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Editorial note to "A mechanism for biologically induced iodine emissions from sea ice" published in Atmos. Chem. Phys., 15, 9731–9746, 2015

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In a comment on *PubPeer*, serious concerns about Saiz-Lopez et al. (2015) were raised (https://pubpeer.com/publications/6BDB7225E1AA84B05367BF79F47356, last access: 6 June 2025).

The executive editors contacted the authors to clarify the validity of the comment on *PubPeer*. Over the course of several years of discussion between the authors and the executive editors, the authors consistently maintained that the criticisms – both those raised in the interactive discussion in *ACPD* and those on *PubPeer* – were unfounded.

After consulting an independent expert, the *ACP* executive editors concluded that the main criticisms are justified, as they point to obscure scientific practices. However, because these issues do not clearly demonstrate scientific misconduct, the executive editors decided not to retract the paper. Instead, they present below the four main points of criticism to alert and caution readers.

(1) Identical figures resulting from different model set-ups

Figures 3 and 4 in the current paper are exactly the same as those in a rejected *ACPD* paper by Saiz-Lopez and Boxe (2008) with the same title (https://doi.org/10.5194/acpd-8-2953-2008). While it is generally acceptable and welcome to re-use figures, if appropriately cited, this similarity appears problematic for other reasons. On *PubPeer*, the authors explained the identical figures as follows:

> The reason why these two figures are the same is that Saiz-Lopez and Boxe (2008) used $[I]_0 = 10^{-5}$ M and $D = 10^{-2}$ cm^2 s^{-1}, while Saiz-Lopez et al. (2015) used $[I]_0 = 10^{-3}$ M and $D = 10^{-4}$ cm^2 s^{-1}.

These data pairs result in identical iodide fluxes (product of iodide concentration $[I^-]$ and diffusion coefficient D). Therefore, according to the authors, the model gives identical results in the 2008 and 2015 studies. However, this argument contradicts the model description in the current paper, which states that the model was initialized with a concentration of 1×10^{-4} M (not 1×10^{-3} M) iodide. It also implies that nothing else was changed in the model code between 2008 and 2015.

(2) Unjustified volumetric factor

Saiz-Lopez et al. calculate a "volumetric factor" of 1.14×10^{-6} to enhance model concentrations and reaction rates due to the concentration effect of ions and molecular species in the brine. They cite Michalowski et al. (2000) as a reference. In that paper, however, Michalowski et al. only define a simple unit-conversion factor that converts between reference volumes (cm^3 of liquid in the snowpack vs. cm^3 of air in the boundary layer). This volume conversion factor is not related to any physical process, as it only converts between different reference systems for the volume. If the volumetric factor as used in the current paper were indeed to describe a physical "concentration effect in the brine", it should not have a linear dependence on the atmospheric boundary layer height.

(3) Unreasonable diffusion timescale
Saiz-Lopez et al. use a mean sea-ice thickness of 50 cm. Even applying the most favourable diffusion coefficient, the resulting diffusion timescale is very large (40 d; see Table 1 in Saiz Lopez et al., 2015). Values calculated for other depths below the sea-ice surface are not relevant. Although algae within the sea ice (e.g., at a depth of 5 cm below the surface) could release iodide much faster to the atmosphere, those algae would not be in contact with seawater to achieve any high iodide concentration within their cells.

(4) Unrealistic thickness of brine layer
Saiz-Lopez et al. calculate the thickness of the brine layer (which they also incorrectly call a “quasi-liquid layer”) as the product of “sea-ice thickness” and the “mass fraction of liquid water in ice”. At a sea-ice thickness of 50 cm, this results in a brine-layer thickness of 0.5 mm. Their equation implies proportionality between the sea-ice thickness and the brine-layer thickness. Thus, if the sea ice is 10 m thick, the brine layer would have an unrealistic thickness of 1 cm.

References

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