

T-PARC NRL-P3 Dropsonde Post-Processing Overview

- RF1
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- RF12
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- RF15
- RF16
- RF17
- RF18
- RF19
- RF21
- RF22
- RF23

Kate Young, June Wang and Laura Tudor

TPARC Dropsonde Data Products:

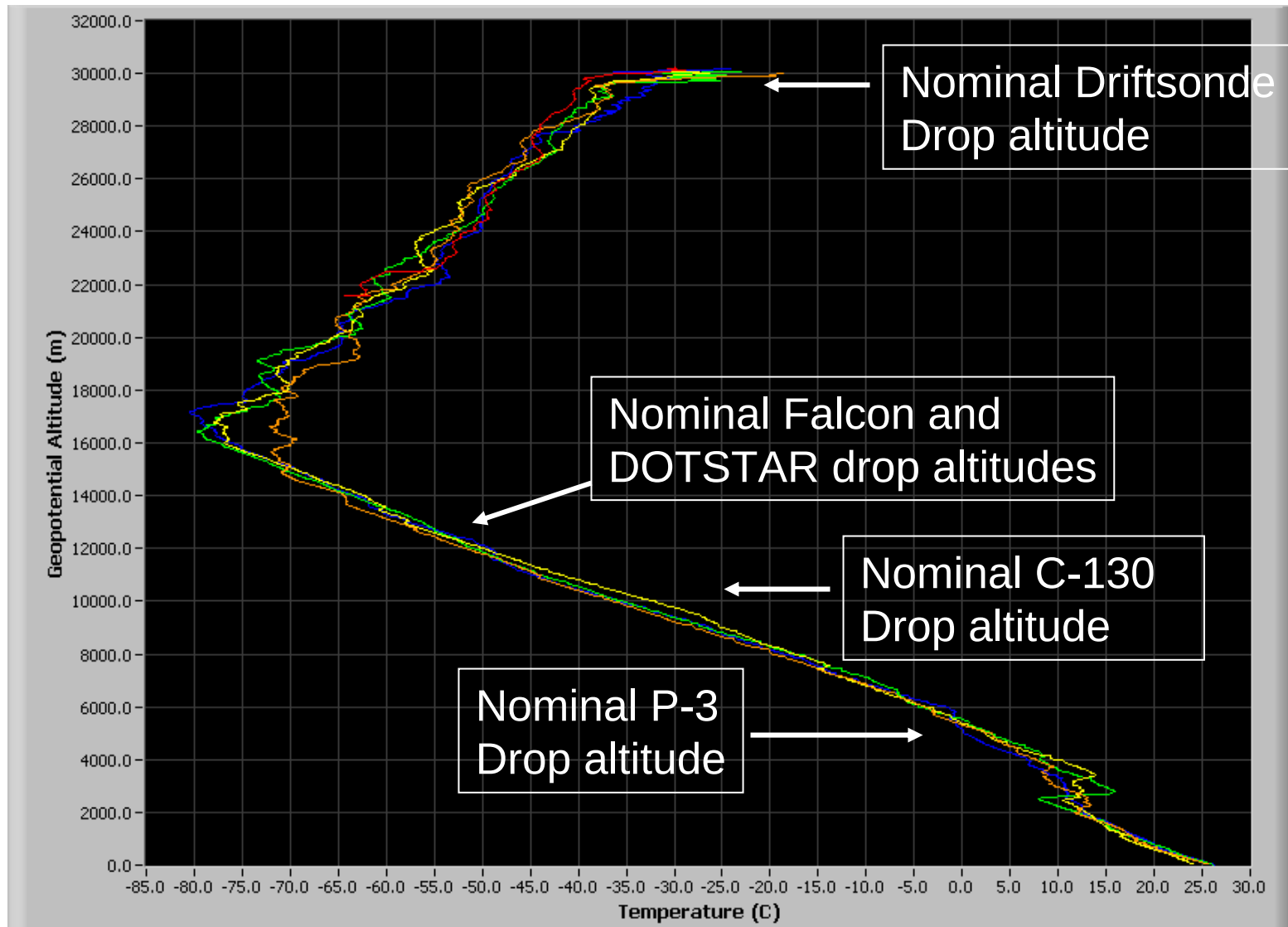
Approximately 1600 dropsonde soundings collected between Aug 1 – Sept 30

Aircraft included:

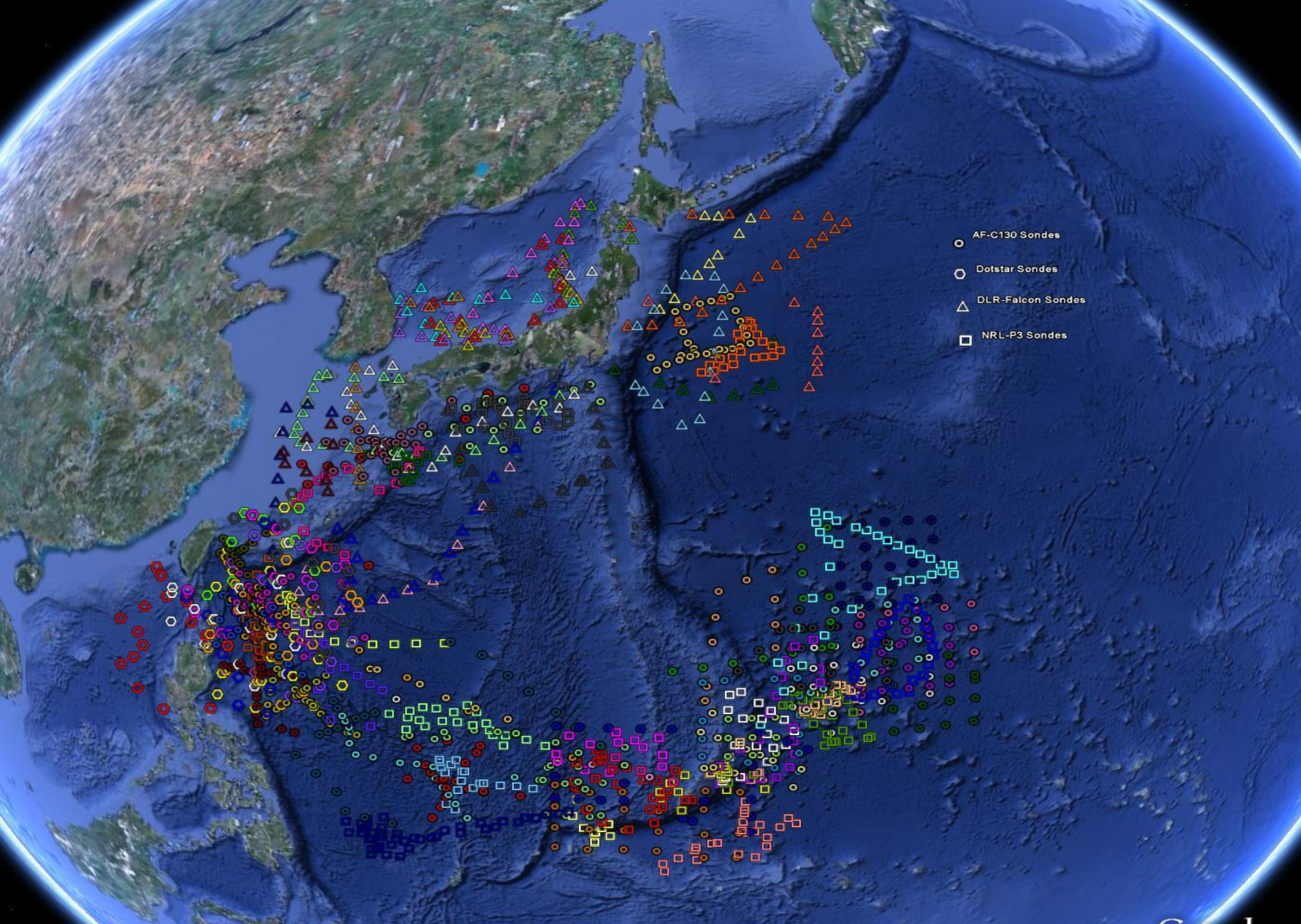
- NRL-P3 = 475 (Released)
 - Air Force C130 = 630 (In-progress)
 - DLR Falcon = 338
 - Taiwanese Astra = 162
- 

T-PARC (airborne) Sounding Systems

Driftsonde Temperature versus Altitude (4 drops) from 30km!



Courtesy of Terry Hock, Jim Moore, and Steve Cohn



- AF-C130 Sondes
- ◉ Dotstar Sondes
- △ DLR-Falcon Sondes
- ◻ NRL-P3 Sondes

Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image © 2009 TerraMetrics
Data © 2009 MIRC/JHA
Image © 2009 DigitalGlobe

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Courtesy of Blake Arensdorf

Dropsonde File Format

Header

Data Type

File Format

Project ID

Launch Site

Launch Time

UTC Launch

Sonde ID

Reference

System

Post Process

/

Time Unit

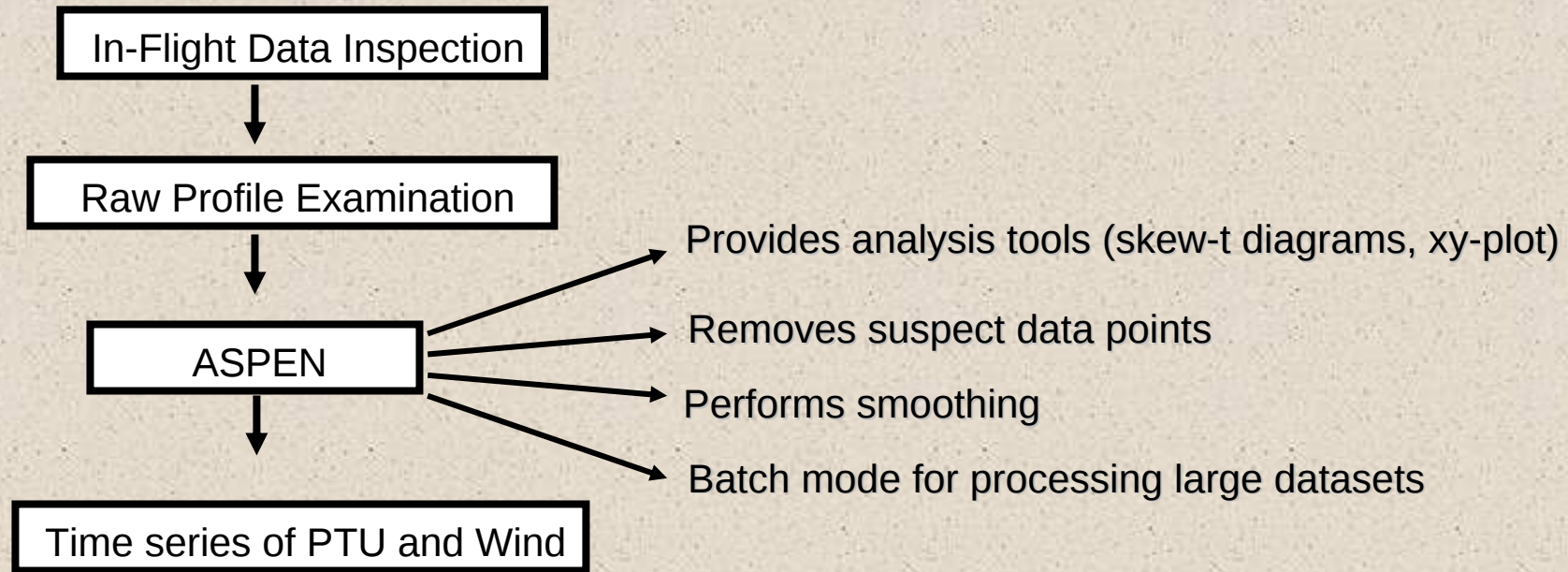
sec hh

Field No.	Parameter	Units	Measured/Calculated
1	Time	Seconds	-----
2	UTC Hour	Hours	-----
3	UTC Minute	Minutes	-----
4	UTC Second	Seconds	-----
5	Pressure	Millibars	Measured
6	Dry-bulb Temp	Degrees C	Measured
7	Dewpoint Temp	Degrees C	Calculated
8	Relative Humidity	Percent	Measured
9	U Wind Component	Meters/Second	Measured
10	V Wind Component	Meters/Second	Measured
11	Wind Speed	Meters/Second	Measured
12	Wind Direction	Degrees	Measured
13	Ascension Rate	Meters/Second	Calculated
14	Geopotential Altitude	Meters	Calculated
15	Longitude	Degrees	Measured
16	Latitude	Degrees	Measured
17	Altitude	Meters	Measured
18	Vertical Wind	Meters/Second	Calculated
19	Filtered Vertical Wind	Meters/Second	Calculated

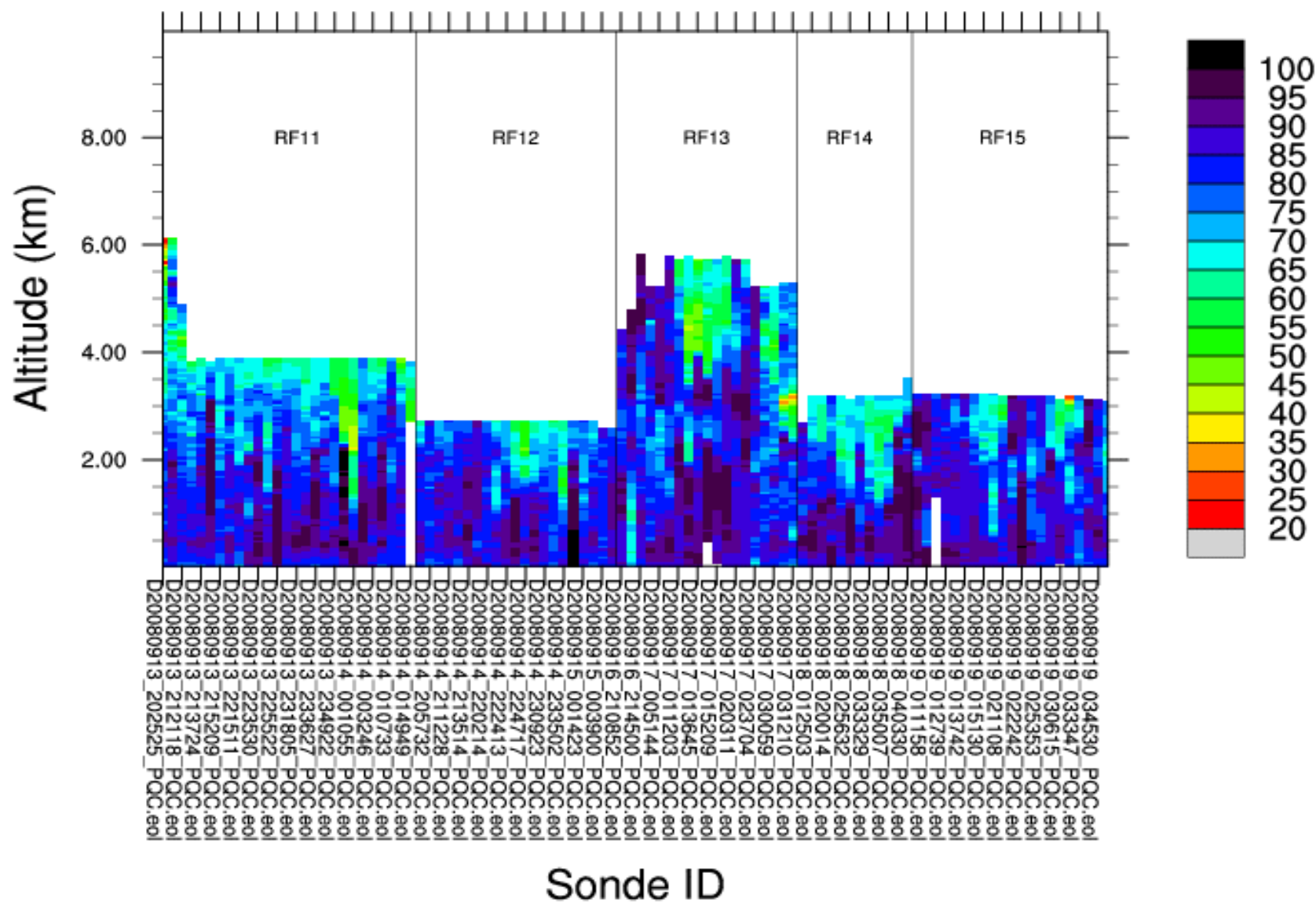
nd_f

/s

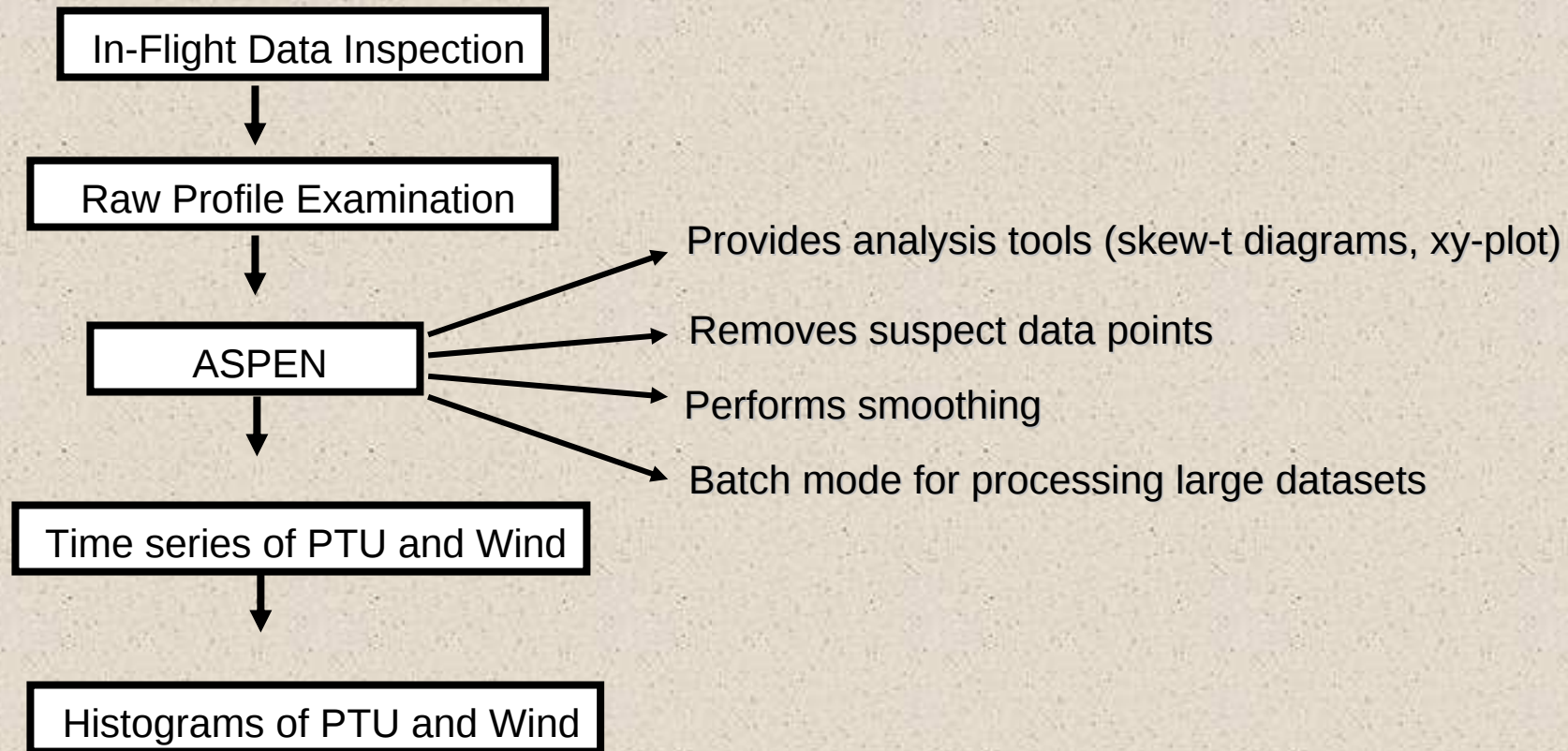
Quality Control of P3 Dropsonde data

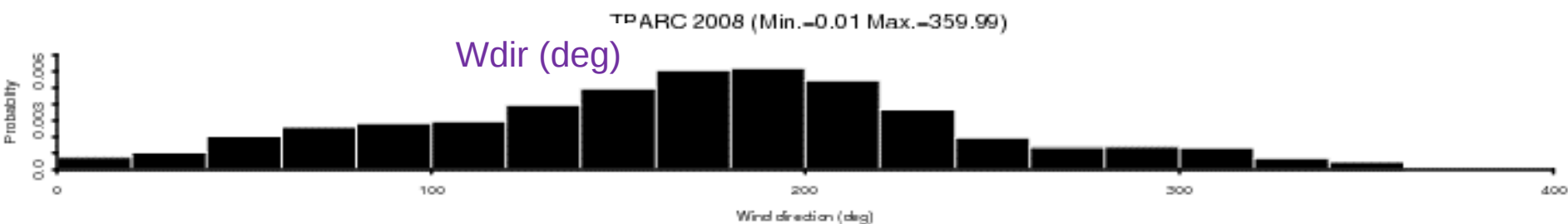
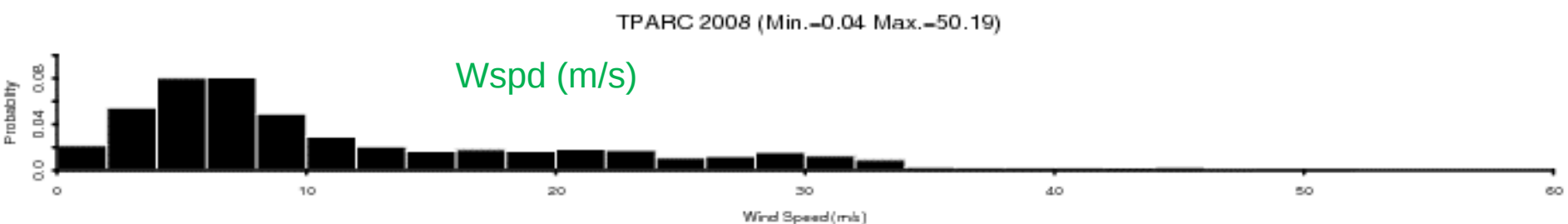
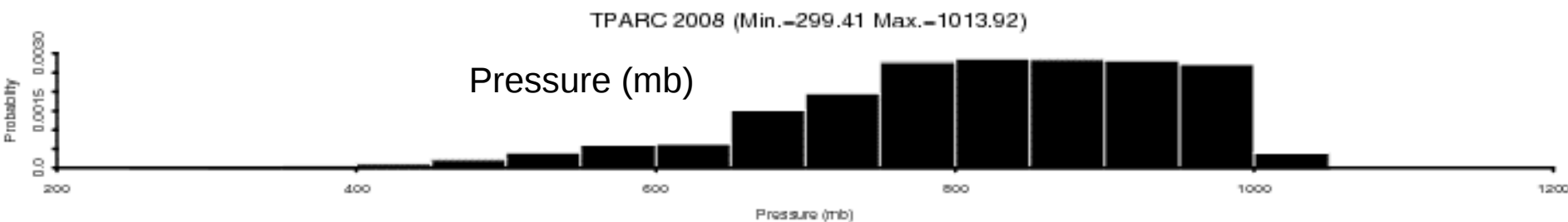
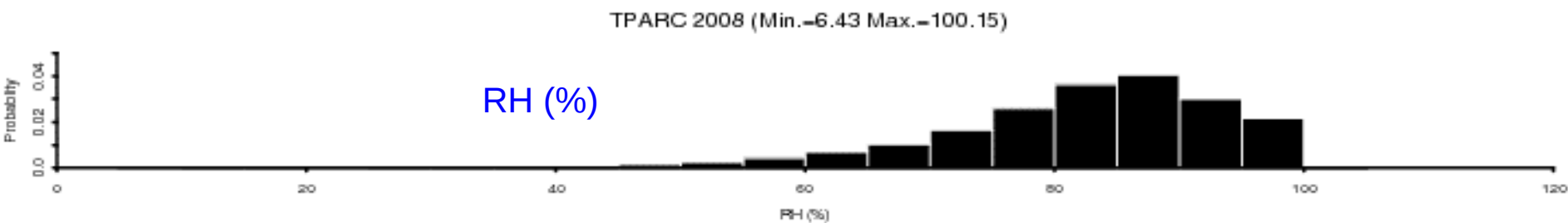
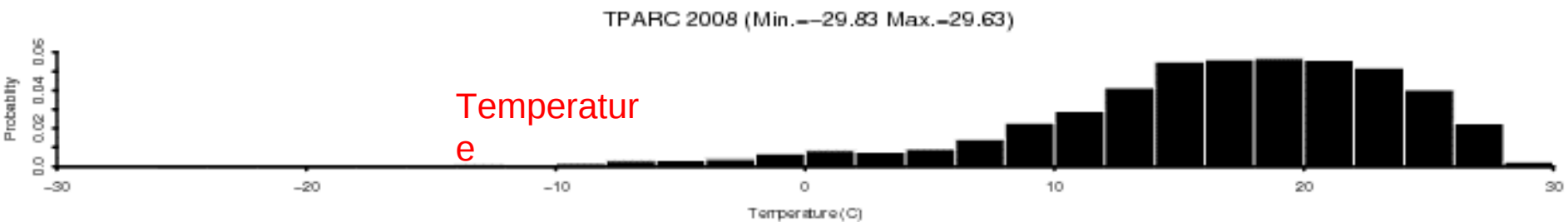


TPARC P3 Dropsonde (201-300) - RH

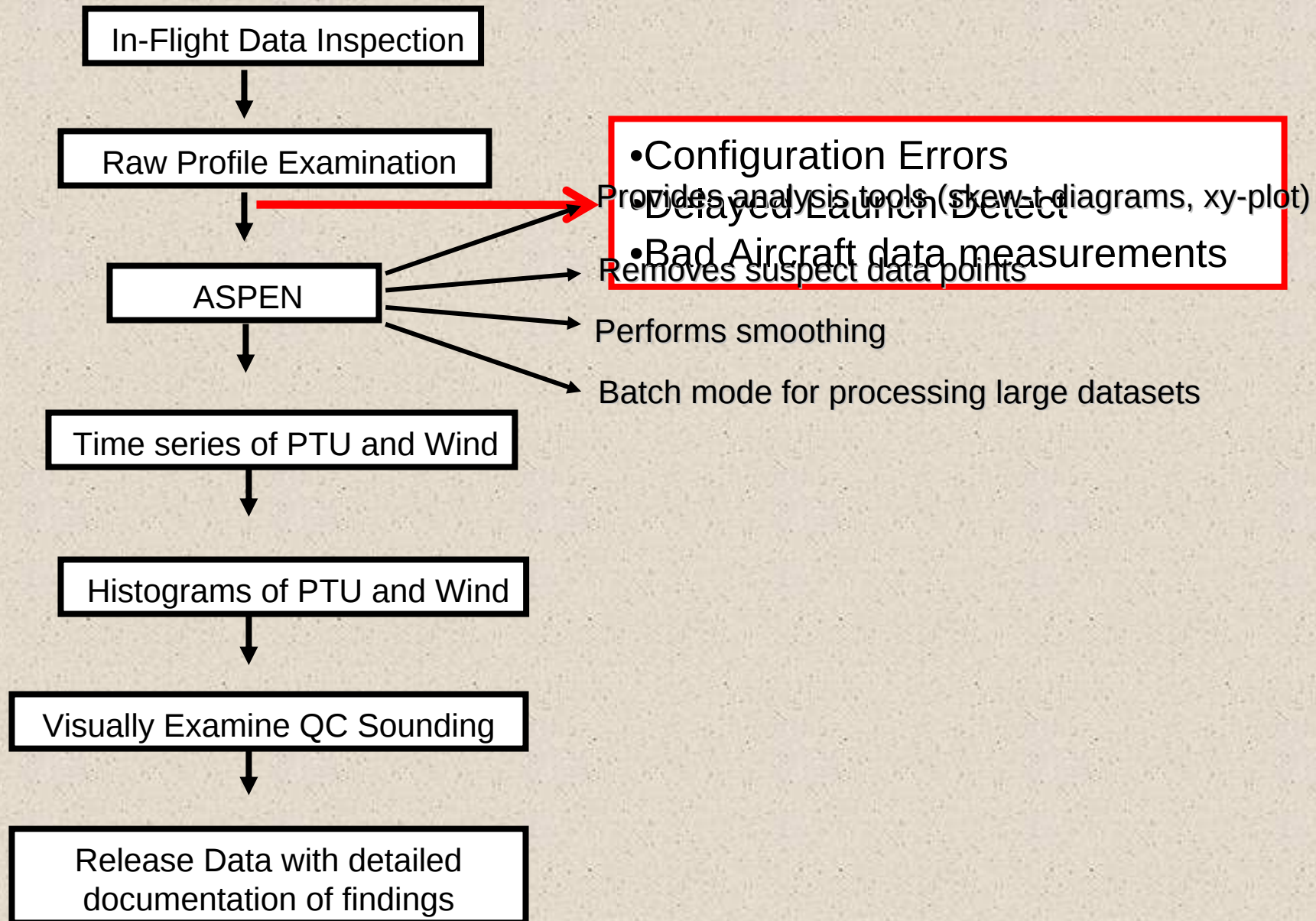


Quality Control of P3 Dropsonde data



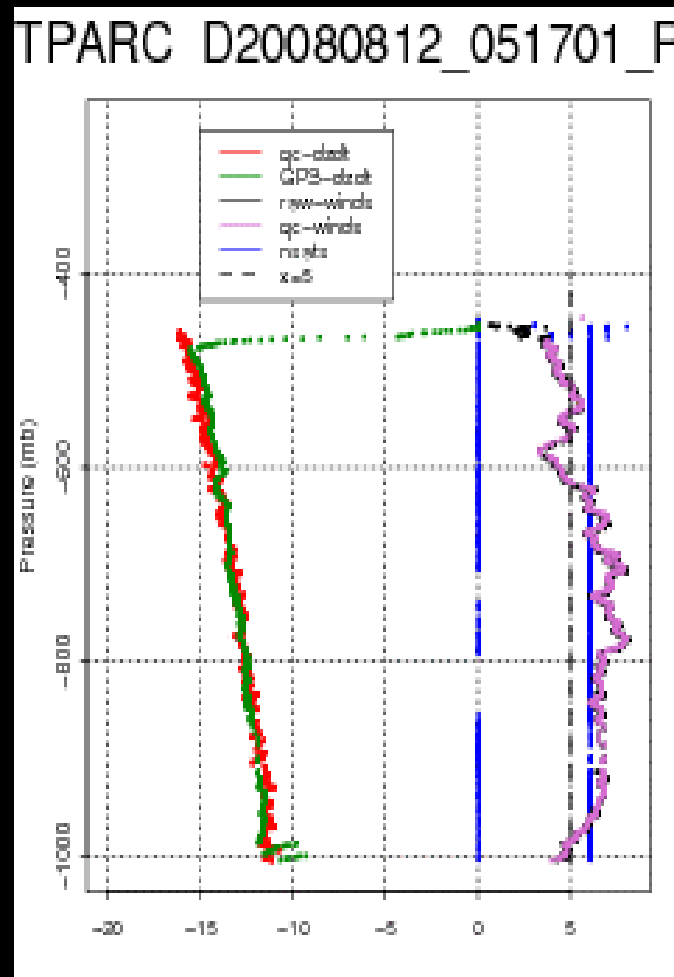


Quality Control of P3 Dropsonde data



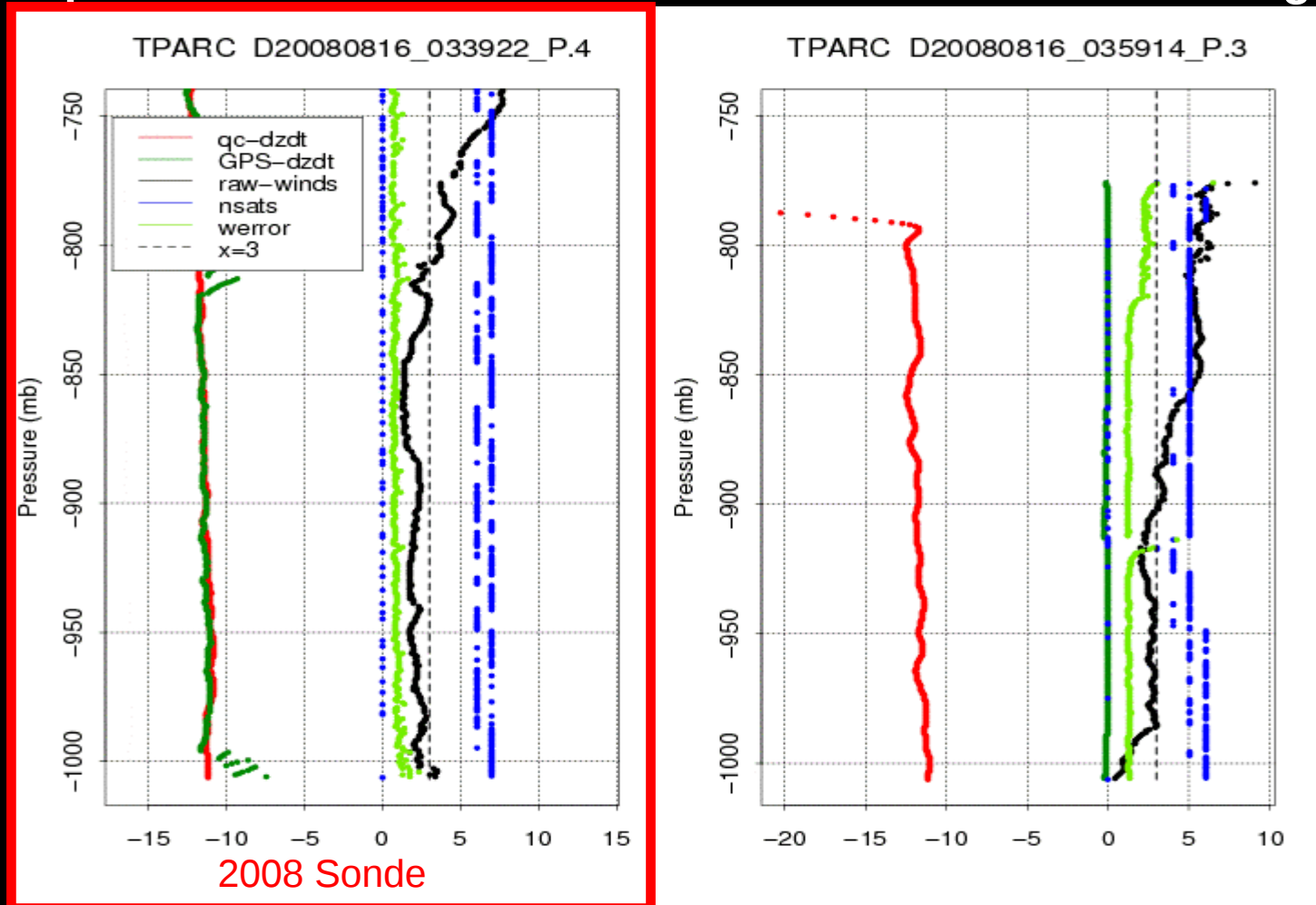
Configuration Error Files

- Identify sondes manufactured in 2008
- Create profiles of GPS measured dz/dt and ASPEN calculated dz/dt
- Separated them into “good agreement” and “not so good”



Configuration Error
Dropsondes with Good
Agreement between
Measured and Calculated
 DZ/DT

For those with good agreement....
Did comparisons between sondes launched from the same flight.



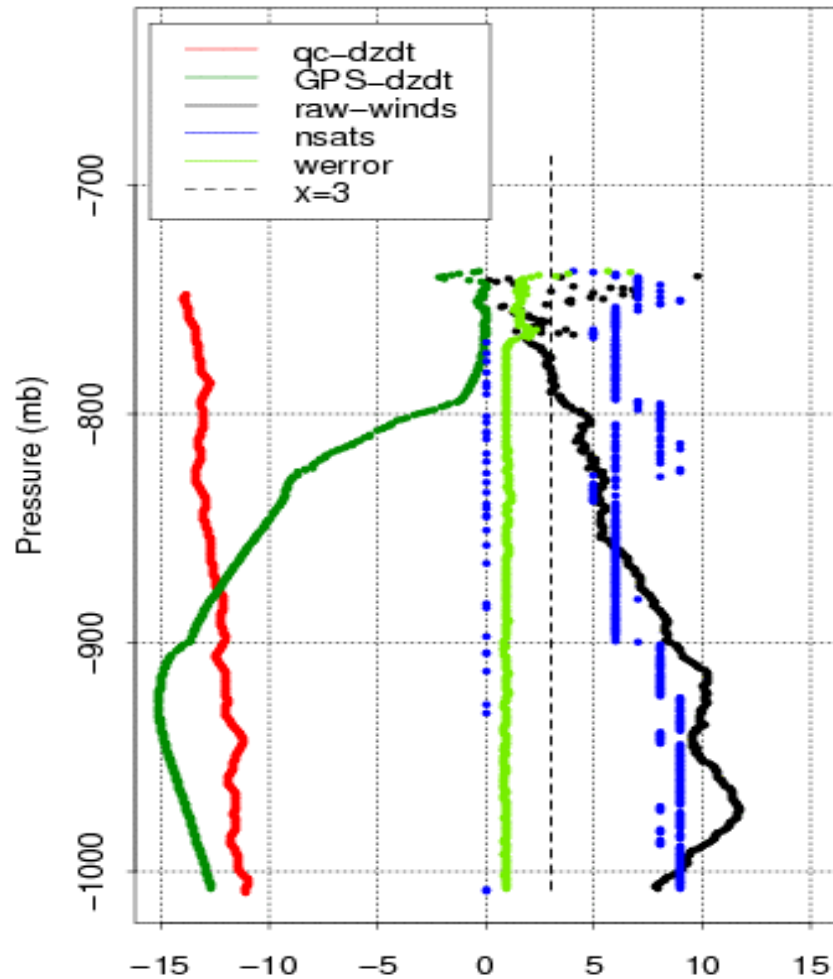
**Based on these comparisons, we
determined the winds to be ok.**

Configuration Error
Dropsondes with Poor
Agreement between
Measured and Calculated
 DZ/DT

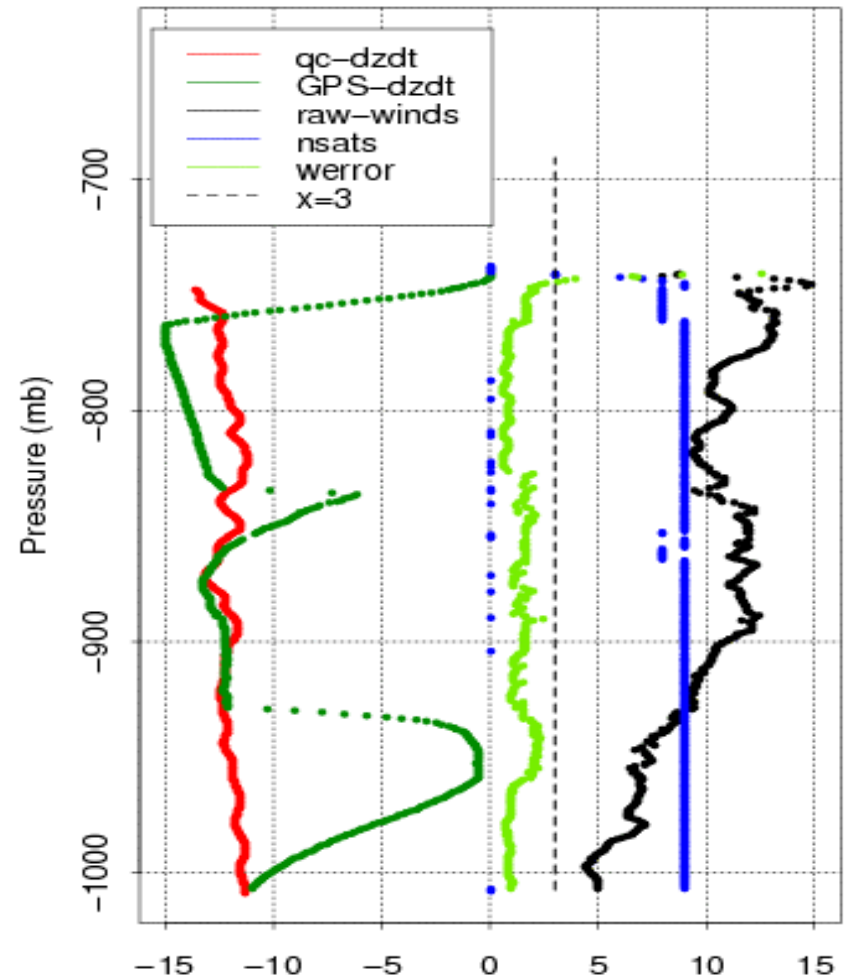
Category #1

Characterized by suspicious GPS dz/dt, but reasonable wind speed when wind errors are low and sats ≥ 5 .

TPARC D20080901_205846_P.2

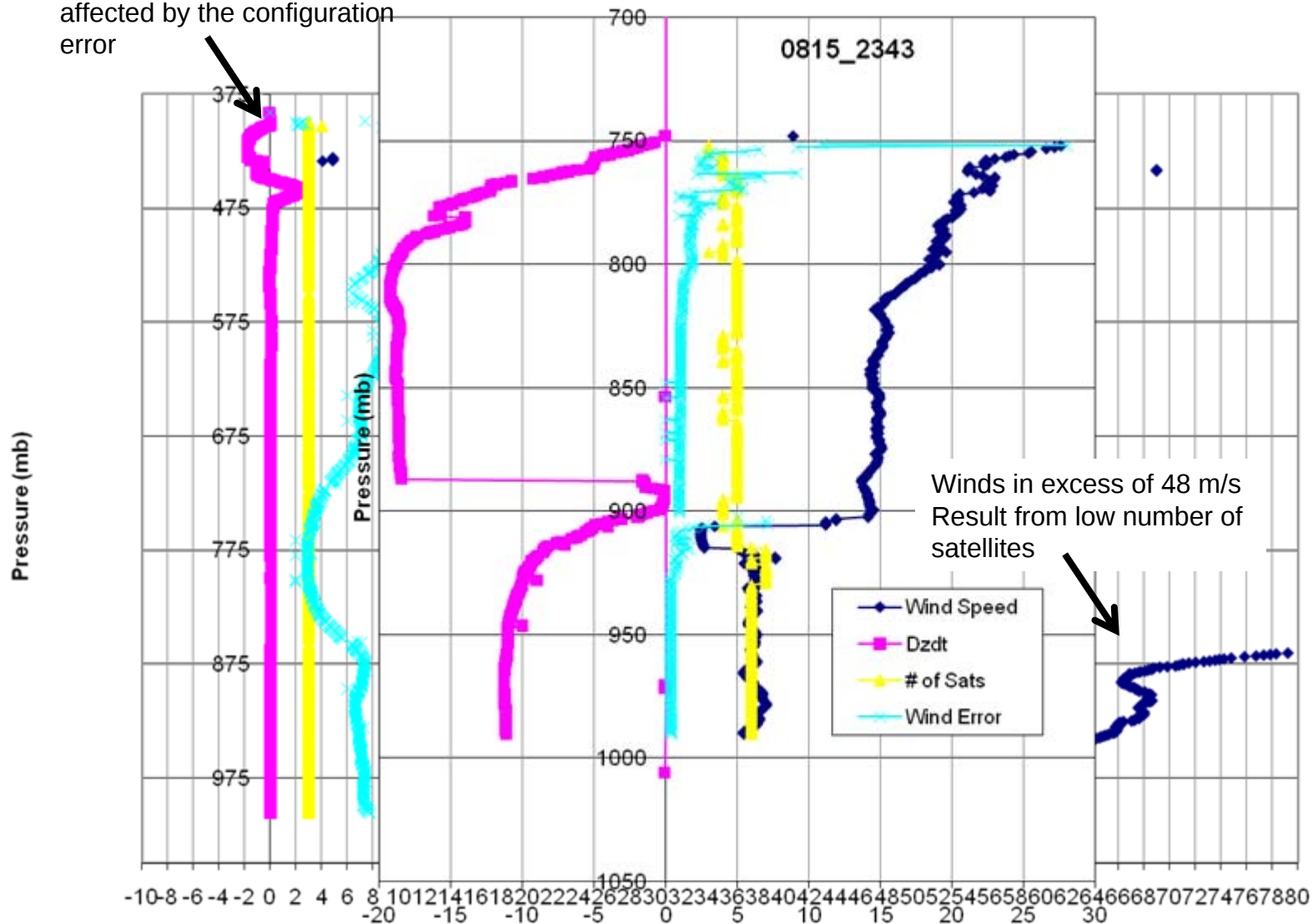


TPARC D20080901_213511_P.2



Errors with dz/dt , suspicious winds

GPS DZ/DT is affected by the configuration error



Solution to Address Soundings with a Configuration Error

Additional evaluation included:

- Examination of GPS Altitude
- Comparison between calculated position and position integrated from winds
- Both of which showed questionable results as well.

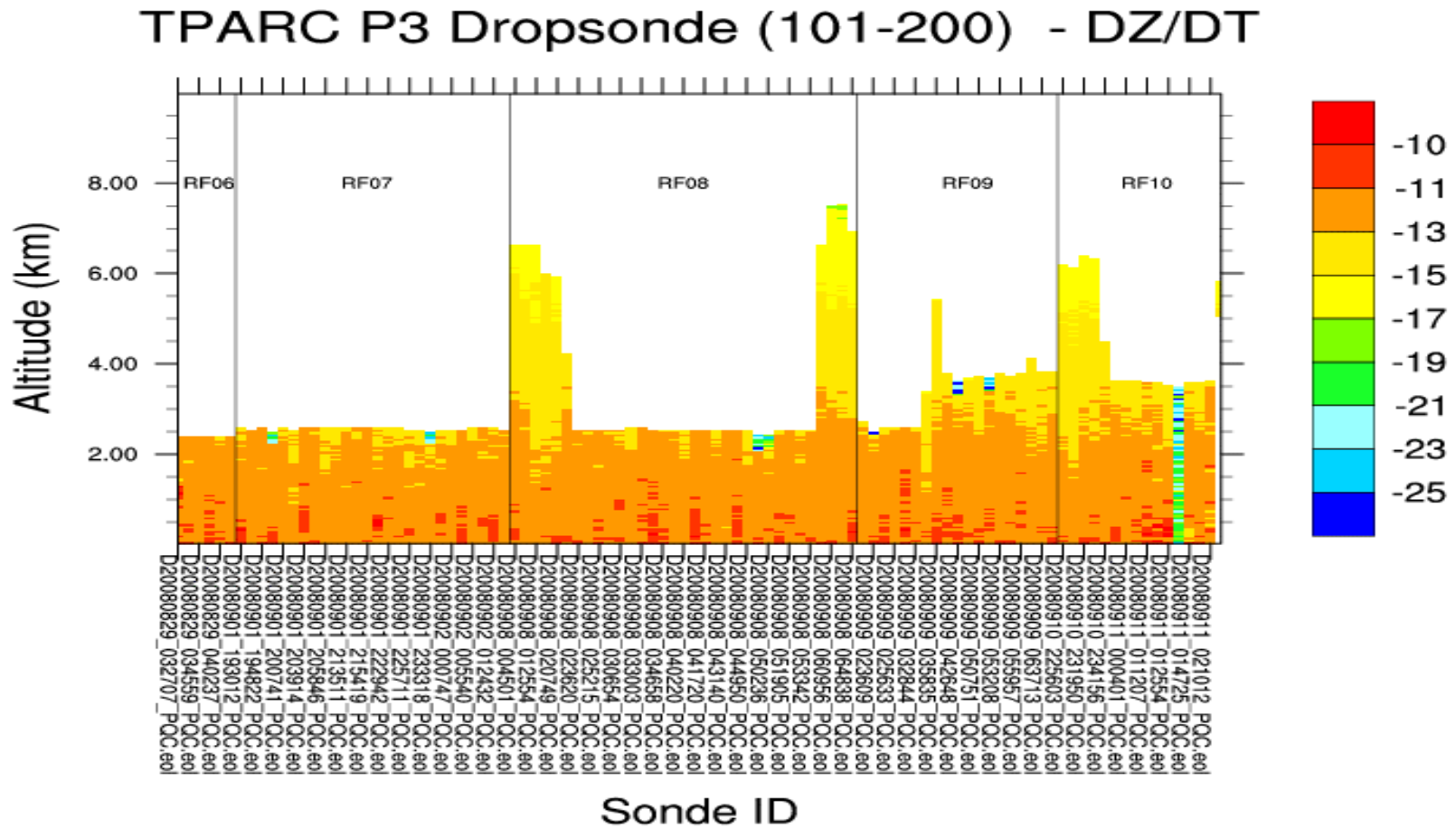
Final decision was made to remove all GPS data (wind spd, direction, lat, lon and GPS alt) from data files where calculated and measured dz/dt did not agree well.

“Configuration Error” Dropsonde Statistics

- 484 dropsondes used
- 100 had configuration set to ground based mode (20.6%) (before 9/11/08)
- Of those 100 evaluated:
 - 47 appear to be ok (agreement between GPS vs calc dz/dt)
 - 22 had no GPS data
 - 31 were evaluated for large differences between GPS measured and ASPEN calculated dz/dt , and GPS were ultimately set to missing (6.4% of total)

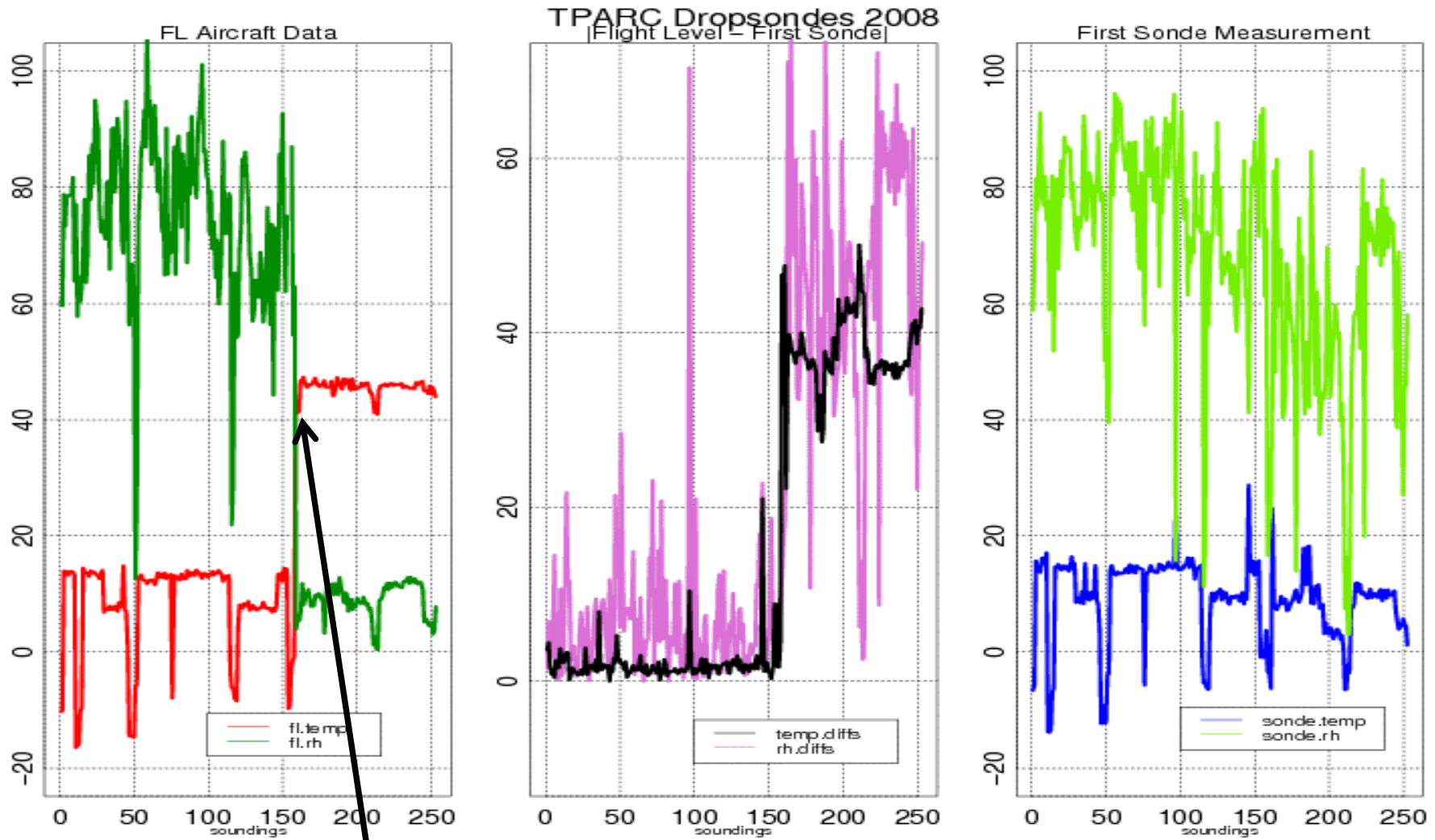
Delayed Launch Detect

Delayed Launch Detect



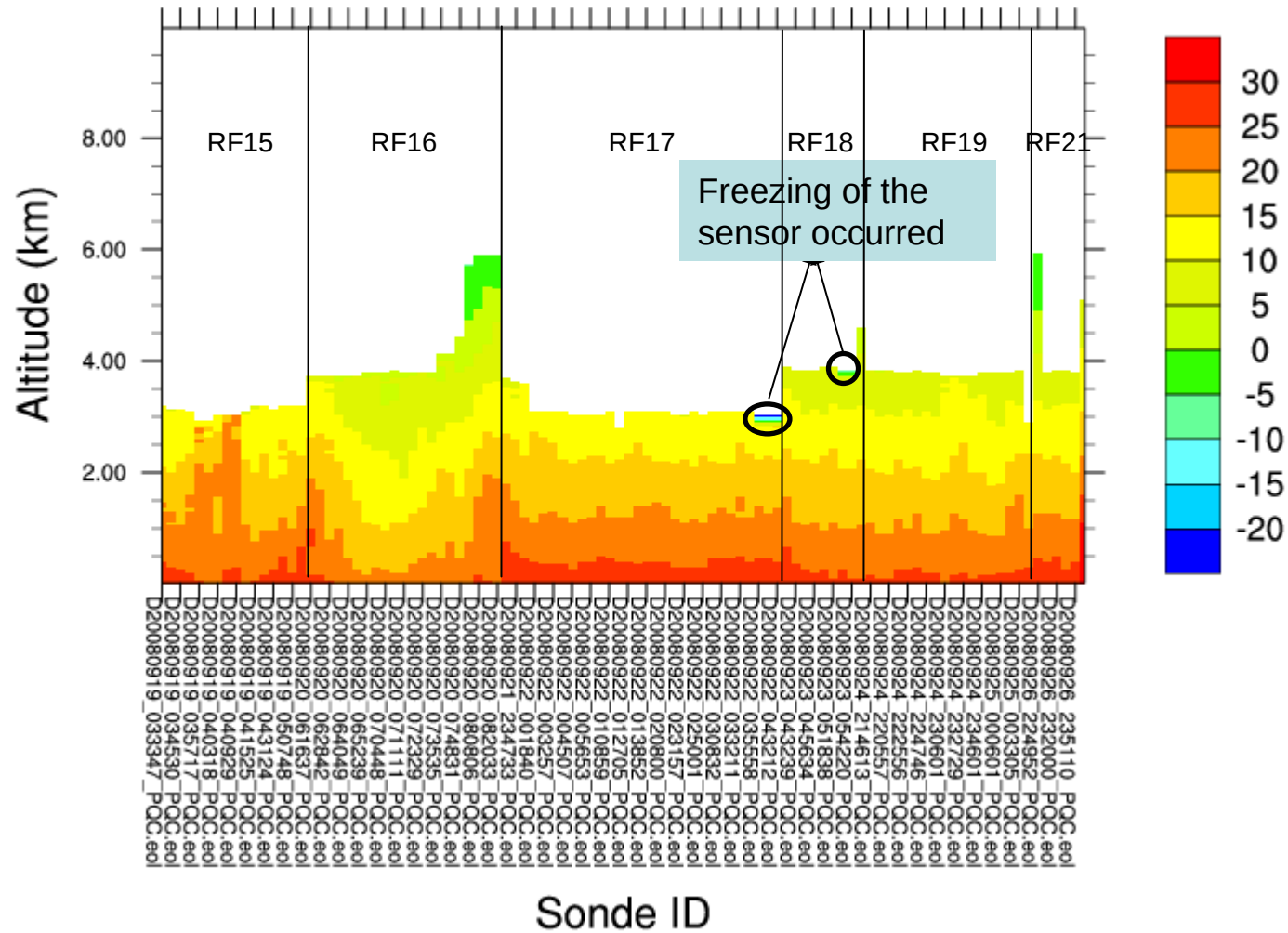
Aircraft Data Errors

Failure of Aircraft T/RH sensors

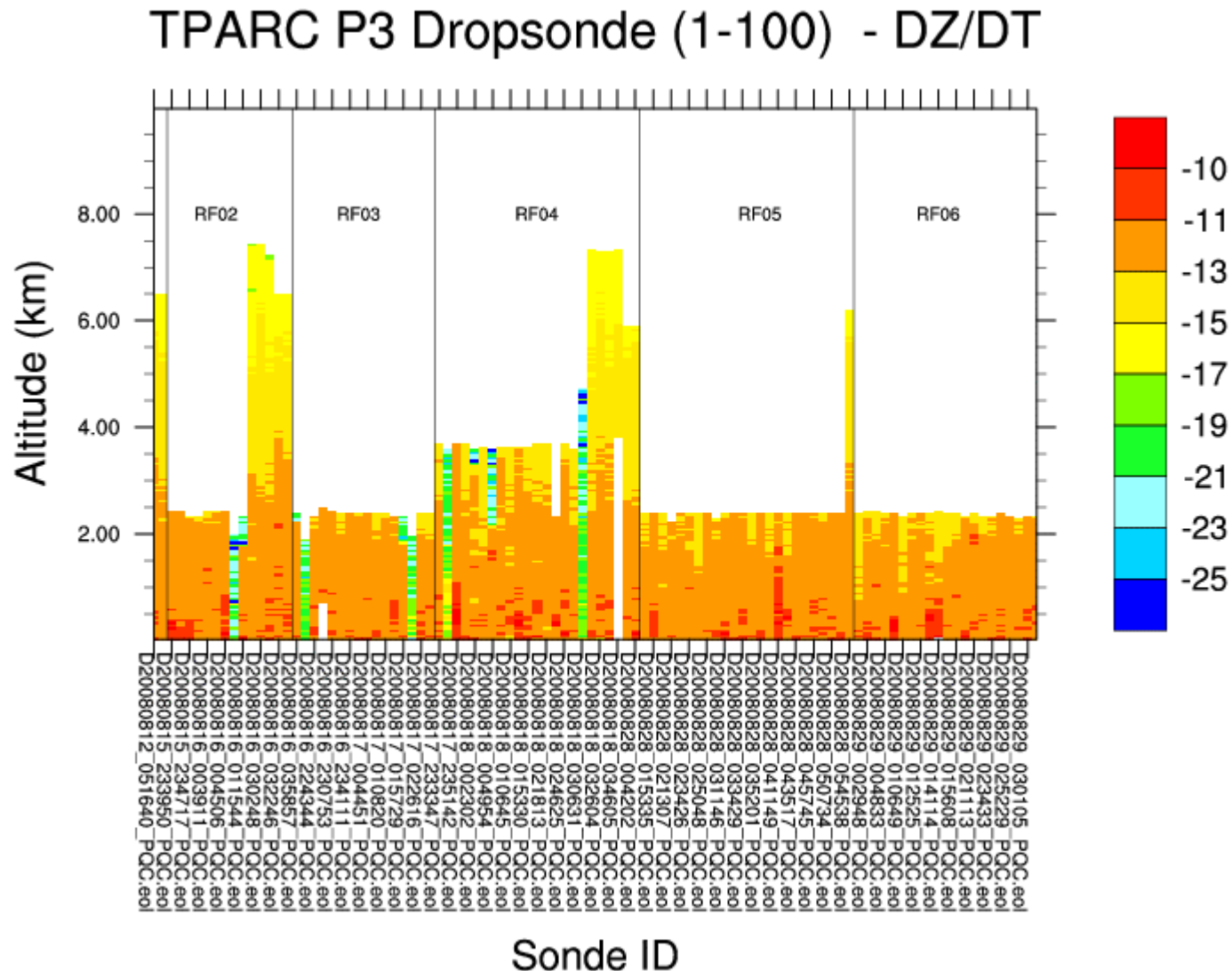


T sensor broke during
ferry flight on 09/17

TPARC P3 Dropsonde (301-400) - Temperature



Increased frequency of Fast Fall Drops



NRL P-3 DROPSONDE STATISTICS

- ◉ 20 delay of the launch detect (corrected)
- ◉ 6 failure of launch detect (corrected)
- ◉ 7 fast falls (removed winds)
- ◉ 6 didn't transmit to surface (corrected)
- ◉ 11 soundings interrupted by other sondes on same frequency. (corrected)
- ◉ 110 contained bad aircraft data (corrected)

Highlights & Conclusions

TPARC P3 Dropsonde (1-475) - Temperature

