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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Measurements and modelling of molecular iodine emissions, transport and photodestruction in the coastal region around Roscoff" *by* R. J. Leigh et al.

Anonymous Referee #2

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The paper describes the comparison of model results of iodine emissions and iodine measurements using LP-DOAS and BBCRDS during a RHaMBLE campaign in 2006 at a measurement site in France. The model is based on a detailed analysis of the site in respect to macroalgal distribution and local above and underwater topography. Emission rates are taken from Ball et al. 2009 and - combined with a footprint analysis – are used to construct a highly time-resolved prediction of the local molecular iodine concentrations. These results are than compared with the measurements taken at the site by an spatial averaging measurement technique (LP-DOAS) and a point measurement technique (BBCRDS). In my opinion the topic of the manuscript is scientifically highly interesting and timely. It also contains new and original material. Furthermore,

I consider the paper to be within the scope of ACPD and ACP, since the iodine chemistry in coastal regions is still poorly understood. The abstract is in general appropriate (however, see detailed comments below) and contains the main results. Earlier work is adequately recognized. Therefore, I recommend to publish the paper also in ACP, however, after some revisions as described below.

In general the paper is not easy to read, especially since the reader is forced to go back and forth to have a look at the figures. I suggest that the authors go through the manuscript again and try to sort the figures that they are discussed one after each other, although certainly referencing back to individual figures will be necessary. Furthermore, I have the impression that the authors emphasize too much on the correlation of modeled and measured iodine concentrations. I agree that correlations as shown in the paper indicate an at least general understanding of the emission rates and sources, however, most of the time the measurements are not well described by the model results. In fact, essential features of the measurements are not described by the model and although the authors mention some potential explanations (e.g. unmodeled local emissions, missing recycling or source components) I would like to see a stronger emphasis on the discrepancies and their potential explanations (beyond just citing McFiggans et al. 2009). In contrast, in my opinion one of the major outcomes of the paper is the still obvious lack of understanding of important processes of the iodine chemistry in the marine and coastal BL.

Additional comments: Figure 8 and 9: What is the color code here ? (just red is mentioned)

Figure 10: It is really difficult to extract information from this figure since too many parameters are displayed. Perhaps a decomposition into two or even more individual graphs will help (similar to figure 6)

Figures 12 and 13: Where are the green dots mentioned in the figure caption ?

Page: 21175, line 23: "LP-DOAS measurements" ?

Page 21177, line 11: Why the detailed description of the wind speed on the very short time scale (14.0-14.1) – what is that telling us ?

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 21165, 2009.