

We thank the reviewers for the revision of this manuscript. In this document, we provide a detailed answer to all the comments raised by the reviewers (blue).

## Reviewer 2

### Major comments:

Author has responded to each of the reviewers' comments.

In the conclusion section be sure to state how the spatial distributions of the LLC(>9ms) and LLC(>18ms) distributions differ from the spatial distribution of total lightning.

Done.

### Minor comments:

I would also prefer LLC9 and LLC18 as acronyms.

We prefer maintaining the notation LCC(>9 ms) and LCC(>18 ms) for consistency with other works.

L196: It is a bit confusing when you state that the ratio is assumed to be zero for fluxes greater than 0.5 (0.3). → State that the ratio is unchanged and equal to 0 for fluxes greater than 0.5 (0.3).

Done.

L241: Output every 5 hours is unusual because  $24/5$  is not an integer. Do you mean 3 or 6?

Indeed, we usually choose 5-hourly output because  $24/5$  is not an integer in order to avoid systematic local biases w.r.t. to the solar zenith angle. In other words, with 5 hourly data, we get at any position of the globe also information about the diurnal cycle. Output every 12, 6, or 3 hours will - at a given geographic location - always be for the same local solar time (and zenith angle).

L379: How many more years of data are needed before robust conclusions can be obtained for LCC (>18 ms) flashes can be obtained?

The total number of LCC(>9 ms) and LCC(>18 ms) flashes observed during one year are  $2.3 \times 10^5$  and  $2.6 \times 10^4$ , respectively. Therefore, we estimate that 10 years of data are necessary to obtain robust conclusions for LCC(>18 ms)-lightning flashes. We have added this to the manuscript.

Figure 1 caption: Explain why the ratio plots are undefined over a portion of the globe.

Done.

Figure 7 caption: Seasonal observed (top panel) and simulated (rest of panels) ratio → Seasonal observed (left panels) and simulated (right panels) ratio

Done.

Figure 8 caption: See correction for Figure 7 caption.

Done.

### **Grammatical Suggestions:**

L22: during more than → for more than

Done.

L58: Why do you use a different font for LNOX?

We are now using the same font as for the rest of the text.

L65: and in the range of latitudes → for latitudes

Done.

L80: replaced it for a 4 years mission starting in March 2017 ... → replaced it in March 2017 and is still sampling latitudes between 54.3 N and 54.3S (Blakeslee et al., 2020) as of January 2022

Done.

L85: What does typical mean? Is this the ratio of  $LCC/(All\_Flashes)$  or  $LCC/(All\_Flashes - LCC)$ ? I'm guessing the latter but am uncertain.

This is the ratio  $LCC/(All\ flashes)$ . We have removed "typical".

L91: activity coincides → activity coincide

Done.

L92: distributions more → distributions is more

Done.

L99-100: high production of LCC(>9 ms)-lightning respect to all lightning → high ratio of LCC (> 9 ms) to total lightning.

Done.

L106: nearly similar → similar

Done.

L108: indicates that → is not surprising as

Done.

L108: the subset → a subset

Done.

L110: obtained total → total

Done.

L160 → lightning parameterizations and scaling factors used in this study are summarized in Table 1.

Done.

L165: combination → combining

Done.

L268: choice lightning → choice of lightning

Done.

L303: LIS missing → LIS to miss

Done.

L327: spatial distribution → spatial distributions

Done.

L328: comparing with observation → comparing with observations

Done.

### **Reviewer 3**

The Sect. "Discussion" still needs some revisions.

1. The authors wrote "... analyze the seasonal and spatial distribution ..." at the beginning, but they discuss the spatial distribution first, and then the seasonal one. It is better to modify the sentence to match them.

Done.

2. The logic of the discussion is not clear because of the deleted parts. The authors should take care of it. For example, the spatial distribution is discussed for both land and ocean. But the seasonal one just focuses on the ocean. I suppose they can split it into two subsections and make the discussion clearer to readers.

Done.