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Atmospheric Measurement Techniques Discussions

Interactive comment on "A performance assessment of the World Wide Lightning Location Network (WWLLN) via comparison with the Canadian Lightning Detection Network (CLDN)" *by* D. Abreu et al.

D. Abreu et al.

strong@atmosp.physics.utoronto.ca

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Response to Referee 3, David Dockendorff

We thank the referee for his helpful comments. In the following we present the referee's original comments in italics and our responses in plain text.

Pg 1869 "...Fig. 6 shows the detection efficiency of the WWLLN as a function of peak current (assuming that the CLDN detects all lightning events)..." A figure depicting the

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calculated detection efficiency of the CLDN can be obtained from Environment Canada and could be used as an additional figure in this paper.

Following this suggestion, we obtained contour maps of the modelled CLDN cloud-to-ground detection efficiency and location efficiency from Environment Canada. These model results are consistent with the "detection efficiency of better than 90% and less than 500 m location accuracy" stated in the paper (Section 2.1, paragraph 2). They are also similar to Figures 8 and 9 in Dockendorff and Spring (2005). We concluded that the adding these figures to the paper would not add significant new information and so we have not included them.

Pg 1871 "...it can be assumed that these are indeed valid lightning strokes that were missed by the CLDN since its efficiency is not 100%..." This contradicts an earlier statement that the author assumes that the CLDN has a 100% detection efficiency. This statement also infers that the WWLLN detection efficiency is actually 100% which is not what one would expect. I suspect that the additional events detected by the WWLLN are either false alarms or echoes of events; i.e. one stroke being counted twice.

As noted above, in Section 2.1, paragraph 2, we state that the CLDN has a "cloud-to-ground flash detection efficiency of better than 90%". We do not say that it has 100% detection efficiency. We agree that neither the CLDN nor the WWLLN has 100% detection efficiency.

On page 1869, lines 16-18, we did say "To further demonstrate the WWLLN current threshold, Fig. 6 shows the detection efficiency of the WWLLN as a function of peak current (assuming that the CLDN detects all lightning events)." To avoid confusion, we have changed this sentence to: "Fig. 6 shows the detection efficiency of the WWLLN relative to the CLDN, as a function of peak current in 5-kA bins."

The WWLLN Stroke-B code is conservative, requiring an over-determined data set using a minimum of five stations and a fit error of <30 microseconds. When focussing

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on a small region, such as that used in this study, the likelihood of any bad WWLLN data points from, say, random triggers at several stations which just happen to make a fit with low spatial/temporal error, is vanishingly low (<0.01% of strokes). Thus, there is no particular reason to think that the additional WWLLN strokes are likely to be false alarms or strokes being counted twice. It is more likely that they are strokes that are not detected by the CLDN, perhaps due to unusual waveforms not matching the CLDN detection criteria.

Pg 1880 Fig 1 The locations of the operational NLDN sensors should also be shown as their data is used to compute the CLDN lightning solutions.

We have modified Figure 1 to include all of the NLDN stations. The text and figure caption have been revised accordingly, as described in the response to Referee 2.

Otherwise a good paper

Interactive comment on Atmos. Meas. Tech. Discuss., 3, 1861, 2010.