

Interactive comment on “The color of melt ponds on Arctic sea ice” by Peng Lu et al.

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Dear Peng Lu and co-authors,

Thank you for your contribution. I am interested in receiving your response to the reviews. I have provided some additional comments below. At this stage I have not checked the paper for continuity. I do note that the paper is well written and English clear (thank you), and as I expect you will make some substantial revisions to the paper I am holding off on a through proof-read until after revision.

Please consider another paper in the Cryosphere Discussion that is on the topic of reflectance of melt ponds. I would be very interested in your opinion on the complimentary nature of your work to this. You can find the paper at <https://www.the-cryosphere-discuss.net/tc-2017-150/tc-2017-150.pdf>, or I can send you a pdf if you need.

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In general, please check that you are citing the original source of information. Was Polashenski and Perovich (2012), line 15, page 2, the original source of the 7 stage model for albedo evolution in summer? I recall Hajo Eicken and Don Perovich talking about this much earlier.

I am curious, could your model be extended to clear skies with non-diffuse illumination? Would this allow you to identify the thickness of ice under melt ponds from satellite imagery such as provided by MODIS? Is this inverse problem one you considered? How much influence does assuming overcast skies have on the comparison with in-situ observations. Did you only consider the sub-set of overcast data in the comparison, or does this include data for all skies?

In the figure captions, I assume "true color" refers to the modeled color of the melt pond. Can you clarify.

I had some difficulty in following your discussion on retrieval of ice thickness from pond color. I feel you need to clarify the discussion as to the parameters that confound the inverse solution. It would help to provide the evidence for this. In particular the paragraph on lines 10-15, page 12, is vague what the competing parameters in the sky and ice conditions are and how they counteract each other such that it might not be possible to find a single solution based on meltpond color. Given you are justifying the value of your work based on the possibility of developing ice thickness products from satellite and camera observations I feel this needs to be addressed much more carefully in your analysis and discussion.

Please consider acknowledging those who collected the data you use in this study.

Looking forward to your response, Jenny

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