

Response to RC3:

Note that we quote the reviewer's comments and suggestions in red.

51: One reason why most MYI is in the Weddell Sea is that the gyre that transports MYI away from the coast to the north and northwest also transports in ice from the north and northeast. This is seasonal ice that gets transport into the Weddell, where it compacts along the ice shelf and Antarctic Peninsula and, along with less solar insolation and colder temperatures, allows that FYI to survive into MYI. This seems a salient point to make here as it is the mechanism to form MYI.

We will add a statement on that in the text: “In turn, seasonal ice is transported into the Weddell Sea from the north and northeast, can be pressed and compacted against the ice shelves and the coast of the Antarctic peninsula where it survives the summer and becomes MYI.”

90-92: No SSMIS sensor data are used?

After 2002, the preferred satellite instruments to be used are AMSR-E and AMSR2 as they have higher resolution than SSM/I and SSMIS. SSM/I was mentioned as it can extend the record backwards before the AMSR-E era. SSMIS can, of course also be used, and actually it can close the gap between AMSR-E (until Oct 2011) and AMSR2 (from July 2012). We will mention this here.

174: How is the “beginning of the cold season” defined? Is it the minimum total extent? But at the minimum, there may be regional gains and regional ice losses occurring (the minimum marks when the gains start to outpace the losses). Ideally, you would use the minimum at given grid cell or at least regionally.

(It is not feasible to define the beginning of the cold season grid-cell-wise (using reanalysis data), in particular as the drift correction is not grid-cell-wise but rather a neighborhood operation. This would also cause problems at the region boundaries if the beginning or the cold season were defined region-wise. Therefore we have chosen the time just after the seasonal minimum of the total Antarctic sea ice, which is the end of February. We will add some words on that in the text.

187: How accurate are the ECMWF 2 m temperatures over the sea ice? There are several coastal stations that I assume provide observations, but over the sea ice, the observations are quite sparse, with few buoys (compared to the Arctic). It is reasonable to use ECMWF as that is what is available and better than nothing. But I think a mention on potential uncertainty is worthwhile here.

Yes, we will mention this.

188-189: And likewise for the ice motions. Antarctic motions typically have higher errors because of the variability of the ice (flooding ice, etc.) and lack of buoy validation. Again, don't need to go into great detail, but a comment on the uncertainty would be helpful.

Here as well, we will mention this.

234-235: In what format are the SoD charts provided? It seems they are used here merely qualitatively. If they are just images, that makes sense. But if they are in some sort of data format (e.g., GeoTIFF), they could be used to do some quantitative comparison with the ECICE. And also, as noted below, they could be manipulated to consolidate the different ice classes into the main three with a clear color scale to more easily visually compare with ECICE.

We have used the maps (graphics files, PNG). Analysing this in more detail using the data in original SIGRID3 format is planned but would probably be beyond the scope of this paper.

236, Figure 2: This figure seems a bit odd and confusing to me. It seems like there are two SAR images overlaid on the ECICE image. But they overlay, so block the ECICE. Once can see some continuity, so the performance looks reasonable, but it seems odd to show only one figure with one or the other (SAR or ECICE). The ECICE color scale seems to have several more gradations than the 5 indicated in the legend. The legend color scale should match the colors plotted. It seems like creating a two-panel image – one with the ECICE and one with the SAR images and then overlay the contours on both – would be clearer?

We will consider modifying the figure along the lines suggested here.

239, Figure 3: I guess it is okay to have the SoD color scale in the Appendix – at least the authors acknowledge that it isn't legible in the figure. But ideally, a better color scale would be included/added to the figure. And it's clear that the SoD figure has more categories than the ECICE, so it is a bit hard to directly compare, though the overall patterns are clear. It would be more work, but if it were possible to actually take the SoD and create a custom plot with the SoD categories combined into the three ECICE categories, that would be quite helpful.

267, Figure 5: As for Figure 3, it would be nice to have SoD in a simplified form with all types consolidated into the three ECICE types and with a color scale legend provided with the figure.

As mentioned above, using the original data might be beyond the scope of this paper, but we will consider it. Note, however, that there is already one “color family” for each of the three ice types: pink/purple hues for YI, yellow/green hues for FYI, brown hues for MYI.

Minor Comments (by line number):

45: I've seen “snow-ice” with a dash to connect the two nouns and denote a unique type. But this is perhaps simply more of an editorial/style decision.

We use the convention to write a two-word compound without a hyphen, just like “sea ice”.

114: Typo, “cost” not “coast”

Yes.

174: Not sure why the ASI reference is given as a footnote? If that is The Cryosphere style guideline, I guess that's okay, but in my view, datasets should generally be cited as regular references.

(text)

We wanted to give the direct URL for the data on our server and also the reference to the PANGAEA data set. and avoid lengthy parentheses.

346: It seems like the chart color legend (Table A1) should be after the beginning of the Appendix text? But as noted, it would be helpful to create a new legend that combines the relevant classes into the three main types for the figures in the main text of the manuscript.

Figure placement has to be straightened in the final version any way...