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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Model study of multiphase DMS oxidation with a focus on halogens" *by* R. von Glasow and P. J. Crutzen

R. von Glasow and P. J. Crutzen

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We reply to both reviewers separately by first briefly repeating their points.

Replies to reviewer 1:

Specific comments:

- remove much of the quantitative details from abstract

We followed this recommendation, these details are now in the "Final conclusions".

- why is base run at 30 degrees latitude?

To some extent this work is a follow-up study on von Glasow et al 2002b and we used the "base" scenarios from that paper as starting point. We chose to keep that setup (including latitude of 30 degrees) and present winter - summer comparisons where the difference in insolation is a lot biger than a shift from 30 degrees to 41 degrees (Cape

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Grim). The "tropics" runs are based on Wagner et al, where we chose a latitude of 6 degrees, the choice of 30 degrees for the base case therefore only increases the range of different latitudes that we investigated.

- include more details and plots of vertical gradients

We included a vertical profile contrasting cloud-free and cloudy model runs.

- discuss role of iodine

The chemistry of iodine is certainly among the most exciting current topics of the chemistry in the MBL (see our own papers on this: Vogt et al., 1999, von Glasow et al, 2002a). We did not include iodine in the reaction mechanism because there are still important open questions regarding the kinetics of iodine chemistry which need to be investigated in more detail by itself. Furthermore, the rate coefficient of thereaction of IO with DMS is about a factor of 44x (at T=280K) slower than that of BrO with DMS, so that the direct effect of IO on DMS would liekly not be that strong. We included a brief discussion on this in the introduction pointing also to the expected links between the different halogens.

Technical comments

We've changed the text according to most of these suggestions.

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Replies to reviewer 2:

General comments:

- "However, ... is important to remember that .. a strong seasonal biogenic signal exists with summertime maxima in emission of DMS ..and consequent satellite-observed indirect aerosol effect"

We are aware of this seasonality which we included in our "Cape Grim" model runs. In

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section 4.3.3 we mention that bromide deficits in seasalt aerosol and high DMS flux occur in the same season implying a potential for great importance of halogen chemistry. What satellite observation of the indirect aerosol effect is the reviewer refering to?

- highlight key uncertainties better to assist in design of future field campaigns

We added a paragraph in the conclusions.

Specific comments:

- initial aerosol/droplet conditions, esp. seasonal differences for Cape Grim We added a table listing the initial size distributions.

- P6749: the percentages are explained now

- P6761: changed

Technical comments

We've changed the text according to most of these suggestions.

Interactive comment on Atmos. Chem. Phys. Discuss., 3, 6733, 2003.