

Interactive comment on “BrO, blizzards, and drivers of polar tropospheric ozone depletion events” by A. E. Jones et al.

Anonymous Referee #2

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The paper presents observations of surface ozone, wind speed and wind direction from the British Antarctic Station Halley. Together with satellite BrO, back trajectory analysis and ECMWF meteorological reanalysis the authors investigate the conditions under which ozone depletion events (ODEs) occur. They challenge the common understanding that low wind conditions and a stable boundary layer are prerequisites for ODEs.

The paper is well written and addresses an important question. Many key processes during ODE formation remain poorly understood, especially no real onset of an ODE has been observed. All investigations that can shed light on the emergence of an ODE are valuable contributions to the current understanding. The paper should be published after minor changes.

On page 8913, line 21 that authors pose the central question of the paper, “whether
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the BrO is transported, or has involved in situ”. As much as I believe that the ODE was over Halley and that an ODE can be observed at high wind speeds, I am not convinced that there is enough evidence to be sure of it. There is still the possibility that what was measured at Halley and what was seen by the satellite originate from different events and different locations. Having said this, I see no easy way of really proving it. As for the paper, I would like to ask the authors to go back and word these sections very carefully, emphasising more that this mechanism is a possibility but has not been proven.

My second concern is that this is a single event. This is the first and only time between 2003 and 2008 that BrO has been seen directly over Halley (Page 8907, line 19/20). While I agree this is a great opportunity I am not sure if it is possible to generalize from this single event.

Trajectories: When correlating sea ice contact of back trajectories with SCIAMACY satellite pictures of BrO we tend to concentrate on cases when everything “fits”. How do satellite pictures and back trajectories agree during other ODEs that have been observed at Halley? Figure 4a and b show trajectories for 9 October; would it be possible to include also a picture from 7 October, the onset of the ODE?

Technical notes: Page 8913, line 22: let’s focus, please change to “we focus”

Inline with the other referee, I would prefer to change the heading of the last section from “Conclusions” to “Summary” which would be more fitting.

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 8903, 2009.