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Discussions

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comment

Interactive comment on "An algorithm for estimating the detection efficiency of a lightning location system" *by* Haibo Hu and Xiya Zhang

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General Comments

(provided in initial review)

Less-critical comments:

1. The term "single-station acceptance" is used in the abstract and the Introduction, but the reader has to go through the mathematics of the model (equations (5) and (6)) to begin to understand what it means. It seems that this term is derived from the work of Schutte. There are assumed-perfect thresholds (smin and smax) that are implicit in this model. The authors should provide a brief overview of the physical processes that impact the detectability of lightning, and then define "single-station acceptance" in that

context.

2. Pg 2; line 13: The Cummins and Murphy reference does not seem to be appropriate in the context of synoptic analysis of thunderstorms.

3. Pg 2; line 25: "ruin" seem to be too strong of a word. I suggest "compromise."

4. The paragraph starting on line 9 of page 4 partially describes the authors' model. This does not seem to belong in the Introduction section. Maybe there should be a "Modeling" section starting here, and it could also include the description requested in the previous comment.

5. Pg 4; line 16: The authors define their DE calculation as being "iterative." Typically, this term is only used describe methods that do not have a known and finite number of steps. In the case of DE modeling when there are a know number of combinations of sensors and "location modes" the term "combinatorial" is more accurate.

6. Pg 5; line 6-7: the authors are talking about "lightning sources", but then they reference figure 1 which is a set of "peak current probability distributions". They should explain the relationship between "lightning sources" (an ambiguous term) and "peak current." It would also be good to tell the reader that the peak current distributions are really LISS distributions, scaled in a manner to that converts the range-normalized magnetic (or electric) field to an estimate of the current near the base of a lightning channel during a CG return stroke. In addition, the authors mention a 15 kA value in the caption to Figure 1, with no explanation. Many readers will not know the reason for this limit, so it should be explained, or a reference should be provided in the text.

7. Pg 5; lines22-23: an individual sensor does not have a specific location accuracy. The location accuracy of the network at a point-of-interest is determined by the timing- and angle-errors of the individual sensors, and the geometry of the sensors, relative to that point-of-interest.

8. Pg 6; first line: This paragraph seems to belong in a discussion or conclusions

section.

9. Bottom of pg 8: the authors define effective radius as if it is their definition. I think that it was defined in 1987 by Schutte (possibly earlier), and used in his development of the "Acceptance" concept. This should be acknowledged.

10. Bottom of Pg 9: The authors say that equation 13 describes a linear relationship between Ip and s, then they show (in equation 13) a non-linear dependence on r. It might be helpful to clarify that this is true after s is corrected for propagation "s".

11. Pg. 10 line 16: use of the variable "D" (for damping) could confuse some readers, since D is first used in equation 5. The D in equation 5 itself is somewhat confusing, since it implies a function mapping through its inverse.

12. Figure 2: The probability distribution shape-matching illustrated in Figure 2 is of concern, since there is a sampling problem – note that the curves try to match the large value "envelope" of the histogram, but those values are surrounded by much lower (sometime zero) values in adjacent histogram bins.

13. Figure 3 and 4: what is the meaning of the dark-red colored region in the lower-right portion of figure 3(c) and 4? They are not colors in the color table.

14. Pg. 16, line 4: The Acceptance does NOT clearly decrease towards the mountains – it seems to decreases in all areas at similar distances from the sensors due to increasing range.

15. Pg 19, lines 13-15: This conclusion does not seem to be justified from the content in this paper.

16. Figure 5: the corrected stroke density neat Guangxiangtai seems too low, given the significant drop-off if DE near that site shown in Figure 4(b). Which DE correction was used to produce this figure? End

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2017-307, 2017.