We again thank the reviewers for their feedback. In the responses below, the reviewers' comments are presented in black, while our replies are provided in blue. Text added to the revised manuscript is indicated in *italics*, with a red colour for emphasis.

**Reviewer #2**

The authors have addressed most of my concerns. I have only a few minor comments on this version of the manuscript:

1.Lines 739–741: There is also a geostationary instrument over East Asia, the FY-4A Lightning Mapping Imager (LMI) (Ni et al., 2021; Zhang et al., 2026; Zou et al., 2024). Please include it.

We agree with the reviewer that LMI also deserves to be mentioned. We added it to the revised manuscript:

*"Examples include the Geostationary Lightning Mapper (GLM) on the GOES-R series over the Americas (Rudlosky et al., 2019), the Lightning Mapping Imager (LMI) on China's Fengyun-4 series over eastern Asia, western Australia, and adjacent oceans (Ni et al., 2021), and the Lightning Imager (LI) on Meteosat Third Generation (MTG) over Europe, Africa, and adjacent regions (Bliznák and Sokol, 2026)."*

2.Line 1015: Please define the "simple climatological benchmark". It is unclear what benchmark was used and how it differs from other complex ML models.

We clarified what the "simple climatological benchmark" is in the revised manuscript:

*"Krause and Rammig (submitted) showed that an even higher predictive skill can be achieved without using any meteorological predictors. Specifically, a simple climatological benchmark was constructed by calculating the mean daily lightning density for each grid-cell and calendar day of the year across all training years. These climatological means were then used to predict lightning density in the corresponding grid-cells and calendar days of the test years, irrespective of the actual meteorological conditions. In other words, the benchmark reproduces the mean spatial distribution and seasonal cycle of lightning but cannot capture year-to-year variations in lightning activity. Despite its simplicity, this benchmark explained 92% of the variance in daily LIS/OTD lightning observations in the test years and also reproduced spatial patterns and hemispheric seasonal cycles with performance comparable to or better than the much more complex machine-learning models."*

References:

Ni, X., Hui, W., Zhang, Q., Huang, F., & Liu, C. (2021). Comparison of Lightning Detection Between the FY-4A Lightning Mapping Imager and the ISS Lightning Imaging Sensor. Earth and Space Science, 8(6), e2020EA001099. https://doi.org/https://doi.org/10.1029/2020EA001099

Zhang, Y., Qie, X., Jiang, R., Cao, D., Yang, J., Wang, D., Liu, M., Liu, D., Sun, Z., Zhang, H., & Yuan, S. (2026). Corrected event dataset of FengYun-4A Lightning Mapping Imager (FY-4A LMI), 2019–2023. Earth System Science Data, 18(8), 5773-5791. https://doi.org/10.5194/essd-18-5773-2026

Zou, M., Zhang, Y., Fan, Y., Wang, J., & Zhang, H. (2024). Performance Evaluation of LMI Based on Low-Frequency Three-Dimensional Total Lightning Flash Location Data. Remote Sensing, 16(2), 244.