We would like to thank the reviewer for his/her constructive comments. The responses to the referee are formatted as follows:
The original comments are given in black
The author's response is given in red
The changes in manuscript are given in green

Review by Anonymous Referee #2

1st comment:
P1, line 7, the authors conclude that two methods yield similar results for the annual mean aerosol-cloud radiative effect. Actually, there is a big difference in standard deviation except for similar mean value.

Response:
Thanks for this comment; we changed our method to calculate the annual radiative effect. Now, the seasonally weighted mean radiative effect is calculated and uncertainties are calculated based on the propagation of uncertainty. In this new method, the annual radiative effect for Method 1 (Method 2) is -1.5±1.4 (-1.5 ±1.6) W/m^2. Originally we calculated the annual radiative effect by putting all data together and calculated the linear regressions of each partial derivative. Because of missing values, there was a mistake in the calculation of the uncertainties in Method 2, therefore the uncertainties have been changed as follows:
Winter: -0.6±1 W/m^2, Spring: -1.3±4 W/m^2, Summer: -4.3±4.1 W/m^2, Fall: -1±2.5 W/m^2

2nd comment:
P1, Line 17, "Semi-direct effect can result in negative (absorbing aerosol lies above low clouds) and positive (absorbing aerosol lies within low clouds)". It is confused that how to tell from the aerosol layer position above or within low clouds. As shown the author's statistic results, the 50-90

Response:
The statistical method used in our study allows assessing the effect of a vertically integrated variable like DAOD on stratocumulus clouds so for the calculation of the aerosol-cloud radiative effect it is not necessary to know the position of the aerosol layer relative to the low clouds (see also the response to the 2nd comment in the review by W. Wang).

The manuscript has been modified as follows (both in abstract and text parts):
The persistent MSc are low and confined within the boundary layer. CALIPSO shows that 61.8% ±12.6 of Saharan dust resides above North Atlantic MSc during summer for our study area. This is consistent with a relatively weak first aerosol indirect effect, and also suggests the second aerosol indirect effect plus semi-direct effect (the second term in Method 1) is dominated by the semi-direct effect. In contrast, the percentage of Saharan dust above North Atlantic MSc in winter is 11.9% ±10.9 which is much lower than in summer. CALIPSO also shows that 78% ±12.4 of the dust resides below 1.5 km altitude

in winter. During summer, however, there are two peaks, with 31.1% ±12.9 below 1.5 km and 44.4% ±9.2 between 2 and 4 km

Kok et al. (2017) show that the dust found in the atmosphere is substantially coarser than represented in current global climate models. As coarse dust warms the climate, the temperature inversion is stronger and yields thickening of the underlying clouds.

3rd comment:
P4, Line 16, the same question as above, how did the authors quantify how much dust is within or even below clouds using CALIPSO? According to my understanding, most aerosols within and below clouds cannot be detected by CALIOP. If the clouds with cloud optical thickness less than 4 are excluded as described by authors, the aerosols within and below clouds will never be detected.

Response:
We got the data from Amiridis et al. (2013) and the product utilizes cloud-free CALIPSO profiles. In any case they could never retrieve the amount of dust below or within a cloud. Clouds could have been close to these profiles (horizontally), but not in the same columns that are used to provide dust properties. We use CERES cloud top heights and dust extinction coefficients from CALIPSO in 1°x1° grid boxes to calculate the percent of dust above clouds.

This part is added to the manuscript:
The extinction coefficient of dust for each level is obtained from CALIPSO and vertically integrated to calculate DAOD for each grid box, and then extinction coefficients above the CERES cloud top heights are vertically integrated and divided by DAOD to give the percent of dust above the clouds. The computation is done on a 1°x1° grid.

4th comment:
Suggest to give reader much more specific explanation about how to select SCs in the study area. More reader as me will confuse the connection between marine SCs regime and CERES cloud properties. Because authors told us that the SCs regime are defined only according to vertical velocity and LTS from ERA-Interim data. The definition exactly increase the convenient of selecting SCs, but we cannot understand how to obtain SCs cloud properties from CERES data and how to screen the effect of ice cloud at multilayer cloud system in this study. Because the calculation of planetary albedo according to function (2) ignores the contribution of ice clouds. Despite SCs are warm clouds, the ice cloud above SCs should be also screened according to such as cloud top pressure or cloud top temperature and so on.

Response:
Only those grid points and days are selected in our analysis where 500 hPa vertical

velocity > 10 hPa day−1 and LTS > 18.55 K (see Figure 2). The contribution of ice clouds in planetary albedo in our study area is small and negligible, but we also remove them. Clouds with cloud top pressure less than 500 hPa and cloud top temperature below 270 K are screened out (This part will be added to the manuscript). On page 7, line 4 we mention: where f is the marine stratocumulus cloud coverage and clouds are not obscured by overlying ice clouds.

This part is added to the manuscript:
… a LTS criterion is used, defined as LTS = $\theta_{700hPa} - \theta_{1000hPa} > 18.55K$ (where θ is the potential temperature). Only grid points and days within the MSc regime are used in the analysis.

and:
…where f is the marine stratocumulus cloud coverage and clouds are not obscured by overlying ice clouds (i.e. the small number of scenes with ice clouds in our study area are removed from the analysis).

5th comments:
P2, Line 5, please refer the following paper about dust semi-direct effect. Huang, J., P. Minnis, B. Lin, T. Wang, Y. Yi, Y. Hu, S. Sun-Mack, and K. Ayers, Possible influences of Asian dust aerosols on cloud properties and radiative forcing observed from MODIS and CERES, Geophysical Research Letters, 33 (6) (2006), L06824, doi:10.1029/2005GL024724.

Response:
The reference is added to the manuscript.

The paper is added to introduction part:
Huang et al. (2006) analyzed the effect of dust storms on cloud properties and radiative forcing over Northwestern China from April 2001 to June 2004. Due to changes in cloud microphysics, the instantaneous net radiative forcing is increased from -161.6 W/m^2 for dust-free clouds to -118.6 W/m^2 for dust contaminated clouds.