We thank the reviewer for their responds and comments. Pleas find all answers below the comments. The revised manuscript also includes minor spelling corrections.

L37 - not sure what is meant by "sea ice is not directly measurable" suggest removing

Authors Response: removed in reviewed manuscript.

L111 - The statement "FB error is more accurate than sea ice thickness error" is unclear - do you mean the error is better constrained?

Authors Response: Yes better constrained is the correct term missing.

L121 - change to “how does the modeled sea ice thickness after assimilation of FB compare to SIT from a conventional…”

Authors Response: changed in the revised manuscript.

L209 - change to “ensemble of model forecasts/simulations”

Authors Response:changed in the revised manuscript.

Figure 2: I don't think Figure 2 provides any additional information to what is in the text. I suggest removing. In any case, Figure 2 says "3 months" around assimilation date, while L250 says "2 months".
Needs changing.

Authors Response: We corrected the figure text, but decided to include the figure as a visual aid.

L358-L360: reference to figure 6 & 7 comes before figures 3,4,5. Suggest reordering so figures are referenced in order.
L406: same for figure 8
L428: same for figure 9

Authors Response: We removed the references to the figures in the method section.

L445 & 463: what is meant by “the physical balance” ?

Authors Response: A model is basically a set of physical differential equations, if extra mass or energy is added (as is done in assimilation) the physical balance will be reestablished over time.

L455-459: I’m not sure that the increase in RMSE over time is just due to the seasonal cycle of sea ice area. In fact, I would expect the RMSE in summer to potentially be largest compared to other seasons (maybe this could be checked if the refRun extends into the summer). As you say, winter SIC errors are primarily coming from the ice edge, as SIC poleward of the marginal ice zone is going to be pretty close to 100% in the model and reality. Meanwhile the local SIC variability in summer can be very large, which the model will not necessarily be able to capture accurately. Also, there will be some amount of error growth in the refRun associated with model drift. I think this is worth mentioning

Authors Response: We agree that the RMSE is largest in summer. However, only winter month are displayed (November to March). The area with large summer RMSE is in November already covered by close to 100% SIC. The largest errors accrue in the Atlantic region. Here the ice edge gets longer through out the winter season. Editions were made to the manuscript to clarify this.
A longer (15y) SIC analysis of the background run, from which the refRuns, sicRun and fbRun are started, show that the SIC model drift is neglectable. It was calculated in comparison to OSISAF SIC.

L472: suggest changing to “the assimilation is working as expected”

Authors Response: We changed the sentence to “Any differences between the two data sets therefore indicate the impact of the here introduced FB assimilation in contrast to the method of directly converting FB to sea ice thickness.”. That the assimilation is working as expected is already shown in Figure 4.

L478-479: There will also be inherent differences between the two as DA computes a “best guess” based on observational and model uncertainty, while the observations are point

estimates.

Authors Response: That is correct. The point was to underline that two different methods were applied to the same data set and the aim is to compare the different results. The assimilation method is evaluated as a hole, including the calculation of the state estimate, not only from the point where the increment is added to the model. The paragraph was altered in the revised manuscript to underline this (including the changes due to the comment above).

Table 1: Do the correlation values correspond to the mean all grid point correlations?

Authors Response: For clarification the table text was changed to: "Monthly mean correlation coefficient and mean bias between the weekly AWI sea ice thickness (SIT) and FB and the fbRun SIT and FB for the entire assimilation period from 2018-01-01 to 2020-12-31. Only grid points covered by both the AWI FB data and the model were considered."