

## ***Interactive comment on “Nine years of UV aerosol optical depth measurements at Thessaloniki, Greece” by S. Kazadzis et al.***

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General comments:

“Nine years of UV aerosol optical depth measurements at Thessaloniki, Greece” by S. Kazadzis et al. is a very complete analysis of the aerosol situation in Thessaloniki over the last decade. The work is based on measurements of AOD, airborne PM-10 samples near the surface, and a backward trajectory model. The AOD data from 2 Brewer spectrometers are calibrated carefully using laboratory and Langley methods. This and the fact that they agree very well with a collocated CIMEL sunphotometer suggest, that the presented data (AOD 320nm, AOD 340nm, and Angstrom exponent for 325–350nm) build a very accurate time series. It allowed the authors to derive a significant decreasing trend in aerosol loading from 1997 to 2006. This trend is confirmed by

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the data series of PM-10 samples. The reason for the improvement of air quality is attributed to a series of measures taken by the Thessaloniki city authorities. Using the backward trajectory model the authors are able to split the seasonal variability of AOD into clusters originating from different directions.

Specific comments:

Page 540, lines 24-25: The sentence “These measurements . . . (Kerr et al, 1981)” is not needed. Measurements of AOD from both MKIII and MKII Brewers are given, which means both are absolutely calibrated. I claim Langley extrapolation is also an absolute calibration.

Page 541, line 26: please state the ozone temperature used in the AOD derivation. It would also be useful to quantify how much (or how little) a variation of the ozone temperature affects the AOD retrieval at 320nm in Thessaloniki.

Section 2.2: add a sentence on how often was the calibration repeated for each instrument.

Section 2.3: is the CIMEL calibrated at Goddard? How often is it calibrated?

Section 2.5: How are the samplers calibrated (brief explanation or literature)? How often are they calibrated (what is the long term stability)?

Figure 3: I suggest connecting the dots by a thin line and plotting the two instruments on top of each other (maybe in gray and black).

Section 4 and Figure 3: are the linear trends taken from deseasonalized data as in figure 8? If yes it should be mentioned, if not the data should be deseasonalized either with the method used in figure 8 or simply be making yearly means before calculating the trend. Also report the uncertainty of the linear trend analysis.

Figure 4: The bottom figure is hard to interpret. I suggest making only one figure with 5 lines (no boxes) for the AOD distribution (4 seasons+yearly, as in figure 7). (Also: text

refers to left and right panel instead to top and bottom panel).

Page 550, lines 10-11, and page 551, line 6: Report the uncertainties of the linear trend analysis.

Page 550, lines 14-27: I do not fully understand this paragraph. The total pollution load over the city went up from 1989-2003, while in the city the pollution went down? So did the actions to reduce pollution (cleaner crude oil etc.) only affect the center and not the suburbs?

Section 6: In figure 5 I see a correlation between AOD and the Angstrom exponent. So the average particle size seems to go down when the aerosol loading goes up. Maybe this can be discussed at the end of section 6. The average Angstrom exponent could also be included in table 2 for each cluster.

Section 6: has a scatterplot of simultaneous PM-10 and AOD 340nm data been done? This could be interesting with respect to the height distribution of the aerosols.

Technical corrections:

Page 539, line 5: “Anderson et al., 2003” instead of “2003a”

Page 539: replace “Section 3 presents” by “Sections 3 to 5 present”

Page 541, line 11: “Jaroslowski and Krzyscin, 2000” is not in references

Page 542, line 5: “from the instrument’s” instead of “form the instruments”

Page 542, line 9: text says “Arola and Koskela, 2005”, in references I find “Arola and Koskela, 2004”

Page 542, line 12: text says “De Backer and Cheymol”, in references I find “Cheymol and De Backer”

Page 553, line 4: replace “2003a” by “2003”

Page 554, line 23: replace “2002a” by “2002”

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