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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Exploring the relation between aerosol optical depth and $PM_{2.5}$ at Cabauw, the Netherlands" *by* M. Schaap et al.

Anonymous Referee #2

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The paper by Schaap et al is a useful addition to the growing use of satellite data for air quality work. In this paper the authors study the AERONET AOD-PM2.5 relationship from the ground, use a lidar to assess cloud cover, use a ceilometer to obtain mixing layer height, examine the AERONET AOD-PM2.5 relationship for midday conditions, compare the MODIS AOD-PM2.5 relationship, and finally create a PM2.5 map using these relationships.

The authors certainly understand the problem; otherwise they would not have used the multiple data sets to address these issues. Having said that, the paper is not well written to capture the analysis and results. The abstract and conclusions especially are rather weak and do not give the reader the most important points of this paper. Case in point – If the mixing layer height information did not improve the AOD-PM2.5

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relationship then it should be stated in the abstract clearly. Therefore, I think that the paper needs quite a bit of editing. The authors need to rewrite the paper to provide a well thought out flow to the paper.

Other points

Why is 18 ugm-3 considered high? Are there standards in Netherlands and Europe – like the United States? If so, we need to see a Table of what is considered high and what is low etc…

How good and relevant are the satellite spatial maps in the area? How can we assess the uncertainties in such a broad scale?

Why was the LIDAR not used to assess aerosol heights to understand the AOD-PM2.5 relationship?

Specific comments.

1. Page 2, line 6-7, Inclusion of newer references for health impact of PM2.5 would be good idea. 2. Page 3, para 2, line 7-8, Reference should be ‘Wang and Christopher, 2003’, Also this study did provide any analysis on western USA 3. Page 4, last para of introduction, It will be more appropriate to call ‘section 1’, ‘section 2’ instead of chapter 1, chapter 2 etc 4. Page 4, para 2, line 4-5, CIMEL measure in 10 channels. If this specific CIMEL is built to measure in 4 channels then please specify, otherwise it may create confusion to readers. 5. Page 7, Haij et al, 2007, a brief discussion on MLH retrieval from ceilometer would be useful to readers 6. Page 8, para 1, line 3, Check Levy et al., 2008 papers for revised accuracy numbers and refer them. 7. Page 9, Fig 2, No data for Oct-Nov, any clarification why this data is not used? 8. Page 14, para2 , line 5-6, Terra and AQUA are morning and afternoon satellite respectively. Rewording required to the sentence describing this fact. 9. Page 18, para 2, line 9-10, most of the PM2.5 sites in US comes under EPA network called AirNow not IMPROVE. IMPROVE is a speciation networks,

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8, S7934–S7936, 2008

which does not make daily observations. 10. Page 19, para2, 1-5, this discussion give impression that you are the first one to use collection 5 for such studies. There are studies such as Gupta et al., 2008, Hutchison et al., 2008 (in your reference list), which also used collection 5 MODIS data. 11. Page 20, section 5.2, Change in title of this section would be appropriate, as no mapping has shows under this section. Figure 11 is already discussed in section 4. 12. Page 28, Table 1, Minimum value of PM2.5 is reported as 0.0, does not look like real value? Also, was wondering if you have included 0.0 values in your data while calculating statistics?

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 17939, 2008.