The paper analyzes a data-set of radiometric data coming from the Alboran Island, located in Western Mediterranean Sea, far about 150 km from Malaga city and 50 km from North-Africa coast. Authors analyzed the period July 2011- January 2012.

This can be a good observation point to study aerosol mixing effect of background aerosol with dust particles from Sahara, or with polluted emissions from ships crossing the Mediterranean Sea.

To determine spatial and temporal variation of aerosol properties, authors complete their study comparing data from Alboran with coincident data from Malaga (Spain), Ojuda (Morocco) and Palma de Mallorca Island (Spain). Moreover they compare Alboran data with ship sun photometer measurements obtained during a cruise from the Black Sea to the Mediterranean Sea in the period July-November 2011, in the framework of the Maritime Aerosol Network (MAN).

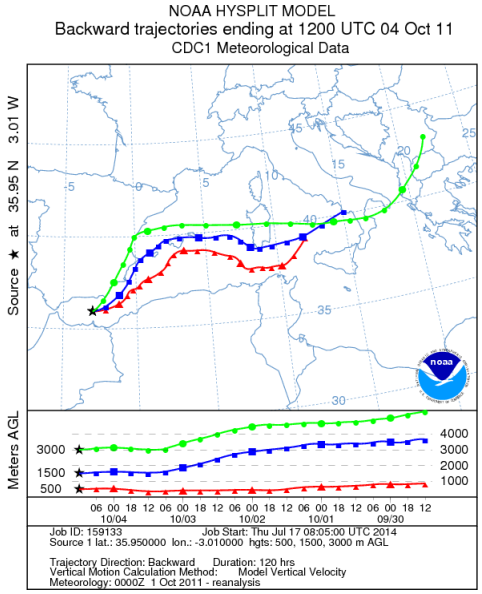
Finally, they try to derive information about the possible effects of the EU Directive on ship emissions from long-term radiometric data obtained in Malaga.

This paper can be published on ACP under major revisions.

In the following the critical points to be carefully revised.

- A great part of the Introduction consider the ships as sources of air pollution, due to their SO_2 emissions by which sulfate aerosol derive. However the paper, dealing with radiometric measurements only, do not consider SO_2, neither sulfates data. For this reason, this part of the Introduction should be omitted or rewritten according to the treatment of this part in the corresponding paragraph.
- Page 6: authors describe the site characteristics and the possible sources affecting the atmosphere in Alboran. According to the regional circulation and in absence of local sources, they expect Alboran island to be affected by anthropogenic pollutants from Europe and desert dust from North Africa. They should consider also the Mediterranean Sea as an aerosol source.
- Page 9: Differences among mean values parameters obtained with present study and those reported in literature could depend, also, on different air masses circulation and different periods and duration of the measurements campaigns.
- Page 9: 40% is not a poor percentage of background marine conditions. Please, delete "only".
- Page 9: Looking at the work of Smirnov et al., 2002 (table 3), it can be seen that pure maritime conditions correspond to $\tau(500) < 0.1$ and alpha< 0.8. The values considered by the authors of present work ($\tau(500) < 0.15$ and alpha< 1) correspond to mixed maritime conditions. In order to verify the goodness of the Smirnov's criterion for pure maritime situations, they should examine measurements fitting the conditions $\tau(500) < 0.1$ and alpha< 0.8. The day under examination (26 August 2011) does not always fulfill this last condition. In any case," background conditions" should correspond, by definition, to low aerosol loading, that is very low AOD values. Moreover, due to the location of the measurements site, it would be expected to find marine aerosol as one of the major components of background conditions. It is interesting to note in figure 2a-b how conditions of poor aerosol loading in Alboran correspond to 1< alpha < 1.5. This could suggest that background conditions are actually characterized by marine particles, both in their fine and coarse components. Measurements of single scattering albedo, if available, could represent a useful tool to identify and classify optical particles properties.
- On page 7 authors say they use HYSPLIT model with CDC1 Meteorological data, but figures 3b and 4c have been calculated with GDAS model. Authors conclude that measurements obtained from 30

September to 4 October are affected by polluted air-masses coming from North-Italy and report in figure 4c, as an example, HYSPLIT back-trajectories at 12:00 on 4 October 2011 with GDAS Meteorological Data. Looking at the figure this peculiarity do not appear, rather the trajectory ending at 1500 m suggests a strong presence of marine particles. Also the back-trajectories derived with the CDC1 data-set and reported in the figure below highlights a strong marine contribution to the aerosol load. For this reason authors should re-discuss this part of their comments.



- Figure 5: Along with monthly mean values of δ_a, δ_F, δ_C , monthly mean values of alpha and FMF should be reported in another figure.
- Page 12: By the light of the previous considerations, authors should revise the comment on the figure 4c related to the pollution transported from Northern-Italy.
- Page 12: the strong reduction of the aerosol load during November-January could be related to the wet deposition too.
- Page 13: For a better comprehension of the data analysis, authors should report, for each comparison, the number and the periods of coincident measurements days.
- Pages 13-14: Similar mean values of δ_F in Alboran and Malaga suggest similar concentrations of fine particles and, in particular, anthropogenic particles that are related to anthropogenic activities in Malaga and to ships emissions in Alboran. Did the authors verify the air masses paths for both sites in days with similar δ_F ?
- It is recommended to show on different plots, as done in figure 6 for Malaga, the comparison between Alboran and Oujda and Alboran and Palma de Mallorca.
- The conclusion on the role of ships emissions on the Alboran atmosphere at the moment can be only an hypothesis. Analysis of radiometric data over more than one year (8 months) can better assess this. Anyway, only chemical analysis of particles sampled in-situ under different air masses circulation can unambiguously ascertain this.
- Page 15: Authors report the mean AOD(500) value for the entire cruise period (0.22 ± 0.12) that suggests a large aerosol load. This consideration is unimportant, since on table 3 mean AOD(500) values for each sector of the cruise depict different conditions, according to the crossed area (0.14 (East. Med $\leq$ AOD(500) $\leq$ 0.35 West Med.). Moreover, the periods compared are different and aerosol loading can change also according to the seasons. The same consideration can be done for the other parameters. On the other hand, authors themselves highlight this on page 16, lines 9-11.
  Page 15: On the basis of previous considerations, the comment on figure 4 is incorrect.

- Page 16: North-Eastern Europe is also an area strongly affected by biomass burning during summer.
- Page 16: Authors explain the reduction of fine particles in Eastern Mediterranean from summer to autumn with the wet deposition and a less effective secondary aerosol formation. Wet deposition can be effective for large particles too.
- Table 4: For a more complete information, authors are requested to report the number of coincident measurements Alboran/cruise sector for each comparison.
- Page 17: Authors compare in table 4 the mean values of the radiometric parameters obtained in Alboran and in the different sectors of the cruise. They calculate these parameters grouping data from the same sector, although measurements were performed in different seasons. This could lead to uncorrect conclusions.
- Page 17: In a previous paragraph authors have strongly highlighted the similar contribution of fine particles to the AOD both in Malaga and Alboran: in one case they were mainly related to anthropogenic activities, in the other to the ships emissions. After the discussion in paragraph 3.4 one can derive that fine particles dominate Black Sea, central and eastern Mediterranean, unlike Alboran. This would mean that ship emissions in Alboran are not so important? In any case the possible ship emissions contribution in Alboran is lower than the contribution from anthropogenic emissions over Black Sea, central and eastern Mediterranean. Finally, are there information on the traffic of ships crossing Black Sea, central and eastern Mediterranean sea and their related emissions?
- The paragraph on the effects of the EU regulations on the air quality in Malaga seems very untied from the rest of the paper and should be removed. In fact, radiometric data only are not enough to evaluate aerosol loading dynamics at the ground. This can be an argument for a different paper, supposed that measurements from ground-based instruments are analyzed together with columnar ones.
- Page 19: Authors should revise the percentage of measurements in background conditions, according to the previous observations on what are the background conditions.
- Page 19: The conclusion "The mean value of δ_F(500 nm) over Alborán Island was comparable to that observed over the other three nearby AERONET stations, suggesting homogeneous spatial distribution of fine particle loads over the four studied sites in spite of the large differences in local sources." should be verified because, at the moment, the reader does not know how many coincident measurements have been considered for the comparison of each measurements site.
  Finally, all the conclusions should be revised according to the revisions required.

Minor revisions

- Figure 2a: For sake of clearness it would be better to report mean AOD values at two wavelengths.
- Page 5, Line 12: Authors have already said that Western Mediterranean area is poor of aerosol measurements.
- Geographical coordinates of Alboran in tnhe abstract are different from those used for back-trajectories calculation and reported in the corresponding plots.
- Page 14: It is unnecessary to repeat that the comparison between Alboran and Oujda was done with coincident measurements.
- Page 15: change Figure 7c in Figure 7b.
- Page 17, line 3: change "lower" with "higher".
- Page 17, line 6: delete "significantly".
- Page 17, line 18: change "can explains" in "can explain".