Atmos. Meas. Tech. Discuss.,
doi:10.5194/amt-2019-435-RC1, 2020

Atmospheric Measurement Techniques Discussions

Interactive comment on "Comparing lightning observations of the ground-based EUCLID network and the space-based ISS-LIS" *by* Dieter R. Poelman and Wolfgang Schulz

Anonymous Referee #1

Received and published: 5 February 2020

Review: Comparing lightning observations of the ground-based EUCLID network and the space-based ISS-LIS (https://doi.org/10.5194/amt-2019-435)

Also available in the supplement as a pdf file.

This manuscript compares the satellite-based optical ISS-LIS and ground-based radio EUCLID observations of lightning. It is an important study in that it helps evaluate both ISS-LIS and EUCLID networks and could potentially contribute to future LMI studies on the Meteosat. This study was very thorough and the manuscript is well written. Below are some of my comments.

Major comments: 1. I know that the terminology used in our community is a little con-

fusing. A LIS "event" is not equivalent to a EUCLID "event. " I would suggest adding a sentence somewhere to emphasize that, so the readers wouldn't get confused. Something like use the capital Event as a LIS "event." 2. The ISS-LIS data used in this study are non-quality controlled. That could, to some degree, affect the results. I would suggest adding the reference of Blakeslee's talk at the 2019 GLM meeting (https://goes-r.nsstc.nasa.gov/home/meeting-agenda-2019), which showed that ISS-LIS is slightly less sensitive than TRMM, and have a few sentences discussing the possible impact. 3. In Line 206, it says that "on average an ISS-LIS group occurs first." This looks a little odd to me. LIS group is an accumulation of a 2 ms period and the LIS timestamp is adjusted to the middle of that frame, which is 1 ms earlier than the end of the frame (Bitzer and Christian, 2015). So my impression is that the radio signals should be detected earlier. Zhang et al. (2016) also shows similar results. Do you have an explanation why ISS-LIS group occurs first in here? Possible scenarios could be that the EUCLID didn't report the initial breakdown processes in the flashes, while LIS reported them. If that's the case, then what is the detection efficiency of EUCLID reporting initial breakdown processes? Is it known that EUCLID has a poorer DE for initial breakdown than NLDN? I would suggest the authors double-check the results. If the results are correct, then this could lead to some further discussions.

Minor comments: 1. Line 41: Brightness is fine, but the LIS radiance is actually energy density (Koshak, 2010). 2. Line 216: artifact 3. Line 228: Should it be 12.9% and 20.5%, respectively? The P(EUCLID) in the full domain should be less than in the centre of the network, correct? 4. The very first paragraph on Page 9 (line number around 255) that discussed the absolute DE of ISS-LIS. The fact that ISS-LIS is less sensitive than TRMM-LIS might also contribute to the findings here. I would suggest adding that in the paragraph.

Reference: Bitzer, P. M. and Christian, H. J., 2015: Timing uncertainty of the lightning imaging sensor. J. Atmos. Oceanic Technol., 32(3), 453-460, https://doi.org/10.1175/JTECH-D-13-00177.1. Koshak, W. J., 2010: Optical char-

acteristics of OTD flashes and the implications for flash-type discrimination. J. Atmos. Oceanic Technol., 27, 1822–1838, https://doi.org/10.1175/2010JTECHA1405.1.

Please also note the supplement to this comment:
https://www.atmos-meas-tech-discuss.net/amt-2019-435/amt-2019-435-RC1-supplement.pdf

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Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2019-435, 2020.