Answer to Reviewer #1

The authors greatly acknowledge the anonymous reviewer for carefully reading the manuscript and providing constructive comments. In the following lines we answer the questions and comments from reviewer #1.

1.- The paper presents multi-year aerosol optical depth data collection in Granada, Spain. Measurements were made during daytime and nighttime using sun and star-photometers. The paper is well written and statistical analysis shown in it may be useful for various modelling and remote sensing applications. The Introduction underlines very clearly goals of the current study. The paper will become much stronger scientifically if the authors include either synoptic (air mass) or meteorological analyses or both in conjunction with optical properties in their consideration. Also for the daytime measurements aerosol retrieval are available and could be included in the seasonal analysis. However I understand that the major point the authors wanted to make is to present the dataset that contains several years of day and night AOD data record.

We agree with the referee that the analysis of aerosol optical properties dependence on the air-mass types affecting the study area would help to make the present paper much stronger scientifically. However, the inclusion of this analysis in the new manuscript version would extend the current paper size greatly. Currently, we are preparing a new paper about the dependence of day- and night-time columnar aerosol properties on air-mass types affecting our study area using multiyear aerosol data. However, according to the other referee suggestions, we will include two case studies in the new manuscript (one for summer and another for winter) to study day-to-night aerosol dynamic. In both case studies, we will include detailed analysis of aerosol optical properties at day and night according to the different air-mass types that affected the study area during these case studies. Five days backward-trajectories computed by the HYSPLIT model will be use for classifying the air-mass types affecting our study area.

Table 1 shows the mean AOD and α obtained in each day and night between 18 June and 1 July 2008 and the associated air mass types, while Table 2 shows the same results but for the period from 21 January to 1 February 2008. We also include the origin where the different air-masses were generated. From both tables we can observe a high dependence of AOD and α on the air-mass types that affected our study area, both at day and night time. High aerosol load associated with low Angström exponent are observed both at day and night during Saharan dust transport over the study area, while during Atlantic air-masses low aerosol load with variable values of Angstrom exponent are obtained, both at day and night time. No significant differences were observed between aerosol properties obtained at day and night for each air mass class. Furthermore, the analysis of Gobbi diagrams for the summer case (see Figure 3 in the answer to the other referee) show an increase in both fine mode radius and fine mode contribution to aerosol optical depth at night-time, which is independent of the air mass types affecting the study area. All these findings will be included and discussed in the revised manuscript.

Finally, daytime aerosol properties have been included in the seasonal analysis in the old manuscript version. In the revised manuscript we will be more careful making clear this point.

References

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		Day-time				*Night-time*	
Date(2008)	**AOD(440)**	**α(440-870)**	**Air-mass origin**	**Date (2008)**	**AOD(440)**	**α(440-870)**	**Air-mass origin**
18 June	0.09 ± 0.01	0.69 ± 0.22	North Atlantic	**18-19 June**	0.12 ± 0.01	0.88 ± 0.18	South Atlantic
19 June	0.15 ± 0.01	0.79 ± 0.13	North Africa	**19-20 June**	0.18 ± 0.01	1.19 ± 0.10	North Africa
20 June	0.17 ± 0.01	1.00 ± 0.07	Iberian Peninsula	**20-21 June**	1.17 ± 0.04	1.13 ± 0.06	North Africa
21 June	0.13 ± 0.01	1.01 ± 0.07	Iberian Peninsula	**21-22 June**	0.13 ± 0.01	1.09 ± 0.07	Iberian Peninsula
22 June	0.24 ± 0.11	0.40 ± 0.21	Sahara Desert	**22-23 June**	0.34 ± 0.02	0.47 ± 0.06	Sahara Desert
23 June	0.58 ± 0.07	0.24 ± 0.09	Sahara Desert	**23-24 June**	0.24 ± 0.03	0.71 ± 0.16	South Atlantic
24 June	0.15 ± 0.02	1.04 ± 0.07	South Atlantic	**24-25 June**	0.13 ± 0.02	1.06 ± 0.18	South Atlantic
25 June	0.21 ± 0.06	0.5 ± 0.3	South Atlantic	**25-26 June**	0.34 ± 0.02	0.44 ± 0.05	Iberian Peninsula
26 June	0.30 ± 0.04	0.33 ± 0.04	Iberian Peninsula	**26-27 June**	0.28 ± 0.03	0.59 ± 0.07	Iberian Peninsula
27 June	0.22 ± 0.18	0.89 ± 0.18	Iberian Peninsula	**27-28 June**	0.33 ± 0.04	1.35 ± 0.08	North Africa
28 June	0.28 ± 0.02	1.36 ± 0.09	Iberian Peninsula	**28-29 June**	0.29 ± 0.03	1.40 ± 0.14	Mediterranean Sea
29 June	0.25 ± 0.03	1.35 ± 0.11	Mediterranean Sea	**29-30 June**	0.46 ± 0.05	1.03 ± 0.09	Mediterranean Sea
30 June	0.50 ± 0.03	0.78 ± 0.05	Mediterranean Sea	**30 June 1 - July**	-----	-----	Mediterranean Sea
1 July	0.22 ± 0.03	0.56 ± 0.11	Mediterranean Sea	**1-2 July**	-----	-----	Atlantic

Table 1: Mean values of day- and night-time aerosol optical depth (AOD) and Angström exponent as well as the associated air-mass types that affected the study area for every day and night between 18 June and 1 July 2008

Day-time				*Night-time*			
Date (2008)	**AOD(440)**	**α(440-870)**	**Air mass origin**	**Date (2008)**	**AOD(440)**	**α(440-870)**	**Air mass origin**
21 January	0.08 ± 0.02	1.05 ± 0.18	European Continent	**21-22 January**	0.11 ± 0.02	1.14 ± 0.20	Iberian Peninsula
22 January	0.12 ± 0.02	1.21 ± 0.05	North Atlantic	**22-23 January**	0.16 ± 0.05	0.70 ± 0.14	North Atlantic
23 January	0.09 ± 0.02	0.95 ± 0.11	North Atlantic	**23-24 January**	0.17 ± 0.02	0.66 ± 0.14	North Atlantic
24 January	0.21 ± 0.02	0.82 ± 0.24	North Atlantic	**24-25 January**	0.19 ± 0.03	0.92 ± 0.18	North Atlantic
25 January	0.27 ± 0.03	0.82 ± 0.17	Atlantic – Iberian Peninsula	**25-26 January**	-----	-----	European Continent
26 January	0.20 ± 0.03	1.20 ± 0.14	European Continent	**26-27 January**	0.23 ± 0.05	1.06 ± 0.08	European Continent
27 January	0.19 ± 0.03	1.28 ± 0.10	European Continent	**27-28 January**	0.24 ± 0.06	1.28 ± 0.15	European Continent
28 January	0.21 ± 0.02	1.36 ± 0.08	Mediterranean Sea	**28-29 January**	0.21 ± 0.02	1.08 ± 0.13	Mediterranean Sea-North Africa
29 January	0.20 ± 0.03	1.26 ± 0.10	Mediterranean Sea	**29-30 January**	0.21 ± 0.05	1.11 ± 0.17	Local
30 January	0.12 ± 0.03	1.02 ± 0.17	Iberian Peninsula	**30-31 January**	0.15 ± 0.02	0.97 ± 0.08	Atlantic – Iberian Peninsula
31 January	0.15 ± 0.03	1.05 ± 0.13	Iberian Peninsula	**31 January- 1 February**	0.19 ± 0.02	1.09 ± 0.13	Iberian Peninsula
1 February	0.16 ± 0.03	1.11 ± 0.18	North Atlantic	**1 -2 February**	-----	-----	North Atlantic

Table 2: Mean values of day- and night-time aerosol optical depth (AOD) and Angström exponent as well as the associated air-mass types that affected the study area for every day and night between 21 January and 1 February 2008.