

Interactive comment on “A Baltic Sea estuary as phosphorus source and sink” by Jakob Walve et al.

Anonymous Referee #2

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GENERAL COMMENTS: The manuscript by Walve et al. is a local study investigating whether the Stockholm inner Archipelago acts as a source or sink for phosphorus. They use a four-level box model based on observations to calculate the inflow and outflow of phosphorus to and from the study area as well as to calculate the retention of phosphorus within the area. The study is interesting and the manuscript is overall easy to follow.

SPECIFIC COMMENTS: The title is not specific enough, since it is a local study in a limited area and not valid in the entire Baltic Sea. The abstract is too long. It can be more concise. There are some text that would go under study site description and some text that is more of a discussion. The study is not put into a larger perspective, to what extent is this study interesting for the rest of the Europe or the World? Are there

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any more studies performed in the same way, and what do they show? Weaknesses and strengths in in those and this study? There are other studies of the retention of phosphorus in the same area as this study, which are mentioned in the manuscript, but what is new with this study. What is the new scientific question? It is not necessary to use too many abbreviations since it makes the text unnecessarily complex to read. One example is the abbreviation of the water layers, D, M, LS, US. The Conclusion section is too long and should be more concise. It is too much of a discussion in it. The last section in the conclusion is not even discussed anywhere in the manuscript. From where was this concluded?

TECHNICAL CORRECTIONS: P1, L12: what do you mean with the “greater” Stockholm Area. However, it can be questioned if the information about the sewage treatment plants should be in the abstract at all. P1,L18: “. . . bloom and is exported during winter. . . .” exported to where? From the sediment to the water or to outer areas? P1, L22-L24 The word “probably” makes it sound as it is a discussion part and not anything that is concluded. P1, L32 would the word “occurrence” fit better than “incidence”? P3,L5 It is a bit unclear what you mean with small and medium towns. I would assume that it is a question of definition which can be different in different parts of the world. What do you mean? P3, L25 Actually this is discussed in the study by Almroth-Rosell et al. (2015), full reference below. P4, L13-L14 What is the reference for the description of the area? P4, L18 DIP is already defined above sections. P4, L29 STP is also already defined in above sections. P6, L16 Should it be “S in Fig. 1”? P7, L2 “LS” is not defined in the text. P7, L17 K as in K in fig. 1 ? or why have K within parenthesis? P7, L27 In PEXP-MM, what does MM mean? P7, L31 In PEXP-BM, BM is not defined as well. P8, L2 The net import should be defined once if it is the import-export or the opposite, but it is by definition a net result, and the word “net” should not be included as well when it is written out as P import-export. This goes for the entire manuscript. P8, L2 “closely mirrors”, I am not sure that it can be seen so easy from the figure. What is the correlation coefficients? P9, L2 . . . Higher in. . . . Higher than what? This can be seen also in other parts of the manuscript. Please go through and check

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this. P10, L18 “closely mirrors”, correlates? What is the correlation coefficients? P11, L1 6b, do you mean 6c? Correct also at other places throughout the manuscript. P11, L22 change July to August? P11, L23 insert water at the end of the row: surface water P11, L29-L30 “Although among years.” Can be seen where? P12, L19 insert “negatively” in front of “correlated”. P14, L18-L31 I am not sure what you would like to say with this paragraph. Rewrite. P17, L1 Blomqvist et al. (2004) should be cited here, full reference below. P18, L26 “. . . . 1990 on. . .” Remove “on”. P30, L18-L20 in c) and d) and e) it should be clarified that it is in the inner archipelago and not at a specific station. P30, L23-L25 Here it should be said something about the two models shown in fig. 4b. P30, L26 Replace the first comma with “ of”. P31, L14 Replace “yearly” with “annual” P31, L24 No P-value? P32, L1 Replace “yearly” with “annual”

Fig. 1 The letters showing the different stations cannot be seen properly. They are too small and the contrast with the background is too bad. Fig.3 It is hard to distinguish the dots in the legend from each other. Make larger, and change color is one suggestion.

REFERENCES: Almroth-Rosell, E., Eilola, K., Kuznetsov, I., Hall, P.O.J., Meier, H.E.M., 2015. A new approach to model oxygen dependent benthic phosphate fluxes in the Baltic Sea. *J.Mar.Sys.* 144, 127-141. Doi: 10.1016/j.jmarsys.2014.11.007

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