

Interactive comment on “Sunlight, Clouds, Sea Ice and Albedo: The Umbrella Versus the Blanket” by Donald K. Perovich

Anonymous Referee #3

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The manuscript presents an insightful analysis on the role of sunny and cloudy skies in the surface radiation budget as the albedo seasonally evolves. The effect of changing sea ice conditions on the net radiative flux was investigated by comparing sea ice conditions in the Beaufort Sea in 1998 and 2007. The main findings demonstrate that sunny skies had a lower net radiation flux in May and September, while cloudy skies had a lower net radiative flux in June-August in 1998. For 2007, cloudy conditions had a smaller net radiative flux than sunny conditions in June-September due to increased melt pond and open water coverage. The results are informative to the sea ice and broader communities, and hint at the changing sensitivity of the sea ice cover to atmospheric conditions and its feedback on the surface radiation budget in a changing Arctic system.

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The manuscript is well-organized, the methodology and assumptions clearly described and justified, and the conclusions well-supported by the results. Please find suggestions below that I hope the author will find useful:

Pg. 1, Abstract: Similar to the comment for the conclusion, it would be helpful to include 1-2 sentences describing how the results relate to the broader picture of sea ice-atmosphere interactions in a changing Arctic.

Pg. 1, Line 12: Which four months?

Pg. 1, Line 25: Typo here and throughout the text for "Intrieri."

Pg. 3, Lines 8-9: "It was challenging..." How sensitive are the zero net and break-even albedo values to 24 hours of slightly vs. highly variable conditions?

Pg. 3, Lines 10-16: It would be useful to include the cloud cover and type if that information is available.

Pg. 3, Line 16: Typo "to check."

Pg. 3, Line 19: Please enumerate all equations.

Pg. 3, Line 27: Typo in "fall."

Pg. 4, Table 1: Although it's already described in the text, it would be helpful to include a brief sentence in the table caption explaining "na."

Pg. 8, Line 17-18: Please clarify "In 2007,... bare ice."

Pg. 10, Conclusions: It would be helpful to expand on the implications of the results here. How do they relate to the big picture? What was learned by comparing the 1998 and 2007 sea ice conditions?

Interactive comment on The Cryosphere Discuss., <https://doi.org/10.5194/tc-2018-47>, 2018.

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