

Interactive comment on “The mineral dust cycle in EMAC 2.40: sensitivity to the spectral resolution and the dust emission scheme” by G. Gläser et al.

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We thank referee #3 for his/her helpful comments. Replies to his/her suggestions are embedded below.

1) A major concern is on the section 4 evaluating two single dust events modelled with the T85TG. The contents of section 4 with 5 pages are beyond the manuscript title “The mineral dust cycle in EMAC 2.40: sensitivity to the spectral resolution and the dust emission scheme”. Can this title reflect the contents of this presented paper? Please shorten the section 4 or combine it with the section 3.2.

- We think that the title very well reflects the content of our paper. The paper tests the sensitivity of the EMAC mineral dust cycle to the model resolution and the dust

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emission scheme. In addition it shows that the “most appropriate” model setup also performs well in simulating particular dust outbreak and long-range transport episodes. These case studies are important to show the quality of the dust cycle simulated by the T85TG setup, and we do not think that presenting and discussing these case studies goes beyond the scope of the article indicated by its title.

2) In Abstract (line 8), are the scavenging and wet deposition same?

- We replace “scavenging” by “ageing”.

3) It could be better to add the figures with the differences of BK- and TG-emission schemes in Figs. 2 and 3, because it is hard to distinguish the differences Figs. 2 and 3 in understanding their descriptions in the section 3 and Table 2.

- We add a third column with the differences of BK minus TG.

4) Page 27296, line 22: Table 2 doesn't give the ratio of scavenging (wet deposition) to the total deposition.

- We add the total deposition, the life time and the ratio of wet to total deposition to Table 2.

5) With Table 2, the Eq. (1) and Fig. 4 could be redundant. Please cut them.

- With the additional columns in Table 2 (see comment to point 4.) we decided to cut Eq.1 and Fig. 4.

6) Page 27297, line 4: please explain why the wet-to-total deposition rate is dependent on the BK- and TG-emission schemes.

- We discuss this in the revised version. With the BK scheme there is very strong wet deposition of the dust emitted in the Thar region. This signal dominates when calculating the overall wet-to-total deposition rate. If the evaluation is limited to the domain outside the Thar region, both, T85TG and T85BK, produce a similar fraction of wet deposition (60-70%). This indicates that wet deposition is particularly important

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for dust from certain emission regions, and consequently, that emission schemes with stronger emissions in these regions contribute to a larger fraction of the overall wet deposition.

7) I guess that this paper could be from a thesis. Some sentences are not well rewritten or organized. (E.g. Page 27293, line 19: , page 27297, line 6-7, page 27298, line 10; chapter). Please improve them.

- We rephrase the mentioned sentences.

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