

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

Anonymous Referee #1

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This manuscript presents analysis of the spectral properties of shortwave radiation backscattered from melt ponds found on Arctic sea ice during summer. The information presented is well organized, easily readable, and clear. The subject should be of interest to readers. I have only a few minor comments, mostly technical in nature.

p. 2 line 33 photo in Fig 1 shows various evolutionary stages of ponds? not sure there is 'evolution' shown in this image. Rather, this seems to me to be a fair representation of the variety of melt pond colors often seen in a particular view, however, I see no reason to infer this field represents time-dependent changes.

p. 5 line 7 "two-dimensional representation works"— would be helpful to add a bit more information here— does the 2D representation completely describe the light field? Better to say that than 'works'.

p.10 line 12 "optically isotropic" is not the same as "isotropic scattering" line 14 same

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question line 16 pond water 'clear with regard to its optical properties'? not at long wavelengths! p. 10 line 25 subjects' p. 14 line 2 superliner? not sure 'superliner' means p. 14 line 7 -9 I expect the reason that agreement is better for thin ice is not necessarily associated with ice topography and horizontal homogeneity assumptions of the model, but rather that thinner ice has less optical thickness. With dark ocean beneath, the thinner domain shows better discrimination as light at some wavelengths simply doesn't get backscattered, and that wavelength cutoff varies quickly with optical thickness.

Fig 2 relatively little information content here Fig 4 why does pure bubble-free ice have higher absorption than sea ice? sea water really has higher absorption than ice? These relative values surprise me, so I think they merit some comment in the text.

Interactive comment on The Cryosphere Discuss., <https://doi.org/10.5194/tc-2017-117>, 2017.

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