Atmos. Chem. Phys. Discuss., 15, C1514–C1515, 2015
www.atmos-chem-phys-discuss.net/15/C1514/2015/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Predicting the mineral composition of dust aerosols – Part 1: Representing key processes" *by* J. P. Perlwitz et al.

Anonymous Referee #2

Received and published: 12 April 2015

The paper documents and preliminary evaluates the new methods of explicit calculation of dust aerosol mineral composition incorporated in the GISS ModelE. That was never done in full scale so far and is of great importance as dust mineralogy and chemical composition defines radiation effects of dust particles, their impact on atmospheric chemistry, and clouds. Currently models calculate dust size distribution but assume globally uniform mineral composition of dust particles. The authors show that the proposed approach gives results consistent with a few available observations of dust mineralogy. However, the simulations in this study do not account for radiative feedback of aerosols. It would be interesting to provide more detailed evaluation that would estimate the new approach from this point of view. The paper is well written and could be published after minor corrections.

P. 3500, L 27-29: please clarify the sentence.

P. 3504, L 5: You mean below 20 micron?

P. 3505, L 1-2: Could you give a reference here?

P. 3506, L 10-18: Validity of the approach

P. 3506, L 21-25: What would be if we take an external mixture?

P. 3509, (8): No, if (8) satisfies, then (6) will satisfy. Not vice versa.

P. 3509, (9) and (10): It is the same assumptions as in GOCART scheme.

P. 3509: (11) just defines the amount of clay particle aggregated to silt sizes. What was the reason to talk about corrected size distributions? Are they consistent?

P. 3510, L 21: Change "predominately" to "predominantly"

P. 3520, L 10-11: It is difficult to believe that this distribution is invariant.

P. 3531, L 23-26: It is consistent with the larger radiation effect of coarse fraction in comparison with a fine dust fraction discussed in the literature.

P. 3532, L 24: Change "crytalline" to "crystalline"

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 3493, 2015.