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Comment

## ***Interactive comment on “Advection patterns and aerosol optical and microphysical properties by AERONET over south-east Italy in the central Mediterranean” by M. Santese et al.***

**M. Santese et al.**

Received and published: 30 January 2008

Interactive comment on &#8220;Advection patterns and aerosol optical and microphysical properties by AERONET over south-east Italy in the central Mediterranean&#8221; by M. Santese et al.

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Received and published: 3 January 2008

The paper presents an analysis of the aerosol properties measured at an AERONET station with the help of additional lidar measurements and air mass back trajectory analysis. The paper describes interesting information which combines detailed statis-

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tics of key aerosol optical parameters and with detailed physical explanation of the phenomena presented. The station is situated in a location of great importance concerning radiative forcing studies and in this frame is a very complex area since it is affected by aerosols coming from a variety of sources. Therefore the analysis presented is worth to be published in ACP. However, an important issue of the manuscript is its structure. Sections are not well organized, the number of plots considering the information that they finally provide is very high and most important the discussion of the optical properties is repeated while analyzing the different aerosol source sections. Finally it is difficult for the reader to follow the authors' arguments especially in sections 4 and 5.

A general and mandatory suggestion is to substantially restructure the manuscript and below are my suggestion for doing this work:

Section 1. The current introduction is ok

Section 2 should be titled: Instrumentation and data used (or something similar) and should include, grouped together in one section, short information on AERONET, Back trajectories methodology, lidar measurements and MODIS and what has been finally used and considered in their study.

\*\*\*\*Title and topic of Section 2 have been changed as suggested.

A separate Section 3 should provide describe the A, B, C, M sectors, including the sector definitions as it is now in pages 16079, 7 &#8211; 16080 1-18, introducing Figure 1 (now seen as fig.2). The example of August 29th presented in 16081-16082, can be used as an argument on why this analysis was performed. Figures 3, 4 ,5 and 6 can be omitted and should be replaced by a table showing the frequency of occurrence per sector and per altitude. One example (one sector &#8211; different altitude trajectories) could eventually be shown as figure 2

\*\*\*\*As suggested, Section 3 describes the A, B, C, and M Sectors. Figure 3 (now Fig.

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2) has not been omitted to provide an example of advection patterns. Figures 4, 5, and 6 have been omitted. A new table (Table 1) has been added showing the backtrajectory frequency of occurrence per Sector and per backtrajectory arrival pressure level.

The analysis of August 29th data has been moved to Section 4 where a general description of the aerosol properties over south-east Italy is provided.

A new Section 4 should provide a general description of the aerosol properties over the station including the current Section 16077 &#8211; 16078 (1-20) with figure 3 (now seen as figure 1 a and b) and section 16080 (20) to 16081 (1-25) with figure 4 (now fig. 7)

\*\*\*\* Done

A new Section 5 should present the sector analysis of the aerosol properties. The section should refer to the previous paragraph through current table 1 and should include the discussion of current figures 9a and b which can be combined in a new single figure 5. The current sections 4.1, 5, 5.1 and 5.2 are difficult to follow going back and forth to already discussed figures. I suggest to include all this to a shortened section where the results will be grouped in sub-paragraphs according to the aerosol parameter presented and not according to the sector. This can be achieved combining figures: New figure 6 can be a combination of current fig10+fig14. New figure 7 can be a combination of current fig11+fig15. New figure 8 can be a combination of current fig12+fig16. New figure 9 can be a combination of current fig13+fig17. New figure 10 will be the current fig. 18.

\*\*\*\* Most of the suggestions have been considered. However, the results have not been grouped according to aerosol parameters. The combined analysis of the h, SSA, g, and Lr is required to infer the aerosol properties and hence the aerosol type of each Sector. We believe that to highlight the differences between different Sectors, it is more convenient to provide figures showing the same parameter for different Sectors, instead of plotting in one figure all studied parameters referring to one Sector.

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Additional comments Abstract: Sector names should be avoided in the abstract and should be replaced by a more general description that helps the reader to understand the origin of the aerosols, so that the abstract is more clear to a reader who would like to see the paper's main results.

\*\*\*\* Done

The authors should also investigate if the parameterization presented by Gobbi et al., (ACP, 7 453-458, 2007) can help in analyzing in more detail the result shown in current figure 7a and b.

\*\*\*\* The analysis reported at the end of Section 5.5 clearly shows that the parameterization presented by Gobbi et al., (ACP, 7 453-458, 2007) can help in analyzing paper results.

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Interactive comment on Atmos. Chem. Phys. Discuss., 7, 16071, 2007.

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