Response to Anonymous Referee Comments (RC2)

We would like to thank the Referee for reading our paper. We reply to their comments below.

This is a well-written paper on the ocean version of the WAVETRISK model worth publication. It discusses the equations being solved along with their spatial discretizations, the time-stepping module, the vertical diffusion and TKE closure, the penalisation of lateral boundaries, outline of the relevant algorithms, and finally numerical results against some standard test cases.

I was able to view the very detailed review of Referee # 1. I agree with his recommendations and suggestions. He has addressed every relevant issue worth mentioning.

We have replied to each of Referee 1's many comments in detail and made many modifications to address his comments and improve the paper. These edits are indicated in the revised version of the manuscript.

My only personal recommendation would be to add some convergence plots (to test the accuracy of the WAVETRISK model) and some scaling plots e.g. against the number of cores (to test the performance).

Since the test cases do not have exact solutions, it is not possible to present true convergence plots. Nevertheless, Section 4.3 confirms that the results for the upwelling test case are qualitatively similar when the resolution is increased. The convergence and error control properties of the adaptive WAVETRISK algorithm have already been extensively verified and quantified in our previous papers, for example in figures 14-17 (Dubos and Kevlahan 2013), figures 10-13 (Aechtner, Kevlahan, Dubos 2015), figure 5 (Kevlahan, Dubos, Aechtner 2015). The current barotropic-baroclinic splitting inherits these basic error control properties.

Similarly, Kevlahan and Dubos (2019) included a detailed evaluation of the parallel performance of the adaptive and parallelized WAVETRISK algorithm (see figure 4 and table 2). The current paper states the overhead associated with the splitting (3-30%), but the parallel scaling is not affected. In table 1 of the current paper we complement the previous scaling results with an evaluation of the computational performance of wavetrisk-ocean run non-adaptively compared with ROMS. This assesses the basic efficiency of the code.