Line 481: There is no visible change in SCDOM in the ALLO-CDOM. Please rephrase this statement

Line 481-482: Where is the statistical data to back-up the claim of statistical significance? Is this a comparison between allocthonous with autocthonous or with start values? Please add the data to the results section and re-phrase this discussion based on this.

Line 492: Where is the data for fluorescence spectra of autocthonous material? Figure 10a an10b only present allocthonous.

Line 495: where is this data?

Line 500: could this loss not be due to bacterial degradation?

Line 505-506: Please add a reference to this sentence.

Line 506: what is meant by “elsewhere”?

Line 505-509: This is a very strong statement that cannot be proven with the data from this study. Please re-write.

Line 512: Also this statement is too bold since this was not within the scope of this study.

Line 522-524: Please add a reference to this statement.

Line 547: Isn’t the contribution of wetlands well known? Remove “novel”.

Technical comments:

Line 70-71: Please review this sentence, it seems like information is being repeated and there is a misuse of the word “whilst”.

Line 71: In the same sentence as the above comment “. . .this fulfilling important role...” should probably be “thus fulfilling an important role”.

Line 75: can CDOM have a behavior? Perhaps property could be used instead.

Line 87: should be changed to “for reliable estimation of remotely. . .” Please change.

Line 89: should be changed to “studies have explored the application. . .”

Line 97: change to “size of DOM molecules. . .”

Line 98: I think the authors mean larger/greater molecules, not higher.

Lines 131-133: Please add references to this information about the study area.

Line 136: should be changed to “. . .at that time of the year...”

Lines 162-164: Please add a reference to this statement.

Line 165: what is meant by "...less noticeable..."? Less than what?

Line 219: I suggest moving "fifty-six" to Line 222 so it reads "Fifty-six samples were taken in total of which 21 were composed of..."

Line 228: Please add a reference to the dominance of the phytoplankton in this particular lake.

Line 311: if reference to figure 6d and 6e is made then SUVA should be mentioned first and then E2/E3 ratio to be consistent. Then you can say that it refers to those figures respectively.

Line 315: mean value in table 2 for Keszthely basin is 9.66 not 9.67 as it says in the text. Which is correct? Please review.

Line317: Do you mean with increasing distance from Zala River?

Line 317: remove "in" before the word similarly.

Line346: Change to "there were more than ten orders..."

Reference list: I have not checked the reference list. Line434: How does this statement connect with the data in this study: "previous studies have also found marked differences in the E2:E3 between natural waters..." Present the data from the study and then connect with what other studies have found. Line446: Remove "in" after Lake Balaton. Line450: change "sensitive" to sensitivity. Line456: Add: and, between the two ranges. Line530: change to "new approaches are needed..."

Tables 1 and 2: Is there a reason why values are stated as Max-Min instead of Min-Max? Consider changing to better fit with standard way of reporting such values. Figure2: the lines connecting data points for aCDOM seem to connect in a strange way or to be disconnected. Please review and fix. Figure 9: add to legend what "DC" refers to, dark control?

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