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Biogeosciences Discussions

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

Anonymous Referee #1

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Review of Voynova et al. "Extreme flood impact on estuarine and coastal biogeochemistry: the 2013 Elbe flood"

This manuscript describes the effects of a large flood on coastal waters of the German Bight, with the broader relevance being that climate change is expected to lead to more frequent floods and thus it is important to understand their impact. This topic has been covered fairly extensively elsewhere for estuarine systems, but less so for the estuarine-coastal continuum. As such, it does add something new to the literature. I do have concerns that I hope the authors can address:

1) My main criticism has to do with the quality of the ferry-based data. For example, the authors discuss applying a correction to the pH data, which experienced drift. However, Figure S1 shows a much larger amount of drift than I was expecting. Quite honestly,

I do not feel that any form of drift correction will give me confidence in the usage of that data. I'd be inclined to tell the authors to remove the pH data altogether. Likewise, I believe that there needs to be more time spent on discussing the qa/qc procedures for the other ferry-based data, particularly D.O. and chlorophyll. The authors mention correcting the D.O. data. Did it experience drift of the magnitude that pH did? What were the procedures used to calibrate sensors (pre- and post-deployment)?

2) In regards to data presentation, I am perplexed as to why no discrete data is presented from the most critical time period, i.e., April-June 2013? It would really help to know what the conditions were like just prior to the flood.

3) The manuscript is generally well written and detailed in its analysis. I do feel as if it contains some analyses/text that are not fully relevant and could be removed to make the paper more succinct.

4) For example, much of the discussion on load calculations and residence time (bottom of page 12, all of page 13) seemed distracting from the overall message and rather drawn out. I suggest removing this section and just say somewhere that the residence time change from X to Y.

5) Much is made of an apparent deviation from linearity in the CDOM/salinity relationship (e.g., first paragraph page 15, third paragraph page 18). Yet I cannot see the non-linearity in Figure 7. Is it statistically significant?

6) Page 15, line 19- I think you mean Figure 9, not Figure 8.

7) The authors refer to loadings of particulate organic carbon throughout the ms, but did not actually measure this. Please rephrase or remove this, as it could lead a reader to believe that this was actually measured.

8) Figure 3 is fairly redundant with Figure 5.

9) I believe that the authors should spend more time on the longer-term effects of this flood, as that is a really exciting part of the story. For example, it appears to me that

the data in Figure 6 shows generally lower D.O and pH (even though I don't believe the pH data...) in 2014 compared to prior years. Could this be an artifact of the continued degradation of organic matter that entered the system during the 2013 flood? I believe that Paerl et al. 2001 observed these longer-term effects from a series of hurricanes.

10) Figure 8, x-axis labels longitude as "North". Should be East or West.

11) Figure 14, need to indicate year in Legend.

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