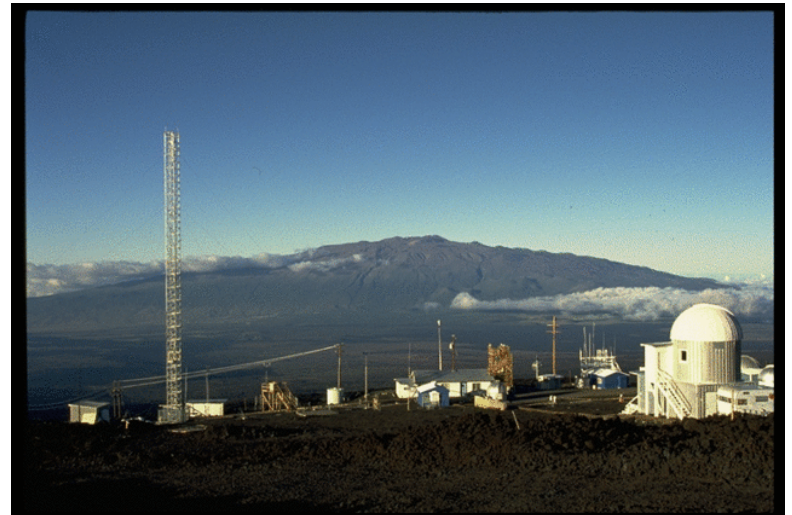
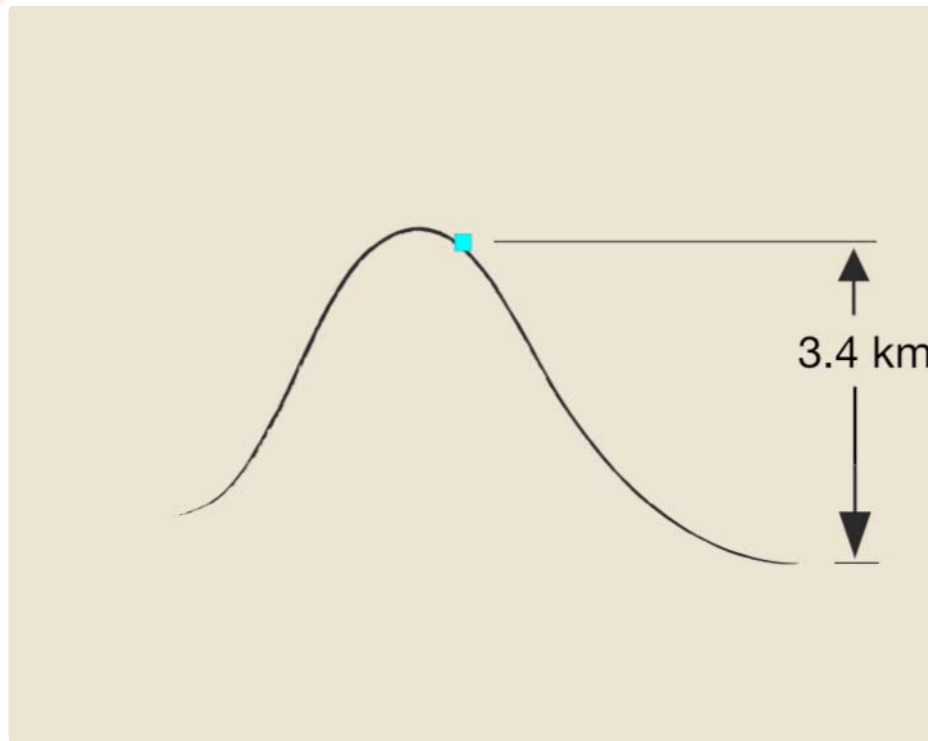


Stratospheric Air Sampled at the Surface at Mauna Loa Observatory

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& Mauna Loa personnel

- NOAA/ESRL Global Monitoring Division
- NOAA/ESRL Chemical Sciences Division
- University of Colorado, CIRES



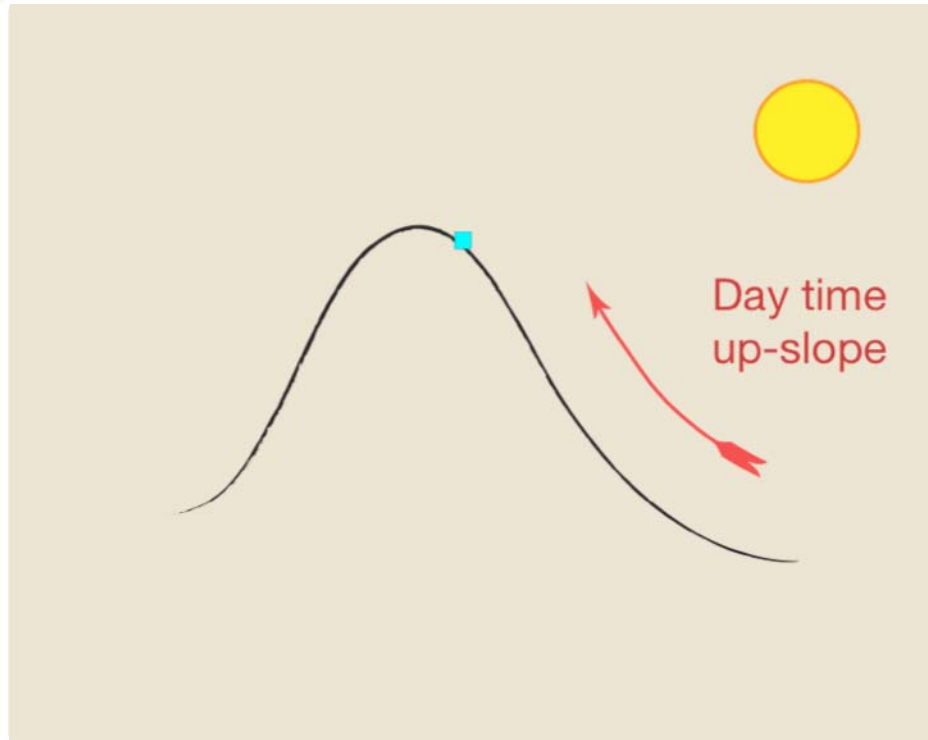


Mauna Loa, Hawaii

Conventional wisdom:

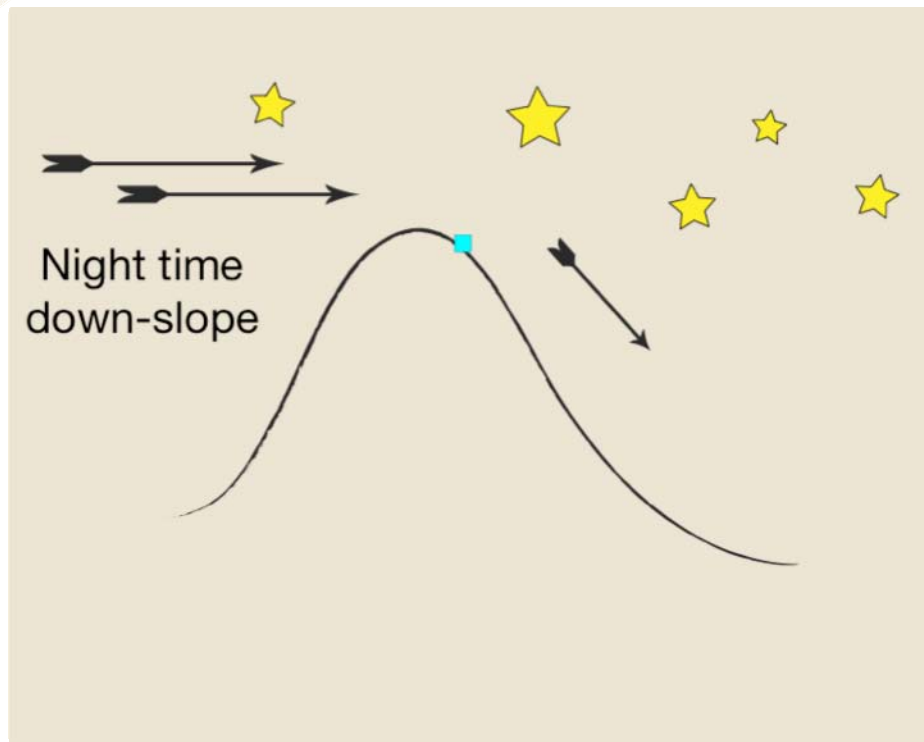
NOAA baseline observatory near the top of Mauna Loa.

3397 meters above sea level.



Mauna Loa, Hawaii

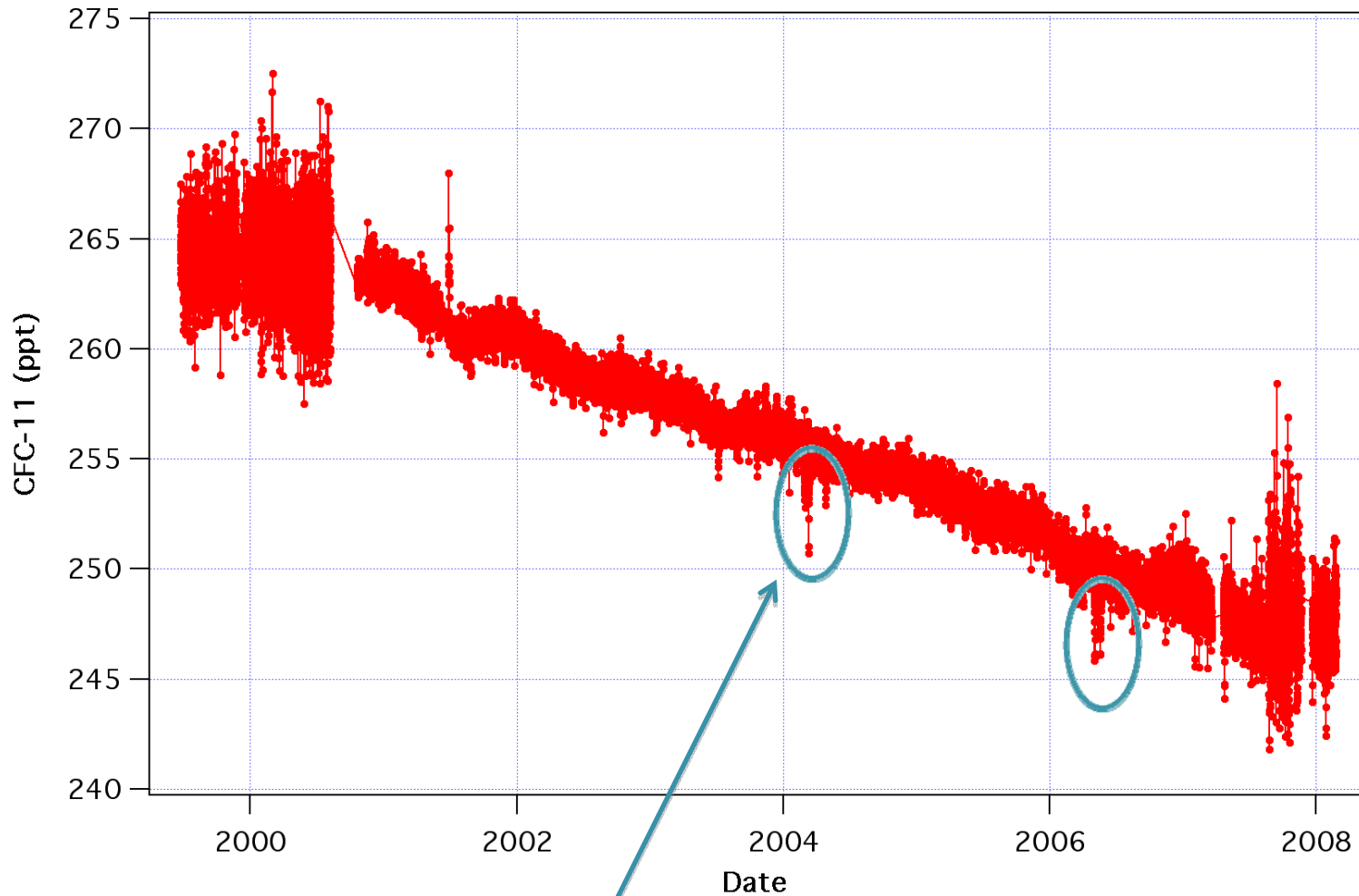
Day time up-slope conditions bring warm air up Mauna Loa and raises boundary layer.



Mauna Loa, Hawaii

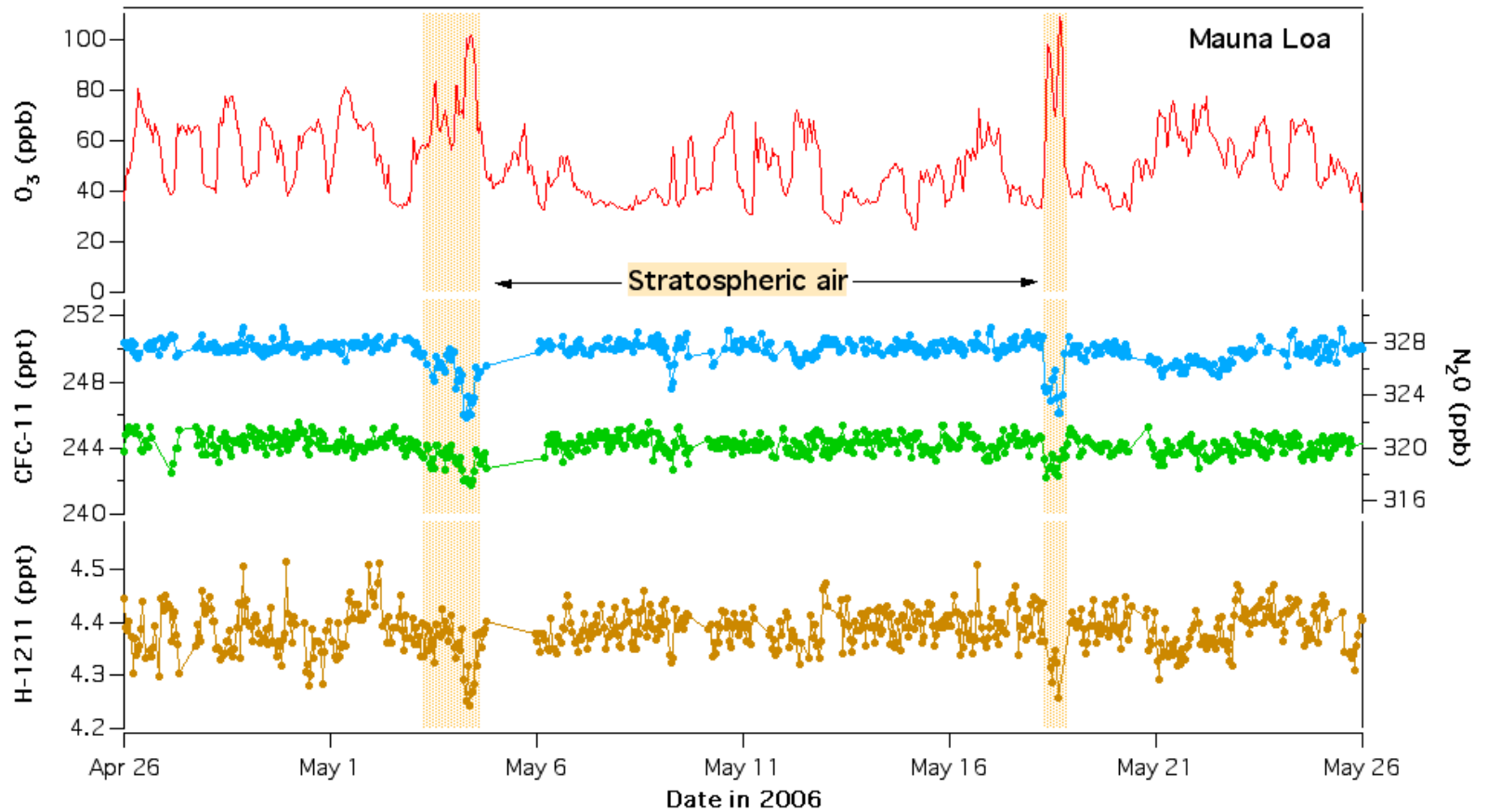
Night time down-slope conditions bring upper free tropospheric air to the observatory.

MLO in situ CFC-11

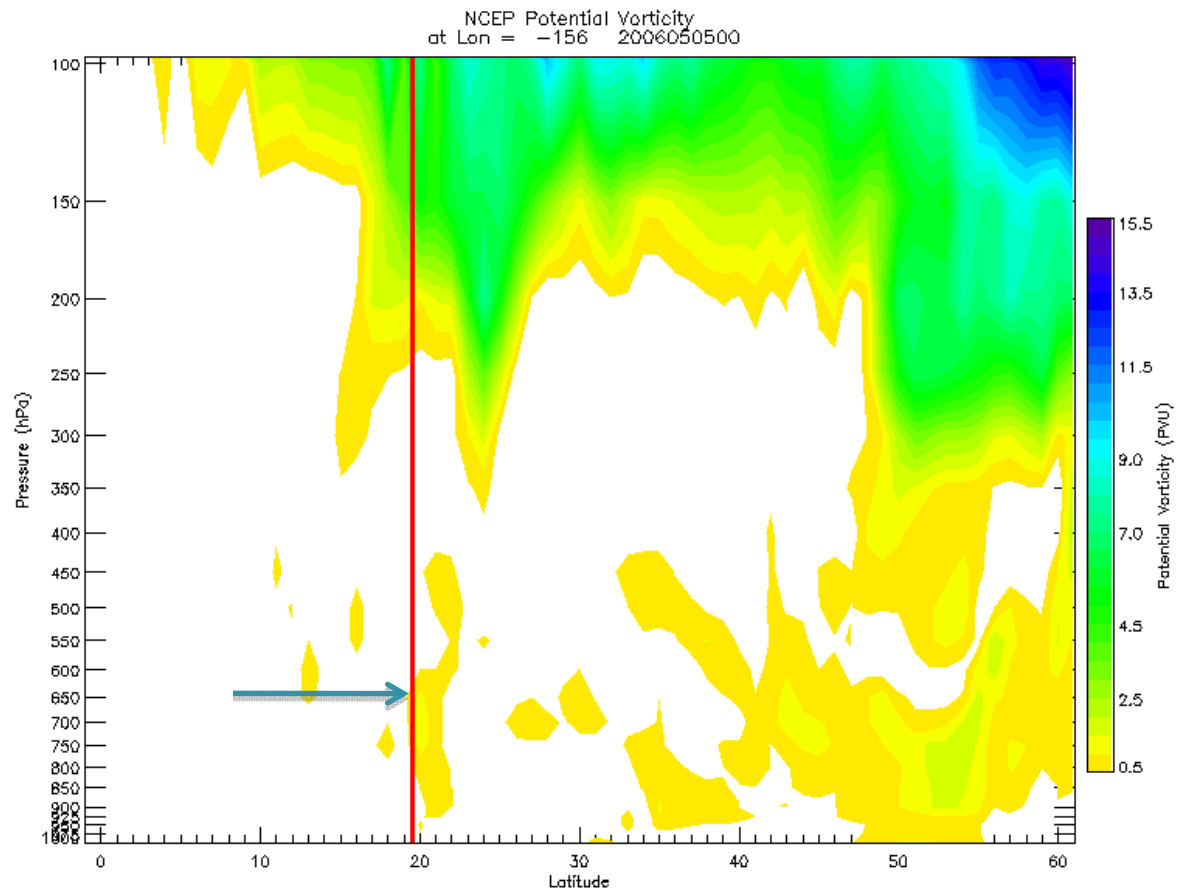


Cooper, O.R., et al. (2005), Direct transport of midlatitude stratospheric ozone into the lower troposphere and marine boundary layer of the tropical Pacific Ocean, *J. Geophys. Res.*, 110, D23310, doi:10.1029/2005JD005783

Stratospheric Intrusions May 2006



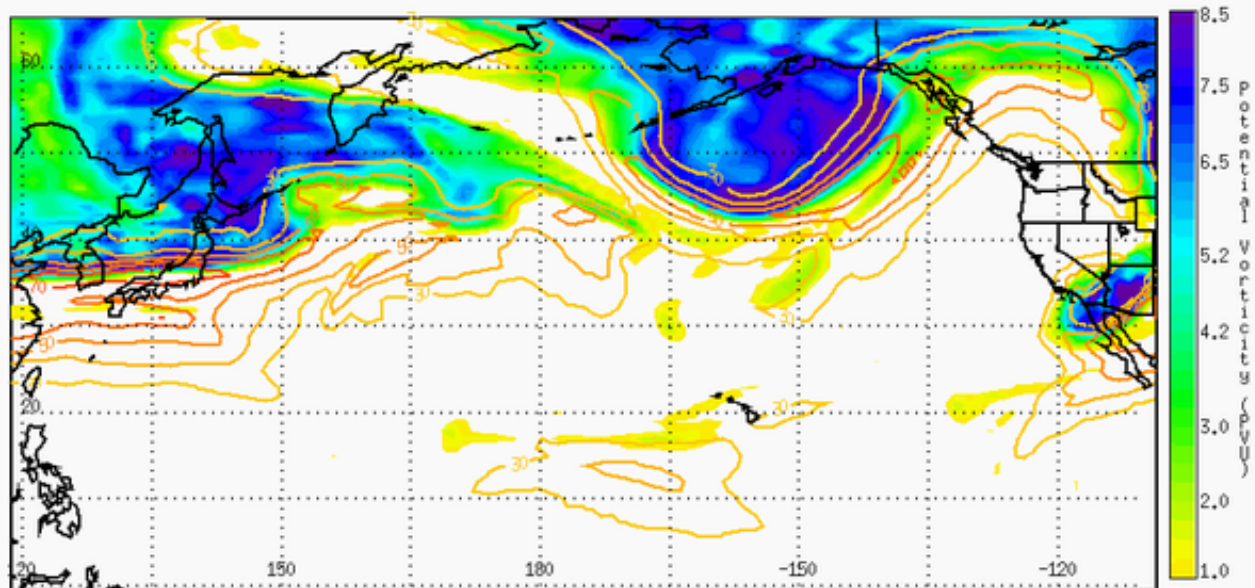
Potential Vorticity May 5, 2006



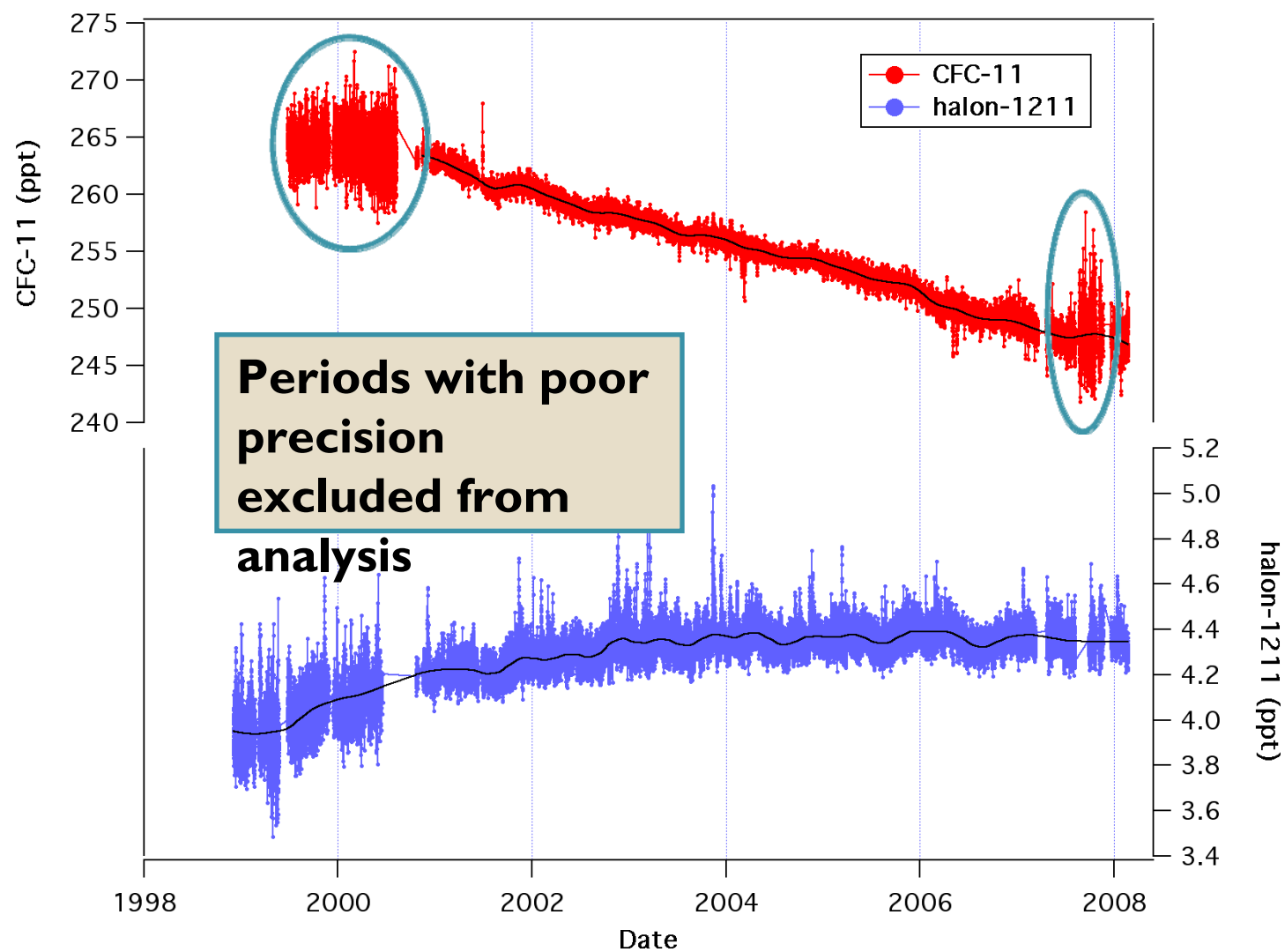
NCEP Potential Vorticity

April 28 to May 28, 2006

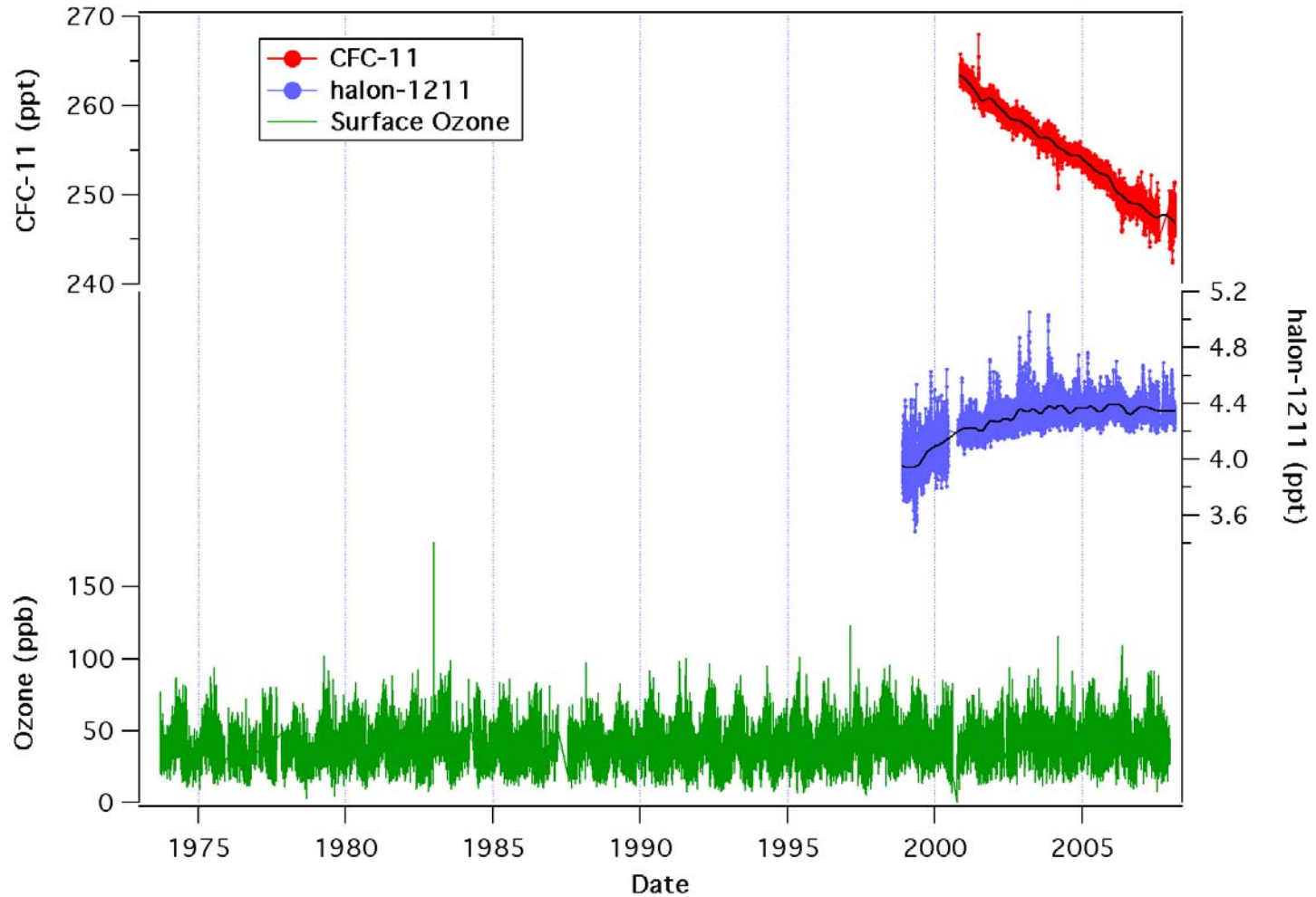
NCEP Potential Vorticity
Press = 250 hPa 2006042800



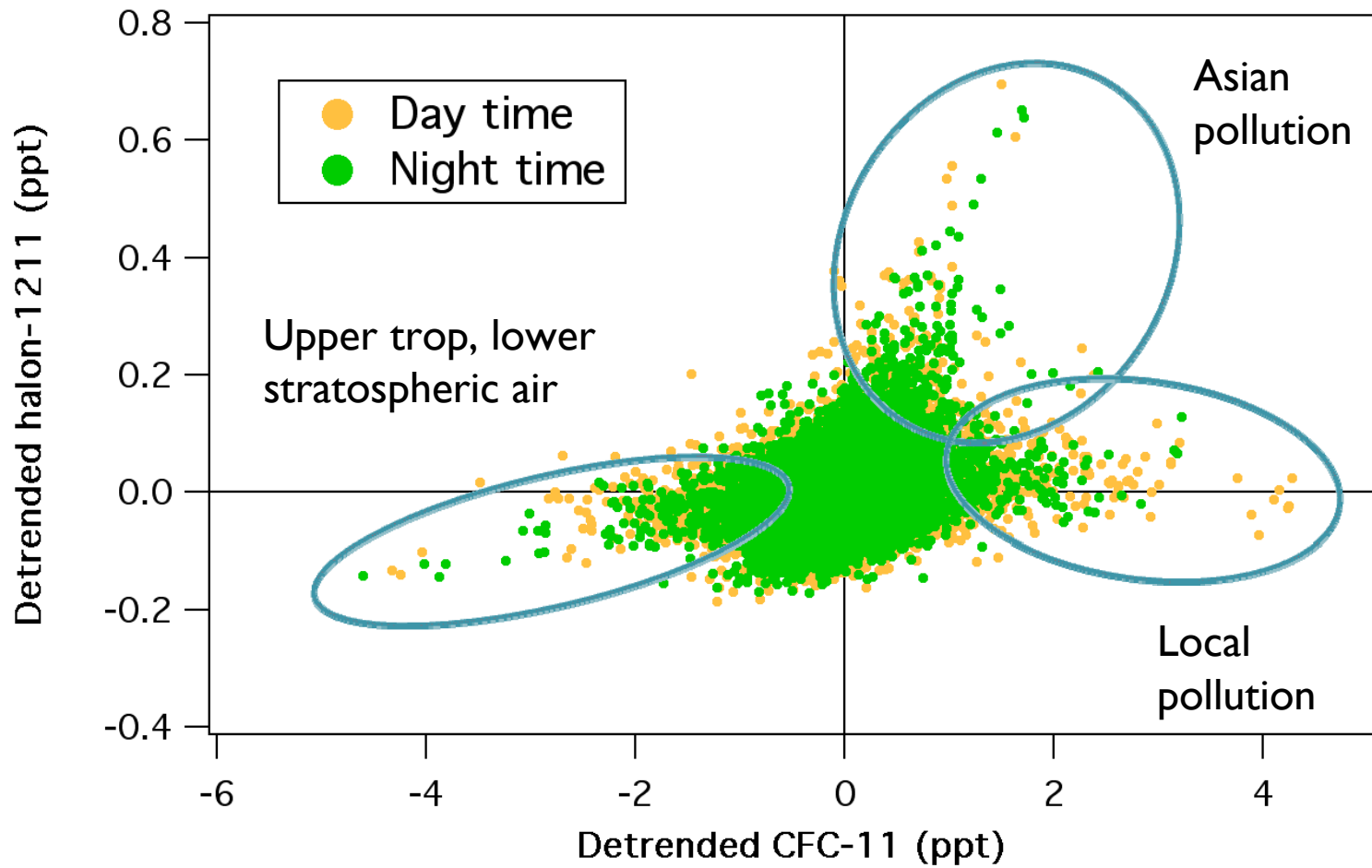
Halocarbon in situ measurements



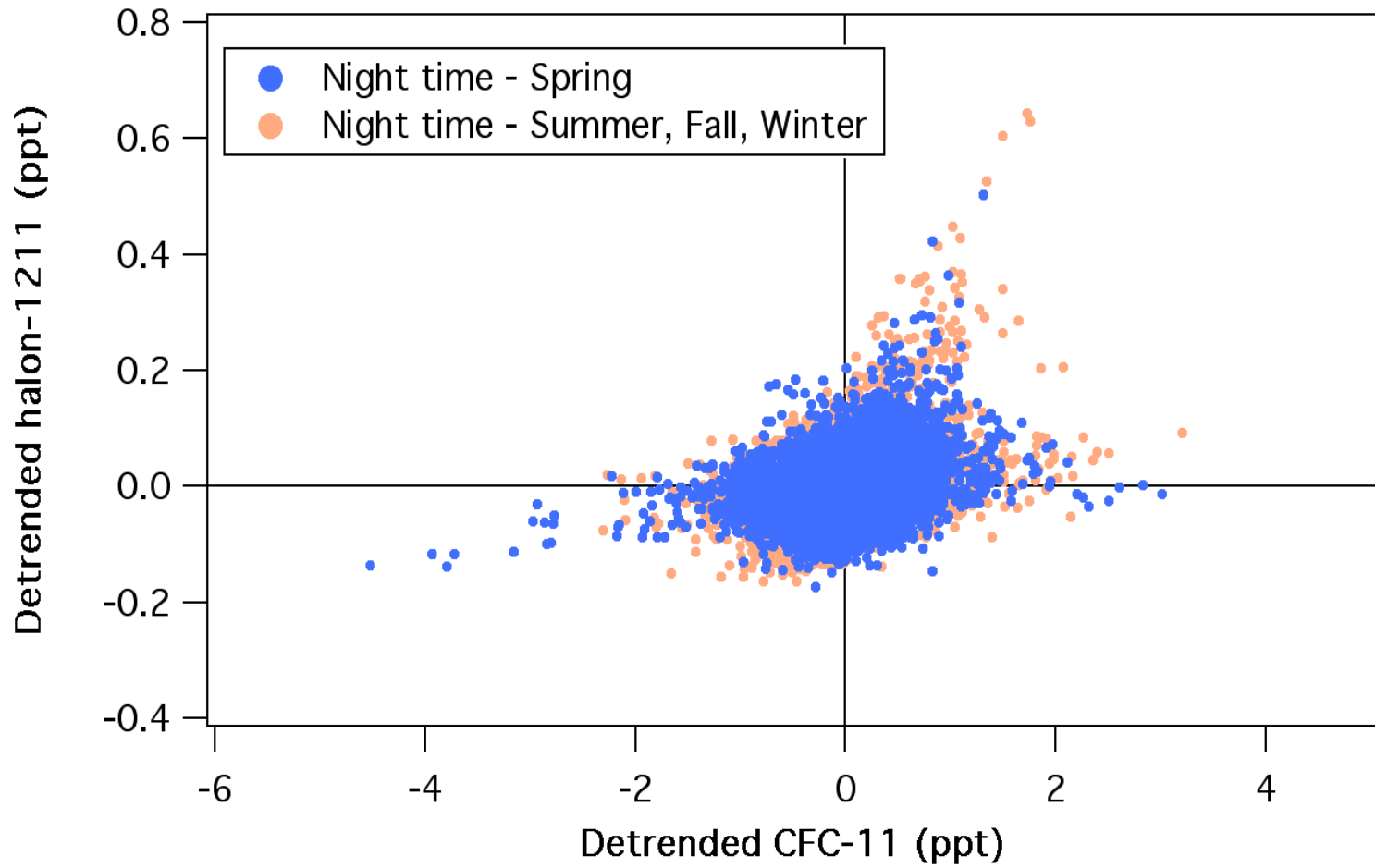
Continuous surface Ozone measurement started at Mauna Loa in 1973.

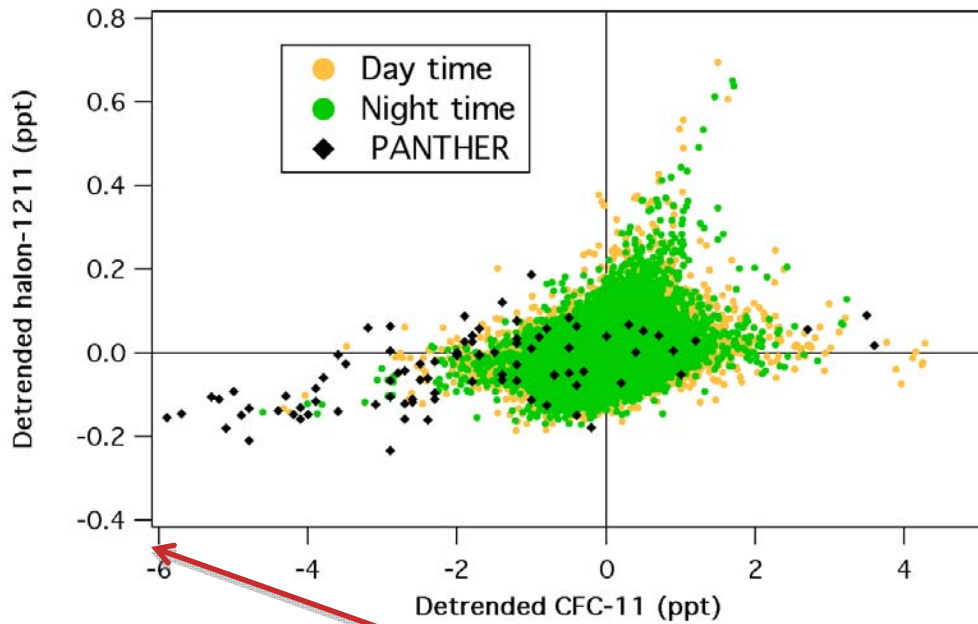


Day and Night Comparison

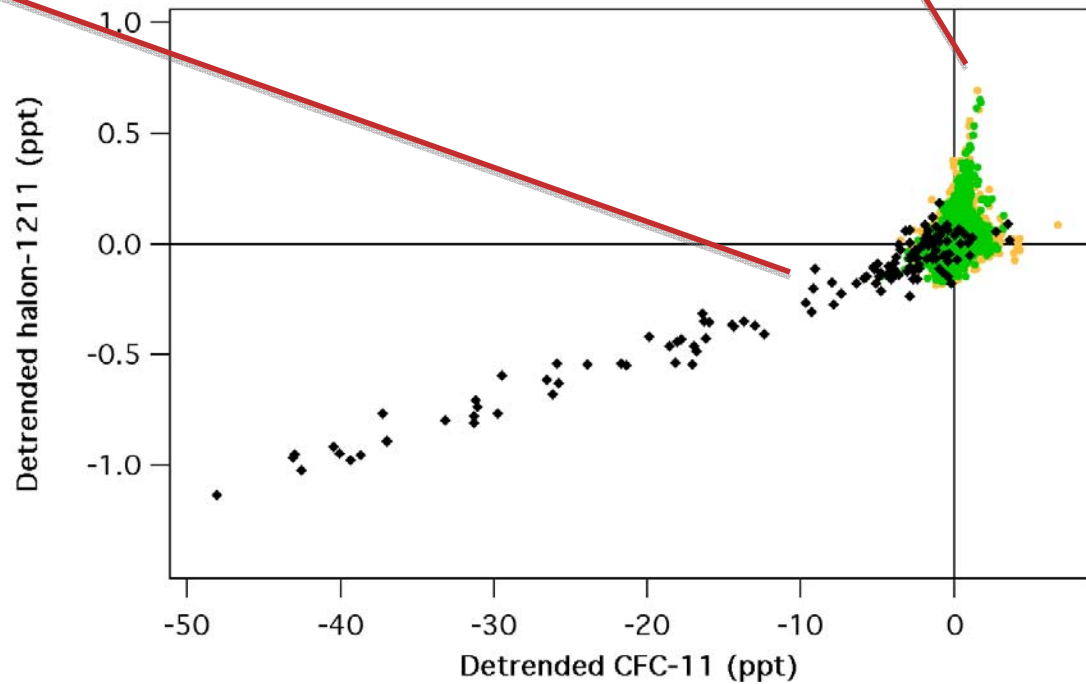


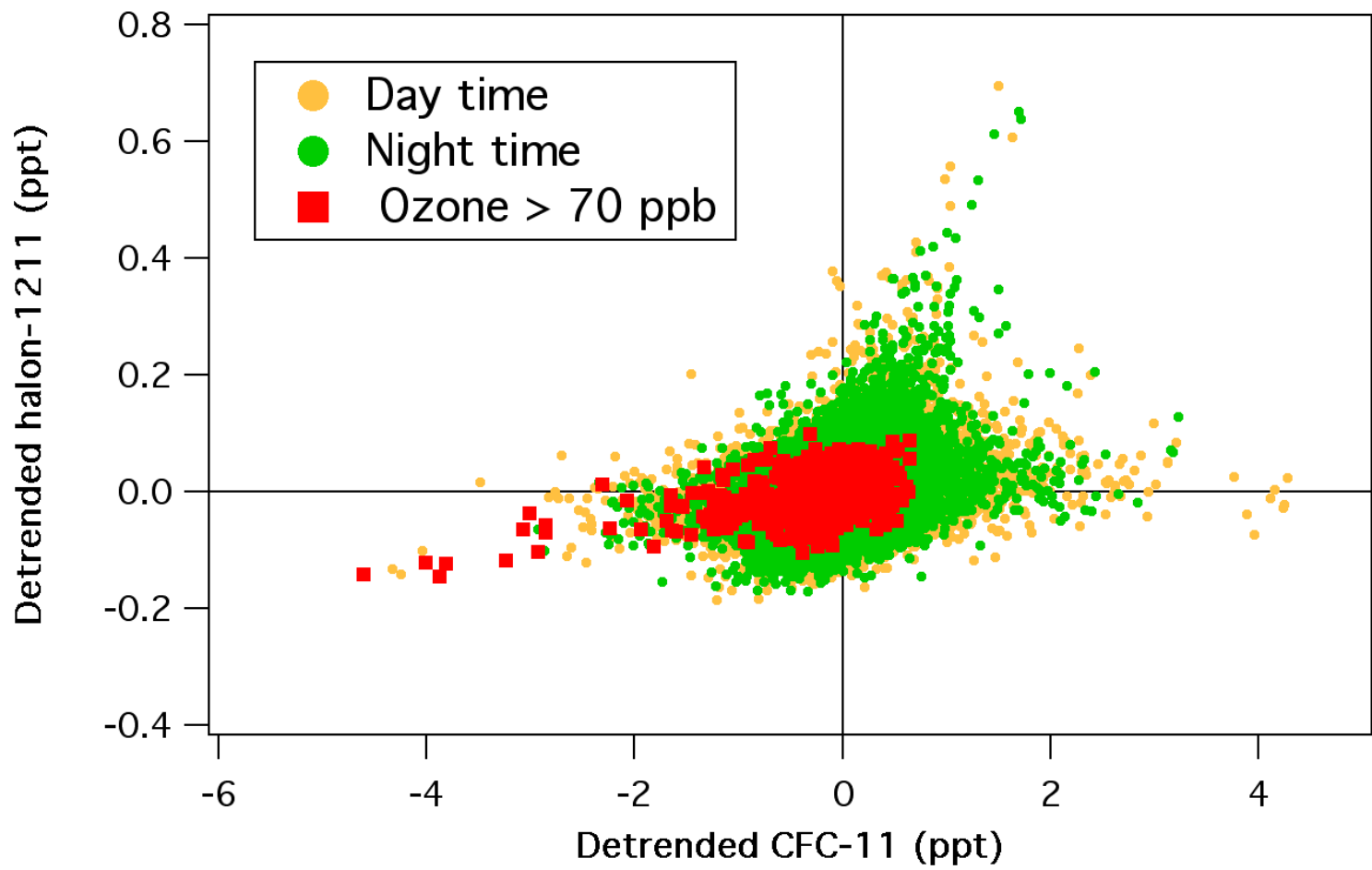
Spring Time

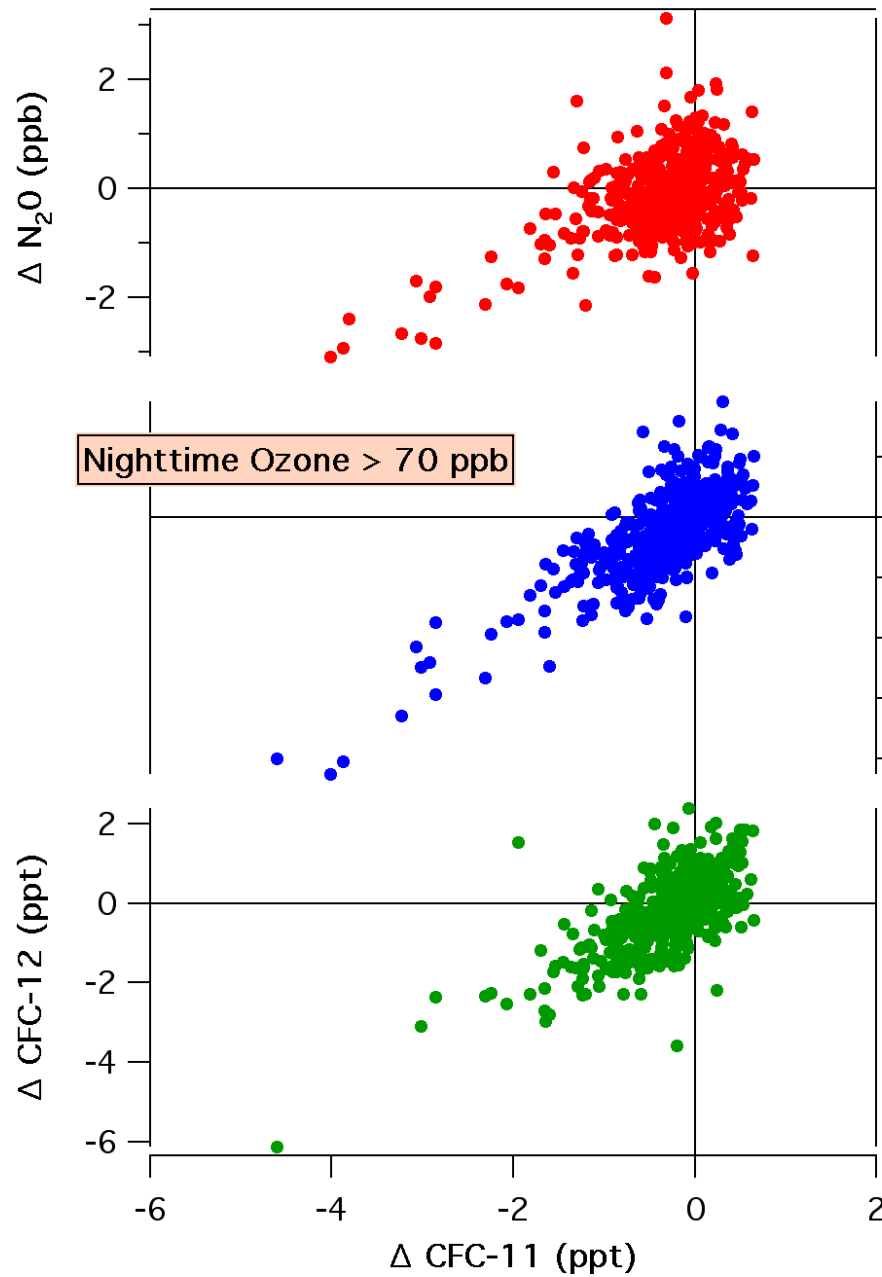




Same tracer-tracer relationship as mid-latitude stratospheric air sampled via WB-57 aircraft.





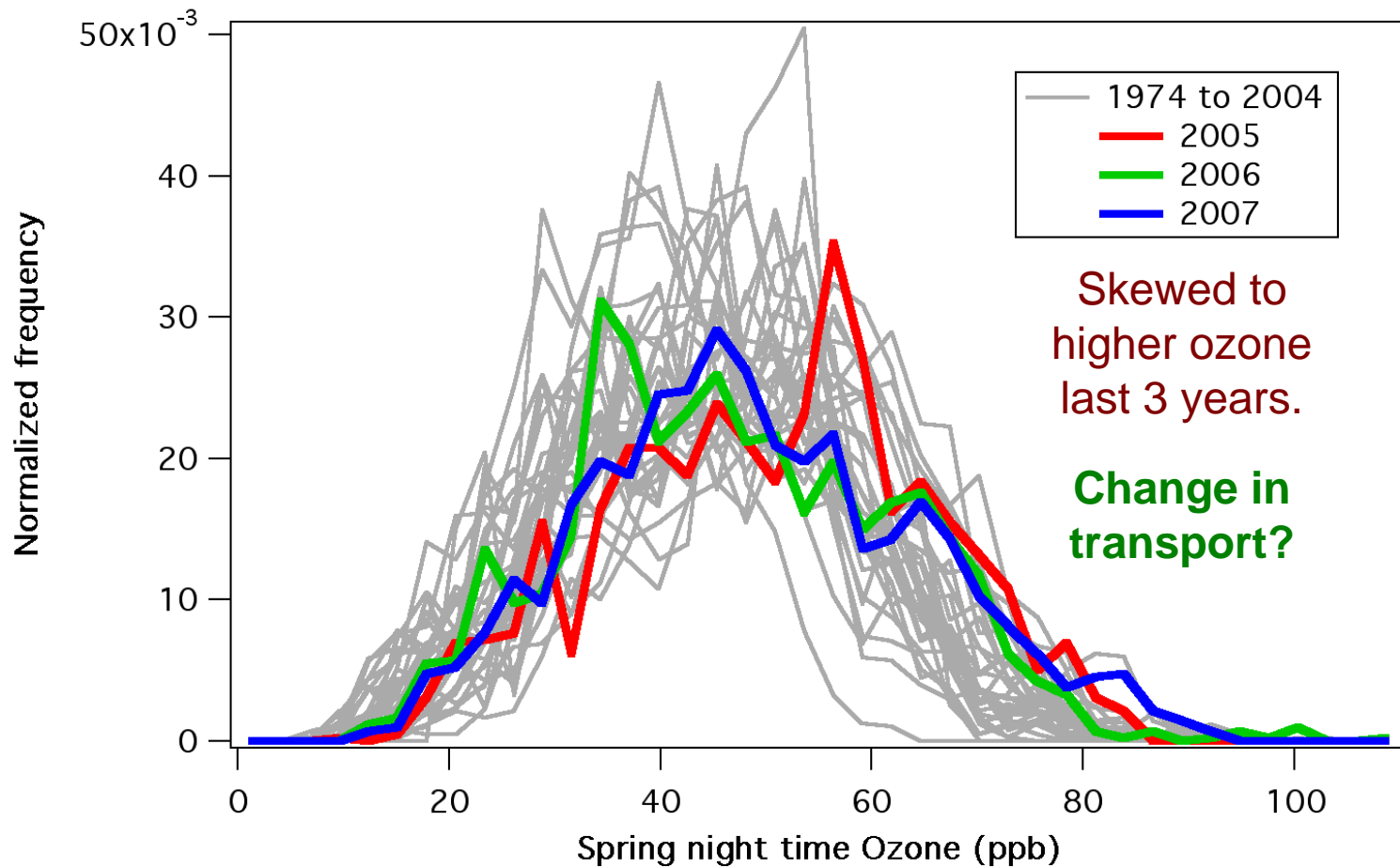


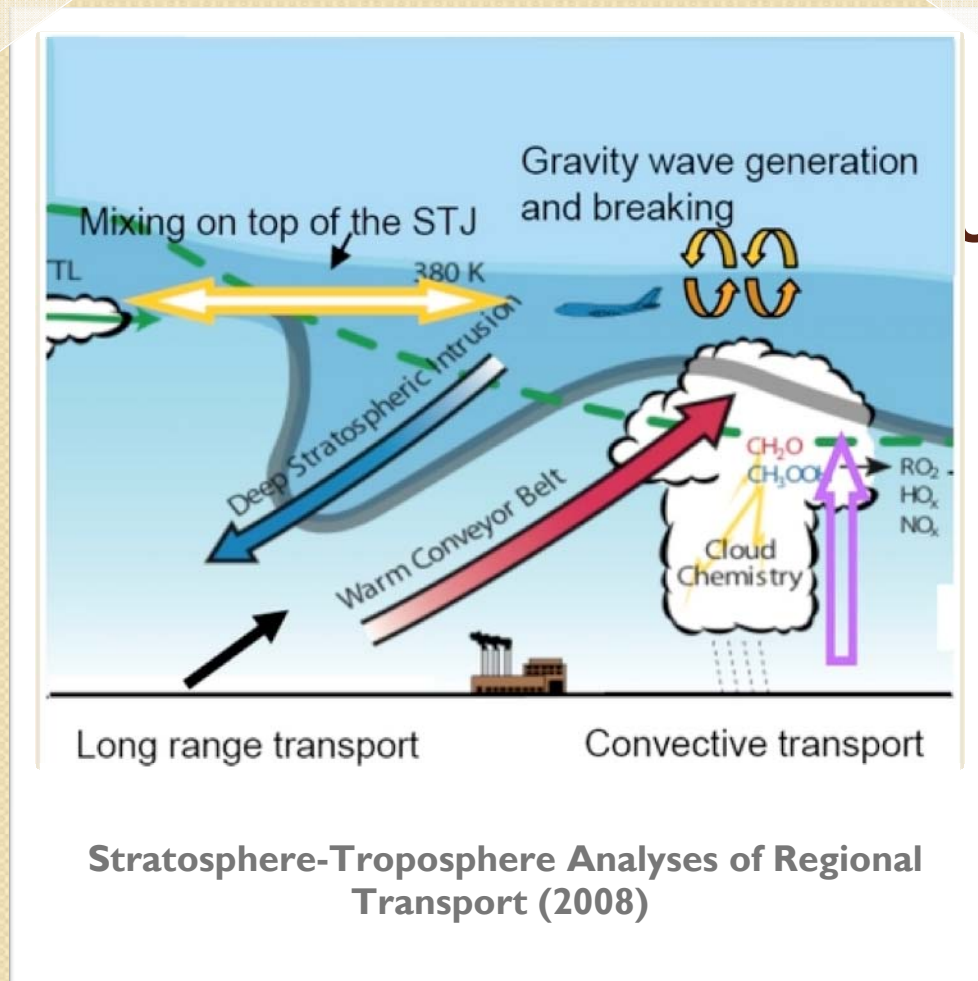
Other trace gases



Slope of correlation
proportional to the
lifetime of the
molecule.

Nocturnal Spring Ozone





Summary...

JTLS air is sampled at MLO almost every Spring and early Summer.

Surface trace gas measurements may show signs of changes in strat-trop exchange related to climate change.