



# **Validation of AIRS V5 AND Candidate V6 TEMPERATURE PROFILES with GPS RO And Water Vapor Skill Score Against Sonde Data**

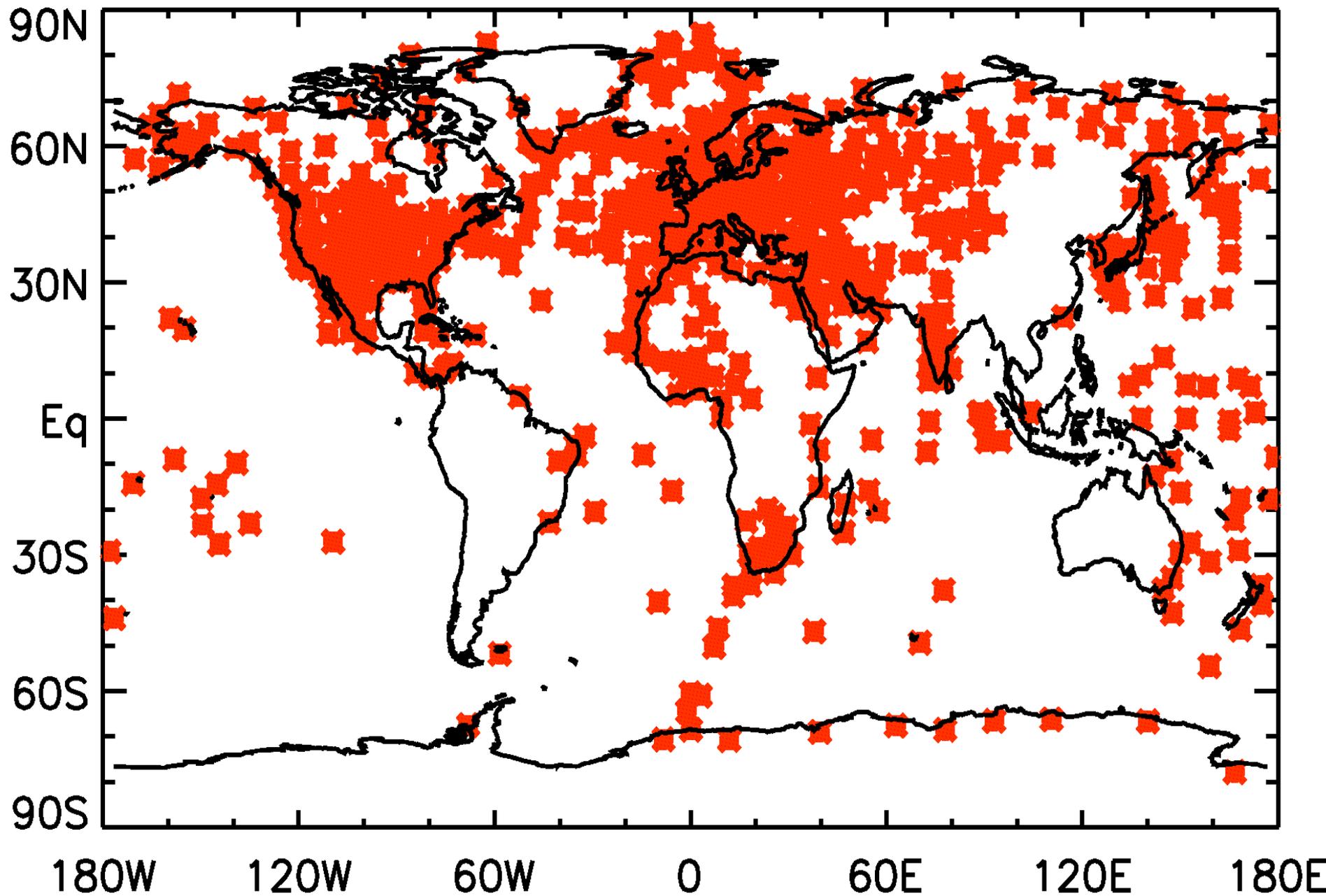
Sun Wong, Van Dang, Evan Manning, Bill Irion, George Aumann, Brian Wilson,  
and Eric Fetzer

Jet Propulsion Laboratory, California Institute of Technology

Sounder Science Meeting, November 2011

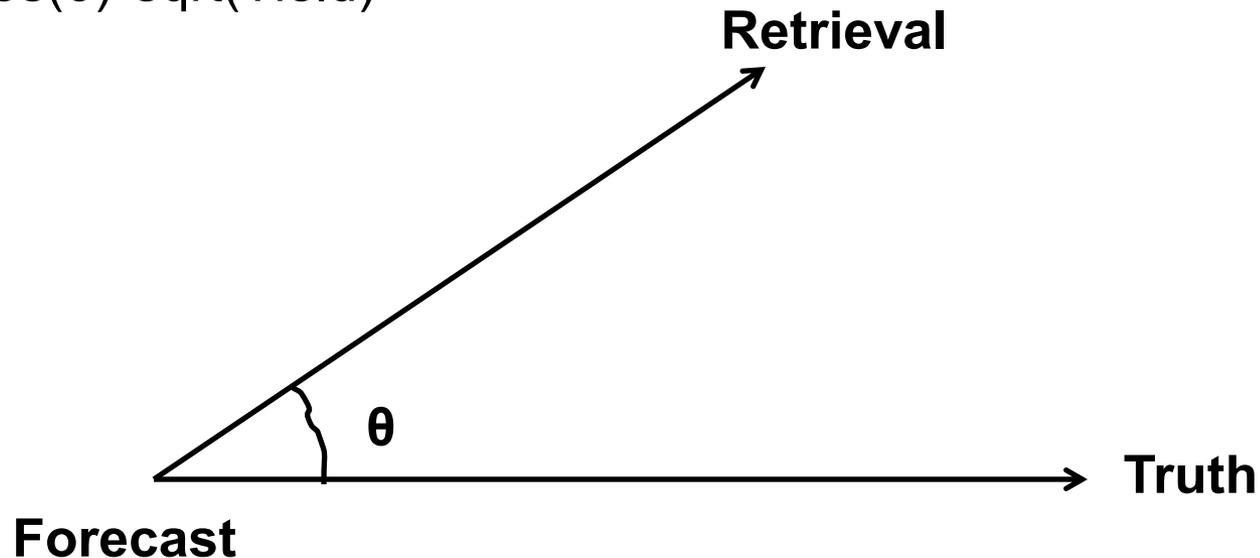
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Government sponsorship acknowledged.

# PrepQC RaObs Sites



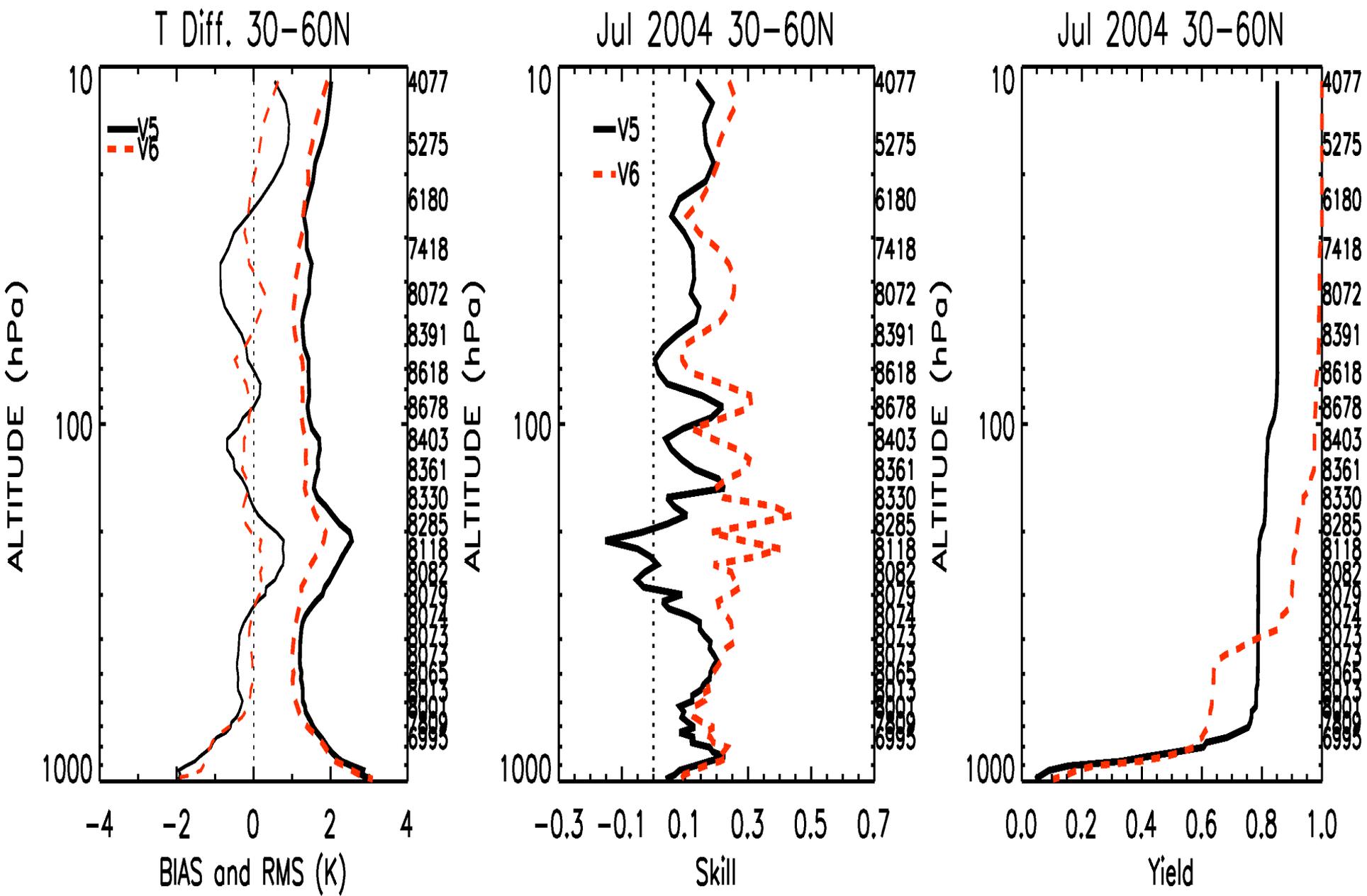
- Skill =  $\text{Corr}(\text{retrieval}-\text{forecast}, \text{truth}-\text{forecast}) * \text{sqrt}(\text{Yield})$
- If retrieval  $\sim$  forecast, skill = 0
- If retrieval  $\sim$  truth (i.e., rabos), skill = 1

$$\text{Skill} = \cos(\theta) * \text{sqrt}(\text{Yield})$$

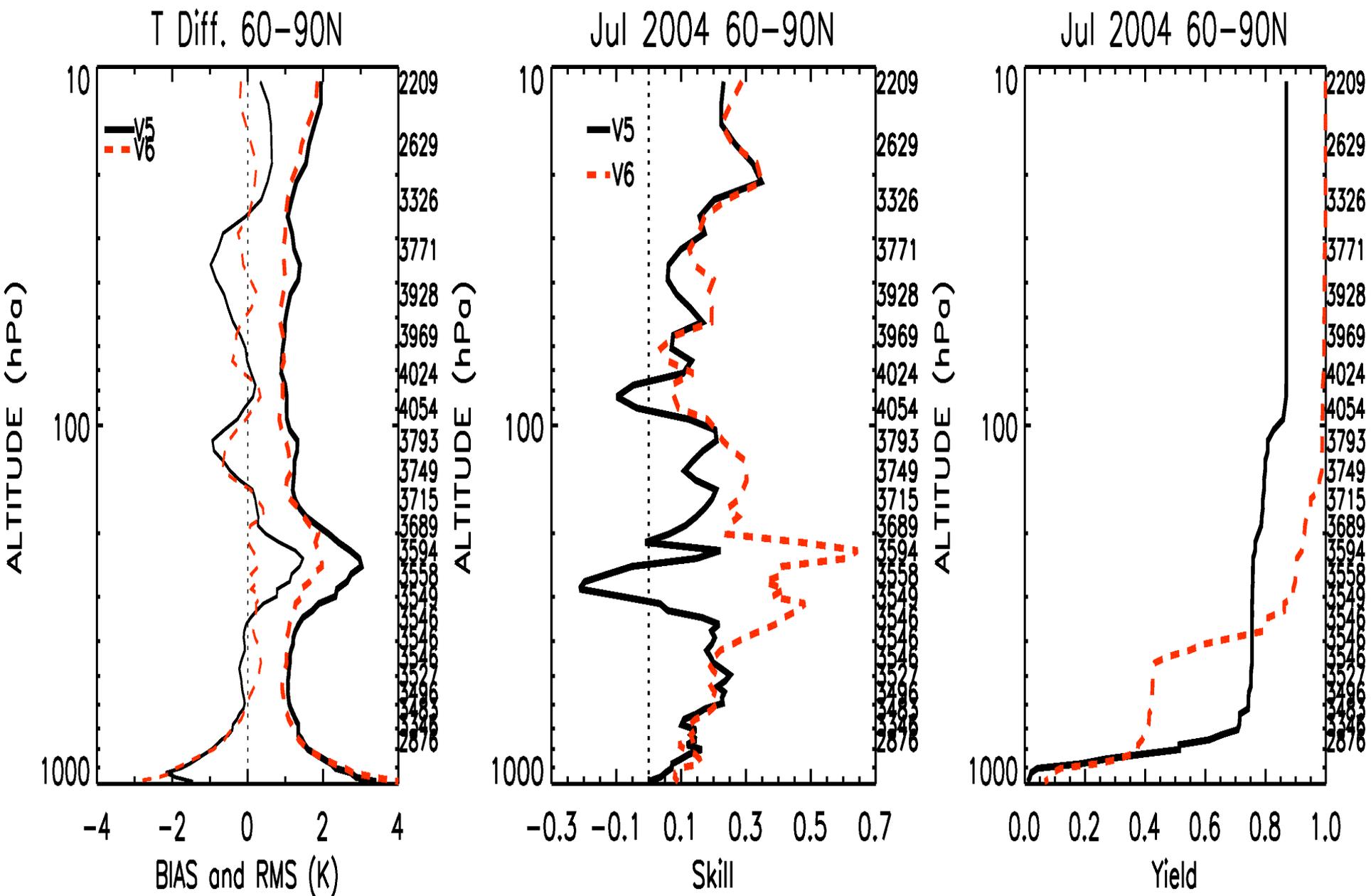




# T, 30-60N, 2004 July (Radio Sondes)



# T, 60-90N, 2004 July (Radio Sondes)

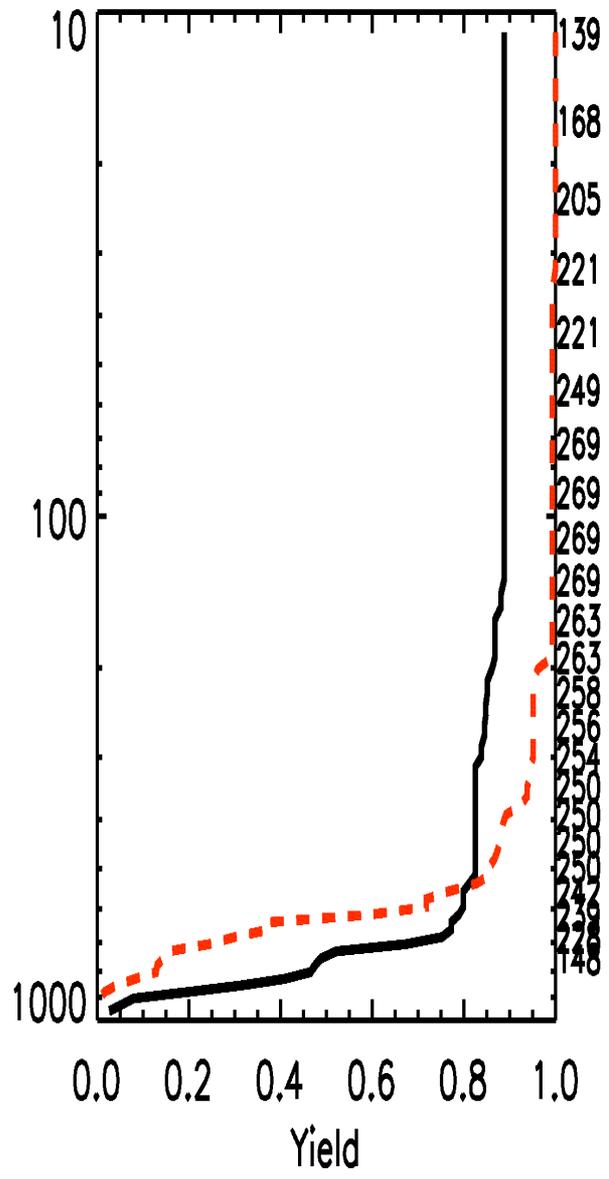
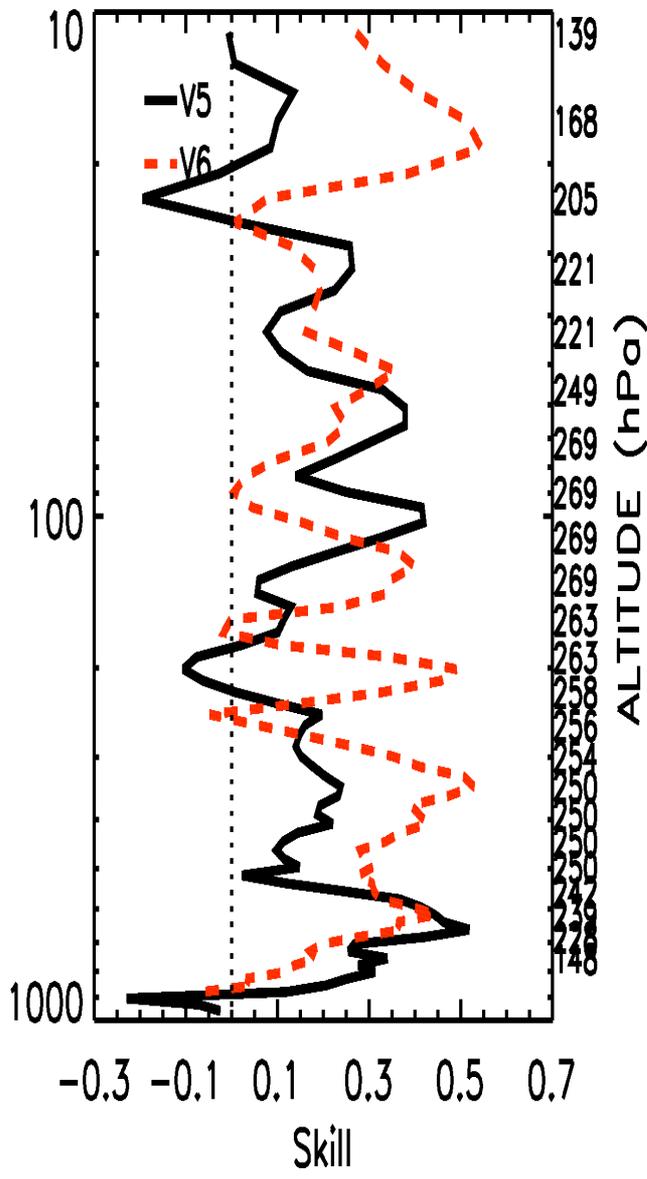
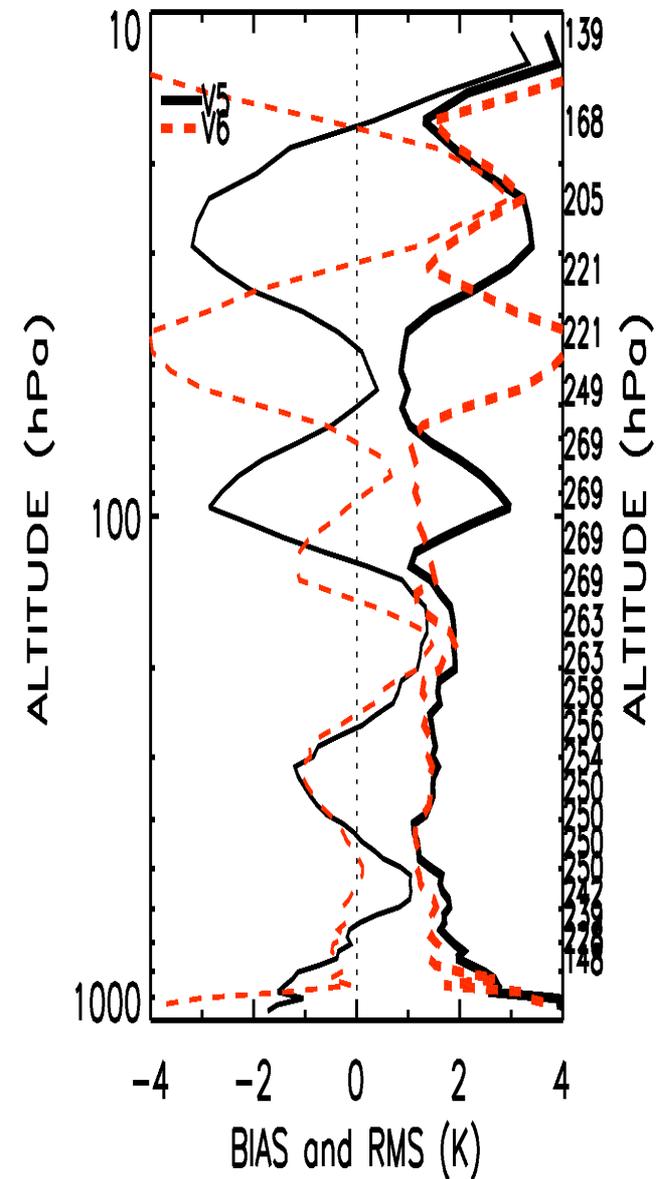


# T, 90-60S, 2004 July (Radio Sondes)

## T Diff. 90-60S

## Jul 2004 90-60S

## Jul 2004 90-60S



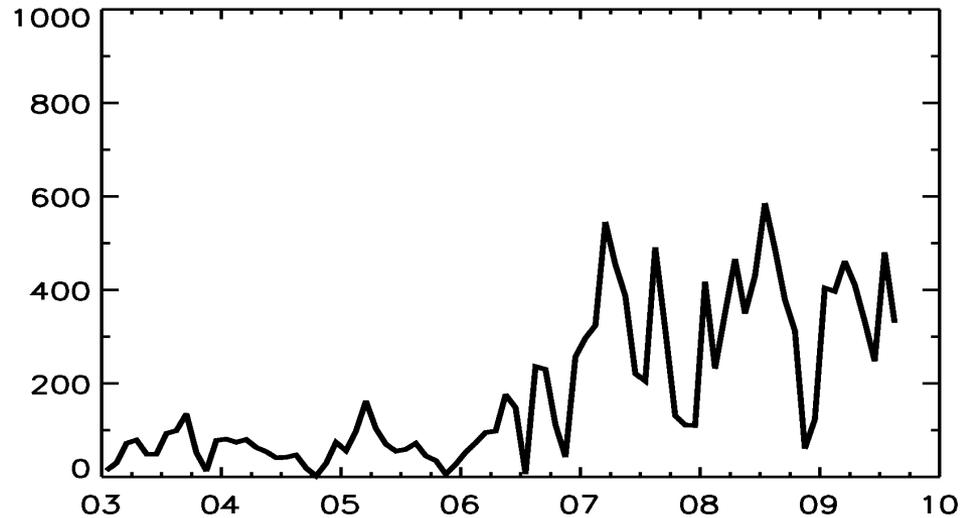
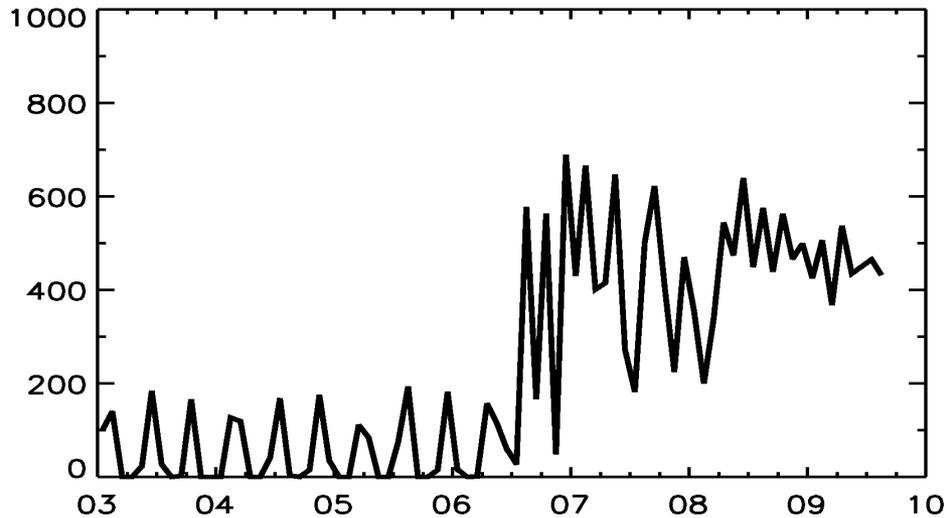
# Monthly Matching Counts

## Tropics (5S-5N)

## South Polar region 80-90S

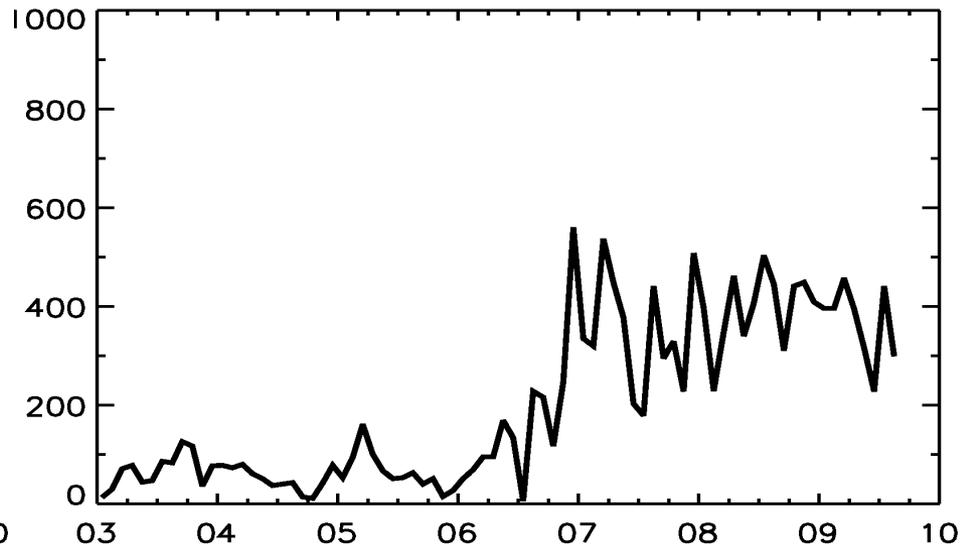
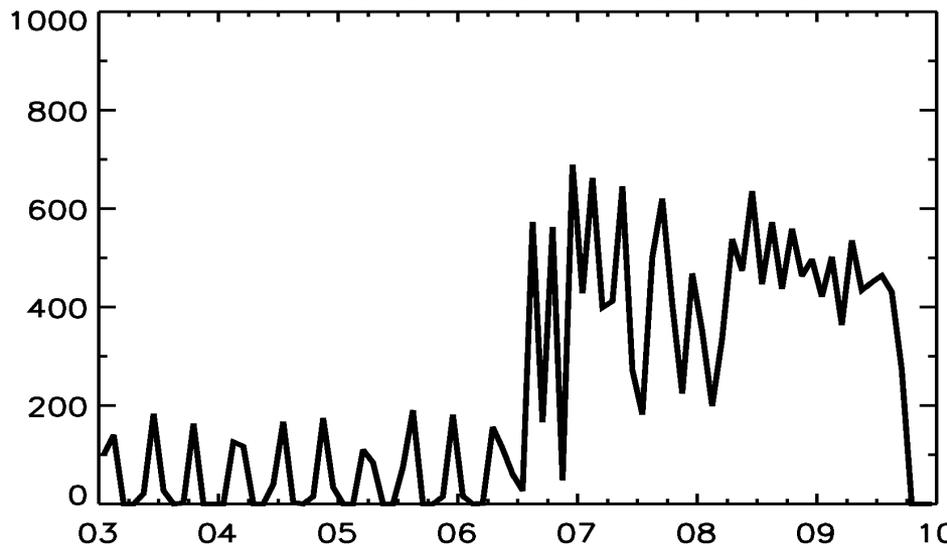
Match Count 5S-5N 10 hPa

Match Count 80-90S 10 hPa



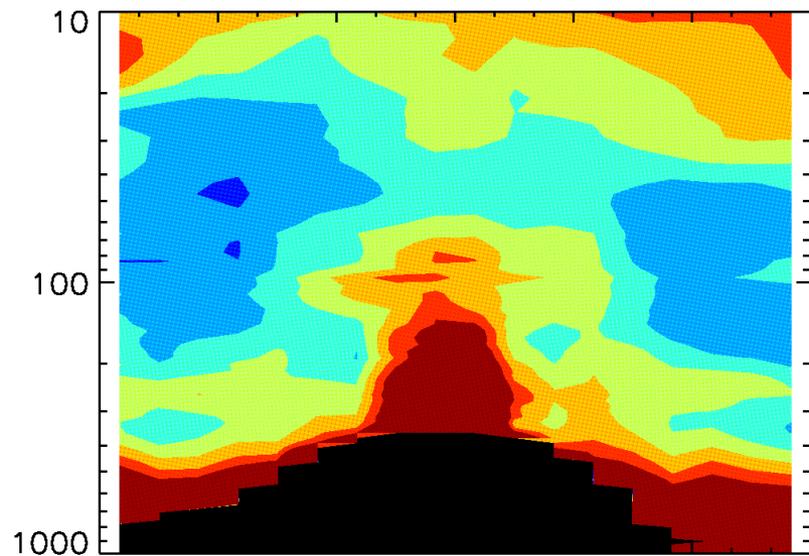
Match Count 5S-5N 300 hPa

Match Count 80-90S 300 hPa

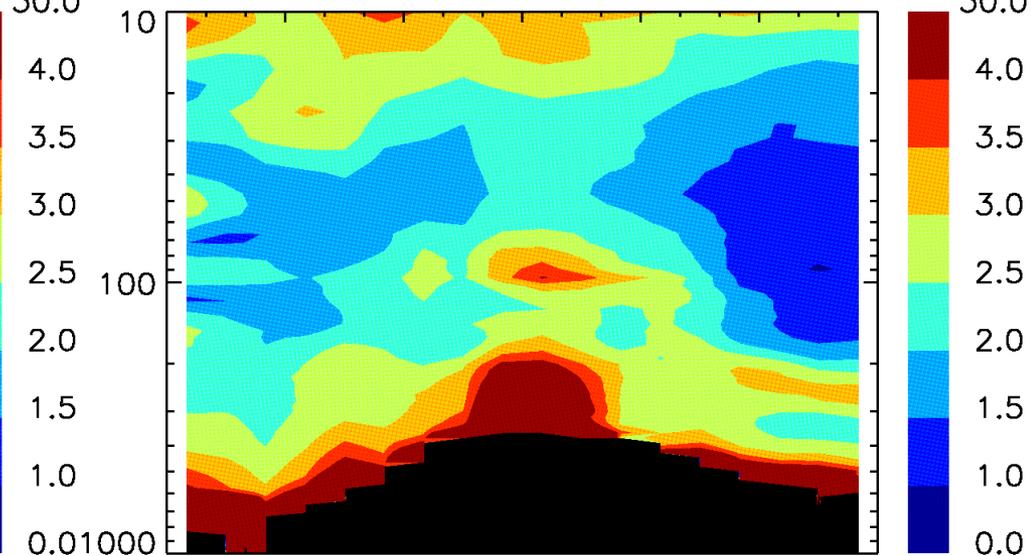


# AIRS – GPS T RMS (K)

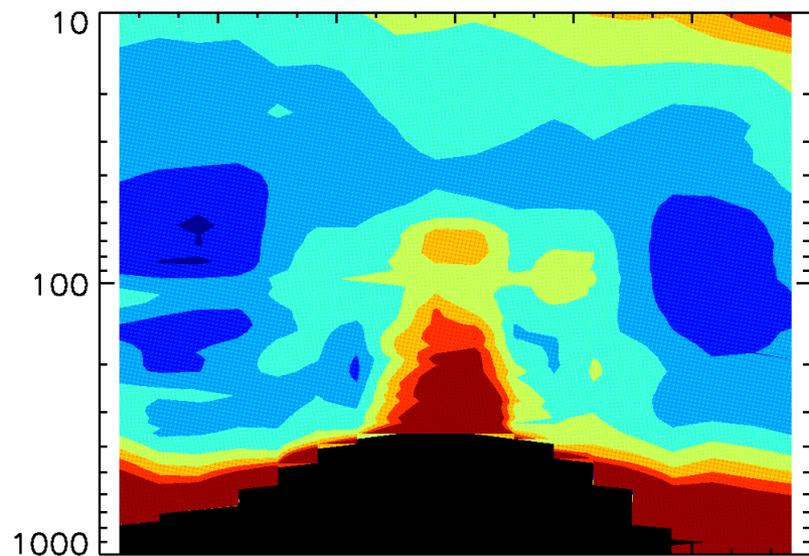
DJF AIRS–GPS V5 RMS:



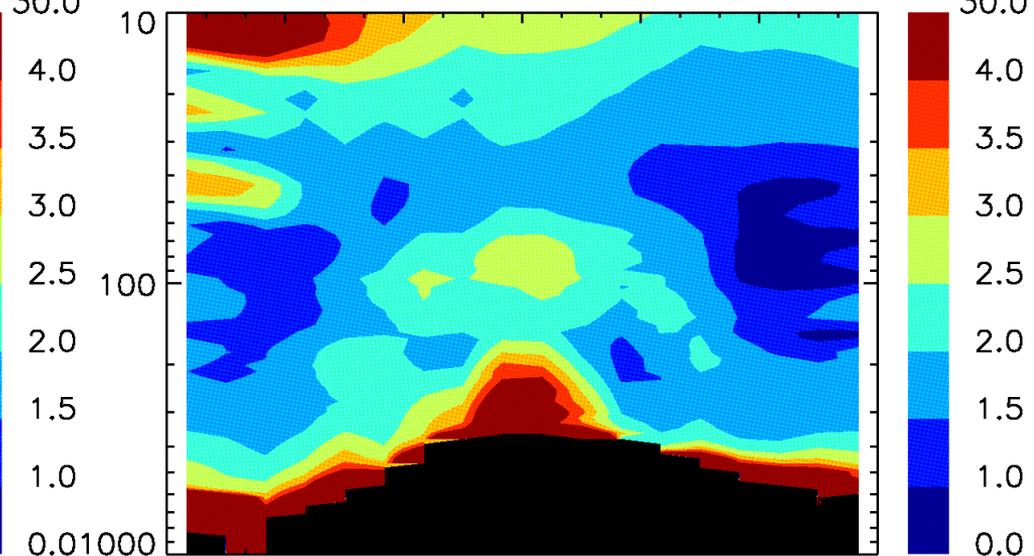
JJA AIRS–GPS V5 RMS:



DJF AIRS–GPS V6 RMS:



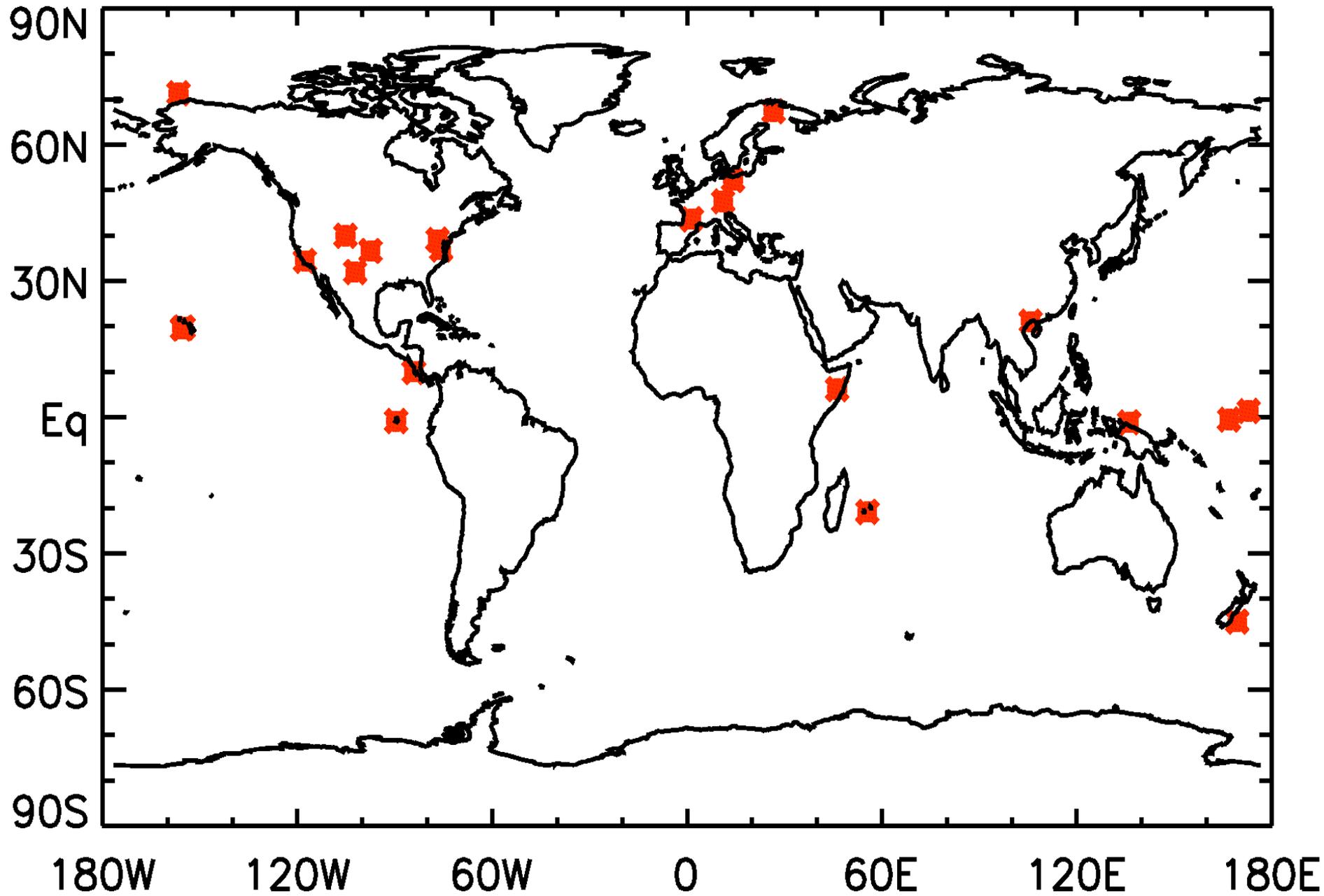
JJA AIRS–GPS V6 RMS:



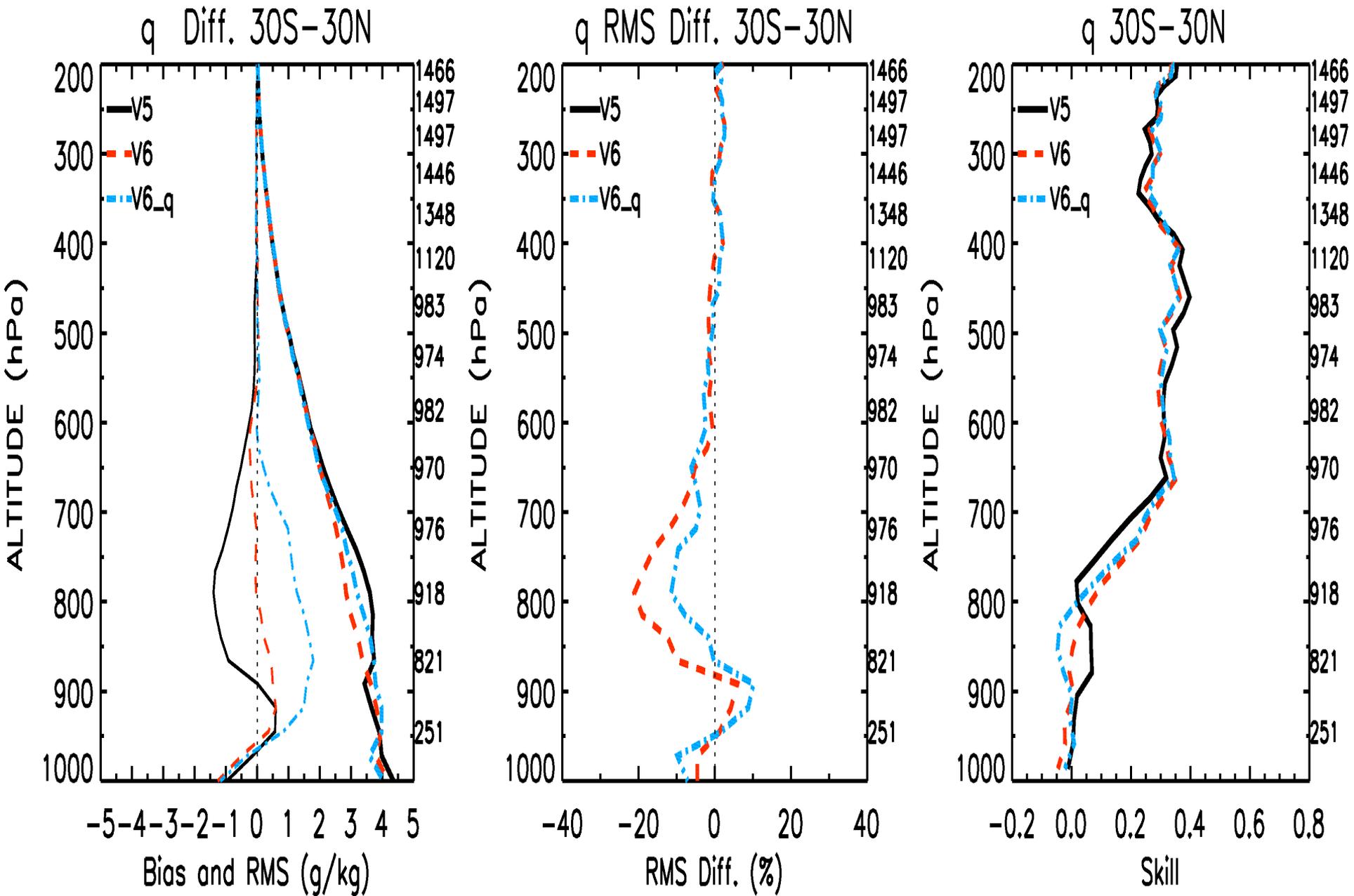
90S 60S 30S Eq 30N 60N 90N

90S 60S 30S Eq 30N 60N 90N

# Dedicated Sonde Sites

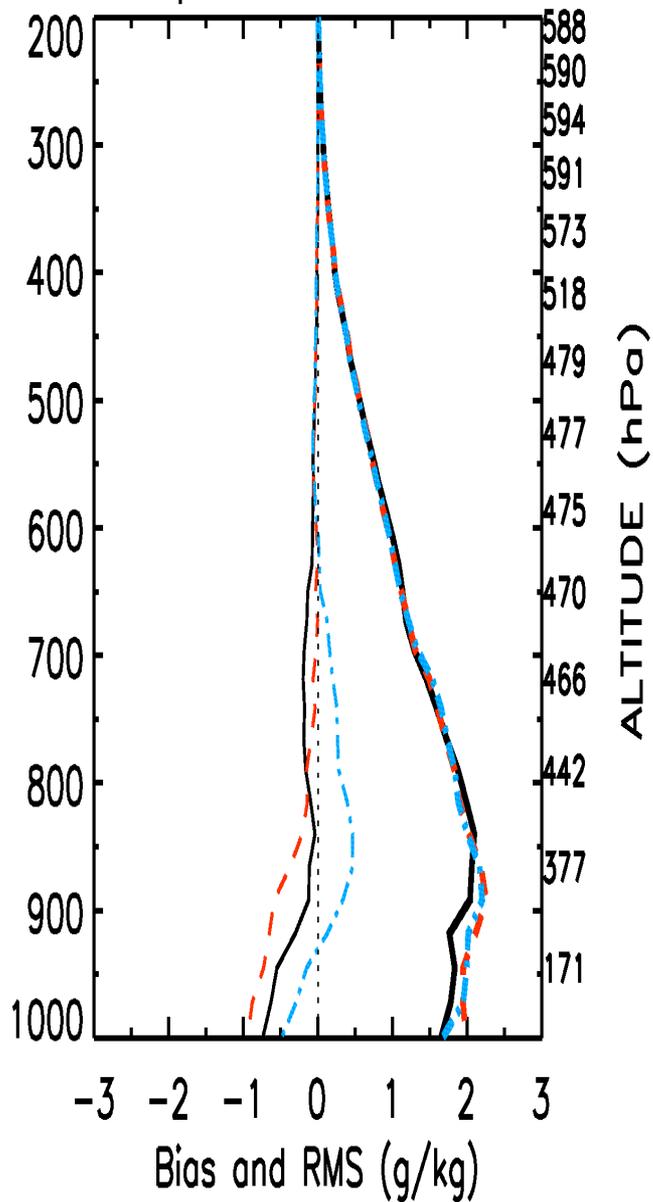


# q , 30S-30N, All Year (Dedicated Sondes)

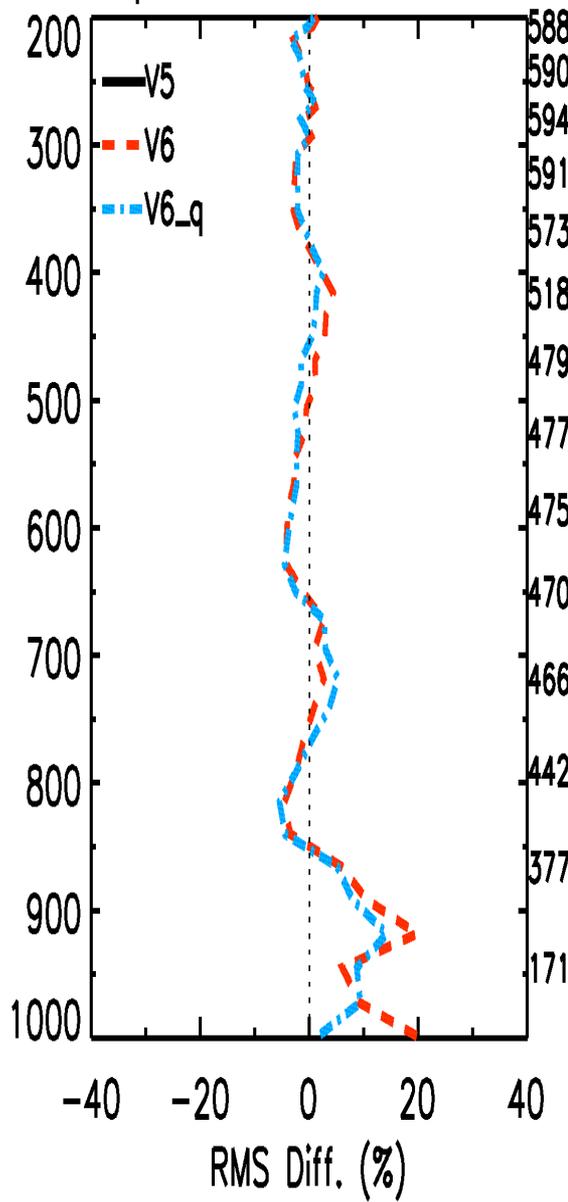


# q, 30-60N, All Year (Dedicated Sondes)

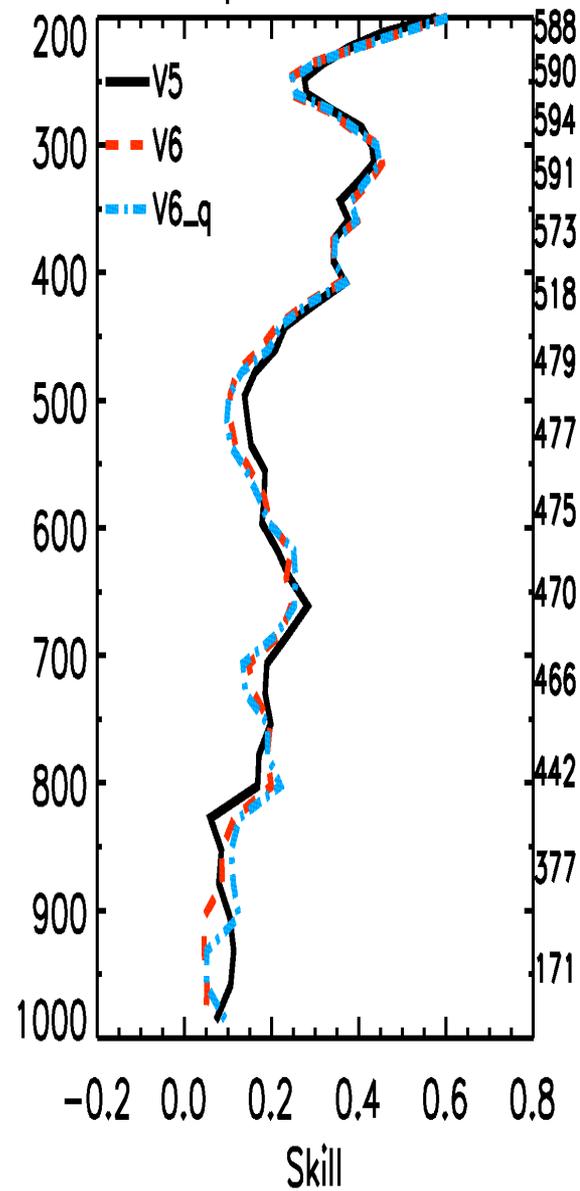
## q Diff. 30-60N



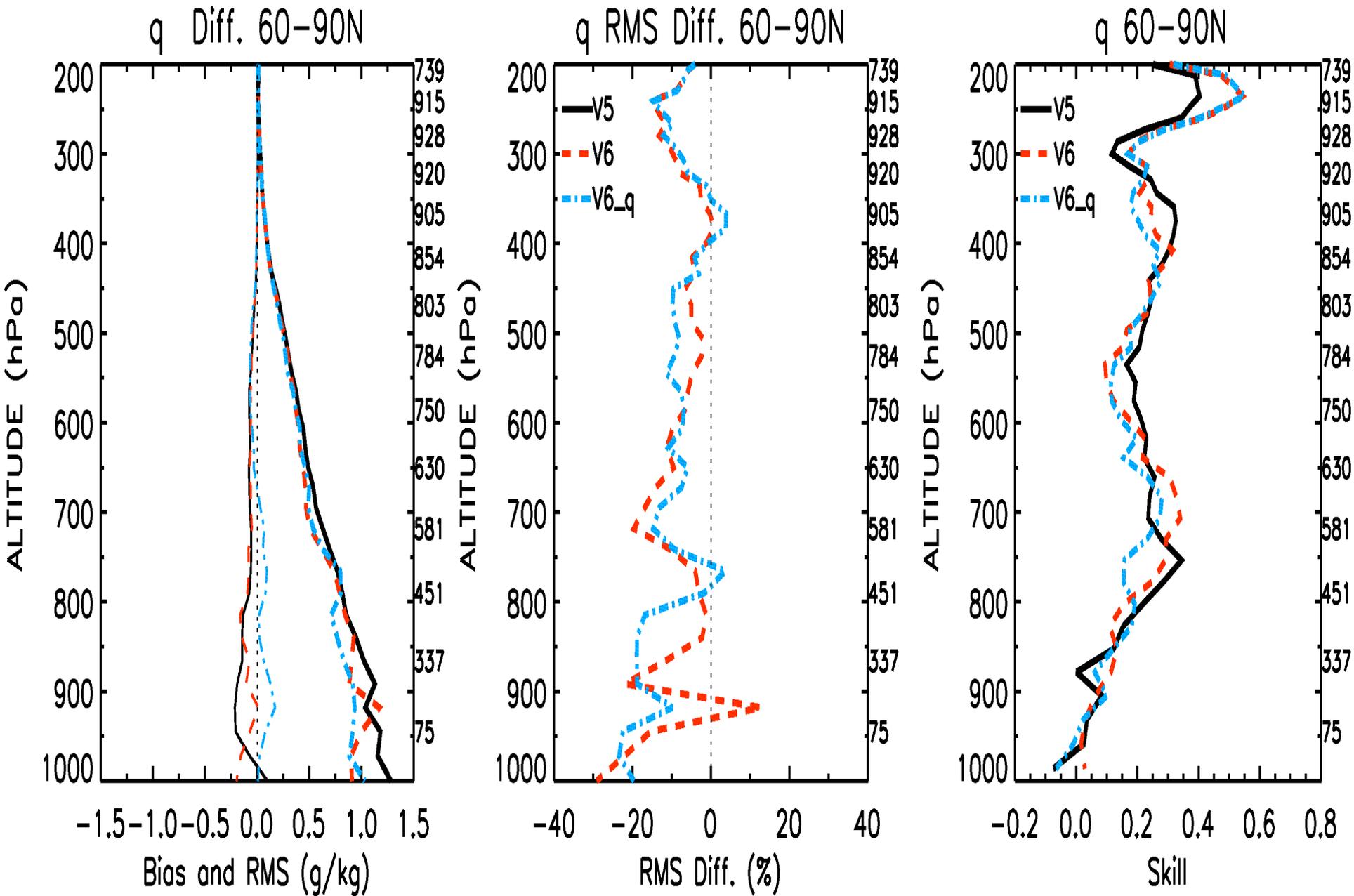
## q RMS Diff. 30-60N



## q 30-60N



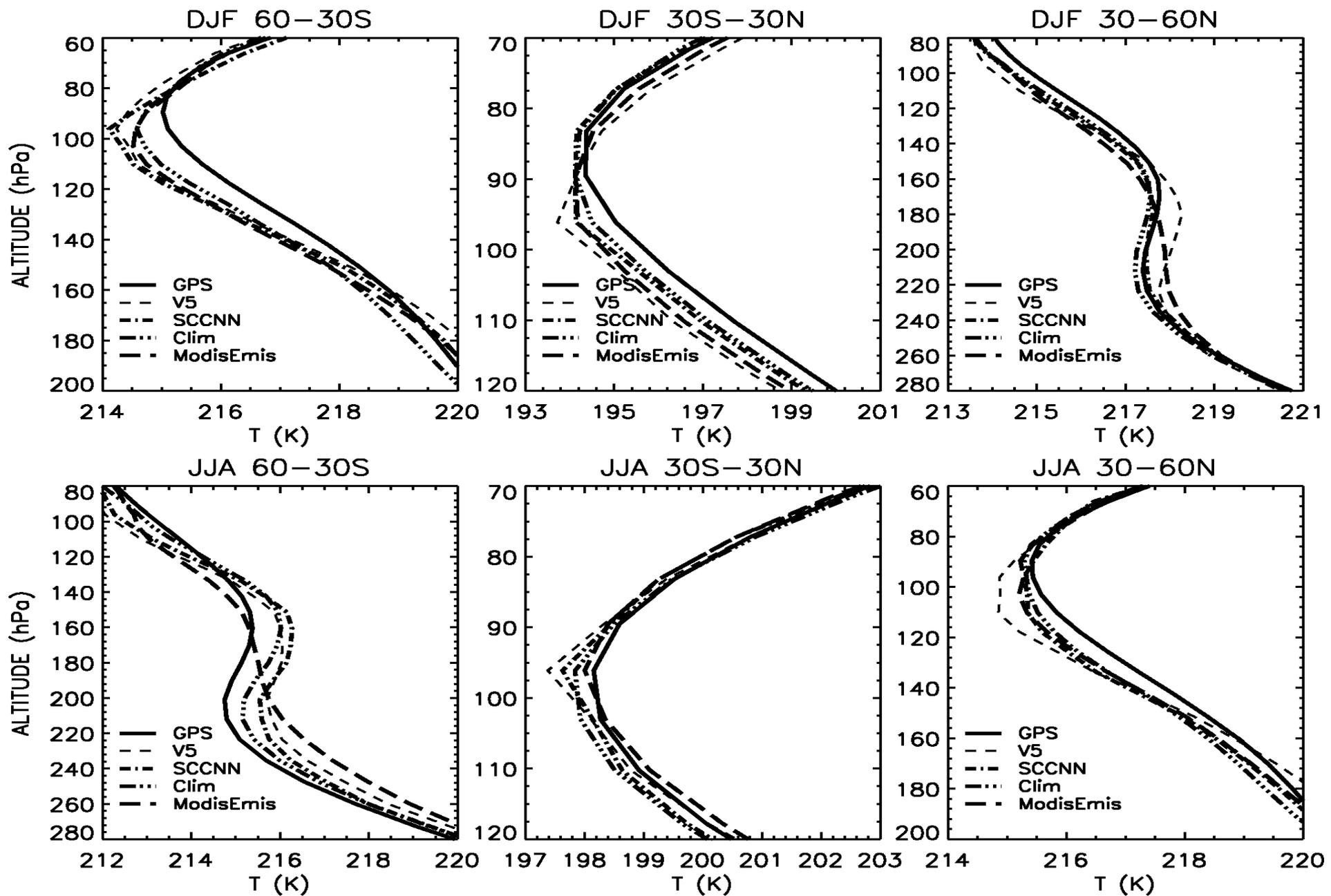
# q, 60-90N, All Year (Dedicated Sondes)



## Conclusions:

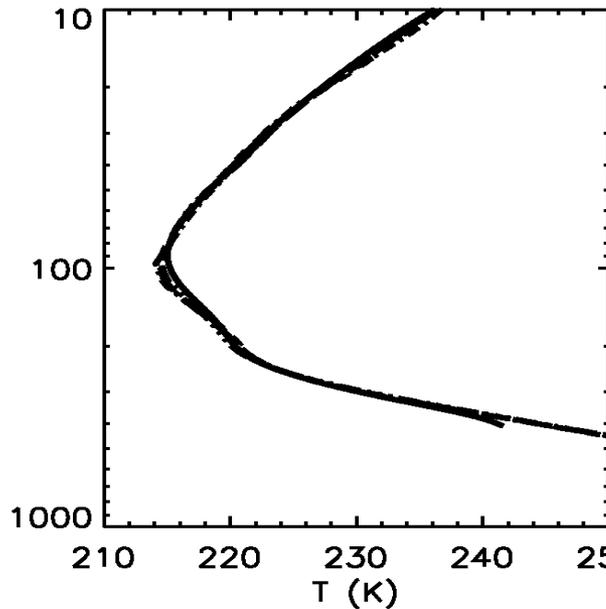
- V5.9.12 has reduced T RMS errors from RaObs and larger skill scores throughout the troposphere
- V5.9.12 T RMS error from GPS RO is reduced almost everywhere from 30-300 hPa
- V5.9.12\* may reduce specific humidity RMS error in 500-925 hPa in the tropics and polar latitudes. V5.9.12 reduces more RMS in the tropics, while V5.9.12q reduces more in the NH polar region
- Skill scores for V5.9.12\* specific humidity retrievals are comparable to that for V5's.

# June-July-August T RMS (K)

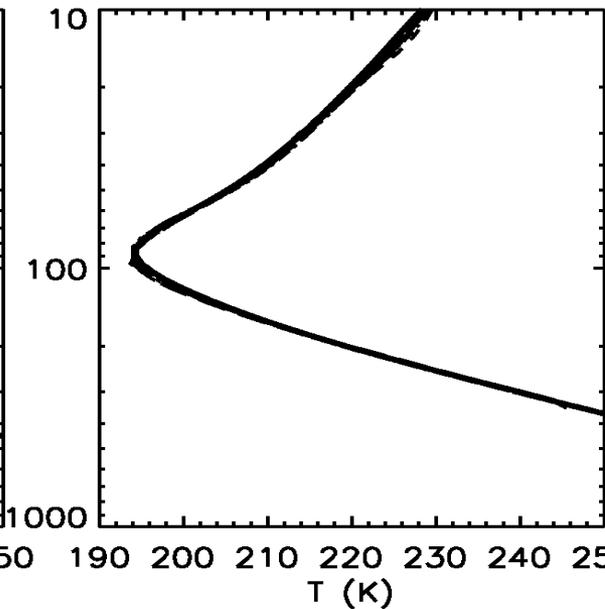


# T Profiles

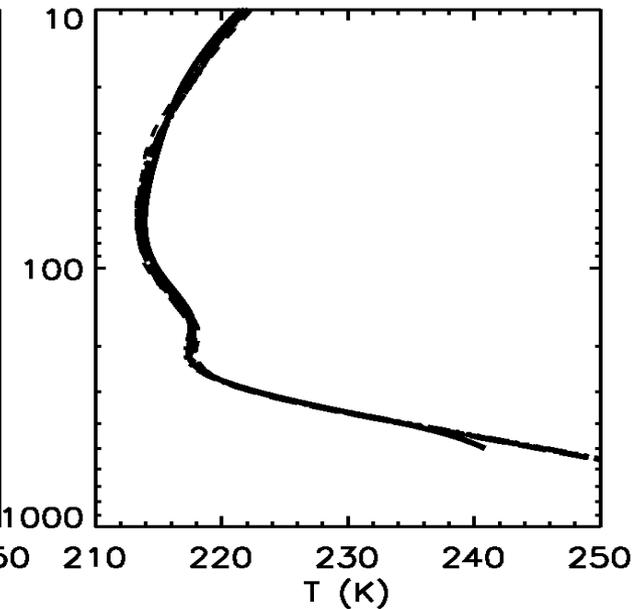
DJF 60–30S



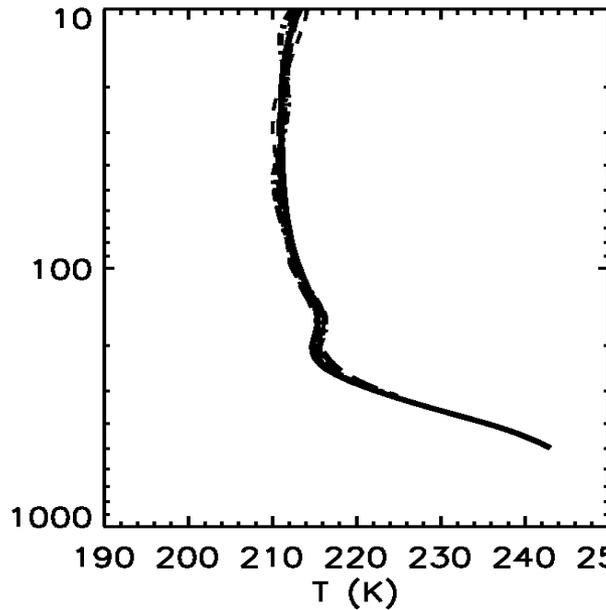
DJF 30S–30N



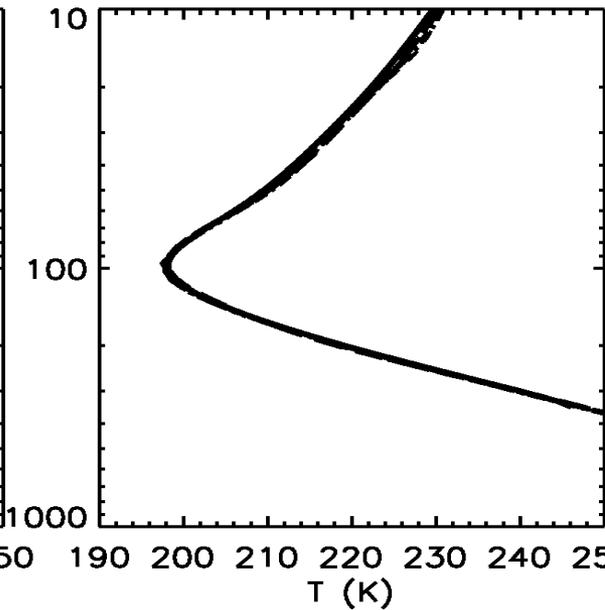
DJF 30–60N



JJA 60–30S



JJA 30S–30N



JJA 30–60N

