

Interactive comment on “Estimations of anthropogenic dust emissions at global scale from 2007 to 2010” by Siyu Chen et al.

Anonymous Referee #3

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The authors investigate the emission of mineral dust that can be related directly or indirectly to human activities. While the topic is of interest, the way the authors present their findings is not convincing. I therefore recommend rejection of this work.

Besides the issues raised in the interactive comment by Paul Ginoux, I have further concerns regarding the manuscript:

- The authors refer to their work as simulations. However, I take from the description, that they just combined wind fields from the ERA-Interim re-analysis with indices of human activity. This seems to be more of a straightforward analysis rather than a simulation. Have any model runs been performed to warrant referring to the work as simulation?

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- The structure of the paper should be improved. There should be at least a proper separation between input data and findings. For instance, Figures 1, 2, 3, and 5 and respective discussion are presented under results while they actually show input into the authors analysis and should be discussed in Section 2.
- The methodology section is lacking a convincing presentation of how the parameters in Eqs. (4) and (5) have been obtained. A coefficient of determination of 0.26 is not a "good fit" and it's hard to assess the underlying analysis without further details, e.g. in the form of figures of the correlation.
- Does the purple color in Figs. 4, 6, and 7 really refer to the maximum values? It seems odd to have relatively low values (light blue) right next to the maximum values. If your findings aren't just noise, that is.
- Where do the data for Figure 8 come from? Is this your work or a result of Huang et al. (2015)? If it's the latter, please present it when CALIPSO is introduced.
- For all the values presented, it would be good to provide an error of the retrieval as well as to put them into to context of natural dust emissions.
- The comparison of the obtained dust mass flux with the CALIPSO AOD related to anthropogenic dust is not very convincing as apples are being compared with oranges. There is no estimate as to whether or not the emitted anthropogenic dust actually stays airborne (i.e. can contribute to a column mass load estimate) or not. Information on the anthropogenic mass load should be available if actual model simulations have been performed. As long as such fundamentally different parameters are compared, there is no value in normalising them.
- The authors claim that the magnitude of anthropogenic dust mass flow is less in developed countries because city development and environmental policies are more mature. Is there any reference for this? You might as well argue that the

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use of heavy machinery (for agriculture and construction) in developed countries compared to a higher rate of manual labour in developing countries leads to stronger emission of anthropogenic dust...

- The last three figures should be omitted as their content can easily be mentioned in the text.

Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2017-890>, 2017.