

Interactive comment on “Phosphorus recycling in sediments of the Central Baltic Sea” by L. Viktorsson et al.

Anonymous Referee #3

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This paper is an excellent work presenting data on benthic phosphorus fluxes in the Baltic. The paper is very nicely prepared and written so my comments are brief.

Highlights of the manuscript include:

1) It provides data on benthic P fluxes in the Baltic, which is particularly impacted by phosphorus. This research adds to the surprisingly few published measurements of in situ P benthic fluxes at well-characterized sites either in the Baltic or over the whole ocean. A wide range of sites were examined in this study over the course of multiple expeditions. Some sites were revisited allowing a level of replication rare in the benthic flux research.

2) Benthic P measurements are used to update the overall P budget for the region and

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clearly show the dramatic impact of benthic P regeneration.

3) Benthic flux data is carefully and cautiously interpreted. The authors recognize the potential confounding effects of bottom type (erosional, transported, depositional) on P fluxes. The authors clearly recognize the potential pitfalls associated with interpretation of low P fluxes.

4) As has been observed in other studies, this study provides further data showing that the enhanced benthic P fluxes associated with sites overlain by anoxic bottoms involve mechanisms other than the reductive dissolution of iron oxide phases and the associated release of P sorbed to such phases. The explanation for enhanced benthic P fluxes seems to lie in processes associated with organic matter decomposition specific to anoxic environments.

Overall, the authors did a great job and this is a nice contribution. The only area I found difficult was the discussion regarding the correspondence between pore water DIP and dissolved Fe and Mn concentrations (Page 15471, lines 15-18, Figure 4). The claimed co-variance between dissolved P and dissolved iron and manganese is not at all clear from the figure. Compared to other pore water studies the correspondence in these sediments between dissolved iron and phosphorus is not that striking.

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