

***Interactive comment on “Modelling multi-phase halogen chemistry in the coastal marine boundary layer: investigation of the relative importance of local chemistry vs. long-range transport” by D. Lowe et al.***

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Lowe et al. present interesting model calculations of tropospheric halogen chemistry. I recommend publication of the manuscript in ACP after making minor changes as described below.

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**Scientific Comments**

- The introduction contains very long descriptions of the models by Leigh et al. (2009) and Mahajan et al. (2009a). Since this is not a review paper, I don't think it is necessary to describe the models of other studies.
- p. 19440, l. 9: Does the value of 0.8 really refer to the molar Cl/Na ratio or is it the chlorine enrichment factor compared to sea water composition? Note that the molar Cl/Na ratio of sea water is not equal to one.
- p. 19441, last paragraph: Could you briefly mention what in your opinion is the reason for the discrepancy between measured and modeled OIO?
- p. 19441, l. 27: What is the meaning of the word “only” in “only 5-2.5 times the detection limit”? If it is above the DL, it should still have been detected.
- p. 19442, l. 10-11: I don't understand “before increasing equally markedly at the end of the bursts”. As far as I can see from Fig. 3, reactive chlorine and bromine remain low until the next burst starts at about 11.93.
- conclusions, last paragraph: If  $\text{NO}_x$  is not uniformly distributed, it would also be possible that local patches of BrO exist in areas with low  $\text{NO}_x$ .

**Technical Comments**

- Please add the physical units to all quantities, especially to Tables 1 and 5, and also to Equations (2) and (4).
- Please define all acronyms that you use, e.g.: “PD-FiTE”, “LT”.
- p. 19430, l. 24: Change “Odown” to “O'Dowd”.

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- p. 19431, l. 10: The sentence starting with “Which” seems to be incomplete.
- p. 19431, l. 27-28: Change “pptv” to “pmol/mol” here (and also elsewhere).
- p. 19434, l. 13-14: I agree with the other reviewer that the complete chemistry mechanism should be published in a supplement instead of just citing other papers on which it is based.
- p. 19436, l. 3: Is  $K_e$  proscribed or prescribed?
- p. 19437, l. 26: Are the numbers describing the composition based on mass fractions or molar fractions?
- p. 19443, l. 3: The word “if” is probably missing here.
- p. 19444, l. 19: The word “are” is probably missing here.
- Tables 3 and 4: Please give the references from where these values are obtained. If they are your own estimates, please mention it in the table captions.
- Table 5: Is the denominator of the function really  $d_r$ ? I think it should probably be  $d \ln r$  or  $d \lg r$ .

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Interactive comment on Atmos. Chem. Phys. Discuss., 10, 19429, 2010.