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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Aerosol physical and optical properties in the Eastern Mediterranean Basin, Crete, from Aerosol Robotic Network Data" *by* A. Fotiadi et al.

A. Fotiadi et al.

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I. General Comments

The paper has been largely re-organized and re-written to present the results simply and succinctly. In particular, the discussion part of the paper (section 3), but also the summary and conclusions (section 4) have been significantly shortened and restructured with emphasis to the seasonal variability, as suggested by the Referee.

II. Specific Comments

1. Conclusions related to annual averages have been downgraded in the abstract and summary since in reality the aerosol properties are characterized by strong seasonal

variations.

2. No such meaning was intended. The aim was to compare the aerosol observations collected at the FORTH AERONET site in Crete with corresponding ones in nearby sites, either in Greece or in the eastern Mediterranean Basin. As for other data collected (not from an AERONET site), to our knowledge there is no independent calibration.

3. The comparison of the FORTH AERONET aerosol data with those from other AERONET stations in the eastern Mediterranean should not be taken as a validation. This comparison reveals some similarities, but also differences, which we prefer to discuss in the text (page 9) rather than through a plot. This is because the present paper focuses on the presentation of the FORTH AERONET station measurements, and not on a comparison with the other AERONET sites. Such a comparison certainly requires a more thorough investigation and can be the subject of a future study.

4. A brief introduction to the measurement and data analysis techniques, which are common to all AERONET stations, is now given (page 4, lines 5-15). More information can be found in the references provided.

5. The installation of the FORTH AERONET station in Crete was decided because of its location at the center of the eastern Mediterranean Basin, surrounded by continental areas producing different aerosol types (e.g. desert dust, fine anthropogenic particles). The signature of these particles, together with that of background maritime aerosols, has been identified through the present study. This is a significant difference to the rest of AERONET stations installed in the eastern Mediterranean Basin (Erdemli, Nes Ziona, Sede Boker) located mainly on coastal or near-coast locations and closer to continental aerosol sources. The results of this study show that the FORTH AERONET station in Crete is well located for capturing dust transport events from North Africa. The climatic effects of aerosols, based on the measured aerosol properties at the FORTH site, will be the subject of a future study where the aerosol

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induced changes on the surface and atmospheric radiation budgets will be addressed in detail using state of the art radiative transfer models. This has been stated in the summary and conclusions (page 19, lines 8-21) and in the Abstract (page 1, lines 17-20).

6. The relevant scatterplot (Figure 6 in previous version) was replaced by corresponding scatterplots for each season (Figures 5a,b,c and d), where the groups of points are now better identified and highlighted in the plots. In addition, the text was re-written in the way proposed by the Referee. Sections 3.3 and 3.5 in the previous version were merged into the new section 3.3, and the conclusions are better supported by the results. When more data become available, which is essential for the application of a tool like the Principal Component Analysis, such an analysis or another similar tool will be applied to distinguish better groups of points. We note that there are no clear separate groups of points in the scatterplots, compared to corresponding plots for other sites, indicating the presence of mixed aerosol populations over Crete, due to the geographical location of the FORTH AERONET site. This has been stated in the text (section 3.3, page 12, lines 1-4).

III. Minor Details

a) Autumn AOT values are no longer referred to as secondary maxima (e.g. page 1, line 4; page 5, lines 6-8). b) The instrumental detection limit is now given in section 2 (page 4, lines 12-15). c) As already mentioned (specific comment 6), Figure 6 (old version) was replaced by the corresponding Figures 5 a,b,c and d, covering each season. d) The active mixing is cited to indicate/explain the simultaneous presence of different types of aerosols in the atmosphere over Crete. e) Figure 6c (Figure 8c in the previous version) is now labeled correctly. f) The labels in Figure 4 (Figure 5 in the previous version) were increased in size to be legible.

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