

## ***Interactive comment on “An improvement on the dust emission scheme in the global aerosol-climate model ECHAM5-HAM” by T. Cheng et al.***

**T. Cheng et al.**

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Minor comments:

1) page 13960 line 19: Reference of IPCC 2001 must update by IPCC AR4 2007.

-We changed the reference.

2) page 13961 line 1: What is first-order patterns ?

-We rewrote these sentences and added some references.

3) page 13962 Equation (1) : Describe the definition of  $U_{t^*}(D_p)$

-The calculation of  $U_{t^*}(D_p)$  is indicated now and referred to Marticorena et al,

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(1995a).

4) page 13965 second paragraph: The soil type of "Taklimakan" sounds strange. Is this a common classification of Chinese soil type?

-The 5 soil types in East Asia are grouped according to locations and characteristic soil textures. Taklimakan type is featured of a high fraction of fine mode particles (refer to Table 1) and dominates in Northwest China, where the Taklimakan desert locates (see Figure 2). Because of the unique texture of soils in this location, we take "Taklimakan" as one of the soil types specified in East Asia.

Mei et al. (2004) also pointed out the high portion of fine sand population in Taklimakan desert. We added this reference and some words to indicate what the categorization is based on.

5) page 13967 line 18: Why the result is "reasonable" ? I understood that the emission value of 1670 Tg/yr is within the variation range of AeroCom, however this is not a reason of reasonable.

-We modified the wording to avoid using "reasonable".

6) page 13969 Section 3.2 Validation on East-Asian dust emission. Contents of this section are a little bit poor and qualitative. More detailed discussion of emission change in East Asia is important. Show the emission amount map (like Figure 5 for emission). The reader must have a strong interest where and how much dust emission changes due to the inclusion of new Chinese soil type information. The discussion of Figure 6 and Table must base on RMS between observation and model.

-We added a new Figure 6 to plot the increase of emission amount between case 5 and case 0. The emission amount is almost doubled when model is run with the improved emission scheme (increased by 92.8%). We added an analysis on Figure 6 in the manuscript as well.

We changed the correlation coefficients into the averaged relative differences between

model results and measurements in Figure 4 and new Figure 7 (old Figure 6). The difference between RMS of model results and measurements has the same trend as the averaged relative difference. We chose to use the averaged relative difference because it is more straightforwardly.

7) Section 4 does not include conclusion. It only has discussion. I suggest splitting this section into 4. Discussion and 5. Concluding remarks, and then authors must describe their new findings in New section 5.

-We rearranged the last section as the reviewer suggested. The new features and the significance of this study are summarized in the new "conclusion" section.

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Interactive comment on Atmos. Chem. Phys. Discuss., 7, 13959, 2007.

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