Please find below the referee comments (in black) and our answers (in blue).

Anonymous Referee #1

The article presents a feedback atmospheric process following the decrease in sea ice concentration. The feedback begins with the change in sea ice concentration, followed by the surface energy balance change that changes cloud condition, then back to the surface energy balance. The feedback process presented in this paper roughly halves the direct consequence of the sea ice reduction, through cloud radiative effect. The article is an important contribution for evaluating the consequence of the on-going sea ice reduction, in a more realistic way than so far published works.

We thank the reviewer for her (his) positive comments.

For improving the realiability of presented numericals and also for easier readability by the workers in other fields however, minor alterations are suggested as listed below:
Scientific aspect:

1) The recgnition of clouds is a key point of this work. It is necessary to present how the CERES evaluation recognises the clouds. There are manuals stating this process, but a brief summary of the process in one paragraph will help readers.

Additional discussion and references to the cloud retrieval techniques are provided in Section 2.1.

2) Surface fluxes, whether through satellites or model computations, are subject to errors that are often large. The quoted papers in the reference list do not satisfy this test. This reviewer recommends the authors to make a point-by-ponit comparison with the first-class ground observations. The sites, Ny-Alesund, Barrow, Alert and Resolute have long-standing observations of high quality irradiances for the Arctic. Similarly, Neumeyer, Syowa and South-Pole offers high quality irradiances with additional cloud information. The data are available at BSRN Centre at AWI, Bremerhafen.

Thank you for this comment. We also agree that the determination of radiative surface fluxes using satellite data is a challenge prospect. The CERES science team has spent much of the last 20 years analysing and refining these data. The requested comparisons have been undertaken and published by the CERES Science Team (e.g., Kato et al. 2018). Kato et al. (2018) compared the CERES surface EBAF Ed 4 monthly mean surface radiative fluxes with 46 buoys and 36 land sites, including the high-quality sites in the Arctic (e.g, Ny-Alesund, Barrow, Alert, and Resolute). The uncertainty estimates for individual surface radiative flux terms in the Arctic range from 12-16 W m^{-2} (1σ) at the monthly mean 1°x°1 gridded scale. Moreover, previous studies have stated that the CERES SFC EBAF fluxes are as a key benchmark for evaluating the Arctic surface radiation budget (Boeke et al. 2016; Christensen et al. 2016; Duncan et al. 2020). This discussion is now included in the text.

References:
Kato, S. and coauthors, 2018: Surface Irradiances of Edition 4.0 Clouds and the Earth's Radiant Energy System (CERES) Energy Balanced and Filled (EBAF) Data Product. *J. Climate*, **31**, 4501-4527, doi: 10.1175/JCLI-D-17-0523.1.

Boeke, R. C. and P. C. Taylor, 2016: Evaluation of the Arctic surface radiation budget in CMIP5 models. *J. Geophys. Res.*, **121**, 8525-8548, doi: 10.1002/2016JD025099.

Christensen, M., A. Behrangi, T. L'Ecuyer, N. Wood, M. Lebsock, and G. Stephens (2016), Arctic observation and reanalysis integrated system: A new data product for validation and climate study, Bull. Am. Meteorol. Soc., doi:10.1175/BAMS-D-14-00273.1.

Duncan, B. N., Ott, L. E., Abshire, J. B., Brucker, L., Carroll, M. L., Carton, J. and coauthors, 2020: Space-based observations for understanding changes in the arctic-boreal zone. *Reviews of Geophysics*, 58, e2019RG000652. https://doi.org/10.1029/2019RG000652

Presentation and minor typological comments: P2, L 63 and elsewhere: It is necessary to provide the full names of ACRONYMs at their first appearences, e.g., CMIP on this page and P3 L 75 EBAF. P 3,
OK, done see lines 72-74 and 85.

Figure 1: To be consistent with the text, Swcre and Lwcre should read SWcre and LWcre.
OK, done see Figure 1.

P4, L 98: The quoted publication, Kato et al. (2013) barely offers the information on the accuracy of irradiances, nor any of the authors are experienced with radiation science.

Additional references describing and analysing the CERES SFC EBAF data have been added to the manuscript along with a more detailed description of the surface radiative flux uncertainty, also see previous response. The reviewer should also know that the author list includes a member of the CERES Science Team experienced with radiation science. See section 2.1.

P6, L 149: This sentence appears incomplete, or some words may have gone lost.
P12, L223-224: This sentence is difficult to understand.
P14, L 310: "half if induced by" may read "half is induced by".
P15, L 317: "should aim to reduce" may read better when "should aim at reducing".
P18, L 390: Too many authors presented. This paper was written by four authors only.
Ok, done. Thanks

These are, however a minor comments, and this reviewer hopes that the authors will work for the quickest publication of this interesting work.
We thank the reviewer for his constructive comments that allows us to improve he manuscript.