

Interactive comment on “A revised mineral dust emission scheme in GEOS-Chem: improvements in dust simulations over China” by Rong Tian et al.

Anonymous Referee #2

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General Comments: This paper presents the simulations of the Asian dust with GEOS-Chem model. The main drawbacks of the original parameterization of the dust emission used in official GEOS-Chem are pointed out firstly, subsequently the authors make a lot of efforts to improve the dust emission scheme by revising parameters such as aerodynamic roughness length, soil texture, and sandblasting efficiency. The simulated spatial and temporal variations of dust aerosols are found much closer to observations with the revised GEOS-chem model. General speaking, the manuscript is scientifically sound and well organized. I recommend accepting it after addressing the following comments. Major comments: 1) I suppose you are using a nested version of GOES-Chem with higher model resolution over your target region East Asia. Are there any interactions between the global simulation and the nested region? Please clarify this.

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2) How the dust size distributions are considered after the bulk vertical emission flux calculated? Specific comments: 1. Fig S2 is better for reader to understand your study. I suggest you moving it to the main text. What is the meaning of the $u_{10,t}$ in Fig S2? 2. What is the meaning of the contour plot in Fig. S5? 3. The units of Z_0 s in Table 1 and Fig. 3 are inconsistent, please clarify the unit in Fig. 3. 4. In Fig.7, it is meaningless to compare the simulated averaged threshold friction velocities in Beijing, since there are no dust emissions in Beijing due to the erodibility factor S . Therefore, I recommend you making more comparisons over the dust source regions.

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