

Interactive comment on “Sensitivity of satellite observations for freshly produced lightning NO_x” by S. Beirle et al.

Anonymous Referee #1

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This manuscript addresses an important issue concerning the use of UV-Vis satellite instruments for detecting NO₂ from lightning. This source of NO_x is the most uncertain and we are hoping that satellite observations will be an excellent means of reducing the uncertainty of the lightning source strength. However, the few studies that have been conducted to date have illustrated the difficulties associated with using this source of data for lightning studies. This manuscript presents a rigorous treatment of the estimation of the sensitivity of the satellite observation to lightning NO_x. The paper is very well written and should be published after addressing the very few comments I list below.

1) page 18120, line 5: the cloud resolving model was run with the assumption that an IC flash produces only 50% of the NO produced by a CG flash. Recent literature points

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to the likelihood that IC and CG flashes produce roughly equal amounts of NO per flash. How might the "visibility" and "sensitivity" respond if the assumption of production equality had been made in the cloud model (likely increasing the amount of LNO_x in the upper portion of the cloud). I would guess that the estimates of these characteristics would increase. Perhaps some comments could be made to address this issue in the section of the paper on uncertainties.

2) page 18129, line 20: But Dye et al. (2000) found that the flash rate maximum was downwind of the updraft core in a multicell storm that evolved into a storm with supercell characteristics. This reference should be included and some discussion added on what the influence of this storm structure would be on the sensitivity.

3) page 18134 line 13: Here and in the abstract the mean value of sensitivity is given as 0.46. However, on page 18126 it is given as 0.41. Please clarify.

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 18111, 2008.

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