

Interactive comment on “Modelling the optical and radiative properties of freshly emitted light absorbing carbon within an atmospheric chemical transport model” by M. Kahnert

M. Kocifaj (Referee)

kocifaj@savba.sk

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General comments This is a novel and worthy piece of simulation work which addresses problems with radiative forcing of light absorbing carbon particles. The methodology used is well acceptable and the author has made a good attempt to put the work in context. The mathematical workings are clear and concise.

Here is a set of minor comments: 1. The author evaluates the radiative forcing using the Eq. (7). Is the diffuse radiation explicitly incorporated into F_{diff} ? 2. The simpler version of the code by Xu & Gustafson enables to calculate the optical properties of a particle in a fixed orientation. If so, the formulation at page 7, line 8, column 2

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needs to be corrected. 3. As for the representativeness of the results: how these can change with particle's morphology? Is the chosen morphology typical for LAC? 4. The range of size parameter in Figs. 6-7 doesn't fit with size classes $[0.02,0.1)$ μm , $[0.1,1.0)$ μm , $[1.0,2.5)$ μm and $[2.5,10.0)$ μm . Note that $x=0.15$ corresponds to the particle diameter about $0.02 \mu\text{m}$, so the particles with $x<0.15$ become smaller than a monomer. 5. The cubical fit (Eq. 3) is well-founded for cross sections of strongly absorbing particles (refers e.g. to well-known book of Bohren & Huffman). Is there some reason for using such a fit for asymmetry parameter too?

In spite of these minor comments, I strongly recommend the paper for publication in ACP after the comments will be answered.

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 25443, 2009.

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