

Dear Editor,

I acknowledge the Editor for positive comments, which are appreciated.

Question. Given the shallow nature of the lagoon, do you think higher respiration might be another mechanism driving P release rather than just anoxia?

Answer: I am not sure I am understanding the question that is being raised here. If I am right the Editor asking whether greater P flux from sediments during transient night-time oxygen depletion associated with cyano blooms is due to (a) more favorable conditions for P release (due to anoxia), or (b) higher rates of P remineralization (via sediment OM respiration)?

Given the fact that lagoon is mostly freshwater, the sulphate reduction within sediment should be limited during hypoxic/anoxic events. Therefore, I think that ferric iron reduction via respiratory pathways is likely responsible mechanism for DIP liberation and further release from sediment to bottom water (Zilius et al. 2015).

However, I cannot neglect that DIP production within sediments also depends on aerobic respiration as shows correlation between O₂ and DIP fluxes ($r_s=0.37$, $p<0.001$, $n=135$) from our long-term benthic flux measurements in muddy area. While our recent study reveals that due to positive buoyancy cyanobacteria accumulation in sediments is likely limited (Zilius et al. 2018)

References

Zilius, M., et al. 2015. Phosphorus mobility under short-term anoxic conditions in two shallow eutrophic coastal systems (Curonian and Sacca di Goro lagoons). *Estuarine, Coastal and Shelf Science* 164: 134-146.

Zilius, M. et al. 2018. The influence of cyanobacteria blooms on the attenuation of nitrogen throughputs in a Baltic coastal lagoon. *Biogeochemistry*, 141(2), 143–165, doi:10.1007/s10533-018-0508-0.

Comment: Line 391-392 please check ref dates:

Answer: done. Here we cited:

Karlson, A. M. L., Duberg, J., Motwani, N. H., et al.: Nitrogen fixation by cyanobacteria stimulates production in Baltic food webs. *Ambio*, 44, 413–426, doi:10.1007/s13280-015-0660-x, 2015.

Woodland, R. J., Holland, D.P., Beardall, J., Smith, J., Scicluna, T., and Cook, P. L. M.: Assimilation of diazotrophic nitrogen into pelagic food webs. *PLoS ONE*, 8(6), e67588, doi:10.1371/journal.pone.0067588, 2013.

I would like kindly to know if my reply met raised question.

Sincerely,

Mindaugas Zilius