

Interactive comment on “Parameterization of subgrid aircraft emission plumes for use in large-scale atmospheric simulations” by A. D. Naiman et al.

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We first want to thank the referee for his/her helpful comments.

1 General Comment

The paper does not address the key question of parameterizing the chemical or the microphysical processes of the material contained in the plume: As noted in the response to the first referee, the details of implementation of this model in a

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GCM, including any chemical and microphysical processes that take place within the plume, are not the purpose of this paper. The SPM is meant to be a model of plume dilution. The title and introductory material have been changed to clarify this point. Readers are referred to the study by Jacobson, et al. (2010) for details about the GCM implementation and results. Please see the response to the first referee for the rewritten abstract and introduction.

How would you match the background supersaturation of the running GCM with the ice distribution obtained from a separate LES? The supersaturation of each individual contrail is calculated based on the background humidity, plus the known water vapor emission from the aircraft. Ice particles then grow within each plume by size-resolved coagulation, condensation/evaporation, and ice deposition/sublimation with mass-conservative and stable numerical methods. No relative humidity is assumed - the ambient and emitted water vapor are added to the plume, and the local relative humidity is calculated. The SPM is used to calculate the dilution of the contrail over time.

Reorganization: We have attempted to clarify that the objective of this paper is to present a model of plume dilution that is a reasonable model of line-contrail dilution. We hope that the rewritten title and introductory material make this objective clear.

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 24755, 2009.

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