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Atmospheric Chemistry and Physics Discussions
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Interactive comment on "Aerosol radiative effects in the ultraviolet, visible, and near-infrared spectral ranges using long-term aerosol data series over the Iberian Peninsula" *by* D. Mateos et al.

Anonymous Referee #1

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General comments:

Mateos et al., 2014 presents aerosol radiative effect (ARE) obtained at six Iberian sites in different period for each station covering from 2000 to 2012. Also, the aerosol forcing efficiency (AFE) is obtained. The ARE and AFE were calculated in the UV, VIS, NIR, and SW spectral regions. The last is a novel result for the region. It is used data on aerosol optical properties from AERONET and atmospheric radiative transfer models. So, the paper addresses relevant scientific questions within the scope of ACP. The

principal objective of the paper is to analyze the behavior or trend in aerosol optical properties and its radiative effect to produce a characterization of the aerosol over the Iberian Peninsula. There were also obtained the relation of the ARE with the aerosols properties. This paper is interesting, but I have some comments that are informed below. I have two points to specify, the first related with the discussion of the results and a description of the results or phrases. Some examples are given below in the specific comments. The second point is related with the presentation of data you should give more details in the discussions, when comparing with other reports or show dataset. The originality of the results must be showed. I propose to approve the paper for publication, after some major revisions, corrections and modifications. I hope the future version will have an improvement of the quality of the results.

Specific comments:

Abstract; Page 8781 Line 7: "climatology"? I suggest substituting by "climatological or climatologic". Introduction Page 8783 Line 15: Which six stations? You used the term "the six stations" and It is the first time you mention these stations in the text... Which time period? It is the first time mentioned in the text. I propose to organize this paragraph, introducing these points at least in general sense. Section 2 Page 8784 Line 1: My suggestion is to change the title "Aerosol ground-based data". The term ground-based is usually applied to measurements or instruments. Page 8784 Line 4: Why do you select only these six stations? Did you based in a specific criterion, the number of years? I propose to add this information in the text. Page 8784 Line 4: Cimel CE-318 ?? Page 8784 Line 7: Which selected wavelengths? Please, could you mention? Page 8784 Line 24: Why do you mention "absolute uncertainty about 0.03-0.05"? Dubovik et al., 2000 report in Table 4 as higher limit the value of 0.07. Page 8785 Line 10: Why do you select the value 0.15 as a threshold to AOD440? Please, explain in the text. Was the value of AOD = 0.15 excluded in the considerations? Because do you show the sign higher than or below than but not equal. Page 8785 Line 20: at 400 nm?. Fix it. Page 8785 Line 25: Why do you use the fixed values

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of SSA (0.90) and g (0.75) for the cases with AOD<0.15 at 440 nm? I think you must explain it in the text due the representatives of the data in the region. Page 8786 Line 3: Which time interval is the "investigated period"? I think you must explain it, you mention in the abstract a period between 2004 and 2012, but there are different time intervals for all stations (Table 1). Page 8786 Line 10 and Page 8787 Line 1: These sentences are the same, could you fix it? Page 8787 Line 13: You mention "In each interval, these properties are considered as wavelength independent." Which implications have this assumption to the calculations? How do you manage this consideration in the NIR interval when you have two values? Section 4 Page 8788 Line 21, Page 8789 Line 6, 16, 22: I suggest to change the term "climatology" by other term like statistical or simply the annual behavior. Page 8791 Line 8: You establish that "The temporal trend of aerosol load can be established over the last decade in the Iberian Peninsula". You have only one station with 10 years, El Arenosillo, the others stations have less or equal than 9 years. How could you establish the trend in one decade if you have not 10 years of data? There are stations with missing data in the time interval. Figure 4: show the yearly mean values of COD, apparently for the Granada station there is not AOD value for the 2009. Also for the station Cabo da Roca there are not values for the 2008 and 2009 years. These are not explained in the text. How can affect it to the trend calculation? There are not discussions about the causes of the trend in the Iberian Peninsula. Section 5 Page 8791 Line 22: The title has the words inter annual and intra-annual evolution different to the word climatology used in the Section 4. Could you use an uniform terminology? Could you take care of the words daily and yearly or yearly mean value of COD?. Page 8792 Lines 1-2: You mention ARENIR presents a more stable pattern, based in the results show in the figure 5. I don′t see this more stable pattern, the pattern is similar in the three spectral bands with inter-annual changes. Page 8792 Lines 9-10: you mention the contribution of the slight reduction in the radiative effects of the atmospheric aerosol. But you do not discuss the reasons for this small reduction of ARE for the individual stations. Page 8795 Line 5: You write the phrase "AFENIR shows the weakest effect caused by aerosol absorption". Could you

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give some discussion about it? Page 8795 Lines 6-21: You describe some reports AFE but you do not discuss the relation with the results in the work. Page 8795 Lines 6-21: You describe some reports AFE but you do not discuss the relation with the results in the work.

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 8779, 2014.