

Geosci. Model Dev. Discuss., referee comment RC2 https://doi.org/10.5194/gmd-2021-293-RC2, 2021 © Author(s) 2021. This work is distributed under the Creative Commons Attribution 4.0 License.

## Comment on gmd-2021-293

Anonymous Referee #2

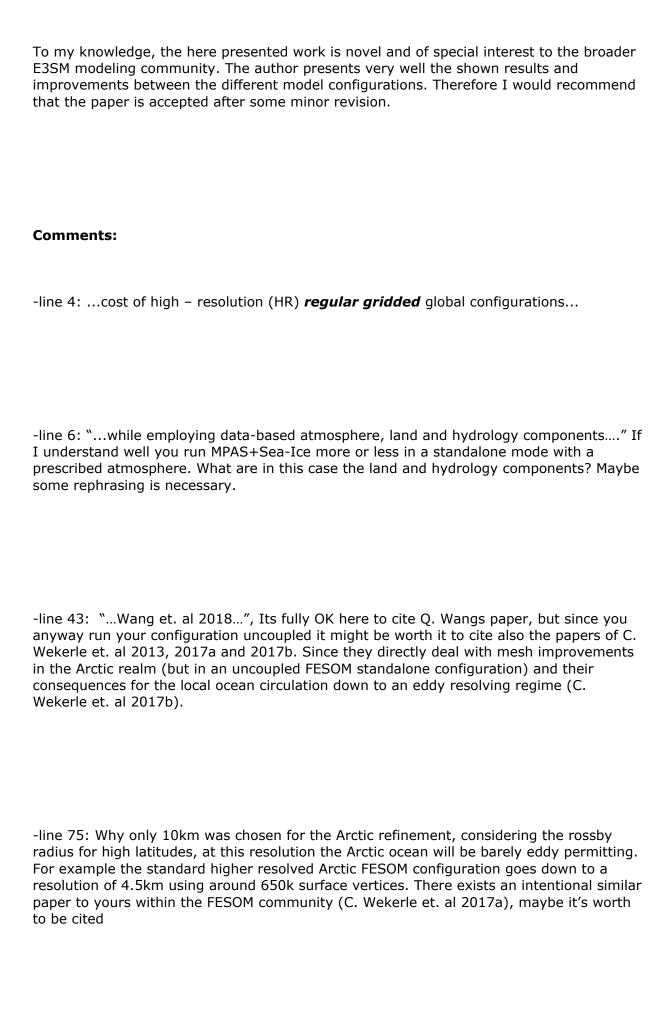
Referee comment on "An evaluation of the E3SMv1 Arctic ocean and sea-ice regionally refined model" by Milena Veneziani et al., Geosci. Model Dev. Discuss., https://doi.org/10.5194/gmd-2021-293-RC2, 2021

Review of: An evaluation of the E3SMv1-Arctic Ocean/Sea Ice Regionally Refined Model. by Milena Veneziani et al.

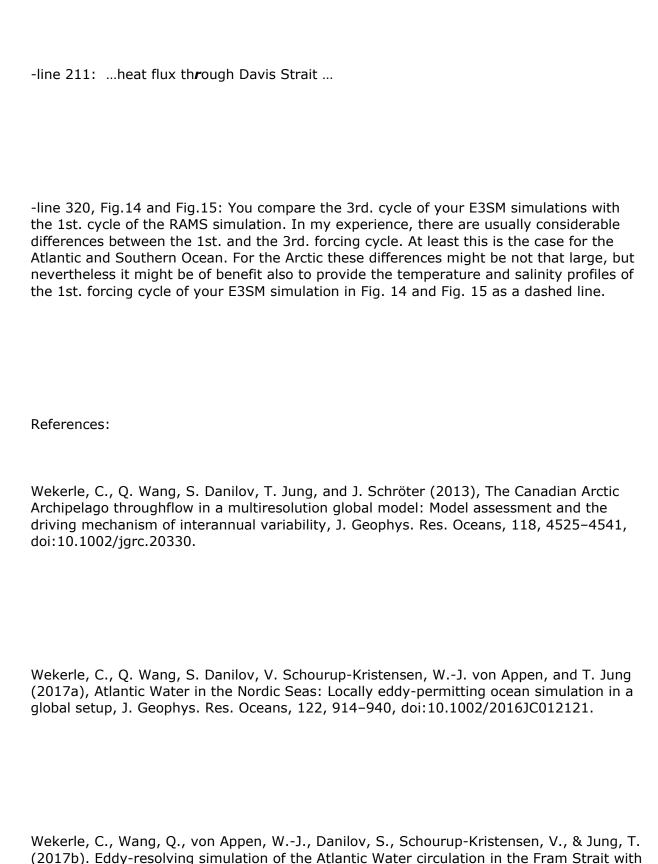
The manuscript compares the Arctic regionally refined E3SM configuration (E3SM-Artic-OSI) for the ocean and sea-ice in a stand alone mode using data-based atmosphere land and hydrology components.

The author carries out the comparison based on a variety of globally modeled but also Arctic ocean related quantities, such as AMOC strength, horizontal temperature and salinity biases but also vertical section of temperature and salinity of certain key features. Further the author focuses on the comparison of the exchanges through Arctic Gateways and the Arctic freshwater content between the higher and lower resolved Arctic E3SM configuration. Also the trends in the sea-ice components between both E3SM configurations have been thoroughly analyzed. A variety of observational derived data have been used to evaluate and classify the improvements in the E3SM-Artic-OSI configuration.

In summary it is shown that E3SM-Arctic-OSI significantly improves the simulated Arctic Ocean and sea-ice when compared to a less resolved Arctic model configuration (E3SM-LR-OSI). In particular the exchanges through the main Arctic gateways, Arctic Freshwater content variability and sea ice trends benefit from the refined resolution. Although other aspects like upper ocean stratification and sea ice thickness need further tuning as it is the case in other models as well.







focus on the seasonal cycle. Journal of Geophysical Research: Oceans, 122, 8385-8405.

https://doi.org/10.1002/2017JC012974