

Interactive comment on “Resuspension and estuarine nutrient cycling: insights from the Neuse River Estuary” by D. R. Corbett

Anonymous Referee #3

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The manuscript submission (Corbett) to the Biogeosciences Discussion, Resuspension and estuarine nutrient cycling: insights from the Neuse River Estuary (MS 2010-87) discusses the porewater and bottom water nutrient conditions associated with resuspension events in the NRE and is an important contribution and will be of interest to the estuarine scientists and readership of Biogeosciences.

Scientific Significance: The author has conducted a time-series study over several months at 6 locations at the NRE and has found that the advective sediment flux of nutrients (primarily ammonium and phosphate) into the overlying water is greater than the diffusive flux especially during times of year where wind induced advection dominates. The manuscript is an important contribution to the study of nutrient cycling in estuarine systems as it compares Fick’s law of diffusion and advective flux parameters for nutri-

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ents from sediments into the overlying water column, an important consideration when estimating the sediment impact on water quality. This information can be used by managers and scientists alike in nutrient reduction planning and decision making, since the stored and transformed nutrients in sediments during diagenesis must be considered as part of the nutrient input into overlying waters.

Scientific Quality: The quality of this paper is very good and it is clear that the authors conducted the appropriate methods and analyses to reach their conclusions.

Presentation Quality: The author’s have done a good job citing the appropriate literature in their introduction and background as well as stating their research aims. However, I found some of the methods to be limited in explanation. For instance, it seems since a large part of the research aim was to use radiotracers to measure the re-suspension of sediments as such, it is important to include how exactly this was done (even if a brief explanation) and not just use a simple reference to another paper published earlier by the authors. Furthermore, since Fick’s law was defined in the methods section, I find it equally important to include the mathematical relationships used to calculate the advective flux in this section. Currently, the advective flux relationships are not defined nor are they detailed in the methods section of the paper, however the diffusion calculations are explained in detail. Since the bulk of the conclusions rely on this advective flux relationship and the radiotracer measures, I find it particularly import to detail these portions of the work with the manuscript text.

Also the author references the use of “sensors” several times throughout the manuscript (e.g., pg 2778, ln 4) but what these sensors are and what they measure is not explained or detailed in the manuscript. Methods section page 2774 – Was the core sliced or centrifuged under an N₂ environment? If not, how could this have influenced the redox sensitive porewater species in this work? What was done to avoid any potential influences and what other published papers support this method of analysis?

Specific comments: Pg 2770, Ln. 26. Delete the “and” and insert a comma after

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“surface” and before “promoting” – Page 2773, Ln. 20. Delete the “s” on “Theses” – Page 2773, Ln 24. The NRE has already been defined (abstract and introduction) delete “Nuese River Estuary” and use the abbreviation only. – Page 2774, Ln. 7: include “over” or “along” between the words “subsectioned” and the “length of the core” so that the sentence makes grammatical sense. – Page 2775, Ln 17: delete the extra space after “timeframe” and before the “.” – Page 2776, Ln 11: insert a comma after the “However” and before “concentrations” – Page 2776, Ln 25: insert the word “bottom water” before mention of nitrates and nitrates in the last paragraph so that it is clear that you are referring to the bottom water and not the porewaters. – Page 2777, Ln 18-24 – Provide more detail concerning the radioisotope methods as it is not clear how sampling, measurement, or analyses was completed. – Page 2778, Ln 16. How low is the DO in NRE that you are referring to? Please provide data since DO is not included in any of the provided data tables. – Page 2780, Ln 24. Please provide a reference or measured parameter that documents that the sediment at the NRE are indeed anoxic and the cause for elevated ammonium concentrations. – Page 2782, Ln. 15. “camparative” should be “comparative”. Please fix. – Page 2796, Fig. 4: to make this figure more clear, I recommend that each of the panels be labeled as the specific ions being measured or by using A,B or C and referencing the letter in the figure caption. – Page 2797-98, Figs. 5-6: I believe these values are averages over the sampling period. Therefore the figure caption should state such.

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