

Interactive comment on “North African mineral dust sources: new insights from a combined analysis based on 3D dust aerosols distributions, surface winds and ancillary soil parameters” by Sophie Vandenbussche et al.

Anonymous Referee #2

Received and published: 2 June 2020

This manuscript described a new algorithm for applying satellite product for identifying dust particles at source and downwind areas, with solid method and detailed analysis of employed dataset. As mentioned in the manuscript, dust plays an important role in the climate system and this study would be a good supplement to constrain the emission, transport, and atmospheric burden of dust in addition to the modeling method and other satellite products. The manuscript is well organized with fluent writing, therefore I would like to recommend it to be accepted for publication with minor revision if the following comments could be properly addressed:

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Comment#1. Line#82-95: what's the limitations/advantages of these approaches, and how the new method promoted in this study can address those challenges?

Comment#2. Line#75: why anthropogenic influence is mentioned here? Can the method described in this study be applied for human-driven dust from cropland road dust?

Comment#3. Line#96: "The goal of this work . . ." this sentence doesn't give any clear information with "additional information" and "still another approach"

Comment#4. Line#121&Line#130: It's interesting to comment on "aerosol species", are there any satellite products addition to TIR available to distinguish mineral dust particle from other aerosols? How sea salt is excluded from TIR? Can other satellite sensors with TIR bands be used with the same method to identify dust as IASI?

Comment#5. Line#163: So MAPIR relies on CLIPSO to determine vertical profile of dust?

Comment#6. Line#168: this is confusing, line#150 mentioned the data is from IASI cloud-free measurements, so the AOD=5 and 200-350K is setup as double screening of cloud spectra?

Comment#7. Line#190: what's the depth of soil moisture data, and what's the depth we need to pay attention for considering dust elevation?

Comment#8. Line#250-252: models use "friction velocity", it is not equivalent to the wind velocity. Have you tried sensitivity analysis by changing the value of this threshold?

Comment#9. Line#269: As the land cover is multi-annual mean, what's the temporal resolution of NDVI?

Comment#10. Figure 5: I would rather prefer not use google maps figure in a scientific journal publication, there are a lot dataset could be used here to identify the

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geographical condition.

Comment#11. Figure7&Figure8: It's interesting to see the diurnal pattern, please discuss why some places and months (e.g., Aug) show larger difference.

Comment#12. Section4.4: long-term trend is of special importance to understand the climate effect of dust, please consider add time-serious analysis of the result, for example, annual variations for the whole study period, instead of 3-year aggregation.

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