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Climate of the Past Discussions

Interactive comment on "Explaining interdecadal salinity changes in the Baltic Sea in a 1850–2008 hindcast simulation" *by* Hagen Radtke et al.

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1. Does the paper address relevant scientific questions within the scope of CP?

yes, clearly! fits into the main subject area of "theoretical and empirical studies of processes in and feedback mechanisms between all climate system components in relation to past climate change on all space scales and timescales" (https://www.climate-of-the-past.net/about/aims_and_scope.html)

2. Does the paper present novel concepts, ideas, tools, or data?

yes, investigations on the runoff contribution via a direct dilution effect are very interesting

5. Are the results sufficient to support the interpretations and conclusions?

very likely; however, the structure of the paper is not very easily grasped; therefore, it is difficult to decide if everything is consistent and conclusive

6. Is the description of experiments and calculations sufficiently complete and precise to allow their reproduction by fellow scientists?

not in every aspect, e.g. please provide more details on the significance analysis of the signals appearing in the wavelet decompositon/coherence analysis; have you considered the papers by Douglas Maraun (e.g. 10.5194/npg-11-505-2004) here?

7. Do the authors give proper credit to related work and clearly indicate their own new/original contribution?

proper credit to related work is only given fairly; in my opinion the overall literature work for the paper could be improved; there is a strong focus on papers that focus mostly on runoff as a driver; however, as the authors claim to explain the investigated interdecadal salinity changes and they also directly investigate on variations in saline inflows/transports and wind-induced mixing, their literature work should be more substantial on what is actually known about drivers behind salinity variations; spontaneously, I can think of works by Schimanke (e.g. 10.1175/JCLI-D-15-0443.1) and e.g. Gustafsson and Andersson (10.1029/2000JC000593); there is also work focusing on improving the conceptual understanding of major Baltic inflows and ultimately Baltic Sea salinity, but unfortunately these are published only as conference talks (e.g. 10.5281/zenodo.3536232 and 10.5281/zenodo.3567086)

8. Does the title clearly reflect the contents of the paper?

not really; the title suggests an analysis of variations in a hindcast simulation only, however, variations in observational records are also studied; furthermore, there are not really many satisfying explanations given, at least not in a conclusive and nicely summarized way; generally I think the manuscript would benefit from focusing on fewer

aspects, that should then be tackled more deeply

10. Is the overall presentation well structured and clear?

mostly; however, in my opinion the authors should better decide on what their actual research questions are; they open many boxes, but do not properly "close" them; the manuscript appears very unfocused to me

11. Is the language fluent and precise?

yes! practically no issues on that side

12. Are mathematical formulae, symbols, abbreviations, and units correctly defined and used?

yes! I did not check on every single item, but the authors follow the common standard

13. Should any parts of the paper (text, formulae, figures, tables) be clarified, reduced, combined, or eliminated?

for better focus, e.g. - leave out Figure 3, climate indices analysis, ... - extend "direct dilution effect" discussion/analysis, ...

14. Are the number and quality of references appropriate?

see question #7

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