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Estimates of Lightning NO_x Production based on High Resolution OMI NO_2 Retrievals over the Continental US

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Lightning is an important source of nitrogen oxides (NO_x = NO + NO_2) in the upper troposphere, with strong impact on ozone and the hydroxyl radical production. However, the production efficiency (PE) of lightning nitrogen oxides (LNO_x) is still quite uncertain (32 – 700 mol NO per flash). Satellites measurements are a powerful tool to estimate LNO_x directly as compared to conventional platforms. To apply satellite data without geographic restrictions, a new algorithm for calculating LNO_x has been developed based on the new Berkeley High Resolution (BEHR) v3.0B NO_2 satellite product and the WRF-Chem model. We estimate LNO_x PE over continental US using the NO_2 product and Earth Networks Total Lightning Network (ENTLN) data. The sensitivity of modeled profile shape, background NO_2 and thunderstorm location is evaluated. Furthermore, we explore the relationship with the cloud vertical structure, flash rates and LNO_x.