

Interactive comment on “The Arctic sea ice cover of 2016: A year of record low highs and higher than expected lows” by Alek A. Petty et al.

Anonymous Referee #2

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Petty et al. revisited the unusual 2016 Arctic sea ice conditions by looking at the Arctic sea ice area (SIA) and extent (SIE), the compactness (SIA over SIE), the concentration budget (the ice intensification and ice divergence), sea surface temperature, and weather conditions. Comparisons were made with the 2000-2015 climatology. When calculating SIA and SIE, they evaluated the differences caused by different averaging methods and retrieval algorithms. They demonstrated that the choice of the averaging method could cause differences as large as the choice of retrieval algorithm. Although SIA and SIE differ with averaging method and retrieval algorithm, they show in common that the sea ice low anomalies at the start of 2016 did not translate low anomalies in summer. However, a record low of sea ice compactness was seen in summer 2016, which was likely caused by the two cyclones entering the Arctic Ocean in August. The

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location and strength of the cyclones made them not able to melt out the sea ice and create a record low summer SIE.

The study has the potential to contribute to the understanding of the unusual behavior of Arctic sea ice in 2016. I suggest several revisions as follows.

1. L19, P1: Shouldn't the 'compactness' be sea ice area over sea ice extent, not only 'the estimates of sea ice area'?
2. L21, P2: The statement of 'a new record low September Arctic SIE was not suggested by the SIO in 2016, despite this strong winter/spring preconditioning' seems not objective enough without mentioning whether these models in SIO could successfully predict the winter/spring preconditioning as strong as observed.
3. L30, P3: The study only used Bootstrap SIC data for the year 2016. Is it because the NASA Team data was not available? Please clarify.
4. Section 2.2 lacks details of how the ice drift data will be used in the following study.
5. L1, P8: From the Figure 3, it is very difficult to see the differences in SIE between the NASA Team and Bootstrap data. The differences should refer to Table 1 instead.
6. L23, P8: This paragraph seems subjective. Any literature review on quantifying the differences between the two products from the perspectives mentioned in this paragraph?
7. L3, P8: Suggest replace 'methodology' with 'averaging methodology', and 'algorithm' with 'retrieval algorithm' for readability. This could apply to the whole paragraph.
8. Suggest the authors be more careful with delivering the results. For example, in Line 13, Page 10, negative anomalies in the Bering seas are seen in Jan, not obvious in Feb and Mar. And positive anomalies in the Labrador Sea and the Sea of Okhotsk are not clear with the black sea ice edge lines. Another example is in line 11, Page 11, strong positive anomalies are seen in the Chukchi Sea in both November and December,

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which is not consistent with the statement of 'the autumn SIC anomalies are mainly negative'.

9. Line 26, Page 10: a similar pattern to what pattern?

10. Section 4.4: All the referred Figure 10 should be Figure 11.

11. L24, P14: This sentence is confusing.

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