



## **The influence of polar vortex ozone depletion on Northern Hemisphere mid-latitude ozone trends in spring**

S. B. Andersen and B. M. Knudsen

Danish Meteorological Institute, Copenhagen, Denmark ( sba@dmi.dk / Fax: +45 3915 7461 /Phone: +45 3915 7409 )

Reverse domain-filling trajectory calculations have been performed for the years 1993, 1995, 1996, 1997, and 2000 to calculate the spreading of ozone depleted air from the polar vortex to midlatitudes in spring. We find that for these years with massive Arctic ozone depletion the zonal mean total ozone column at midlatitudes is reduced with between 7 and 12 DU in the April-May period. The polar vortex and remnants have preferred locations which leads to longitudinal differences in the midlatitude ozone trends. Together with decadal variations in circulation the dilution of ozone depleted air may explain the major fraction of longitudinal differences in midlatitude ozone trends. The dilution also has a significant impact on the zonal mean ozone trends. With a multiple linear regression model we find that the dilution may explain 39 % of the trend in the period 1979-1997 and 54 % of the trend in the period 1979-2002. By calculating the effect of simply removing the dilutions we get the possibly more reliable estimates that that dilution may explain 29 % of the trend in the period 1979-1997 and 33 % of the trend in the period 1979-2002.