

# Retrieval of SST from XDD Sounding Data

Mark Beaubien, Todd Allen, Will Jeffries (YES) Lee Harrison (ASRC)

[mcb@yesinc.com](mailto:mcb@yesinc.com) +1-413-522-3136



- HDSS dispenser flight-proven across 20 WB-57 flights spanning 2013-2015



GANTRY

HDSS PAYLOAD

3' PALLET

TEMPORARY  
WHEELS

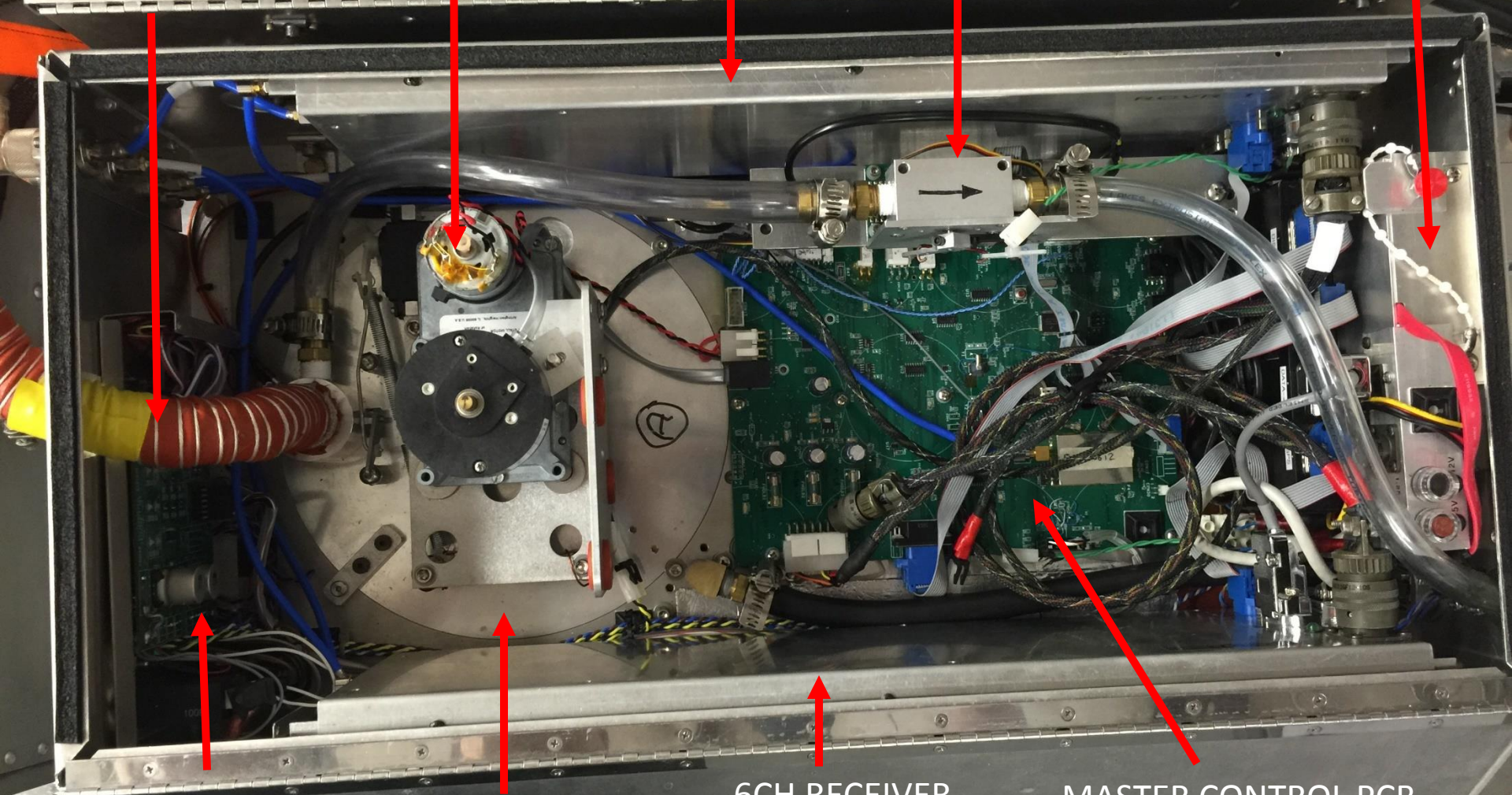
4 PSI  
AIR IN

DRUM MOTOR  
ENCODER

6CH RECEIVER

LOW PRESSURE  
AIR REGULATOR

QUAD CORE  
MASTER CPU



SEO SWITCH  
INTERFACE

ROTATING DRUM  
INTERFACE

6CH RECEIVER

MASTER CONTROL PCB

Aug/30/2015 \*19:09:44  
WB-57 AFT HDSS

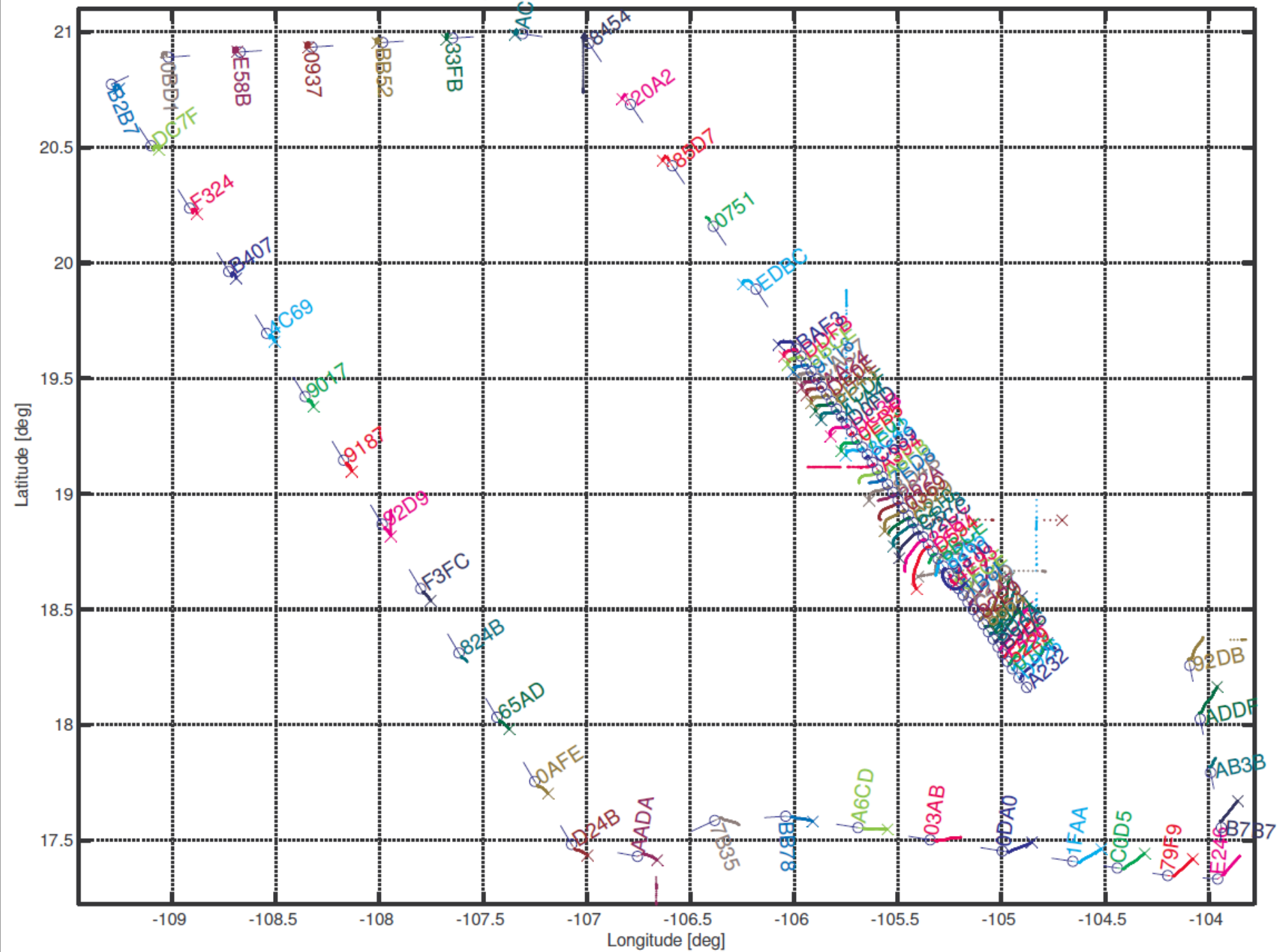


## Challenge of IR measurements ... the list of unknowns is ugly:

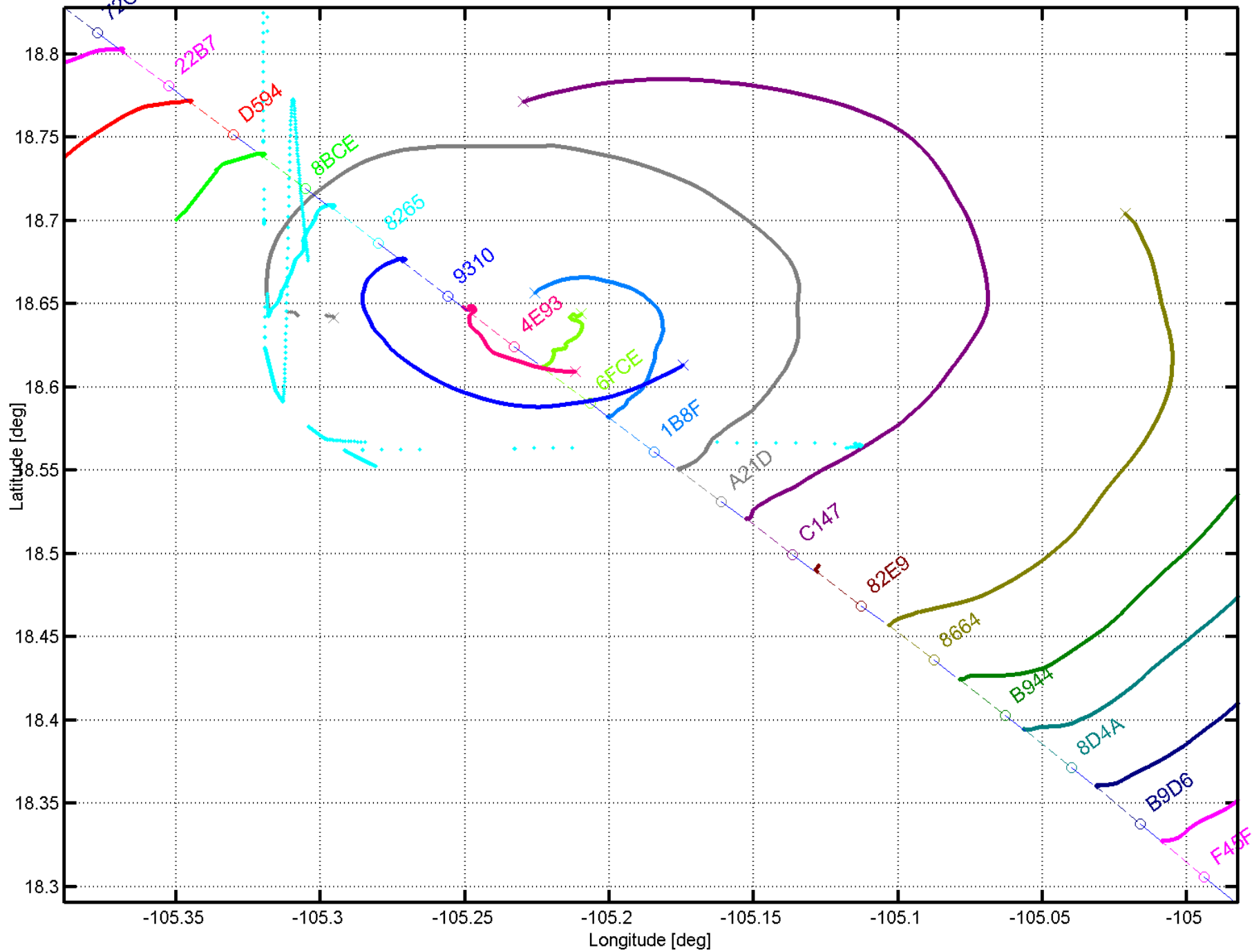
- Limit height for last data packet received (LS curve to surface)
- Altitude determination (hypsometric equation assumes constant  $T_a$ )
- Variability in thermal IR window filter (convolve signal)
- Contamination (window wetting, cold rain, water vapor)
- Look / tip angle (field-of-view to surface)
- Emissivity of surface in turbulent seas (what is the “surface”?)
- Variability in base “reference” temperature (dynamics)

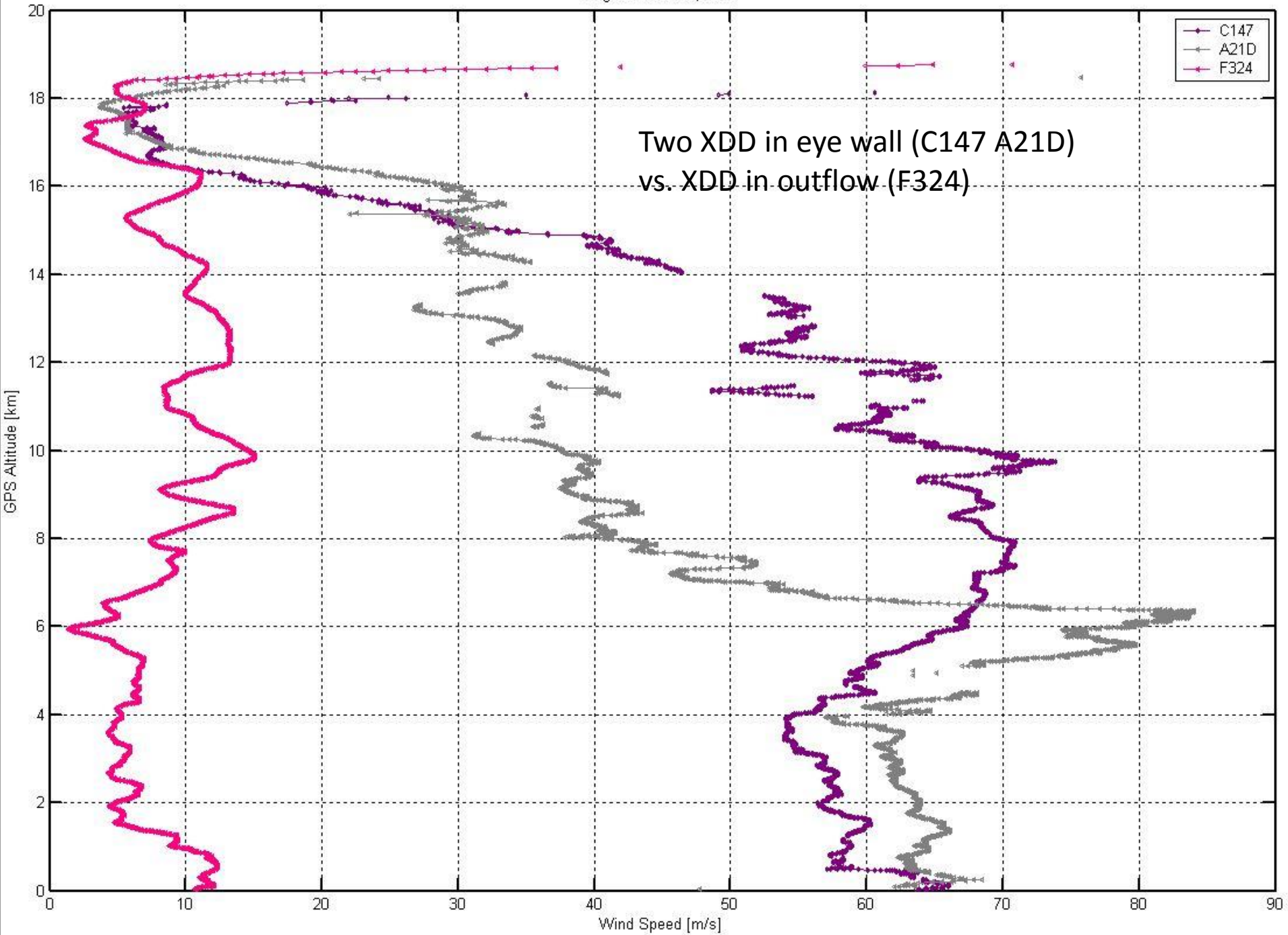


Flight on Oct 23, 2015 Track of Launches, all sondes



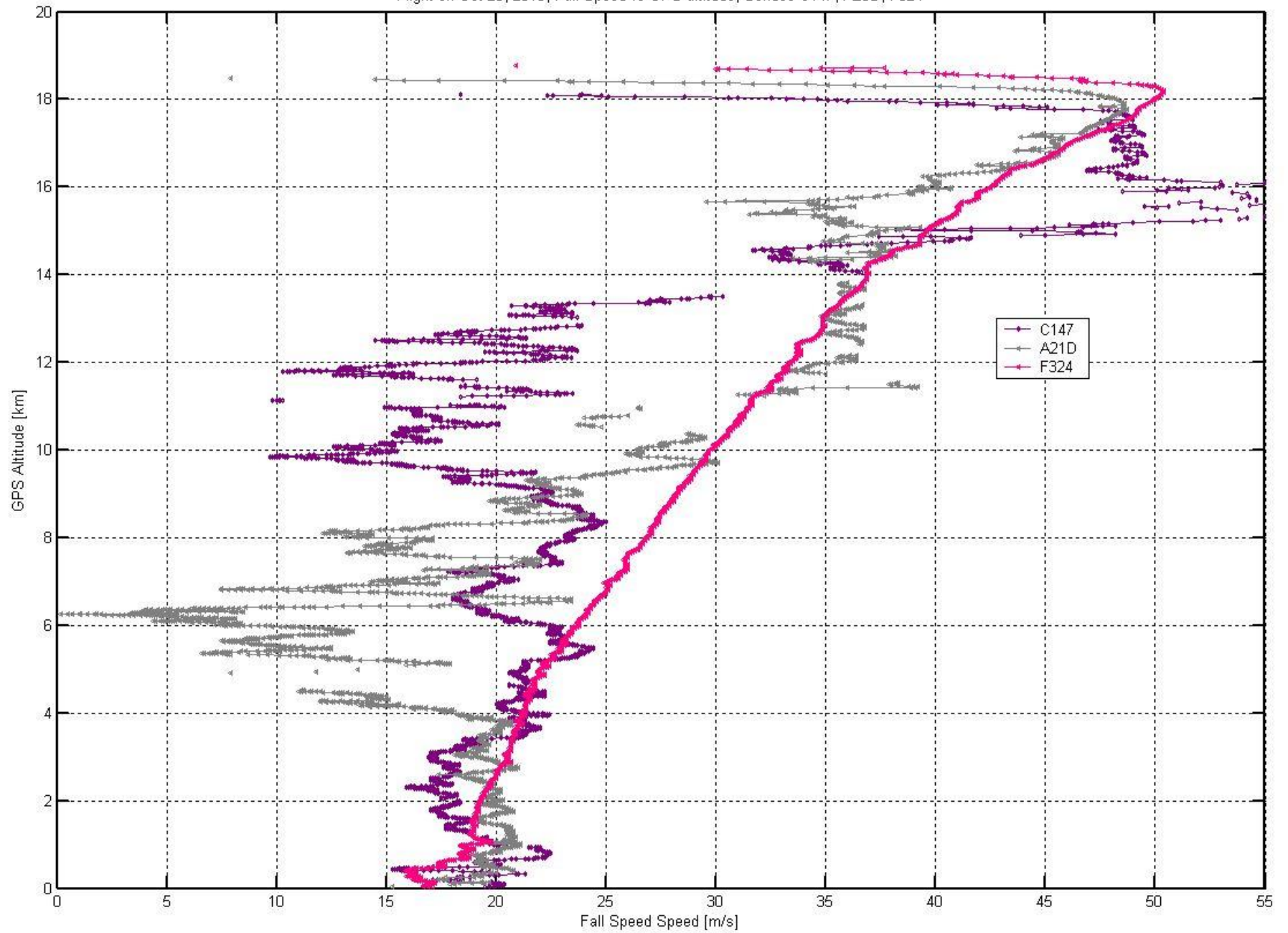
Flight on Oct 23, 2015 Track of EYE sondes

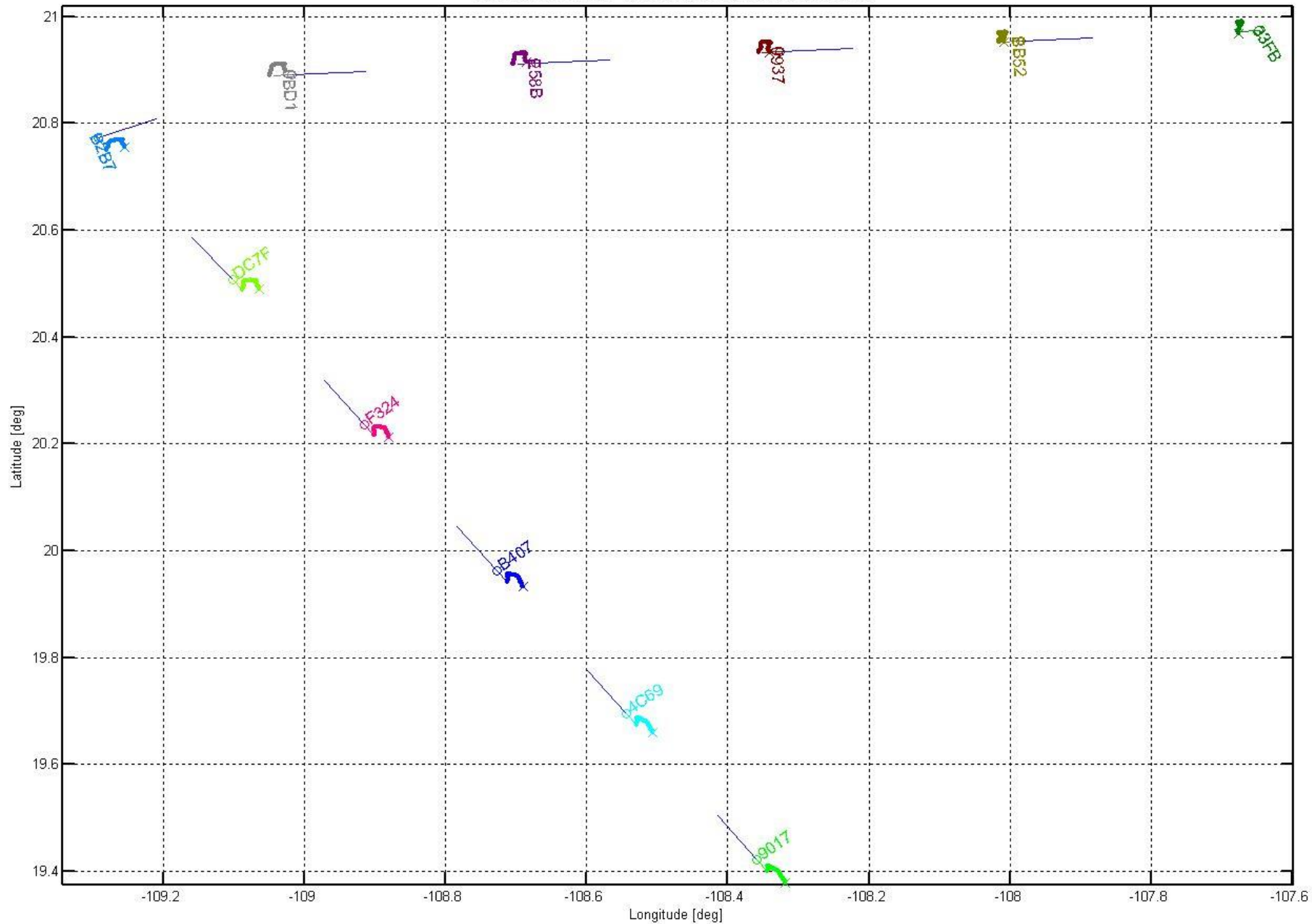




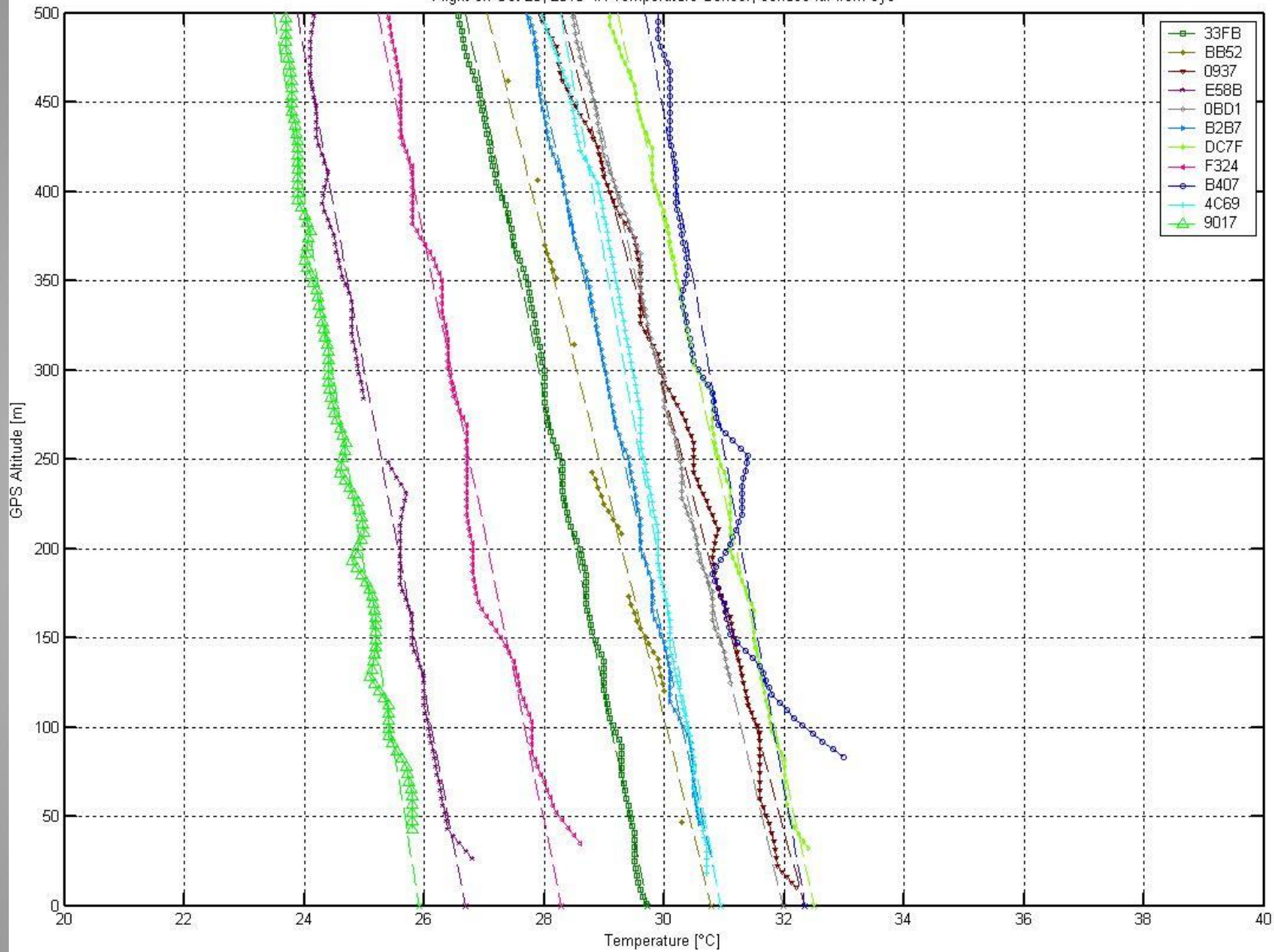


Flight on Oct 23, 2015, Fall Speed vs GPS altitude, Sondes C147, A23D, F324

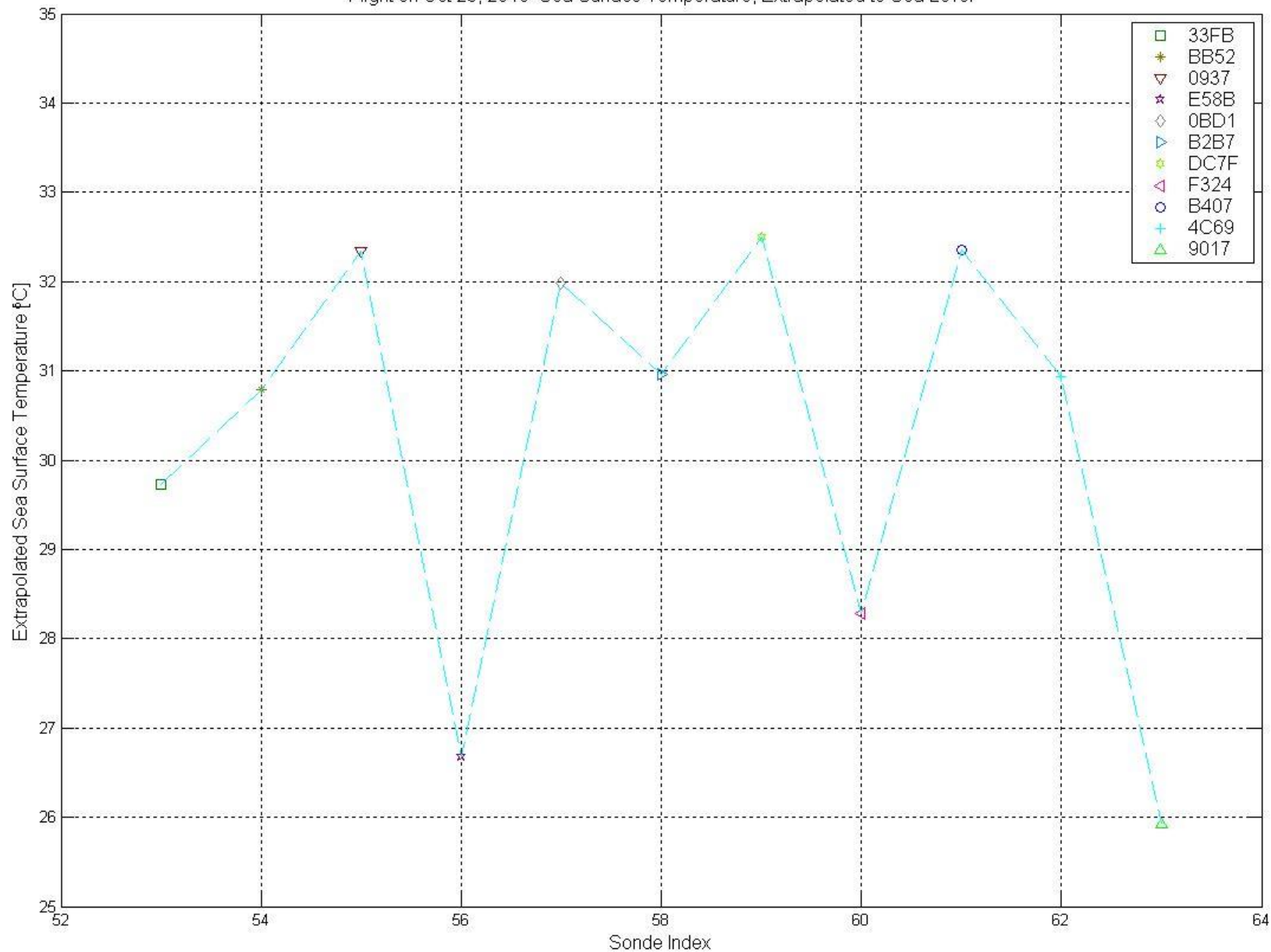




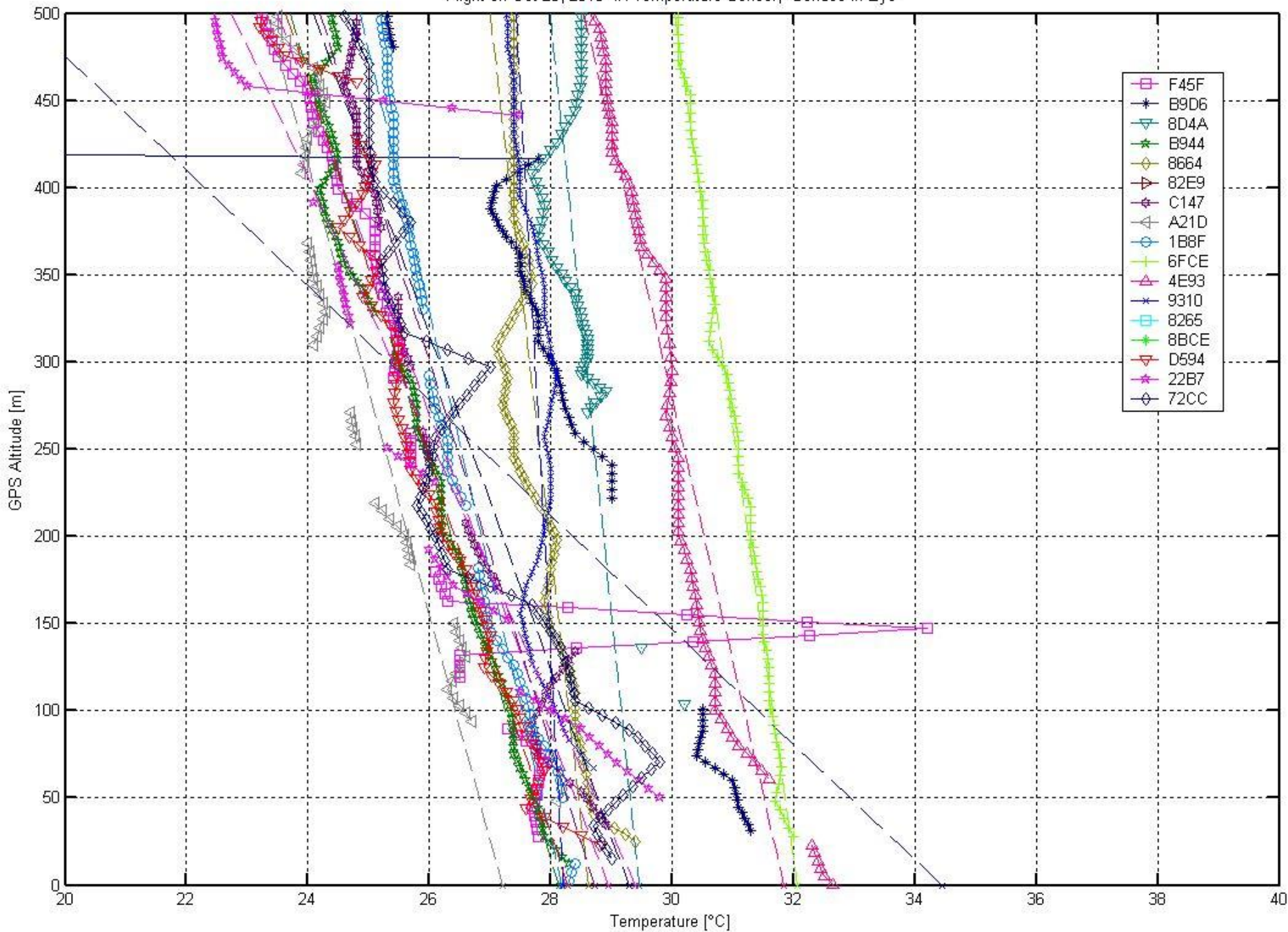
Flight on Oct 23, 2015 IR Temperature Sensor, sondes far from eye



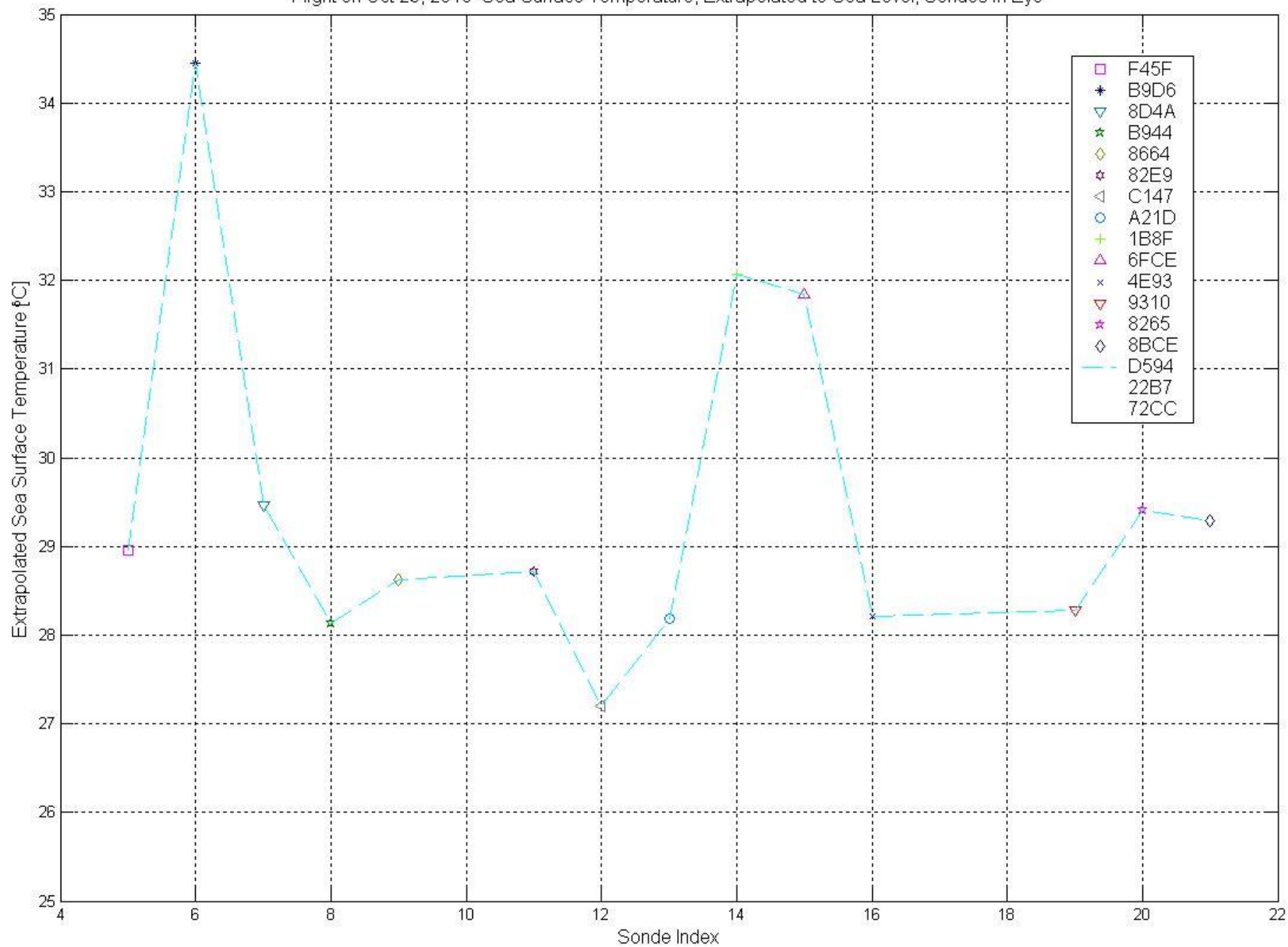
Flight on Oct 23, 2015 Sea Surface Temperature, Extrapolated to Sea Level



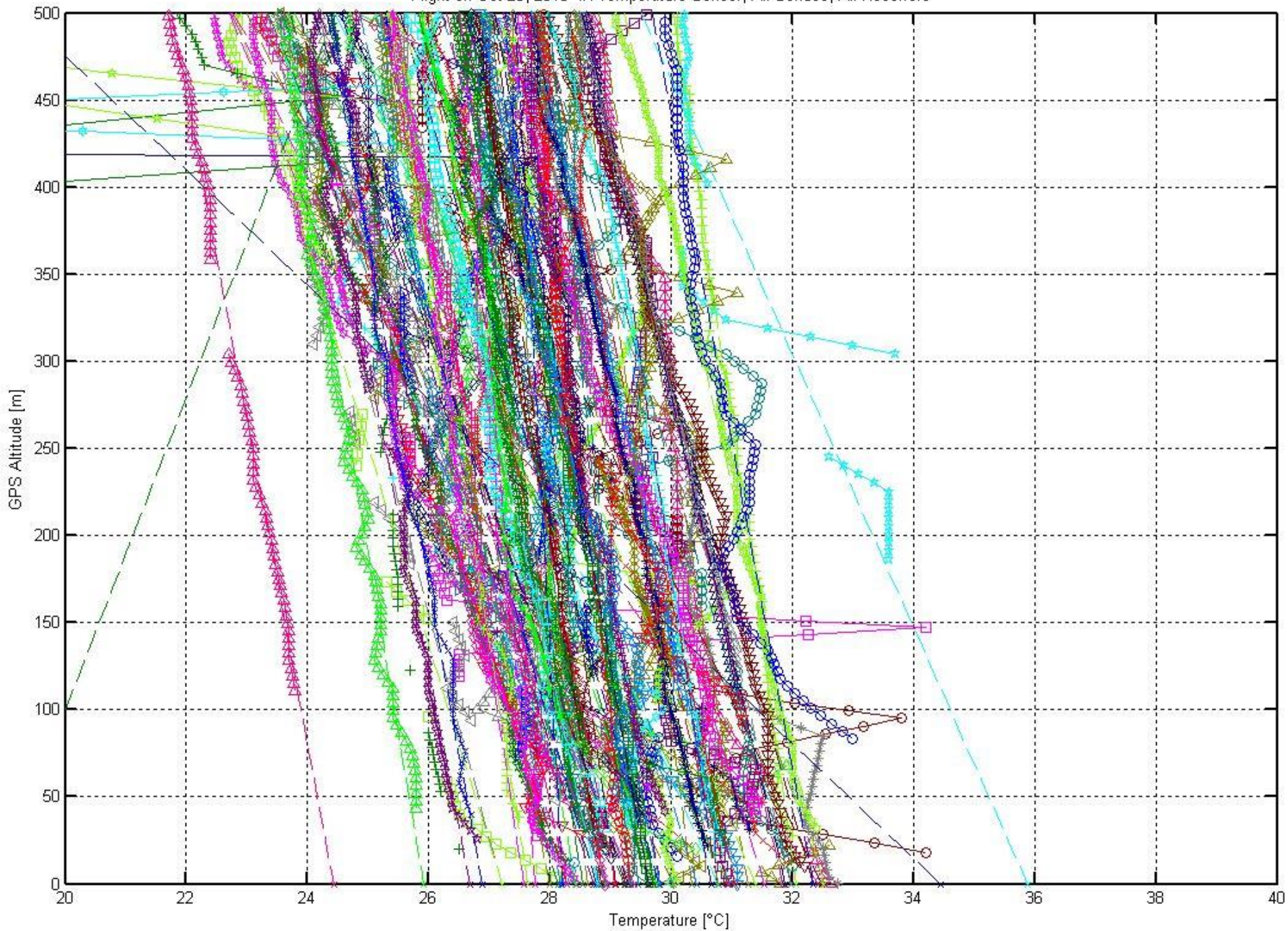
Flight on Oct 23, 2015 IR Temperature Sensor, Sondes in Eye



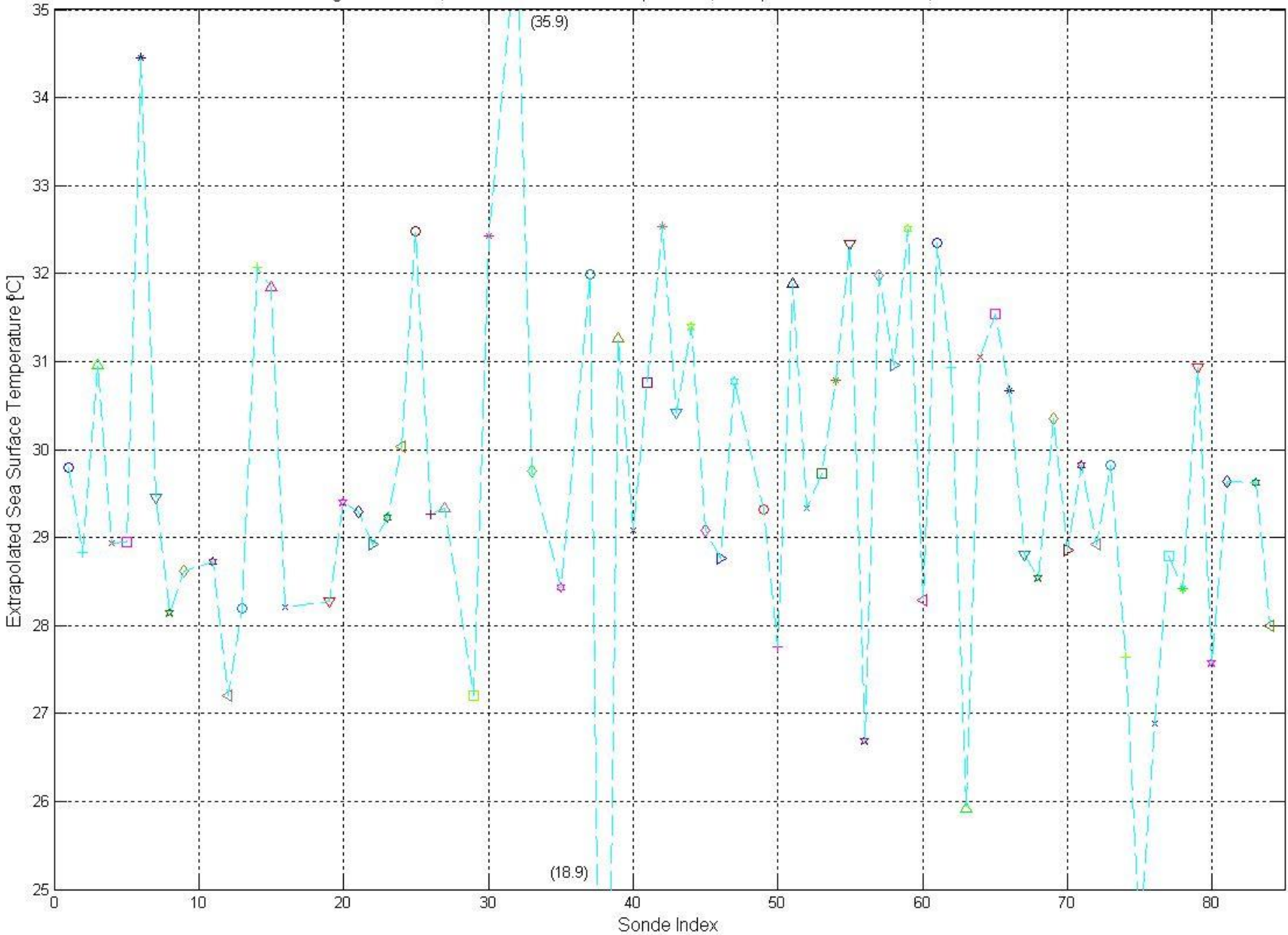
Flight on Oct 23, 2015 Sea Surface Temperature, Extrapolated to Sea Level, Sondes in Eye



Flight on Oct 23, 2015 IR Temperature Sensor, All Sondes, All Receivers



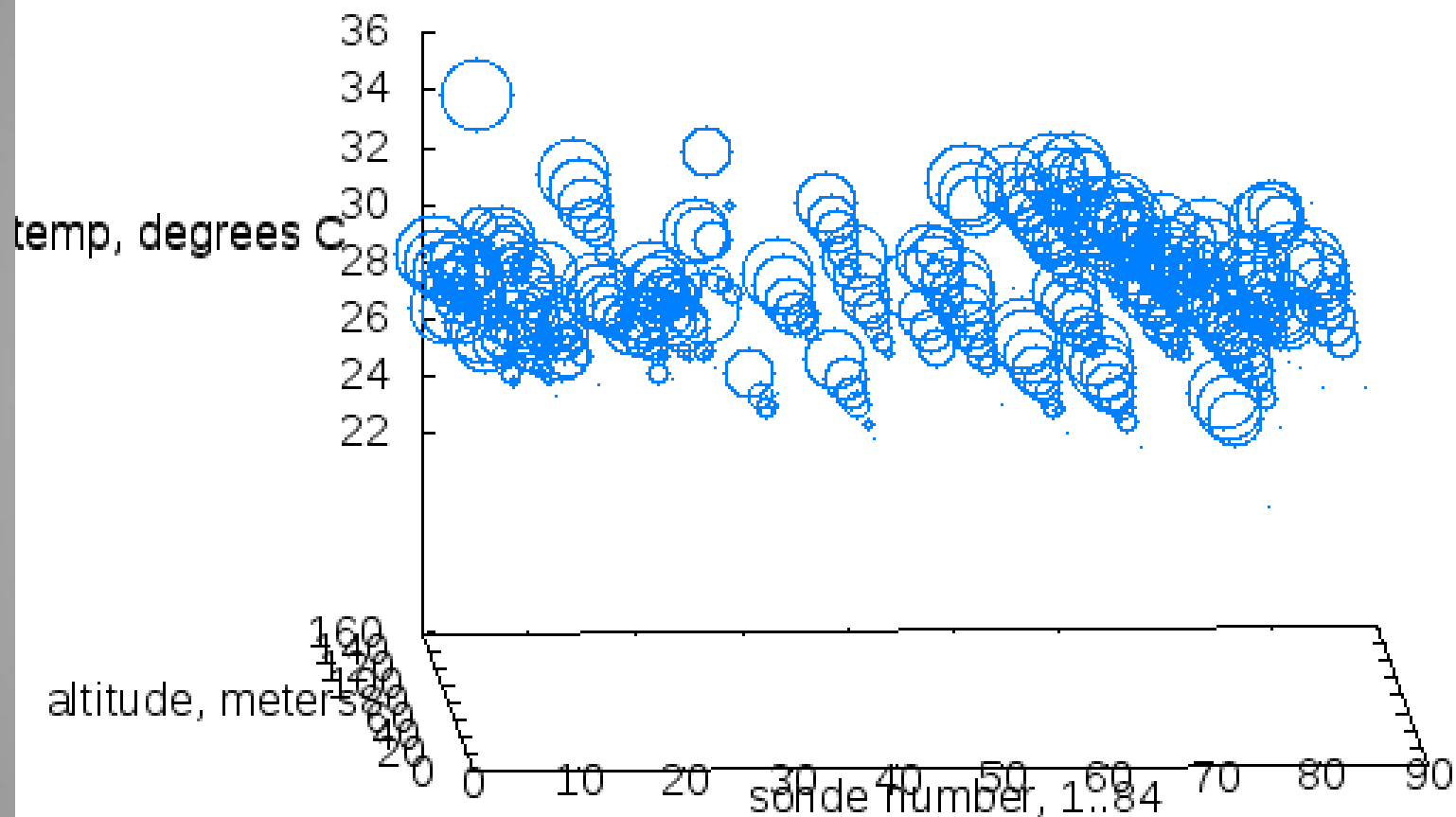
Flight on Oct 23, 2015 Sea Surface Temperature, Extrapolated to Sea Level, All Sondes



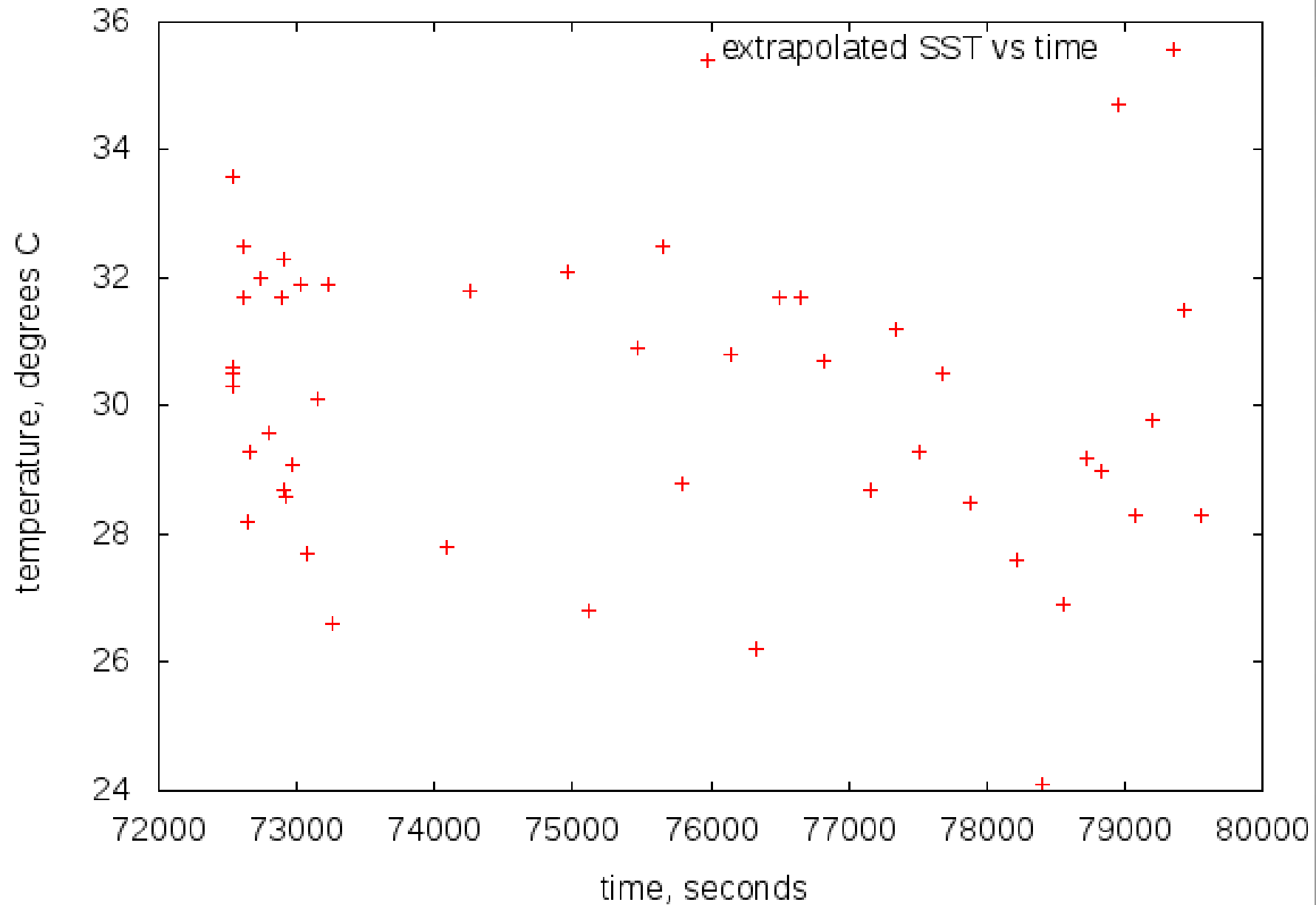


# Hurricane Patricia SST data, 10/23/15

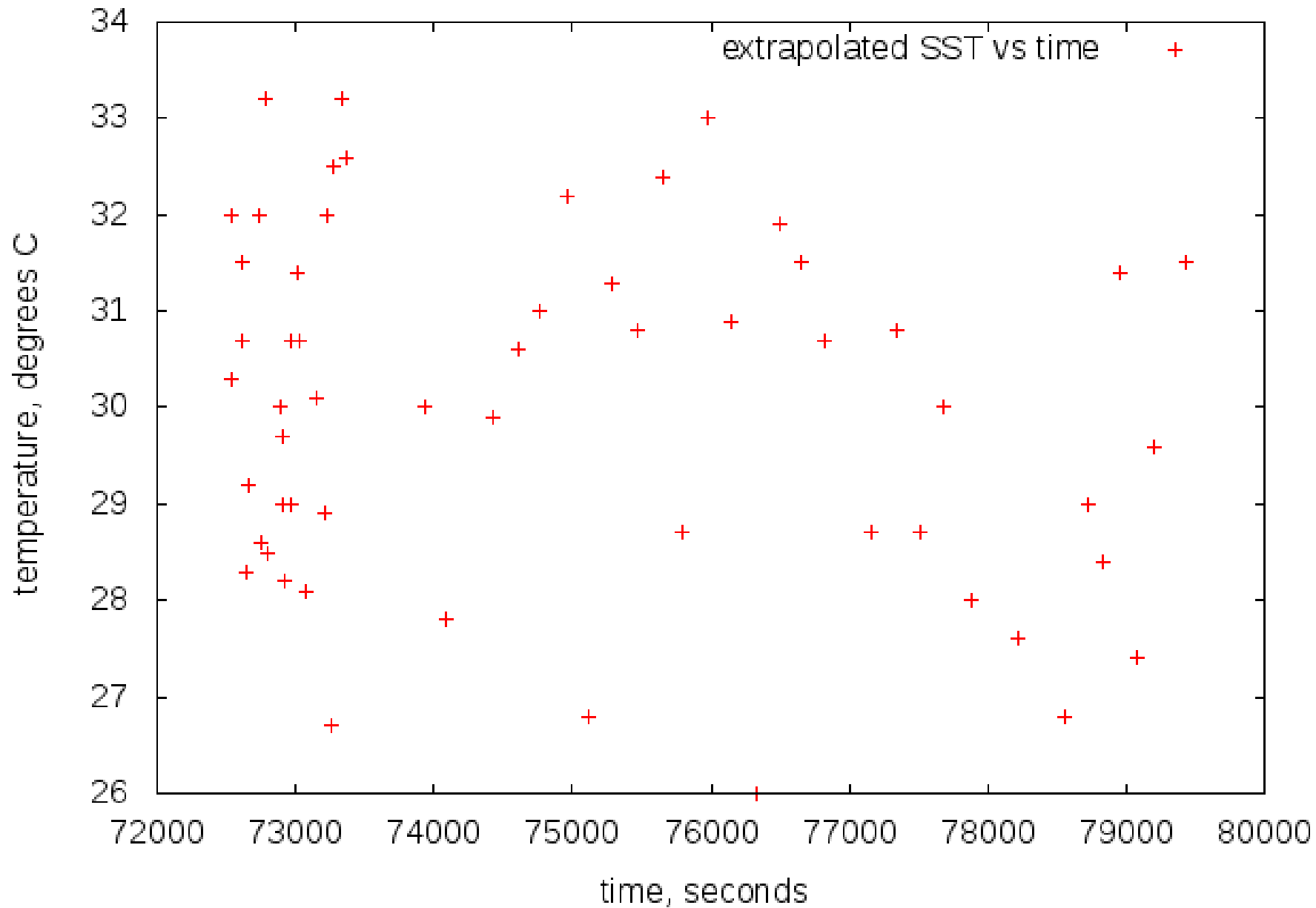
'sst.dat' using 1:3:4:( $3 \times .03$ )



Hurricane Patricia SST data, 10/23/15



Hurricane Patricia SST data, 10/23/15



Future Work, Questions?

