

***Interactive comment on “Study of the diurnal variability of atmospheric chemistry with respect to boundary layer dynamics during DOMINO” by B. J. H. van Stratum et al.***

**Anonymous Referee #2**

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Overall the paper is well organized and provides a significant contribution to the field. I recommend the paper for publication with a few minor comments.

I have a few general comments. I feel that a bit more detail on previous work would be useful. In particular, in p 6522, l. 13-19 a few previous studies are listed, but the comment that follows just gives a general statement on the importance of dynamics (which in any case mirrors the general conclusions of the paper). I suggest a more specific comment on what previous studies have found and what is novel about the results you present.

I was also wondering how the box model is initialized? You set fluxes to 0, but the box

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model properties are not the same as MXLCH at  $t=0$ .

Finally, I found the discussion on Figure 5 a bit superficial. It appears that its purpose is simply to compare the MOZART and reduced schemes. In particular, no mention is given to the box model results, which perform comparably to MXLCH, particularly for HO<sub>2</sub> and H<sub>2</sub>O<sub>2</sub>. A comment as to why this is the case would be good, particularly for H<sub>2</sub>O<sub>2</sub>, which has a longer lifetime so might be expected to be affected by dynamics. Furthermore, if OH is relatively insensitive to the dynamics, why is there such a large discrepancy between the reduced and box results (while isoprene, with a longer lifetime, shows very little difference)?

Minor Comments: P6524, l. 5: “Representation OF boundary layer dynamics.”

P6528, l21: “Temporal evolution OF dynamics and chemistry”.

P6528, l25: “...mixed layer EXPERIENCES a rapid...”

P6531, l13: “ This MEANS/IMPLIES that the total O<sub>3</sub> tendency...”

P6532, l19: “...quantification of THEIR relative importance, ...”

P6534, l26: “which neglects the influence OF ABL dynamics”.

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Interactive comment on Atmos. Chem. Phys. Discuss., 12, 6519, 2012.

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