

Interactive comment on “New developments in the representation of Saharan dust sources in the aerosol-climate model ECHAM6-HAM2” by B. Heinold et al.

Anonymous Referee #1

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General comment The current paper “New developments in the representation of Saharan dust sources in ECHAM6-HAM2” by Heinold et al presented a nice way to correct dust emission biases in global aerosol-climate model. They replaced the original dust source map across North Africa with that from satellite dust source activation observations. The simulated dust emission and aerosol optical thickness (AOT) during 2007–2008 across North Africa has been evaluated with multiple satellite and ground observations. Although the simulated dust emission and AOT shows subtle improvement to the original setup, which is likely due to the poorly represented meteorological field, this paper pointed to a promising direction for bias correction in dust emission.

Detailed comments

C2059

Minor comments 1. The abstract needs better specification. For example, the opening sentence said that “The model results agree well with AERONET measurements”, but in terms of what? In the second sentence of the same paragraph, “good correlations” refers to spatial correlation? Then it’s better to say “spatial correlation” instead of “correlation”. 2. The structure of the method section can be improved. The method section includes model description and an introduction of the MSG-DSA driven dust source approach. These two parts can be grouped under sub-sections. Later in the results section, the authors introduced multiple satellite products for model evaluation. In my opinion, the satellite products should all be introduced in the method (or “data and method”) section. 3. On page 7881 line 6, the sentence about the contribution of Sahara desert to global dust load needs a reference. 4. On page 7882, the first paragraph talked about the bias in ECHAM5-HAM compared to other AeroCom models. How about the version ECHAM6-HAM2 used in the current paper? 5. On page 7884 line 28, the 1% threshold for masking out dust source regions needs a justification (or robust test, e.g. how about using 2%?). On page 7885 line 17, the correction factor of 0.86 needs a justification or explanation.

Technical comments On page 7907 line 2 in the caption of Figure 4, delete “,” after “Agoufou”.

Interactive comment on Geosci. Model Dev. Discuss., 8, 7879, 2015.

C2060