

## ***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 #1**

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The Arctic sea ice cover displayed some unusual behavior in 2016. This submission explores a number of issues associated with this behavior. Part of the paper is devoted to a straight review of the year, while other parts delve into more scientific components. I think the mix works well. In a bigger picture it also present a detailed analysis and comparison between the main data sets usually used for Arctic ice studies. and how the choice of sets can, in some cases, affect the specific of conclusions. The authors present informed and careful analyses, and explain the associated uncertainties.

The has a strong potential to contribute substantially to the relevant literature. I suggest revision in accord with the points aired below.

Page 2, l 7: As part of this survey include recent analysis of Simmonds 2015 - Comparing and contrasting the behaviour of Arctic and Antarctic sea ice over the 35-year

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period 1979-2013, Ann. Glaciol., 56(69), 18-28.

Page 4, line 17: NSIDC have recently released Version 3 of the sea ice data set analyses; see A. Windnagel, M. Brandt, F. Fetterer and W. Meier, 2017: Sea Ice Index Version 3 Analysis. NSIDC Special Report 19. National Snow and Ice Data Center, 80 pp. <https://nsidc.org/sites/nsidc.org/files/files/NSIDC-special-report-19.pdf>. The new version, and the reasons for it, are pertinent to some of the discussion (of differences) in the present investigation. Comments should be made (perhaps later) on this matter.

P 6, ll 21-23: Please to make a few brief words in connection with the use of the (new) MERRA-2 reanalysis, and how it compares with Version 1 of Rienecker, M. M., et al. (2011), MERRA: NASA's Modern-Era Retrospective Analysis for Research and Applications, J. Climate, 24, 3624–3648. Of relevance to the present investigation make mention, in particular, of the assimilation of satellite obs. not used in MERRA and the improvement in representations of the cryosphere.

Page 13, lines 27-28: We need some references here and quantification. Suggest referring to Montiel F, Squire VA (2017) Modelling wave-induced sea ice break-up in the marginal ice zone. Proceedings of the Royal Society A 473: 20170258 doi: 10.1098/rspa.2017.0258 and Kohout AL, Williams MJM, Toyota T, Lieser J, Hutchings J (2016) In situ observations of wave-induced sea ice breakup. Deep-Sea Research Part II, 131: 22-27 doi: 10.1016/j.dsr2.2015.06.010.

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Interactive comment on The Cryosphere Discuss., <https://doi.org/10.5194/tc-2017-207>, 2017.