Biogeosciences

Discussions

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Interactive comment on "Extreme Flood Impact on Estuarine and Coastal Biogeochemistry: the 2013 Elbe Flood" *by* Yoana G. Voynova et al.

Anonymous Referee #2

Received and published: 6 August 2016

GENERAL COMMENTS:

The paper by Voynova et al. aims at describing the effect of an extreme flood event occurred during summer of year 2013, on the biogeochemistry of the Elbe estuary and the adjacent coastal zone. The study demonstrates that a specific biogeochemical response of the Elbe system can be related to the large flood event by comparing biogeochemical data measured during three years (2012-2014) and confirms that the increasing frequency of this kind of phenomena in the future could strongly alter the current carbon cycle along the land-ocean aquatic continuum. Overall, the paper is well written and the work is detailed. However, I feel a number of revisions would be needed to improve its clarity. My recommendations are given below.

SPECIFIC COMMENTS:

SECTION 2.1: A map describing the study site should be added. This will help readers, who are not familiar with the Elbe coastal system, follow the study. Authors would also modify the existing Fig. 1. In this case, I would suggest specifying where the German Bight, the Wadden Sea, Zollenspieker and Geesthacht are located on the map. In both cases, I would also suggest specifying Büsum and Helgoland locations. Additionally, please specify in the caption of Fig. 1 what HPA, BSH, HZG and AWI stand for.

PAGE 5, lines 24-26: In Volta et al. (Volta et al., 2016. Regional carbon and CO2 budget of North Sea tidal estuaries, in: Estuarine, Coastal and Shelf Science), authors reported a very high average pH value ($\approx$9) at the Geesthacht weir during summer between years 2009-2011 and highlighted the uncertainty associated to this result. As a consequence, I am wondering if a pH>9.5, as reported in the manuscript, could be considered as a chronic condition for the riverine zone of the Elbe. Please clarify this aspect.

PAGE 7, lines 24-27: The drift of pH data is extremely large (Fig. S1). Please support the use of the method applied with literature. Mentioning if this method has been used before to correct biogeochemical drifted data will definitely strengthen the reliability of pH corrected data used in this study.

PAGE 9, line 16: Please specify which parameters influenced by biological production you focussed on.

PAGE 12, EQ. 1: Please explain better where this equation comes from (e.g. how many observed data have been used to obtain it?)

PAGE 14, line 4: It is unclear to me if data in Fig. 6 represent measurements in a specific location along the ferry transect or if they represent the average calculated over it. Please specify.

PAGE 14, lines 11-15: I would provide the R2 values relative to the linear correlations found between CDOM and salinity (Fig. 7). This would strengthen the result indicating

that there are no significant sinks/sources of DOC.

TECHNICAL COMMENTS:

PAGE 7, lines 25-26: The reference Aguilera, 2008 in the text is indicated as Aguilera, 2008b in the reference list. Please check.

PAGE 8, lines 18-19: Please remove "a" between "at" and "the surface".

PAGE 9, line 10: Please be coherent with the legend of Fig. 1. Does BAH AWI in the text correspond to AWI in Fig. 1's legend?

PAGE 13, lines 15-17: Please remove the " strong" referred to the linear correlation between TOC and salinity and between TSS and TOC.

PAGE 13, line 19: I think there is a missing "and" between "Cuxhaven" and "transport". Please check.

PAGE 14, line 27: I think authors mean Fig. 6, not 7. Please check.

PAGE 15, line 19: I think authors mean Fig. 9, not 8. Please check.

PAGE 19, line 19: I think authors mean Fig. 3, not 8. Please check.

PAGE 12-14: Please mention that these percentages refer to the Elbe.

FIG. 3: Please add a legend to specify what black, red and blue lines represent.

FIG. 4: Please add a legend to specify what black lines represent. Moreover, line colours for turbidity and sea level PSD are too similar. Please choose a different colour for turbidity.

FIG. 5: Please modify the legend and/or the caption to better explain what Cmax, Cmin, Hmax and Hmin stand for.

FIGS. 8 and 9: I think that x-axes should be labelled East (E) in both figures. Please check.

C3

FIGS. 11 and 12: Please specify that black lines in the right panels represent the FB transect in both figures.

FIG. 14: Please mention that data refer to the year 2013 in the caption.

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C4