Reply on RC2
Matthias Gröger et al.

Author comment on "Coupled regional Earth system modeling in the Baltic Sea region" by Matthias Gröger et al., Earth Syst. Dynam. Discuss., https://doi.org/10.5194/esd-2021-14-AC2, 2021

Coupled regional Earth system modelling in the Baltic Sea region

By Gröger et al.

The paper gives a comprehensive overview of coupled modelling systems applied over the Baltic Sea region. It covers a wide variety of coupling options between different parts of the earth system for example biosphere, atmosphere, cryosphere and ocean – and gaps and challenges which lies therein. The article has a good structure and is well written, I thus recommend it for publication.

We gratefully thank for a thorough review of our manuscript and appreciate the suggestions and recommendations that will definitely help to improve the manuscript.

General comments:

1) Though the article emphasizes its focus on the Baltic Sea region I still feel that other coupled models could be briefly mentioned. Amongst others the dynamical vegetation model FATES and the coupled system COAWST are state of the art model systems worth mentioning briefly in a review article as this.

Thank you for this suggestion. We agree that these models should be mentioned in our article even though they are currently used mainly outside the Baltic Sea region. We will do this in a revised version of the manuscript.

2) Regional coupled models at high spatial resolution are still very computational demanding and therefore sacrifices must often be made. I miss a section towards the end where this is discussed. In my opinion a setup that fits most purposes aren’t still computationally feasible, therefore one must consider whether the coupling is at all worth the computationally cost for the particular problem addressed. What is the authors opinion on such challenges?

Thank you for this comment. Coupled model can be indeed computationally very demanding and thus require many economical resources. This should be more emphasized in the manuscript. Hence, we will add a brief section discussing arguments for either coupled model or uncoupled models with respect to specific applications and scientific
Specific comments:

L32; double word "models"

We will correct this in a revised version.

L464+475+539; which data were used as initial and boundary conditions in the ocean? This must have effect on the results, i.e. also on how these then can be interpreted I assume?

We agree and will add this important information with note how results might be affected.

L475+539; Missing A in ERA40

Will be corrected.

L605–610; Perhaps mention ERA5 which has a much higher resolution, both spatially and temporal.

We will mention ERA5 and emphasize it’s higher resolution in this respect.

L736; double word "also"

Will be removed.

L837; The fact that the driving data in a stand-alone model may be at a coarser resolution compared to the interface in a coupled model can be mentioned here too. Thank you! We will mention this important effect.

L1144; Sentence is hard to read, consider to reformulate for better understanding

Yes, indeed. We will reformulate this sentence in the revised version.

L1168; Typo in "statistics"

Will be corrected.

L1255–1260; Several typos in the author contribution paragraph.

We will carefully revise this section and correct typos.