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Interactive comment on "Changing seasonality of the Baltic Sea" *by* M. Kahru et al.

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In this study, the authors clearly and convincingly demonstrate, using remote seining data, that climatic changes with resultant impacts on water column dynamics (temperature, wind speed, transparency) that have occurred since the late 1970's-early 1980's in the Baltic Sea region have led to significant changes in ecology, physiology and overall trophic conditions of the Baltic Sea proper. In particular, increases in temperature, combined with longer warm periods, coupled to decreases in wind speed shave significantly widened the "window" for surface-dwelling cyanobacterial blooms in the Baltic Sea. Interestingly, turbidity has increased as well during this period, most likely as a result of higher cyanobacterial production rates. In some respects this represents a positive feedback on the cyanobacterial populations as well, because as surface dwelling populations, they can circumvent higher turbidity in the water column and as a results this favors their competitive capabilities relative to eukaryotic phytoplankton

communities.

These are all highly significant and important findings that are worth publishing. The manuscript is well-written, data were thoroughly analyzed and (where possible) statistically tested. The results are clearly and convincingly discussed in the context of impacts of climate change on cyanobacterial bloom physiology and ecology. the results also have considerable management implications.

In the art line of the abstract the authors state: "The seasonality of a number of abiotic and biotic variables for which data are available has changed drastically during the last few decades. These changes are likely to have major effects on many aspects of Baltic ecosystems." What "ecosystems" are the authors referring to, or are that eferring to the Baltic Sea "ecosystem" as a whole?

P. 12, lines 10-20, the authors state: "The changes in the timing of Ked490 and CHL are related and reflect the increased turbidity and decreased water transparency in the Baltic Sea. An obvious consequence of the increased Ked490 is that less light reaches depths below the surface. While this analysis was done for the central Baltic with small areas of benthic photosynthesis, we can assume that benthic communities in the coastal areas must also be experiencing significantly reduction in light due to the decreased water transparency. We can hypothesize that the increased turbidity and decreased water transparency are related to increased phytoplankton concentrations and increased bacterial production. Likely effects on the rest of the ecosystem including commercially important fisheries should be further evaluated.' The fact that dominant cyanobacterial bloom genera in the Baltic Sea (i.e. Anabeana, Aphanizomenon, Microcystis are highly buoyant may play a relevant role in their ability to overcome recent higher levels of water column turbidity (much of it exerted by the blooms). This should probably be emphasized more directly here.

Otherwise, I have no major issues with or corrections to add to the paper and recommend publication with minor revisions. This manuscript will be broadly appreciated!

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Interactive comment on Biogeosciences Discuss., 12, 18855, 2015.

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