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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Relativistic electron beams above thunderclouds" *by* M. Füllekrug et al.

Anonymous Referee #2

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In this paper, the authors provide supplementary results to their earlier publication [Füllerkrug et al., 2010]. The inferred altitude and charge transfer of the electron beam are important to explore their initiation mechanism. Furthermore, the author has expanded their dataset by including a non-sprite-associated event, which indicates the possibility that lightning can produce relativistic electron beams without sprites. All these results are novel and lead to future studies.

Overall, this paper is well written with significant scientific novelty. Thus I highly recommend for publication after the authors considering following suggestions.

Major Suggestion:

1) The readers will benefit if the authors can provide the lightning peak current or charge moment change for all the detected events in Table 1. This will relate the occurrence of the electron beam with the lightning producing electric fields. The author

may also consider including the non-sprite-associated event in Table1.

2) Line 130 – 133: If the two burst radiations at 4.4 ms and 8.9 ms originate from the same electron beam traveling from 41 km to 72 km, why there is no emission in between in the measurement? This referee suggests the author commenting on this.

Minor suggestions:

Line 38: . . . and lightning activities. . .

Line 8 & 105: The sign of the charge should be specified

Line 183: a time resolution of 50 us . . . .

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 15551, 2011.