

Interactive comment on “Modeling the chemical effects of ship exhaust in the cloud-free marine boundary layer” by R. von Glasow et al.

R. von Glasow et al.

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ad i)

We included the details to make it possible for the reader to understand why we drew these conclusions and think that we did distill the main results from the presented sensitivity studies both at the end of each subsection and in the conclusion and abstract. We nevertheless tried to improve some formulations to make the paper easier to read.

The lines are clearly separated on the plots and where they are not this is part of the conclusion, namely that in those cases there are only small differences even though larger might have been expected.

On the last few lines of page 529 and the first few lines of page 530 we explain why the background does not change in our approach. As correctly stated by the reviewer it is a direct consequence of our approach that the plume values will eventually approach

background values. The point that we made there was how long this timespan would be under different mixing assumptions and what the chemical evolution of the plume would be during this time. Our paper is divided in 2 main parts: effects in a single plume (section 3) and effects of plume overlap and related changes to the background (section 4). The goal of section 3 was to discuss the effects of a single plume in detail. Clearly one plume cannot have an impact on the background values because of its small extension. In section 4 we discuss effects on the background using different approaches.

ad ii)

We use a different upscaling approach now, that is better and easier to explain (and hopefully also to understand).

ad iii)

As stated in the paper we cannot and do not intend to give these numbers because in the framework of our model no comparisons with specific cases can be made. This has to be done with other, preferably three-dimensional models. This paper is more explorative and a first quantification and further discussion of plume effects as previously proposed by Davis et al. 2001.

ad minor point)

We deleted the sentence in question to avoid confusion. It was intended to give a perspective on the "real atmosphere".

Interactive comment on Atmos. Chem. Phys. Discuss., 2, 525, 2002.

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