

Realtime Dropsonde Processing with ASPEN

- ASPEN dropsonde processing on the aircraft is done on the Linux Centos operating system. If you are working remotely, the version of ASPEN for your operating system will have some minor differences in the configuration tabs and processing windows.
- Current ASPEN version is V3.4.1
- Start a new dropsonde log sheet for each flight and make sure you have the correct flight number and mission ID.
- Get the mission id from the flight director. It will be inserted into the tempdrop in the WMM app but you should confirm that it is correct before transmitting the first drop.

Setting up the work station

- Create directories on the desktop for ASPEN to grab the raw “D” files and to save output. Include the flight ID in the folder names, for example 20150601H1_ASPEN_DATA and 20150601H1_RAW_DATA. If you are unfamiliar with Linux open a terminal and type “mkdir <directory name> “
- The workstation allows you to easily navigate between 4 different desktops. Take advantage of this feature to organize the different applications you will be running. A sample configuration is given below.

Window 1 : XCHAT, Remote AVAPS, screen 800

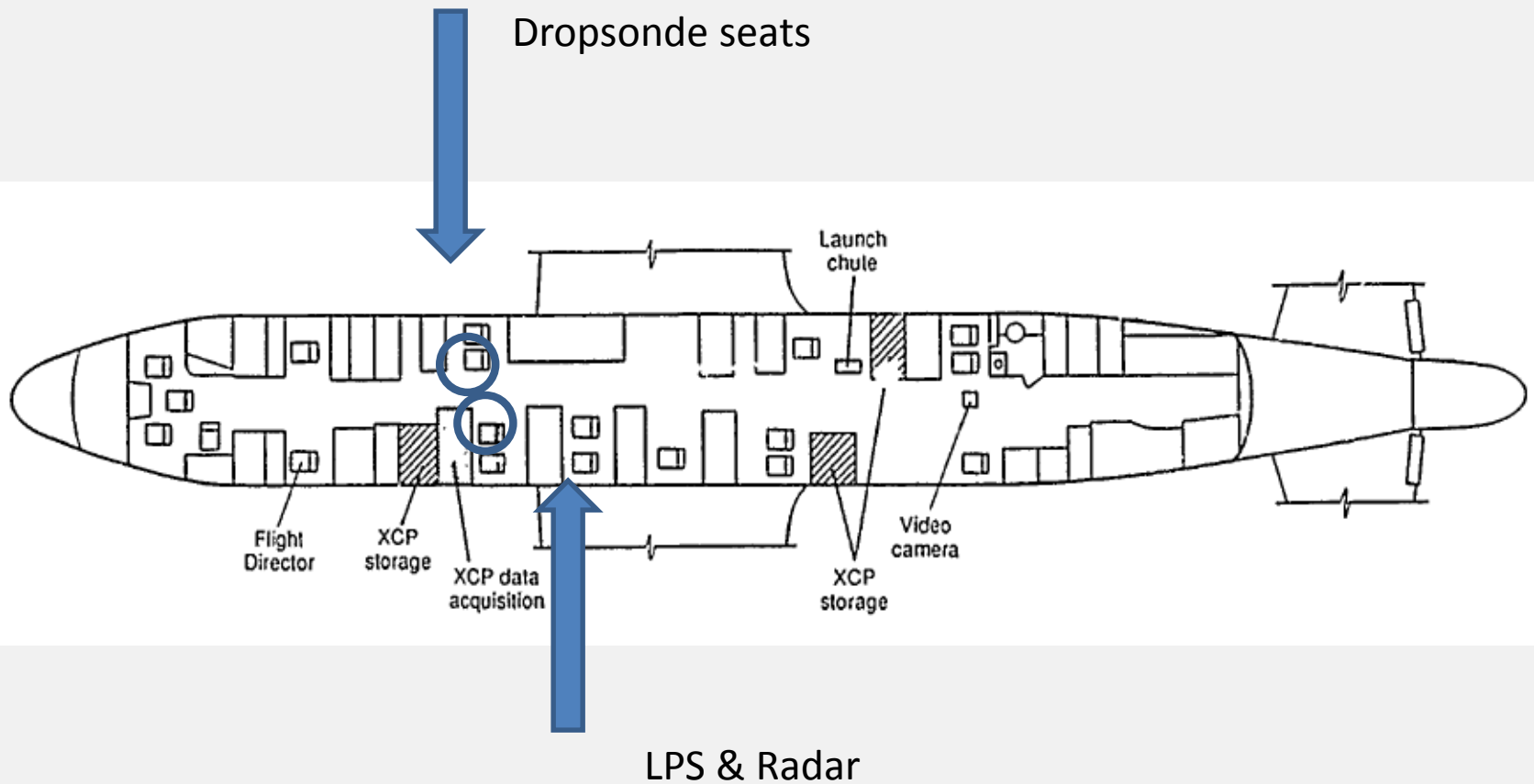
Window 2: AVAPS_PRIMARY, flightid_RAW_DATA directory

Window 3: ASPEN, WMM APP, flightid_ASPEN_DATA directory

Window 4: internet

- You should be constantly watching the first window for new dfiles to process and be available via XCHAT. Use the headset to monitor and make note of dropsonde launch times and status and communicate with the crew.
- ***** if workstation freezes up restart and reconfigure to only use 2 or 3 desktops

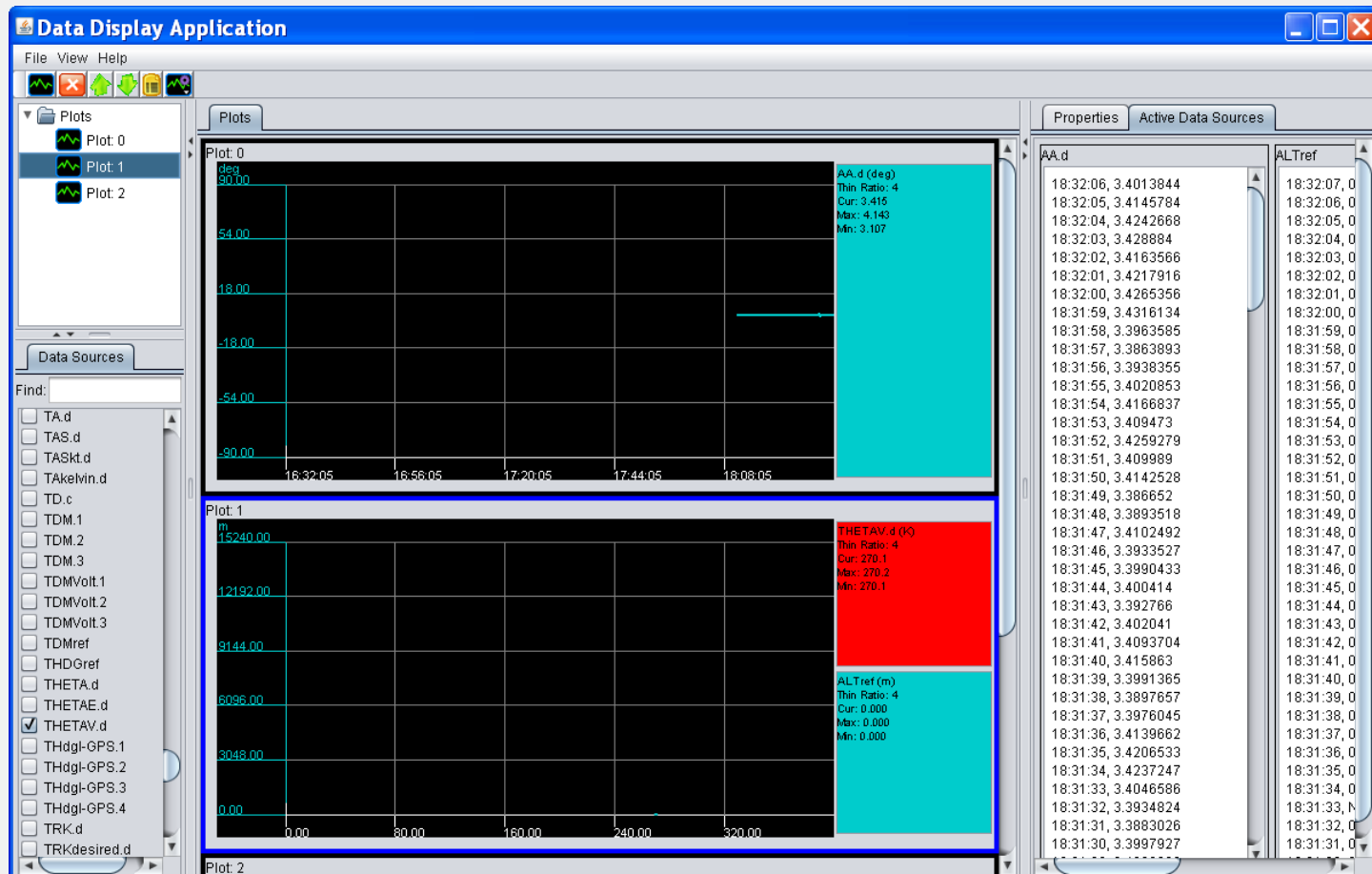
HRD Stations



Data Display Application (Screen 800)

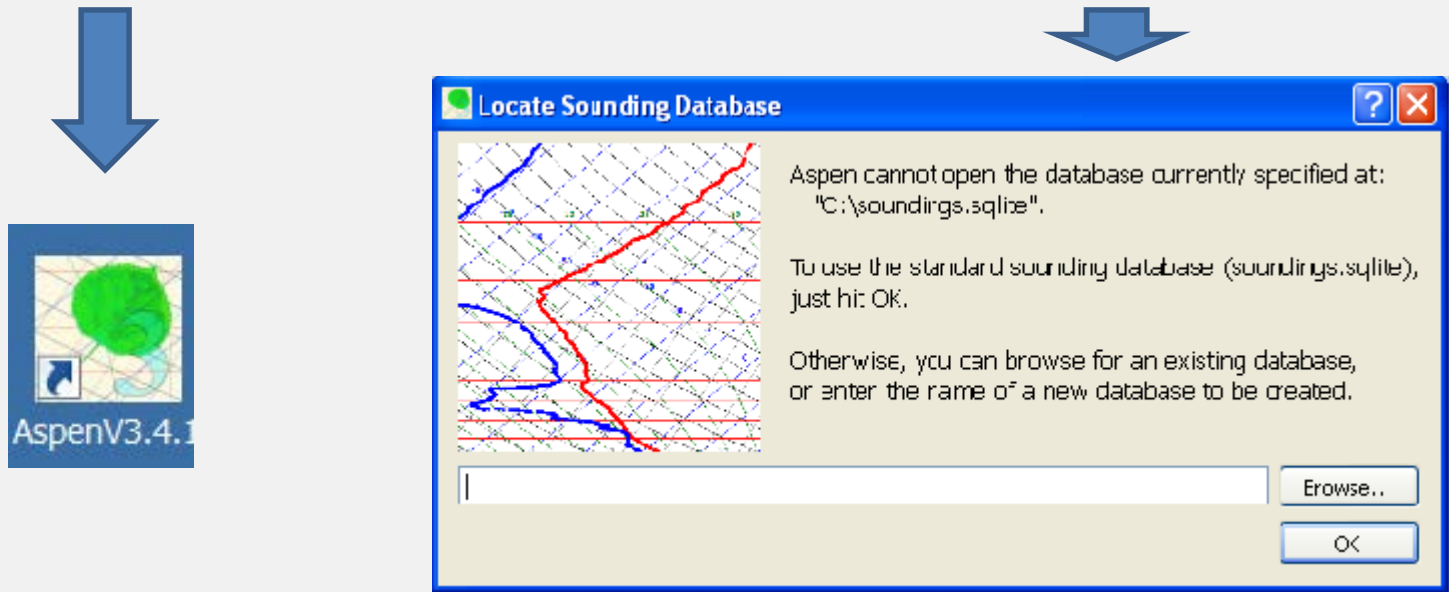
Allows you to look at data from all the instruments on the workstation.

There is a document in the flight bag with details about the available fields and variable names. Video terminals are mounted in front of some workstations, use channels are 13,14 and 15 to view radar; flight level channels are 4 and 5



SETTING UP AND CONFIGURING ASPEN

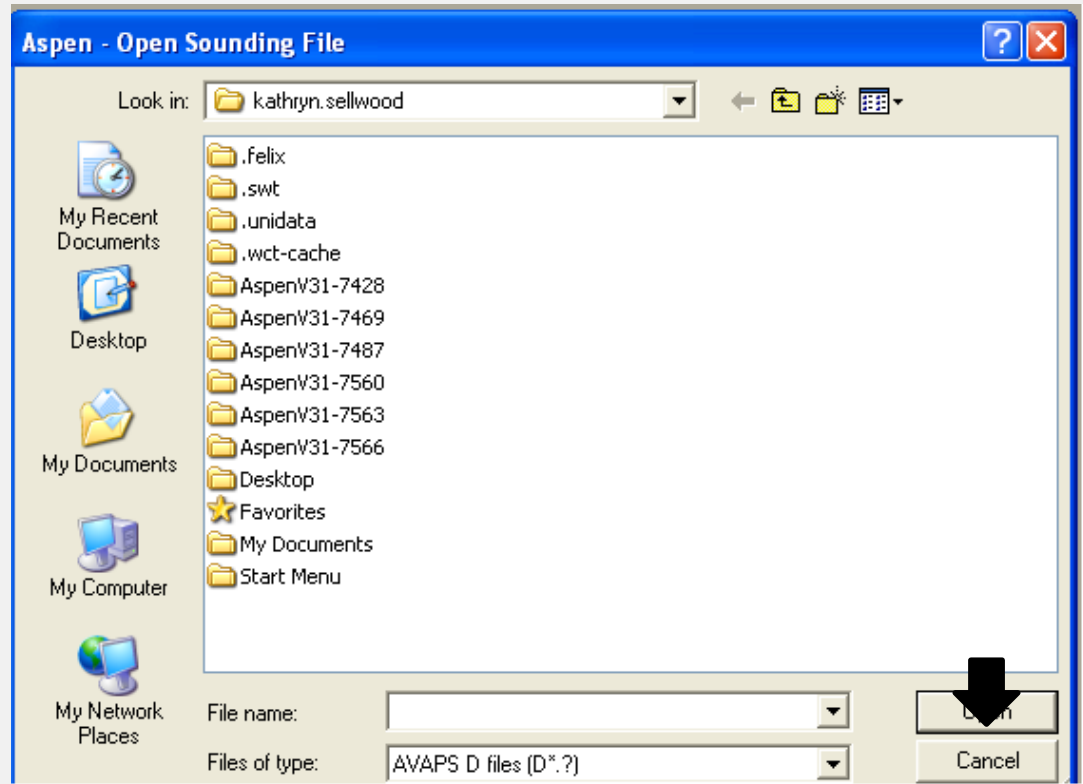
- If you are on the aircraft, check for the sounding file from the previous flight before opening ASPEN. If it has a generic name (ie. Soundings.sqlite) it should be deleted
- Correct version of ASPEN for 2019 is 3.4.1
- Click on ASPEN logo (not batch ASPEN) to open ASPEN – You will see this window



- Click “OK” to create a new database file, *unless* you are restarting ASPEN mid-flight. In that case browse to the location of Soundings.sqlite on your computer. This is the data base that ASPEN will use to create the synoptic plots.
- After the correct file name/location appears in the window Click “OK”

Next you will see this window

- Click “cancel”
- After configuring, following the next few slides, the correct flight directory should appear in this window when you go to open a D file.



Now make sure ASPEN is configured correctly

Click on File / configuration

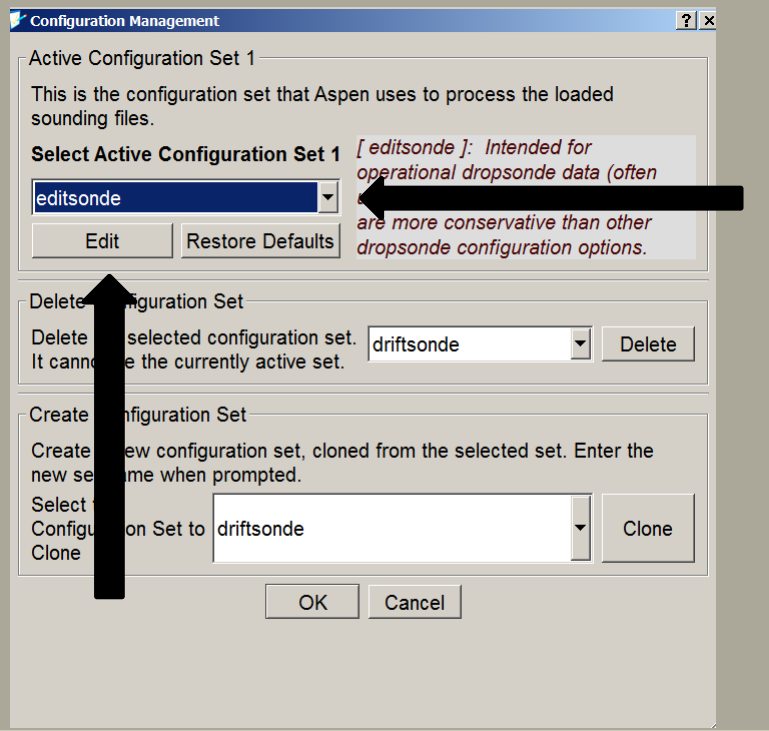
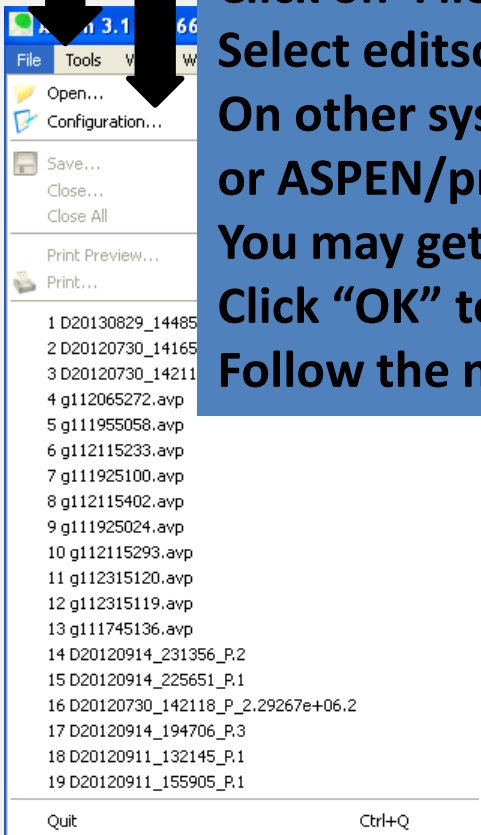
Select editsonde then click on "Edit" button

On other systems the tabs may be edit /options or tools /configuration or ASPEN/preferences

You may get a pop-up window with "Invalid Fixed Data Source"

Click "OK" to close this window

Follow the next 6 slides to complete configuration.



"Editsonde"

Go Through all the Tabs From Left to Right

First Tab: “QC Parameters”

- You should not have to change anything here but always check anyway
- The values shown are correct. They will probably differ from what is in the ASPEN users guide.
- In rare cases you may want to change some of these values (mainly in research mode)
- Make sure that the box for “Pressure Monotonic Check” is not checked and Click on it to uncheck if necessary.
- New value for Buddy Check Slope as of 2019 is 10m/s^2

Advanced Configuration Management

QC Parameters | Processing | WMO | Auto Save | Synoptic Map | Visual

Configuration set name: editsonde

Pressure	Temperature	RH	GPS Lat/Lon	GPS Alt	Winds	
<input type="checkbox"/> 0 (s)	<input checked="" type="checkbox"/> 0 (s)	<input type="checkbox"/> 0 (s)			<input type="checkbox"/> 10 (s)	Dropsonde Wind Equilibration Time
	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	Dropsonde Equilibration Time Override
	<input type="checkbox"/> 20 (s)				<input type="checkbox"/> 10 (s)	Dynamic Correction
<input type="checkbox"/> 4.5 std. dev.	<input type="checkbox"/> 5 std. dev.	<input type="checkbox"/> 10 std. dev.			<input type="checkbox"/> 5 std. dev.	Dynamic Correction Wavelength
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input checked="" type="checkbox"/>	Thresholding
<input type="checkbox"/> 0 (mb)	<input type="checkbox"/> 0 (degC)	<input type="checkbox"/> 0 (%)			<input type="checkbox"/> 10 (m/s ²)	Outlier Check
<input type="checkbox"/> 1.5 (mb/s)	<input type="checkbox"/> 0.5 (degC/s)	<input type="checkbox"/> 3 (%/s)	<input type="checkbox"/> 0.005 (deg/s)	<input type="checkbox"/> 50 (m/s)	<input checked="" type="checkbox"/>	Disable Outlier Check
<input type="checkbox"/> 30 (s)	<input type="checkbox"/> 20 (s)	<input type="checkbox"/> 20 (s)	<input type="checkbox"/> 30 (s)	<input type="checkbox"/> 10 (s)	<input type="checkbox"/> 30 (s)	Offset to Add
<input type="checkbox"/> 1.5 (mb)	<input type="checkbox"/> 0.8 (degC)	<input type="checkbox"/> 20 (%)	<input type="checkbox"/> 0.01 (deg)	<input type="checkbox"/> 50 (m)	<input type="checkbox"/> 3 (m/s)	Buddy Check Slope
<input type="checkbox"/> 10 (s)	<input type="checkbox"/> 10 (s)	<input type="checkbox"/> 10 (s)			<input checked="" type="checkbox"/>	QC Filter Wavelength
					<input type="checkbox"/>	QC Filter Deviation Limit
					<input type="checkbox"/>	Disable QC Filter
					<input type="checkbox"/>	Final Smoothing Wavelength
					<input type="checkbox"/>	Disable Satellite Check
					<input type="checkbox"/> 4	Number of Satellites Limit
					<input type="checkbox"/>	Disable Wind Error Check
					<input type="checkbox"/> 0.6 (m/s)	Wind Error Limit (above 10km)
					<input type="checkbox"/> 0.6 (m/s)	Wind Error Limit (below 10km)
					<input type="checkbox"/>	Pressure Monotonic Check
					<input type="checkbox"/> 5 (s)	Vertical Velocity Pres Smoothing WL
					<input type="checkbox"/> 2.5 (m/s)	Vertical Velocity Difference Limit
					<input checked="" type="checkbox"/>	Enable RS92 Rad Dry Bias Correction

OK Cancel

Next Tab: "Processing"

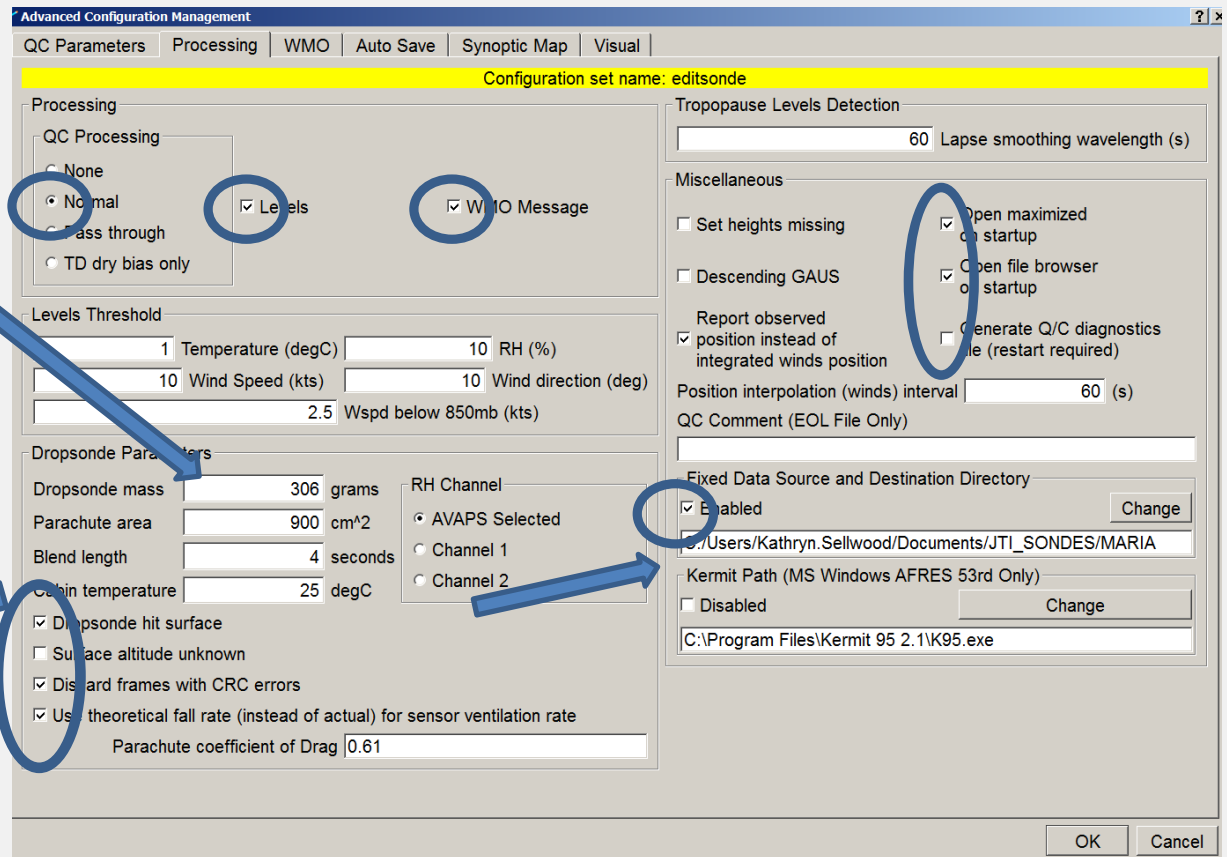
(where you set your input directory)

--- QC Processing set to Normal
Levels checked

WMO message checked
--- Sonde mass = 320 RD94
= 306 RD41

---Check
Dropsonde hit surface
Discard Frames with CRC
errors
Use Theoretical fall speed

---Set input Directory
Under "Fixed data Source"
check "Enabled" then
"Change"
Browse to the "RAW_DATA"
directory you created for
this flight.



Next Tab: “WMO”

- You should not have to do anything in this tab, just confirm that “TEMP” is checked.

Advanced Configuration Management

QC Parameters | Processing | WMO | Auto Save | Synoptic Map | Visual |

Configuration set name: editsonde

WMO identification

These parameters apply only to upsonde messages:

Message Type

TEMP SHIP MOBIL

99999 Block station number (TEMP)

CALL Call sign (SHIP/MOBIL)

UZNT13 Upsonde abbreviated header

KWBC Upsonde ICAO code

Generic TEMP Msg Options

nobody Email address for TEMP

Append NNNN terminator Disable abbreviated header

WMO BUFR

60 BUFR originating center numeric

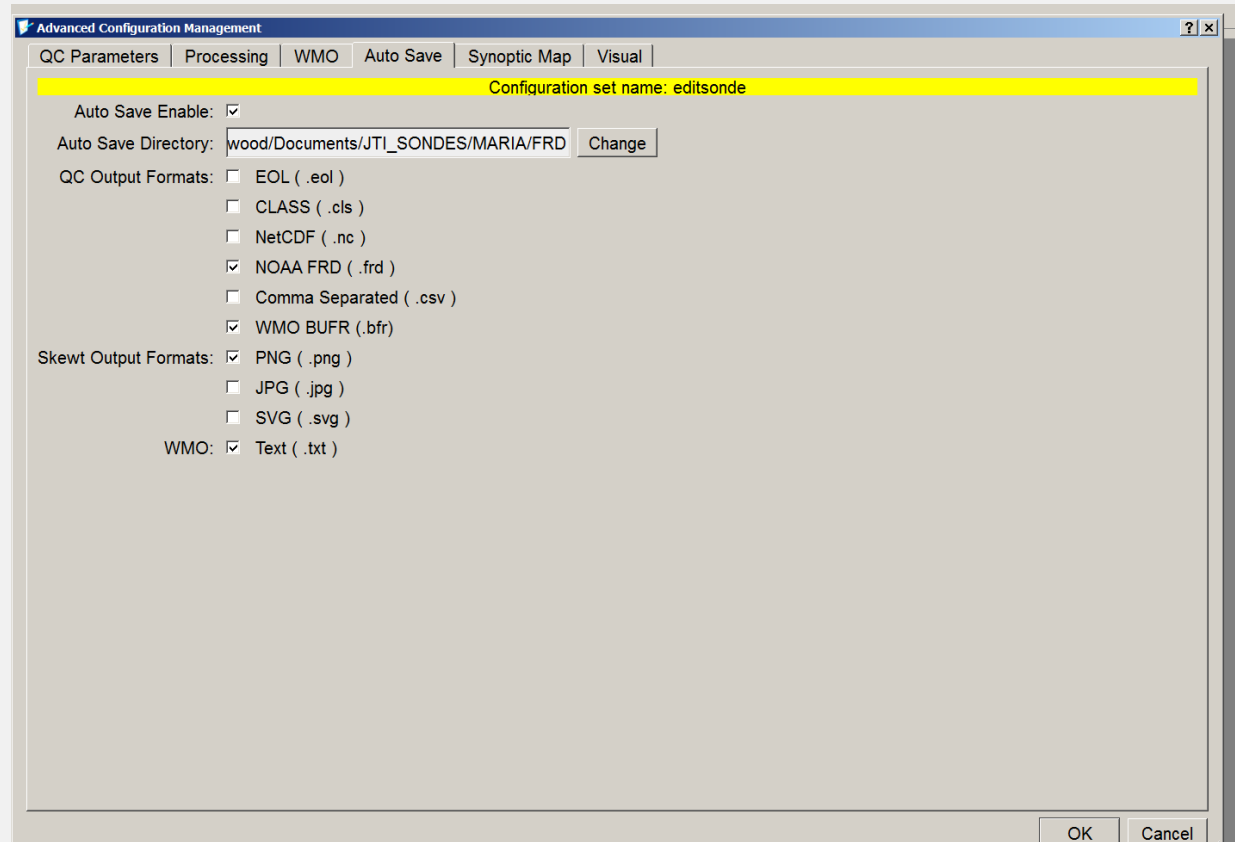
Prepend BUFR abbreviated header

IUDAO1 BUFR abbreviated header

KWBC BUFR originating center ICAO

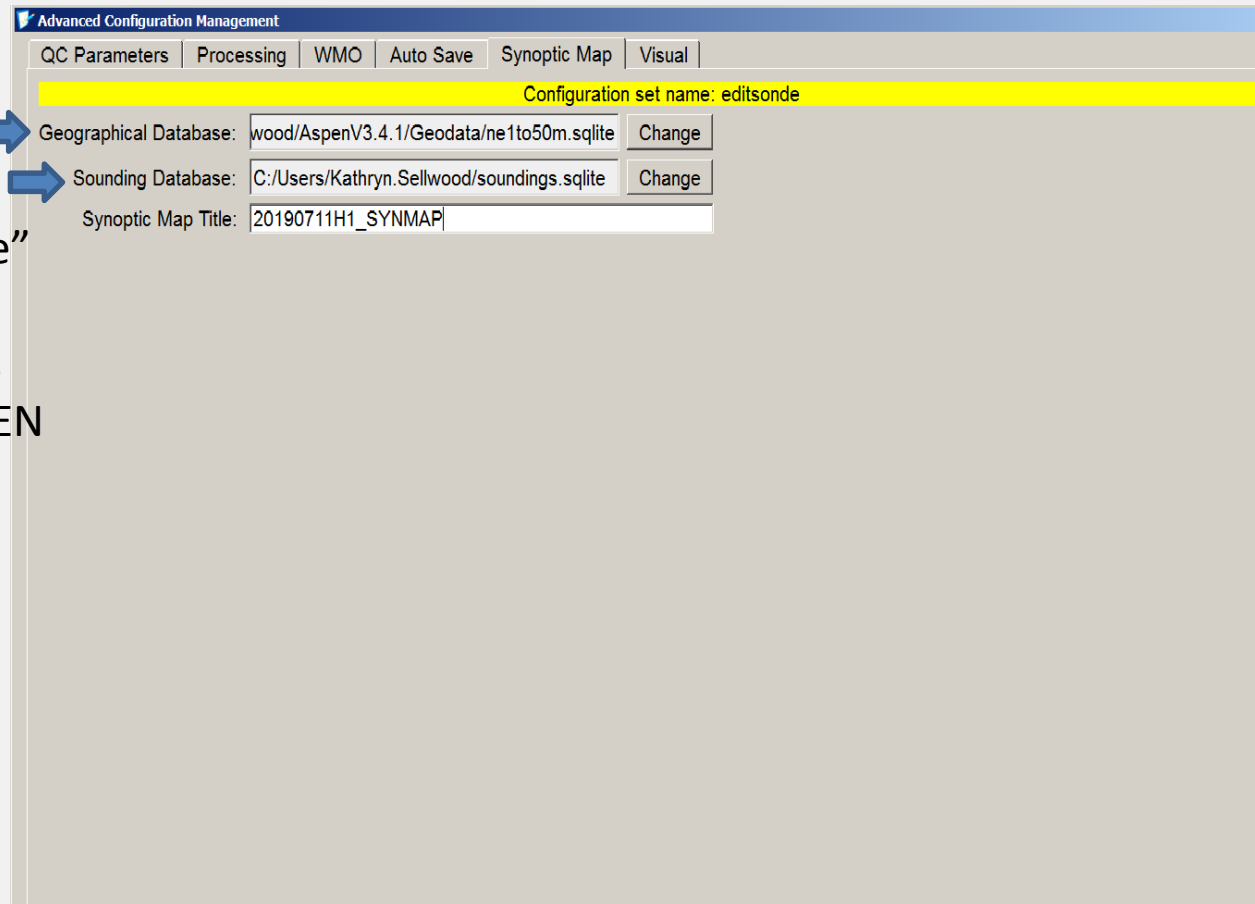
Next Tab: “Auto Save” (where you set your output directory)

- Click “Auto Save Enable”
- Click “Change” and browse to the ASPEN_DATA directory that you created for the flight
- Check
 - WMO bufr (.bfr)
 - WMO Text (.txt)
 - NOAA FRD (.frd)
 - PNG (.png)



Next Tab: “Synoptic Map” (set name for synoptic plots)

- The geographical database default location may not be set correctly. If not, click “change” and browse to the correct location in “ASPEN/ Geodata/ne1to50.sqlite”
- The sounding database is “soundings.sqlite” which was created when you opened ASPEN
- Synoptic MapTitle is what will appear at the top of the figures and in their file names. Suggested name is “flightID_SynMap “



Next Tab: "Visual"

(adjust setting for Skew-T diagrams)

Set Plot Range

P-3

---10,000ft.

10 – 40 C

650 – 1050 mb

---20,000ft.

-10 – 40 C

400 – 1050 mb

G-IV

-40 – 40 C

100 – 1050 mb

•Click "OK"

Advanced Configuration Management

QC Parameters Processing WMO Auto Save Synoptic Map Visual

Configuration set name: editsonde

XY Graph Scale Limits

Set the min/max scale limits for XY graph. If "AutoScale" is selected (default), Aspen will set the scale limits based on the data range. Unselect AutoScale to specify the desired limits for the graph.

	Min	Max	AutoScale
Pres (mb)	50	1050	<input checked="" type="checkbox"/>
Alt (m)	0	17000	<input checked="" type="checkbox"/>
Tdry (degC)	-60	40	<input checked="" type="checkbox"/>
RH (%)	0	100	<input checked="" type="checkbox"/>
Wspd (m/s)	-20	100	<input checked="" type="checkbox"/>
Wdir (deg)	0	360	<input checked="" type="checkbox"/>
Dz/Dt (m/s)	-100	100	<input checked="" type="checkbox"/>
Latitude	-90	90	<input checked="" type="checkbox"/>
Longitude	-180	180	<input checked="" type="checkbox"/>

Text Characteristics

Default Size (pt) 12

Font Arial

Skew-T Graph Settings

Graph Dimensions (pixels) X 1000 Y 700

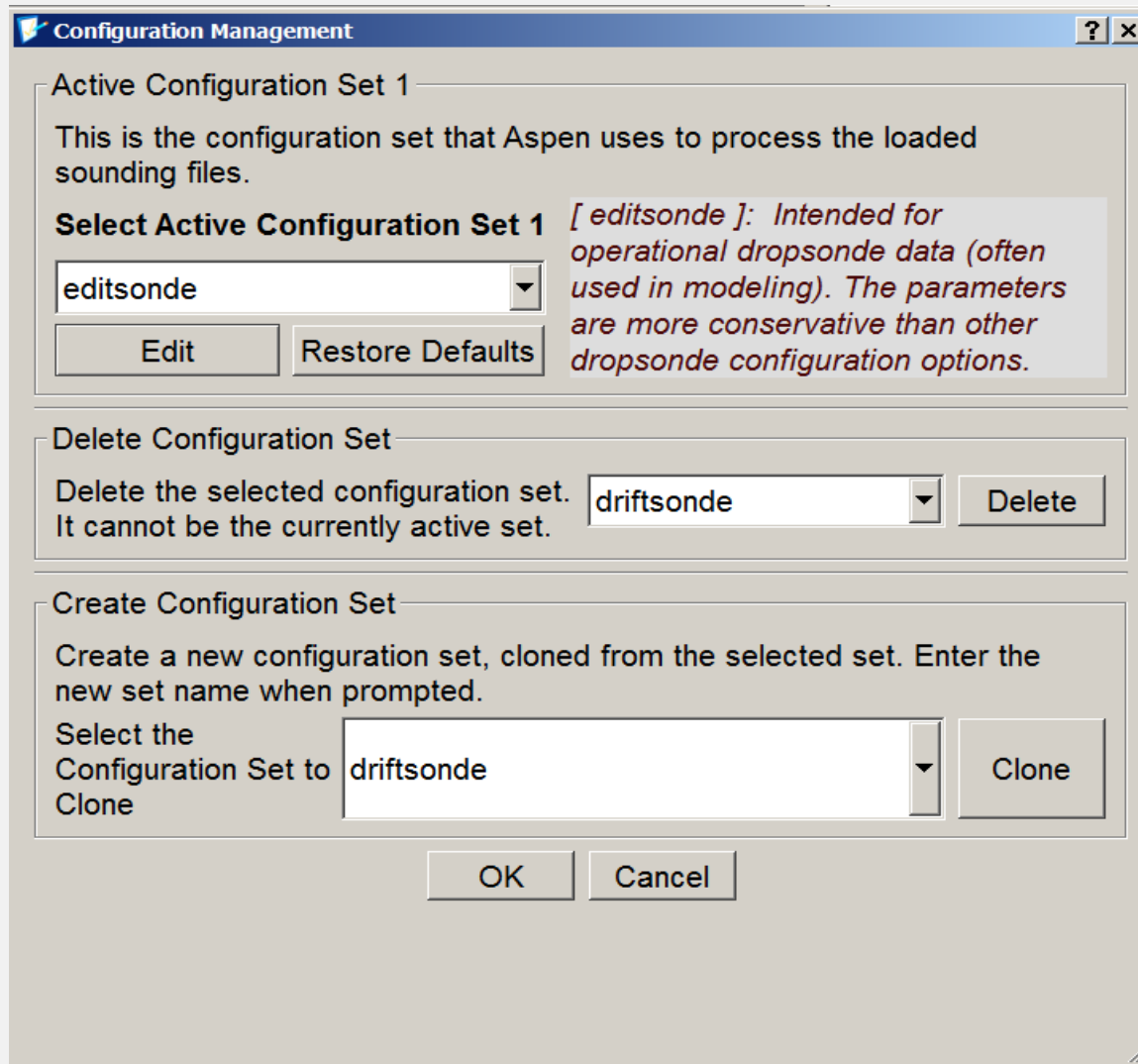
Temperature (degC) min 10 max 40

Pressure (mb) min 600 max 1050

Number of Wind Barbs 20

OK Cancel

ASPEN will go back to configuration window ... Click "OK" to complete

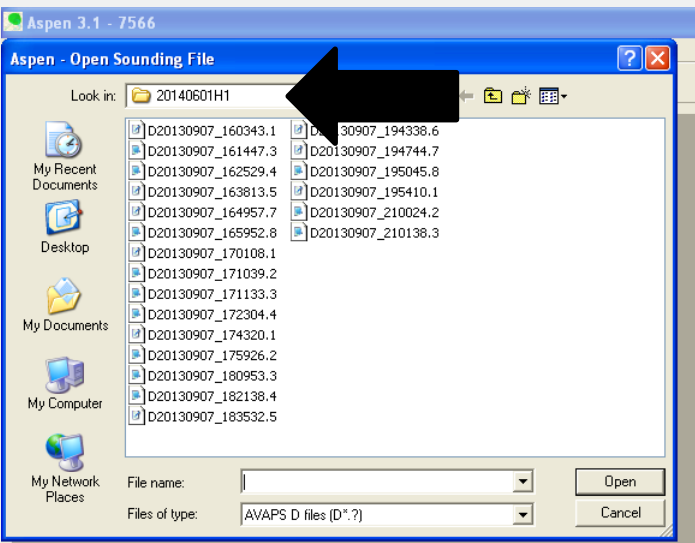


Start a dropsonde log

Get the flight and mission ID's from the Flight Director and AVAPS operators from the seating chart then complete the checklist:

- **Dropsonde Scientist**
- Flight ID 20140601H1 Mission ID 0101A
- Dropsonde Scientists Sellwood/Black
- AVAPS Operators Awesome AOC dudes
- The Lead Project Scientist (LPS) on the P3 is responsible for determining the distribution patterns for dropwindsonde releases. Predetermined desired data collection patterns are illustrated on the flight patterns. However, these patterns are often altered because of clearance problems, etc. Operational procedures are contained in the operator's manual. On the G-IV the sole HRD person is designated the LPS. The following list contains more general supplementary procedures to be followed. (Check off or initial.)
- **Preflight**
- _____ 1. Determine the status of the AVAPS and HAPS or workstation. Report results to the LPS.
- _____ 2. Confirm the mission and pattern selection with the LPS and assure that enough dropsondes are on board the aircraft.
- _____ 3. Modify the flight pattern or drop locations if requested by AOC to accommodate changes in storm location or closeness to land.
- _____ 4. Complete the appropriate preflight set-up and checklists.
- **In-Flight**
- _____ 1. Operate the system as specified in the operator's manual.
- _____ 2. Ensure the AOC flight director is aware of upcoming drops.
- _____ 3. Ensure the AVAPS operator has determined that the dropsonde is (or is not) transmitting a good signal. Recommend if a backup dropsonde should be launched in case of failure.
- _____ 4. Report the transmission of each drop and fill in the Dropwindsonde Scientist Log.
- **Post flight**
- _____ 1. Complete Dropwindsonde Scientist Log.
- _____ 2. Brief the LPS on equipment status and turn in completed forms, dropwindsonde data tapes, DVDs, or CDs.
- **[Note: all data removed from the aircraft by HRD personnel should be cleared with the AOC flight director.]**
- _____ 4. Debrief at the base of operations.
- _____ 5. Determine the status of future missions and notify MGOC as to where you can be contacted.

Processing Sondes



- Drag D-files from AVAPS_PRIMARY/flightID to your flightID_RAW_DATA directory.
- ASPEN will automatically go to your flightID_RAW_DATA directory when you click “open”.
- Click on the sonde that you want to process, working in chronological order.
- You should be keeping track of sondes by writing down the launch times and locations in your log as you hear them called over the headset.
- Inform the AVAPS operator if a sonde does not appear in AVAPS_PRIMARY/flightID shortly after splashing
- Lat/Lon should be reported in degrees + fraction (some navigation sources on the aircraft use degrees + minutes)

Main Tab

- Check the Launch parameters.
- If questionable you can either ignore (check) or override (write in) values.
- Never ignore Latitude or Longitude (enter correct value from raw data if necessary.)
- Compare upward and downward integrated heights with altitude and pressure.
- If ,after examining the data you determine that the sonde did not transmit to the surface, check “set heights missing”. Ensure that “hit surface” and “recompute” are checked when processing the next drop.

(!) Click if you change anything

Aspen V3.4.1 - [180910_164432_P.5]

File Tools View Window Help

Main Raw QC XY Graph Skew-T Levels WMO Compu...

D20180910_164432_P.5 163525188 Hurricane Florence, 20180910H1 WP-3D Orion, N42RF

Launch Point

	Reported	Ignore	Override	
Drop Time (s)	186.76	<input type="checkbox"/>	<input type="text"/>	Clear
Pressure (mb)	722.7	<input type="checkbox"/>	<input type="text"/>	Clear
Temperature (deg C)	14.5	<input type="checkbox"/>	<input type="text"/>	Clear
RH (%)	100.0	<input type="checkbox"/>	<input type="text"/>	Clear
Speed (m/s)	48.8	<input type="checkbox"/>	<input type="text"/>	Clear
Direction (deg)	255.9	<input type="checkbox"/>	<input type="text"/>	Clear
Latitude (deg)	24.9398	<input type="checkbox"/>	<input type="text"/>	Clear
Longitude (deg)	-60.3155	<input type="checkbox"/>	<input type="text"/>	Clear
Altitude (m)	2461.4	<input type="checkbox"/>	<input type="text"/>	Clear

Dropsonde Surface Parameters

Extrapolated Pres (mb)	948.5	Override Pres (mb)	<input type="text"/>	Clear
Altitude (m)	0.0	Override Alt for Integration (m)	<input type="text"/>	Clear

Computations

RECOMPUTE

Launch Time: 16:44:32 2018-09-10

Height Overrides

Hit Surface? Set Heights Missing?

Surface Altitude Unknown (Dropsonde over land)

RH Channel for QC Use

RH0 (AVAPS Selected) RH1 RH2

Dropsonde Height Integration Results

Upward	2359.1	Launch Altitude (m)
Downward	114.3	Low Altitude (m)

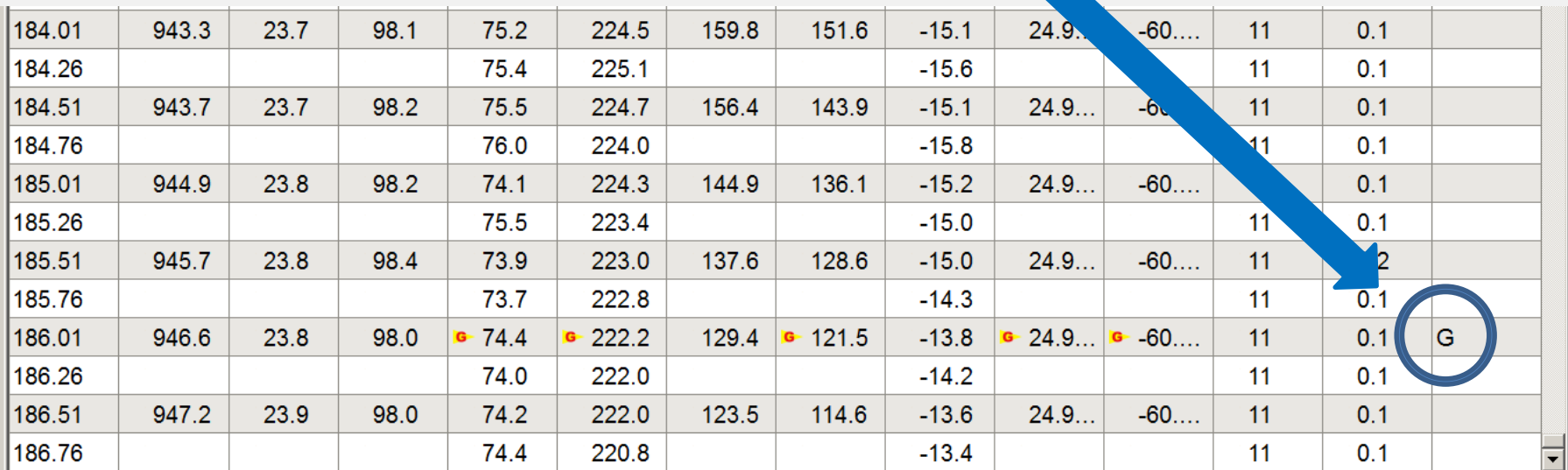
Ready ACTIVE CONFIG: editsonde CONFIG DIR: C:/Users/Kathryn.Sellwood/AppData/Roaming/Aspen/

- You can get Lat/Lon for your logsheet here.
- Drop time may give indication of whether sonde transmitted to surface

Use the Raw tab to perform manual QC.

- Check Flight Level data on the first line and compare with first good data line
- Check for increasing temperature and pressure and decreasing altitude
- Check last line to confirm surface transmission
- Look at bottom GPS altitude and surface pressure.
- Check for extra data lines at the bottom of the sounding

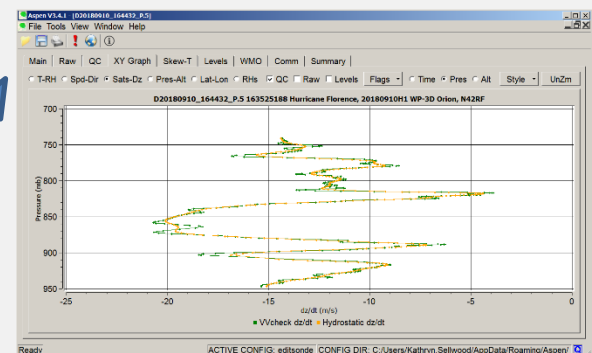
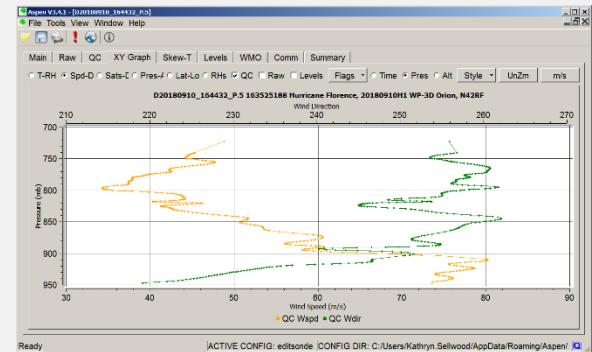
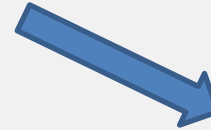
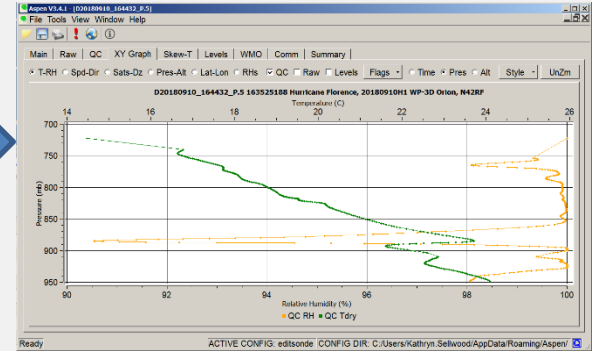
Mouse over QC indicators for explanation of flags



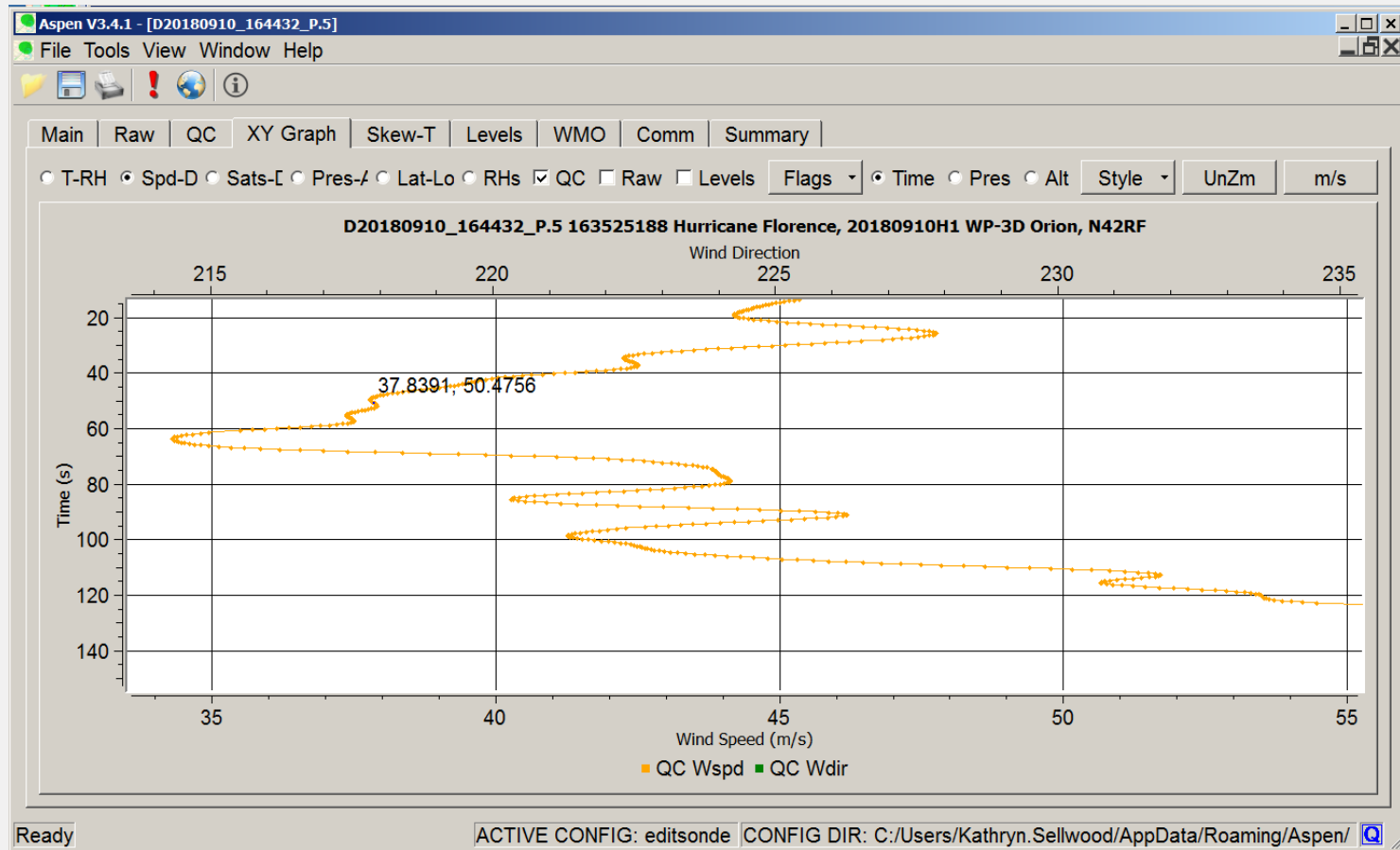
184.01	943.3	23.7	98.1	75.2	224.5	159.8	151.6	-15.1	24.9...	-60....	11	0.1	
184.26				75.4	225.1			-15.6			11	0.1	
184.51	943.7	23.7	98.2	75.5	224.7	156.4	143.9	-15.1	24.9...	-60....	11	0.1	
184.76				76.0	224.0			-15.8			11	0.1	
185.01	944.9	23.8	98.2	74.1	224.3	144.9	136.1	-15.2	24.9...	-60....	11	0.1	
185.26				75.5	223.4			-15.0			11	0.1	
185.51	945.7	23.8	98.4	73.9	223.0	137.6	128.6	-15.0	24.9...	-60....	11	0.1	
185.76				73.7	222.8			-14.3			11	0.1	
186.01	946.6	23.8	98.0	74.4	222.2	129.4	121.5	-13.8	24.9...	-60....	11	0.1	G
186.26				74.0	222.0			-14.2			11	0.1	
186.51	947.2	23.9	98.0	74.2	222.0	123.5	114.6	-13.6	24.9...	-60....	11	0.1	
186.76				74.4	220.8			-13.4			11	0.1	

Use XY Graph to Look at individual fields

- Data should be smoothly varying through sounding
- Compare flight level thermo with first data point to validate flight level temperature and ensure the sensor reached equilibration.
- Check for wind drop-outs (Spd-dir) as nearby data points may need to be removed. Note any interesting features in the droplog.
- Check near surface winds for unphysical increase in wind speed.
- Check for slow/fast fall, if so all winds should be removed. Fall speeds should be 10-12 m/s from 700mb. GIV sondes will start out at a higher fall speed (~20 m/s_
- Play around with the plotting features on your first sonde to see what graphics are available and which might be most helpful to you.
- You can toggle between raw and QC data or plot the levels reported in WMO message.
- New feature allows you to look at lat/lon



Switch to "Time" Y axis and zoom in to better locate data points



Select Data to Remove or Retain in RAW Tab

- Left click to highlight data
- Use shift button to select a column of data
- Right click to ignore (remove) data or keep flagged data
- If wind speed, temperature, or latitude are kept/removed then wind direction, RH, and longitude should also be kept/removed
- Click “recompute” (!) to save changes
- If bad data is sent after sonde splashes note correct end time (s) and change in the main tab.
- If bottom pressure and GPS altitude lead you to conclude that sonde did not transmit to surface go back to the main tab and set heights missing.

Aspen V3.4.1 - [D20180910_164432_P.5]

File Tools View Window Help

Main Raw QC XY Graph Skew-T Levels WMO Comm Summary

D20180910_164432_P.5 163525188 Hurricane Florence, 20180910

Time (s)	Pres (mb)	Tdry (C)	RH (%)	Spd (m/s)	Dir (deg)	Alt (m)	GPS Alt (m)	dz/Dt (m/s)
182.51	941.0	23.6	97.8	75.6	225.8	181.1	173.1	-13.6
182.76				75.8	225.9			-13.8
183.01	941.5	23.6	98.3	75.4	225.4	177.1	166.2	-13.8
183.26				76.2	225.5			-14.5
183.51	942.5	23.7	98.3	75.2	225.0	167.5	159.1	-14.4
183.76				76.1	225.2			-15.0
184.01	943.3	23.7	98.1	75.2	224.5	159.8	151.6	-15.1
184.26				75.4	225.1			-15.6
184.51	943.7	23.7	98.2	75.5	224.7	156.4	143.9	-15.1
184.76				76.0	224.0			-15.8
185.01	944.9	23.8	98.2	75.4	224.5	156.4	136.1	-15.2
185.26				75.4	224.5			-15.0
185.51	945.7	23.8	98.4	75.4	224.5	128.6	128.6	-15.0
185.76				75.4	224.5			-14.3
186.01	946.6	23.8	98.0	74.4	222.2	129.4	121.5	-13.8
186.26				74.0	222.0			-14.2
186.51	947.2	23.9	98.0	74.2	222.0	123.5	114.6	-13.6
186.76				74.4	220.8			-13.4

Ready ACTIVE CONFIG: editsonde CONFIG DIR: C

Look at QC Tab to See Changes

- Flagged data will be removed
- Surface altitude will be set to "0"
- Smoothing and Dynamic Adjustments will be applied
- When data is removed manually, some previously flagged data may be retained.
- Look at XY plots again to ensure that all corrections have been applied properly
- Geometric altitude reported in QC – no value for Geopotential height

RAW

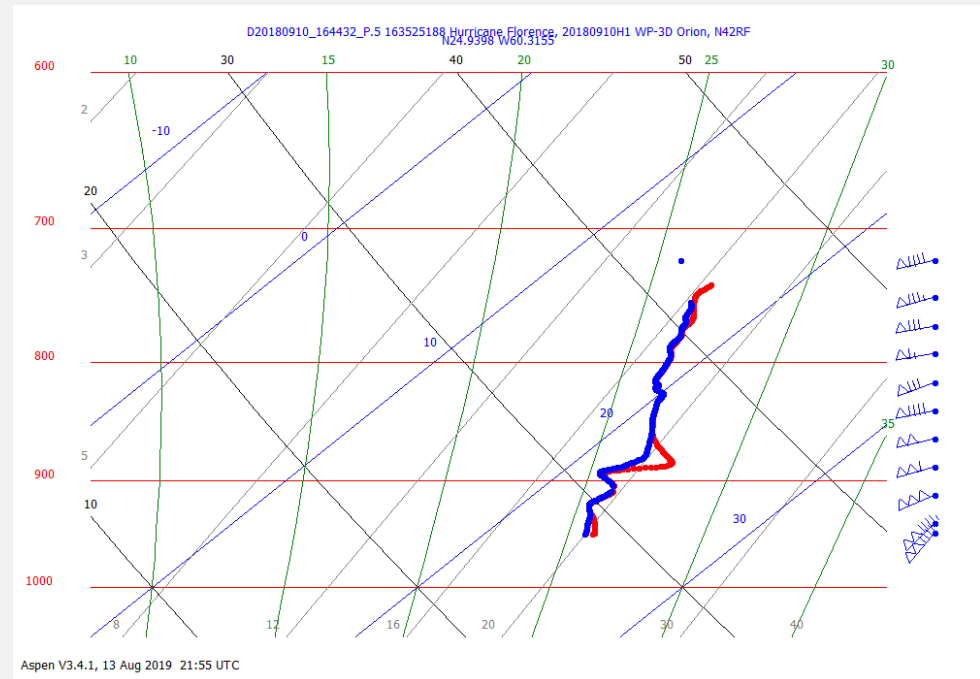
331.00	269.6	-32.2	72.2	11.1	94.4	10687.6	10491.5	-19.0	20.3259	-93.2653	14	7.2	
331.25				Vc 10.9	Vc 94.0			-19.3			14		Vc
331.50	270.0	-32.1	72.2	Vc 9.9	Vc 99.6	10677.6	10481.6	-19.7	20.3259	-93.2654	14	7.2	Vc
331.75				7.5	107.4			-19.1			14		
332.00	Bc 271.8	-31.7	72.5	D 11.7	G 93.0	10629.7	D 10434.0	-18.7	G 20.3259	D -93.2656	14	7.2	Bc G
332.25				11.2	91.3			-18.4			14		
332.50											0		
332.75											0		
333.00	271.1	-31.9	72.3	11.3	92.0	10649.3	10452.7	-18.7	20.3259	-93.2655	14	7.2	

QC

331.00	269.7	-31.4	72.2	10.4	93.5		10442.1	-24.0	20.3259	-93.2653			
331.25													
331.50	270.2	-31.3	72.3				10430.1	-24.8	20.3259	-93.2654			
331.75					10.7	92.0							
332.00		-31.2	72.4										
332.25					10.9	91.0							
332.50													
332.75													
333.00	271.7	-31.0	72.5	11.2	89.6		10390.4	-26.1	20.3259	-93.2655			

Skew-T tab is Visual WMO Message

- Toggle between raw and QC to see what data is removed.
- Check for Temperature equilibration at the top of the sounding.
- Lone dots at the top are the flight level data.
- Plot “levels” to look at the actual data which will be transmitted
- Look at the wind barbs
- You can go back and reconfigure the plotting parameters if the ranges are not optimal.



Check the Mandatory Levels data (Levels Tab), note surface values for dropsonde log.

Aspen 3.1 - 7566 - [D20130907_194338.6]

File Tools View Window Help

Main Raw QC XY Graph Skew-T Levels WMO Comm Summary

D20130907_194338.6

Click on a level

Level	Type	Time (s)	Pres (mb)	Tdry (C)	RH (%)	Dir (deg)	Spd (m/s)	Alt (m)
0	Uppermost Winds	-1.0	795.3			317.8	4.9	
1	Uppermost Thermodynamic	-1.0	795.3	14.9	86.2			
2	62626 REL Location	-1.0	795.3					
3	Station Base Pressure	55.2	850.0	18.3	84.0			
4	GDL Wind Speed	55.2	850.0			328.7	4.4	
5	Standard	55.2	850.0	18.3	84.0	328.7	4.4	1510
6	Standard	129.6	925.0	22.3	82.2	346.0	4.7	777
7	62626 Mean BL Wind	158.8	954.7			352.0	4.8	500
8	62626 150m Layer Mean Wind	201.0	999.8			351.3	5.1	84
9	Standard	201.2	1000.0	27.5	77.2	354.6	5.4	90
10	62626 SPG Location	209.7	1009.1					
11	62626 Deep Layer Mean Wind	210.2	1009.6			339.7	4.6	
12	Surface Winds	209.7	1010.2			347.5	4.6	10
13	Surface Thermodynamic	210.8	1010.2	28.3	76.5			0

Remove a level by clicking on it so it is highlighted in red. *This will only fix the WMO message and not the bufr data.*

Aspen V3.3-304 - [D20151023_170417_gooddrop.1]

File Tools View Window Help

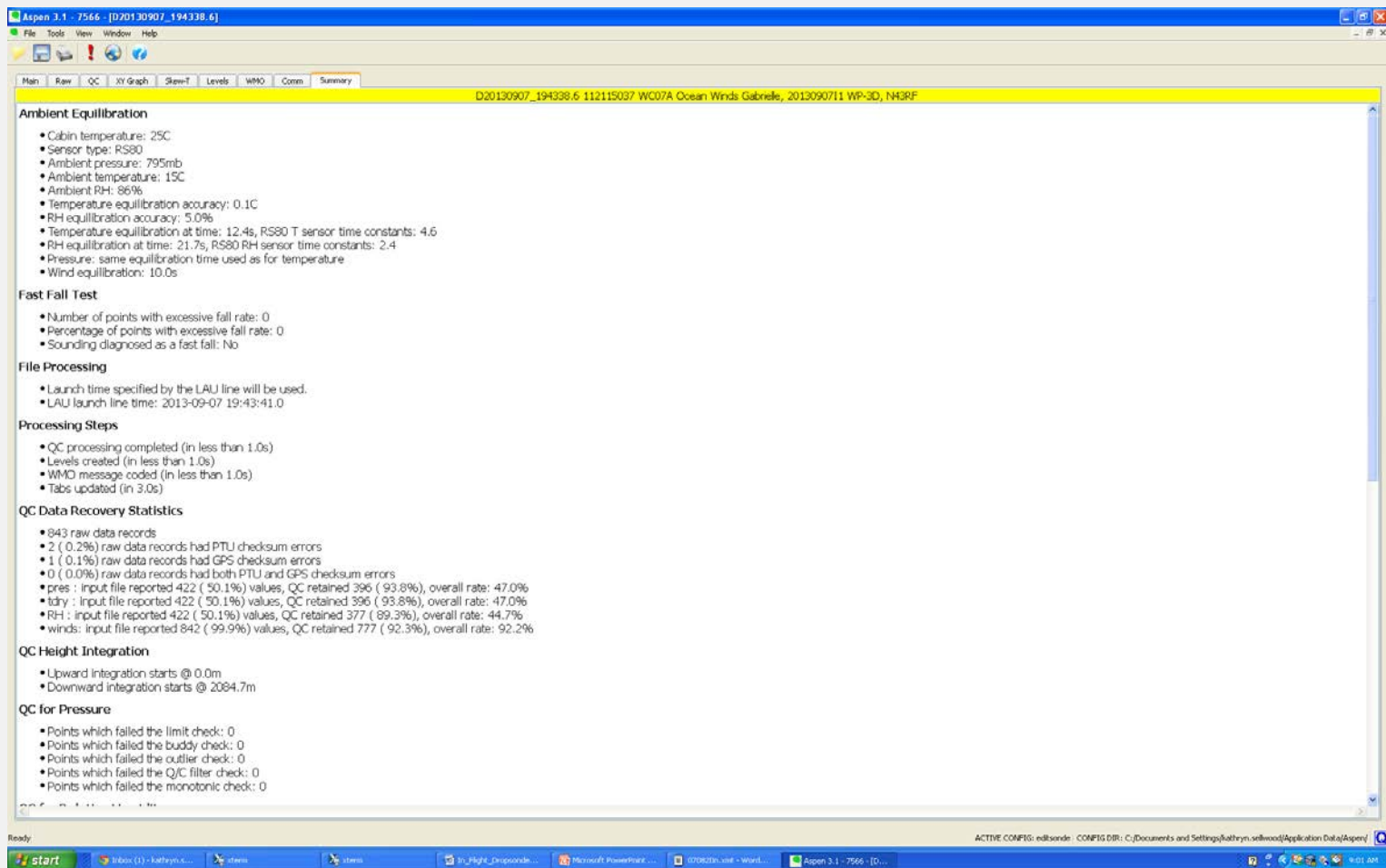
Main Raw QC XY Graph Skew-T Levels WMO Comm Summary

D20151023_170417_gooddrop.1 123315017 Hurricane Patricia #2, 2015102311 WP-3D, N43RF

Click on a level to disable/enable it. Disabled Levels are highlighted in red.

n	Type	Time (s)	Pres (mb)	Tdry (C)	RH (%)	Dir (deg)	Spd (m/s)	Alt (m)
0	62626 REL Location	-1.0	694.9					
1	Uppermost Winds	-1.0	694.9			59.5	12.3	
2	Uppermost Thermodynamic	-1.0	694.9	9.8	91.0			
3	Standard	3.7	700.0	10.2	89.5	57.2	12.7	3103
4	GDL RH	35.5	734.5	12.4	75.6			
5	GDL RH	41.0	740.4	12.7	85.8			
6	GDL Wind Direction	61.2	762.1			44.8	12.5	
7	GDL Temperature	102.0	807.5	17.5	76.6			
8	GDL Wind Direction	106.2	812.3			74.5	12.5	
9	Station Base Pressure	140.1	850.0	19.0	78.9			
10	Standard	140.1	850.0	19.0	78.9	67.8	15.3	1454
11	GDL Wind Speed	140.1	850.0			67.8	15.3	
12	GDL Wind Speed	184.2	900.8			74.5	17.6	
13	Standard	202.5	925.0	23.0	72.3	54.3	17.0	719
14	GDL Wind Speed	218.2	944.6			36.6	14.5	
15	62626 Mean BL Wind	221.3	948.5			17.3	14.2	500
16	GDL Wind Speed	246.2	978.3			15.3	15.3	
17	62626 150m Layer Mean Wind	260.2	994.3			11.8	13.3	83
18	GDL Wind Speed	262.2	996.6			13.1	12.8	
19	Standard	265.1	1000.0	27.2	76.7	15.3	12.9	33
20	62626 SPG Location	267.4	1002.6					
21	62626 Deep Layer Mean Wind	267.5	1002.8			54.2	13.6	
22	Surface Winds	267.4	1003.8			8.1	14.3	10
23	Surface Thermodynamic	268.3	1003.8	27.4	76.0			0

Use the Summary Tab as a final check after making changes and before transmitting



The screenshot displays the Aspen 3.1 software interface, specifically the Summary tab for a data file. The window title is "Aspen 3.1 - 7566 - [D20130907_194338.6]". The menu bar includes File, Tools, View, Window, and Help. The main window has a yellow header bar with the file name "D20130907_194338.6 112115037 WC07A Ocean Winds Gabriele, 2013090711 WP-3D, NH3RF". The Summary tab is active, showing a list of parameters and statistics under various sections:

- Ambient Equilibration**
 - Cabin temperature: 25C
 - Sensor type: RS80
 - Ambient pressure: 795mb
 - Ambient temperature: 15C
 - Ambient RH: 86%
 - Temperature equilibration accuracy: 0.1C
 - RH equilibration accuracy: 5.0%
 - Temperature equilibration at time: 12.4s, RS80 T sensor time constants: 4.6
 - RH equilibration at time: 21.7s, RS80 RH sensor time constants: 2.4
 - Pressure: same equilibration time used as for temperature
 - Wind equilibration: 10.0s
- Fast Fall Test**
 - Number of points with excessive fall rate: 0
 - Percentage of points with excessive fall rate: 0
 - Sounding diagnosed as a fast fall: No
- File Processing**
 - Launch time specified by the LAU line will be used.
 - LAU launch line time: 2013-09-07 19:43:41.0
- Processing Steps**
 - QC processing completed (in less than 1.0s)
 - Levels created (in less than 1.0s)
 - WMO message coded (in less than 1.0s)
 - Tabs updated (in 3.0s)
- QC Data Recovery Statistics**
 - 843 raw data records
 - 2 (0.2%) raw data records had PTU checksum errors
 - 1 (0.1%) raw data records had GPS checksum errors
 - 0 (0.0%) raw data records had both PTU and GPS checksum errors
 - pres : input file reported 422 (50.1%) values, QC retained 396 (93.8%), overall rate: 47.0%
 - tdry : input file reported 422 (50.1%) values, QC retained 396 (93.8%), overall rate: 47.0%
 - RH : input file reported 422 (50.1%) values, QC retained 377 (89.3%), overall rate: 44.7%
 - winds: input file reported 842 (99.9%) values, QC retained 777 (92.3%), overall rate: 92.2%
- QC Height Integration**
 - Upward integration starts @ 0.0m
 - Downward integration starts @ 2084.7m
- QC for Pressure**
 - Points which failed the limit check: 0
 - Points which failed the buddy check: 0
 - Points which failed the outlier check: 0
 - Points which failed the Q/C filter check: 0
 - Points which failed the monotonic check: 0

The bottom of the screen shows the Windows taskbar with the Start button and several open applications, including "Aspen 3.1 - 7566 - [D...". The system tray shows the time as 9:01 AM.

Use the COMM Tab to make Tempdrop Comments Section

Aspen 3.1 - 7566 - [D20120823_141548.8]

File Tools View Window Help

Main Raw QC XY Graph Skew-T Levels WMO Comm Summary

D20120823_141548.8 103815255 Hurricane

Identifiers

Abbreviated Header

Abbreviated Header Override Clear

Correction Number

51515 Group

Doubtful Heights

61616 Group

Agency/Aircraft

Mission Storm System

Mission ID

Observation Number

ICAO id

62626 Group

Environment Azimuth

ATCF Identifier

Retransmission of OB

Corrected Report Last Report

Comms

Com Port

Comm

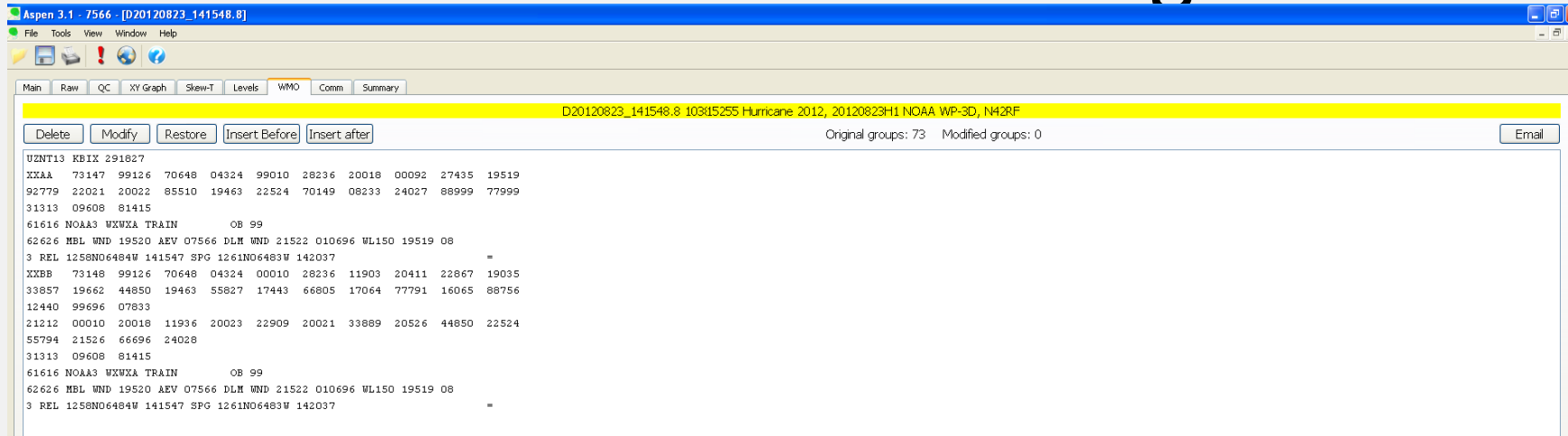
Baud

Send TEMPDROP message to ARWO

Clear

- Designate Environment Indicate azimuth if Eyewall or maxwind
- Click on “Last Report” when sending the final tempdrop (confirm with FD first)

Check the tempdrop in the WMO Tab before transmitting



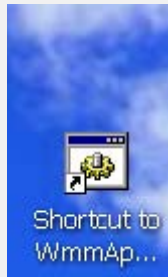
The screenshot shows the Aspen 3.1 software interface. The title bar reads "Aspen 3.1 - 7566 - [D20120823_141548.8]". The menu bar includes "File", "Tools", "View", "Window", and "Help". The toolbar contains icons for file operations and a warning sign. The main window has tabs for "Main", "Raw", "QC", "XY Graph", "Skew-T", "Levels", "WMO", "Comm", and "Summary". The "WMO" tab is active, displaying a yellow header with the text "D20120823_141548.8 103845255 Hurricane 2012, 20120823H1 NOAA WP-3D, NH2RF". Below the header are buttons for "Delete", "Modify", "Restore", "Insert Before", and "Insert after". The main area shows a WMO message with the following content:

```
UZNT13 KBIX 291827
XXAA 73147 99126 70648 04324 99010 28236 20018 00092 27435 19519
92779 22021 20022 85510 19463 22524 70149 08233 24027 88999 77999
31313 09608 81415
61616 NOAA3 WXXA TRAIN OB 99
62626 MBL WND 19520 AEV 07566 DLM WND 21522 010696 WL150 19519 08
3 REL 1258N06484W 141547 SPG 1261N06483W 142037 =
XXBB 73148 99126 70648 04324 00010 28236 11903 20411 22867 19035
33857 19662 44850 19463 55827 17443 66805 17064 77791 16065 88756
12440 99696 07833
21212 00010 20018 11936 20023 22909 20021 33889 20526 44850 22524
55794 21526 66696 24028
31313 09608 81415
61616 NOAA3 WXXA TRAIN OB 99
62626 MBL WND 19520 AEV 07566 DLM WND 21522 010696 WL150 19519 08
3 REL 1258N06484W 141547 SPG 1261N06483W 142037 -
```

At the bottom right of the WMO tab, there is an "Email" button. The status bar at the bottom of the window indicates "Original groups: 73 Modified groups: 0".

- Look over WMO before sending out
- Make sure that REL and SPG are included – if not you may need to set the end of the drop a couple of lines earlier to get a splash location as it uses the last good wind location.
- Check that environment information is included if applicable and that it is correct
- Check the surface data (99 data group on XXAA line)
- Manually add 3 digit SST from at the end of the comments section, before “=” if there was a concurrent BT drop and save the WMO message to the correct folder
- **** If either environment or SST added you must manually save the WMO message
- **** Click File/save or icon browse to correct directory and save
- **** You will be prompted to overwrite the old message if in the correct directory

On the P3 use the WMM Application to transmit the tempdrop messages



The screenshot shows the WMM application interface. At the top, it displays flight information: Flight: 20120730H0, Mission ID: WXXXXA TRAIN, Storm ID: NONE, and Station: KWBC. A warning message "WARNING: HDOB production stopped." is visible. Below this, there are tabs for "Mission", "Vortex", "HDOB", "Recco", "Tempdrop", "Pending Messages", and "Sent Messages". The "Tempdrop" tab is active, showing a list of messages. A blue arrow points to the "Build Test Message" button. Another blue arrow points to the "Load Tempdrop..." button. A third blue arrow points to the "Send Message" button. Below the buttons is a data table with columns for Date/Time (UTC), Lat, Lon, Wind Dir, Wind Spd, Surface Press, Static P, Height of Std Sfc P, Pressure, Geopotential, Ambient T, Dewpoint T, Radiometer SFMR WS, and SFMR Rain. The table contains multiple rows of data for the year 2018.

Date/Time (UTC)	Lat	Lon	Wind Dir (deg)	Wind Spd (kt)	Surface Press (mb)	Static P (mb)	Height of Std Sfc P (m)	Pressure Altitude (m)	Geopotential (m)	Ambient T (C)	Dewpoint T (C)	Radiometer Down (C)	SFMR WS (kt)	SFMR Rain Rate (mm/hr)
3018:26:38	0.00	0.00	343.36	2.56	1024.87	1024.87	221.57	0.00	32.74	20.84	-21.10	13.61	0.10	
3018:26:38	0.00	0.00	343.36	2.56	1024.84	1024.84	221.36	0.00	32.74	20.84	-21.10	13.61	0.10	
3018:26:37	0.00	0.00	343.36	2.56	1024.83	1024.83	221.24	0.00	32.74	20.73	-21.10	13.61	0.10	
3018:26:36	0.00	0.00	343.37	2.56	1024.83	1024.83	221.26	0.00	32.75	20.82	-21.10	13.61	0.10	
3018:26:35	0.00	0.00	343.36	2.56	1024.84	1024.84	221.33	0.00	32.75	20.98	-21.10	13.61	0.10	
3018:26:34	0.00	0.00	343.36	2.56	1024.85	1024.85	221.43	0.00	32.76	21.03	-21.10	13.61	0.10	
3018:26:33	0.00	0.00	343.35	2.56	1024.87	1024.87	221.66	0.00	32.76	21.09	-21.10	13.61	0.10	
3018:26:32	0.00	0.00	343.35	2.56	1024.91	1024.91	222.01	0.00	32.77	21.18	-21.10	13.61	0.10	
3018:26:31	0.00	0.00	343.34	2.56	1024.95	1024.95	222.31	0.00	32.77	21.10	-21.10	13.61	0.10	
3018:26:30	0.00	0.00	343.35	2.56	1024.97	1024.97	222.56	0.00	32.78	21.20	-21.10	13.61	0.10	
3018:26:29	0.00	0.00	343.36	2.56	1025.00	1025.00	222.78	0.00	32.78	21.21	-21.10	13.61	0.10	
3018:26:28	0.00	0.00	343.37	2.56	1025.03	1025.03	223.12	0.00	32.77	21.37	-21.10	13.61	0.10	
3018:26:27	0.00	0.00	343.39	2.56	1025.05	1025.05	223.29	0.00	32.77	21.45	-21.10	13.61	0.10	
3018:26:26	0.00	0.00	343.41	2.56	1025.06	1025.06	223.32	0.00	32.76	21.49	-21.10	13.61	0.10	
3018:26:25	0.00	0.00	343.42	2.56	1025.05	1025.05	223.22	0.00	32.75	21.31	-21.10	13.61	0.10	
3018:26:24	0.00	0.00	343.42	2.56	1025.03	1025.03	223.05	0.00	32.75	21.22	-21.10	13.61	0.10	
3018:26:23	0.00	0.00	343.41	2.56	1025.01	1025.01	222.86	0.00	32.74	21.11	-21.10	13.61	0.10	
3018:26:22	0.00	0.00	343.41	2.56	1024.99	1024.99	222.65	0.00	32.73	20.98	-21.10	13.61	0.10	
3018:26:21	0.00	0.00	343.41	2.56	1024.97	1024.97	222.51	0.00	32.72	21.03	-21.10	13.61	0.10	
3018:26:20	0.00	0.00	343.38	2.56	1024.96	1024.96	222.39	0.00	32.72	20.93	-21.10	13.61	0.10	
3018:26:19	0.00	0.00	343.36	2.56	1024.95	1024.95	222.29	0.00	32.72	20.77	-21.10	13.61	0.10	
3018:26:18	0.00	0.00	343.33	2.56	1024.93	1024.93	222.11	0.00	32.72	20.66	-21.10	13.61	0.10	
3018:26:17	0.00	0.00	343.31	2.56	1024.93	1024.93	222.11	0.00	32.73	20.66	-21.10	13.61	0.10	
3018:26:16	0.00	0.00	343.27	2.56	1024.94	1024.94	222.19	0.00	32.74	20.67	-21.10	13.61	0.10	
3018:26:15	0.00	0.00	343.27	2.56	1024.96	1024.96	222.37	0.00	32.75	20.66	-21.10	13.61	0.10	
3018:26:14	0.00	0.00	343.27	2.56	1024.99	1024.99	222.61	0.00	32.72	20.76	-21.10	13.61	0.10	

- Click on the icon to open WMM
- Click "Load Tempdrop" and browse to WMO message.
- Check the message for errors a final time.

If this is the first drop, check the mission id on 61616 line

- Click "Send Message"
- The tempdrop should now appear in Pending Messages
- Once a tempdrop is sent off the plane it will move to sent messages and be given an ob # – note the ob # in your log

Saving Edited ASPEN output

- Check your output directory to make sure that files are saved there (WMO, .frd, .eol and skewTs)
- Copy WMO .frd .bfr and skewTs to “**FRD**” data folder on the desktop. Files will automatically be ftp’d to the ground from there.
- At the end of the flight be sure to save all the output and dfiles to a thumbdrive for the hrd archive.
- Check that files in FRD folder have been sent (they will move to the “sent” folder

Sending a corrected tempdrop

ON THE AIRCRAFT:

- Within the WMM application go to “Sent Messages
- Select the original tempdrop and click on the “correct” button
- Using your new WMO message manually make the corrections to the original message (copy corrected fields over)
- The software will keep track of the observation number and add “CCA” as needed
- When you are sure that the message is correct press “send”

FROM THE GROUND:

- manually edit the **corrected** WMO message so that the section beginning with 61616 has CCA OB # appended before the “=” using the original observation number.
- You will have to do this twice, once for each 61616 line
- If you have to send the same drop corrected again use CCB the second time then C, D etc. if further corrections are sent.

REMOTE PROCESSING

- **Download latest version of ASPEN from:**

www.eol.ucar.edu/software/aspn

Linux: version 7725

Windows 7: 7724 or 7566 (XP)

Mac: 7724 or 7566 (OSX 10.6, 10.7,10.8)

(Version on plane is expected to be 3.1 release 7717)

- **Download XCHAT:**

<http://xchat.org/windows/#register> (30 day free trial)

- **Follow Flight online:**

<http://www.tropicalatlantic.com/recon/>

<http://airbornescience.nasa.gov/tracker>

<http://mts.nasa.gov> (only if you have an account)

- **The D-records are grabbed from here:**

ftp://seb.noaa.gov/pub/flight/aamps_ingest/avaps/received/YYYYMMDDF

- **WMO files placed on AOML public FTP – coordinate with LPS and/or flight director where these will be and when you have WMO ready for them to transmit (typically your directory / missionid_WMO)**
- **Get SST's from hrd personnel or flight directory via XCHAT**
- **Monitor www.nhc.noaa.gov to make sure that tempdrops are getting there**
- **If more than one person will be processing sondes pass the log and sqlite files onto the next person and be available until they catch up**

Here's where it gets tricky some problems you may encounter

- Relative humidity: sensor picked is not optimal

- Drop in humidity at 900mb appears to be a sensor issue since ASPEN can only use data from 1 sensor, best to switch sensors (from red to blue)
- Change sensor in main panel
- May need to toggle back and forth from plot to see which sensor is which
- Make sure that QC removes likely bad data

RH Channel for QC Use

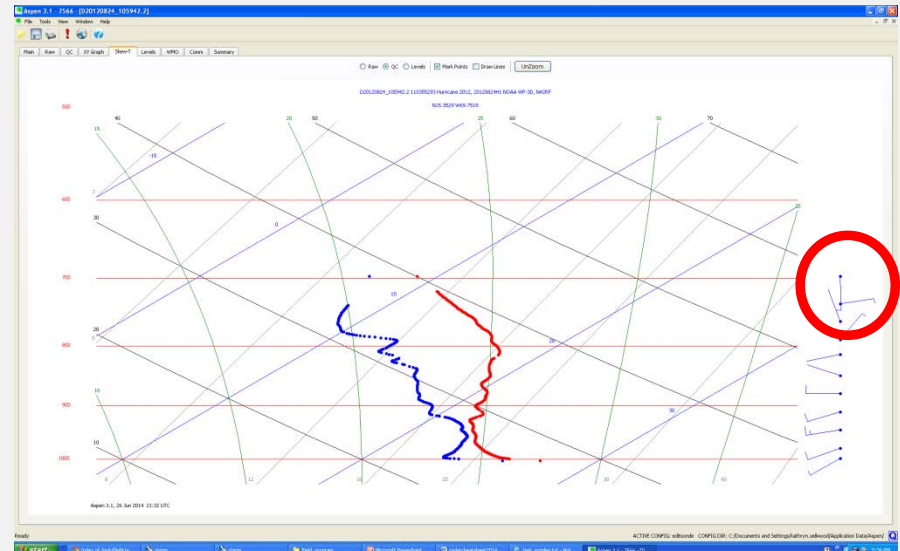
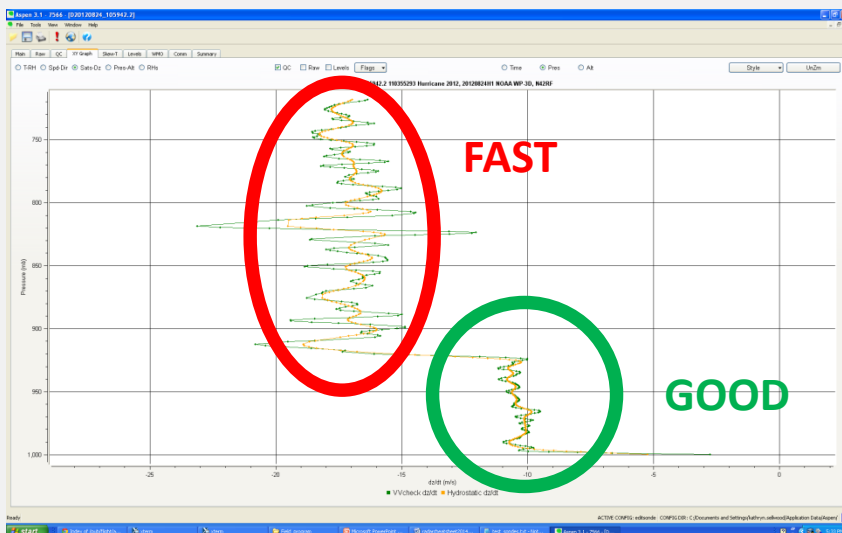
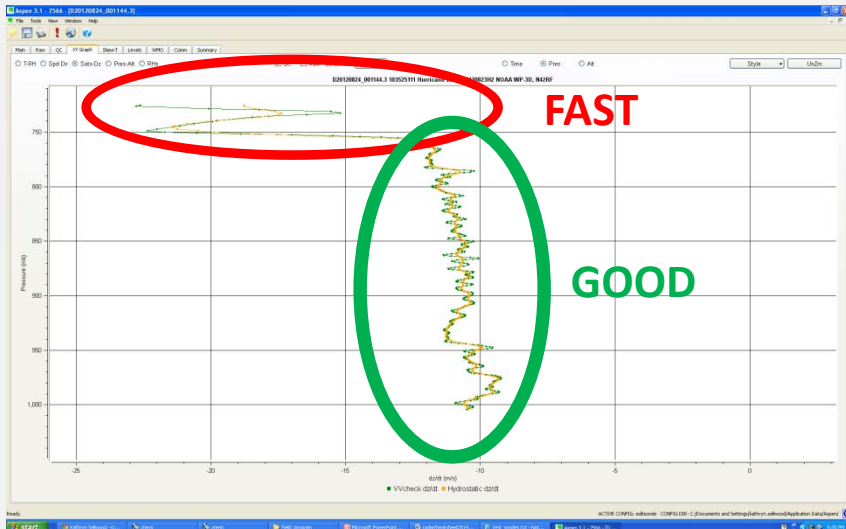
RH0 (AVAPS Selected) RH1 RH2

Dropsonde Height Integration Results



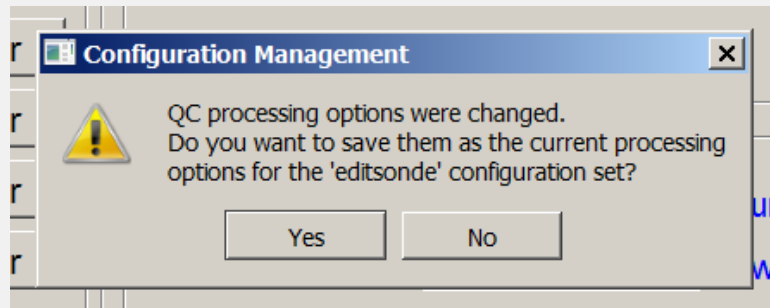
Fast fall – Partial Fast fall

- Normal fall speed is ~10-12 m/s
- Fast fall winds should automatically be removed
- Temperature and humidity data can be transmitted if it looks okay
- Need to remove all winds if ASPEN does not
- May be able to keep some winds if it is only a partial fast fall



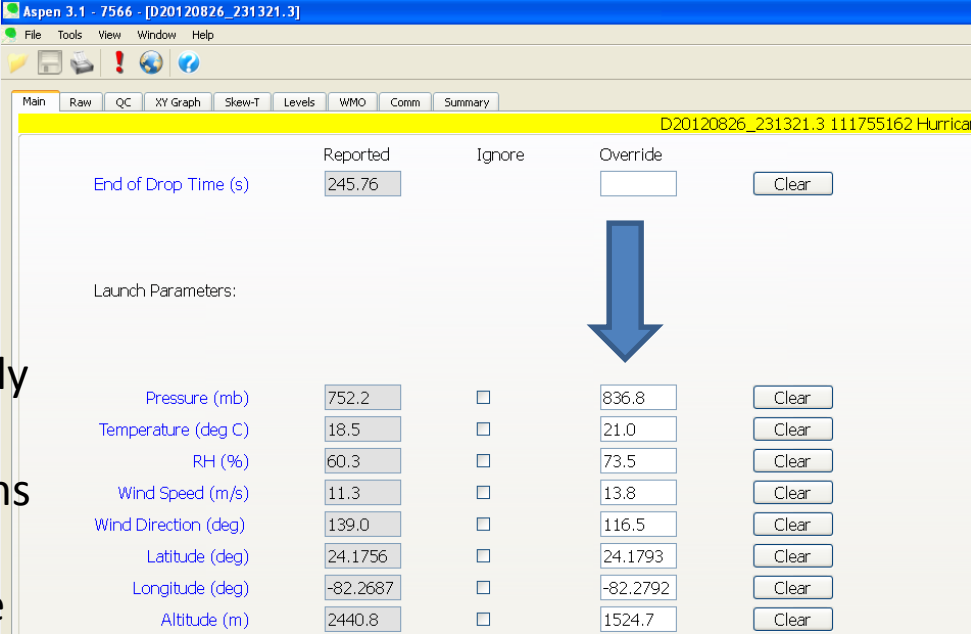
Early Launch detect

- ASPEN now has the ability to identify and correct ELD sondes
- Confirm that the correct launch time has been selected by examining the D-file
- Check the flight level data in the Main tab
- Check box to Ignore T, RH and Wind
- Override the Lat/Lon with the correct value
- Recompute (!)
- When closing the sonde click “No” in the pop-up window



Late Launch Detect or Bad flight level data

- If the flight level data is obviously bad you can remove it by checking “Ignore” next to the bad values.
- In the case of flight level RH > 100% you can put a value of 99.9% in the override column. It will reject a value of 100%. Only do this if the rest of the humidity values look reasonable. This usually only happens when dropping in precip.
- ASPEN should automatically identify late launch detect and reset correctly. Confirm by examining D file.
- In the case of a late launch detect, compare the flight-level values with those in the D-file at the correct launch time. If necessary write the D-file values in the override column.
- ***Be certain that Lat/Lon values are correct***
Use xy plots to confirm (sonde should not “jump” at the top)
- Recompute (!)
- Click “No” in the pop-up window when closing the sonde

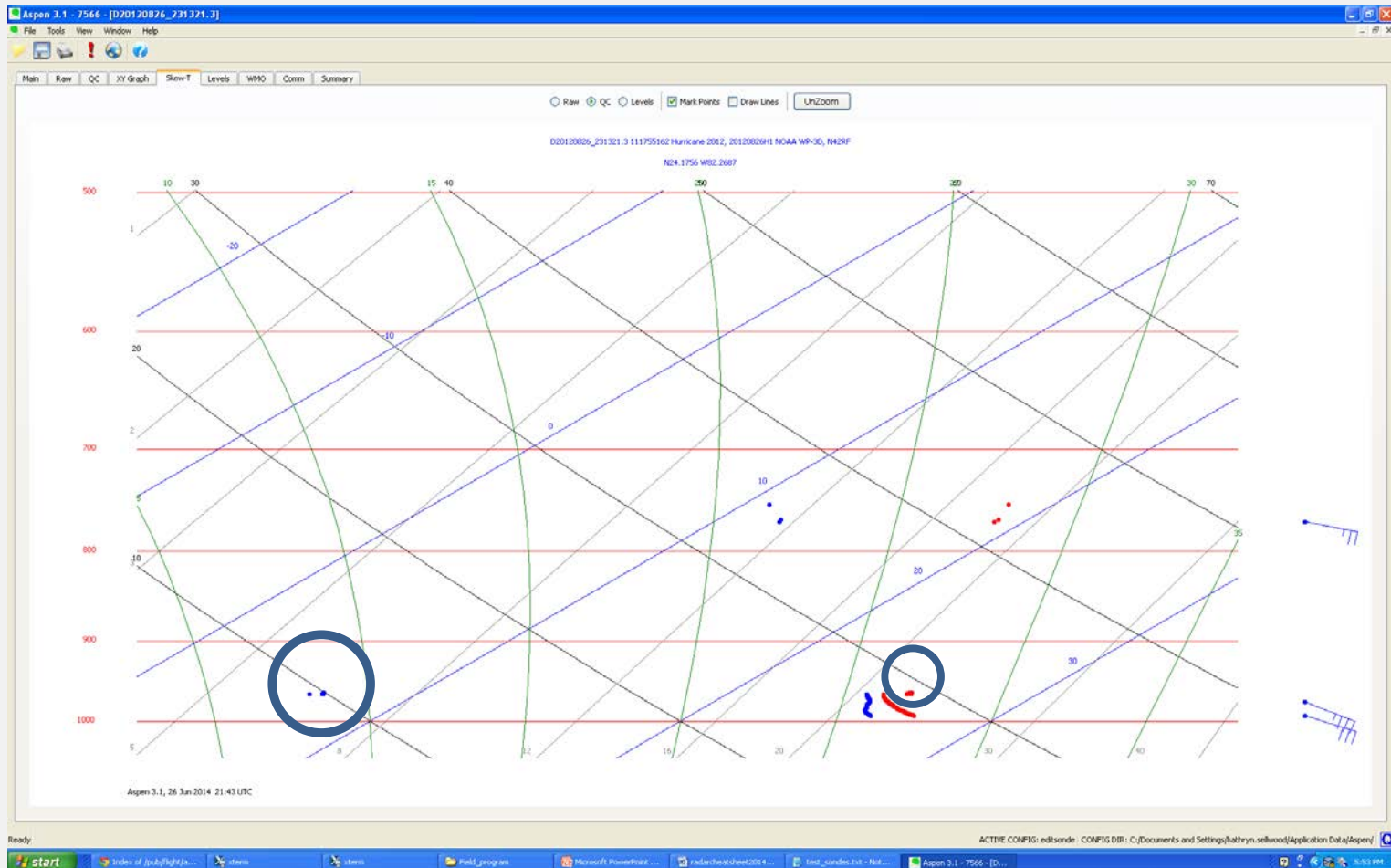


The screenshot shows the Aspen 3.1 software interface. The title bar reads "Aspen 3.1 - 7566 - [D20120826_231321.3]". The menu bar includes "File", "Tools", "View", "Window", and "Help". The main window has a yellow header with the text "D20120826_231321.3 111755162 Hurricar". Below the header, there are tabs for "Main", "Raw", "QC", "XY Graph", "Skew-T", "Levels", "WMO", "Comm", and "Summary". The main content area is divided into two sections. The top section has three columns: "Reported", "Ignore", and "Override". The "End of Drop Time (s)" row shows a reported value of 245.76, an empty "Ignore" checkbox, and an empty "Override" input field with a "Clear" button. A large blue arrow points down from this row to the "Launch Parameters:" section. The "Launch Parameters:" section lists various parameters with their reported values, "Ignore" checkboxes, "Override" input fields, and "Clear" buttons. The parameters and their values are: Pressure (mb) 752.2, Temperature (deg C) 18.5, RH (%) 60.3, Wind Speed (m/s) 11.3, Wind Direction (deg) 139.0, Latitude (deg) 24.1756, Longitude (deg) -82.2687, and Altitude (m) 2440.8. The "Override" values are: 836.8, 21.0, 73.5, 13.8, 116.5, 24.1793, -82.2792, and 1524.7.

	Reported	Ignore	Override	
End of Drop Time (s)	245.76	<input type="checkbox"/>		Clear
Launch Parameters:				
Pressure (mb)	752.2	<input type="checkbox"/>	836.8	Clear
Temperature (deg C)	18.5	<input type="checkbox"/>	21.0	Clear
RH (%)	60.3	<input type="checkbox"/>	73.5	Clear
Wind Speed (m/s)	11.3	<input type="checkbox"/>	13.8	Clear
Wind Direction (deg)	139.0	<input type="checkbox"/>	116.5	Clear
Latitude (deg)	24.1756	<input type="checkbox"/>	24.1793	Clear
Longitude (deg)	-82.2687	<input type="checkbox"/>	-82.2792	Clear
Altitude (m)	2440.8	<input type="checkbox"/>	1524.7	Clear

Satellite drop outs

Since there are no surrounding data points after satellite dropouts ASPEN may miss some bad data. You will need to remove these points manually in the raw tab.



SST of 28.5 degrees from BT manually added to WMO message at end of "62626"

KDENUZNT13 KWBC 050848

XXAA 55082 99249 70730 08043 99009 29257 12024 00081 28457 12526
92769 23245 12535 85505 19036 14533 70149 09425 15525 50587 03957
10522 40760 14746 13027 30973 28966 12516 25100 39957 11005 20248
521// 25010 88999 77168 31063 458//
31313 09608 80826
51515 10190 15429

61616 NOAA9 2214A MATTHEW OB 11

62626 MBL WND 12029 AEV 33297 DLM WND 13522 009161 WL150 12027 08
0 REL 2491N07301W 082629 SPG 2497N07307W 084127 SST 285 =

XXBB 55088 99249 70730 08043 00009 29257 11865 20256 22850 19076
33764 14447 44579 00210 55527 00756 66458 07157 77370 19322 88342
21758 99332 22168 11245 40958 22228 45341 33205 51158 44161 625//
21212 00009 12024 11985 12030 22923 12535 33892 13530 44850 14533
55747 13526 66688 15523 77640 14023 88574 14530 99514 10022 11484
11520 22476 10018 33430 13032 44402 13028 55376 10522 66346 14525
77319 11016 88278 14019 99242 00000 11196 24510 22171 29014 33170
30024 44168 31063 55161 29010

31313 09608 80826

51515 10190 15429

61616 NOAA9 2214A MATTHEW OB 11

62626 MBL WND 12029 AEV 33297 DLM WND 13522 009161 WL150 12027 08
0 REL 2491N07301W 082629 SPG 2497N07307W 084127 SST 285 =

ASPEN_TRAINING FILES ON AOML FTP SITE AND GOOGLE DRIVE

ftp.aoml.noaa.gov/pub/hrd/Sellwood/ASPEN_TRAINING

Google Drive: ASPEN_TRAINING

CONTAINS:

- This Powerpoint
- P3_Dropsonde_Logsheet_2019.pdf : Dropsonde Log
- P3_DROPSONDE_PROCESSING_2019.docx :Detailed instruction for processing dropsondes on the aircraft using ASPEN software
- PRACTICE_DROPSONDES.docx: Guide sheet for processing practice and test dropsondes
- Directory PRACTICE_SONDES : Contains the raw D-files for both practice and testing, listed in “PRACTICE_DROPSONDES”

Email: Kathryn.Sellwood@noaa.gov to request share on Google Drive