

***Interactive comment on* “The effects of lightning-produced NO_x and its vertical distribution on atmospheric chemistry: sensitivity simulations with MATCH-MPIC” by L. J. Labrador et al.**

L. J. Labrador et al.

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We appreciate very much the referee’s constructive comments.

Introduction: While we agree that a 20 Tg(N) source from lightning is likely to be too high, as we attempt to prove in this paper, the figure is still being used in talks and in informal discussions of the issue. So, while we agree with the referee’s comment, we decided not to drop the 20 Tg(N) from our discussion. We have included a line in the text justifying this.

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Section 2.1, lines 20-22: we don't really understand the referee's point; while the flash activity over the SE USA is slightly underestimated in the model, the activity over most of the Indian subcontinent and particularly over SE Asia, with the exception of the Malay peninsula and Sumatra, is clearly overestimated by more than an order of magnitude. Perhaps the referee got the panels reversed; or something we did not see is unclear in our discussion.

P. 6244: lines 15-16. We completely agree with the referee's view. The first and third assumptions (IC flashes more frequent than CG flashes and dependence of NO_x production on ambient air density, respectively) can also be regarded as canceling each other out even in the event of IC flashes being as effective as CG flashes at producing NO_x. A comment has been added to the text to reflect this fact.

P. 6244: lines 27-28: The phrase "marine continental" has been changed to "tropical marine"

P. 6246: line 2: A source strength of 2 Tg(N) of NO_x from lightning was used for the profiles in figure 2. A remark has been added to the text to this effect.

P. 6246: while figure 2 does a respectable job of providing an idea of how LtNO_x is deposited vertically by each distribution, we agree that a more precise illustration of this in order. To that effect, a table depicting the percentage of LtNO_x deposited in different pressure ranges by each different distribution has been added, along with a discussion thereof in the first paragraph of the page.

Figure 2: In the tropics, clouds do indeed go above 200 hPa and less frequently above 100 hPa. We have extended the upper pressure limit in Fig. 2 from 200 to 100 hPa (and put all the distribution profiles in the same scale for added clarity). Likewise, the percentage of LtNO_x deposited by each distribution between 300 and 100 hPa is depicted in Table 2. While the figure shows LtNO_x deposited as far as ~150 hPa, the values, as shown by table 2, are quite small.

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The suggested technical corrections have been implemented.

Interactive comment on Atmos. Chem. Phys. Discuss., 4, 6239, 2004.

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4, S4041–S4043, 2004

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