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Comment

***Interactive comment on “Vertical structure of
Antarctic tropospheric ozone depletion events:
characteristics and broader implications” by
A. E. Jones et al.***

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Response to Reviewer 3

We are grateful also to Reviewer 3 for helpful comments and suggestions which we address here:

P8190, L15-20: As outlined in the Response to Reviewer 2, we have been in discussion with Nicolas Theys, (Theys et al., 2009), and he has calculated the BrO tropospheric column for the cases we consider in Figure 19. We have added a new

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paragraph to explain this under section 5.2. As Reviewer 3 raised this issue from what we wrote in the Abstract, we have also amended the Abstract as follows:

Original: Given the link between BrO and ODEs, we also examine ground-based and satellite BrO measurements, and find a strong association between enhanced BrO and atmospheric low pressure systems.

Revised: Given the link between BrO and ODEs, we also examine ground-based and satellite BrO measurements and find a strong association between atmospheric low pressure systems and enhanced BrO that must arise in the troposphere.

P8192, L19:

Original text: “the vertical resolution is limited to ~ 100 m”

Revised text: “However, the balloons rise rapidly so that, with the ozone sonde time constant (~ 100 s), the ozone profile is considerably smoothed in the vertical.”

P8205, L4 “large” is now removed

P8205, L5-7. Text is now amended as follows:

Original: The tethersonde was able to probe the lowest few hundred meters in great detail - a region of the atmosphere where free-flying sondes are essentially blind.

Revised: The tethersonde was able to probe the lowest few hundred meters in considerably greater detail than could be achieved using a free-flying sonde.

P8207, L19, “transparent to surface ozone measurements” has now been replaced, as suggested, with “unattainable by surface measurements”.

P8209, L11: we have included additional text, so this now reads... “10-m wind vectors (which indicate the speed and direction of winds at 10 m above the ground).”

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P8212, L14-15: At this stage in the paper we are actually describing a previously published piece of work, so feel that we need to faithfully represent what that paper says. However, the point that the reviewer makes is a good one, so we have added a sentence at the end of P8213, L2: “Further, ODEs observed under conditions of high wind speeds can arise from transport to the observation site of air masses already depleted in ozone (e.g. Simpson et al., 2007). Thus separating out the role of low pressure systems, into chemically driving depletion as opposed to transporting already-depleted air masses, is no simple task.”

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 8189, 2010.

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