

***Interactive comment on* “Estimating the climate significance of halogen-driven ozone loss in the tropical marine troposphere” by A. Saiz-Lopez et al.**

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Received and published: 1 March 2012

Anonymous Referee #1

RC: Referee comments – AR: Author Replies

In this article an analyses of the influence of VSL halocarbons, and reactive iodine and bromine species on tropospheric ozone is provided. In the end the authors assess the radiative impact of the halogen-driven ozone loss. To my knowledge this is the first article trying to quantify radiative impact of VSL halocarbons and reactive iodine and bromine. As the paper is well written and structured, I encourage the publication of this article in ACP after only a few minor revisions.

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RC1: Only one scientific question remains: Section 3.3/Fig. 5: Your simulation including halogens reproduces very well the ozone loss at Cape Verde. But, if I understand correctly, your model does not include release of bromine from sea salt. So if including this additional emission, I would expect that the ozone loss will be overestimated. Please comment on this.

AR1: We understand the referee's concerns because we had not explicitly mentioned the processing of halogens on sea-salt aerosol. This mechanism has been parameterised in CAM-Chem and it is particularly important to reproduce the levels of BrO in the marine boundary layer. A detailed description of the relevant processes can be found in the Supplementary of the companion paper by Ordóñez et al. (2012), which focuses on the implementation and first evaluation of very short-lived (VSL) halogenated sources in CAM-Chem. We have included a short paragraph on this in Section 2, where we also refer to that paper.

Additional comments:

RC2: page 32008 line 23 ff. What is “a flat diurnal cycle”? A flat cycle is constant, so better write something like “without diurnal cycle” or do you mean a cycle with a smaller amplitude?

AR2: The expression “with a flat diurnal cycle” has been changed to “with no diurnal variation”, i.e. a constant day and night flux.

RC3: Fig.1. Did I deduce correctly from the other annotations, that the dashed line is the simulated mixing ratio and the continuous lines are the measurements? Please add this information straightforwardly to the caption.

AR3: Yes, the dashed lines represent the model output and the solid lines illustrate the observations both in Figure 1 and Figure 3. This is now mentioned in the corresponding figure captions.

References

Ordóñez, C., Lamarque, J.-F., Tilmes, S., Kinnison, D. E., Atlas, E. L., Blake, D. R., Sousa Santos, G., Brasseur, G., and Saiz-Lopez, A.: Bromine and iodine chemistry in a global chemistry-climate model: description and evaluation of very short-lived oceanic sources, *Atmos. Chem. Phys.*, 12, 1423-1447, 2012.

Interactive comment on *Atmos. Chem. Phys. Discuss.*, 11, 32003, 2011.

ACPD

11, C15757–C15759,
2012

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