

Interactive comment on “Ozone in the Boundary Layer air over the Arctic Ocean – measurements during the TARA expedition” by J. W. Bottenheim et al.

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General comments

The paper presents surface ozone measurements conducted over the central Arctic during the transpolar drift of a ship that was frozen in the ice between September 2006 and January 2008. The observed ozone depletion events have been interpreted by the means of atmospheric backwards trajectories and satellite images of the sea ice cover.

This is a very timely publication about one of the most exciting experiments which were conducted in the recent International Polar Year. The new year long record of ozone measurements over the central Arctic sea ice is of great scientific importance. In

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addition, the paper clearly fulfills the evaluation criteria of ACP and should be published with only minor corrections.

The discussion about the cause and origin of the ODE remains speculative. In the potential frost flower data one can see that the conditions for enhanced frost flower growth move from the north of Svalbard around April 16/17 towards Franz-Josef Land on April 18 arriving at Severnaya Zemlja on April 19 (see attached Figures below). Thus, the area displayed in Figure 6 is not the only possibility for the origin of ODEs. A more detailed study using a suitable air chemistry transport model would be a possible approach to check the validity of different hypothesis about the origin.

Specific comments

Change the title to be more specific with the place and time, e.g.: Ozone in the Boundary Layer air over the Arctic Ocean: Measurements During the TARA Transpolar Drift 2006-2008

240: A suitable image of the mean BrO distribution should be added instead of referring to a website.

275: Define waning phase of frost flowers.

335: "... and hence leading to ozone depletion." This conclusion could be challenged by the effect of increasing temperatures which could damp the salt flux through the decrease of frost flower growth. Less atmospheric bromine and more ozone would then establish a possibly small but positive feedback effect. Both possibilities should be mentioned.

Figure 1: Perhaps, it would be nice to combine the ice conditions and the track of the TARA drift in one graph.

Figure 5: This figure deserves a more detailed description. If I understand this graph correctly, it shows the origins given in geographical latitude and longitude. Then it would be nice to indicate the coastlines.

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Figure 6: Improve quality of the figure. Provide colorbars or definitions to establish a relation to the backscatter coefficient.

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 8561, 2009.

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9, C316–C321, 2009

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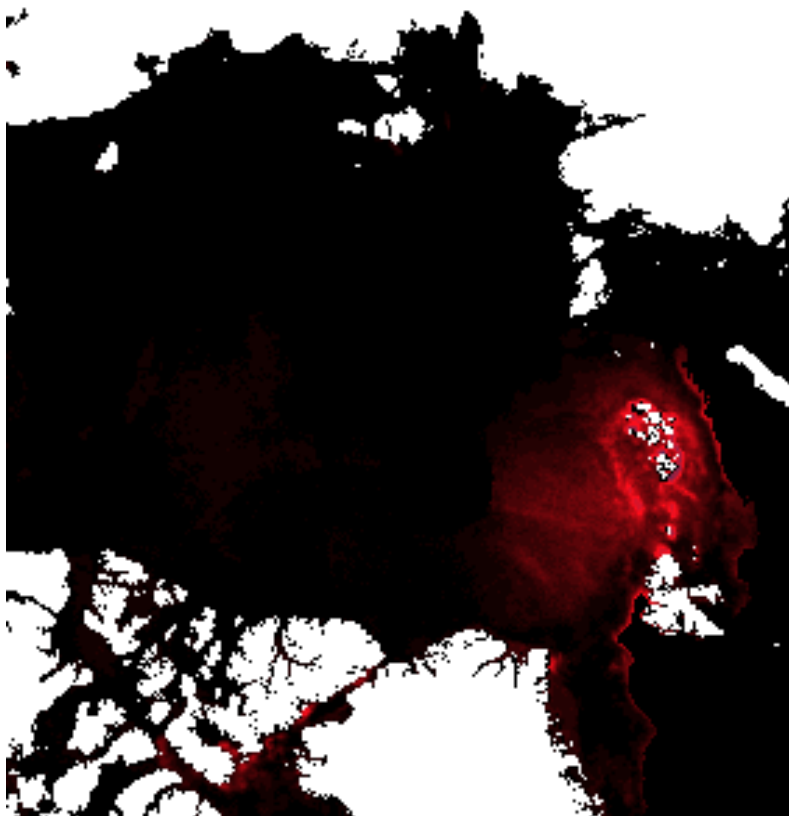


Fig. 1. PFF April 17 2007. Red color indicates areas with high potential for frost flower growth

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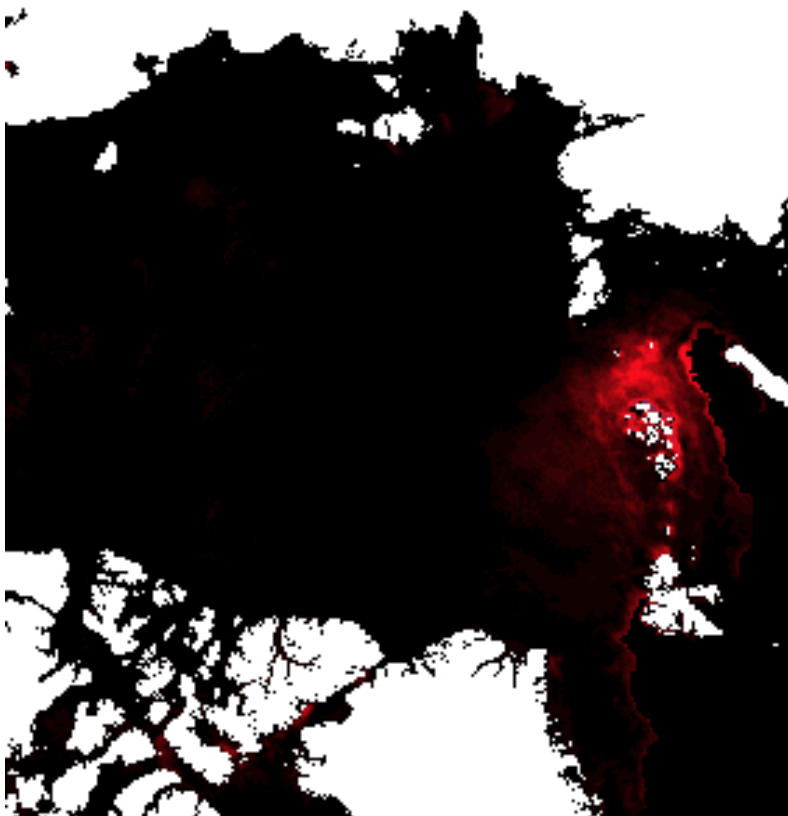


Fig. 2. PFF April 18 2007

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Fig. 3. PFF April 19 2007

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