

L. Istomina, G. Heygster, M. Huntemann, P. Schwarz, G. Birnbaum, R. Scharien, C. Polashenski, D. Perovich, E. Zege, A. Malinka, A. Prikhach, and I. Katsev: **“The melt pond fraction and spectral sea ice albedo retrieval from MERIS data I: validation against in situ, aerial and ship cruise data”**

2nd Review

A big thanks to the Authors for putting a lot of effort in this paper, splitting it up, and clarifying open questions. The result is a very nice study on a new melt pond algorithm, and gives a very detailed validation study which allows also an insight of available (very precious) field data.

After reviewing the manuscript a second time, my suggestion is that the **first part** of the split publication (“The melt pond fraction and spectral sea ice albedo retrieval from MERIS data I: validation against in situ, aerial and ship cruise data”) will be ready for publication after some minor corrections / suggestions:

Minor issues (I part):

Title: Missing comma – change to: The melt pond fraction and spectral sea ice albedo retrieval from MERIS data I: validation against in situ, aerial, and ship cruise data

P.3, l. 7-9: please rewrite the sentence. Or just split it up in 2 sentences.

P.3, l. 9-11: the need is the knowledge of the albedo and the MPF – not a satellite retrieval. With a satellite retrieval you can solve these question and gain a dataset. Rewrite to make it clear.

P.3, l. 22 delete the “new” (if somebody is reading the paper in 3 years the algorithm isn’t new anymore)

P.3, l.24: replace “other” with “previous developed”

Chapter 2 or somewhere else (e.g. Conclusions): I miss a little bit the discussion on submerged ice. It occurs quite often in the pack ice due to ice dynamics, and the spectral response is like melt ponds....of course for the albedo, it makes no difference, but for the MPF. It would be nice if the submerged ice is mentioned here. This can also lead to the weak validation results for MPF.

P. 7, l.28/29: change to “the clouds have a lower albedo than the bright surface and may be seen as melt ponds....”

Chapter 3.2: Albedo validation was only performed on FYI. Please discuss this and the differences that may occur for MYI

The second part (“The melt pond fraction and spectral sea ice albedo retrieval from MERIS data II: case studies and trends of sea ice albedo and melt pond in the Arctic for years 2002-2011”) is weaker in terms of language and content (see minor issues below). But overall, also the 2nd part has potential for publication, at least in combination with part I

The authors refer at least 2 times to a follow up publication, which is not really necessary, or otherwise the reader is asking, why the follow up publication is not included since the paper has only 27 pages in manuscript format.

I want to emphasize a revision of the language, since I have for sure not found/marked all faulty expressions.

Minor issues (II part):

Title: change pond to ponds

P 1, l 15: sea ice albedo **on** spatial....

P 1, l 17: to **air surface temperature reanalysis data**,

P 1, l 24: of both, MPF and Albedo:

P 1, l 24-25: please formulate a proper sentence.

P 2, l 9: **where** 96 % of the ...

P 2, l 11-12: context of **a** changing Arctic due to **the** sensitivity.....for **the** global climate

P2, l 14-15: The maximum this year was in February!

P 3, l. 3: Use “This publication” instead of current work

Be consistent: write either MPF or melt pond fraction (line 7, p. 3)

P 4, l 4: delete one .

P. 4, l. 9, l. 13: avoid ()cloud covered regions with up to 80% cloud cover throughout the year....

P. 4, l. 21: the results **are** presented

P. 5, l 16: change to: MPF decrease due to freezing and snowfall events.

p 6, l 6. If you label the lines in the figure properly you can avoid the parenthesis here in the text.

p. 6 l 18, melt pond formation **followed by a** rapid drainage

p. 7 l. 3: evolution of melt **ponds**

p. 8, l 17-19. The explanation is not clear – please reword the sentence

p. 8, l 22f. The Meris MPF algorithm produces 10-15% bias as far as I understood. Please clarify it here.

p. 8, l. 26 delete one “that”

p. 8, l. 30 date format – please be consistent throughout the manuscript

p. 10, l. 7, which affects

p. 10, l. 12, Please formulate in proper sentences and not in enumerations (it will be easier for the reader)

Chapter 3.3 Trends: I miss here the discussion of Figure 8 (significance)....

References (p 14):

l. 16: check DOI

l. 17: Mäkynen, Rösel (correct spelling of author's names!)

l. 19: give the doi, not a link!

p. 15, l. 14. Delete "Received"

Figure 1, p. 16, l 4: ")" is missing

Figure 2; p. 17, label FYI and MYI!

Figure 4; p. 19, l 3: of weekly **MPF** averages