

Interactive comment on “Satellite Passive Microwave Sea-Ice Concentration Data Set Intercomparison: Closed Ice and Ship-Based Observations” by Stefan Kern et al.

Anonymous Referee #1

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Reviewing Satellite Passive Microwave Sea-Ice Concentration Data Set Intercomparison: Closed Ice and Ship-Based Observations by Kern et al.

General comments: This paper aims to establish a reference by comparing 10 different sea-ice concentration data sets and derived products without ranking them. This is a novel effort and highly worthwhile since many different algorithms are employed to derive sea-ice concentration from an array of space-borne passive microwave sensors resulting in slightly different geophysical values and therefore different individual strengths and weaknesses.

The study is well researched and sufficiently justified, the methodology scientifically

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sound and the discussion thorough and comprehensive. The paper is presented in clear language, even though the referencing of ten products, which are sometimes grouped (and not always in the same groups), does not make it an easy read as such.

I am satisfied the paper will be of high impact meets the expected standard for publication in The Cryosphere and am happy to recommend acceptance with only a few and minor editorial changes (outlined below).

Technical corrections: l. 15: [...] retrieve SIC [...] : remove 'the'; l. 43: [...] covered *by* sea ice [...] ; l. 90ff: reference is made to a second paper of a series (of which this paper under review is the first), which will focus on Arctic summer sea-ice conditions. I'd be hoping that a similar effort may be applied to Antarctic summer conditions; l. 105 [...] After Table 2 [...] : this is awkward language. Following Table 2?!? l. 133 too many commas before and after 'Version X'; l. 142 replace 'It roots on [...]' with 'It originates from' or 'It stems from'; l. 167-176 please rephrase the paragraph; plots don't reveal and don't take information from a figure. Plots and figures show/display data that show or reveal ... ; l. 273 [...] an impression of [...] not 'about'; l. 313 and l. 355 [...] 1980s and 1990s [...] not 'nineteeneighty-ties'; l. 331 and l. 339 don't refer to place names (that is 'proper names') in bulk: Greenland Sea and Barents Sea Ã as well as Pechora Sea and Barents Sea; l. 335 and l. 338 and l. 372 the reading would benefit from stating 'differences exceeding -10%' ... I think I understand what is meant by writing 'differences of < -10%' but it appears confusing Ã see l. 376 for a clearer phrase; l. 385 Weddell Sea and Ross Sea; l. 393 remove 'a' : [...] caused by too aggressive [...] ; l. 434 and l. 438 is 'the last but one bin' actually 'the second last bin'?!? l. 453 The figure does not confirm. A figure shows data that confirm. . . ; l. 485 replace 'remark' with 'note'; l. 494ff. see 'last but one bin' comment earlier; l. 508-509 This behaviour [...] echoes [...] ; l. 546 and l. 549 it is either the track of one ship (the ship's track) or the tracks of many ships (the ships' tracks); l. 553 [...] we can not rule out [...] instead of 'exclude'; l. 578 and l. 579 refer to '1' as the 'identity line' - makes it easier to read; l. 590ff 'in' time 'for' a region ... not 'for winter' etc. ; l. 602ff Figure

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15 shows results of binning ... in red symbols ... etc. ; l. 604 This step is motivated by the notion outlined in [...] ; l. 609 add a note to 'the black ones' – I presume it's un-binned data?!? l. 613 For the Antarctic, [...] ; l. 624 Like for the Arctic [...] ; l. 627 [...] distribute symmetrically [...] ; l. 633 and l. 634 refer to '1' as 'the identity line' ; l. 647 Inter-seasonal [...] for the Antarctic (I think?!?) ; l. 682 [...] are also shown in our Fig. [...] ; l. 693 [...] by a particular algorithm [...] ; l. 711 For the Antarctic, [...] ; l. 712 [...] In September [...] ; l. 721 In September [...] ; l. 727 Data presented in Figure 6 through to Figure 11, [...] ; l. 733 Fig. 1 and Fig. 2 illustrated [...] ; l. 734f [...] Potential users should [...] ; l. 739 [...] Here, we are interested in both the temporal [...] ; l. 796 [...] both Arctic and Antarctica in [...] ; l. 800ff and l. 816 and l. 745 'for' a region (see above) ; l. 855 [...] intermediate [...] (no hyphen) ; l. 891 introduce acronym 'GCOS' ; l. 913 [...] by too aggressive [...] ; l. 925 [...] as long as one [...] ; l. 928 [...] worth to start reconsidering this threshold [...] ; l. 1078 [...] obtained with NT1. NT2 is [...]

References:

I did not find any reference to Heygster et al (2019) but it's listed in the references; I did not find any reference to Meier et al (2017) but it's listed in the references;

l. 1273 wrong DOI, should be [...]L081565

Figures:

l. 1369 Fig. 3 [...] In each panel, the modal [...]

Figure 6: clearer labelling of the panels would assist the reader: 'a) SIA winter', 'b) SIA summer', 'c) SIE winter' and 'd) SIE summer';

l. 1385 [...] for the Arctic winter (March 2003- [...]

Figure 8 – see comment for Figure 6;

l. 1391 [...] for the Antarctic winter (September 2002- [...]

I. 1394 [...] Same as Fig. 9, but for Antarctic summer (January 2003- [...]);

Figure 11 would benefit from a clearer structure of the panels. While all the information is provided, it is difficult to find. Clearly label the columns 'SIC', 'SIA' and 'SIE', first row 'Arctic winter', second row 'Arctic summer' third row 'Antarctic winter' and fourth row 'Antarctic summer'

Figures of Appendix G: the labels and individual panels of the figures are too small to legible. I believe panels a) to l) are January to December but the marks of rows and columns and the actual values are illegible in print.

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