

## ***Interactive comment on “Study of Arabian Red Sea coastal soils as potential mineral dust sources” by P. Jish Prakash et al.***

**K. Kandler (Referee)**

kzk@gmx.de

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The present publication deals with soils in potential dust sources close to the Arabian Sea, an area, of which only few data exists. Mineralogical and geochemical analyses of the potentially windblown size fraction have been investigated. The paper adds new data interesting for atmospheric research.

Similar to the anonymous reviewer, I also would like to see a more critical assessment and comparison of the results from the different techniques. Moreover, a placement of the composition data with regard to other dust source regions would be desirable.

Major remarks

page 4/lines 10-27: The “objectives” chapter apart from first and last sentence, doesn’t

C1

really contain any clear objectives, but a mixture of introduction and general information. I suggest rewriting it and clearly stating the goals of the present study. Any introductory information and motivation should go to chapter 1.

9/31: As of now, I suggest terming it rather “Summary and conclusions”, as there is not much discussion here.

9/32-10/13: This information belongs rather in introduction. Please merge.

In chapter 4 there is some detailed information of the separate samples, and some intercomparison of the samples. However, I’m somewhat missing a comparison with previous measurements from other regions. Are these sources different to Eastern and Western African, Sahelian, or even Chinese sources? There’s for example the reviews of Formenti et al. (2011) and Scheuven et al. (2013), where data for comparison is readily available, e.g. in terms of mineral and elemental ratios. Or maybe the authors can provide more information on other sources by themselves or use the mentioned databases?

Fig. 3 and 5: Data from SEM and XRD are apparently different, when displayed this way. If SEM data shows particle number percent, I would highly suggest calculating mass percentages from them (by assuming spherical or ellipsoidal particles and assigning an according bulk density) and compare again with XRD data. Differences should be discussed. Is there any chemical fingerprint that can be used to detect amphibole in SEM data?

Minor / corrections

page 2/line 13: It’s not just the resolution of the databases limiting statements, but also the general lack of soil data.

2/14-34: The explanation of a source function doesn’t seem to contribute to the rest of the manuscript, except for explaining the particle size range of interest. As the latter can be done with a single reference, I suggest removing it.

C2

2/19-29: Please discuss the parameters in order of appearance, and do not jump from one to the other and back.

2/33-34: It seems to me that this motivation sentence should rather be at the beginning of the section.

3/4-26: This is a lot of information, which is difficult to assess for the reader. If you think it is necessary for the present manuscript, I would suggest trying a graphical representation. Otherwise, I suggest restricting it to the information relevant for the current sampling area.

3/27-4/9: I assume this information is from literature. Please add reference(s).

4/16-18: Which observation? Please be more specific and include references, if appropriate.

4-29-5/4: I would assume that precise geographical coordinates would be available for all sampling locations. Please add them, at least to a supplement. That could be done as a table.

5/5-9: This information should be location in the introduction, as it has nothing to do with sampling and analysis.

5/11: Which unwanted artifacts?

5/21-23: General information, omit or place in introduction.

5/25-27: General information, omit or place in introduction.

5/34-6/2: General information, omit or place in introduction.

6/13-15 and 6/19-21: The chemical symbols are sufficient, there is no concern of ambiguity.

6/24-25: General information, omit or place in introduction.

6/33: rastering -> scanning?

C3

7/1:  $0.5 \mu\text{m} < D < 38 \mu\text{m}$

7/29: disaggregation?

8/3: eroded?

9/6: Is it 2000 particles per sample?

9/6-12: On which substrate this analysis was performed, and how were the C-rich identified, if on carbonaceous material?

Fig. B1 and B2: please combine them into a single (or two) color figure(s), as without any grid the small differences are hard to spot. I suggest giving the size and shape statistics as separate table.

Fig. B3: I suggest either removing, as 4 images do not really represent variation in composition and morphology, or making better use of, e.g. by discussion specific details and characteristics of the particles.

Formenti, P., L. Schütz, Y. Balkanski, K. Desboeufs, M. Ebert, K. Kandler, A. Petzold, D. Scheuvens, S. Weinbruch, D. Zhang (2011): Recent progress in understanding physical and chemical properties of mineral dust. *Atmos. Chem. Phys.* 11, 8231-8256. doi: 10.5194/acp-11-8231-2011

Scheuvens, D., L. Schütz, K. Kandler, M. Ebert, S. Weinbruch (2013): Bulk composition of northern African dust and its source sediments - a compilation. *Earth-Sci. Rev.* 116, 170-194. doi: 10.1016/j.earscirev.2012.08.005

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