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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. Specific comments: "Based on the small differences. . ..Âż The conclusion that the impact of waves is small applies exclusively to the Barents Sea. This conclusion based on long-term calculations. Indeed, there are differences inside the Barents Sea, in some areas there is no influence, but somewhere more, but the maximum of 3%. Of course, heat fluxes depend on different parameters. The differences will be even smaller in the tropic or the equator regions, since there is a low storm activity. In the middle latitude (especially the southern hemisphere) the influence of waves on the heat fluxes probably will be more. However, we need to make a

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Discussion paper

long-term calculations to show the influence of humidity or temperature in similar wave conditions. We will add a comments on this topic. ÂńHow good are the WWIII. . .Âż The quality of our implementation corresponds to similar implementations of other authors. Correlation between model results and measurements data is 0.8–0.9, and the RMSE error is $\sim$ 0.3 m. There is very little direct measurement data. We can compare model results with satellite data to show errors. Since the scatter index of our version is 20-25%, then probably this value can lead to 2-3% errors in the final result in heat flux differences. ÂńThe number of storms per year. . .Âż Storms in the Barents Sea primarily come from the west with Atlantic cyclones. On this west side, the Sea is always open from ice. Reduction of ice slightly increases the number of storms which come from the north when the fetch in growing, but this is not visible in the long-term storm variability. Storms in the Barents Sea are more related to the Arctic Oscillation index. Cao events, on the contrary, are observed in the opposite atmospheric pressure situation – blocking of west-east transport. In theory, these graphs should not coincide. We will add comments on this topic. ÂńLines 388-402: It is interesting to note that the errors in calculation of heat fluxes dropped by more than 50% when the errors in reanalysis data (wind, temperature, humidity) are excluded. It points to the need of corrected reanalysis data product for a better estimate of heat fluxes. Enhanced in-situ measurements can help reanalysis data sets to overcome these bias. Surprisingly, the sensible and latent heat fluxes from different parameterizations are almost identical, even in high wind speed (or high Hs) cases.Âż Unfortunately, reanalysis errors are inevitable, especially in the Arctic, where there is little observational data to assimilate. However, we hope that these errors annihilate with a large time averaging. Small differences between parametrizations are explained by the prevalence of the developed sea state conditions, when all parametrization should behave well. For cases with young sea state difference in heat fluxes between parametrization reached 11% of the flux magnitude. Discussion of small differences between parametrizations will be added.

ÂńSection 3.3: The ship based observations must be along the cruise-track of ship. Mention how the reanalysis input data for different parameterization meth-

ods/experiments is extracted for a comparison with ship data. Any area averaging was considered?Âż CFSR and wave reanalysis were bilinearly interpolated (using 4 surrounding points) to ship location on every time step. No averaging was performed, since the reanalysis already has a rather coarse resolution and the values in its cells seem to correspond to the average value over the cell area. Figures 3 and 4: Yes, it is a Long-term average for complete year. “M” will be changed on “m”.

ÂńFigure 9: Time series of heat fluxes and significant wave heights are shown here. But, these measurements are not really continuous in time throughout. I suggest to have a break/gap in the continuous line joining data points when you jump from year 2005- 2007 (2nd to 3rd data point), 2007 to 2013, 2013 to 2015.Âż We understand the remark, we will correct it.

All technical notes will be corrected. Thanks for your work!

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