

# ***Interactive comment on “Dust impact on surface solar irradiance assessed with model simulations, satellite observations and ground-based measurements” by Panagiotis G. Kosmopoulos et al.***

## **Anonymous Referee #1**

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### General comments:

The manuscript describes and analyses a strong episode of dust on the eastern Mediterranean region, by using satellite, surface and models for estimating the impact of dust on surface radiation.

The analysis is sound and merits publication in this journal. It is also of interest for applications such as solar energy forecast. However it would be interesting to add real measurements of solar energy plants to the estimations here described, if available. In any case, only minor comments are asked to be taken into account.

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## Specific comments:

- Page 2, lines 24-25: please state the reason to choose LibRadTran model among the different models available (if any specific reason). It would be useful to state briefly the advantages. Cite accordingly. - Page 4, line 15: "the temporal resolution of AERONET measurements is very high ( $\sim 1$  per 10 minutes)". This statement is relative. AERONET performs direct AOD measurements broadly every 15 minutes. Other instruments measure the AOD every 1 minute or less. So I do not consider the temporal resolution to be very high in relation to other instruments available. - Page 7, line 18: what is the comparison of CALIPSO and MODIS in terms of AOD for the specific episode? - Page 8, lines 14-27: only level 2 retrievals should be used for climate data records, although level 1.5 are still useful for analysing specific cases. The authors decided to use only level 1.5 data. Do the authors consider that level 2 data criteria were too strict for this particular case, based on their experience or other simultaneous measurements? Could the authors state which AERONET criteria were decisive for not attaining level 2? - Page 8, line 31-32: for the 8 year climatology, level 1.5 or level 2 was used?

Minor corrections: - Page 7, line 8: "extends" or "is extended" - Page 7, line 18: CALIPSO - Page 8, line 30: "by comparing"? - Page 10, line 3: please revise - Page 10, line 6: describe figure 9 before passing on figure 10 - Page 10, line 11: perhaps I missed something, but I would say you refer to AOD instead of radiative forcing. - Figure 5: add axis units - Figure 6: avoid using smoothed lines between points, as in the other figures - Figure 8: plot c, state UV index or units. Same for caption.

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