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Interactive comment on "Comparison of high-latitude line-of-sight ozone column density with derived ozone fields and the effects of horizontal inhomogeneity" *by* W. H. Swartz et al.

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We appreciate the thoughtful review made by Referee #1, and we certainly agree that the complication of line-of-sight measurements by spatial inhomogeneities is generally known. The primary focus of the paper is the intercomparison of ozone measurements made by very different techniques (line-of-sight column ozone from spectral analysis of solar irradiance data, vertical ozone profiles from in situ and lidar measurements, and the reconstruction of three-dimensional ozone fields produced from ozone–potential vorticity mapping of spaceborne ozone profile measurements). Although these intercomparisons do not constitute "validation" per se, the fact that the different techniques agree on average to the order of 2% in terms of line-of-sight column amount, when ac-

counting for inhomogeneity, is a significant finding that speaks to the consistency and in some sense the accuracy of the various measurements during SOLVE II.

In the context of this work, the effects of line-of-sight inhomogeneity at large solar zenith angles are apparent, prompting us to report these results as well. We found that for our admittedly limited dataset at 10 km the magnitude of the inhomogeneity effect was 4% (improving a 6% bias to the 2% quoted above and also reducing the RMS noise of the comparisons). Although one could reasonably anticipate that there should be some effect, we feel that it is of scientific interest to actually *quantify* the effect using field measurements in the context of a campaign that was dedicated to the accurate measurement of ozone under conditions where inhomogeneity has a significant impact (significant in that its magnitude is comparable to typical disagreements among state-of-the-art datasets, as noted in Sect. 5 of the paper). This work does not solve the problems associated with satellite retrievals at large solar zenith angles but rather explores a complicating factor. The findings in the paper are useful both in the context of interpreting SOLVE II results and also with respect to other high-latitude measurements.

Interactive comment on Atmos. Chem. Phys. Discuss., 5, 11617, 2005.