



EGUsphere, referee comment RC1
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Comment on egusphere-2022-957

Anonymous Referee #1

Referee comment on "Improving sea surface temperature in a regional ocean model through refined sea surface temperature assimilation" by Silje Christine Iversen et al., EGU sphere, <https://doi.org/10.5194/egusphere-2022-957-RC1>, 2022

This work describes two improvements to the assimilation of satellite sea surface temperature (SST) retrievals into a regional ocean model. The first is a bias correction scheme to make SST data from multiple providers more consistent before they are assimilated. The second improvement is an observation operator for passive microwave SST that correctly accounts for the difference in resolution between the measured and modelled SST.

The manuscript is well structured and results and methods are clearly explained.

I have only a few comments/suggestions:

L91: Could you elaborate on why the observational error is constructed to be dependent on the model background error in this way? I didn't find how the background error covariance B is modelled, but I imagine it has a very different spatial structure than the satellite SST error.

Sec. 2.2: I think it would be good to include a discussion on how IR sensors intrinsically measure the skin temperature and how their measurements are converted to sub-skin temperature for the different products. For most products this is done by the data creator, but for Sentinel-3A the conversion is done by the authors by adding a constant offset of 0.17°C . Since Sentinel-3A is subsequently used as the reference satellite, this simple offset could possibly degrade measurements from satellites that use more sophisticated solutions.

Tab. 3: Is it possible to include the metrics for the free model run in this table? The fact

that PWM2 is similar to the free model in terms of spectrum (L330) makes me curious to see how much the impact of assimilating with the supermod operator really is.

L263: Are the reduced increments for PMW2 compared to PMW1 not simply a result of the choice of the parameter alpha?

L270: Is the fact that PMW SST fills in the gaps of IR SST sufficiently represented in the performance of the combined experiments? If the comparison with satellites is using IR SST, it does not take into account situations where only PMW SST is available and you may be underestimating the performance.