

Earth Syst. Sci. Data Discuss., referee comment RC2
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Comment on **essd-2021-358**

Julie Letertre-Danczak (Referee)

Referee comment on "The MONARCH high-resolution reanalysis of desert dust aerosol over Northern Africa, the Middle East and Europe (2007–2016)" by Enza Di Tomaso et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2021-358-RC2>, 2022

This article on the data set of reanalysis from MONARCH over Northern Africa, Middle East and Europe for 2007-2016 is well documented.

The explanation of the data set is rich of information and the metadata are clear.

However I have few comments on the data set:

Some confusion are made on between Modis Collection 6 and collection 6.1 (some clarifications are needed).

In the table 1 which is the overview of the experiment that has generated the data is missing the data assimilation window (it is mentioned at the earliest in section 5, adding it in the table will be beneficial).

The dust bins description is referred but again a table making an easy finding of the information will be helpful for someone who would like to use the data.

The organisation of the sections should be revisited (the section 6 should come directly after section 3 as it is more details on the model).

2 more general comments:

1) The output of this experiment should be compared to a denial experiment where no data assimilation will be performed to understand why the emission scheme is over producing (issue with the scheme and the climatology behind? scheme loaded with dust transport? ...) That will be interesting to conduct maybe for an other article.

2) The comparison with an independent set of data: Modis is evaluated against AERONET, so if your system is converging toward your data by your data assimilation, it seems logical that it will also converge toward AERONET even if it is not a guarantee. I would suggest that you add another independent set of data in the evaluation process for the eventual article that I have suggested before (lidar, dry deposition measurement, ...).

The bibliography has not been checked.

Final comment:

This article on the description of a dataset correspond to the criteria expected for a data journal.

