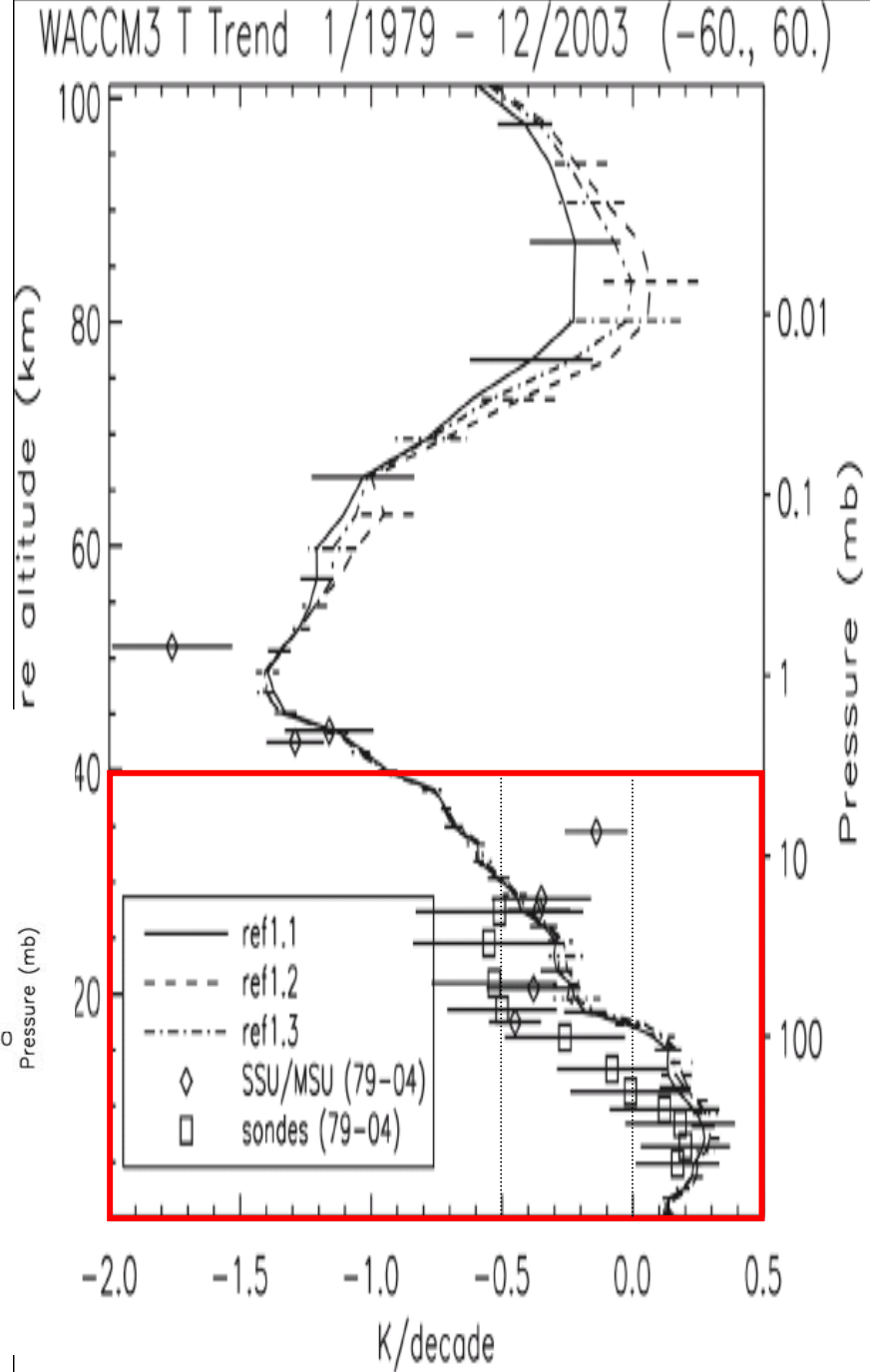
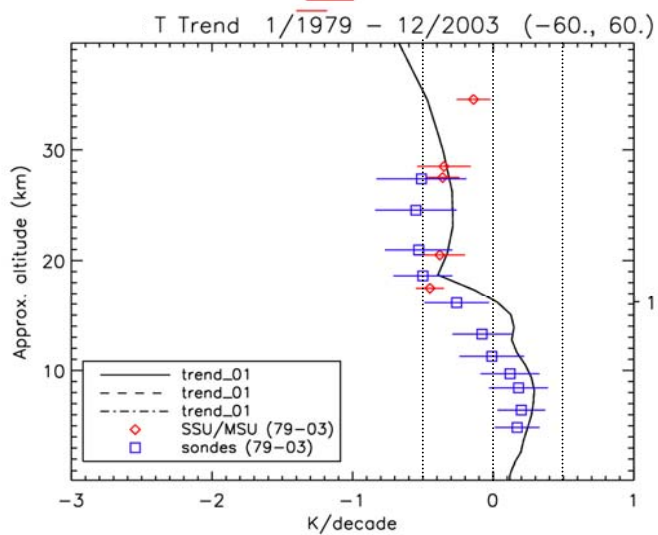


CAM for stratospheric trends studies

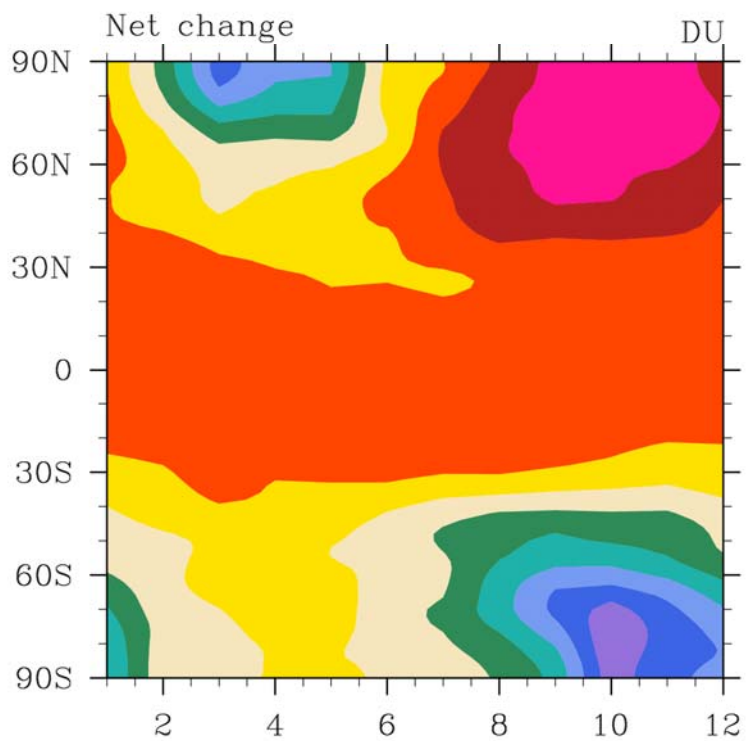
With lots of help from D. Kinnison
and J. Orlando

Specifics

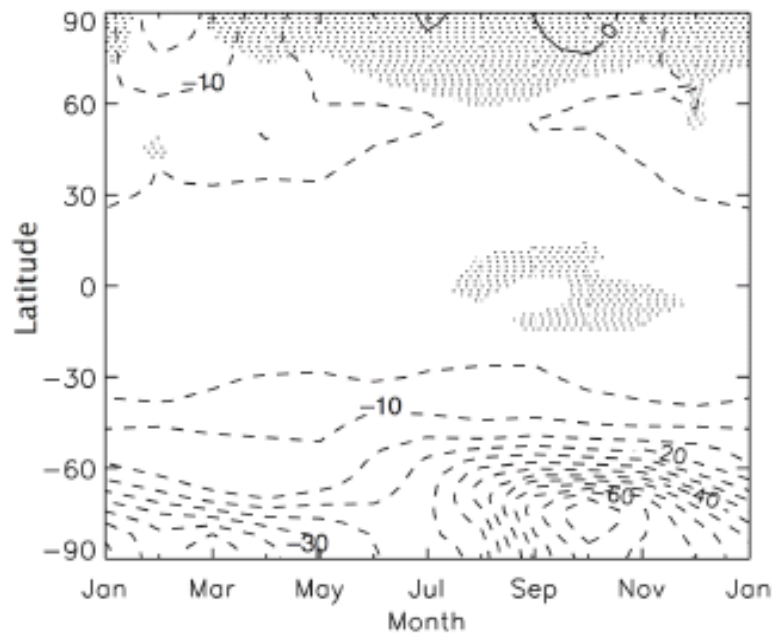
- Reduced tropospheric chemistry (has some representation of hydrocarbons)
- Additional stratospheric chemistry (including PSCs; uses time-dependent SAD climatology)
- CFCs, CH₄, CO₂ as time-varying lower boundary condition from obs.
- Time-varying observed SSTs
- 1970-2005; use the first 10 years as spin-up
- 2x2.5, 26 levels (up to 4hPa)
- Start from WACCM results for 1970



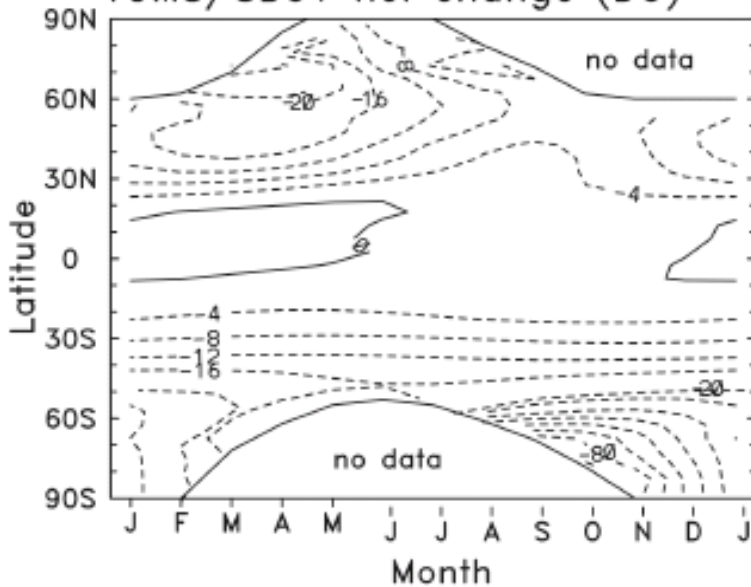
Change in total ozone column



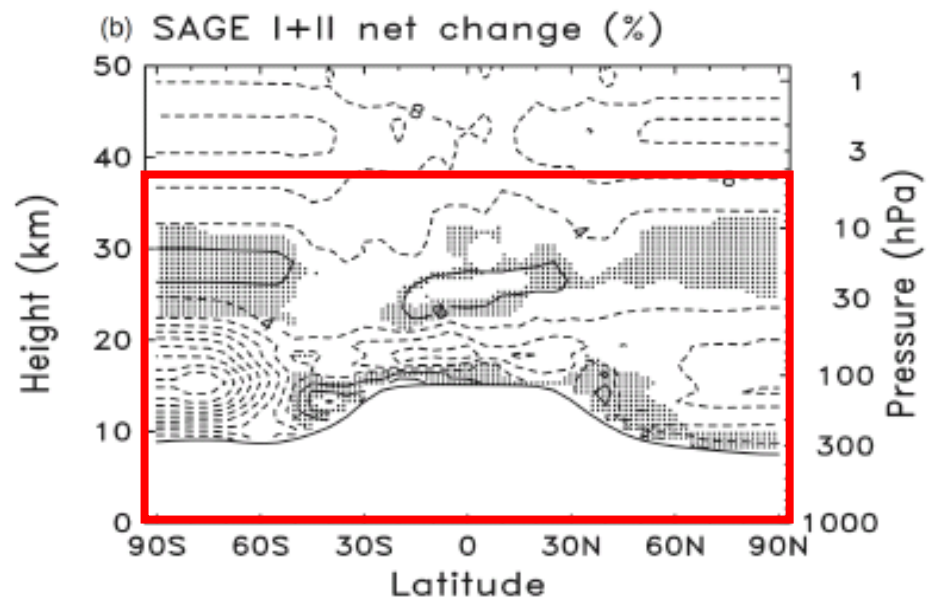
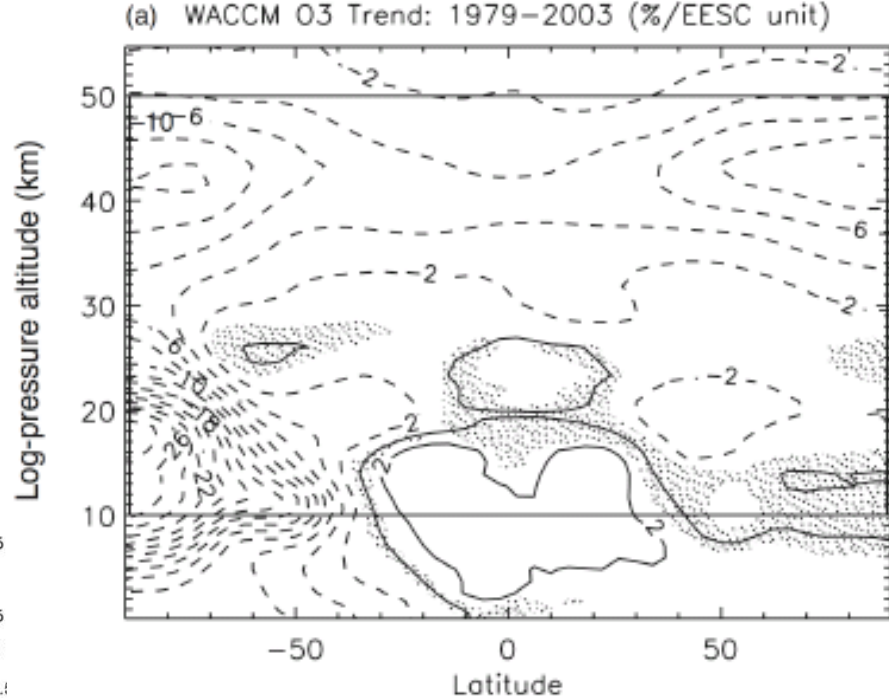
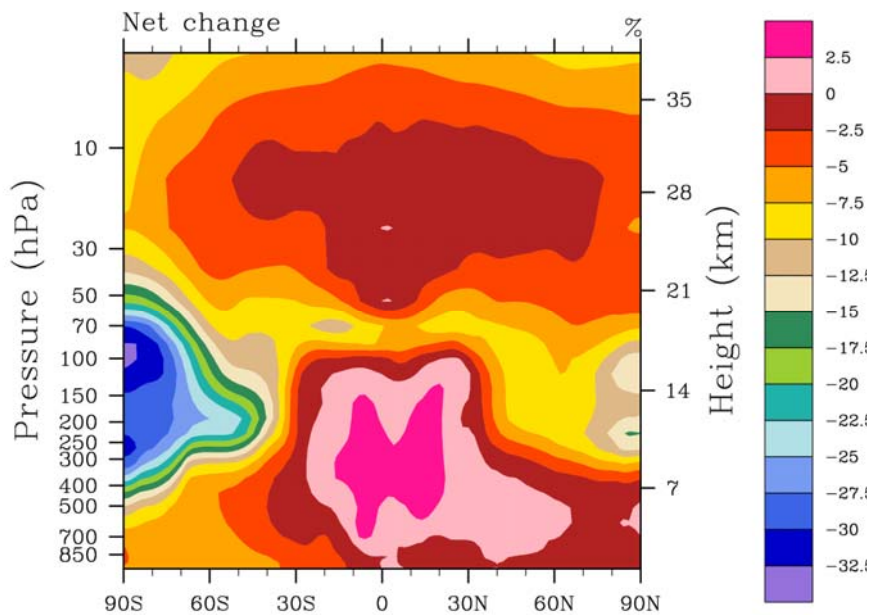
(a) WACCM Column O3 Trend (DU/EESC unit): 1979–2003



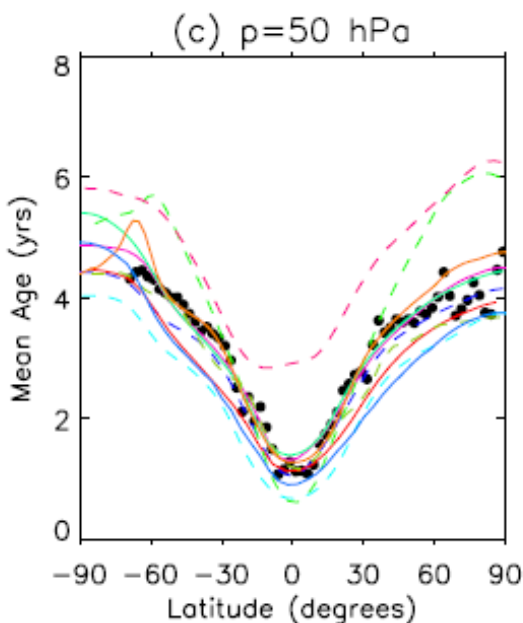
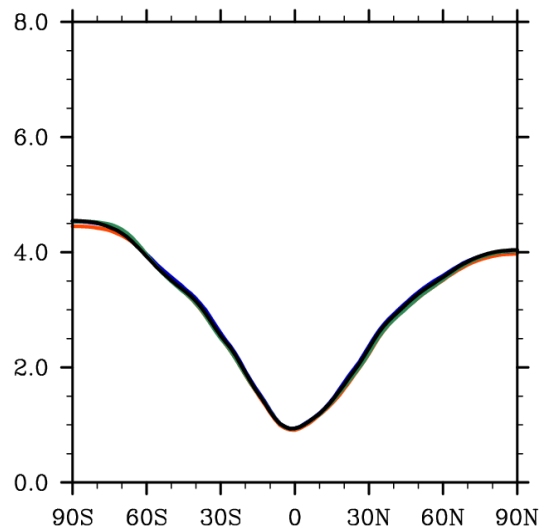
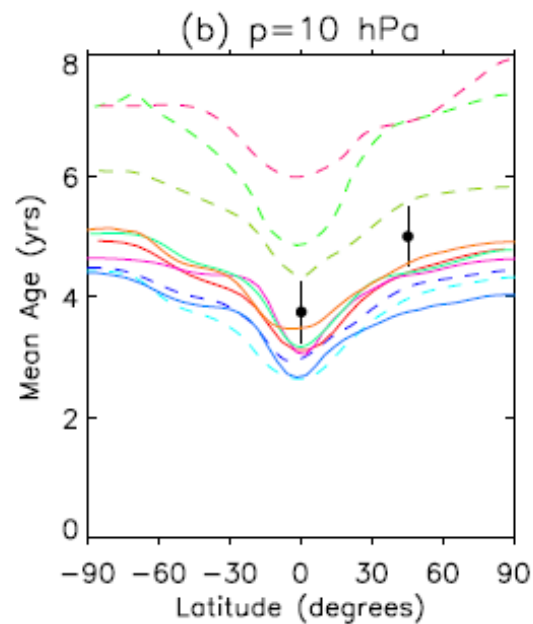
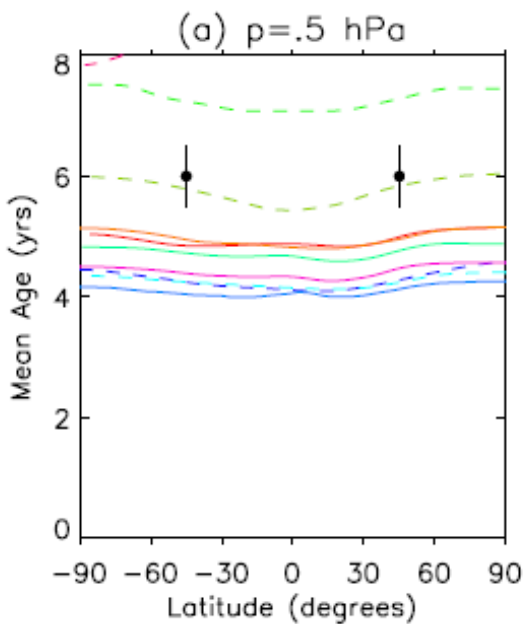
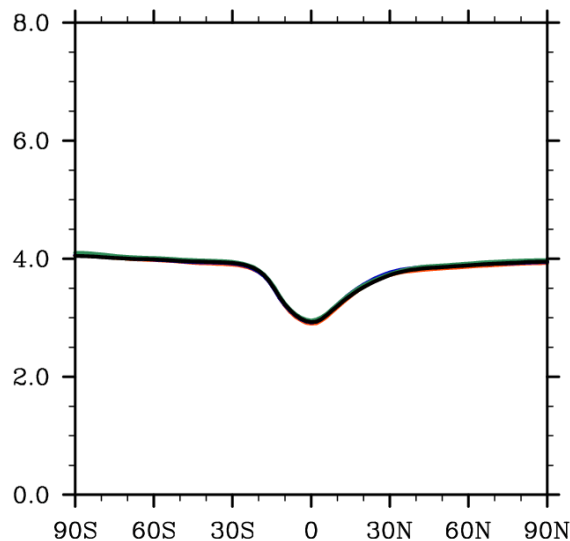
(b) TOMS/SBUV net change (DU)



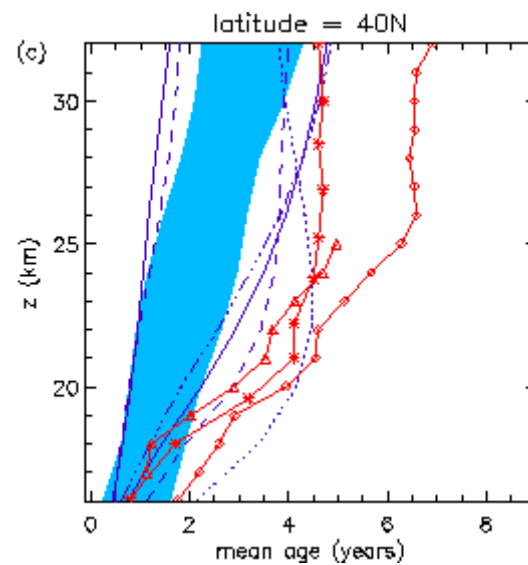
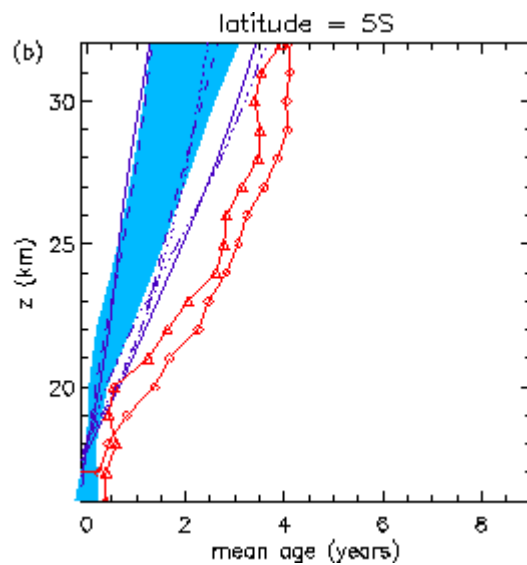
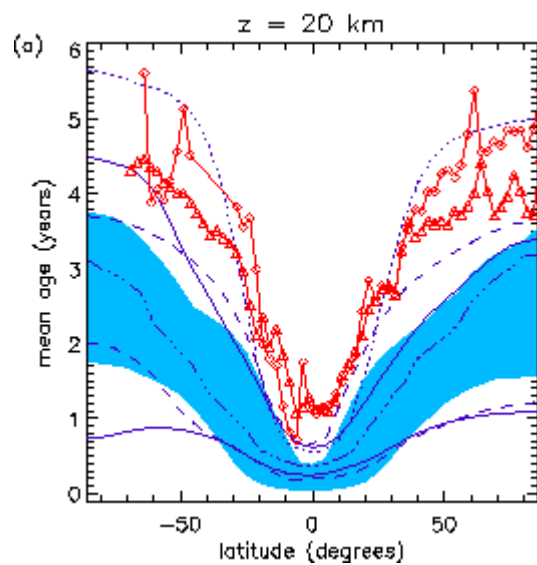
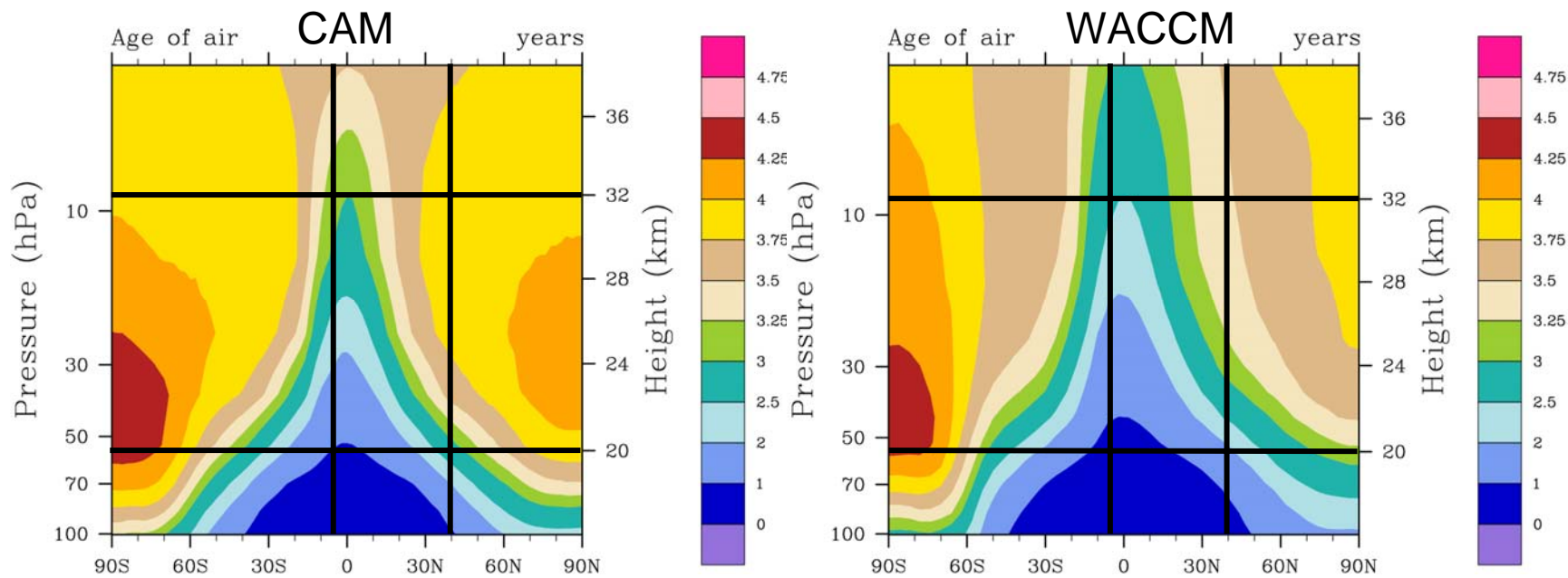
Change in zonal-mean ozone



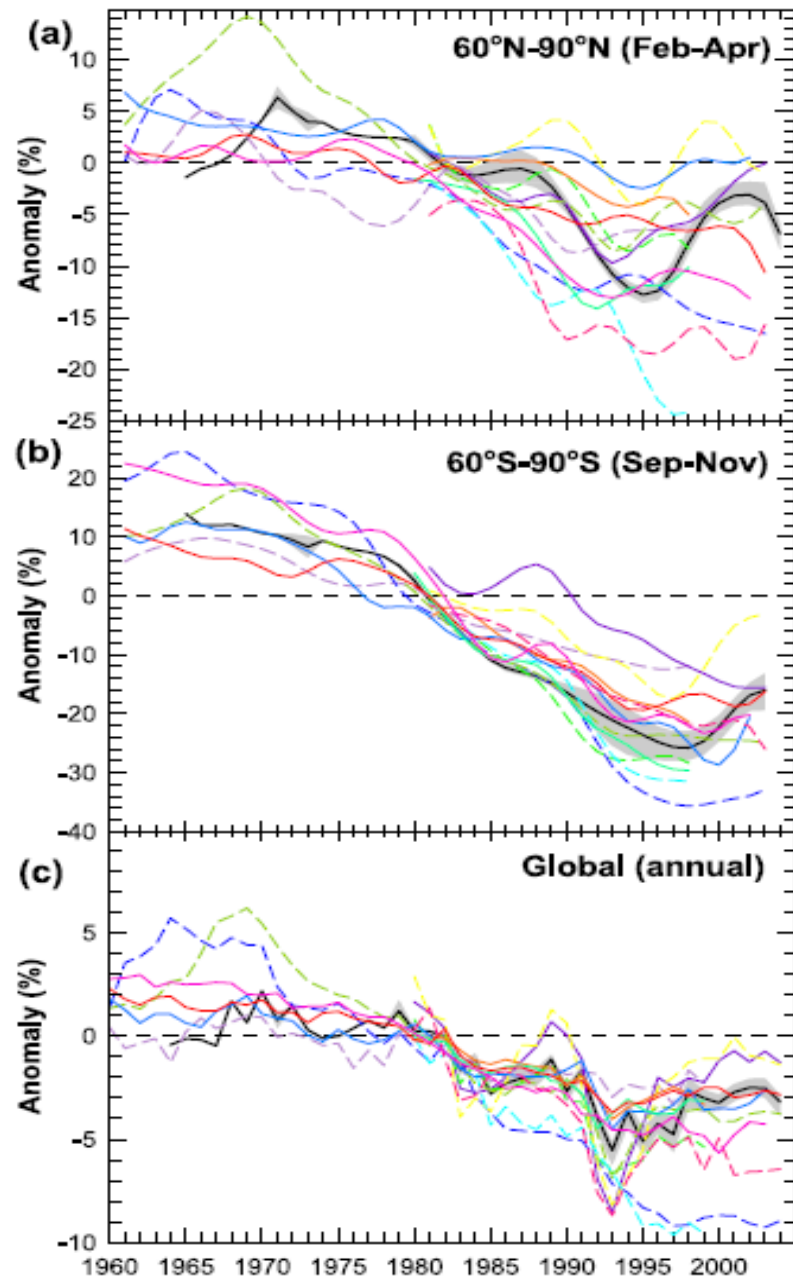
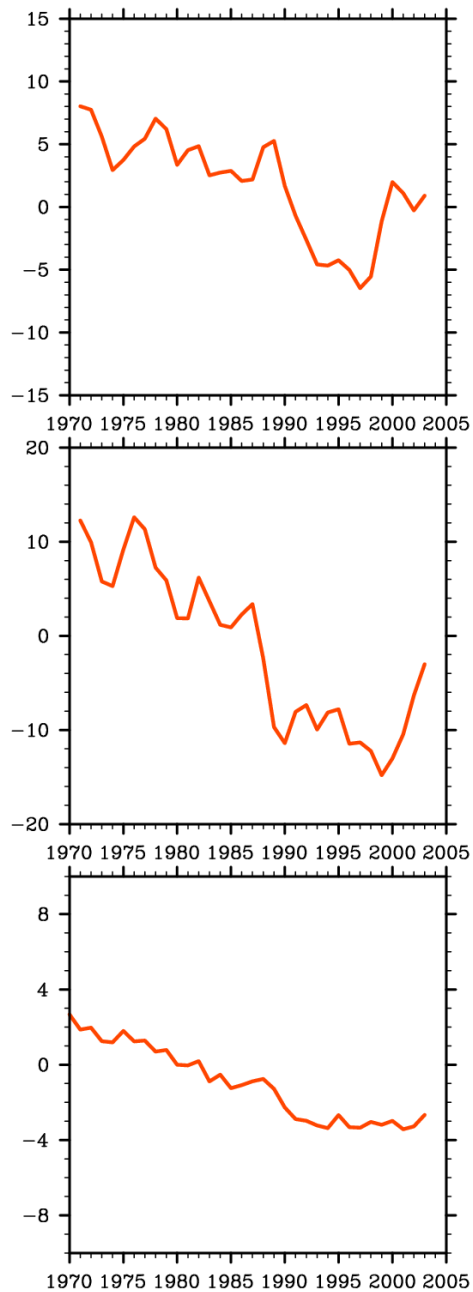
Age of air



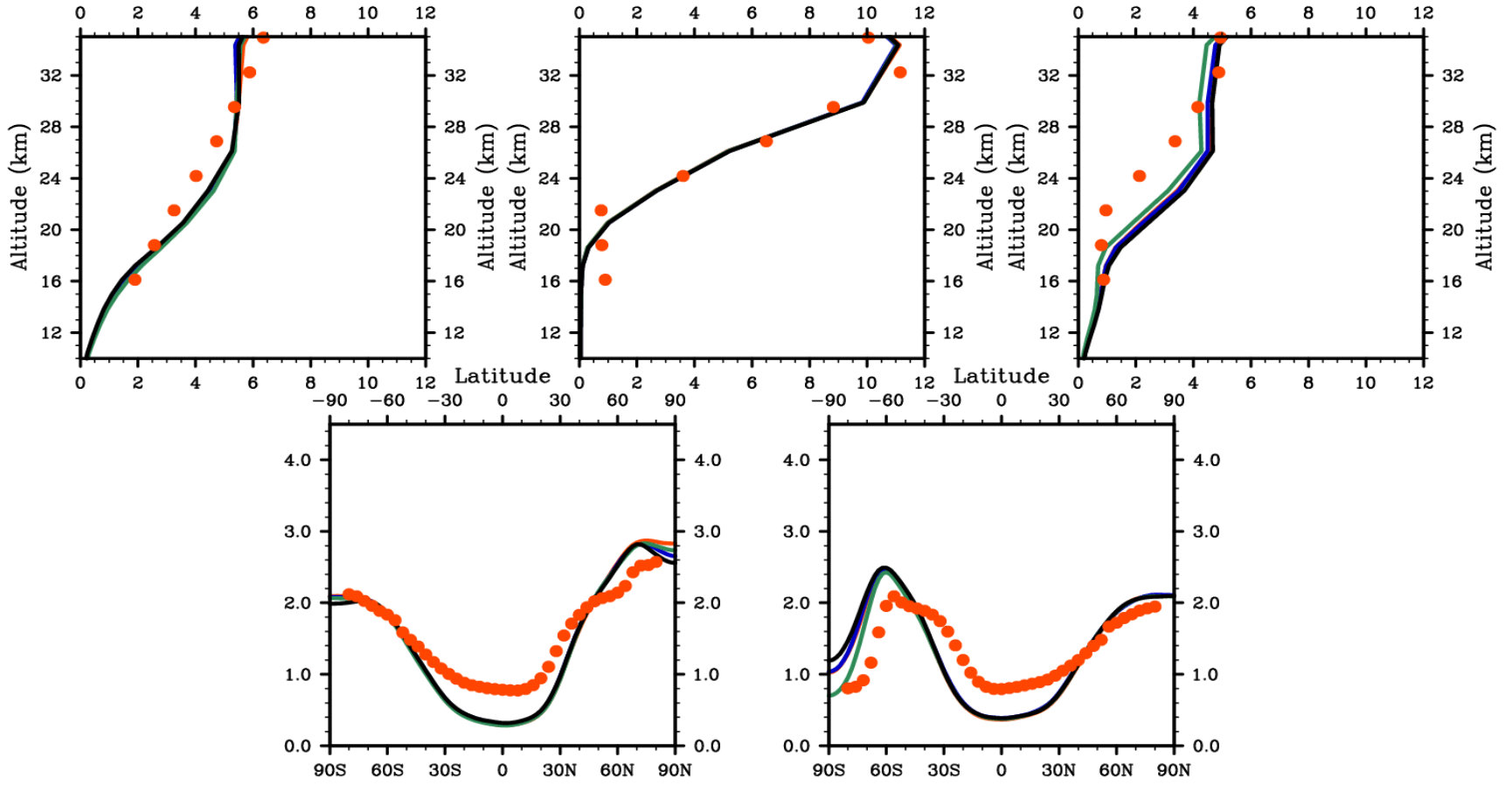
- AMTRAC
- CMAM
- GEOSCCM
- LMDZrepro
- MAECHAM4CHEM
- MRI
- ULAQ
- UMTRAC
- UMFLIMCAT
- WACCM



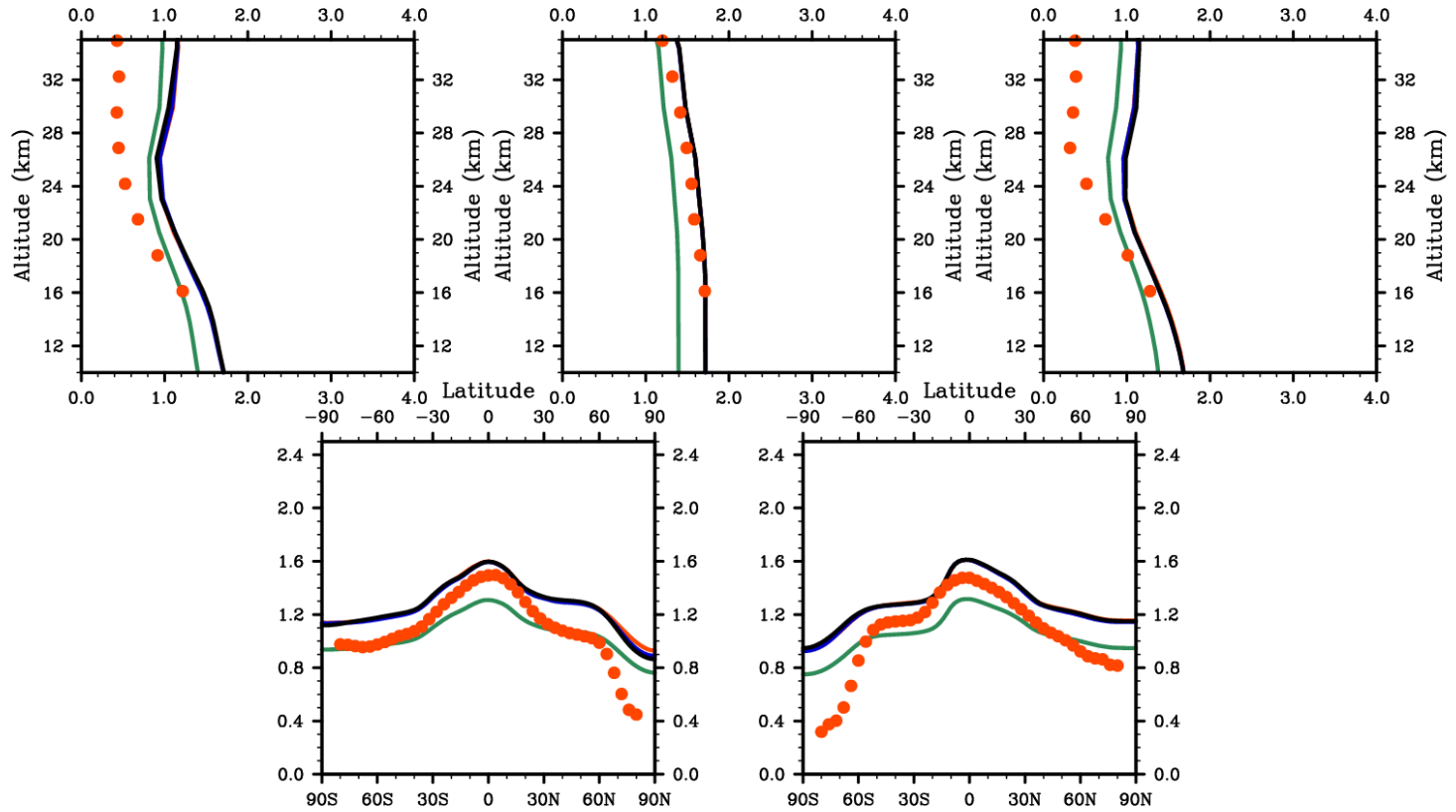
Ozone anomaly
w.r.t. 1980



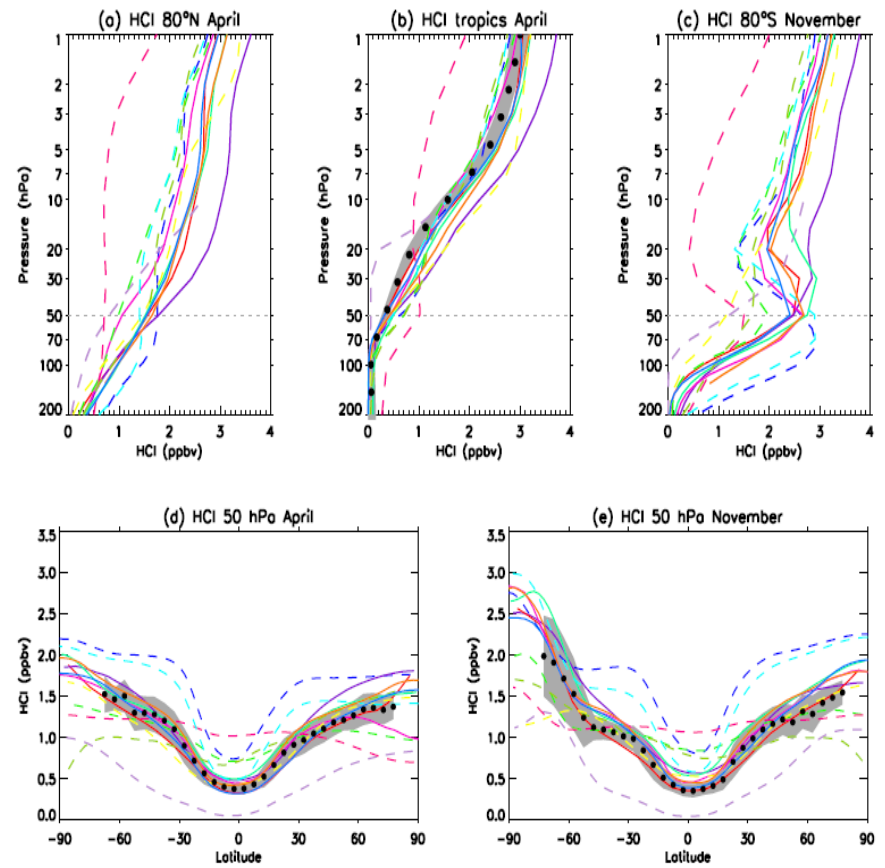
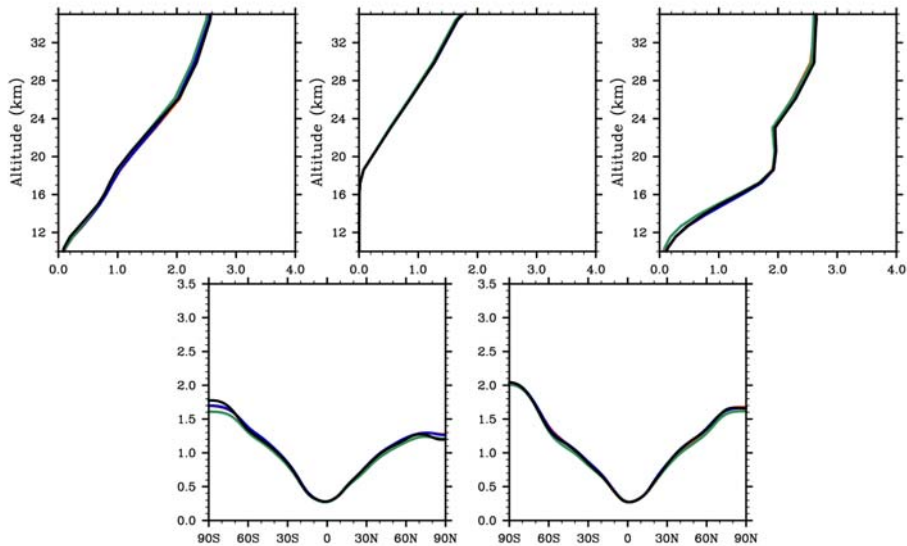
Ozone



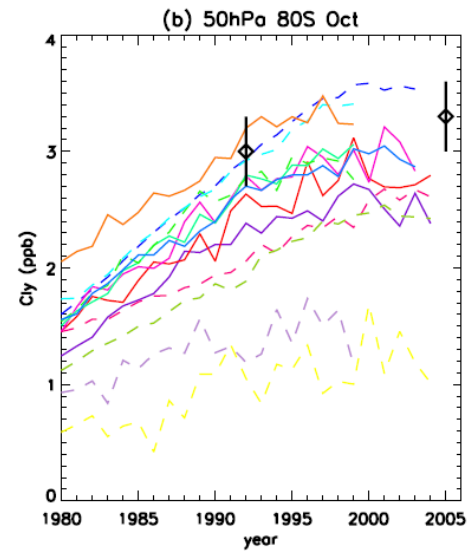
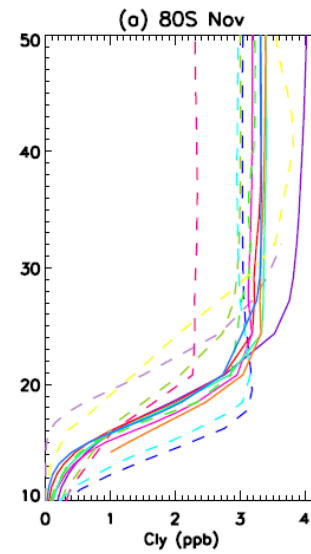
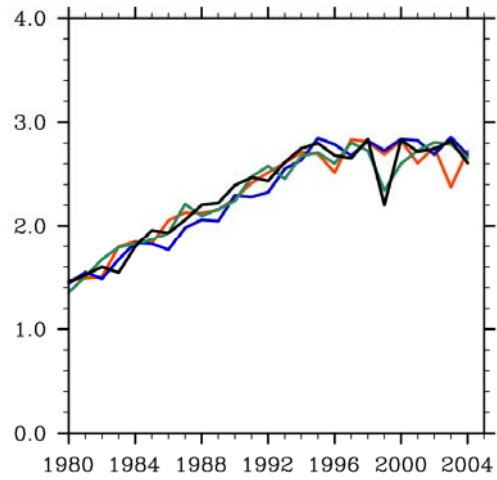
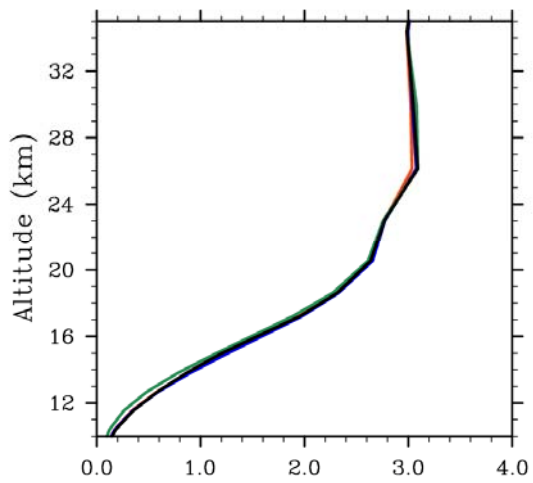
Methane



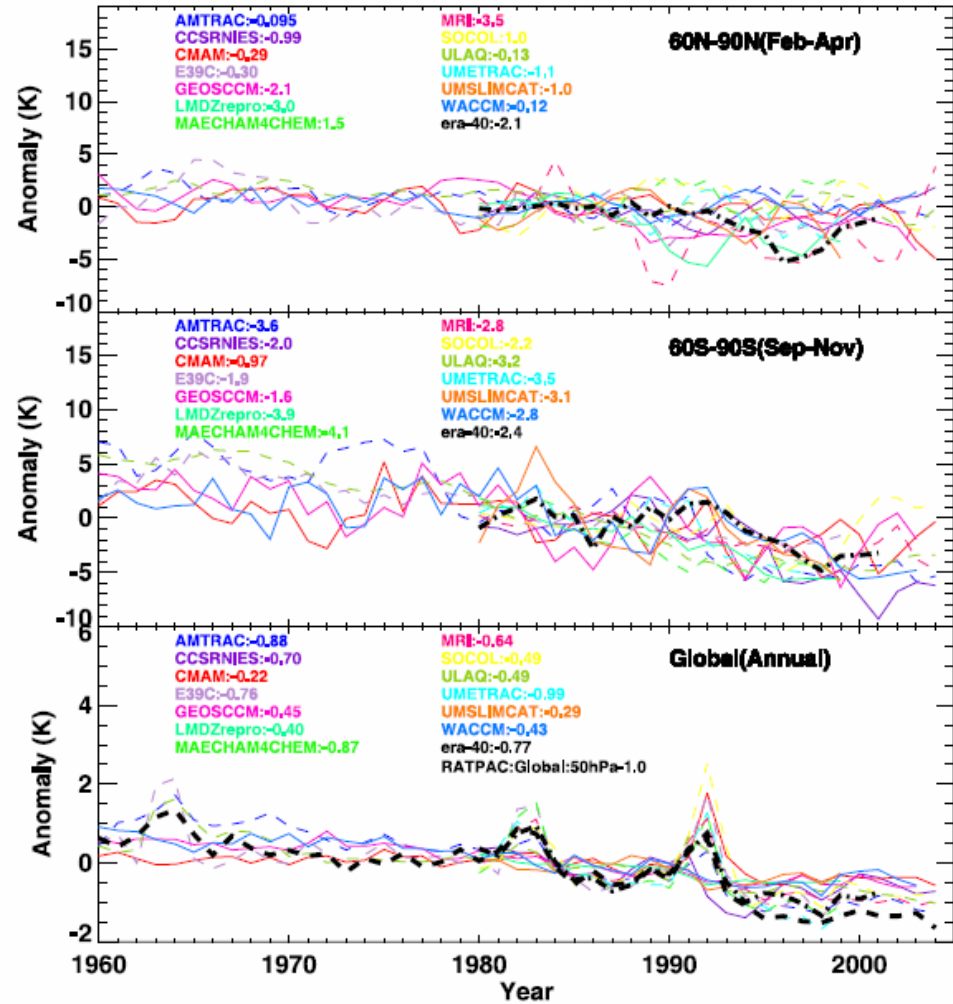
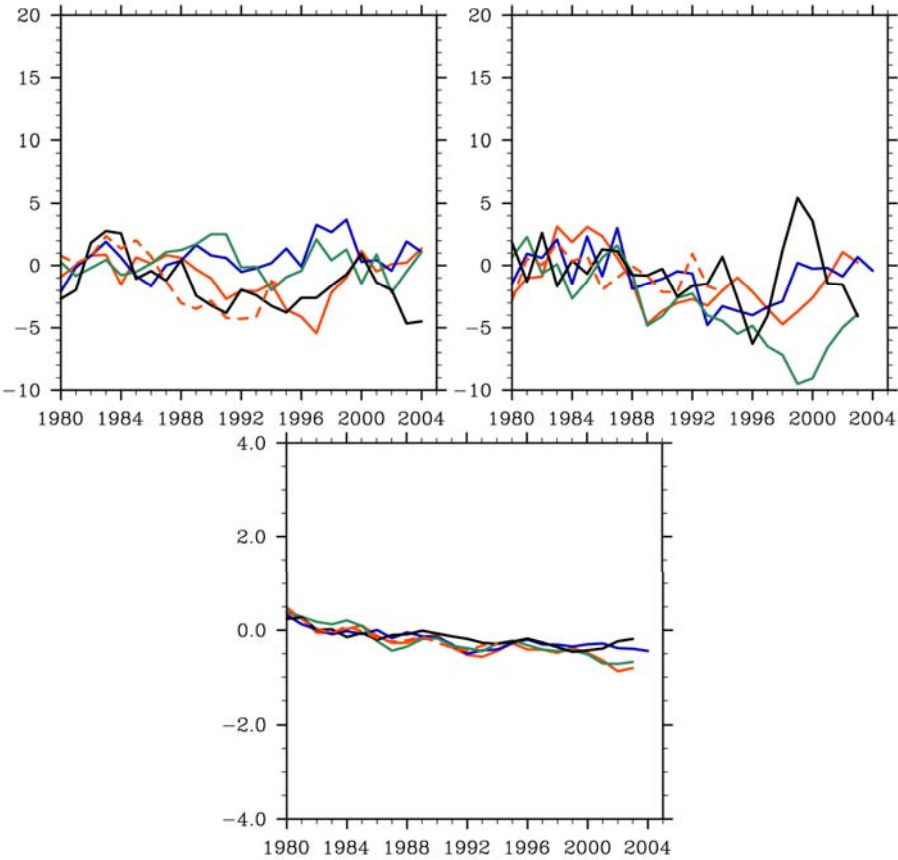
HCl



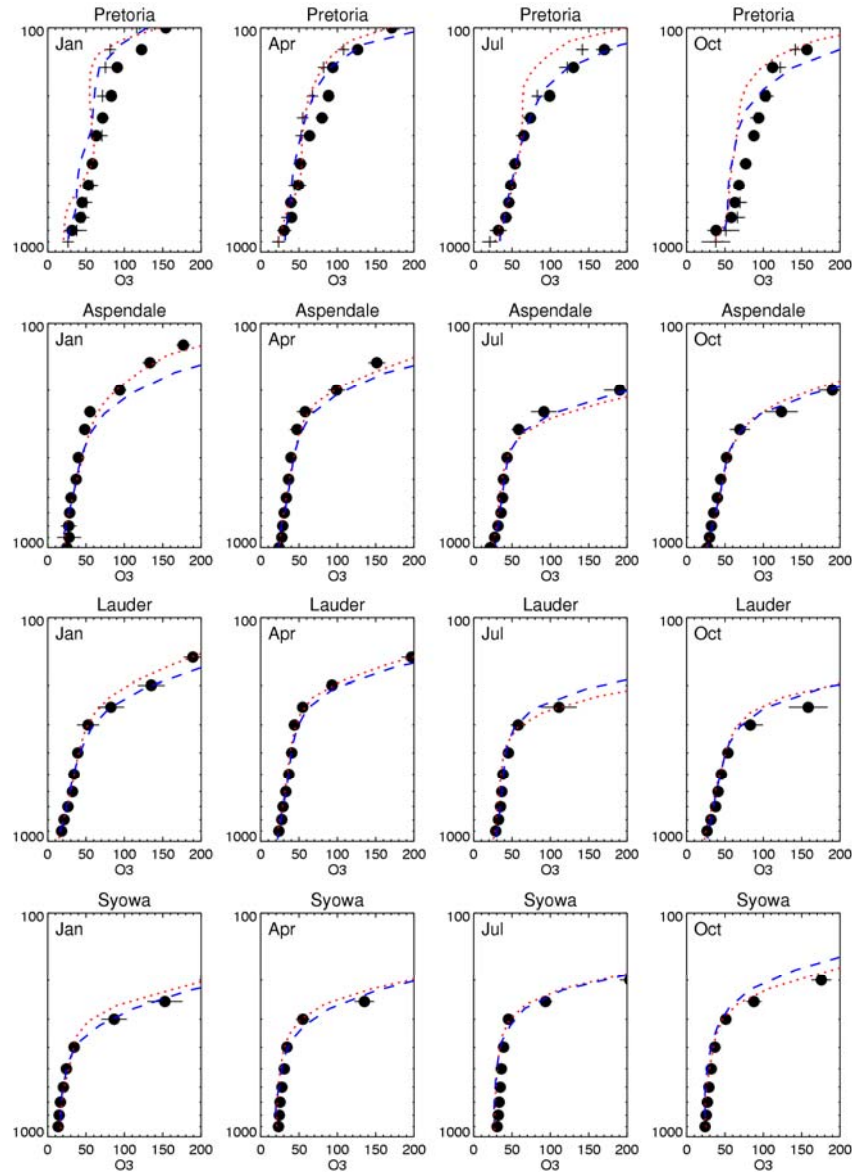
CIOy



Temperature



Comparison w/ ozonesondes



Next steps

- Look at STE, tropospheric trends
- Look at tropospheric lifetime (methane looks good)