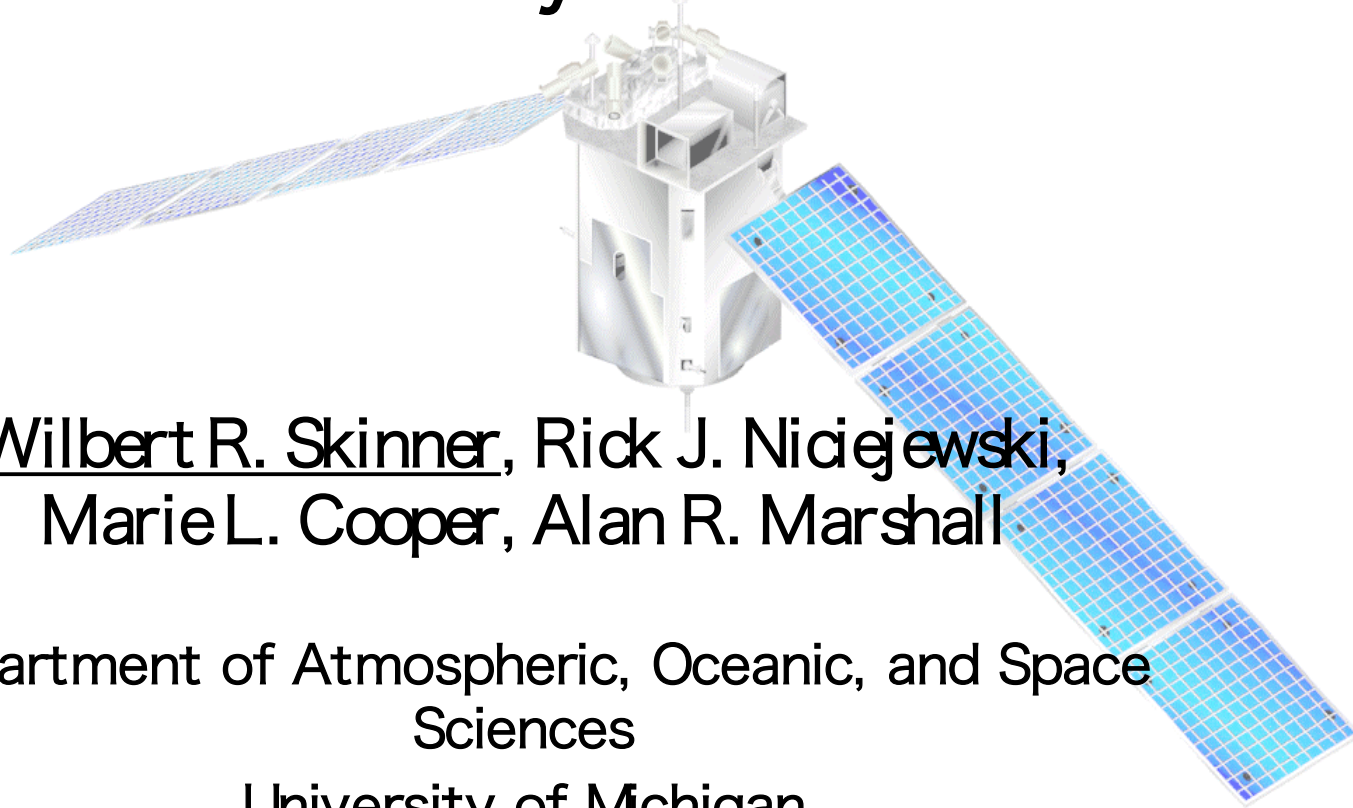


# Intra-Annual Variability of the Mesosphere Wind Field as Observed by TIDI



Wilbert R. Skinner, Rick J. Nidejowski,  
Marie L. Cooper, Alan R. Marshall

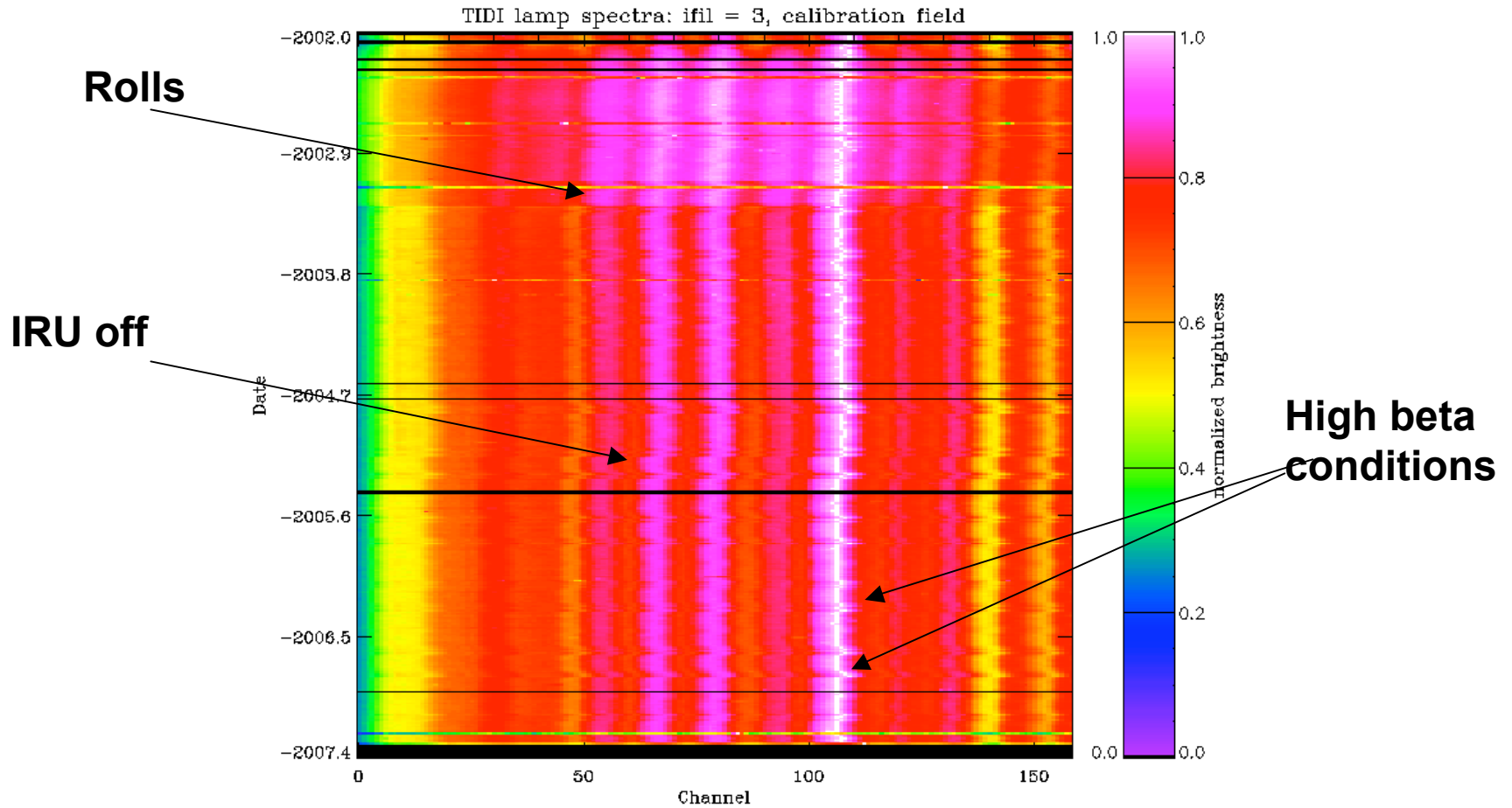
Department of Atmospheric, Oceanic, and Space  
Sciences

University of Michigan

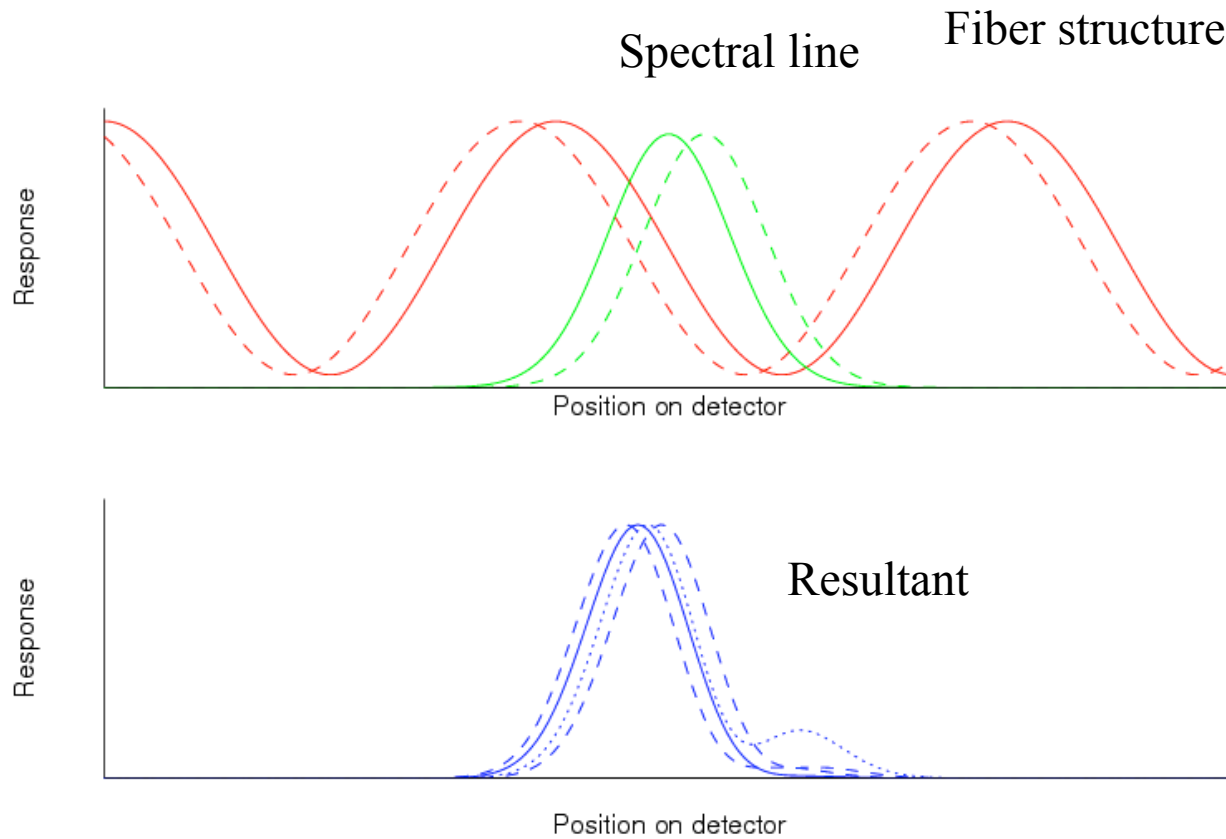
# Outline

- Improvements to TIDI data (V10)
  - Zero wind correction
  - Background removal
  - Exception handling
- UARS/HRDI and TIDI comparison
- One quick view of the TIDI wind data

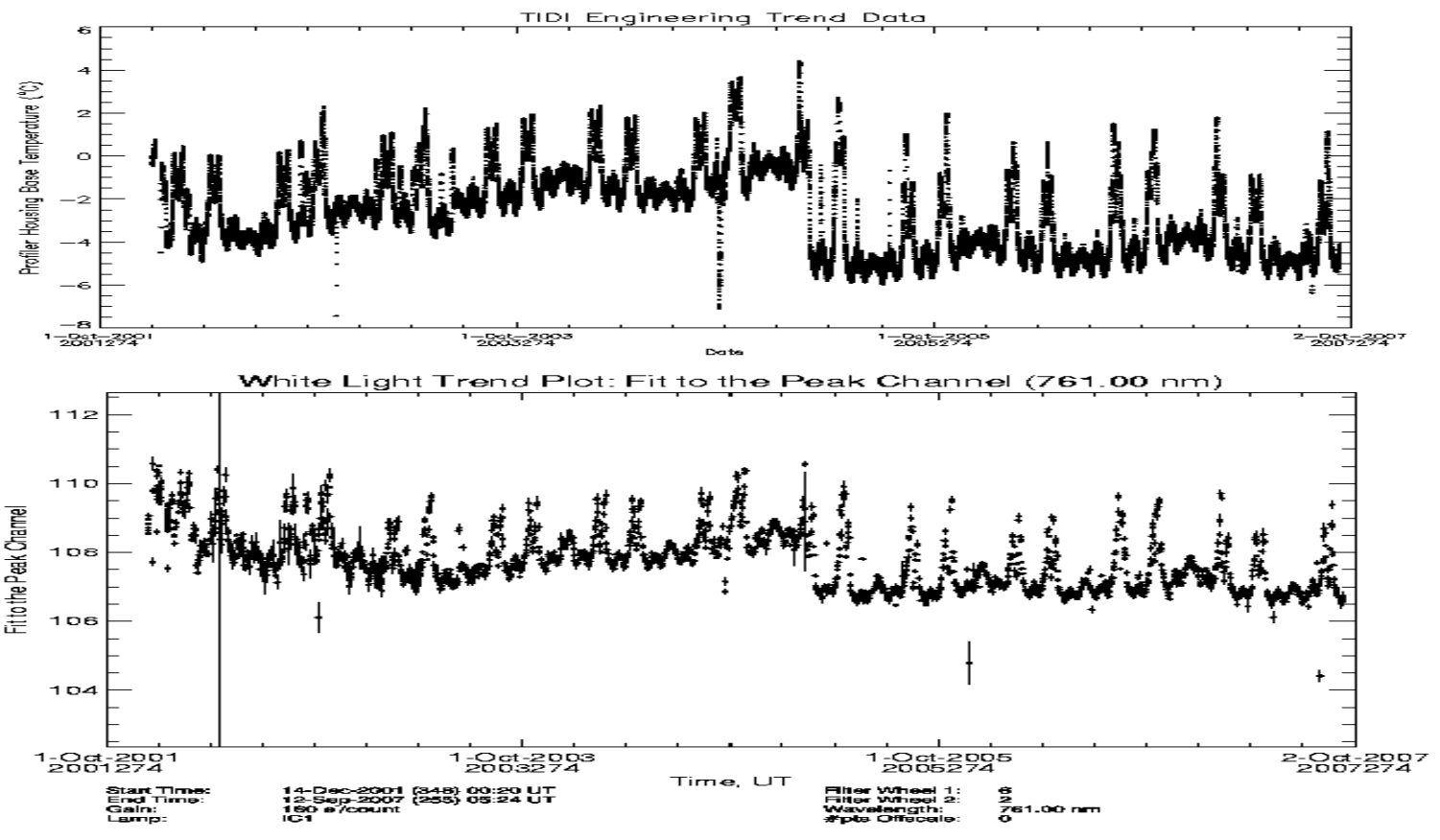
# Filter wheel configuration 3 (P9 line)



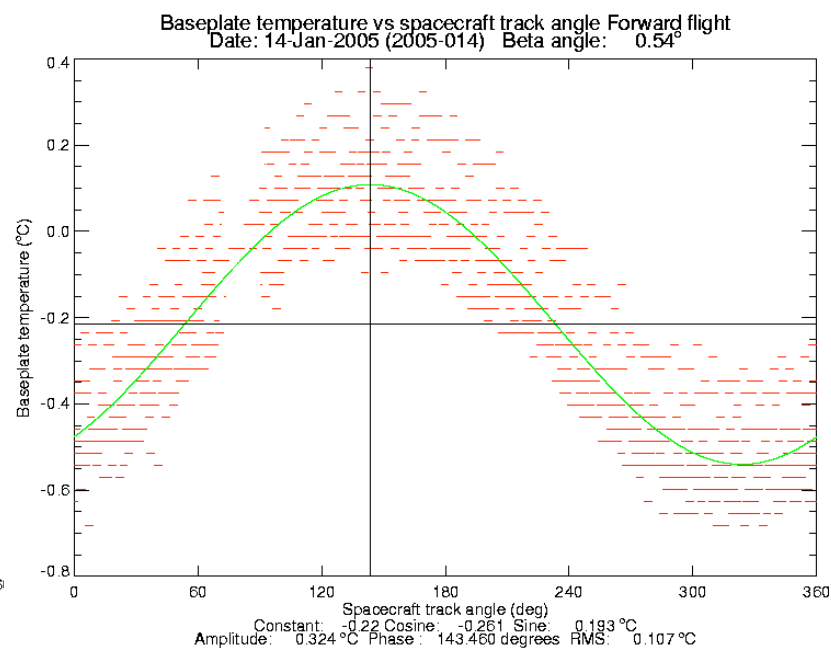
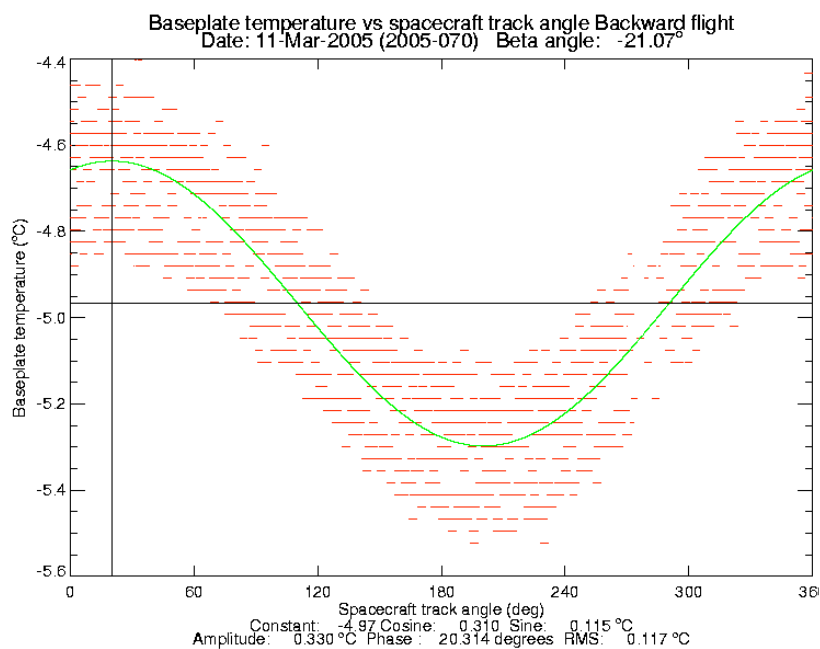
# Illumination pattern



# Fiber shift and baseplate temperature



# Orbital variation of instrument temperature



# Zero Wind Correction

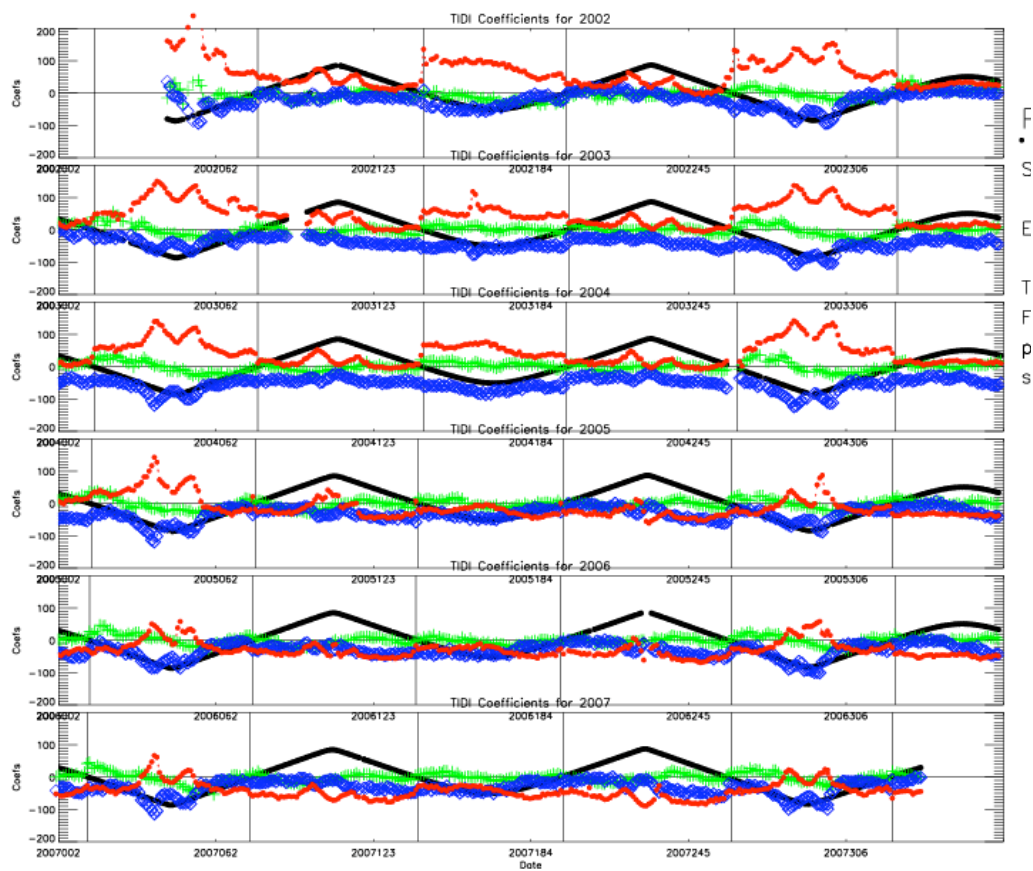
- Earth rotation speed along line of sight

$$v_{earth} = - \frac{2\pi R_e \cos \lambda_{poi} \sin \Phi}{P} = - \frac{2\pi R_e (\cos i \cos \alpha + \sin i \sin \alpha \cos \theta)}{P}$$

- The empirical correction fits all winds from 85 to 105 km for each telescope to

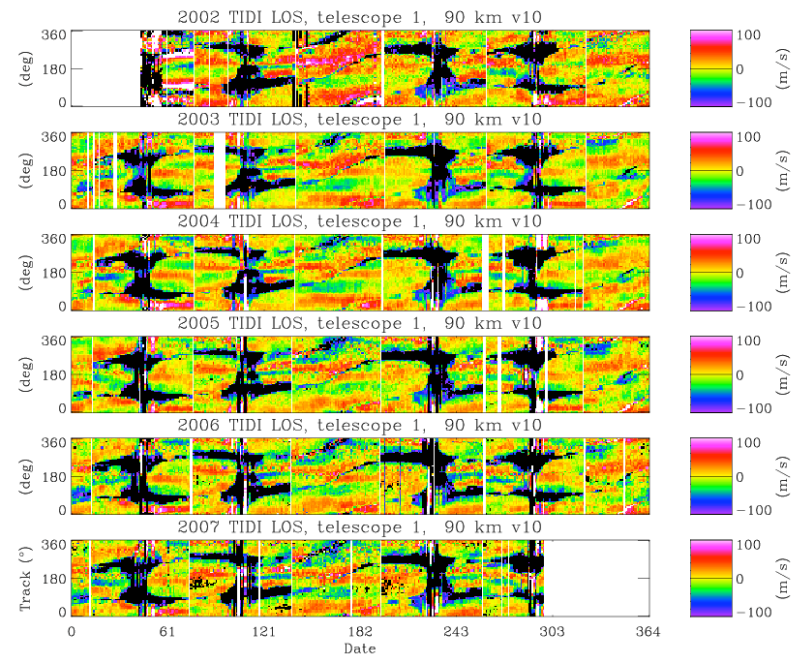
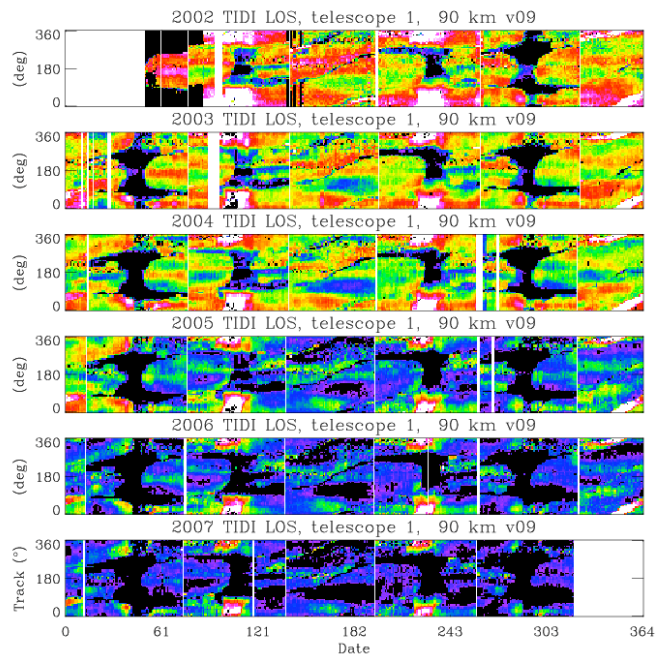
$$u_{zero}(d, T, \theta) = a_{0,d,T} + a_{1,d,T} \cos \theta + a_{2,d,T} \sin \theta$$

# TIDI Correction coefficients

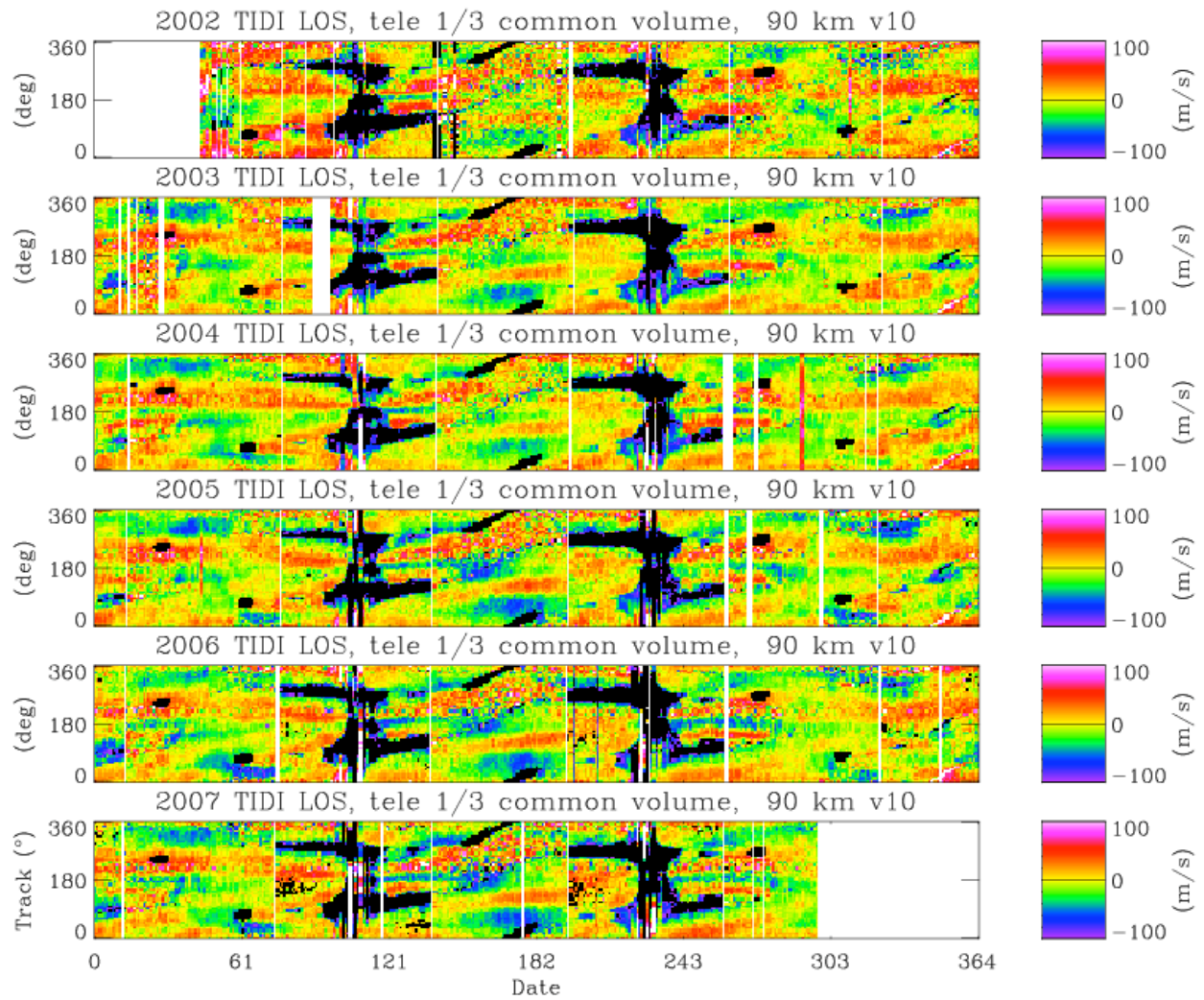




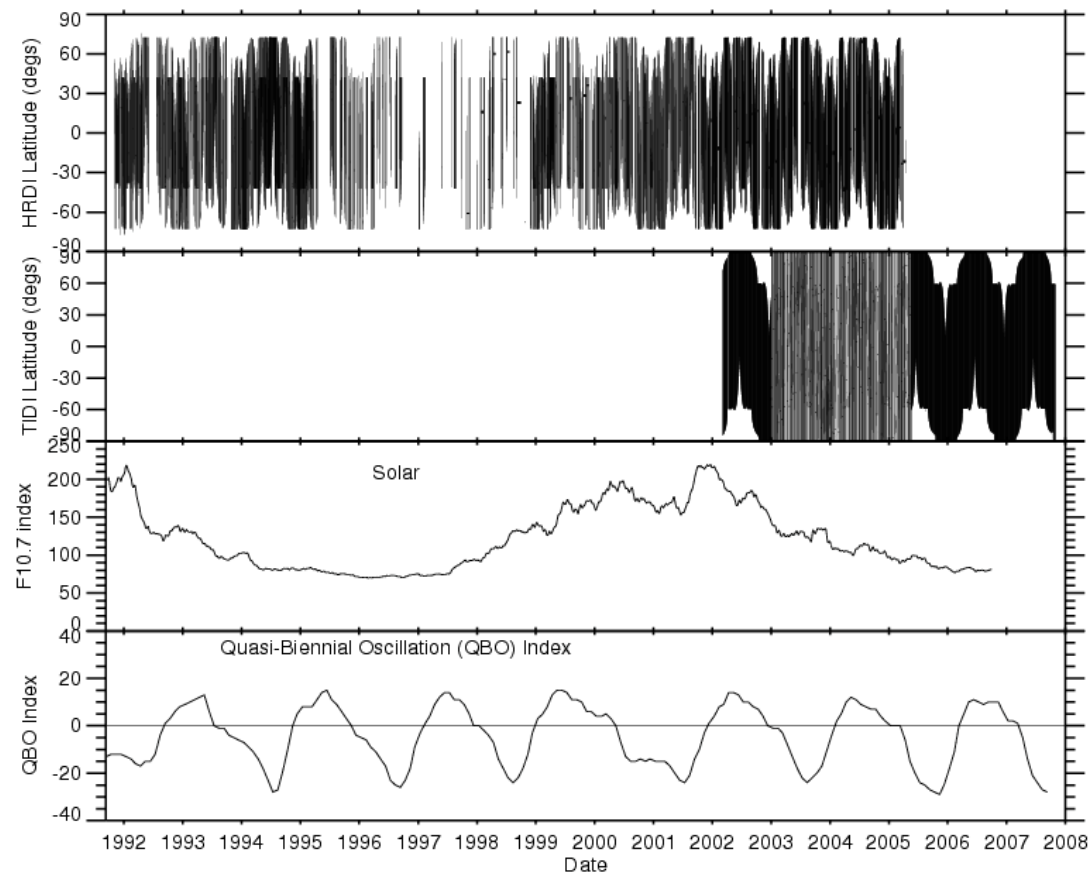
# V9 (left) and V10 (right) telescope 1 (45 degrees)



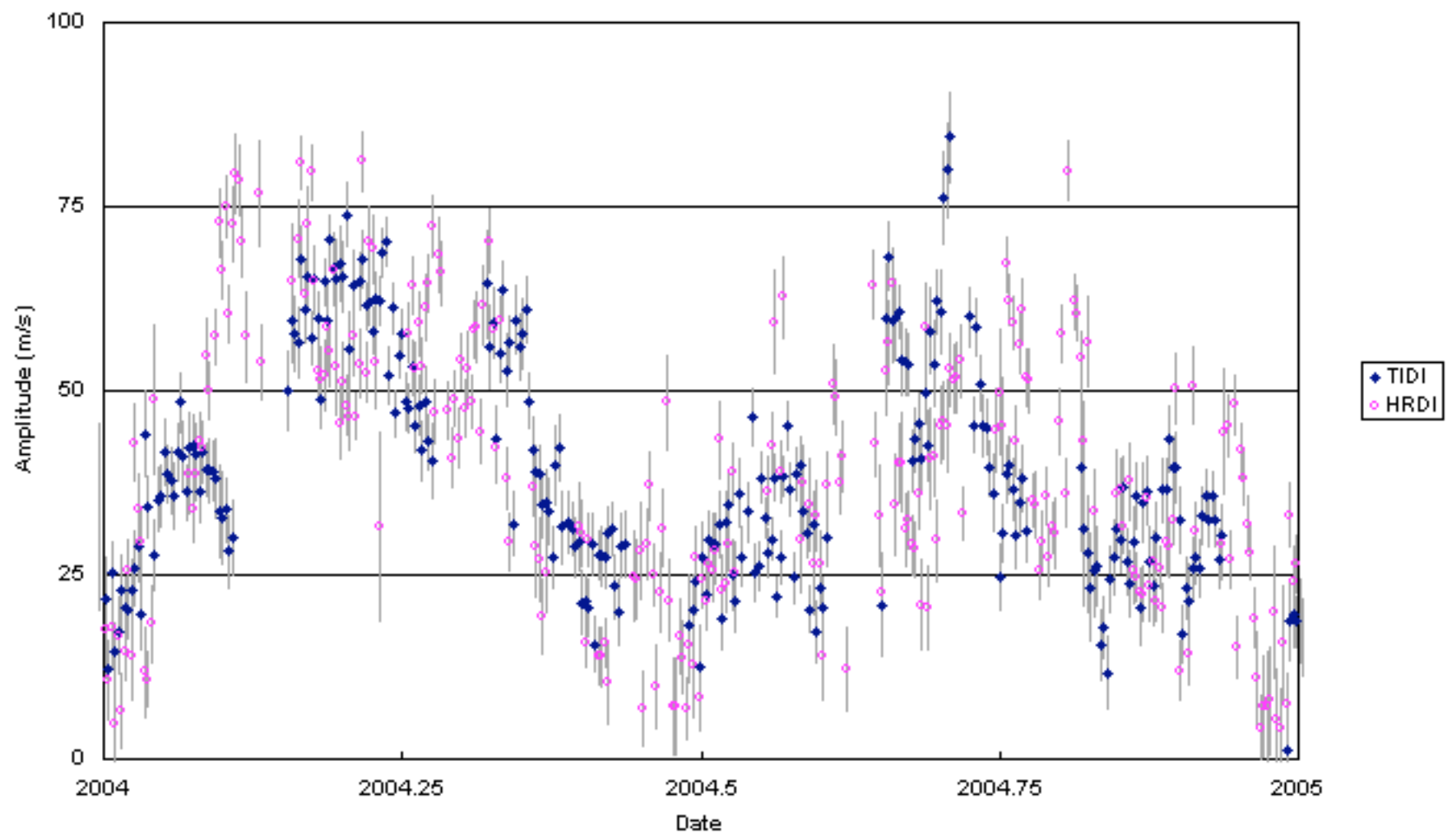
# TIDI common volume line of sight winds



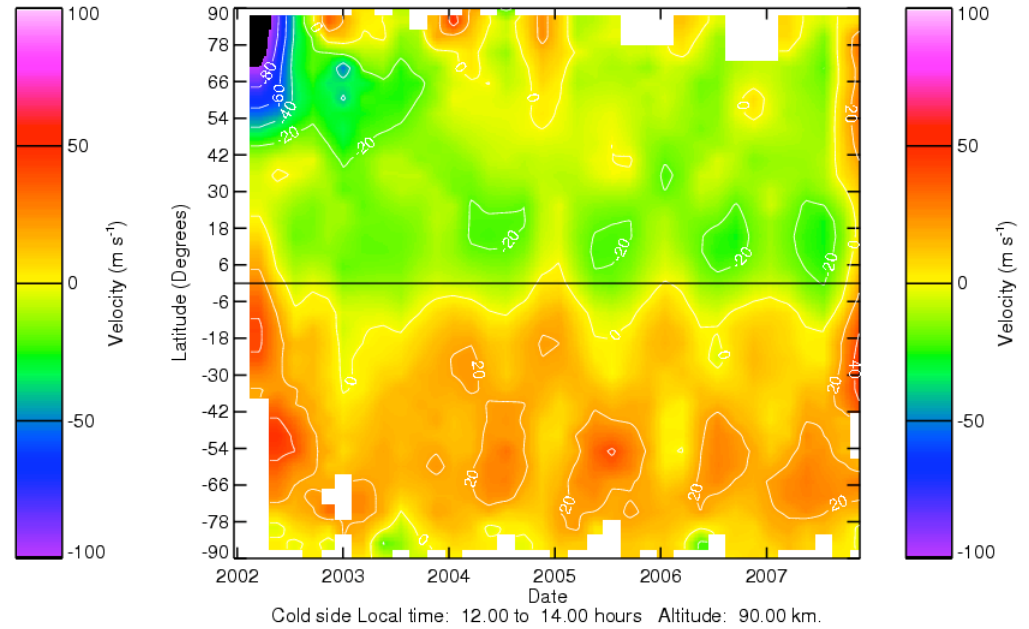
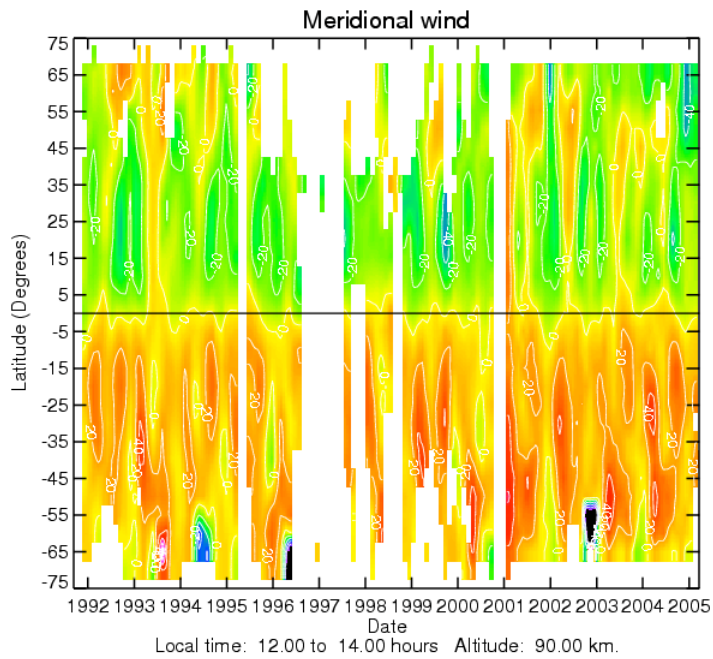
# HRDI and TIDI coverage



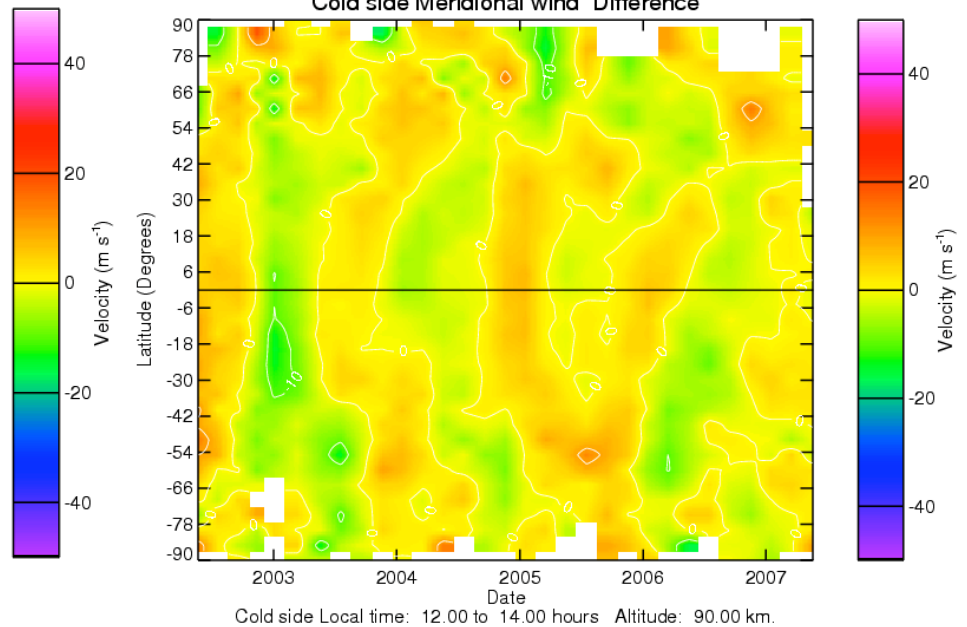
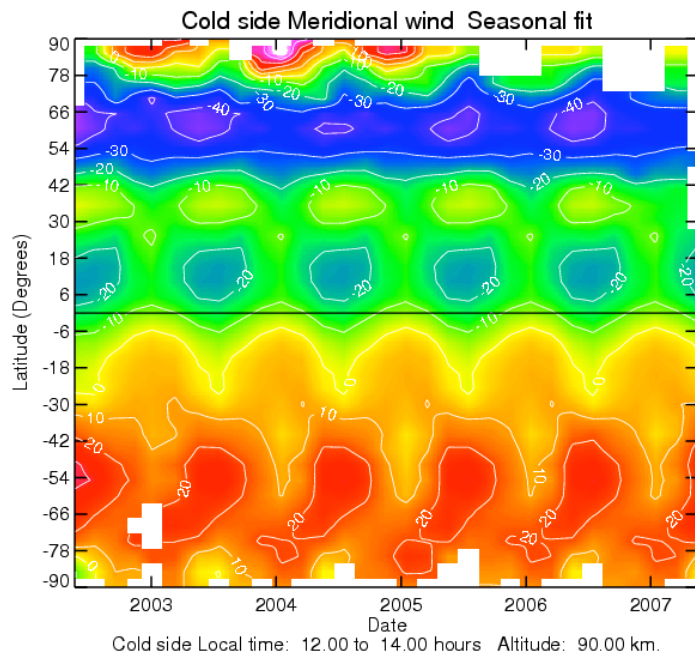
**Magnitude of the Hough (1,1) Diurnal Tide  
maximum @ latitude = 19 deg, altitude = 100 km**



# HRDI and TIDI meridional wind 90 km 12-14 hr local time



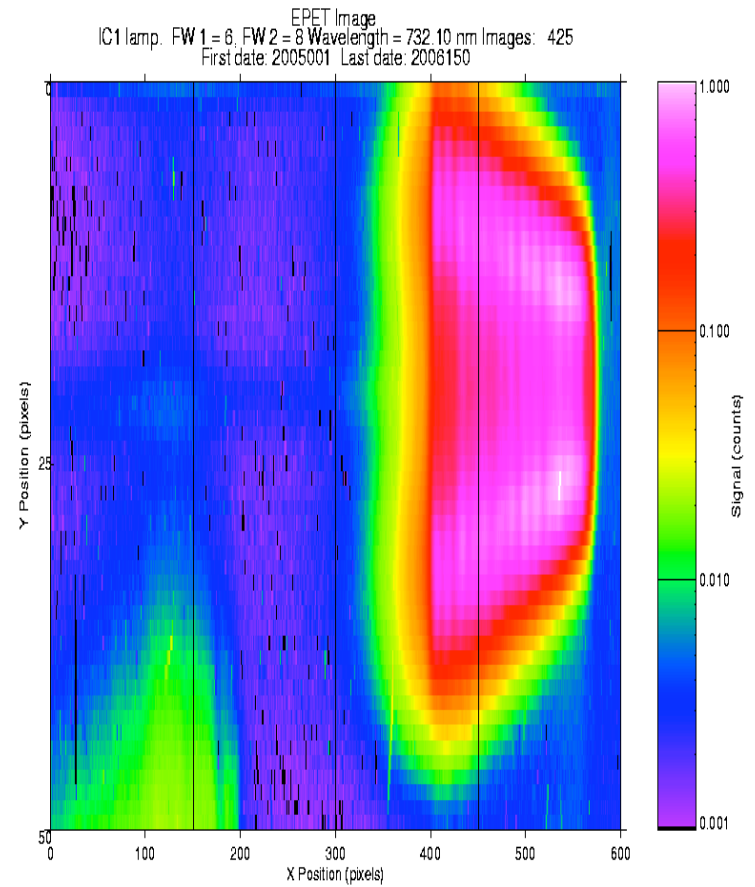
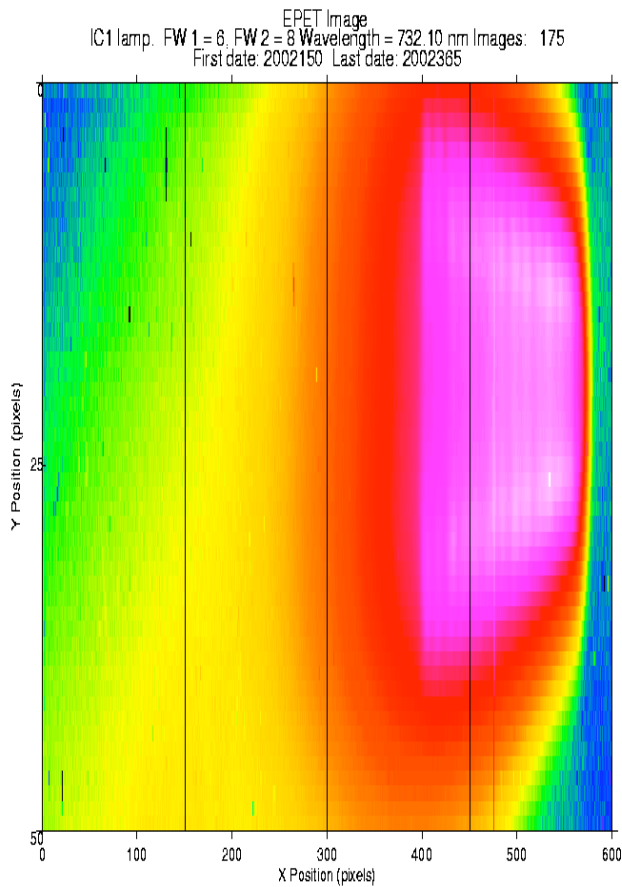
# Fit to TIDI data and difference



# Summary

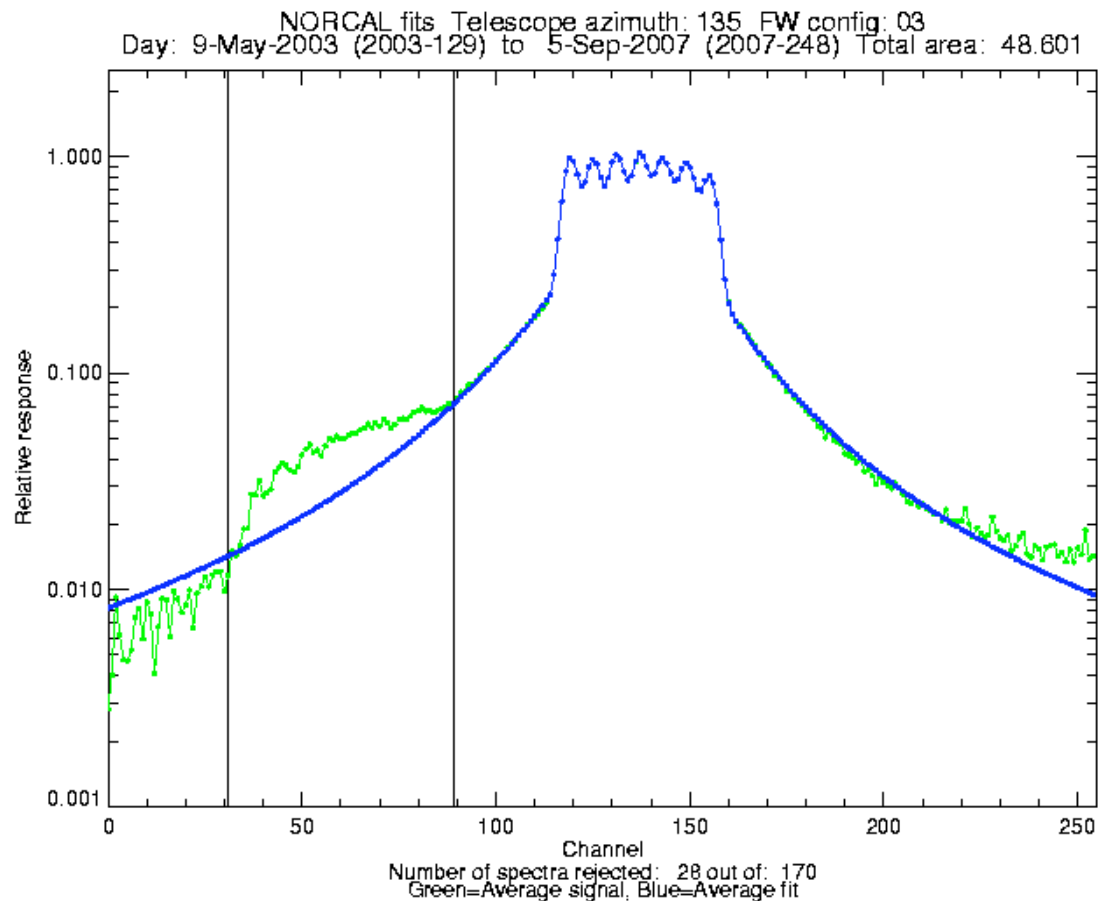
- Significant progress has been made in resolving the TIDI zero wind offset
- Comparison with the HRDI data is very encouraging
- The HRDI and TIDI data sets now extend more than 16 years
  - 2 solar maxima, 2 solar minima
  - 7 QBO cycles

# Calibration image – white light (732 nm)





# Average NORCALs for 135 degree telescope



# TIDI data morning and afternoon

