Atmos. Chem. Phys. Discuss., 10, C2117–C2118, 2010
www.atmos-chem-phys-discuss.net/10/C2117/2010/

Atmospheric Chemistry and Physics Discussions

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

Anonymous Referee #1

Received and published: 26 April 2010

Review: A.E. Jones et al., "Vertical structure of Antarctic tropospheric ozone depletion events: characteristics and broader implications"

General Comments

This manuscript nicely builds on the paper by essentially the same group published last year in ACP (A.E. Jones et al., "BrO, blizzards, and drivers of polar ozone depletion events"), adding much evidence for the link between low pressure / high wind systems and elevated BrO in the atmospheric column. It also presents 6 case studies of ozone, temperature and wind profiles in the lowest 200-300m during various stages of surface ozone depletion events (ODEs). It is well written, clearly presented, and

definitely deserves publication after some minor modifications (see below). There is still work to be done by Polar researchers to develop a good explanation of ODEs that covers all observations, but this paper makes a few steps in a promising direction by providing a plausible link to synoptic-scale atmospheric processes and by touching on the complexities of characterizing transport and exchange in the bottom few hundred meters of polar atmospheres.

Specific / Technical Comments

Page 8191 Line 21: a dramatic example of the role of meteorology in ODEs is given by Morin et al., GRL 32 (8), 1-5 (2005).

P8195L10: 1km in which direction?

P8195L18: eliminate the "indeed"

P8193L2: complementary

P8193L5: focus

P8200L12: more and more research shows that the "critical Richardson Number" is a hazy and very over-simplified concept – see for example Mahrt, Boundary Layer Met. 135, 1-18 (2010).

P8202L13: wouldn't the large dT/dz in this layer suppress turbulence? Can you definitely say this is a turbulent layer, or might it be waves along the discontinuity?

P8213L3: a more succinct way to phrase this might be ..."are not a sufficient but a necessary condition. It is clear from "...

P8221L7: You could also do this with an ozone DIAL (differential absorption lidar)...

Fig. 3-8: it would be very useful to include the wind speed profiles in these plots. Maybe overlay them into the temperature profiles, with the scale on top?

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