

Interactive comment on “ Ozone variability and halogen oxidation within the Arctic and sub-Arctic springtime boundary layer” by J. B. Gilman et al.

Anonymous Referee #2

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This paper is about measurements in the Arctic and sub-Arctic boundary layer showing persistent halogen oxidation influenced O₃ variability during the springtime. A major part of the paper is using FLEXPART to trace the back trajectories of the measured air to determine the air mass history specifically with regard to exposure to sea ice which is defined in the paper as having been within 100 m of the surface where ice was present. Although previous studies have shown similar results on somewhat smaller scales, i.e., air masses depleted in O₃ had been exposed to the Arctic sea ice, an interesting finding from this paper is that the effects of bromine chemistry are observable even in the ice-free regions of the North Atlantic because of the air-mass history and its exposure to the catalytic bromine cycle in the Arctic boundary layer.

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This is good contribution to the growing body of knowledge for the Arctic boundary layer halogen/ozone story and should be published with some minor modifications. I actually like the fact that the paper is not overly ambitious but illustrates and interprets some interesting data.

Although I like the analysis in general for the paper there is some limitation or weakness if you will in the FLEXPART analysis that defines the lowest 100 m of the atmosphere as the surface layer. I know that this is probably a situation of what was possible to do and not what is the best thing that the authors may have liked to do to represent exposure to sea ice. I think that a caveat should be added about the Arctic boundary layer gradients which can be huge within 100 m – so to point out that there is potentially a huge variability in the 100 m deep boundary layer airmass.

In the methods section 2.1 . The authors need to completely rewrite the paragraphs starting on line 20 P 15889 and ending on line 19 of the following page. Although most of the paper is well written this part is very poorly written. Leave out any description of the previous instrument as it is not relevant here and spend time describing the present instrument. It is very cryptic and unclear.

P 15891 line 14 sentence beginning with “In the analysis. . . is not a sentence.

P 15891 last sentence – should be “Samples were collected in SS canisters. . .

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 15885, 2010.

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