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Interactive comment on "Fall vortex ozone as a predictor of springtime total ozone at high northern latitudes" *by* S. R. Kawa et al.

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We thank Dr. Tilmes for her interest in the manuscript and pointing out the relevance of early-winter O3/tracer correlations for the current work. The comment also points out that in some years the vortex is not well isolated in November and suggests that we try establishing our fall O3 values at a particular time when the vortex is isolated. We recognize that the vortex is not a discreet air mass at any time of the year and that mixing will affect the vortex O3 mixing ratio. A strength of the current analysis, however, is that we use all available data over a fixed time interval, essentially putting each year on an equal footing without trying to maximize the signal by selective processing. Mixing will undoubtedly add some level of variability to the fall O3 average, but this is just as likely signal as noise in our analysis. We have explored possible dynamical couplings

between fall vortex O3 and spring high-latitude column. As mixing and descent are products of dynamical activity in the fall, their variability contributes to the observed O3 difference from year to year. The objective is quite different here than in Dr. Tilmes' work that tries to isolate the chemical contribution of O3 loss.

The comment also suggests that we examine the wave activity in fall and/or timing of vortex isolation on temperatures throughout the winter. We have looked at the correlation of November heat flux with temperature in the late winter. We find no significant correlations in late winter with fall wave activity. This was shown earlier by Newman and Nash (2001) with their correlation of March temperature with heat flux over the course of the season. That is, March temperature is strongly related to January-February heat flux, but weakly related to September-December heat flux. Timing of isolation of the vortex seems to be a rather subjective measure, which would likely be closely coupled to heat flux and wave activity, so we did not attempt this test.

Interactive comment on Atmos. Chem. Phys. Discuss., 5, 155, 2005.