



*Supplement of*

## **Ensemble simulations of the role of the stratosphere in the attribution of tropospheric ozone variability**

**P. Hess et al.**

*Correspondence to:* P. Hess (pgh25@cornell.edu)

# WACCM: 150 hPa CEUROPE

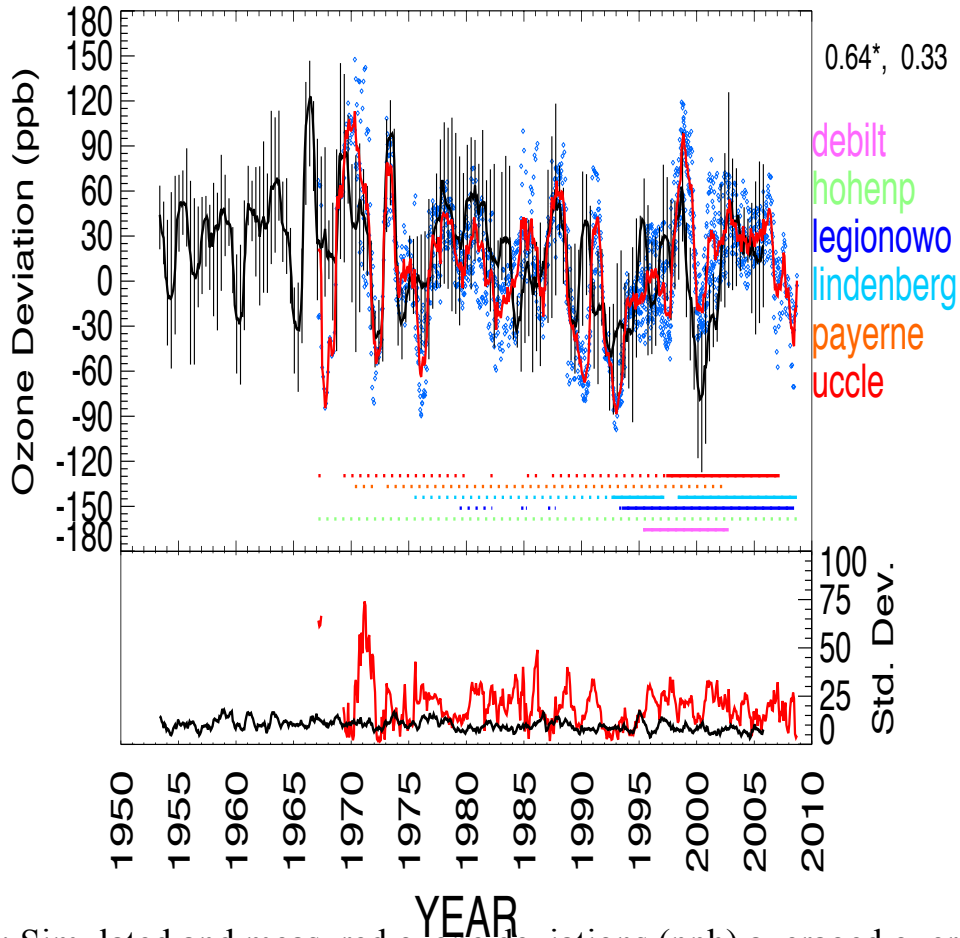
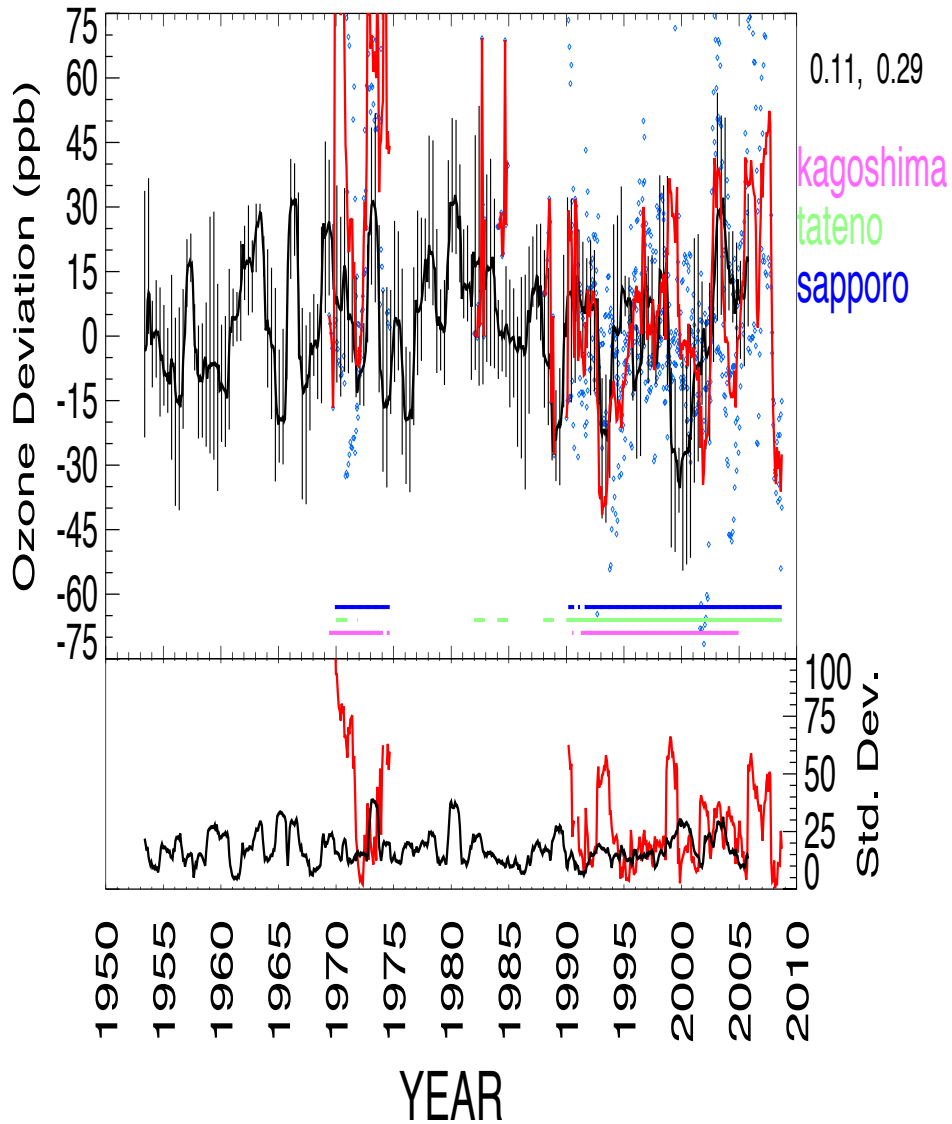
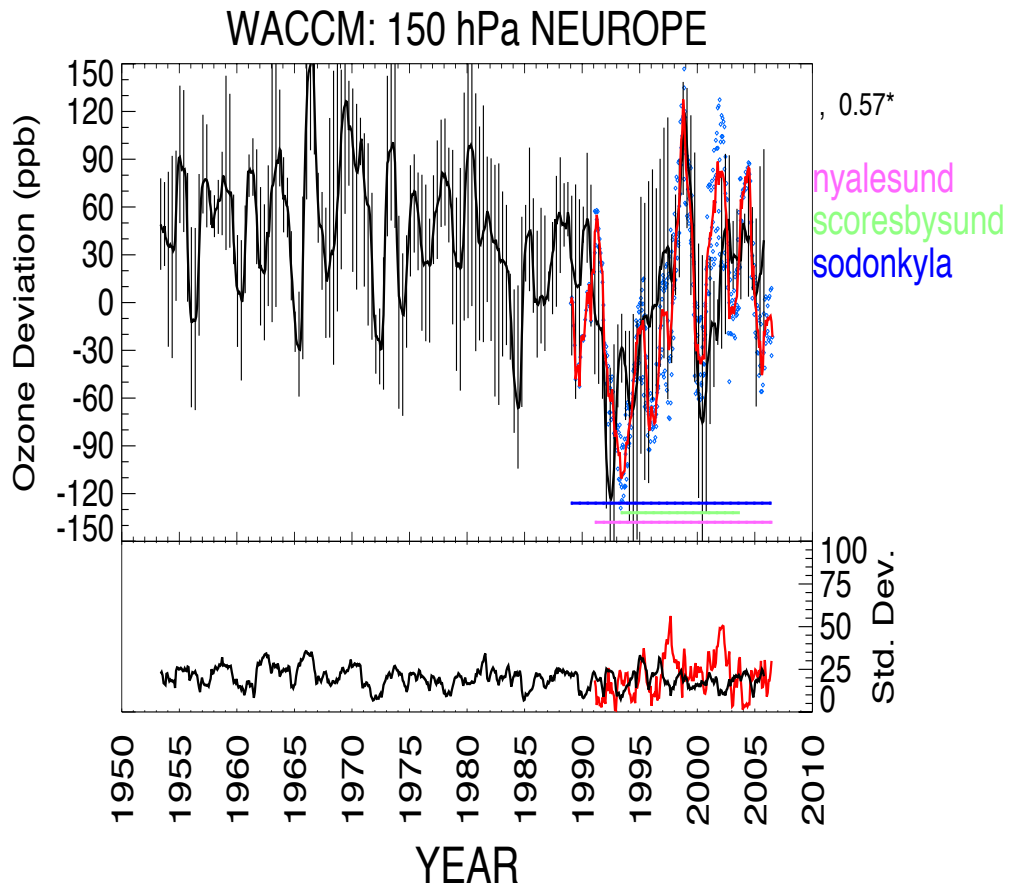


Fig. S1: Simulated and measured ozone deviations (ppb) averaged over the Central European ozonesonde sites at 150 hPa. The simulated ensemble average is given as the bold black line, the thin black lines bracket the maximum and minimum ensemble ozone deviation, the measured average is given as the red line, the blue dots give the measured ozone deviation for each site comprising the regional average. Colored bars indicate when each measurement site (color coded as indicated on right) made sufficient measurements to calculate an annual ozone concentration: solid lines indicate an ECC measurement and dotted lines a BrewerMast ozonesonde measurement. The black and red lines at the bottom give the simulated (black) and measured (red) standard deviation of ozone (ppb) calculated across all sites within each region. Numbers in the upper right give the model-measurement correlation of the average ozone within each region prior to 1990 (left) and after 1990 (right). Correlations use detrended data. Significant correlations at the 95% level are starred. Monthly ozone deviations are smoothed over 12-months. Deviations are from ozone averaged 1990-01-15—1994-12-15.

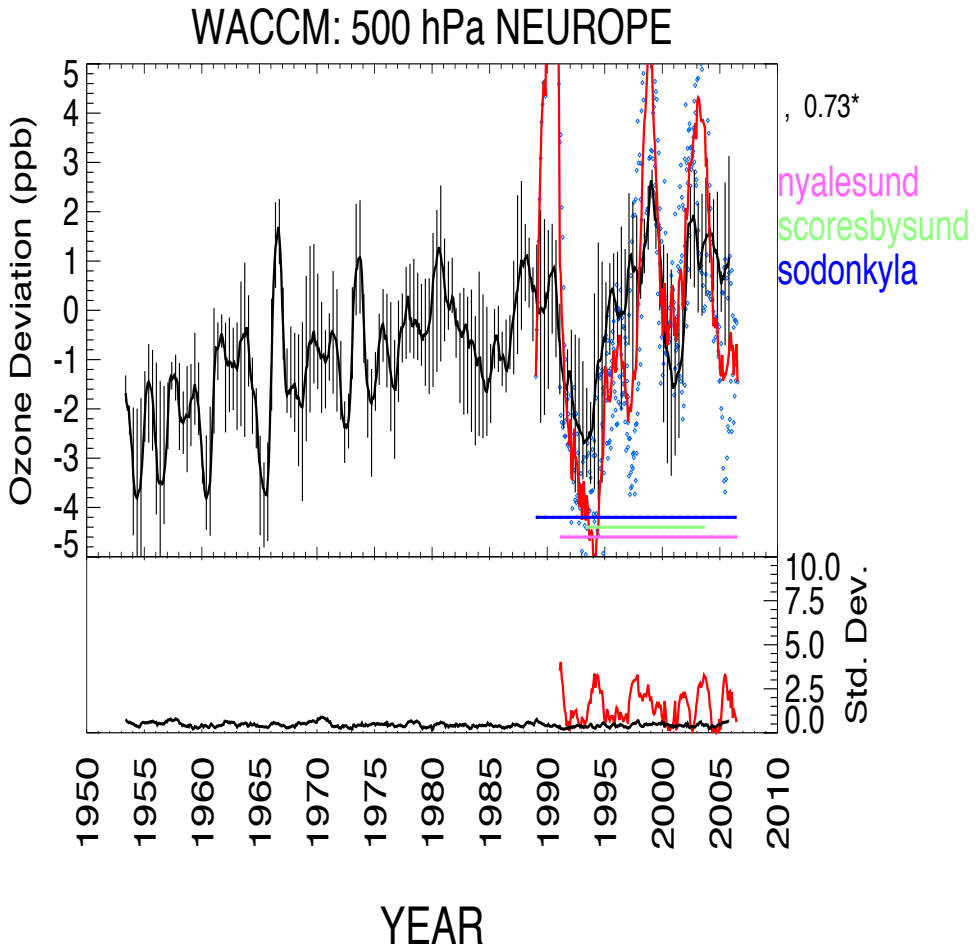
# WACCM: 150 hPa JAPAN



FIGS2: As in Figure S1, except for the Japanese 150 hPa Ozonesondes. The sonde type, carbon-iodine KC type sondes were used for the duration of the measurement period.

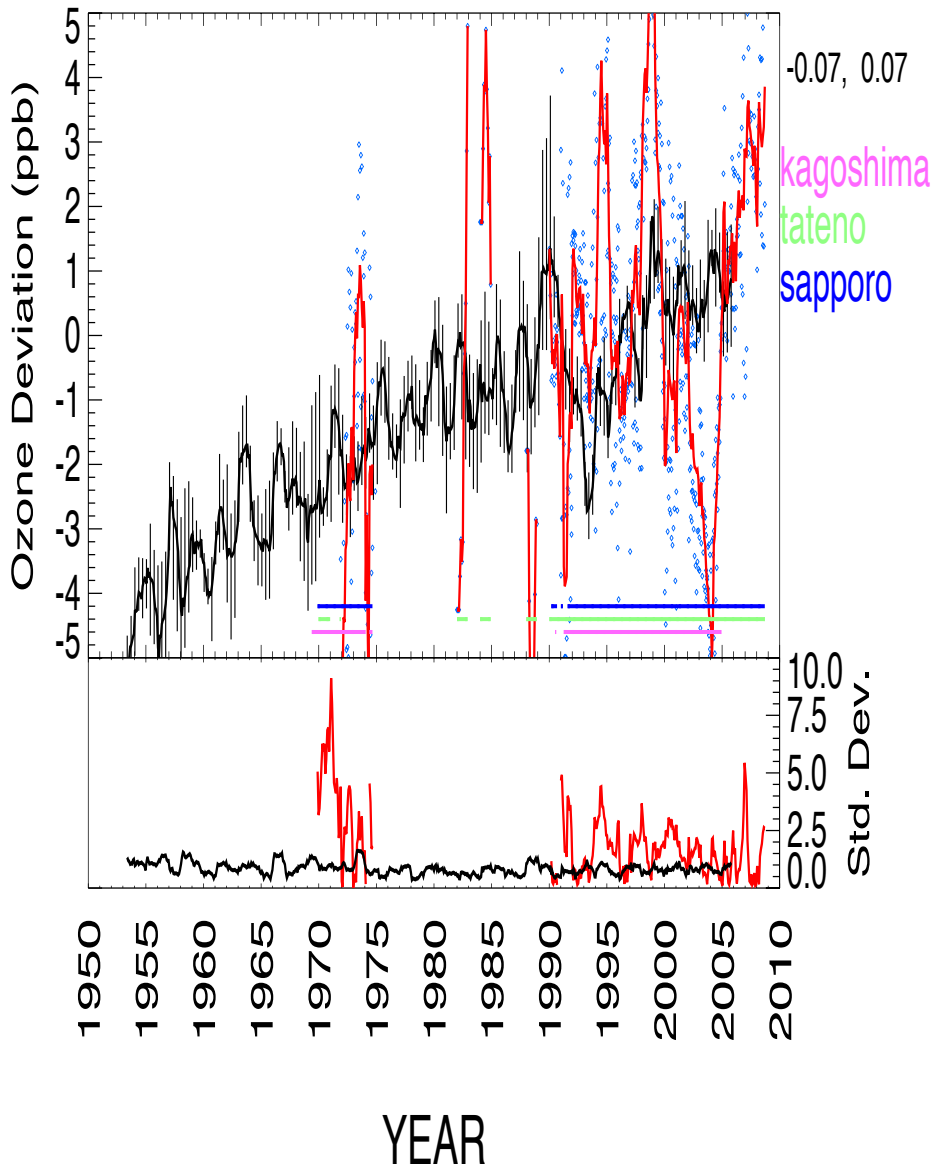


FIGS3: As in Figure S1, except for the Northern Europe 150 hPa Ozonesondes. The sonde type, ECC type sondes were used for the duration of the measurement period.



FIGS4: As in Figure S1, except for the Northern Europe 500 hPa ozonesondes. The sonde type, ECC type sondes were used for the duration of the measurement period.

# WACCM: 500 hPa JAPAN



FIGS5: As in Figure S1, except for the Japanese 500 hPa Ozonesondes. The sonde type, carbon-iodine KC type sondes were used for the duration of the measurement period.

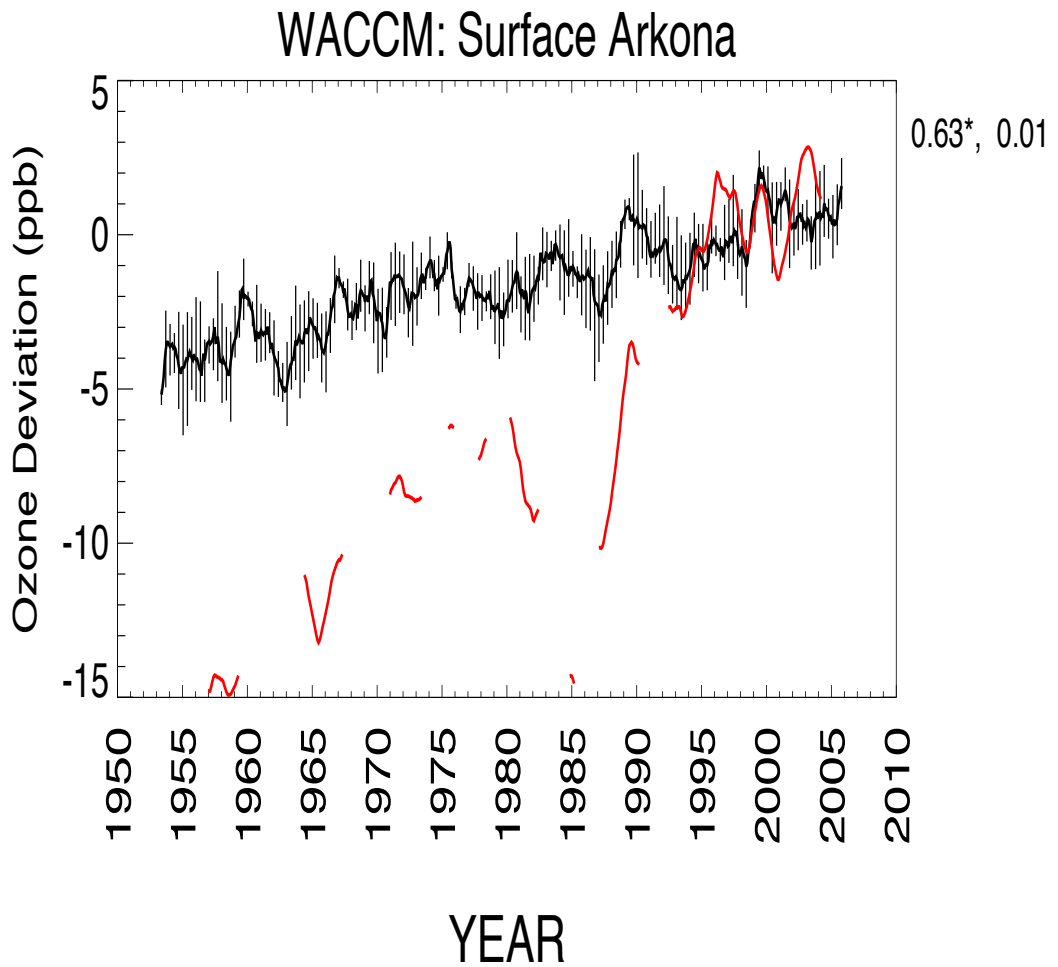
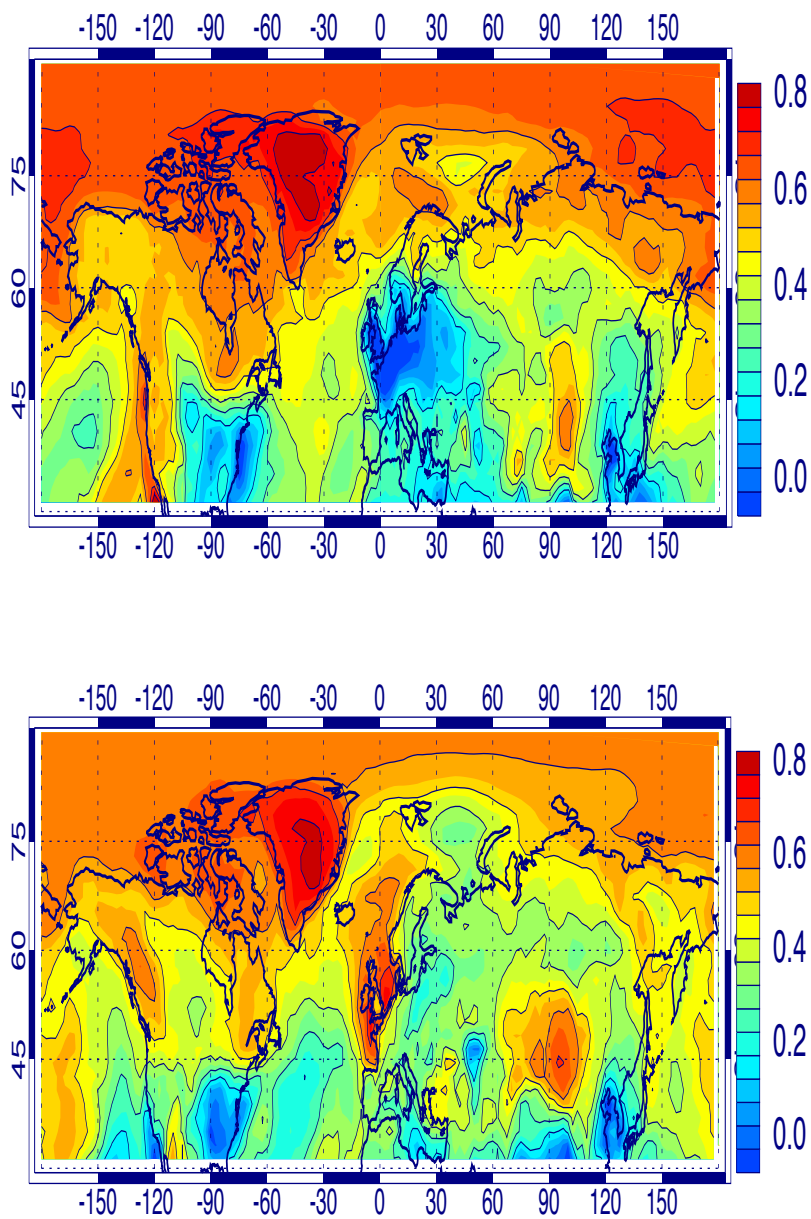


Fig. S6: As in Figure S1 but for the surface simulated and measured surface ozone deviations (ppb) at Arkona.



FigS7. Normalized first EOF component of detrended ozone at the surface for two different ensemble members. Shown is the EOF multiplied by the standard deviation of the principal component. The absolute value of the result shows variability of ozone (ppb) expected due to variations in the first EOF component, the sign of the result shows the relation between variability in different locations.