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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Aerosol climatology: on the discrimination of aerosol types over four AERONET sites" *by* D. G. Kaskaoutis et al.

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1. Length

The length of the revised version has been reduced significantly. That is the 36 page original paper (excluding Tables and Figures) has become a 25 page (excluding Tables and Figures) revised manuscript. The above reduction consists of omitting several paragraphs, which refer to previous studies of general interest with no specific target on the subject of our study. In this way we limit our discussion to our results without extending an extensive comparison of them with those of similar studies. In the context of shortening the paper, Figure 3 was also omitted since the information of the Figure is also included in the next Figure 4 (now Fig. 3).

2. Scope of the study

Our study mainly focuses on the determination and discrimination of the various aerosol types occurring over the four AERONET sites on a seasonal and inter-annual basis. Such results (with classification of various aerosol types studied over more than two AERONET sites) have not been presented in the literature. This gap is fulfilled by the present study. As far as it concerns the suggestion of the referee "to fine-tune the identification algorithm, and then the entire AERONET database would have been processed in order to provide a proper climatology", this will be considered in a future study.

3. Aerosol identification algorithm

The selection of the same threshold values as those in the work of Pace et al. (2006) was deliberate. Pace et al. (2006) analyzed the aerosol loading and properties over Lampedusa island in the middle of the Mediterranean and found the occurrence of air masses traversing the area with different aerosol types. To classify the aerosol types they set two threshold values, one for AOD and one for Angstrom exponent. This way they found various types of aerosols over Lampedusa i.e., urban/industrial, clean maritime and desert dust. Therefore, their results showed the complexity of the aerosol field over Mediterranean and can be considered as covering the main aerosol types worldwide. For this reason we adopted their methodology without trying to tune it to the specific aerosol characteristics at each of the four AERONET sites considered. The relationship of the AOD versus Angstrom exponent has extensively been used for the aerosol types determination. Previous studies (Cachorro et al., 2001; Holben et al., 2001; Pace et al., 2006) as well as our Fig. 4 (in the revised manuscript) reveal different scatter patterns regarding aerosol types. A similar scheme (AOD versus fine-mode fraction) has also been used by Barnaba and Gobbi (2004) for the aerosol type classification over Mediterranean. According to the rationale explained above, we had no reason to reject the definition of mixed-type aerosols given in Pace et al. (2006). In the revised version we also call the mixed-type aerosols as undetermined ones. This category includes aerosol types that do not belong to any of the other three classes.

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Our analysis shows that at almost the four AERONET sites the mixed-type aerosols are present in all seasons and at high percentages. Therefore, none of the other three aerosol types proves to be obvious on annual basis at any of the four AERONET sites, but it can prevail in certain seasons (e.g., forest fires in Alta Floresta or dust outbreaks in Solar Village). This is the second goal of our work.

4. AERONET policy on publications

We offer co-authorship to the four Principal Investigators to the corresponding AERONET sites. We still keep waiting for responses from two of the PIs, the third was satisfied with an acknowledgment and the fourth accepted the co-authorship and his name was added in the end of the author list.

Interactive comment on Atmos. Chem. Phys. Discuss., 7, 6357, 2007.