

## 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.

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.
- 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?

Specific comments:

L32; double word "models"

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?

L475+539; Missing A in ERA40

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

L736; double word "also"

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.

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

L1168; Typo in "statistics"

L1255–1260; Several typos in the author contribution paragraph