1. D20210704\_113459 .4 : This is a fairly typical sounding, ASPEN generates a flag to set the end of drop time as there appears to be post splash data. Note that there is not launch altitude from upward integration. In the raw tab you can see satellite drop outs near the top of the sounding causing some lat/lon values to be flagged. The first few RH values seem a bit too low and probably should be flagged. P T and wind data are flagged at the top while the dropsonde sensors adjust to the environment outside of the aircraft. Wind needs a longer equilibration since the chute has to fully deploy to stabilize the drop and satellites must be acquired for GPS tracking. End of drop should be set to 291.50, notice the GPS altitude, lack of satellites and fall speed to determine end time, geopotential height can be nearly 50m at the surface. The temperature observation at 294.00 may actually be a valid SST and worth noting in your log.
2. D20210703\_170053.5: ASPEN does not always catch sondes with post splash data, note that there is no launch altitude from upward integration. Also if you check the WMO message, there is no surface data reported. End time should be set to 294.25. You will now have an upward integration and surface data in the WMO message.
3. D20210702\_175542.1: This is a center drop, these have priority because the flight director needs to include the data in their vortex message. In the raw tab you can see that there are very few flagged data and the end point looks good. In the XY plots you can see the sounding is warm and dry with multiple inversions. Winds are fairly calm, especially higher up. In the lat/lon plot you can see that the sonde is moving around the center. The skewt is fairly typical of an eye sounding, warm and dry at the top with a low level temperature inversion and weak winds. Higher winds near the surface indicate that the drop may have been late or that the vortex is tilted. Get the height of the lowest wind and the surface pressure from the levels tab and the surface wind speed and direction from the WMO message. Add a “CENTER” comment in the Comm tab and recompute (“!”). Xchat the surface information to the flight director, wind speed should be given in knots.
4. D20210929\_2141: This is an Eyewall drop. First notice the height from the downward integration and the low surface pressure. In the raw tab you can see at the bottom that both GPS altitude and geopotential height are over 400m so the drop failed before it reached the surface. When this happens, go back to the main tab and uncheck the “hit surface” box and check “set heights missing” and recompute (“!”). This will clear the surface pressure and upward height integration. Check the xy plots to make sure the data is good. Note the high RH and 65 m/s wind speeds and strong vertical motion. Skewt is typical of an eyewall sounding. Add the “Eyewall” comment in the Comm tab, from the wind direction the azimuth appears to be 315 (NW). ASPEN will produce a pop up window when you close the sonde asking if you want to save changed attributes, click no.
5. D20211026\_223731.7: ASPEN detects and fixes a late launch detect, note the times reported in the popup window. Open the dfile in a text editor and search for “LAU”, this will be at the line corresponding to the original launch time. You will notice a jump in pressure. Scrolling upwards to the launch time diagnosed in ASPEN you can see that this is when the sonde actually left the aircraft. Get the latitude and longitude from this line and use it to override the launch lat/lon in the main tab ( -86.382346 17.852428). Look at the XY plot of lat/lon before and after you do this. Once you close the pop up another one appears for post splash data, set the end time to 275.25.
6. D20211006\_145901.3: ASPEN identifies this as a fast fall, normal fall velocities are between 10 and 12 m/s. Look at vertical speed in the XY plotting first to see if this is indeed a fast fall. Notice that the fall speeds are 15-20 m/s and vertical velocities are negative throughout. This is definitely a fast fall and all the winds must be removed. The data can be sent if the PTH looks reasonable. In this case the PTH data appears to be questionable, note the RH between 700 and 850mb and T near the surface. Best to let this one go.
7. D20210909\_174936.3: The first thing you should notice is that the fall time (182.01s) is a bit short for a 2426.5m release altitude. Looking at XY plots, RH and Wind are noisy at the top and the sonde is a fast fall up until about 870mb. Switch the y axis to time to see that the sonde starts falling normally after 69s. Go back to the raw tab and remove wind and RH before 69s.

**Extra practice sondes:** Here are a few more examples to try on your own.

D20210831\_135941.7: This is a center drop. The correct end time is 189.50. The data near the top of the sounding doesn’t look right, especially lat/lon, if you change the y axis to time, it looks like the first 9 seconds of data should be removed. Skewt is also typical of center sounding. Add center comment in the comm tab. Make note of the surface measurements.

D20210702\_163358.3: This is an eyewall drop, notice the fairly long fall time and no post splash data. From the xy plots you can see there are some good updrafts between 850 and 950mb and downdrafts near the surface. You can also see that the sonde moves around the center. Add eyewall NW comment in Comm tab. Skewt is typical of eyewall sounding.

D2020918\_160708.2: This is another center drop. The correct end time is 180.50. In the xy plots you can see some questionable data at the top of the sounding, most notably in the lat/lon. In the raw tab you can see that there were many satellite drop outs at the top. Switching to time on the y axis it looks like about 25s of wind and lat/lon data need to be removed and about 5s of RH data. Notice the very light variable winds throughout the sounding. Make note of the surface measurements.

D20210704\_103900.9: ASPEN give a late launch detect warning, drop time is 151.50 and there is no flight level information. The extrapolated pressure is 848.8. It appears that the sonde started to fail at about 57 seconds in and died completely at 123.50s. If you look at the WMO message no mandatory levels are reported and the rest of the data is questionable. Do not bother trying to QC this drop and do not transmit when the data is this sparse or questionable.

D20210904\_200900.1: This is an example of an early launch detect sonde that would have to be manually edited before loading to ASPEN. The extra data must be removed, the “LAU” line reset and the flight level data on the next line replaced, D20210904\_20900.1\_fixed shows how to do this. This is difficult to do on the aircraft, you can hold the sonde until later and try to fix or decide not to send the sonde at all. If it is a center fix you will have to try to process. Unfortunately, this happens most often on center drops as the AVAPS operator has the drop initialized and ready to drop ahead of time.

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**Test Sondes:** These must be processed correctly and entered onto a dropsonde log to demonstrate your readiness to process sondes operationally. Send the ASPEN\_OUTPUT files and the log sheet to Kathryn, Jason and JZ when you have completed them. Be sure to add comments, ie. Good drop no QC, fast fall, late launch, post splash data, center or eyewall and quadrant. Note end times if you had to remove post splash data and any other manual QC that you provided.

1. D20201007\_043812.7
2. D20201111\_112156.3
3. D20210702\_165953.5
4. D20210816\_123852.7
5. D20210816\_125739.5
6. D20210817\_095824.2
7. D20210820\_000305.7
8. D20210828\_105821.2
9. D20210828\_140232.5
10. D20210906\_191842.3
11. D20210925\_225725.3
12. D20210930\_000250.4