

## ***Interactive comment on “Spatiotemporal variability of light attenuation and net ecosystem metabolism in a back-barrier estuary” by Neil K. Ganju et al.***

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The manuscript presents an impressive data set for four locations in an estuary, including several useful variables/parameters. The data interpretation reveals some interesting results and conclusions, which are definitely worth publishing in Ocean Science. However, in some cases there seems to be over-interpretation, for example the difference in metabolic rates between vegetated and unvegetated sites. Also the data processing should be explained in somewhat more detail.

For the net ecosystem metabolism, sometimes NEM is used, for example in Figure 11, and sometimes Pn, for example in Table 1. Please use only one single symbol or

C1

abbreviation throughout the manuscript. Below a list with more detailed comments.

P6, L3 please define RBR D|Wave P6, L7 please define ADCP

P9, L2 “across sites across habitats” Modify piece of text? P10, L15 I would recommend not to use NPQ as abbreviation, as it is only used twice; the reader possibly has to search for it here.

P10, L19-20 “with the highest values consistently observed at CB11” I think one cannot state that, because the record at CB11 is far from complete; certainly the word “consistently” is misleading here.

P10, L20 “with lowest fDOM in the winter, possibly due to reduced biological activity” This does not sound like a good explanation. fDOM is not high during maxima of chlorophyll, which seems to indicate that it is not produced by biological activity. Moreover, the highest values seem to occur at site CB11, which receives most riverine freshwater.

P11, L14-16 “Light attenuation at site CB11, with its proximity to freshwater and nutrient sources, was highest overall and more highly influenced by chlorophyll-a and fDOM than at other sites.” This is hard to believe when inspecting Figures 2-5. Moreover, there is much less data available for this site than for the others.

P12. L13-14 “between May and October” My view of the figures says that this should be “between May and September”.

P12, L14 “during November to April” I was say “during November to March” P12, L19-20 “but instances of net autotrophy ( $P_g > R_t$ ) occurred nearly 70% of the time at the vegetated sites” When I view Figure 11, neither autotrophy nor heterotrophy are statistically significant. This should be mentioned here.

P13, L10 at 1-7 day P13, L23-24 “The peak in spectral density was 30% higher at CB03 than CB10” This is really hard to see, if at all, in Fig. 6. Possibly the authors could add a comment to Figure 6 (Diss Oxygen) that the curve of CB3 lies under the

C2

one of CB10.

P17, L26 where the canonical C:N (I suggest to add canonical, since this is the well-known Redfield ratio based on data from many locations)

P19, L1-2 "In fact, modest net autotrophy prevailed during the summer season at vegetated sites but not at un-vegetated sites." This does not follow from the data in Figure 11, where NEM is around zero all through the year. See also comment above. Actually I am surprised by the uncertainty interval of NEM, which should have been formed from subtracting two larger terms. Because of this, I would expect it to be clearly larger and not smaller than the uncertainty of both of the terms.

References P22, L4 The usual abbreviation is: *Limnol. Oceanogr.* P22, L7 What is this? Ref. No. [UMCES]CBL 04-105a? Report? P22, L23 The usual abbreviation is: *Estuar. Coast. Shelf Sci.*, P23, L16 change: *Fremantle* P23, L22 The usual abbreviation is: *Estuar. Coast. Shelf Sci.*, P24, L5 The usual abbreviation is: *Estuar. Coast. Shelf Sci.*, P24, L16 If the journal consists of one word, the full name should be given: *Biogeosciences* P25, L8 Modify journal name: *Mar. Ecol. Prog. Ser.* P25, L16 Add pages and doi: S3-S16. doi:10.1890/05-0800.1 P25, L23 The usual abbreviation is: *Limnol. Oceanogr.* P26, L7 The usual abbreviation is: *Limnol. Oceanogr.* P26, L16 Add volume and pages: *Mar. Geol.*, 404, 1-14 P26, L18 The usual abbreviation is: *Limnol. Oceanogr.* P26, L22 Use full journal name: *Biogeosciences* P27, L2 The usual abbreviation is: *Estuar. Coast. Shelf Sci.*, P27, L12 Please give more info on this publication; report, website? P27, L14 dito P27, L16 The usual abbreviation is: *Limnol. Oceanogr.* P27, L18 *Ocean Mod.* P27, L20 Please add page numbers

Table 1 Please spell out standard deviation

Figure 1 Please also define ADCP and CBWS . Figure 6 I think CB10 in red under the figure panels must be CB11 (unvegetated) Please indicate panels (a) – (d), and then also in the caption. Please explain the x-axis; in the main text the authors talk about "peak at 12.4 h", but this is not reflected in the figure.

C3

Figure 7 It is not clear to me how the oxygen saturation could be 130% in the middle of winter (e.g. at CB11).

Figure 9 Please indicate panels (a) – (d), and then also in the caption. Please explain what the bottom structures in the panels mean, and why the data are shown despite these structures.

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