The article by Zhang et al. investigates the impact of various parameters on nighttime satellite aerosol retrievals using surface artificial light emission sources and a 3-D radiative transfer model, following their earlier work, Zhang et al., 2008. The draft reads technically sound with good analysis and its context is logically organized. The introduction also provides enough background for readers and cites necessary previous works. Therefore, I recommend publishing after addressing some minor comments:

We thank the reviewer for their time and the constructive comments provided.

L54, can you provide a few more words to explain what is "retrieval-filled value issue"?

We added this sentence: "for which aerosol signals as received from lidars are too low for retrievals and thus retrieval filled values are assigned that may introduce sampling-related biases "

L93, since the spatial resolution is highly variable as mentioned here, does this paper discuss the impact of the spatial resolution on nighttime retrievals in the later context?

We didn't include the mentioned discussions in this study as we used VIIRS data that have a known spatial resolution. Still, this is an interesting research topic and can be a full research topic of its own. This is especially true because, to carefully resolve the issue, observations from different platforms with different spatial resolutions are needed for validation/evaluation efforts. Thus, we leave this question for a future study.

L160, what is the distance threshold for choosing the pairs?

Since AERONET data from the Dakar site (14.394°N, 16.959°W) were used for evaluating retrievals from Dakar, there is no need for a distance threshold. The AERONET site is located within the city.

Figure 1 caption, add space between "showing" and "sources". I feel this figure can be improved. I don't see the "sensor" or satellite on this figure. Is it helpful to label come concepts such as VZA in the figure?

We added a space between "showing" and "resources". Also, we added "VIIRS DNB" in Figure 1 as suggested. We prefer not to label VZA as we need to add an assisting line to introduce the concept of VZA, which will make the overall structure of Figure 1 less ideal. Also, VZA is a fundamental parameter in remote sensing, and thus we decided to not draw VZA in Figure 1.

L372, how many AERONET sites for their data are involved in this study?

Only one; the Dakar AERONET site was used as we conducted the study over Dakar

I feel the following article is relevant and should be cited. Cavazzani, S., Ortolani, S., Bertolo, A., Binotto, R., Fiorentin, P., Carraro, G., & Zitelli, V. (2020). Satellite measurements of artificial light at night: Aerosol effects. Monthly Notices of the Royal Astronomical Society, 499(4), 5075-5089.

This reference has been added.