The Cryosphere Discussions

The Cryosphere Discuss., referee comment RC2
https://doi.org/10.5194/tc-2021-397-RC2, 2022

Comment on tc-2021-397

Anonymous Referee #2

Referee comment on "A sensor-agnostic albedo retrieval method for realistic sea ice surfaces: model and validation" by Yingzhen Zhou et al., The Cryosphere Discuss., https://doi.org/10.5194/tc-2021-397-RC2, 2022

Summary of Comments on

tc-2021-397_review-1round.pdf

Thanks for this review invitation. The manuscript describes a method combining a RTM model and a machine learning method to estimate broadband sea-ice albedos from TOA reflectance. The validation of method with ground measurements over sea ice is interesting. However, the method description is not clear enough while some statements are not objective and eager to emphasize the advantage of the proposed method. I have the following suggestions/questions before recommendation for publication.

- The coupled RTM is used to simulate TOA reflectance from various sea ice surface and atmospheric properties. The surface parameters are listed but the values were not mentioned as well as the sampling strategy. I cannot figure out how the authors determine the distribution and relevance among the parameters. Similar concern for the atmospheric parameters and the solar/view angles.
- The machine learning method needs more detailed description about how it was used. How to deal with the invalid retrievals from the relationship? Is there a post-processing? It was mentioned there are two models trained. What are their difference and advantages?
- The author emphasized many times about the advantage of the proposed method than the previous MPD or direct-estimation methods. However, many descriptions needs to be clarified or discussed more. What are the advantage of the coupled RTM rather than the separate radiative transfer models? Is there any quantitative comparison about this? Is a classification within sea-ice surface needed in previous methods? The method is claimed as independent on sensor or spatial resolution, how that is realized without considering the spectral response function difference? Did the previous method restrict to a specific spatial resolution?

Minor comments:

Please refer to the highlights in the PDF document.

Thanks.

Please also note the supplement to this comment:
https://tc.copernicus.org/preprints/tc-2021-397/tc-2021-397-RC2-supplement.pdf