

## ***Interactive comment on “Clouds damp the impacts of Polar sea ice loss” by Ramdane Alkama et al.***

### **Anonymous Referee #1**

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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. For improving the reliability 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 recognition 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. 2) Surface fluxes, whether through satellites or model computations, are subject to er-

rors 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-point 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.

Presentation and minor typological comments: P2, L 63 and elsewhere: It is necessary to provide the full names of ACRONYMS at their first appearances, e.g., CMIP on this page and P3 L 75 EBAF. P 3, Figure 1: To be consistent with the text, Swcre and Lwcre should read SWcre and LWcre. 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. 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.

These are, however a minor comments, and this reviewer hopes that the authors will work for the quickest publication of this interesting work.

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Discussion paper

