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Discussions

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Interactive comment on "Broadband albedo of Arctic sea ice from MERIS optical data" *by* Christine Pohl et al.

Anonymous Referee #2

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Mapping broadband albedo of Arctic sea ice from remote sensing data is critical important for cryosphere and global climate change studies. However, the reflectance anisotropic effects of Arctic sea ice and melt ponds have not been well considered in current available broadband albedo products. Thus, it is still a challenging topic for developing long-term and high quality Arctic sea ice broadband surface albedo dataset. In this paper, the authors provided a new spectral-to-broadband conversion (STBC) method which can obtain much accurate broadband albedo compared with the conversion coefficients provided by other literatures. In additions, the authors also compared the Artic sea ice albedo derived from ERA5 and MERIS data. From my point of view, the parts for describing the experiments and methods are solid and credible. However, the discussions for the STBC method and comparison with reanalysis data are too

short. I would like to suggest the authors to add more discussions and comparisons before developing it into a final publish paper. Major comments: 1. The STBC method has not considered the variations of atmospheric conditions and solar/view zenith angle. Please add a discussion about the uncertainties of the STBC method proposed by this paper. References: Liang S. (2001). Narrowband to broadband conversions of land surface albedo I: Algorithms. Remote Sensing of Environment, 76(2), 213-238 Liang S., Shuey C. J., Russ A. L., et al.(2003). Narrowband to broadband conversions of land surface albedo: II. Validation. Remote Sensing of Environment, 84(1), 25-41 2. The STBC method proposed by this paper has not considered the difference between the black-sky and white-sky albedo. Please provide different conversion coefficients or add a discussion about it. 3. I suggest to add a short describing for the Melt Pond Detector (MPD) algorithm and the procedure for generating the spectral albedo and melt pond fraction of sea ice. 4. It is necessary to validate the broadband albedo of Arctic sea ice from MERIS data with in situ albedo measurements, e.g., TARA data. 5. It is necessary to compare the broadband albedo of Arctic sea ice from MERIS data with other broadband albedo products, such as CLARA, VIIRS, and GLASS. 6. Why there are differences between albedo derived from ERA5 and MERIS data? Is there any relationship between differences and melt ponds fraction? Please add a discussion about it. Minor comments: 1. Page 10, Line 11. Why the k_0 is set to 0? 2. Page 9, Line 25. The variable c has not been described. 3. Page 10, Line 31. The word "then" should be "than".

Interactive comment on The Cryosphere Discuss., https://doi.org/10.5194/tc-2019-62, 2019.