

Nat. Hazards Earth Syst. Sci. Discuss., referee comment RC1  
<https://doi.org/10.5194/nhess-2022-39-RC1>, 2022  
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## **Comment on nhess-2022-39**

Colin Price (Referee)

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Referee comment on "A satellite lightning observation operator for storm-scale numerical weather prediction" by Pauline Combarrous et al., Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2022-39-RC1>, 2022

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I have read this paper and find it very comprehensive, clear, well written, and important in the field of predicting lightning hazards using NWP models, and the future use of geostationary satellite lightning data that will soon become available over Europe with the launch of the MTG LI sensor. I have a few minor comments related to clarifications, language, and methodology.

1) Abstract and title. From the abstract and title, it is not clear if the paper is about a) improving lightning assimilation into NWP models, in order to improve forecasts, or b) to understand what NWP parameters are best related to lightning. While these are connected, it is somewhat confusing in the abstract. Maybe this could be clarified in the abstract, and maybe the title too.

2) line 47: FEA: Why is this called extent if you are talking about the flashes per pixel, and the pixels are of constant size?

3) line 67: Why were only 1 hour forecasts tested? Why not 3 hours, 6 hours?

4) line 90-91: Are 10 days really enough for making such a conversion between CG to total lightning? Are the storms in the SE USA similar to the storms in France? How do you think these issues may have influenced your results?

5) line 96: Figure 1

6) line 129: I should point out that PR92 looked at CONVECTIVE cloud top height, not all cloud top height. Hence in the NWP it is possible to isolate convective cloud tops from other clouds (cirrus).

7)line 137: detailed

8) line 151: why are the updrafts so low in your model? This does not match reality in thunderstorms.

9) line 404: convection-resolved

10) line 465: prevision time? Maybe prediction time?