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Atmospheric Chemistry and Physics Discussions

Interactive comment on "A comparison study of regional atmospheric simulations with an elastic backscattering Lidar and Sunphotometry in an urban area" *by* E. Landulfo et al.

Anonymous Referee #2

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Overall comments:

The paper presents measurements from an elastic lidar and Cimel sunphotometer during a specific biomass burning event to highlight the difference and potential impact on a large urban area. The authors also present results from a regional model that are compared to the measurements to better understand the overall performance of the model. The overall premise of the paper presents data to a region that is sparse in measurements and publications but the presentation of the results are limited in scope and provide only qualitative results. The impact of the conclusions are fair and mainly state that there is indication that the model assessment of the burning emissions are

consistent with the measurements. Overall this paper is fair in that the authors provide data that is unique to the region where there is not a lot of active lidar or Aeronet measurements and try to use this data to evaluate a regional model focusing on a biomass burning event. There should be a more focus and analysis for the analysis and conclusions of the model performance.

An editorial review needs to be done for this paper. Outlined below are some of the grammar edits were noted during the review. Abstract: Page 9152, Line 11: remove ‘points out’ Introduction: Page 9152: Line 16 and 17 reword: …. during the dry season, continental scale biomass burning activity occurs mainly…. Line 18: remove ‘has’ Line 19: change ‘got’ to ‘was’ Line 21: add plume after smoke Page 9153: Line 1: change ‘on’ to ‘in’ Line 6: remove ‘a approaching’ Line 7: change ‘determines’ to ‘setup’ and remove ‘does’ from line 8 Line 12: change ‘heavy densed’ to ‘densely populated’ Line 15: change ‘profile vertically’ to ‘vertically profile’ Line 18: change ‘transports’ to ‘transport events’ Line 28: change ‘on’ to ‘out’ Page 9156: Line 2: change ‘tipically’ to ‘typically’ Line 5: for the 300m overlap, what is the FOV? Line 19: remove ‘also’ Page 9157 Line 24: change ‘propertie’ to ‘property’ Page 9158 Line 1: Should ‘distribution’ be ‘shape’. The word distribution implies an extensive property. Line 14 & Line 20: The formatting is not correct in this section. Line 14 looks to be missing a period and ‘he’ should be ‘The’. Line 20 also looks to be having a formatting issue with periods and missing words. It is not clear what this line is meant to state. Line 18: How does the AOT change from level 1.5 to 2.0? This logic is not acceptable and needs to be clarified. References were provided to Aeronet retrievals and the expected changes between the different levels of data should be explained. Page 9159 Line 1: change ‘dispertion’ to

ACPD

9, S2225–S2227, 2009

Interactive Comment

‘dispersion’ Page 9160 Line 23: remove the word ‘to’ Page 9161 Reference to the figures should include numbers such that the reader can determine which one is being referenced. Figure 1: Should include the location of San Paulo on the map for reference. The figure caption should include the days of the data rather than noting ‘some days’. Line 3: Change ‘above mentioned’ to ‘mentioned above’ Figure 2: Why does it only show the four dates. It seems that the transition of interest is near the 27th. It is nearly impossible to see the inset plots of AOT and these should plotted on the same timeline as the AE and Lidar Ratio data. Also, the Lidar Ratio has higher values for biomass and urban sources so it would be hard to distinguish the difference from these two sources. The overall aerosol backscatter distribution would be useful to show as well (curtain plots) during this period for the reader to see the overall altitude distribution. There is much more that could be done with Figures 1 & 2 to make the connection from the data to the model simulations. With AOT values of nearly 1.5 in some of the cases this should be most obvious from the lidar data as is the case for the AOT on 8/30 in Fig. 2.

Table 1: The very large differences in the AOT from the model and Cimel are not fully discussed in the paper. In particular on the 27th were the data showed AOT = 2.1 and the model AOT= 0.8. Was there differences in the temporal or slight mismatch in the horizontal distributions of the model? Again, a more thorough discussion is merited here.

Figure 3: A plot of the correlation needs to be provided (or the correlation fit parameters) to state that there is a good correlation.

Page 9162 Line 8: Change ‘sinergy’ to ‘synergy’ Line 12: The authors have not shown that there is good agreement between the Lidar Ratio and the AE values compared to the model. The plot and discussion need much more focus and analysis to make this point.

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 9151, 2009.

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9, S2225–S2227, 2009

Interactive Comment