

## ***Interactive comment on “Size-segregated mass distributions of aerosols over Eastern Mediterranean: seasonal variability and comparison with AERONET columnar size-distributions” by E. Gerasopoulos et al.***

**Anonymous Referee #2**

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The paper presents data and analysis of aerosol sizes during a two year period in Finokalia, Crete, as representing conditions in central Mediterranean. This is one more important paper that comes out of the same group. In many aspects this paper complements the previous results by providing size distributions and also comparison between in-situ ground measurements and remote sensing of columnar integrated size distributions from AERONET. The value of the paper is not only academic, but it also has some practical aspects to it. For example, it illustrates that for air pollution control it is more important to measure the PM<sub>10</sub> and PM<sub>1</sub>. This is because the PM<sub>10</sub> and PM<sub>2.5</sub>, which

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are commonly measured, are very similar and do not provide better understanding of the processes that occur in the atmosphere.

The paper is well written and clearly understood and should be accepted for publication in ACP. I would however, request a few changes based on the following comments:

- 1) The paper needs improvement in spelling and grammar.
- 2) The name Rodriguez is misspelled.
- 3) Section 3.3 third line - the definition of monthly means for different years is not clear to me. Please describe it better.
- 4) In Fig. 4 there is a sharp minimum at 1 micron, which is not explained properly. I would not have expected such a sharp minimum.
- 5) Page 11 - it is stated that "Aitken 1" is missing in spring. Could it be that these small particles simply stick rapidly to the numerous large and giant particles that are present during this season?
- 6) In the middle of Page 11 - the authors discuss "Accumulation 2" particles in autumn and attribute it to cloud processing. This idea should be expanded. Growth of smaller particles by oxidation is probably not the mechanism that creates these particles. On the other hand, it is possible that CCN in drops that grow by coalescence and then evaporate can lead to the release of larger particles into the atmosphere.
- 7) Fig 7 shows that the AERONET values are always lower than the in-situ measurements. Could you please explain this difference?
- 8) Page 14 last three lines and beginning of the next page - I would think that during winter the relative humidity is higher and the particles aloft will grow more, leading to smaller difference between MMD and VMD. In addition, in winter the mixing height is lower, thus pollution will tend to concentrate near the surface and the difference between the AERONET and the ground measurements should be smaller. Please

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explain better.

9) The correlations between surface mass and columnar volume distributions are not very good (see Figure 10). I therefore do not understand the strong statement that surface measurements could be used to represent columnar distributions.

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Interactive comment on Atmos. Chem. Phys. Discuss., 7, 469, 2007.

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