

Interactive comment on “Iodine speciation in rain, snow and aerosols and possible transfer of organically bound iodine species from aerosol to droplet phases” by B. S. Gilfedder et al.

B. S. Gilfedder et al.

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We would like to thank reviewer 2 for the time taken to review our paper, and particularly for the positive comments that have improved the earlier version of the manuscript. We have made all of the changes suggested by the reviewer and have outlined these in detail below.

Reviewer 2: I think the comment in the introduction about global fluxes of iodine particles altering the energy balance is overstated and should be deleted.

Answer: We included the possibility of a radiative effect from new iodine-derived aerosols in the introduction due to some recent speculation about the importance of iodine nucleation in the atmosphere (Von Glasow, 2005;Caine, 2007) and the ear-

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lier modeling work of Dowd et al., (2002). However, as iodine nucleation has not, as yet, been shown to occur over the open oceans (which would be required for global significance) this section has been removed as suggested.

Reviewer 2: How much confidence do the authors have on the assignment of the 4 min 40 sec peak to iodoacetic acid.

Answer: Reviewer 2 is correct that ion chromatography is not a definitive method for identification of polar organic molecules, and therefore assigning this peak as 'provisional' is definitely warranted. Indeed, iodopropionic acid elutes at a very similar time; when both are injected we can see two the peaks, but it is not possible to separate them properly for quantification. We believe iodoacetic acid is the most likely candidate based on the standard available, but aerosol samples must be further analysed by complementary methods such as LC-MS-MS and optimally NMR for unambiguous identification of these complex iodoorganics. Therefore, the provisional nature of the iodoacetic acid assignment to peak 4min 40 sec has been included in the revised version of the paper.

Reviewer 2: Abstract: change "theoretically" to "thermodynamically"

Answer: Change made.

Reviewer 2: Abstract: Change 'while' to 'and'

Answer: Change made.

Reviewer 2: 7980 I12: should read "hampered by the lack of reliable methods for speciation"

Answer: Change made

Reviewer 2: 7990 I9: not clear what is meant by "non-linear reaction" - From the discussion following this statement it appears that what is meant is "the rate of reaction between iodine and aerosol organics may vary as the organics age"? This should be

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reworded for clarity.

Answer: The rate of a reaction theoretically should not change, which is why we refrained from stating that it varies with organic matter age. However rate constants are derived for specific reactions between two or more known substances generally under laboratory conditions. The complexity of aerosol organic matter, such as HULIS for example, precludes the measurement of such an exact rate constant, and therefore we described the process of HOI binding to different organic molecules as the aerosol ages as 'non linear'. However, the reviewer is correct that this also is not an optimal description of the HOI-Organic reaction process. The sentence now reads: 'It is anticipated that the reaction rate between HOI and organic material varies as the composition of the organics change e.g. by oxidative processes during aging' which seems to describe the processes better than the previous wording.

Reviewer 2: The fact that diurnal variations were not observed should [not] be termed "unfortunate", unless one is personally advocating for one explanation over another.

Answer: The reviewer is correct that the use of 'unfortunate' implies a personal preference for an inanimate process. This has now been removed.

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Von Glasow, R.: Seaweed, Iodine, New Particles and Atmospheric Chemistry; The Current State of Play, *Environmental Chemistry*, 2, 243-244, 2005.

Interactive comment on *Atmos. Chem. Phys. Discuss.*, 8, 7977, 2008.

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