

Interactive comment on “Modeling of biomass smoke injection into the lower stratosphere by a large forest fire (Part II): Sensitivity studies” by G. Luderer et al.

Anonymous Referee #3

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This paper is a sequel of the accompanying paper (Part-I), Trentmann et al. (2006) on the modeling study of the Chisholm fire. This paper discusses the results of a series of sensitivity studies to understand the relative importance of the general meteorological conditions, the heat flux from the fire, the moisture from the combustion and the CCN. The paper is very well written and only the following suggested minor revisions are necessary.

1. The paper discussed the role of CCN extensively and the conclusion is that CCN is of minor importance to the evolution. But certainly IN should also be present in the pyro-Cb and the model has IN as well. Normally IN have much lower concentration

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than CCN and hence probably play even a smaller role. But it should help readers to state clearly that it is the case.

2. The authors have stated that there are uncertainties about radiative dissipation of the combustion energy. One additional possibility that may exist and I am not clear from reading the manuscript is that the CCN may absorb and hence trap some radiated heat (a sort of greenhouse effect). This effect may act to increase or decrease the stability of the pyro-Cb depending on whether this absorption occurs at high or low level. It may be worthwhile to say something about this possibility.

3. P. 6105: it is indicated that the present results contradict that of Andreae et al. (2004) and Koren et al. (2005) on the role of CCN and that there are no invigorating effects of CCN on the dynamics of this mid-latitude pyro-Cb. Is this specifically due to the nature of the mid-latitude convection or you are actually saying that there is a disagreement between the reasoning?

Interactive comment on Atmos. Chem. Phys. Discuss., 6, 6081, 2006.

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