The paper “Spatial-scale dependence of aerosol indirect effects over land in eastern China: A comparative analysis” by Yuqin Liu et al. investigates the effect of spatial scale on the sensitivity of cloud droplet effective radius (CER) to aerosol optical depth (AOD) and on the sensitivity of cloud droplet number (N_d) concentration to AOD, for two different time periods (2008–2014 and 2015–2022) in the eastern region of China. The present study is of scientific interest, falls within the scope of ACP, the manuscript is really well-written and even better well-structured, the presentation clear, the language fluent. I recommend publication in ACP; however, I recommend to the authors the following revisions and modifications. Since the study is already at a good level, I would argue the authors to see the comments in a positive way as made, raised by an approach and a view point of an external reader, as modifications that would improve the flow, and help other readers to better understand the outcomes and the scope of the study, improving also specific points that it seems that there are gaps to fill.

1) Abstract: The suggestion here is to re-write it in a different concept. The suggestion is to add somewhere in the beginning a sentence delineating the objective to the study, something like “… aims to reveal the sensitivity patterns of aerosol indirect effects to spatial scales, …” and then referring to the datasets used to facilitate the results and the basic outcomes. In addition, please re-visit the sentence “decreases, reflecting the weaker of aerosol-cloud interactions for declining aerosol concentrations.”. It needs to be written clearer.
2) “Buffer size”: Though the authors have tried to delineate the concept, it needs further improvements. From the reviewer’s point of view, and since this is a core-element of the study, I would suggest further effort on explaining this concept. I would argue the authors to address this as a constructive point, improvement is needed.
3) A basic comment is that frequently the manuscript needed references that were missing. In the following part of the review suggestions on parts that need a reference-or-two will follow. For instance:
3.1) at the end of the sentence in lines 43, 44, and 45, references are needed.
3.2) for the arguments in lines 55, 56, and 57: for each of the “satellite observations”, “aircraft measurements”, “ground-based monitoring”, and “numerical simulations” add one-or-two references, to show the importance of the research on atmospheric dust.
3.3) line 60 and “MODIS”. When referencing to instruments, references are required.
3.4) line 97 and “CALIOP”. Similar comment with the above.
3.5) line 142 and “particularly during spring”: add references on dust climatology over the region of interest.
3.6) line 155 and “cloud systems”: add references.
3.7) lines 204-206: add references.
3.8) lines 361-363: add references.
4) line 82 and “exhibited positive values over land and negative values over oceans”: complete the sentence on positive and negative values of what.
5) line 91 and “only two of these”: add which regions.
6) lines 93 and 94 and “aerosol and cloud properties”: it would be good to add information on the kind on properties (e.g., physical, chemical, optical, …), naming them.
7) line 98 and “calculating aerosol”: calculating aerosols what? AOD? a532nm, CCN, ...? Please be more specific.
8) General the comment on the introduction: frequently in the paragraph studies are mentioned to support the necessity of the study, and this is the approach of the present study. However, in this paper, there are studies that are referencing without properly mentioning the core outcomes and conclusions of the studies, to pave the road for the present study. This leaves a potential reader confused on which is the point of mentioning them if not for also fulfilling the point of delineating the scientific gap. It would be towards the right direction if the authors revisit the introduction and work more on the studies that are mentioned, to bring everything together in the end.
9) Section 2.2. and Data used. It would be towards the right direction to add a paragraph describing the degree of uncertainties behind the products used, especially of the CDR, LWP,

COT, CTP, and CPI, this addition would be of particular importance, since the uncertainties of the aforementioned products are significantly higher than MODIS AOD.
10) line 160: The authors need to add a justification on the reason behind applying the threshold on 1.5, and not for instance 1.4, or 1.6? Add references or as a supplement the analysis made supporting this upper limit.
10) Paragraph in lines 180-188: Please revisit the paragraph, the references are not so suitable. When referring to CALIOP and CALIPSO the Winker et al., 2009, 2010, and 2013 are the most suitable ones, the Winker et al., 2003 should change. Moreover, the Stephens et al., 2002 is at the early steps of the A-Train and the authors should possibly add more updated references. Finally, CALIOP is not the "first" space-based lidar in space, so remove please correct this part.
11) Table 1: add more information on the products used, especially in terms of CALIOP, the list is not complete I guess, I am left of the impression that more observations and products were applied than just the coordinates.
12) end of section 2.3: It would be fair to the approach and the readers to provide a paragraph reporting the assumptions and uncertainties of the methods/equations, and as such the limitations, in order to facilitate also future studies.
13) Section 2.4 line 236: at some point the comparison of clouds' horizontal extend with the spatial homogeneity of aerosols should be discussed.
14) Central hypothesis of the comparison between the two periods is that LWP is more or less similar, allowing comparison between AOD and CER/Nd in terms of spatial sensitiveness. Please add at some point discussion on the degree that this hypothesis holds.
15) Lines 261-262 and lines 269-270: please add at least at one map the Hebei, Shandong, Shanxi, and Anhui provinces at a map, not everyone is familiar with the geographical areas and provinces in terms of where they are located.
16) line 268: correct ".,".
17) Lines 314-318: When providing results of the analysis discuss on the reasons "why" behind the results is of significance. A connection with theory is missing in this section. The paper would benefit by adding a few lines at the end of the section.
18) Lines 369-371: In general it is missing an explanation on the mechanisms resulting to the observed patterns, here are results provided without any connection with theory or at least some brief discussion. The section can be significantly improved.
19) Section 3.3: At some point discussion of AOD has to be included, in terms of composition. The aerosol composition resulting to the AOD over the two periods may have significantly changed due to the policies imposed, therefore the impact of AOD on clouds may be very different, even for exact same AOD values, since the relative percentage of different aerosol species will be different. Add at least some discussion on this aspect, to be fair with the analysis, the hypothesis that are made, and the readers.
20) Section 4. The discussion is well-written. However, some of the points raised should also appear accompanying the results and the discussion on the figures, and not appearing in this section for the first time.