

Interactive comment on “Sea waves impact on turbulent heat fluxes in the Barents Sea according to numerical modeling” by Stanislav Myslenkov et al.

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The authors are grateful for your comments. “Wave modeling: . . .” We use calm conditions on the open boundaries. But we use a big unstructured grid which include all North Atlantic Ocean (waves do not come from south hemisphere to the Barents Sea, it is very far). On the North the ice fields is a nature boundaries. Therefore, our grid allows us to get correct estimates of wave climate in the Barents Sea.

“ COARE input: If I understood correctly” Yes, the wind input in the wave model and in COARE is the same: it is 10-m wind from CFSR reanalysis. “Heat fluxes difference: I found it interesting” Some analysis of these significant differences will be

C1

added to the text. Maximal differences between parametrizations are observed for the young sea state.

“Also, you recommend in the conclusion” The choice on neglecting or not neglecting the explicit wave account depends on the application. In climate studies operating with large time-scales and spatially and temporally averaged values (for example, in future climate modeling) the difference between parametrizations is small and the Charnock parametrization (which do not involve additional wave modelling) seems to be sufficient. On smaller time scales, for example, in weather prediction, the choice of parametrization plays a greater role. However, it is impossible to determine the best parametrization because there are no in-situ measurements of heat fluxes in those areas and those times, where heat flux differences in parametrizations are big. Available measurements shown on Fig.9 corresponds to situations when differences between parametrizations were rather small. Some explanations on this topic will be added to the text.

“Did you look at the momentum fluxes differences” In this paper, we focused specifically on heat fluxes, since Barents Sea is a “hot spot” in terms of heat air-sea exchange. However, we will add a few sentences on momentum flux at the end of the paper.

Technical corrections:

Line 147 : “a development” - OK.

Line 315 : do you mean “ and their detailed analysis would require an additional research” ? - YES

Line 354 : ‘ is significant and represents up to 16%’ - OK

Fig 9: it would be better to show that it is a discontinuous data, that the gap between observations can be easily seen on the figure. -OK

Line 411: “and difference between experiments are shown on” -OK

C2

Fig 10,11 : Do you mean “ sea ice represents more than half of the grid nodes” ? No. It mean that the sea ice in one node was in 50% of all time of calculations.

Line 424: fix typo ‘within -3 _ 2’ – OK. Line 483:” Experiments T1 and O2 increase everywhere the magnitude of” – OK.

Thanks for your work!

Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2020-1007>, 2020.