Atmos. Chem. Phys. Discuss.,
https://doi.org/10.5194/acp-2020-1013-RC2, 2020

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Aerosol radiative effect during the summer 2019 heatwave produced partly by an inter-continental Saharan dust outbreak. 1. Shortwave dust-induced direct impact" *by* Carmen Córdoba-Jabonero et al.

Anonymous Referee #2

Received and published: 22 December 2020

General comments

In this study, the shortwave dust direct radiative effect and the contribution of coarse and fine dust components is investigated for two European cities, during a Sahara dust outbreak, using the synergy of AERONET and MPLNET measurements and the POLYPHON method. This study is a comprehensive analysis of this dust event describing the origin of dusty air mases and their trajectories, separation of coarse and fine dust components profiles and finally investigating their direct radiative effect. This is a very interesting work and the results for the shortwave direct radiative effect of

dust and its coarse and fine components are of particular interest for satellite remote sensing measuring techniques. I think that the analysis is scientifically sound and the manuscript is generally well-written. I have made some suggestions for improvements below.

Specific comments

Lines 164-165: Dust direct radiative effect maybe instead of " . . .dust radiative effect"? The acronym DRE is usually used for Direct Radiative Effect

Lines 357-358: Instead of "using AE440-870" maybe better using AERONET AE440-870

Line 419: The authors give in this line the DOD values for BCN from 24J to 27J that varies between 0.13 and .26, but I suggest to the authors to provide here and in the rest of the results section the wavelength that these values are refer to, because later in this paragraph results from other studies are provided and referred to specific wavelength.

Line 448: Please define the acronym BOA or rephrase to SRF. The same for legend at fig 8c.

Lines 489-492 & 557-561: These positive trends of fine mode contribution to dust direct radiative effect are statistically significant?

Line 511: Maybe instead of "in the range of values" to rephrase to close to these values?

Line 563: Maybe apart from the day, the location may be referred too, like the day of 26J in BCN

Lines 627-628: I would suggest to include here, and in the rest of the paragraph, the wavelength that DOD values are referred to, like in case of the other optical properties.

Line 670: I would suggest to add inside the parenthesis: DRE peak at TOA

Technical corrections

Line 341: AE440-870 instead of AE440-8

Line 342: AE440-870 instead of AE440

Line 410: was also calculated instead of “is also calculated”

Line 411: was calculated instead of “is calculated”, two times in this row

Line 429: Figure 9a instead of Figure 10

Line 499: was reached instead of “is reached”

Line 500: I suppose the authors refer to Fig. 8a

Line 514: DREDf(SRF) instead of DREDfDRE(BOA)

Line 526: SRF instead of BOA

Line 560: SRF instead of BOA

Line 584: SRF instead of surface inside the parenthesis

Interactive comment on Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2020-1013, 2020.