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.

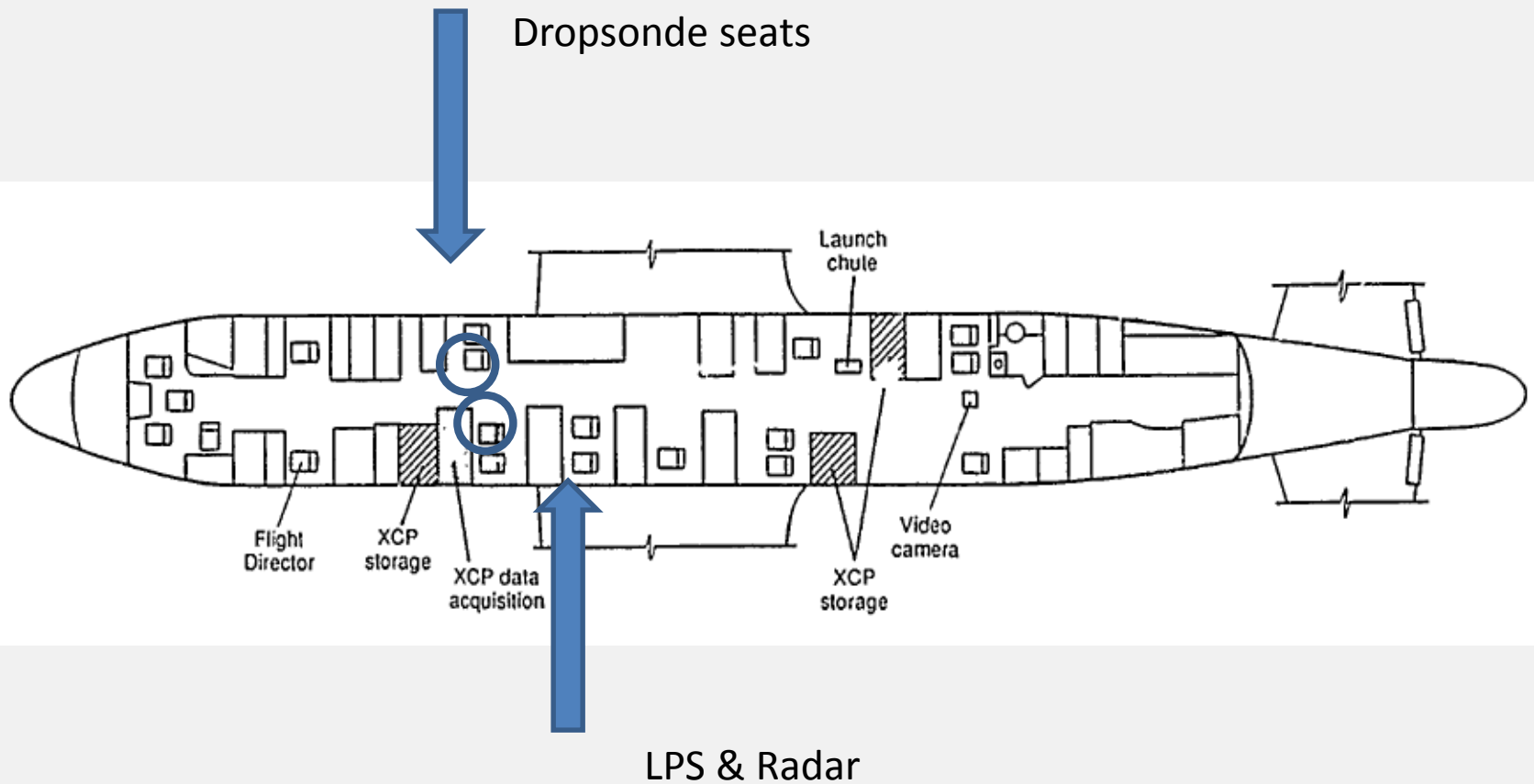 Window 1 : XCHAT, Remote AVAPS, screen 800

  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

Dropsonde seats

Launch chute

Flight Director

XCP storage

XCP data acquisition

XCP storage

Video camera

LPS & Radar

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
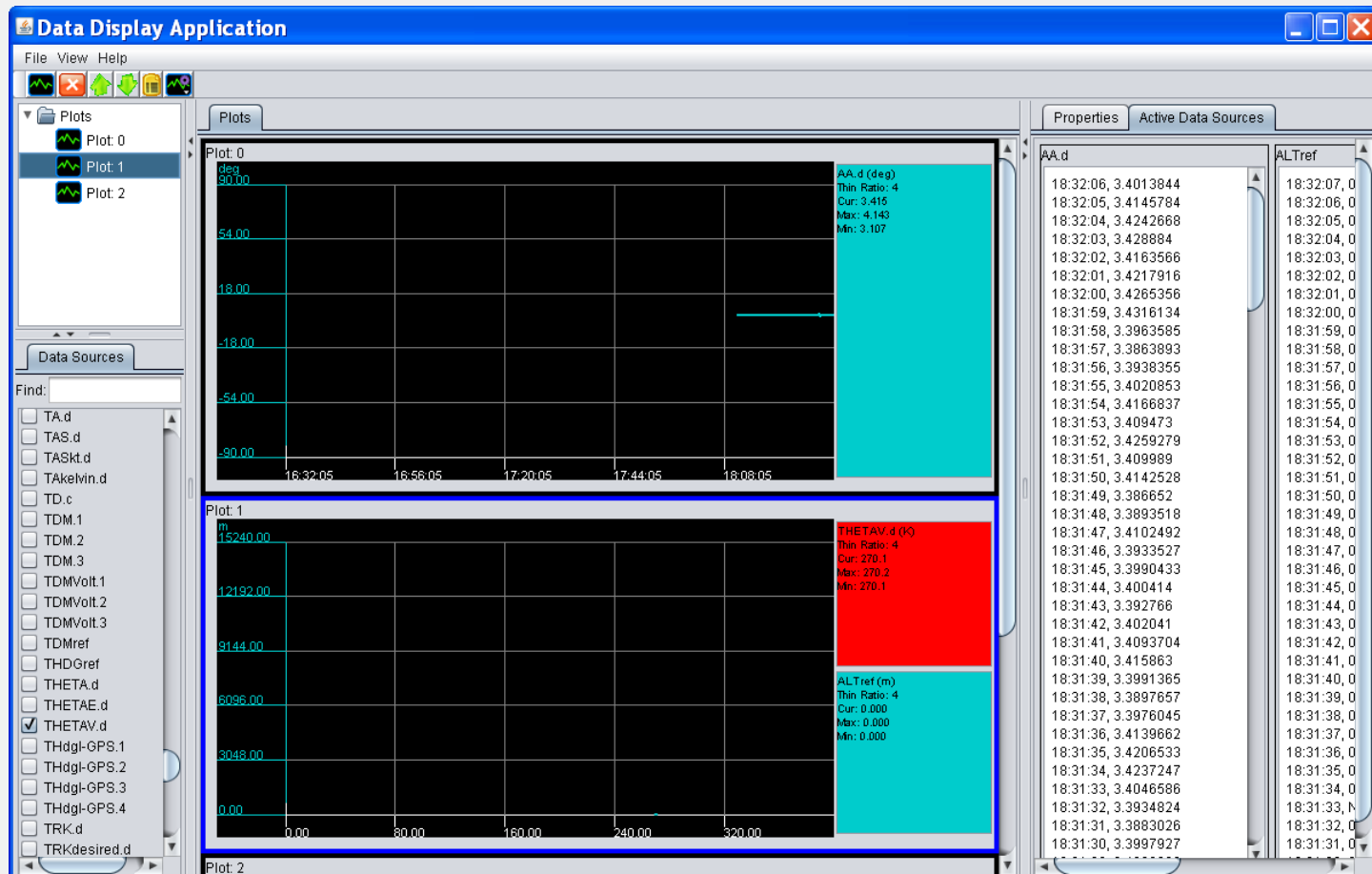
SETTING UP AND CONFIGURING ASPEN

- 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
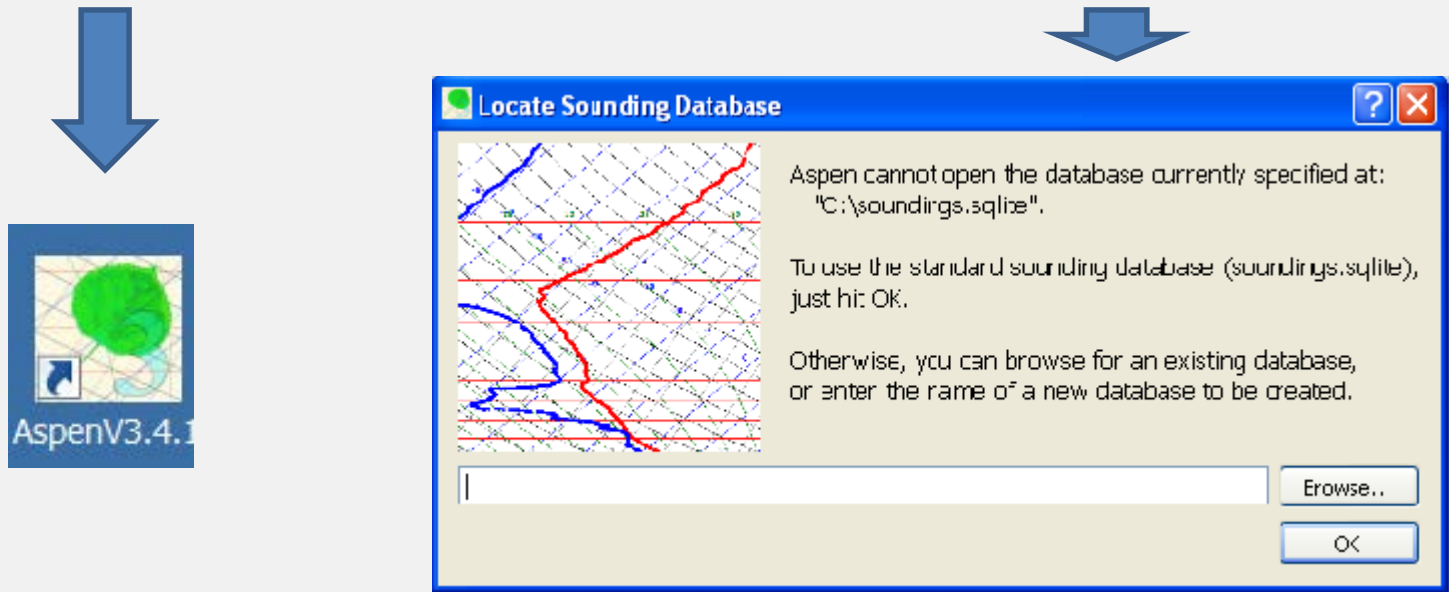
- Click "OK" to create a new database file, *unless* you are restarting ASPEN mid-flight. In that case browse to the location of Soundings.squlite on your computer. This is the data base that ASPEN will use to create the synoptic plots.
- After the correct file name/location appears in the window Click "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.
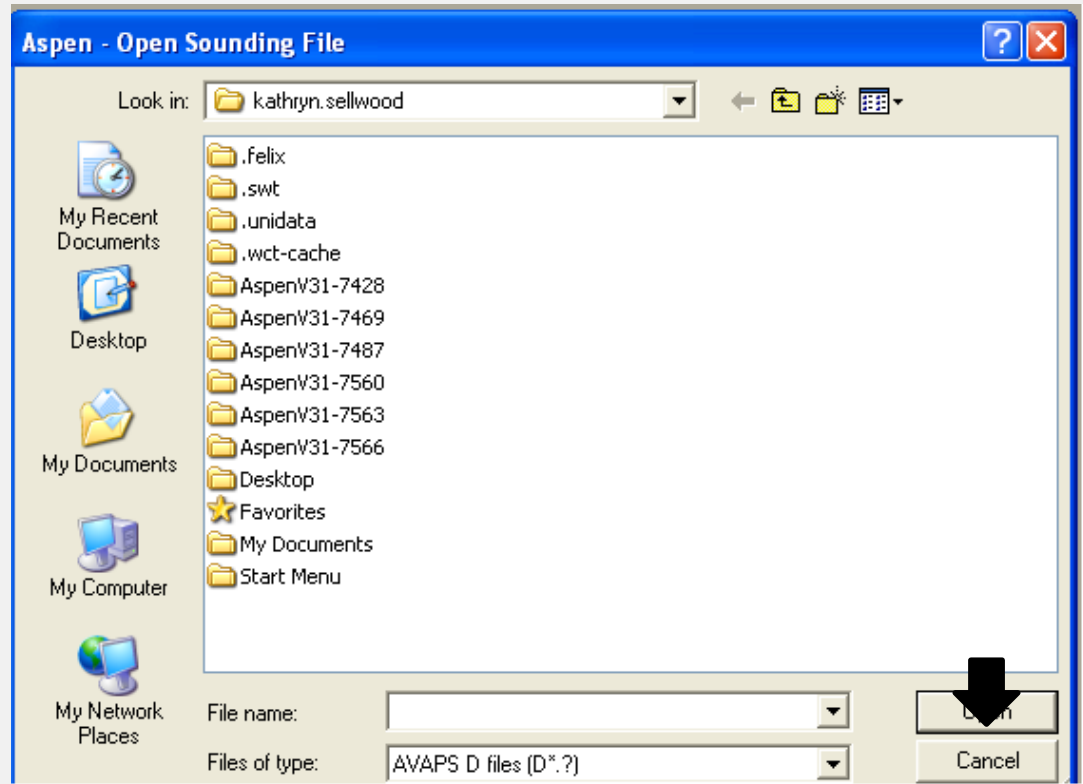
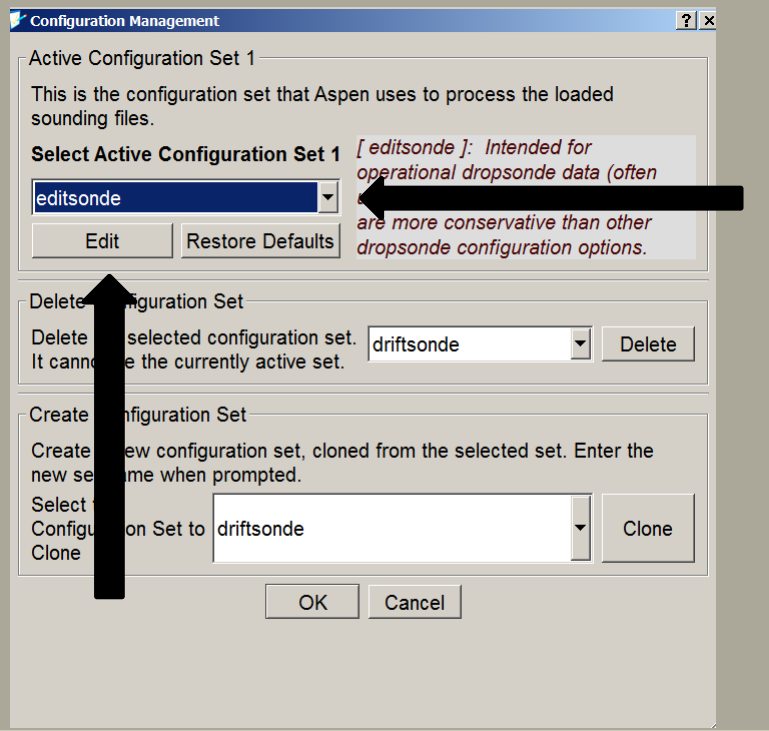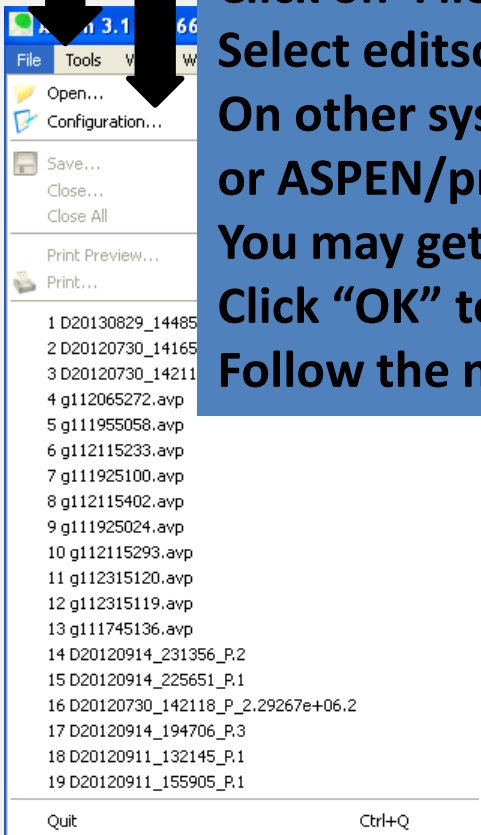Now make sure ASPEN is configured correctly
Click on File / configuration
Select editsonde then click on "Edit" button
On other systems the tabs may be edit /options or tools /configuration or ASPEN/preferences
You may get a pop-up window with "Invalid Fixed Data Source"
Click "OK" to close this window
Follow the next 6 slides to complete configuration.

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

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.
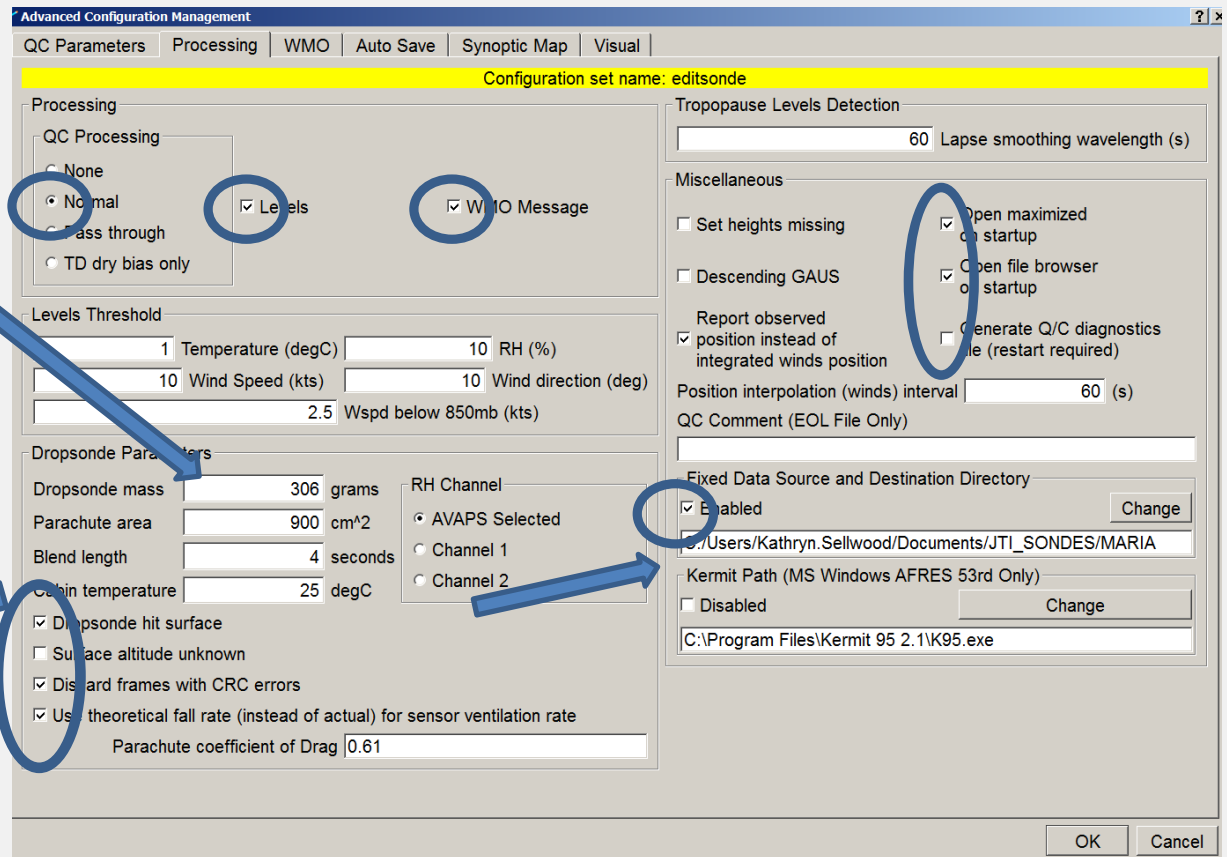
Next Tab: "WMO"

• You should not have to do anything in this tab, just confirm that "TEMP" is checked.

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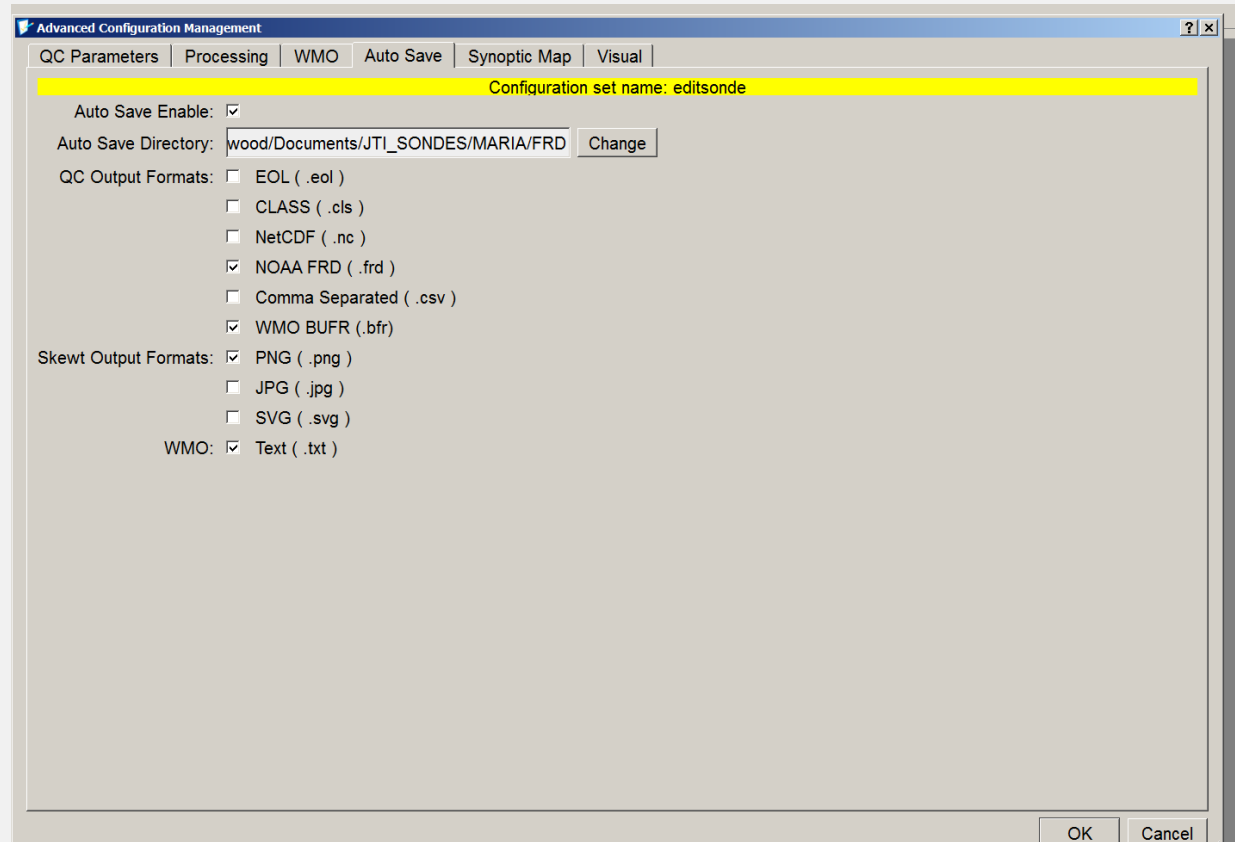
Next Tab: "Synoptic Map" (set name for synoptic plots)

- 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 "

Advanced Configuration Management

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

Configuration set name: editsonde

Geographical Database: wood/AspenV3.4.1/Geodata/ne1to50m.sqlite [Change]

Sounding Database: C:/Users/Kathryn.Sellwood/soundings.sqlite [Change]

Synoptic Map Title: 20190711H1_SYNMAP
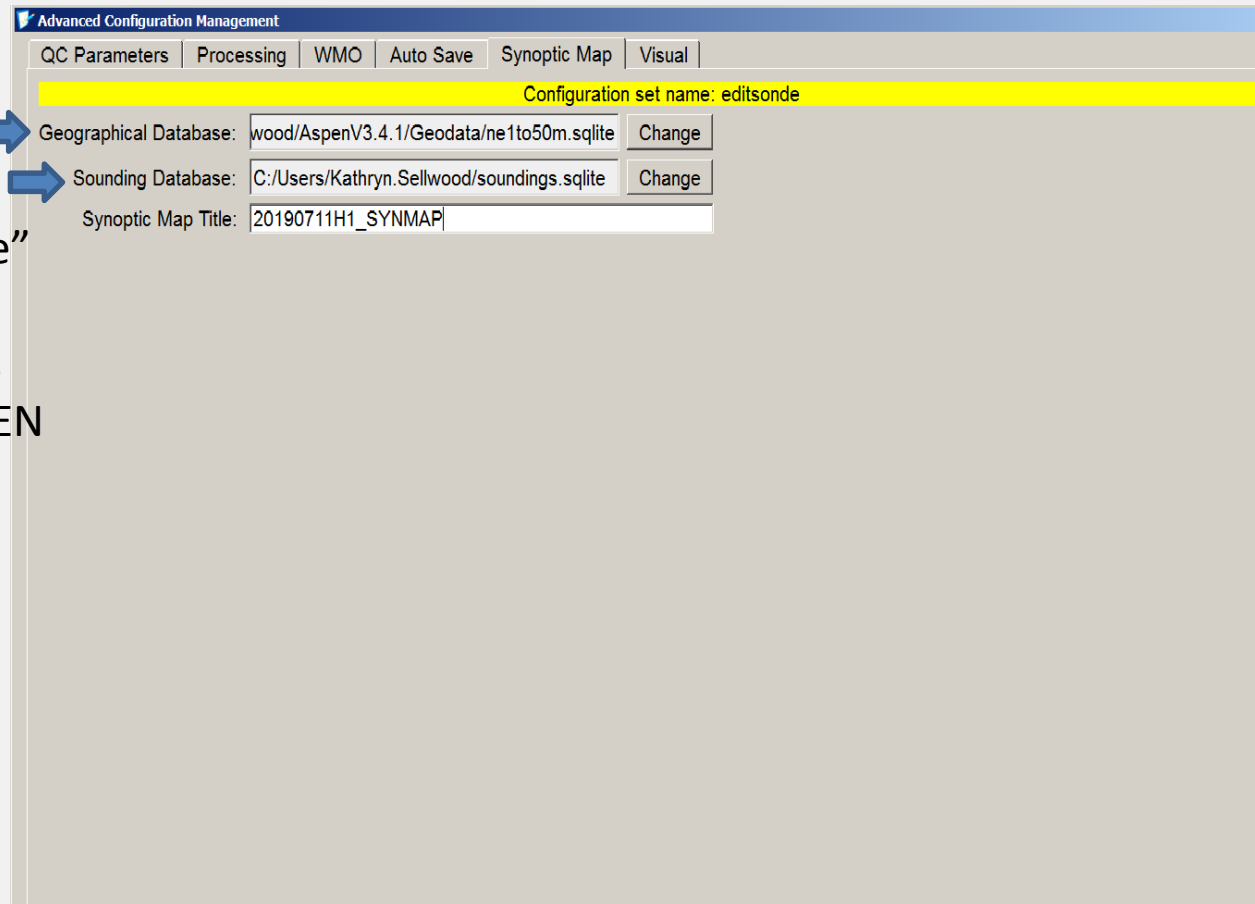
Next Tab: "Visual"
(adjust setting for Skew-T diagrams)

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	☑
Alt (m)	0	17000	☑
Tdry (degC)	-60	40	☑
RH (%)	0	100	☑
Wspd (m/s)	-20	100	☑
Wdir (deg)	0	360	☑
Dz/Dt (m/s)	-100	100	☑
Latitude	-90	90	☑
Longitude	-180	180	☑

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

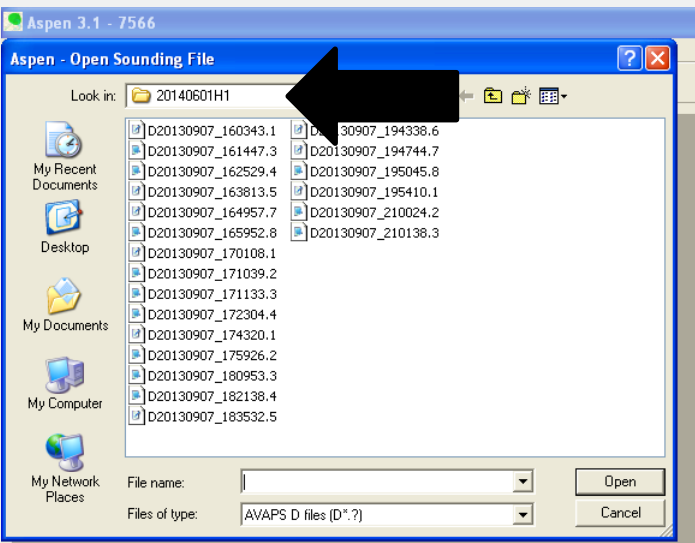# ASPEN will go back to configuration window …. Click "OK" to complete
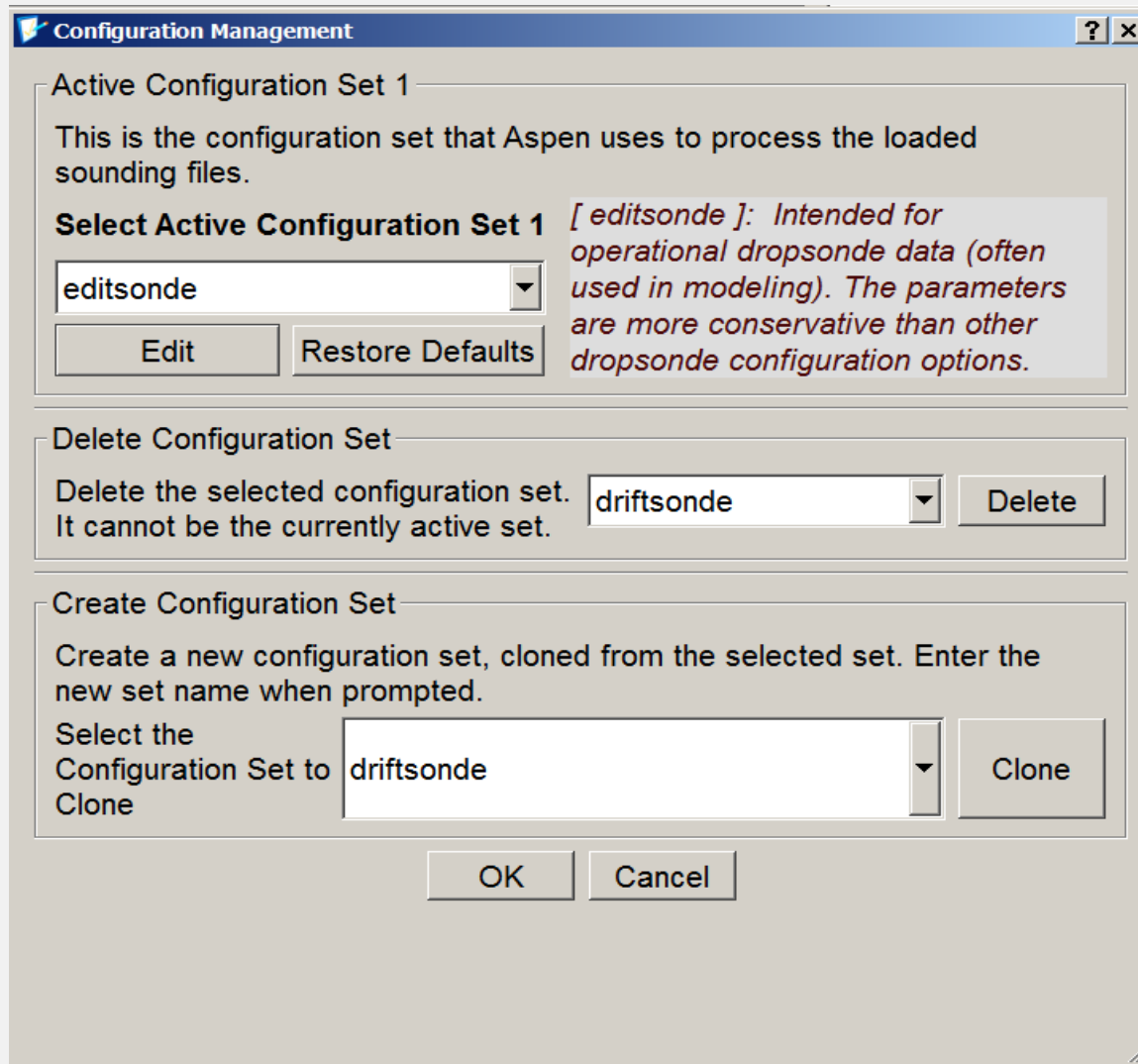
Start a dropsonde log

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.

Update the Dropsonde Log

- Note take off and landing times/locations
- Keep track of drop status via the headset (or XCHAT if on ground)
- Fill in Metadata
  -get the first 5 columns from the "MAIN" tab
  -get surface wind from the "WMO" message
  -get last wind height from the "Levels" tab)
- Enter SST for Combo drops with AXBT, and
- identify center, Eyewall and rainband drops with quadrant info.
- Use the comments sections to note anything interesting in the sounding or extra QC you did to sonde (ie. Reset end time, removed flight level RH)

N42/3RF HRD GPS Dropwindsonde Scientist Log (Revised 5/2002)

Storm_____ Dropwindsonde Scientists_____ Page ____ of ____

Flight ID_____ Flight Director_____ Takeoff from _____ at _____ UTC

Mission ID_____ AVAPS Operators_____ Recovery at _____ at _____ UTC

Drop #	Sonde ID #	Time (UTC)	Lat (°N)	Lon (°W)	Surface Pressure (mb)	Wind closest to surface dir/spd (kt) hgt (m)	BT SST (°C)	Eye, Eyewall, Rainband (direction)	Comments	Ob #

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 ou 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*

- 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...	-6...	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...		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	2	
185.76				73.7	222.8			-14.3			11	0.1	
186.01	946.6	23.8	98.0	G▸ 74.4	G▸ 222.2	129.4	G▸ 121.5	-13.8	G▸ 24.9...	G▸ -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	

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

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
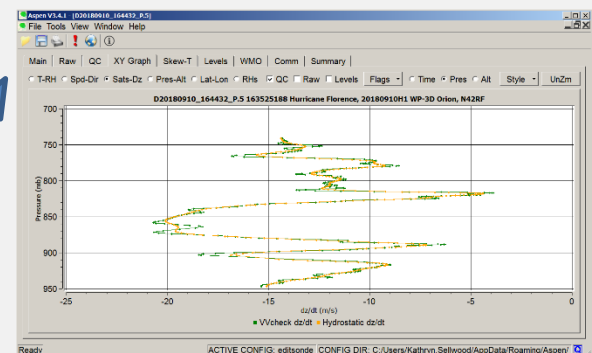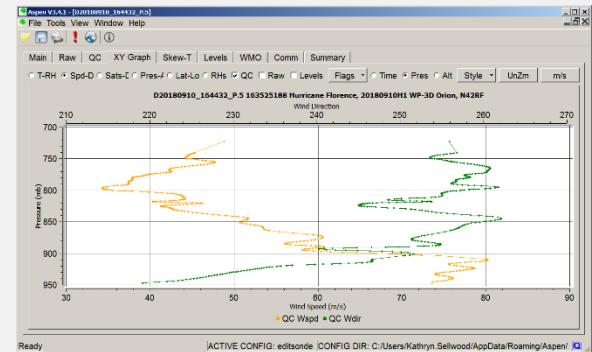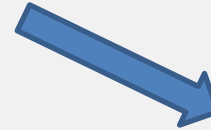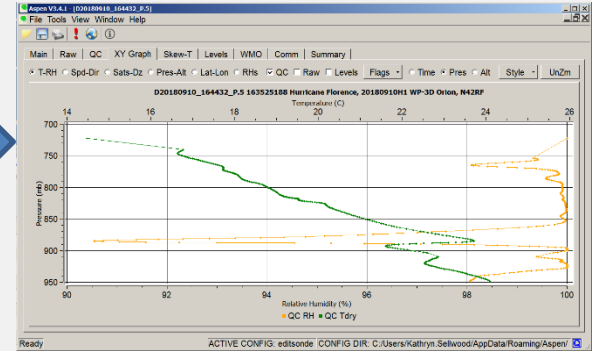
Switch to "Time" Y axis and zoom in to better locate data points
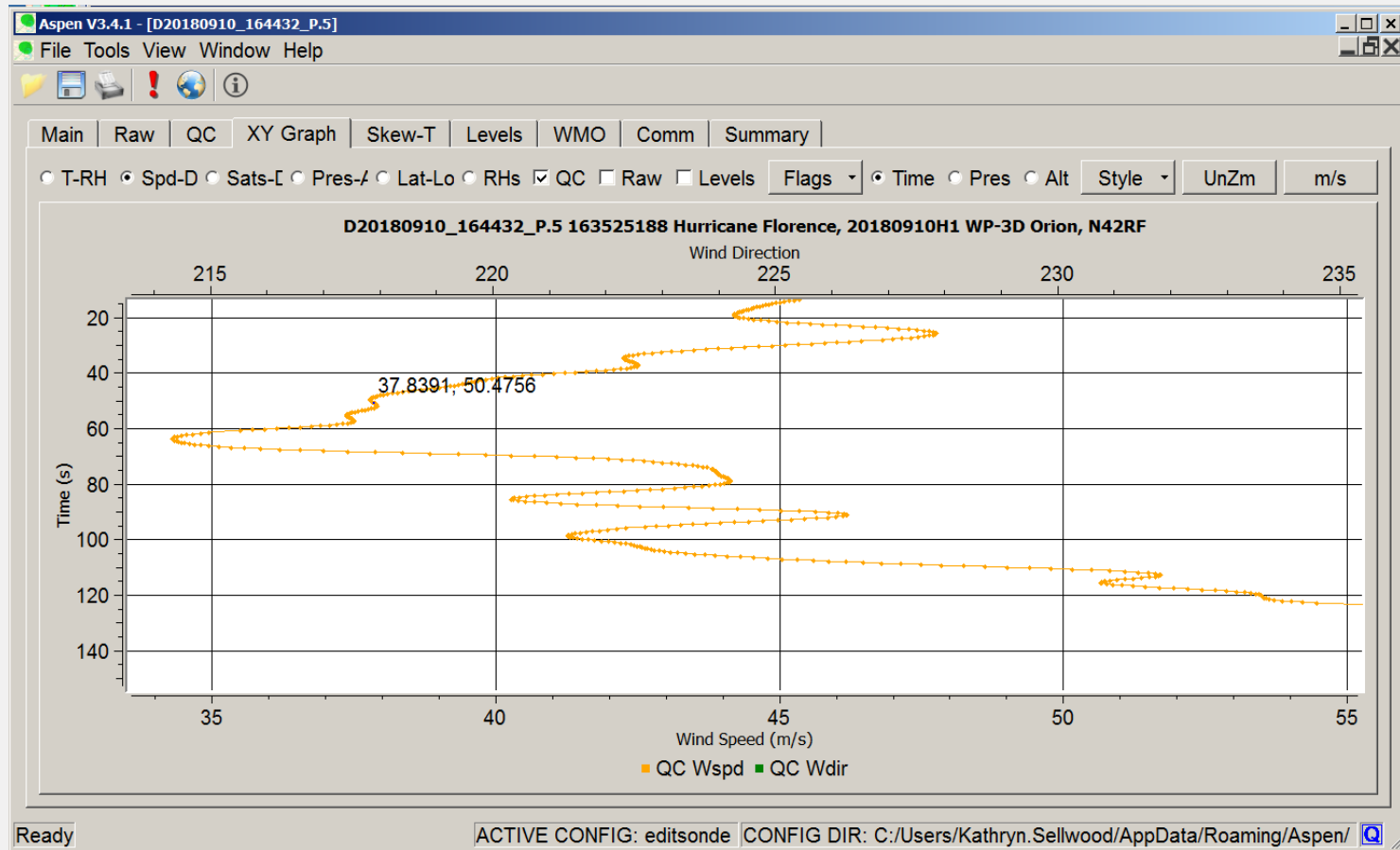
Select Data to Remove or Retain in RAW Tab

- 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	74			136.1	-15.2
185.26				75				-15.0
185.51	945.7	23.8	98.4	75			128.6	-15.0
185.76				75				-14.3
186.01	946.6	23.8	98.0	G 74.4	G 222.2	129.4	G 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

Set Ignore Attribute
Clear Ignore Attribute

Set Keep Attribute
Clear Keep Attribute

Ready

ACTIVE CONFIG: editsonde   CONFIG DIR: C

Look at QC Tab to See Changes

- Flagged data will be removed
- Surface atlitude 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	G 11.7	G 93.0	10629.7	G 10434.0	-18.7	G 20.3259	G -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.
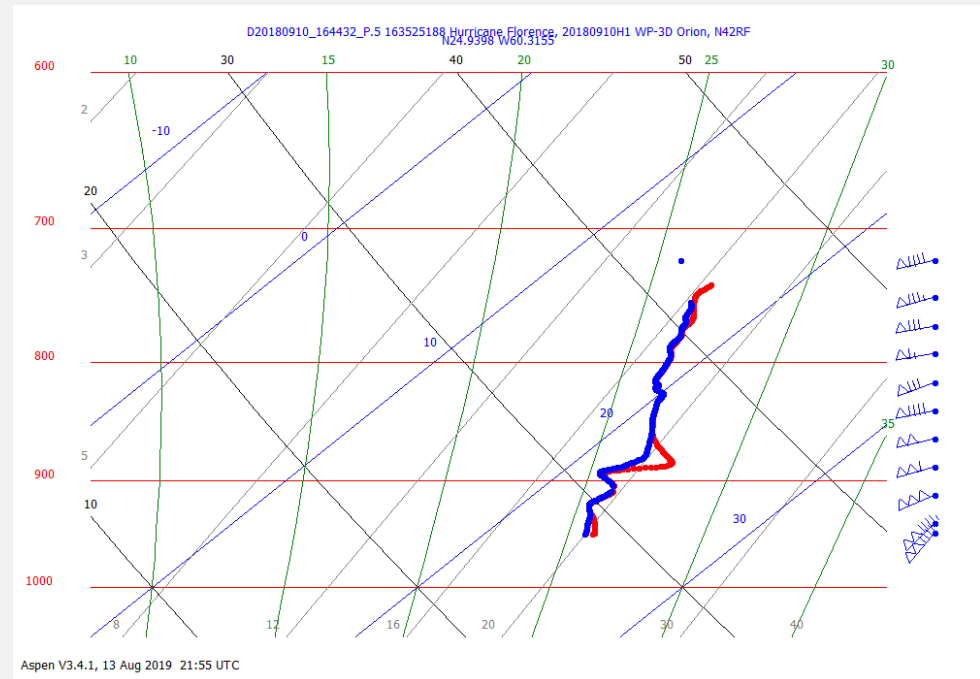
Check the Mandatory Levels data
(Levels Tab), note surface values for dropsonde log.

n	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.*

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

Use the COMM Tab to make Tempdrop Comments Section

- 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

- 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

- 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/aspen

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
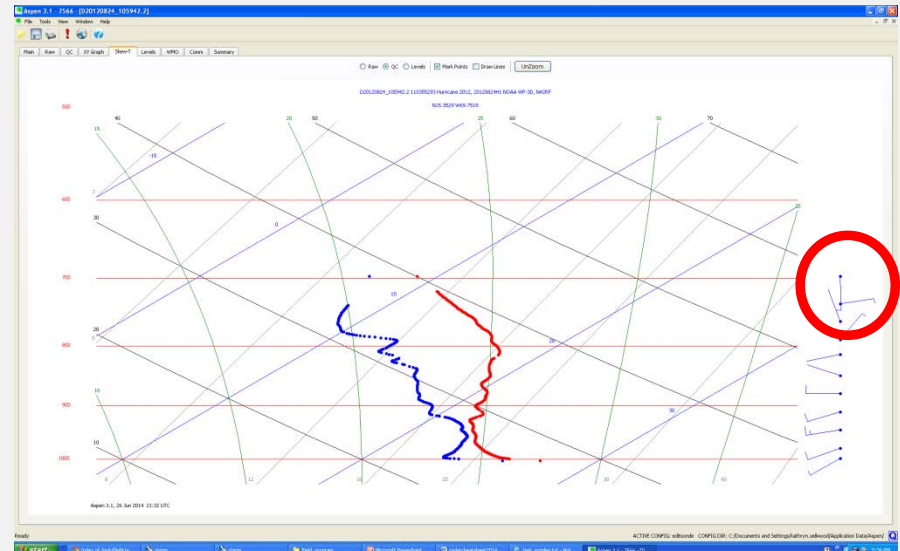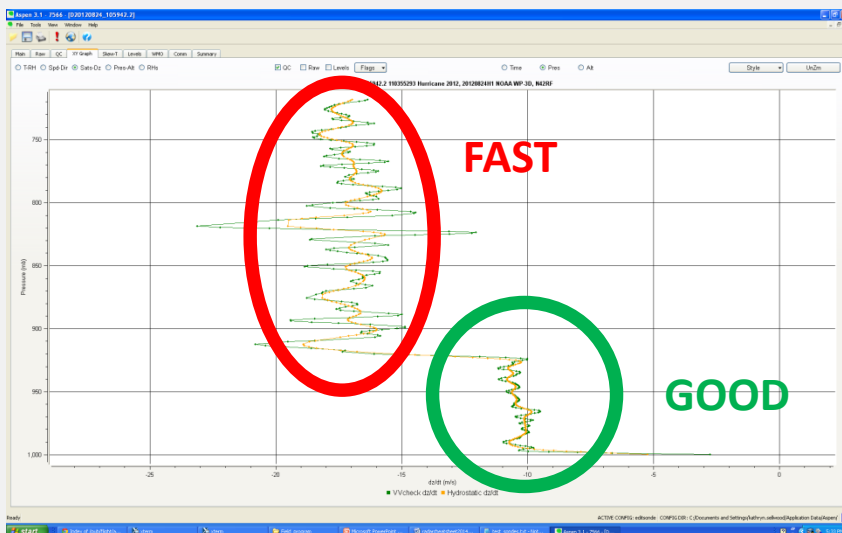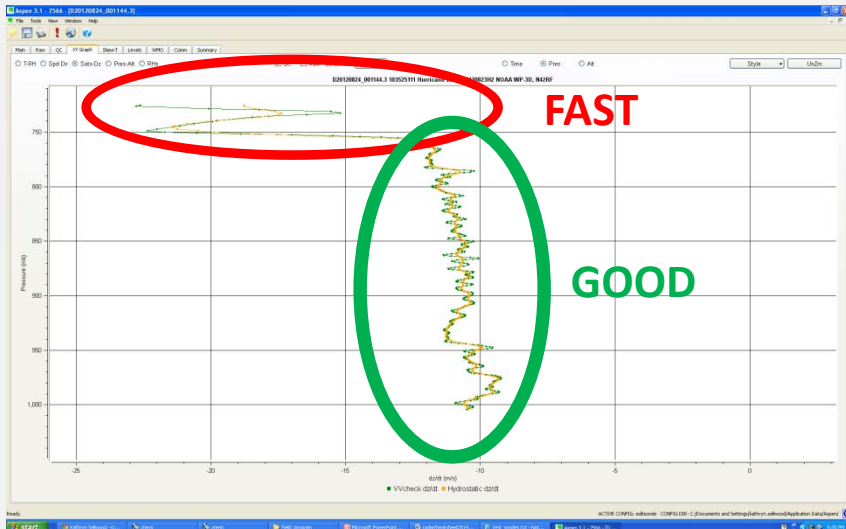
•Make sure that QC removes likely bad data

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
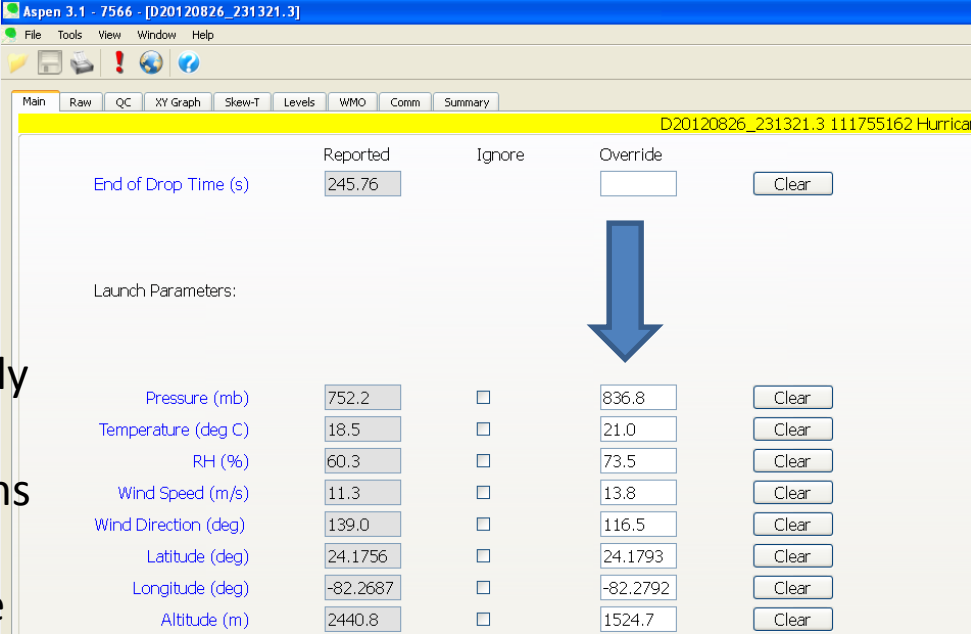- May be able to keep some winds if it is only a partial fast fall

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
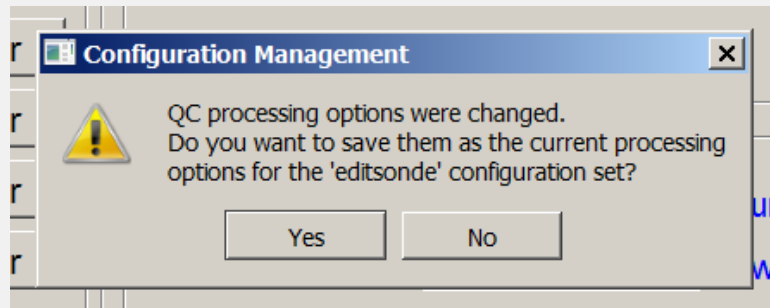
Late Launch Detect or Bad flight level data

- 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 (!)
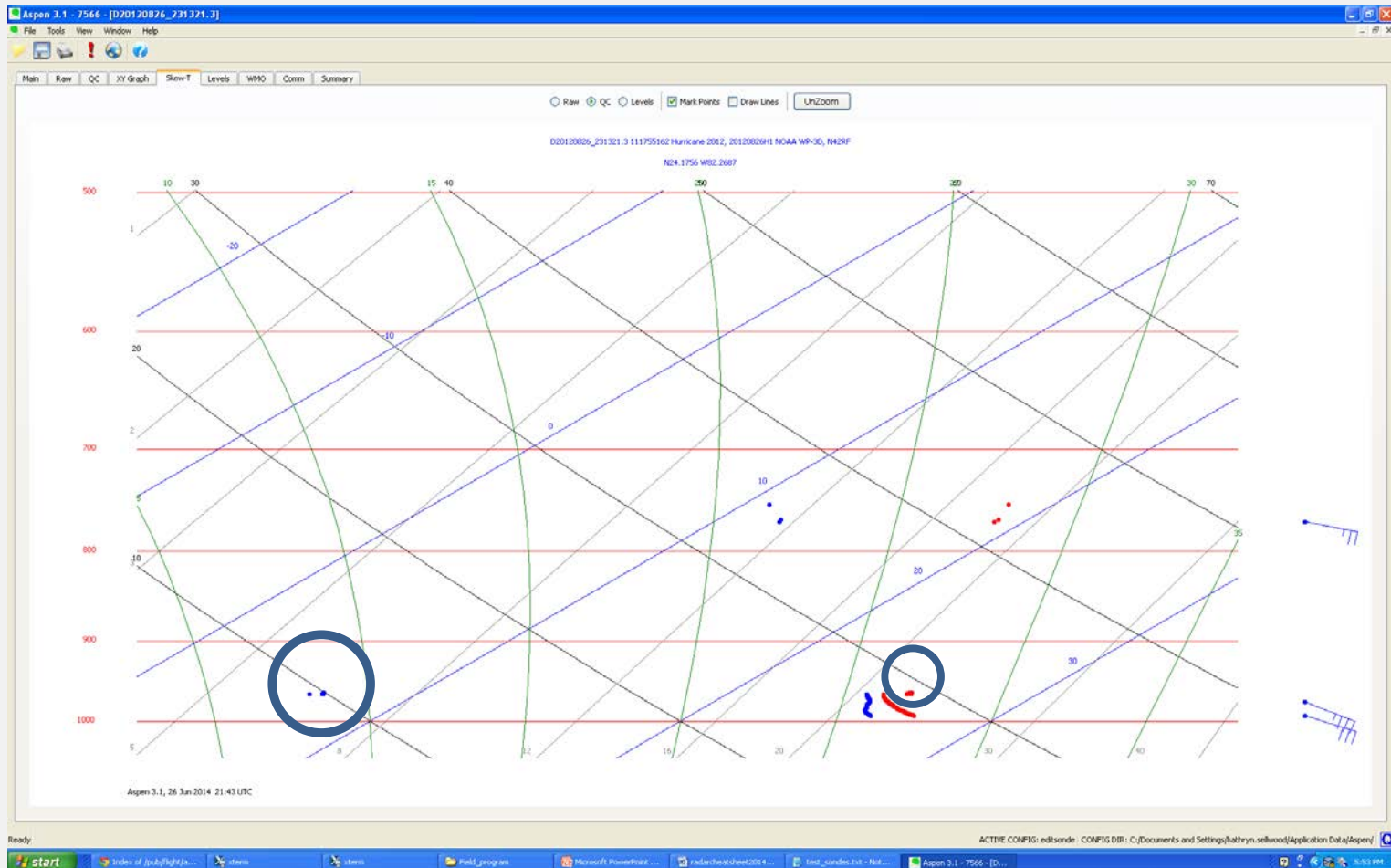- Click "No" in the pop-up window when closing the sonde

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.

Edit Tempdrop to add SST

- Click on last line in 62626 section to change then "modify
- Add SST in 10ths of degrees Centigrade before "="

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