

Interactive comment on “Source contributions to 2012 summertime aerosols in the Euro-Mediterranean region” by G. Rea et al.

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We are grateful to François Dulac for his careful editorial and scientific review of the initial and discussion manuscript. Please, find hereafter our point-by-point response.

-Regarding the surface PM dataset that does not cover the Mediterranean basin, I would like to stress that there are 2 datasets available from background stations sited in the Island of Corsica within the NW Mediterranean basin that you would be welcome to include in your analysis; they are located at Venaco (660 m in alt., PM_{2.5} until 9 July and PM₁₀) and Ersa (535 m in alt., PM₁₀ only, from June 11 on); I could send you the corresponding data files, originally available from the local air quality agency web site and MISTRALS/ChArMEx data base.

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These datasets are welcome to improve the statistics for the evaluation of the model. The two additional rural stations have been added to the new version of the manuscript, they belong to the sub-region MED-We that contains now 171 stations for PM₁₀. This sentence has been added in Section 2.1: "Two additional rural stations located in Corsica in the frame of the ChArMEx project are also taken in consideration (Venaco and Ersa).", and the references to the Airbase stations along the manuscript have been modified in order to also mention ChArMeX stations.

-In section 2, I would expect some statistics on the number of days with available information from the various observational data sets. As a consequence, I suggest an additional figure following the format of Fig. 1 including 4 maps respectively showing (i) PM₁₀ stations, (ii) PM_{2.5} stations, (iii) AERONET stations, and (iv) MODIS pixels, all equally colour-coded by the number of days with observations during the considered 92-d period.

A new figure in the manuscript has been added with the number of days covered by each type of observation used (AirBase stations with PM₁₀ and PM_{2.5} concentrations, AERONET stations with 500 nm AOD, and MODIS AOD). Three sentences have also been added to Sections 2.1 and 2.2:

- For Airbase stations: "The average concentration from 1 June to 31 August 2012 at the AirBase PM₁₀ stations is shown in Figure 2, with the number of days with data shown on Figure 1. Almost all the stations present data every day of the studied time period."

- For AERONET stations: "During the period of the simulation and within the domain, data from 53 stations of the network are available, with values each day of Summer 2012 (Figure 1)."

- For MODIS data: "The data coverage over the studied time period is shown on Figure 1. The Mediterranean Basin presents AOD values almost every day, particularly for East Europe and the Balkan, where a lack of AERONET or AirBase stations is noticed."

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The North of Europe is under-represented during the period, due to recurrent clouds in the area."

-The quality of satellite products evaluated globally may significantly vary in space and time. I would expect a comparison between collocated MODIS and AERONET data to confirm the quality of the MODIS AOD for the considered sub-regions.

A succinct comparison (mean, correlation and rmse) in each region between MODIS and AERONET data has been conducted, to be sure of the coherence between both in all regions. In the new manuscript, we thus added in Section 2.2: "The AOD at 550nm from the AERONET and MODIS datasets have been compared over the studied region and time period. Both datasets are coherent in variability and order of magnitude: correlation coefficients from 0.71 in MED-Ea to 0.96 in NEU-We and a slight overestimation of MODIS compared to AERONET measurements (mean fractional bias of 7% on average)."

-In Figure 10, you could add the standard deviation on the plots, at least along the total (REF) profiles; vertical bars might also help visualizing model altitude levels.

The Figure 10 (now Figure 12 in the new manuscript) with standard deviation bars has been redone with vertical bars along the REF profile only for clarity, as suggested. Bars on the other sensibility profiles makes the figure difficult to read.

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