

Interactive comment on “Climatological aspects of aerosol optical properties in Northern Greece” by E. Gerasopoulos et al.

Anonymous Referee #2

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The paper contains original material and is worthwhile to be published. It deals with two (or three) year observations of optical properties in northern Greece with photometers and nephelometers. For this region optical data for a longer period are rare.

Minor changes are necessary.

Title is misleading: climatological aspects suggest periods of 10 years and more...

Appropriate title: Particle optical properties in northern Greece

page 2059, 5: Their frequency distribution have revealed.... frequency of measurements? Please be more specific!

page 2060, 19: aerosol scale height is defined as that height of an exponential profile at which the value is decreased to $1/e$ of the ground value. But I guess this scale height

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is not ment. Please improve!

page 2060, 25: You may use intensive (counterpart extensive) property instead of intrinsic properties.

page 2061, 15: How is the hemispheric background troposphere defined? An average from the pole to the equator, over oceans and continents. Who has measured such a value? Is it derived from satellite observations? If not, please avoid such notion.

page 2061, 23, Lelieveld 2002 paper is related to gaseous pollution, not to aerosols. So, please change. I have never seen any paper concerning aerosol transport from southern Asia to Europe because that has never been found by observations and satellite remote sensing. Are there no lidar-related papers dealing with long-range transport of particles in the free troposphere that could be cited?

page 2063, section 2.3: What's about artifacts in the nephelometer observations by humidity effects? The particles get heated in the nephelometer and dry. Isn't that a problem? The scattering coefficients may be smaller than the ones for ambient conditions. One may discuss that problem when trying to estimate the PBL height from photometer/nephelometer comparisons. 20 percent reduction caused by particle heating may result in 20 percent lower PBL heights (after the correction of the 20 percent reduction in the scattering properties).

page 2065,19: How can comparisons of nephelometer data with photometer data give an idea about high thin cirrus? One can never be sure that ground observations are unbiased (local pollution impact can never be excluded). So, there is no link between ground values and high aerosols or cirrus layers. Leave out!

page 2066, 14-20, Please specify in detail how the Angstrom values are calculated, what wavelengths are explicitly used. The German Weather Service published a ten year observation of optical depth (Weller et al., Ten years of aerosol optical depth observations at the Lindenberg Meteorological Observatory, Contributions of At-

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atmospheric Physics, 71, 387-400, 1998) should be cited. They discuss the Angstrom exponent in detail.

page 2067,21-26: What are the units for sigma: Mm^{-1} ? Please specify!

page 2071, 5-23: It is hard to follow. Please state again the periods for the different two sites. What is the observational period for MAO and what is the period for LAP?

page 2073: I have my doubts that RH values measured at ground can be used to interpret the diurnal cycle of optical depth. Nothing is known about the humidity conditions in the upper part of the PBL. But the moisture in the upper part may have the strongest impact on the optical depth.

page 2073/74: Sea breeze is, to my opinion, the driving force.

page 2076,7: 'homogeneously concentrated' means that the aerosol profile was height-constant? That should be written. 'Homogenous concentration' is not clear enough.

page 2089, Fig.2, plot in the upper right corner: x-axis: a_T not aT !

page 2090, Fig.3: please give UNITS for sigma (upper plots)!

page 2092, Fig.5: Radar plots..... Please avoid Radar! The reader may suggest that radar observations are shown. Please add in the caption: Stars mark the boundaries of the defined sectors.

page 2083, Fig.6: Units for sigma...!

page 2099, Fig.12: As mentioned, 'scale height' is misleading (because it is clearly linked to exponential profiles as the atmospheric pressure profile). One may use 'estimated aerosol layer height' ...and define that height in the text or better in the caption.

Interactive comment on Atmos. Chem. Phys. Discuss., 3, 2059, 2003.

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