Comments to the author:

To the authors,
Thank you for your thoughtful revisions and patience throughout the review process. Both reviewers agree that the revised version is ready for publication and therefore I am happy to accept the paper for publication pending a few small final revision (as can be found in the most recent round of reviews). Provided you can make these corrections in a timely manner, we can proceed with the publication process.

Best,
Alex Robel
Topical Editor, GMD

Reviewer 1:

The revision addresses all of my concerns and upon a second review I believe my initial assessment about the broad applicability of this work was not fully justified. I agree with the author's response that the highly detailed experiments especially the mix and match vertical mixing runs will be a nice baseline for other modeling centers to compare against. Further, the manuscript is well structured and well written. Thus I recommend this to be accepted.

I only have one very minor technical issue. In a few places, e.g. L458, the phrase 'OBLd is enhanced' is used. I would suggest deepens instead of enhanced.

We corrected this in the manuscript

Reviewer 2:

Second REVIEW of
" Assessment of the Finite Volume Sea Ice Ocean Model (FESOM2.0), Part II: Partial bottom cells, embedded sea ice and vertical mixing library CVMIX" by Scholz et al., 2021. In the revised version of the manuscript, the authors made significant progress and carefully addressed most of my questions/comments from the previous review. In particular, they provided some quantitative analysis which is summarized in the Table now. The authors also improved the quality of the Figures and Tables. I am satisfied with most of the replies provided by the Authors and I think that this manuscript can be published in JTECH after addressing a few minor comments which I provide below:

Minor Question:
1. (old question related to the Line 57:
Former Line 57: "implementation of embedded sea ice relies on the zstar vertical-coordinate option in FESOM2 and also on the fact that the sea ice component is called on each time step of the ocean model"

We refer here to the time step of the ocean model, not the sub cycled time
steps of the sea ice model. The shown model results use the standard EVP
method of Hunke and Dukowicz, 1997 using NEVP=150 subcycles. We will
consider using a VP solver, but only if we manage to make it as efficient as the EVP solver.

Ok. If so, I guess:
a) then that should be mentioned somewhere around line 57.

We added this to the manuscript.

b) Are 150 iterations enough? As far as I know, the last tendency is to increase the number of subcycle iterations up to 2000, since "Too small NEVP may lead to numerical noise (see, e.g., Bouillon et al., 2013; Lemieux et al., 2012; Losch & Danilov, 2012)" https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2018MS001485.
This should be discussed.

There is a publication of Koldunov et al. 2019 which deals with this topic in FESOM2. The outcome was that in coarse resolved configuration 150 subcycles can be sufficient, beyond that the ice model does not significantly improve anymore. However in higher resolved configurations (e.g. ~4.5 km) significantly more subcycles are necessary to converge to a satisfying solution.

Line 59: zstar-> z-star

We would like to stick here with the used notation of zstar, since we used the same in the previous publication.

Line 153-155 (Former Line 151):
"Furthermore, we limited the thickness of the partial bottom cell to be at least half of the full cell layer thickness to reduce the possibility of violating the vertical Courant–Friedrichs–Lewy (CFL) criterion."

I guess, your explanations should be included into this sentence, somehow. For example, mention that this limitation is for shallow regions only …

We added this to the manuscript.

Former line 265
Thank you for providing an explanation and, especially, for the volume transport figure. Actually, I like this figure very much and suggest including it into the Supplemental material! The inflow of the warm AW into Arctic Ocean is the key question in Arctic Ocean modeling and this result may be extremely useful for Arctic Ocean modelers.

Figures have been added to Supplementary.