

## ***Interactive comment on “Lightning and convection parameterisations – uncertainties in global modelling” by H. Tost et al.***

H. Tost et al.

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Reply to Referee#2:

We thank the referee for his comments, which we think to be mostly useful for a revised manuscript, since they point to misleading or not detailed enough explanations.

Here we reply to the specific comments in detail:

P6774, L7-8: As the referee correctly stated, a daily climatology can only be derived from the observations using several weeks of data (we are aware of this). Therefore, as mentioned in Sect. 4.4, a different data set which is not specific for the year 1999 but a climatology of several years is used for the analysis of the diurnal cycle. It is the data set labelled as “LISOTD\_LRADC\_V2.2”. This will be mentioned in the section describing the data analysis. For all the other sections the data from the year 1999 is

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used, i.e. the “LISOTD\_LRTS\_V2.2” data set.

P6779, L5: The cloud top height observations are restricted to convective cases. The 3A25 TRMM product contains the convective storm height, which we used as convective cloud top height for this study. It is determined from the precipitation radar (will be mentioned in the revised manuscript).

P6783, L14: We used a fixed conversion factor from number of flashes to molecules of NO, which will be given in the manuscript ( $6.7E26$  molecules/flash  $\rightarrow$   $\sim 15.6$  kgN/flash). The ratio of NO<sub>x</sub> production of IC to CG flashes is reduced by a factor of 1/10. We are aware that these numbers are uncertain, but due to the lack of more detailed information we stay with those. Furthermore, these numbers do only affect the differences in the NO<sub>x</sub> profiles of Sect. 4.5., and have no influence on the distribution patterns of the lightning activity. The vertical NO<sub>x</sub> profiles are determined with the Pickering et al. scheme, as mentioned in the simulation setup section (Sect. 3), but for clarification this will be repeated in Sect. 4.5.

P6786, L9: The typo will be corrected.

P6787, L5: We are aware of the uncertainties in the observations, and they will be mentioned in the revised manuscript. However, from the modelling point of view we have to assume that the observations are close to reality, since the convection and lightning schemes are heavily parameterised and have to be tuned towards the observations, even though they themselves have uncertainties.

P6787, L11: Of course, cloud top height is indirectly physically related to convective updraft velocities. However, even though this is not such a direct effect as the updraft velocity itself, it is physically related to the cloud electrification, and this sentence will be reformulated in a revised manuscript.

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Interactive comment on Atmos. Chem. Phys. Discuss., 7, 6767, 2007.

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