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Discussions

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Interactive comment on "Mapping and Assessing Variability in the Antarctic Marginal Ice Zone, the Pack Ice and Coastal Polynyas" *by* Julienne C. Stroeve et al.

Anonymous Referee #3

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The manuscript examines the variability and trends of Antarctic sea ice in three categories: pack ice, marginal ice zone and coastal polynya derived by Bootstrap and NASA Team algorithms. Authors show that the differences in trends and variability between these two datasets are quite large for pack ice and marginal ice, even though the differences in the total extents are relative small. The details within the ice pack is quite essential for the atmosphere-ocean-sea ice interaction, as well as biological studies, such as the study on snow petrel presented here. The manuscript reveals an important fact that satellite observed sea ice concentration can contain large errors and biases, and should be used with caution. I think that the study contains valuable information for polar community. However, I see some places need to be clarified. In general, the

manuscript is rather tedious. Authors should reduce the discussions on insignificant results and focus on important and significant results. It is worth to be published after a minor revision.

The research represents an original effort to evaluate SIC quality by comparing two datasets in marginal ice zone and pack ice. It fits well the scope of TC. The methodology is sound and conclusions are sufficiently supported by analyses. However, the title is not quite accurate. The study cannot conclude on the trend and variability of MIZ since the discrepancies between two data products are quite large. The manuscript focuses on the discrepancies in MIZ, pack ice and coastal polynyas between data products. The title should reflect on that.

Technic/editorial issues.

Figure 3. It would be helpful to add longitude lines to separate the different regions. In addition, bird study areas also need to be marked in this figure.

Line 306-317. The figure 7 needs some clarification. Is the expansion and contracting of outer ice edge relative to a zonal mean? If it is the case, what is the zonal mean of MIZ, in consideration of that the zonal mean pack ice is the mean of 85% and outer edge is the mean of 15%?

Line342. Insert "area of the" or "extent of the" before pack ice.

Line 371, "While the sign of the Ross Sea sector trends from"

Figure 9 need some work. It would be very helpful if authors add contours of a confidence level in figure 9 so readers can see where and when significant trends occur. All x-axis and y-axis labels need to be enlarged, so they are visible.

Page 10, There are many detailed discussions and the key results don't stand out. Authors should focus on the significant trends and their implications.

Page 11, section 3.2.3. Authors need to explain how figure 10 is calculated. It should

be seasonal mean and zonal mean, right? In addition, it would be nice to comment on whether the results derived from the width are consistent with or different from the results from ice extent/area presented in the early section.

Line 507. Please define "AIC".

Page 13, Discussion. It is very clear that SIC derived from these two algorithms has large differences within the ice edge. To readers who use SIC for various studies, it is very important to know which product is more suitable for their need. It would be useful if authors could comment on whether there are other independent verifications? The snow petrel study is an excellent example. However, it is only related to the packed ice.

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Discussion paper