Atmos. Chem. Phys. Discuss., 6, S3967–S3968, 2006
www.atmos-chem-phys-discuss.net/6/S3967/2006/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "The January 2006 low ozone event over the UK" *by* M. Keil et al.

Anonymous Referee #3

Received and published: 20 October 2006

General comments: This is an interesting case study showing a record low total ozone of 177 DU over Reading, UK on 19 January 2006. Based on a detailed trajectory analysis the authors showed that in different altitudes the north-eastward transport of low ozone below the ozone layer maximum und the south eastward-transport above the ozone layer maximum are mainly responsible for such deep ozone values. These mechanisms are already known from many studies, but again well shown here. A new point would be for the authors to separate the transport effect from the chemical one. I think the authors should pay more attention in their paper to that point in order to give a quantitative estimation of the role of chemical induced contribution to the observed very deep ozone minihole.

I recommend to accept the paper after specific and technical revisions outlined below:

Specific comments: (i) quantitative estimation of transport contribution below and

above the ozone layer maximum during that event (ii) quantitative estimation of chemistry contribution below and above the ozone layer maximum during that event (iii) extension of the introduction and discussion by including important papers which have not been mentioned and discussed in the light of this study Vaughan et al. QJRMS 1991, 1281: relation ship between Ertel's PV and total ozone Hood et al. JAS 2005: role of miniholes for ozone trend Entzian et al. JClimate 1999: decadel zonal asymmetric ozone changes in January over Europa James et al., Tellus, 2000, 1123: Polar vortex shifts and deep miniholes James et al., Ann. Geophy. 2002,835: Lagrangian view of ozone minihole

Technical revisions: 1 - p3§3l1 Allen et al. => Allen and Nakamura 2 - p6§3 you should focus on the chemical contribution part, too; otherwise what is the new? May be you can use a regression analysis to give an estimation for all requested parts. 3 - p6§4 use EPV maps for UT/LS layer, because better than 100hPa geopotential 4 - p6Figure 3 show profiles in DU instead of ppmv, better to relate to total ozone changes 5 - p8§2-3 why 10 - 30 km, you mean 5 - 30km (see Figure 10(9)) Discuss also the contribution changes from higher altitudes than 30 km, not mentioned so far! 6 - p9§4l9 yes, but add that it is related to a poleward Rossby wave breaking event 7 - p9§3l6 change Figure numbers 10=>9 vs 8 - p10§2 How many DU below and above about 70 hPa are related to which mechanism? (You say, all is due to transport here, 1/3 from above) See special comments (i) (ii) and technical T2.

Interactive comment on Atmos. Chem. Phys. Discuss., 6, 8457, 2006.