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Interactive comment on “DOAS measurements of formaldehyde and glyoxal above a South-East Asian tropical rainforest” by S. M. MacDonald et al.

Anonymous Referee #1

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The manuscript by MacDonald et al. describes DOAS based measurements of HCHO and glyoxal over a tropical rainforest. The measurements are compared to a single column model and sensitivity studies are performed to gain inside into the effect of various production and loss processes on the concentration levels of those species. Since in particular glyoxal measurements are sparse, the data set itself is of high relevance for the atmospheric chemistry community. The data analysis is sound and the paper is well written. Thus, I recommend publication after some minor revisions:

Page 5909: The description of the MAX-DOAS measurements lacks some information on the data quality (detection limits). This information would be useful and should be added.

Page 5910: In the discussion of Fig. 7 the authors state that there is good agreement

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between the HCHO measurements performed by LP-DOAS and the converted slant column densities for the 2° elevation angles of the MAX-DOAS. What does good mean? A more quantitative comparison (e.g. a scatter plot) should be provided to allow the reader to judge the quality of the intercomparison.

Page 5911: The authors compare their results for HCHO with previous observations published in the literature. They mainly restrict these comparisons to groundbased observations. Nevertheless, I would recommend to compare their HCHO LP-DOAS and the vertical information gained from MAX-DOAS with our publication on airborne HCHO measurements over a tropical rainforest (Stickler et al., ACP 7, 3933-3956, 2007). The agreement seems to be quite good.

Page 5912: I understand that the height of the atmospheric boundary layer is kept constant during the model runs. Is that correct and don't you expect, that the change of boundary layer height over a diurnal cycles has some influence on modeled trace gas levels? I also expect, that the actual NO_x level strongly influence at least the HCHO levels. Therefore, I would recommend to perform an additional sensitivity study with varied NO_x levels.

Discussion of Fig. 9 and 10: Although I agree that there is good agreement between modeled and measured concentration levels within the variability of the observations, it seems to me that model and observations disagree on the diurnal variation. While the model produces a concentration maximum around noon, following the local insolation, the observations indicate maxima much later in the day. Could you please comment on potential reasons for this shift in the observations.

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 5903, 2012.

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