Atmospheric Chemistry and Physics Discussions

Interactive
Comment

Interactive comment on "Modelling soil dust aerosol in the Bodélé depression during the BoDEx campaign" by I. Tegen et al.

Anonymous Referee #1

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The paper presents the model simulation results for the mineral aerosol emission originating from the Bodele desert in Chad. Observations from this location, known to be one of the most active sources of Saharan dust, have been used in the study for the model validation and tuning, realized through a series of sensitivity experiments. In this work, sensitivity to different particle size distribution schemes, wind representation and emission threshold has been explored. There is another important aspect investigated in the paper - the impact of using an interactive dust-radiation scheme. This study confirms the importance of including such interactions resulting in changes of the thermal balance especially in the lower atmosphere. The paper represents an important contribution for the modelling community in improving dust source parameterization. The paper is of significant relevance and I recommend its publication.

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Specific questions and suggested corrections:

1. The result shown in Fig. 9 indicates that including dust as a radiative substance can improve simulation/forecasting of conventional meteorological variables (T 2m in this case). I recommend that the authors show how is this parameter sensitive to (at least some of) the parameterization choices used in 3.2

2. Page 4179, line 21 and page 4180, lines 13-15: Is H set to a fixed value in the experiments?

3. Page 4182, lines 7-9: "Clouds, precipitation, local wind systems and mesoscale convection are computed depending on topography." I would suggest you remove the sentence. These processes depend on many other things as well.

4. Page 4182: What data is used to specify land-cover and soil textures?

5. 4.1 A clearer conclusion is missing on what is the "best" choice of different box-model versions. I could be a useful guidance for the dust modelling community.

Interactive comment on Atmos. Chem. Phys. Discuss., 6, 4171, 2006.

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