

Interactive comment on “Three-year ground based measurements of Aerosol Optical Depth over the Eastern Mediterranean: the urban environment of Athens” by E. Gerasopoulos et al.

Anonymous Referee #2

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In the present work, the authors show the results of the analysis of 3 year (2006-2008) of ground-based observations of optical aerosol properties in the urban environment of Athens, in the eastern Mediterranean Basin. This analysis is complemented with the clustering analysis of the HYSPLIT backtrajectories in order to establish the main aerosol sources that affect this area. Additionally, a short comparison with MODIS aerosol product is presented.

The manuscript has an appropriate structure and it is well written. The methodology and data set used are appropriately presented. The analyses are performed in a correct way that leads to interesting results, which are contrasted with previous works

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developed in the eastern Mediterranean region.

Although I would like to make some comments and suggest minor suggestions on the contents of the manuscript that they are included in the next paragraphs.

P28284: Some previous analyses with MODIS sensor have been conducted over Athens (Kosmopoulos et al., 2008 Remote Sensing of Environment, 122, 2354-2366, 2008). This study focuses on the seasonal and year-to-year fluctuation of the number of occurrences of each aerosol type. The main conclusion of this study is that the coarse-mode particles exhibit much stronger inter-annual and seasonal variability compared to the urban/industrial aerosols. I suggest mentioning this earlier work in your discussion of your findings.

P28290, line 21: The sentence “ $\frac{A_{440/675-675/870}}{A_{440/675-675/870}} < 0$ shows the dominance of one mode, associated to coarse dust particles” leads me to believe that only coarse mode has associated to $\frac{A_{440/675-675/870}}{A_{440/675-675/870}} < 0$. As indicated by Gobbi et al. (2007), $\frac{A_{440/675-675/870}}{A_{440/675-675/870}} < 0$ shows the dominance of one particle mode. As shown in the literature (e.g. Basart et al., 2009), strong negative values of $\frac{A_{440/675-675/870}}{A_{440/675-675/870}}$ (between -0.5 and -0.2) indicate dominance of fine mode aerosols and under the dominance of coarse mode aerosols, such as desert dust, $\frac{A_{440/675-675/870}}{A_{440/675-675/870}}$ can be negative or slightly positive (between -0.3 and 0.1). Therefore, $\frac{A_{440/675-675/870}}{A_{440/675-675/870}} < 0$ values can be related to the presence of a single mode fraction, independently whether it corresponds to fine or to coarse aerosols. Thus, maybe it could be better that you modify that sentence.

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 28273, 2010.

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