

Boulder, Colorado

2010 Site Report



Earth System Research Laboratory

Global Monitoring Division

EOL

NCAR Earth Observing Laboratory



Boulder

Routine GRUAN Activities



- GPS IPWV
- ▲ Balloon Launch
- FTIR Solar Spectra

GPS IPWV

J. Wang (NCAR), S. Gutman (NOAA),
J. Braun (NCAR)

Balloon Soundings

Ozone + Imet (weekly)

FPH + Ozone + Imet (monthly)

Add RS92 to every balloon payload

D. Hurst, E. Hall, A. Jordan, B. Johnson
(all NOAA)

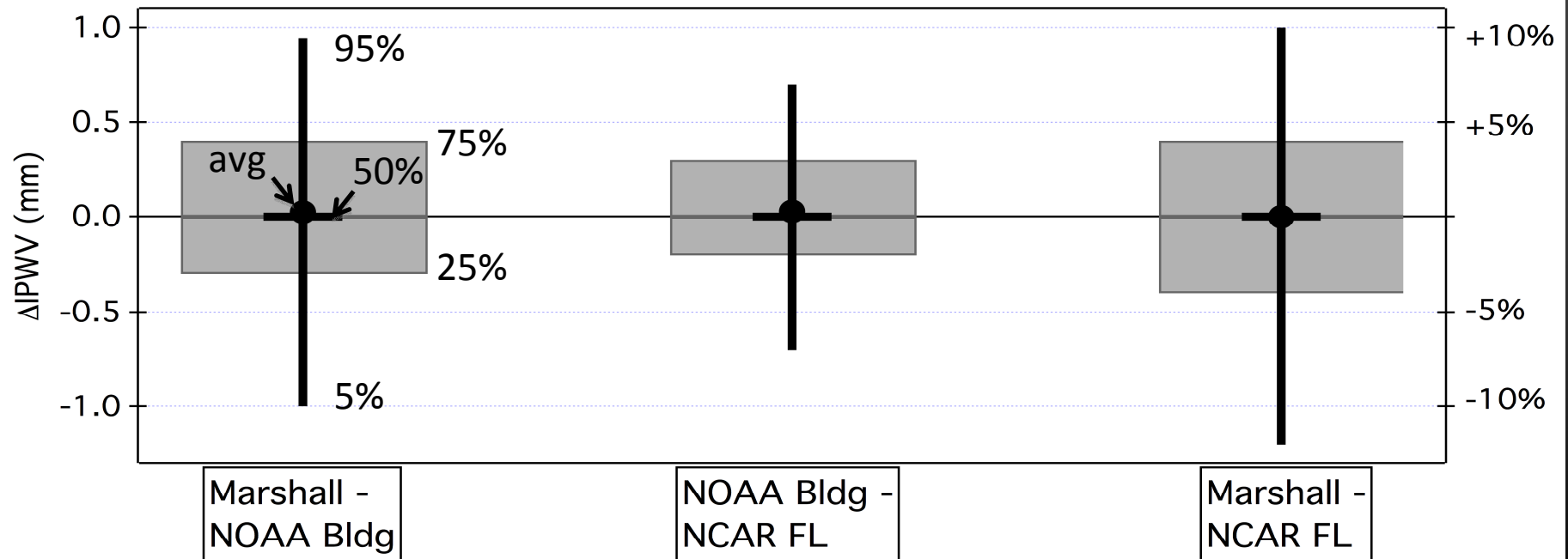
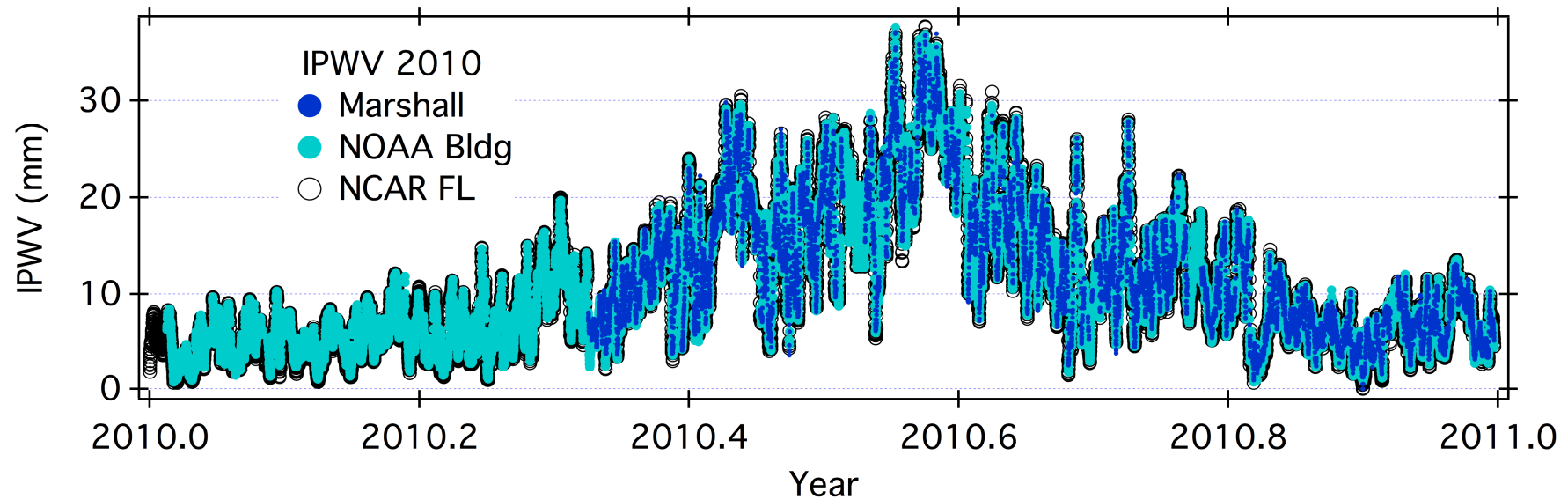
FTIR

Column H_2O , O_3 , other trace gases

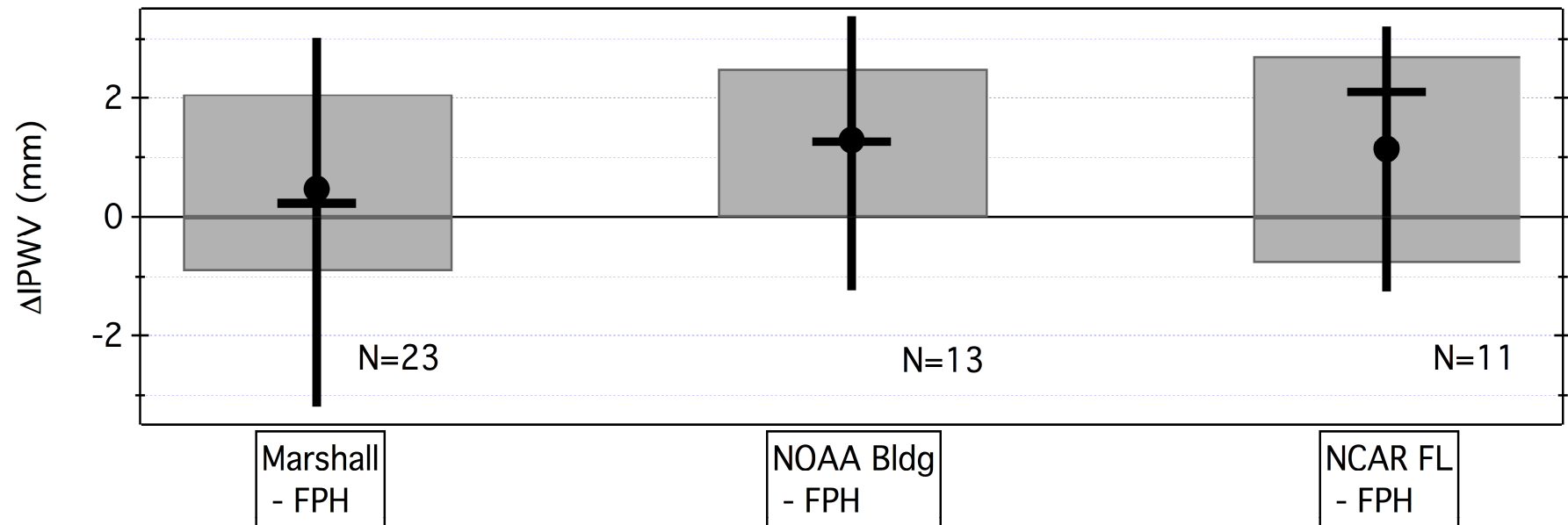
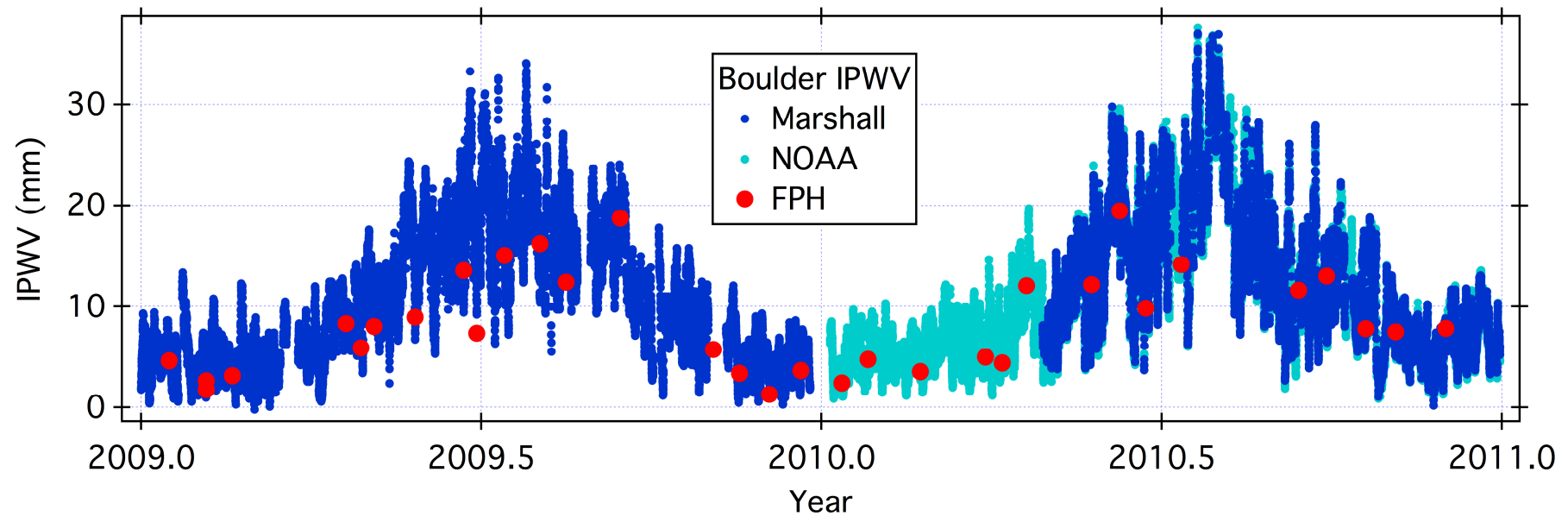
Vertical profiles of H_2O and O_3

J. Hannigan (NCAR)

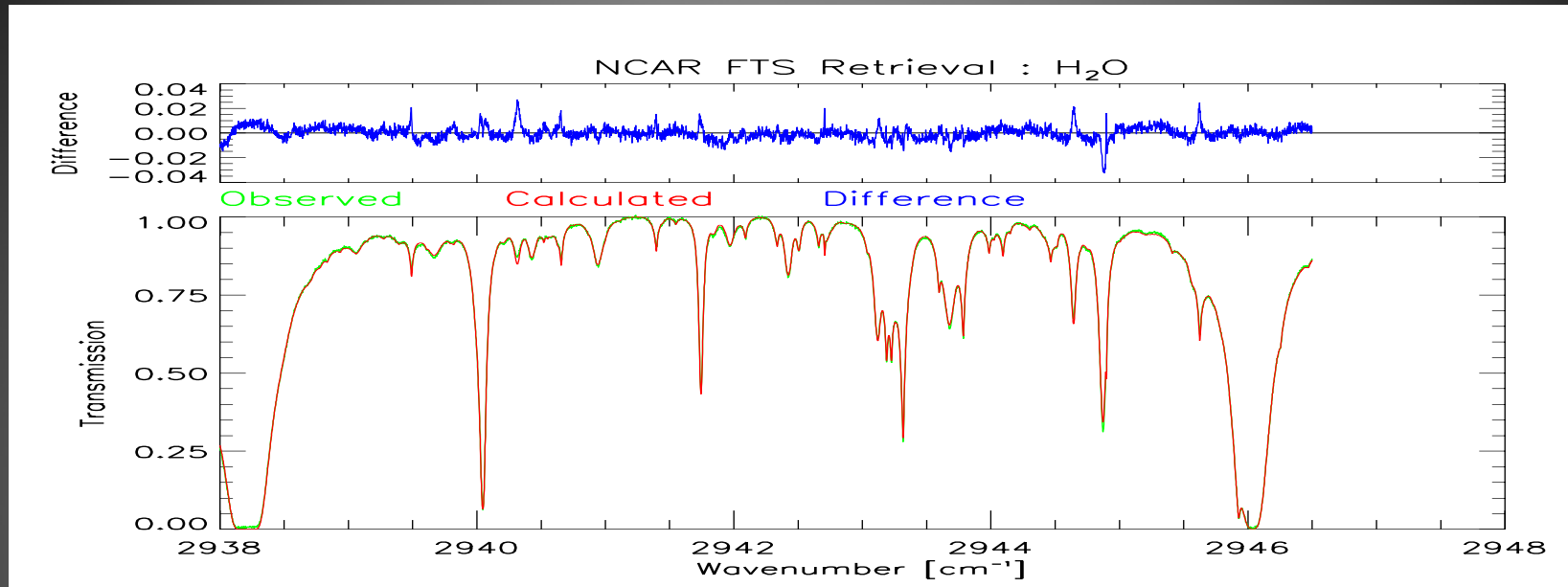
GNSS - GNSS IPWV Comparison



FPH - GNSS IPWV Comparison

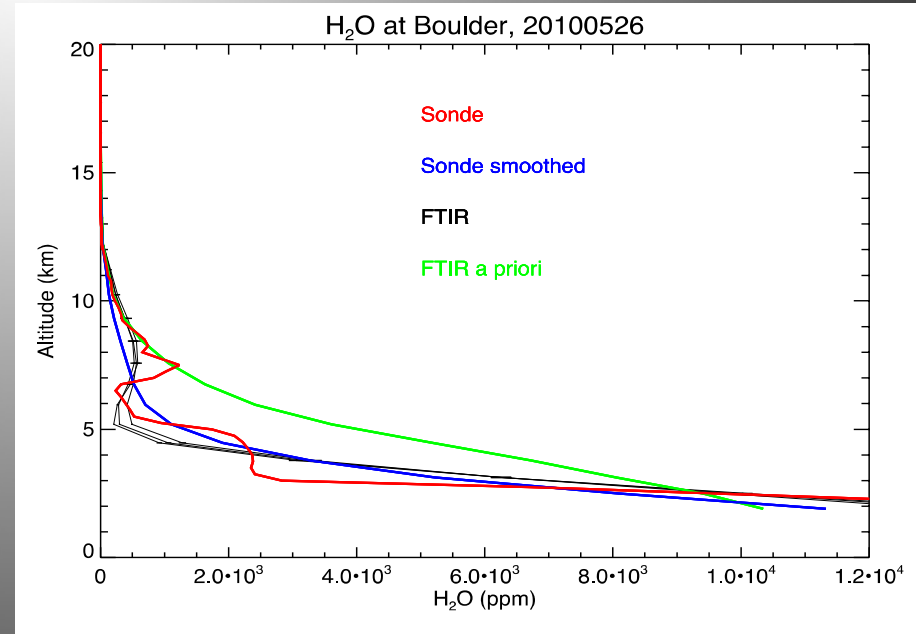


FPH - FTS Comparison

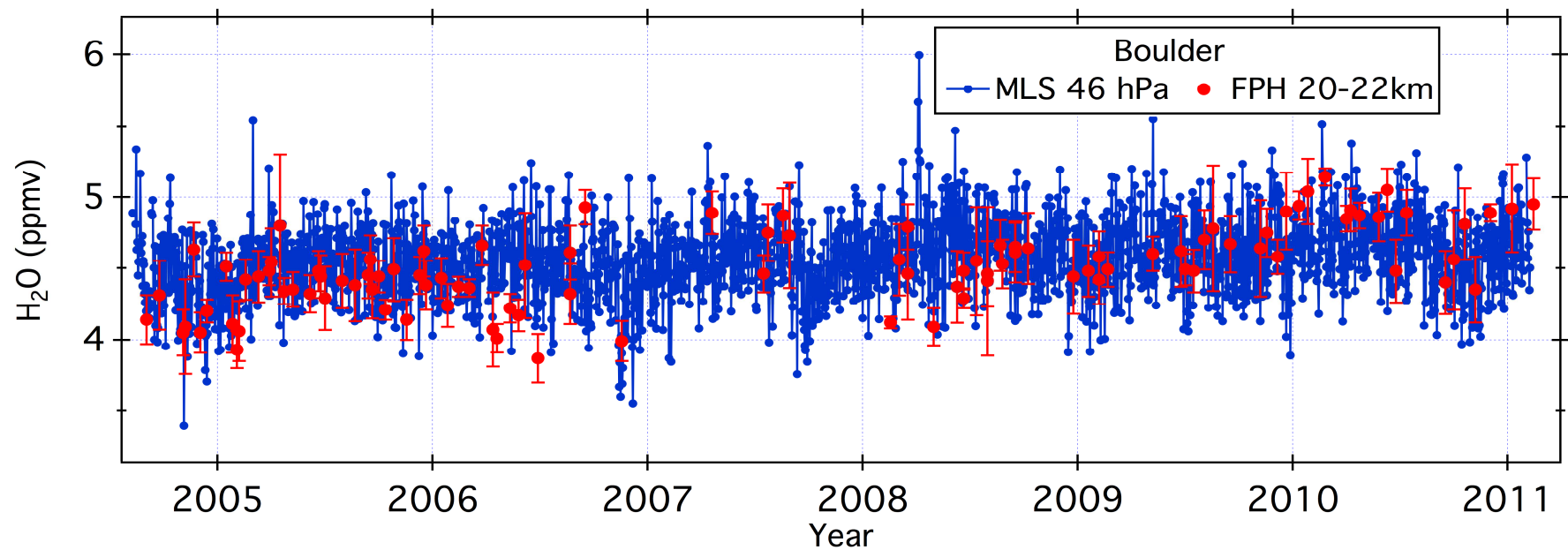
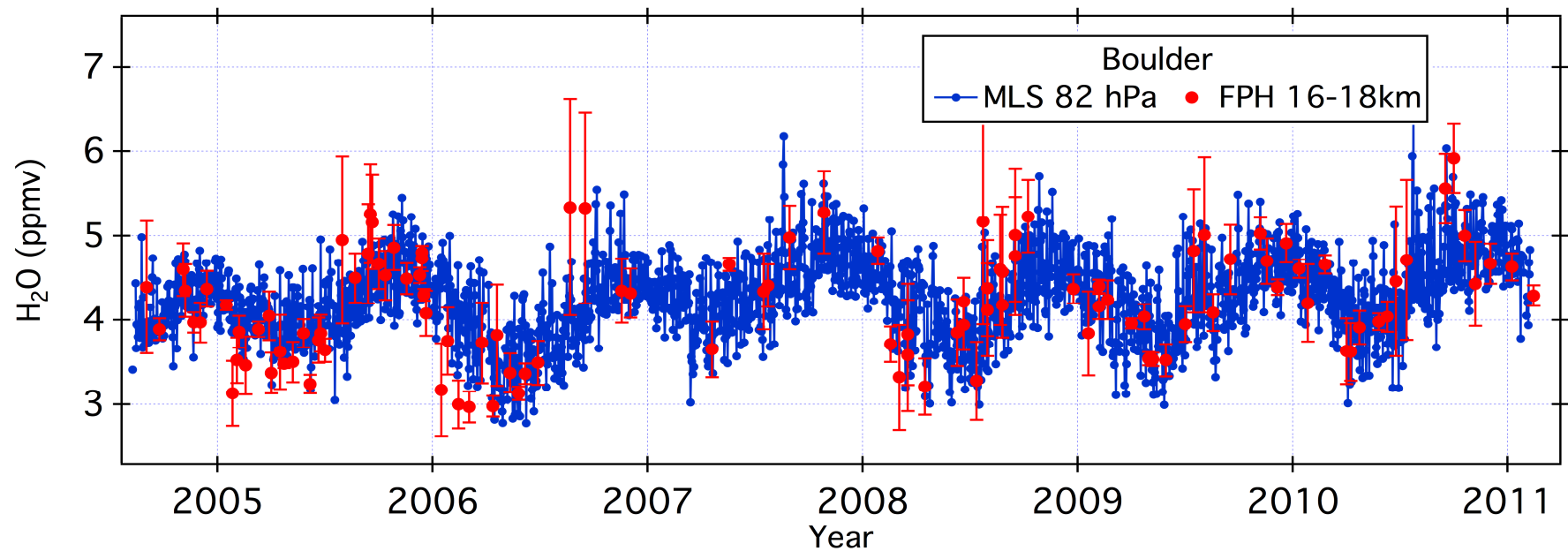


A priori (green) is WACCM monthly mean

- 11 Coincident measurement days - late 2009 to present
- Continue to build a record with a large range of column water



FPH - MLS Comparison



Boulder Non-Routine GRUAN Activities

3000 g balloon

NOAA FPH / Imet

CFH / Imet

SWS TDL

RS92 (NCAR GAUS)

1500 g balloon

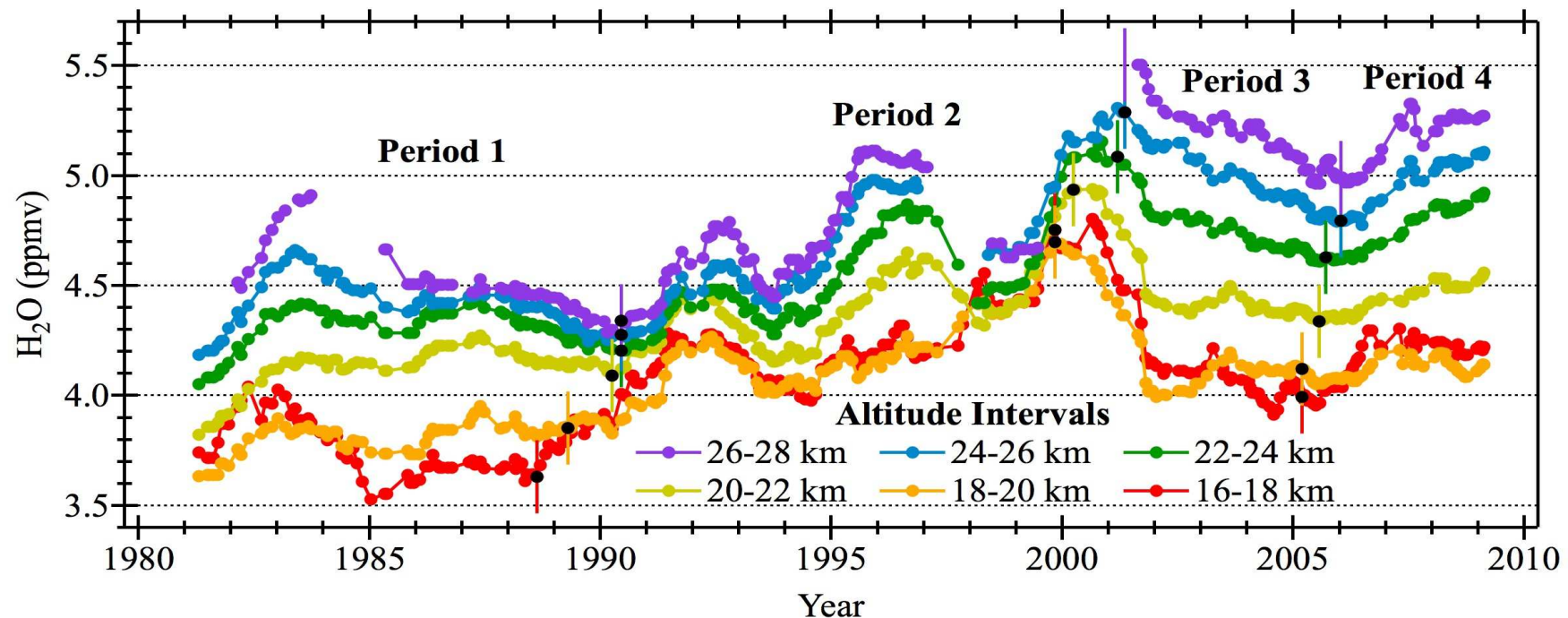
RR01

RS92 (DigiCora)

**08 April, 2010
Marshall Field Site**



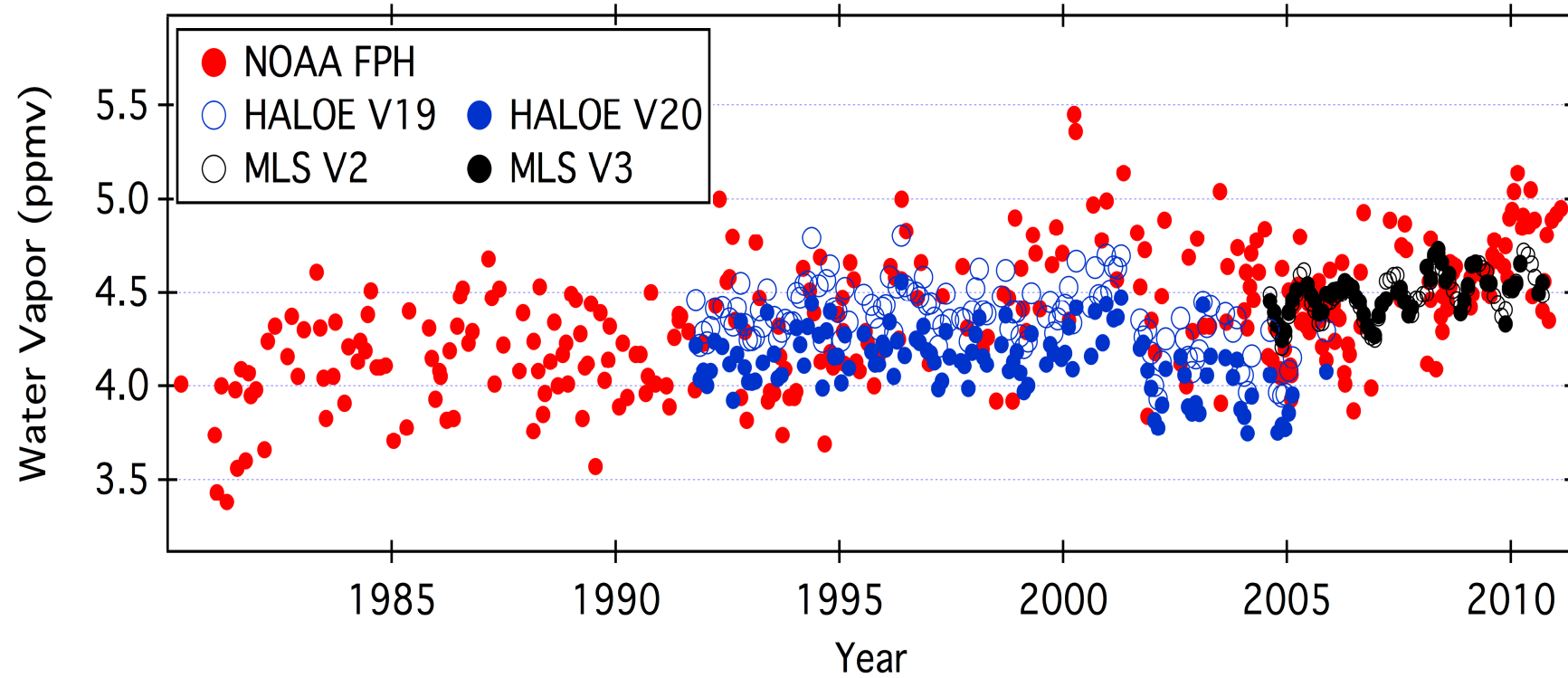
Boulder Water Vapor Trends



from Hurst et al., JGR [2011]

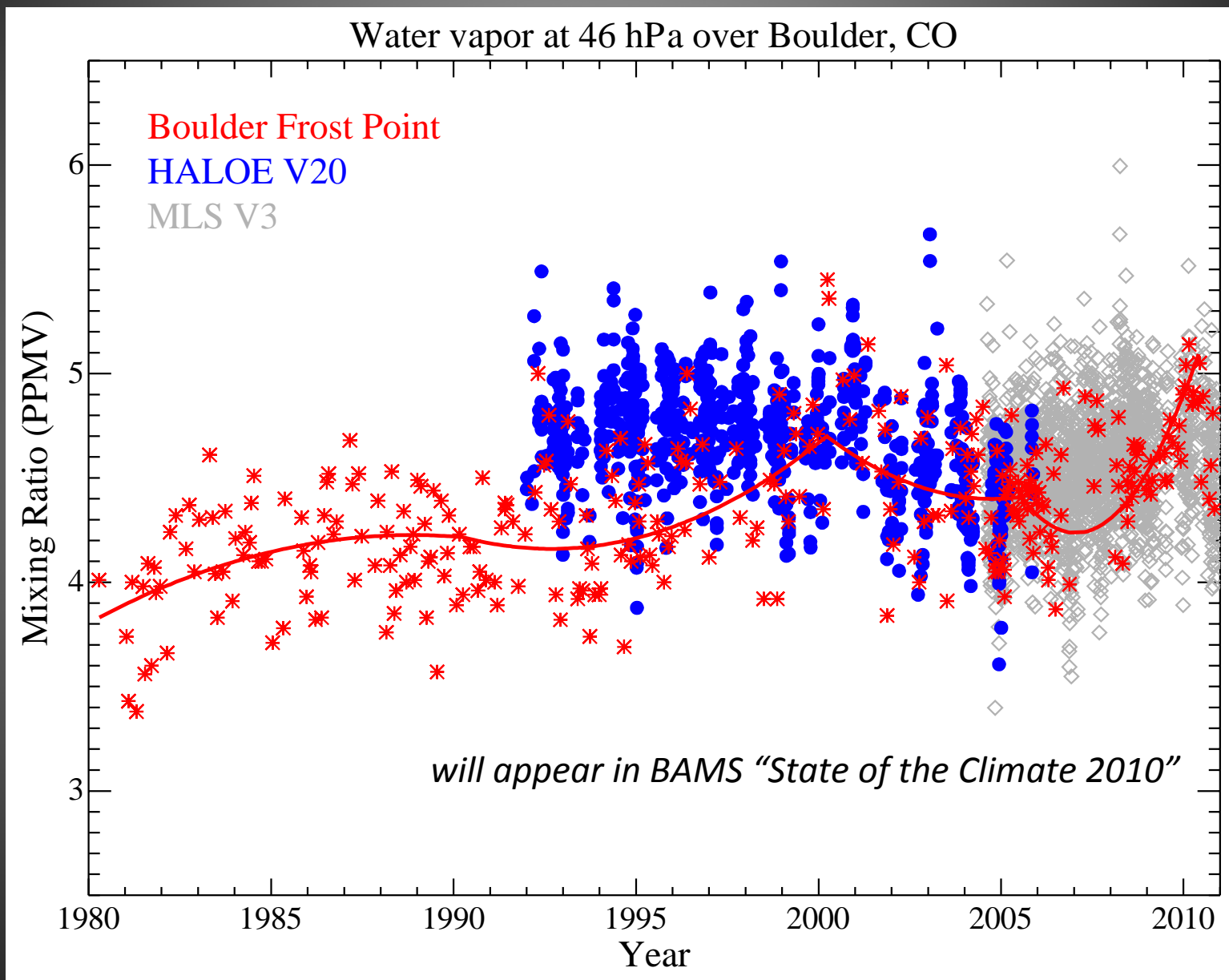
- Net increase of 1.0 ± 0.2 ppmv ($27 \pm 6\%$) from 1980-2010
- CH_4 growth can account for at most $25 \pm 5\%$ of this net increase
- Sharp 0.5 ppmv decrease after 2000 attributed to anomalously cold tropical tropopause and increased tropical upwelling [Randel et al., 2006]
- The 10% decrease counteracted 25% of global surface temperature increase expected from well-mixed greenhouse gases during 2000-2009 [Solomon et al., 2010]

Boulder Water Vapor Trends



from Karen Rosenlof, NOAA

Boulder Water Vapor Trends





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