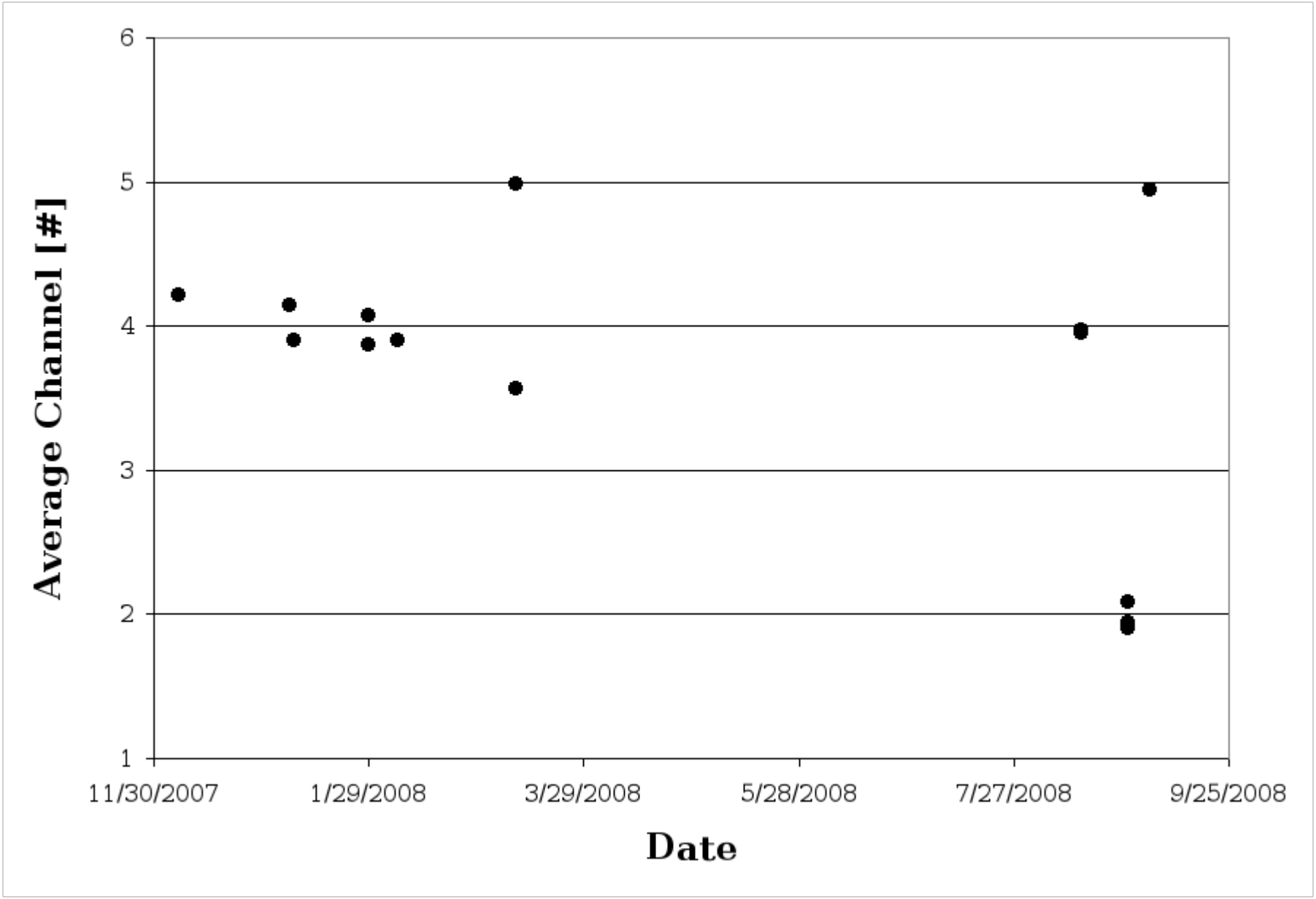
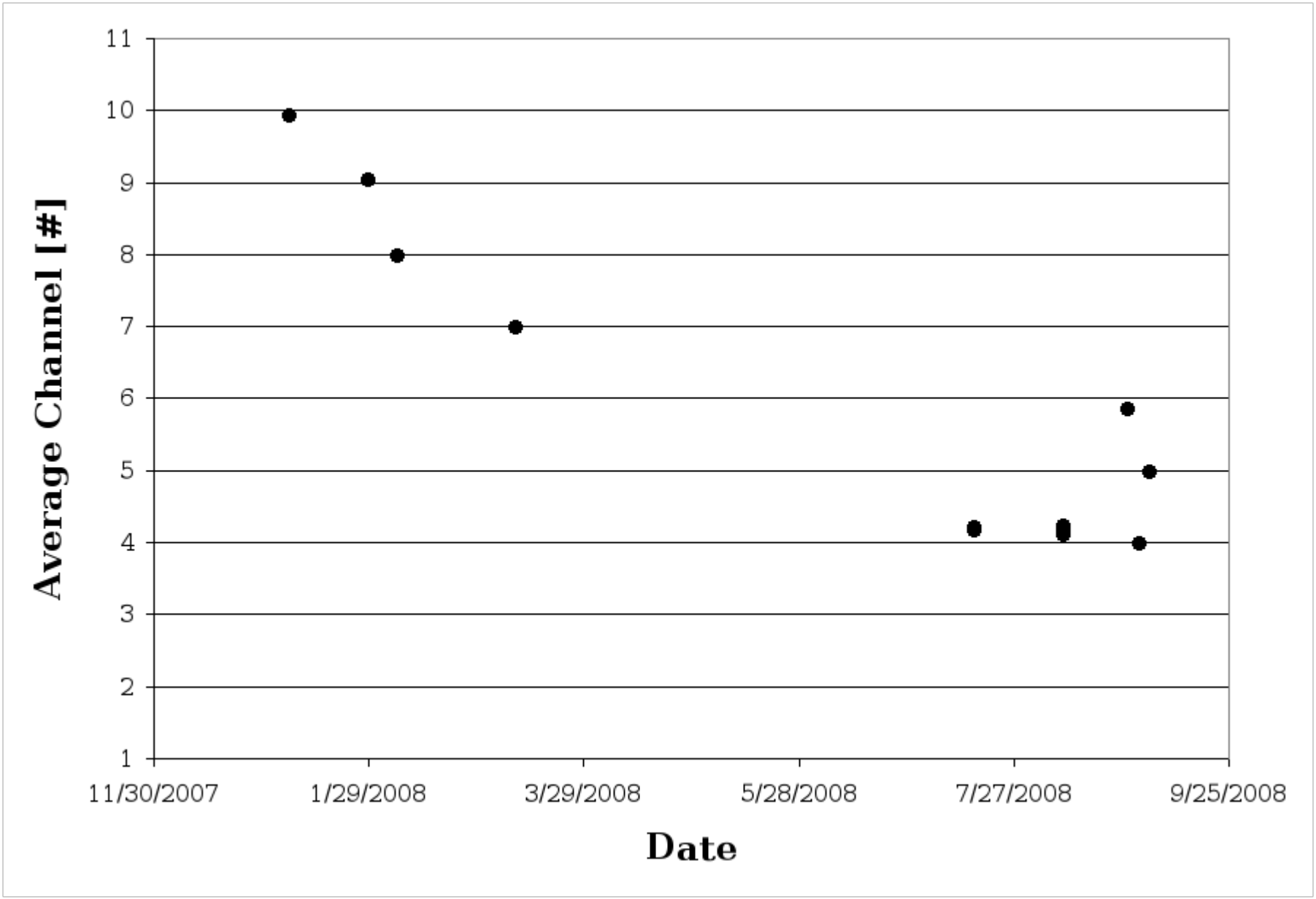
Saudi Arabia 2007/2008 Calibration Checks and Quality Assurance

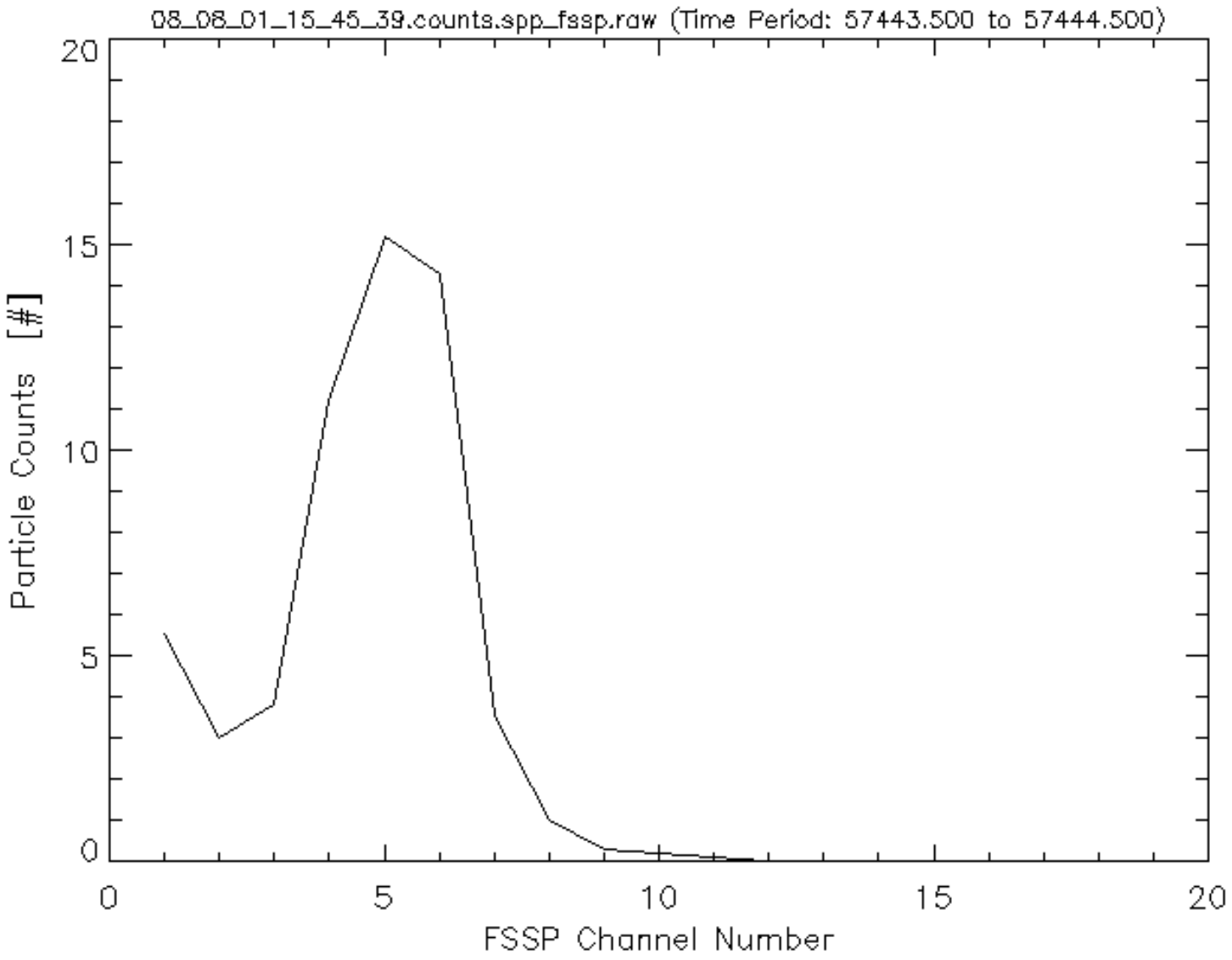
By
David Delene
Christopher Kruse

15 um Bead Checks

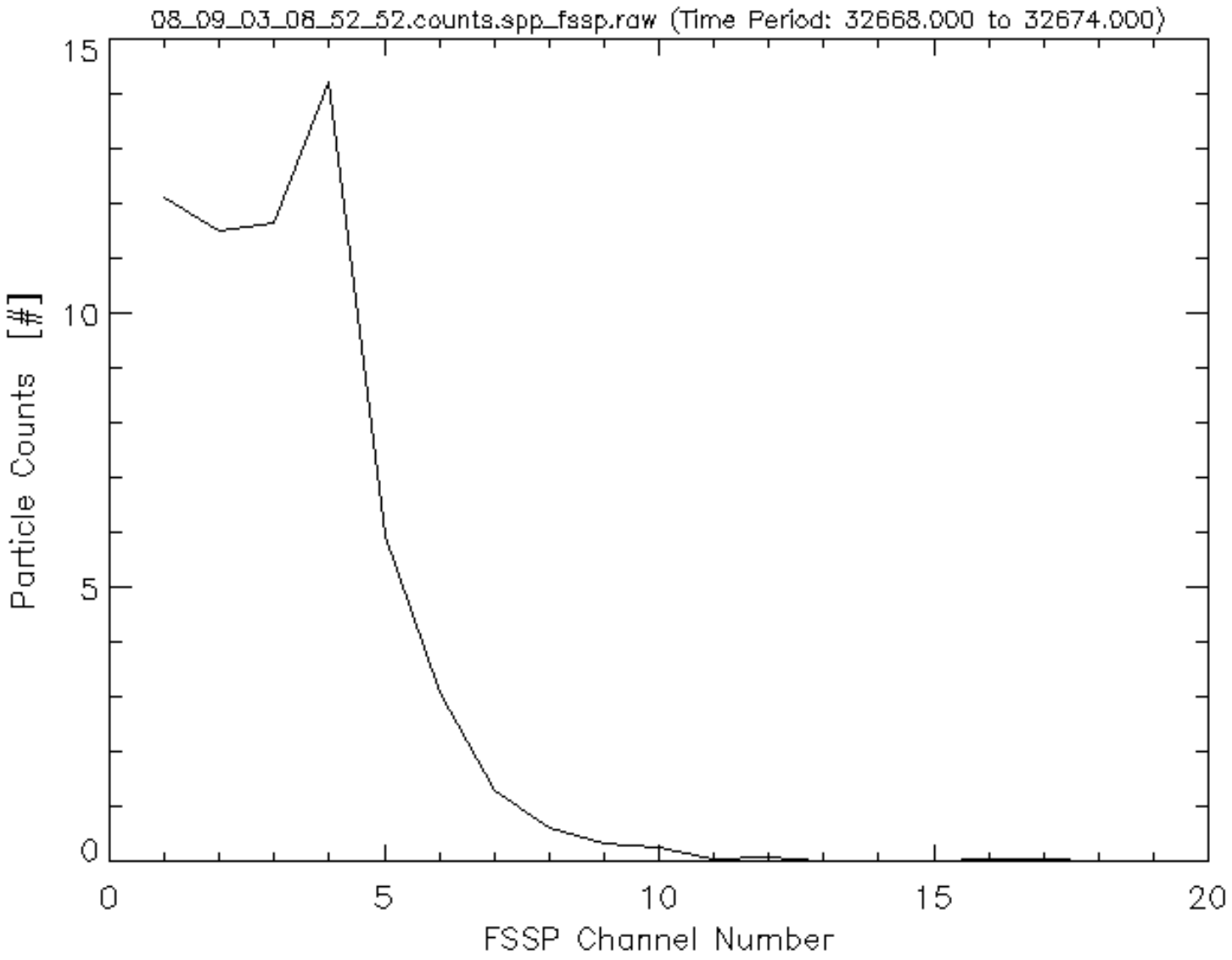


30 um Bead Checks

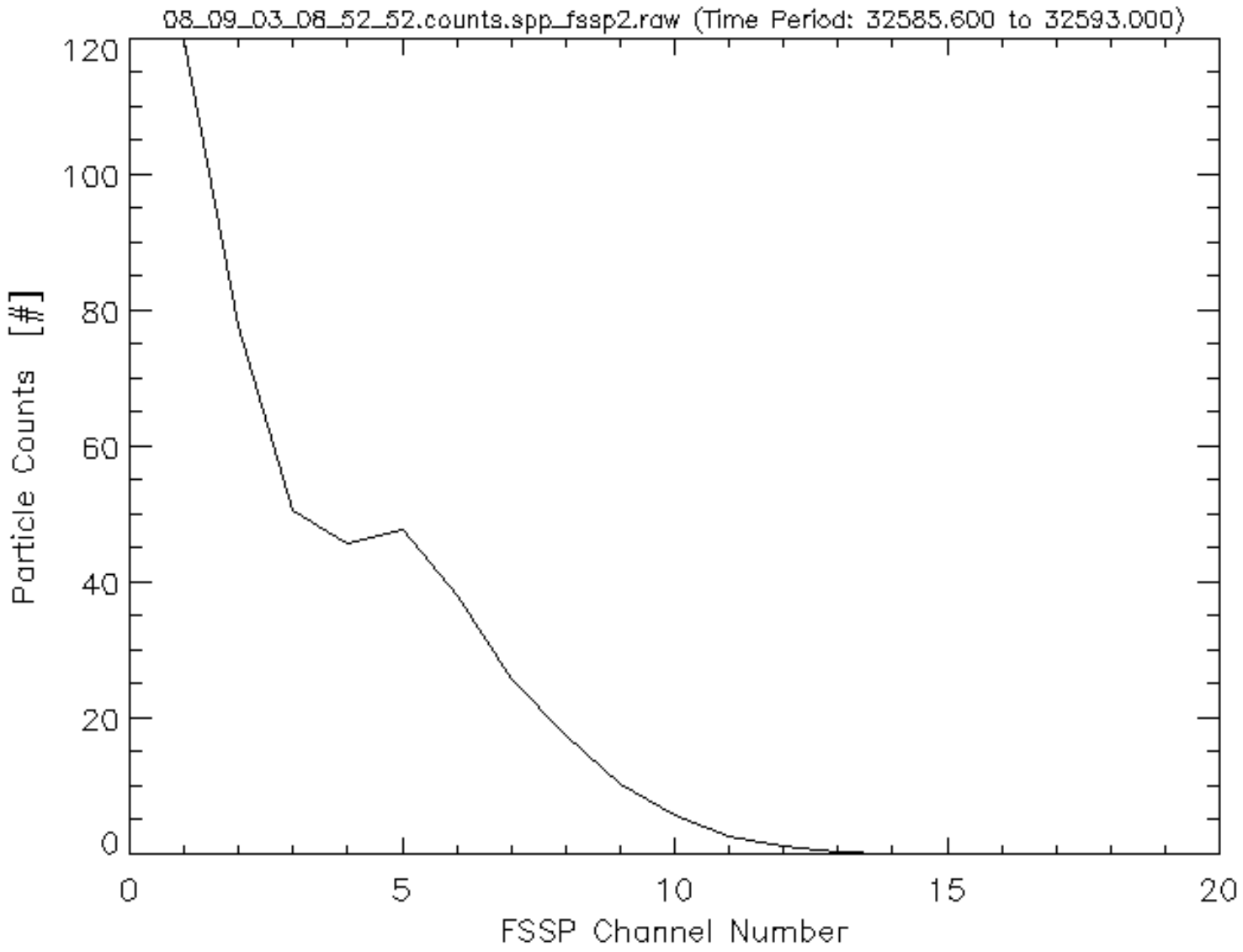




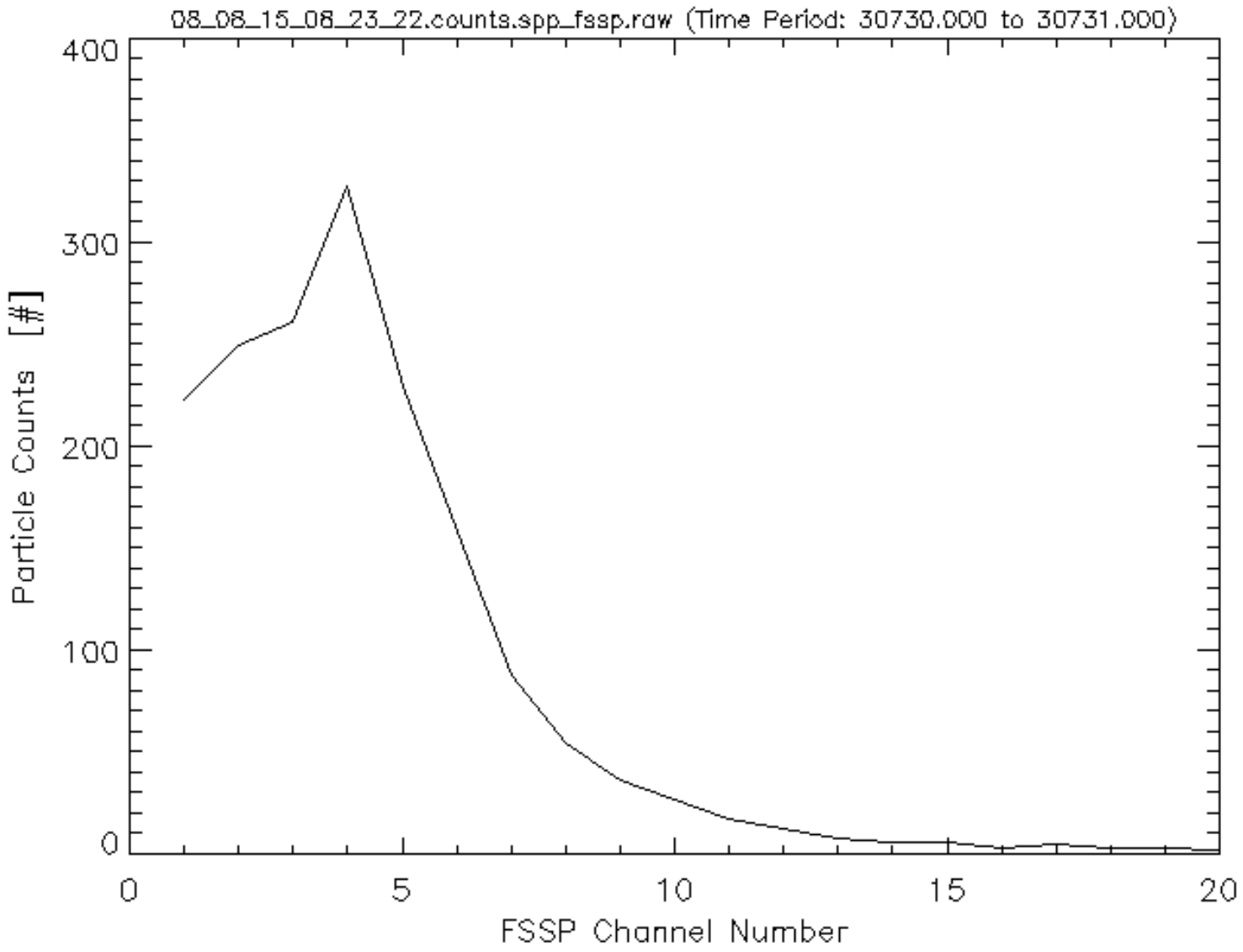
August 1, 2008 calibration check on the NCAR FSSP (SN 277-0676-06) using 15 µm beads. Calibration check was performed at UND before being shipped to Saudi Arabia.



September 3, 2008 calibration check on the NCAR FSSP (SN 277-0676-06) using 15 µm beads. Calibration check was preformed while the probe was in Saudi Arabia on the Research Aircraft



September 3, 2008 calibration check on the WMI FSSP (SN 1947-0281-60) using 15 µm beads. Calibration check was preformed while the probe was in Saudi Arabia on the Research Aircraft

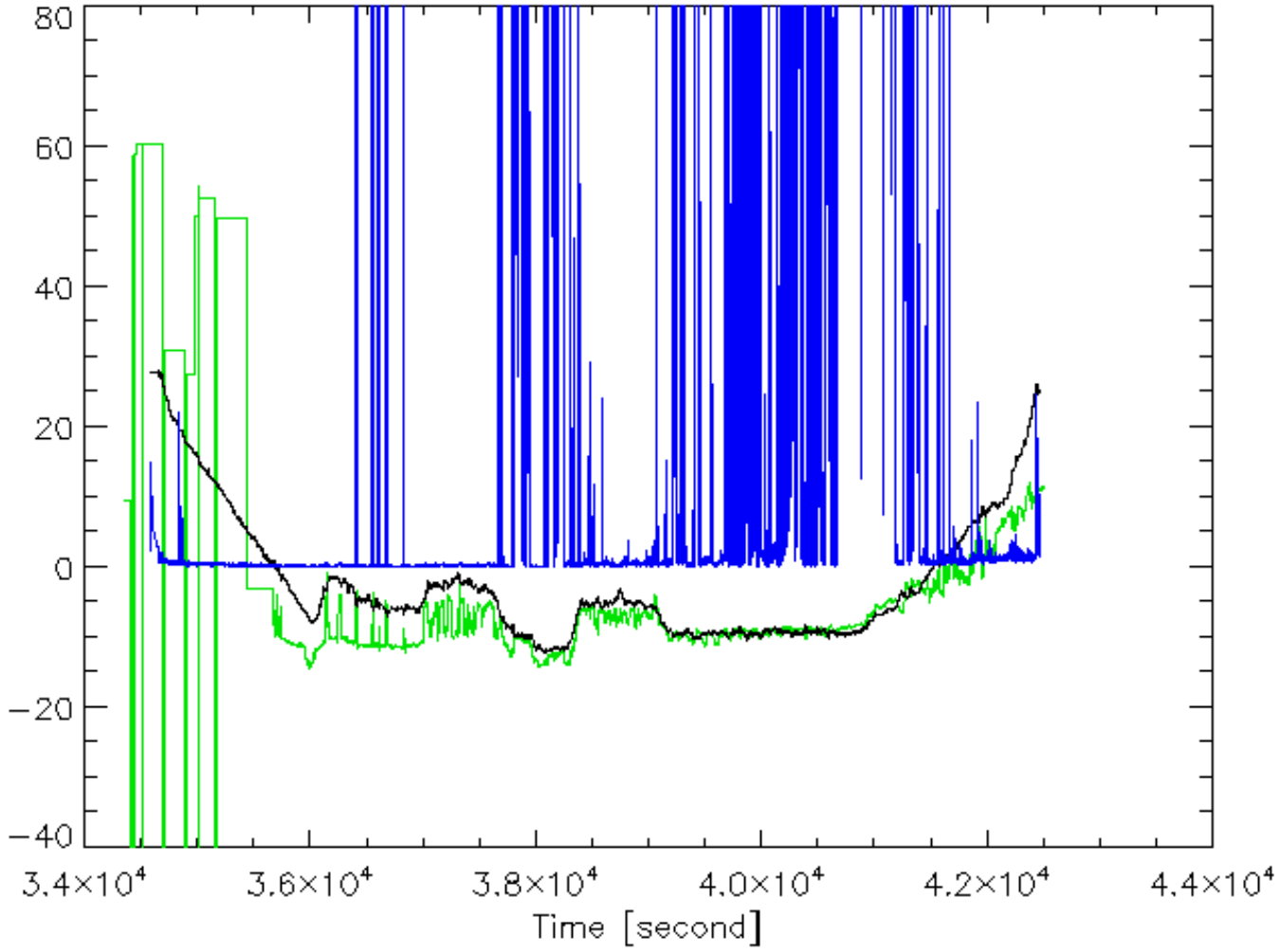


August 15, 2008 calibration check on the WMI FSSP (SN 1947-0281-60) using 15 µm beads. Calibration check was preformed while the probe was in Saudi Arabia on the Research Aircraft

FSSP Data

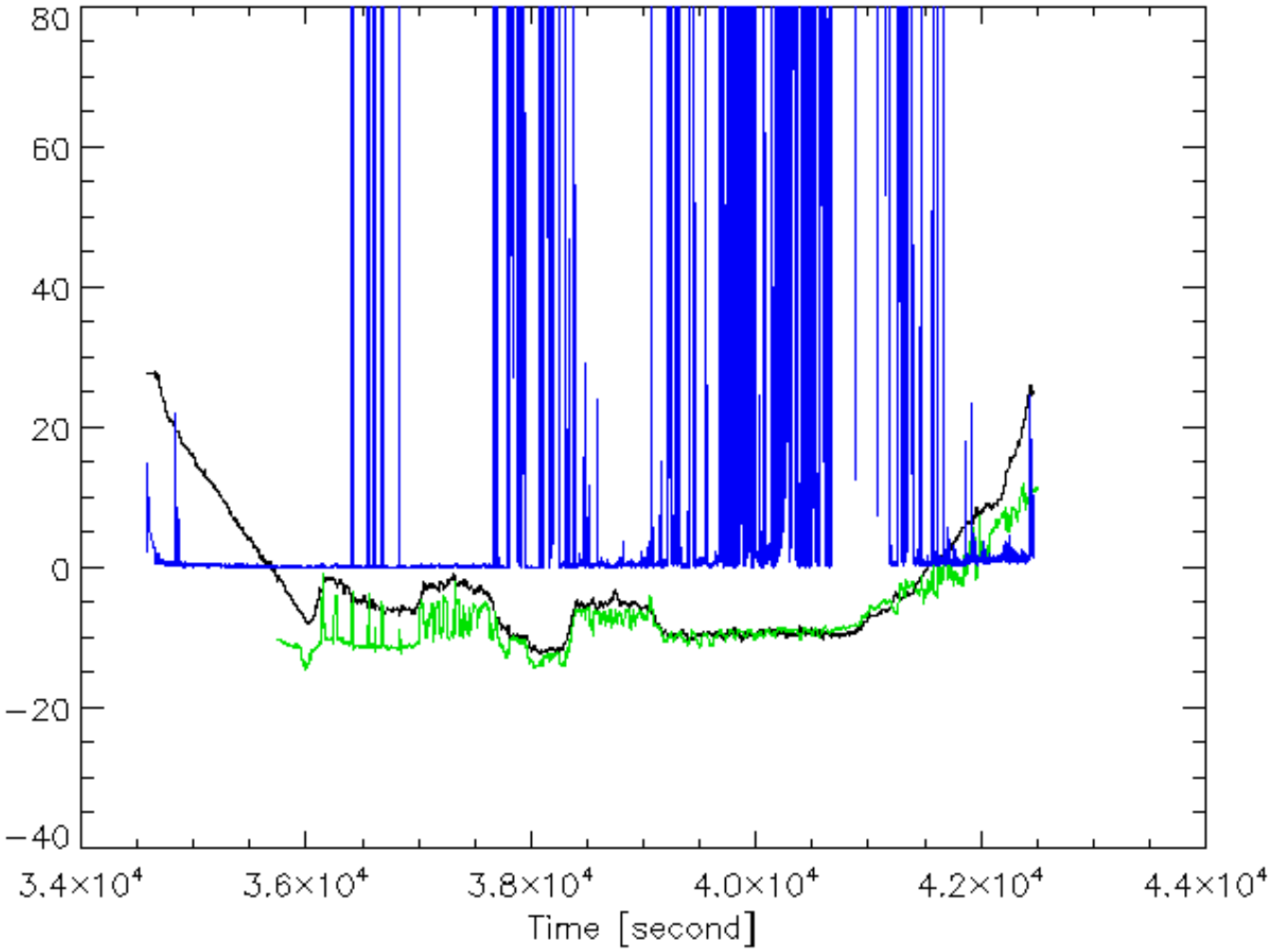
- Show use a vacuum to draw air through the FSSP for calibration checks.
- Need to do a evaluation of the NCAR FSSP once it returns from Saudi Arabia.
- Need to look closely at the 30 um bead checks.

Dew Point Temperature



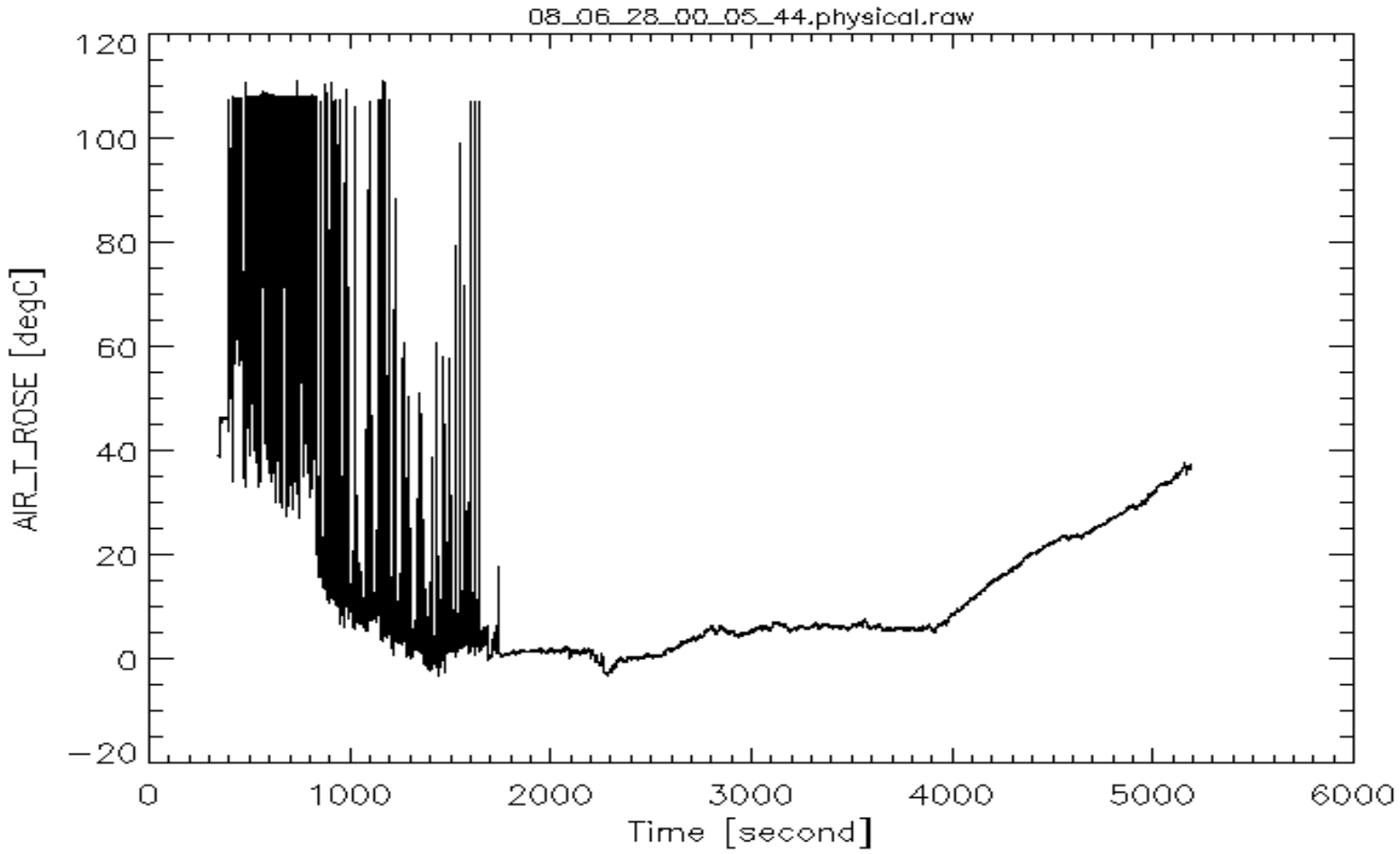
Unedited data from the July 9, 2008 Saudi Arabia flight. The temperature (degrees C) is black, dew point temperature (degrees C) is green, and the FSSP concentration (#/cm^3) data is blue.

Dew Point Temperature



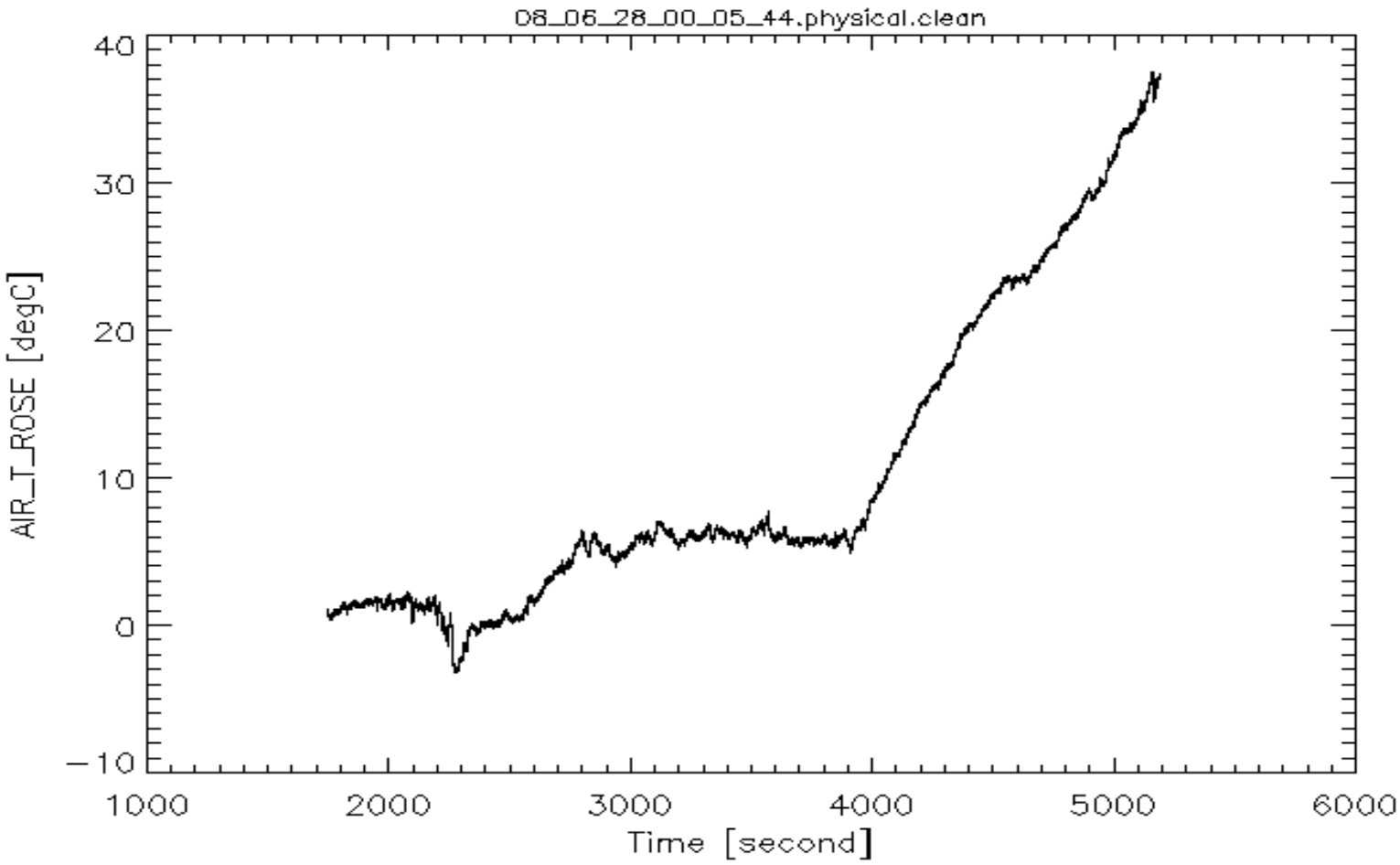
Edited data from the July 9, 2008 Saudi Arabia flight. The temperature (degrees C) is black, dew point temperature (degrees C) is green, and the FSSP concentration (#/cm^3) data is blue.

Temperature



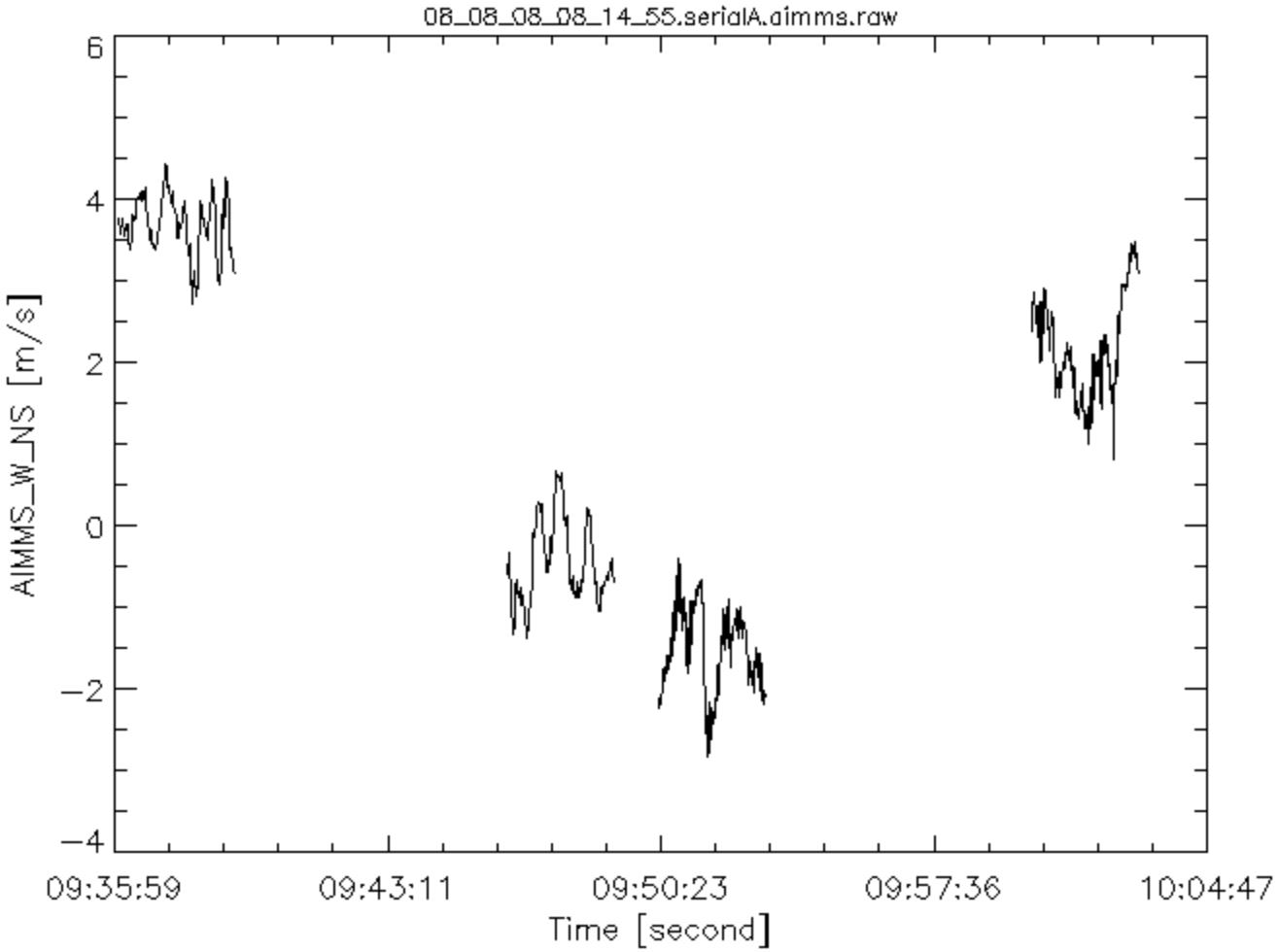
Unedited temperature data from the June 28, 2008 Saudi Arabia flight.

Temperature



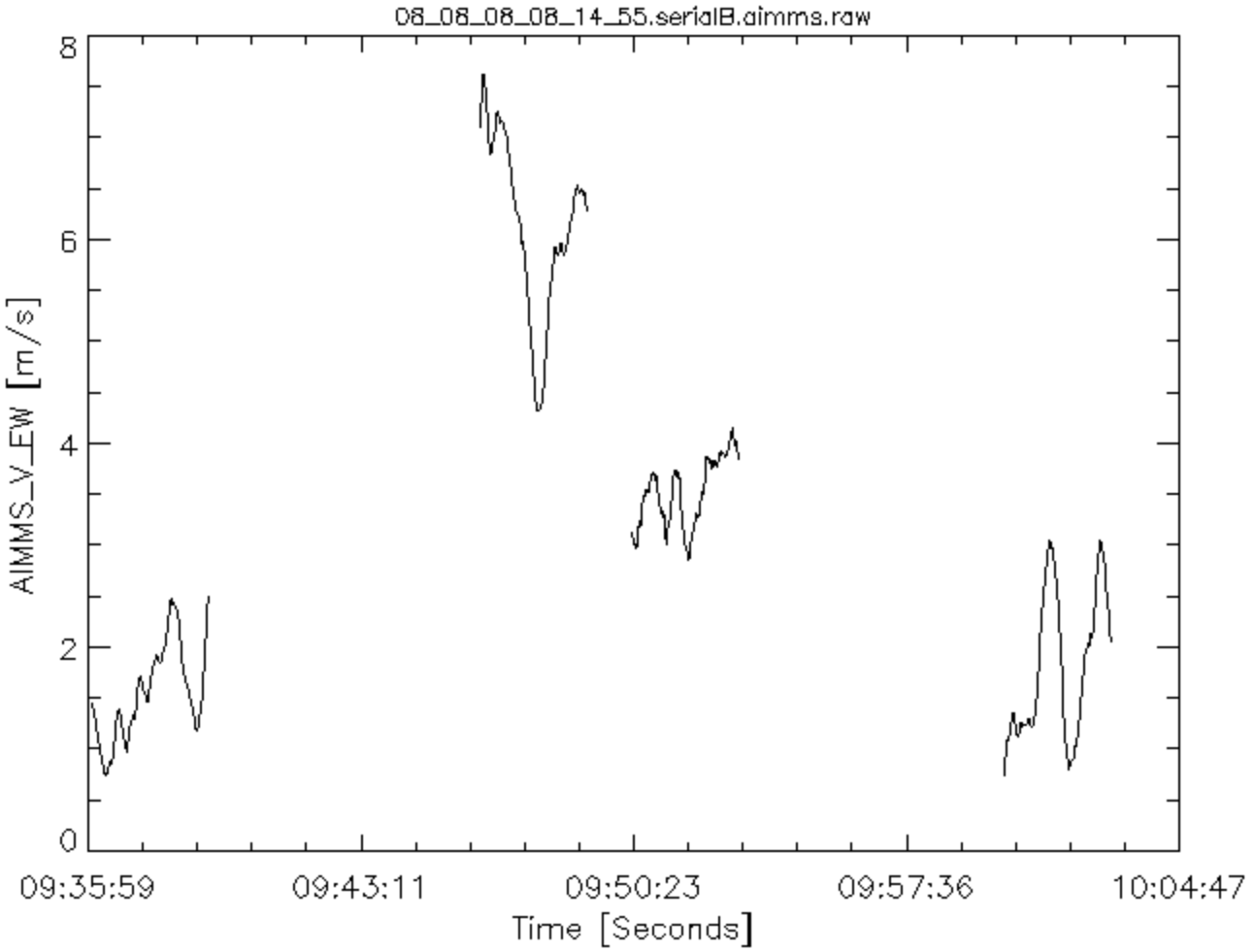
Edited temperature data from the June 28, 2008 Saudi Arabia flight.

Winds



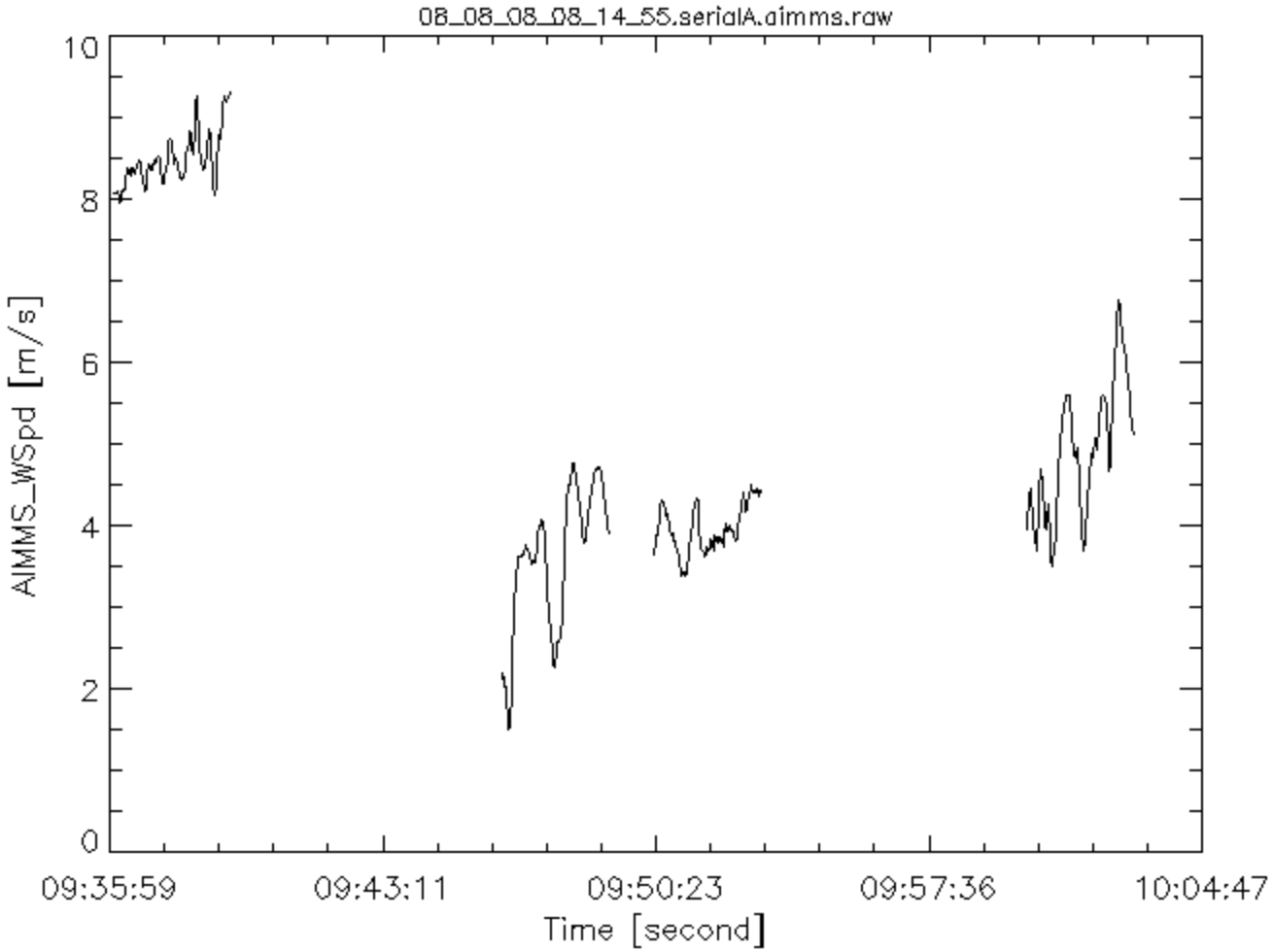
The north/south component of the horizontal winds from the AIMMS probe on August 8, 2008. The first and last intervals are when the aircraft is heading north, the two intervals in the middle are when the aircraft is heading south.

Winds



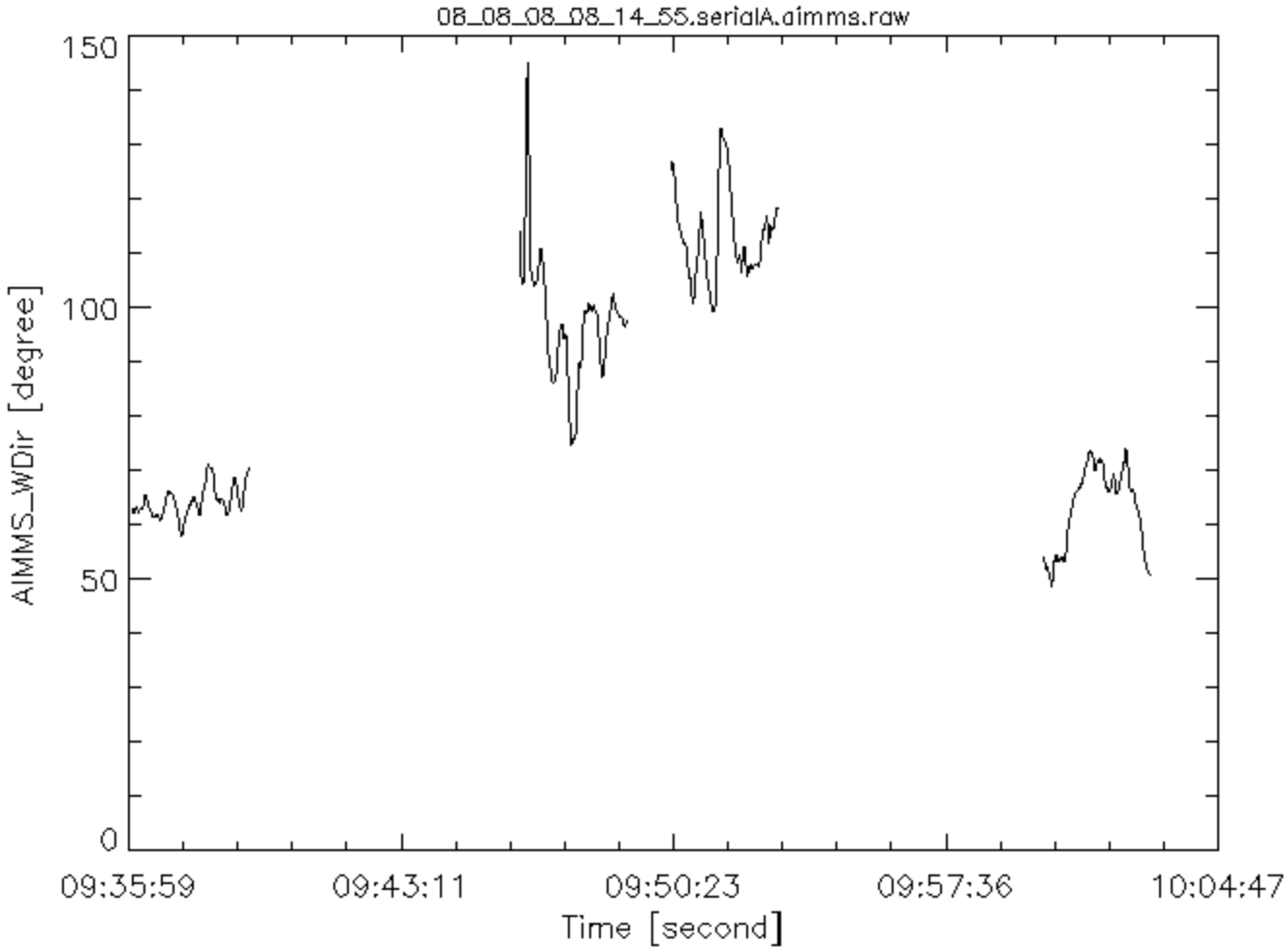
The east/west component of the horizontal winds from the AIMMS probe on August 8, 2008. The first and last intervals are when the aircraft is heading north, the two intervals in the middle are when the aircraft is heading south.

Winds



The magnitude of the horizontal winds from the AIMMS probe on August 8, 2008. The first and last intervals are when the aircraft is heading north, the two intervals in the middle are when the aircraft is heading south.

Winds



The direction of the horizontal winds from the AIMMS probe on August 8, 2008. The first and last intervals are when the aircraft is heading north, the two intervals in the middle are when the aircraft is heading south.

Conclusion

- AIMMS horizontal winds are not with in 1 m/s accuracy.
- Temperature, Dew Point Temperature, FSSP, and PCASP data have been reviewed and necessary edits applied to create a quality assured data set.
- Need to confirm conclusion from FSSP calibration checks by laboratory checks of the NCAR FSSP and a DMT calibration of the WMI FSSP.

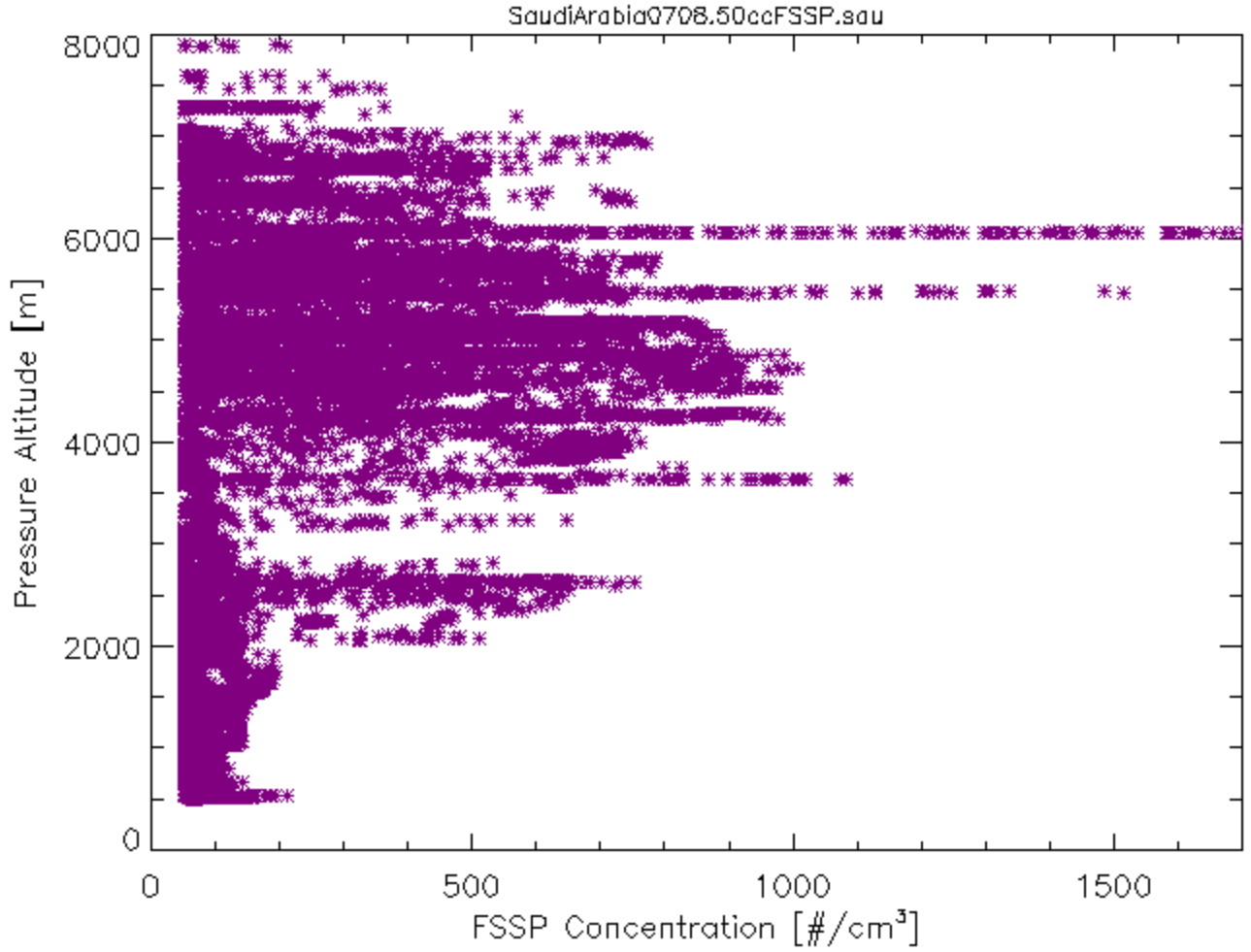
Future Work

- Compute summary statistics on the FSSP data (total concentration, median volume diameter) at cloud base and near cloud top (-5 to -10 C)
- Computer summary statistics on the PCASP data (total concentration, sub-micrometer concentration) at cloud base.
- Continue to evaluate the AIMMS data. Need equations and software. Need to record raw data.
- Evaluate Uwyo CCN counter data.
- Process and evaluate 2-DC data.

Saudi Arabia 2007/2008 Cloud Microphysics

By
David Delene

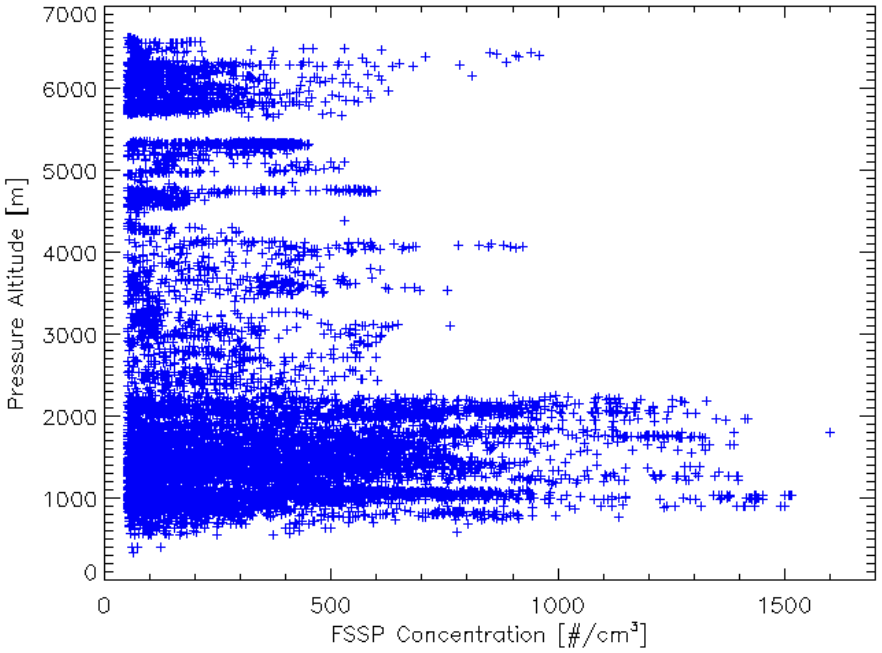
Saudi Arabia Winter 2008



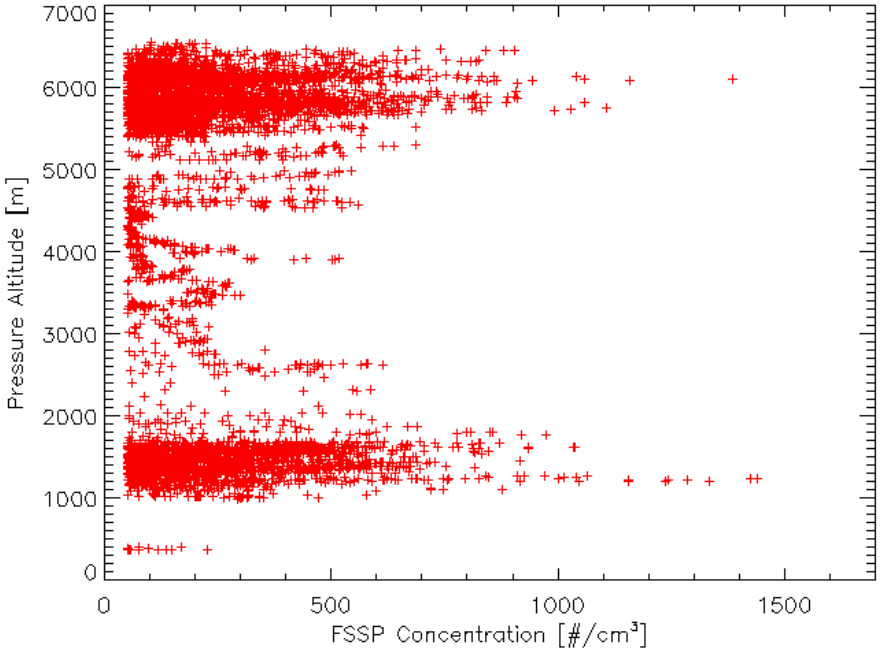
The 1 Hz cloud droplet concentration at standard temperature and pressure versus pressure altitude for all January-April 2008 Saudi Arabia flights measurements with concentrations above 50 # cm^{-3}.

Mali, West Africa

2006



2007



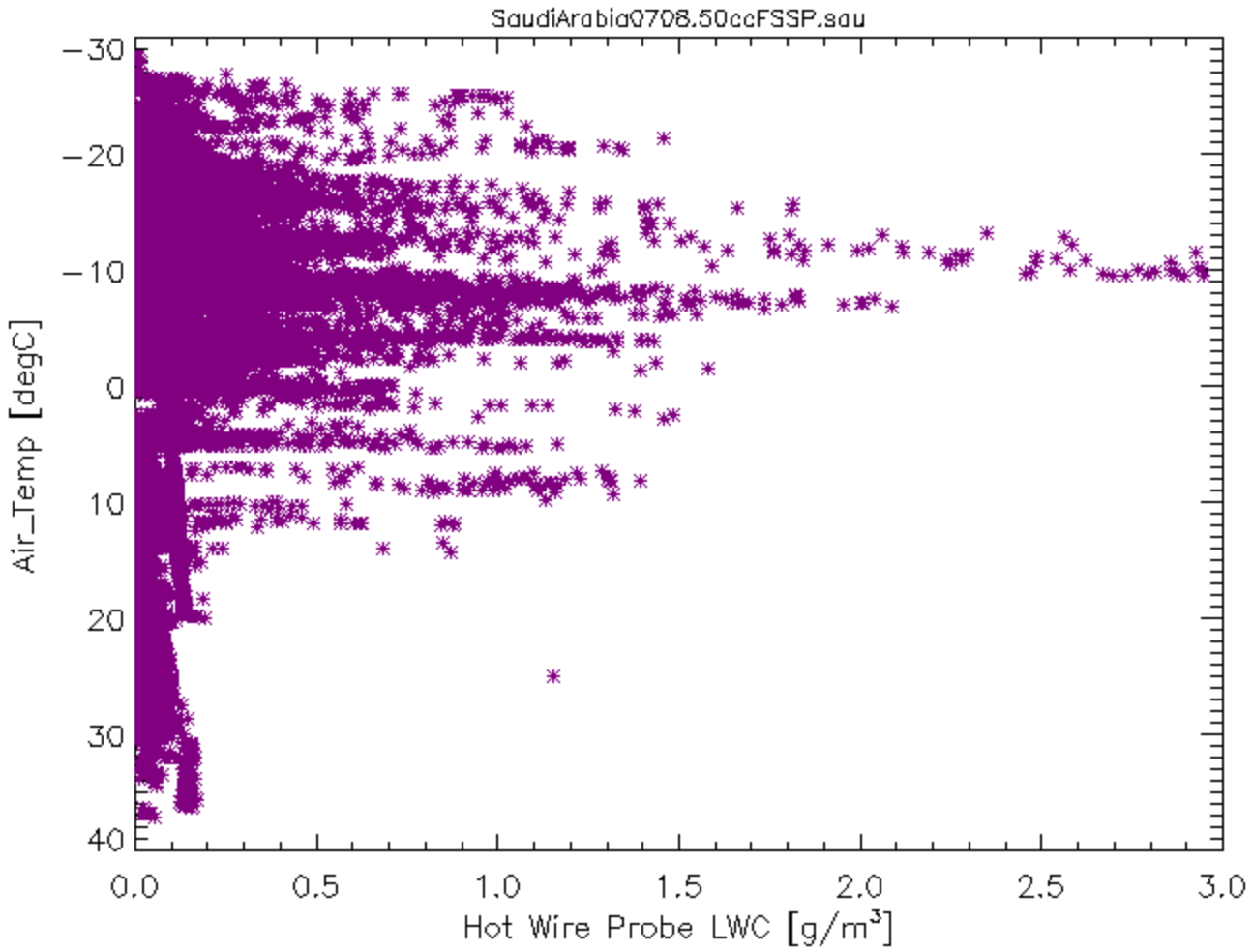
The 1 Hz cloud droplet concentration at standard temperature and pressure versus pressure altitude for all Mali 2006 (Top-Blue) and Mali 2007 (Bottom-Red) measurements with concentrations above 50 # cm-3.

FSSP Concentrations

Date	Location	5%	25%	50%	75%	95%
Saudi S08	All	59	122	292	547	898
Saudi W08	All	53	65	93	240	651
Mali 2006	All	61	125	277	505	841
Mali 2007	All	60	110	195	333	570
Mali 2006	Bottom	67	182	384	587	867
Mali 2007	Bottom	62	119	227	388	623
Mali 2006	Top	56	78	136	255	417
Mali 2007	Top	62	113	191	319	554

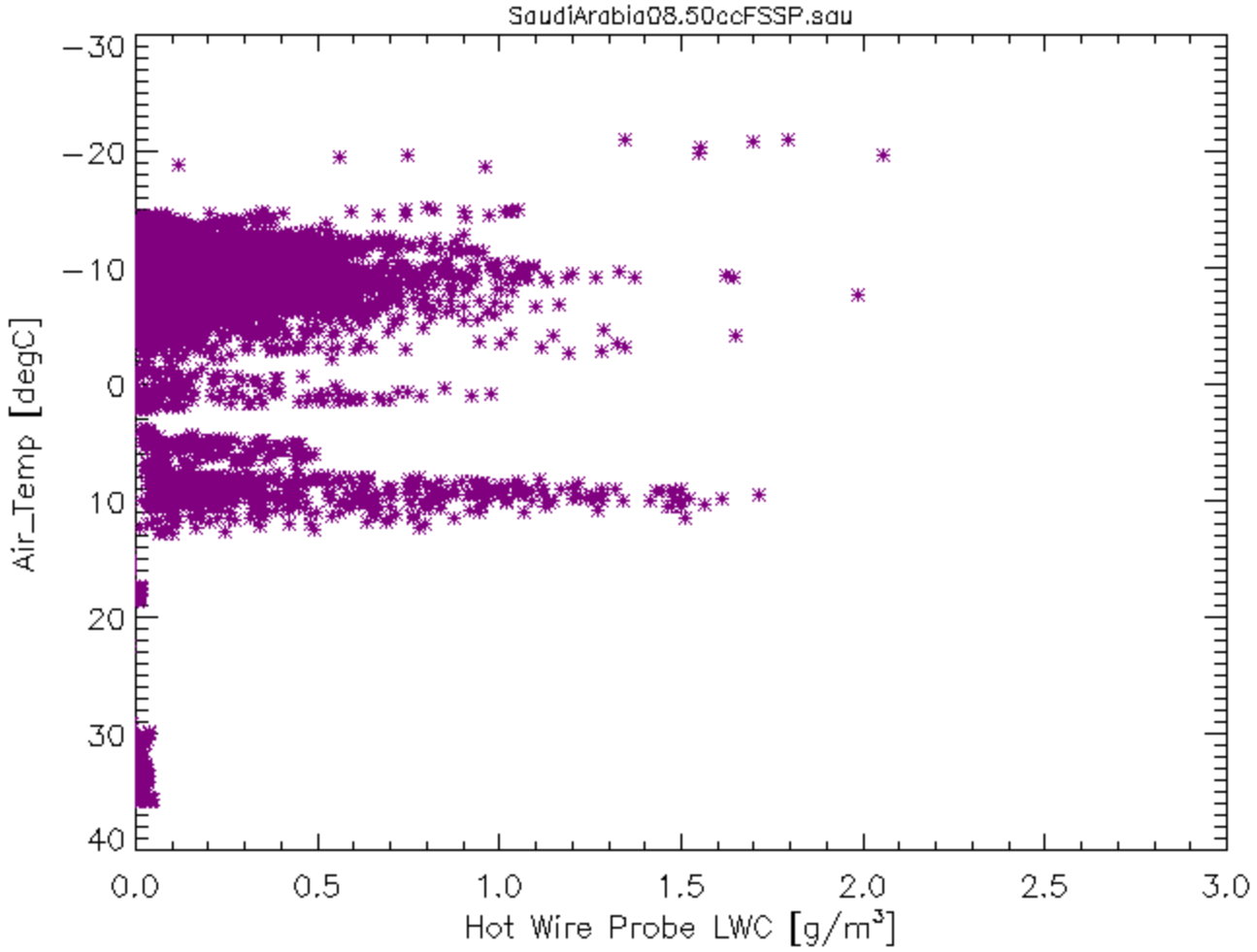
The 1 Hz cloud droplet concentration at standard temperature and pressure for all measurements with concentrations above 50 # cm-3.

Saudi Arabia Winter 2008



The 1 Hz liquid water from the DMT hot wire probe for all January-April 2008 Saudi Arabia flights measurements with FSSP total concentrations above 50 # cm^{-3}.

Saudi Arabia Summer 2008



The 1 Hz liquid water from the DMT hot wire probe for all June and July 2008 Saudi Arabia flights measurements with FSSP total concentrations above 50 # cm^{-3}.

Hot Wire Liquid Water

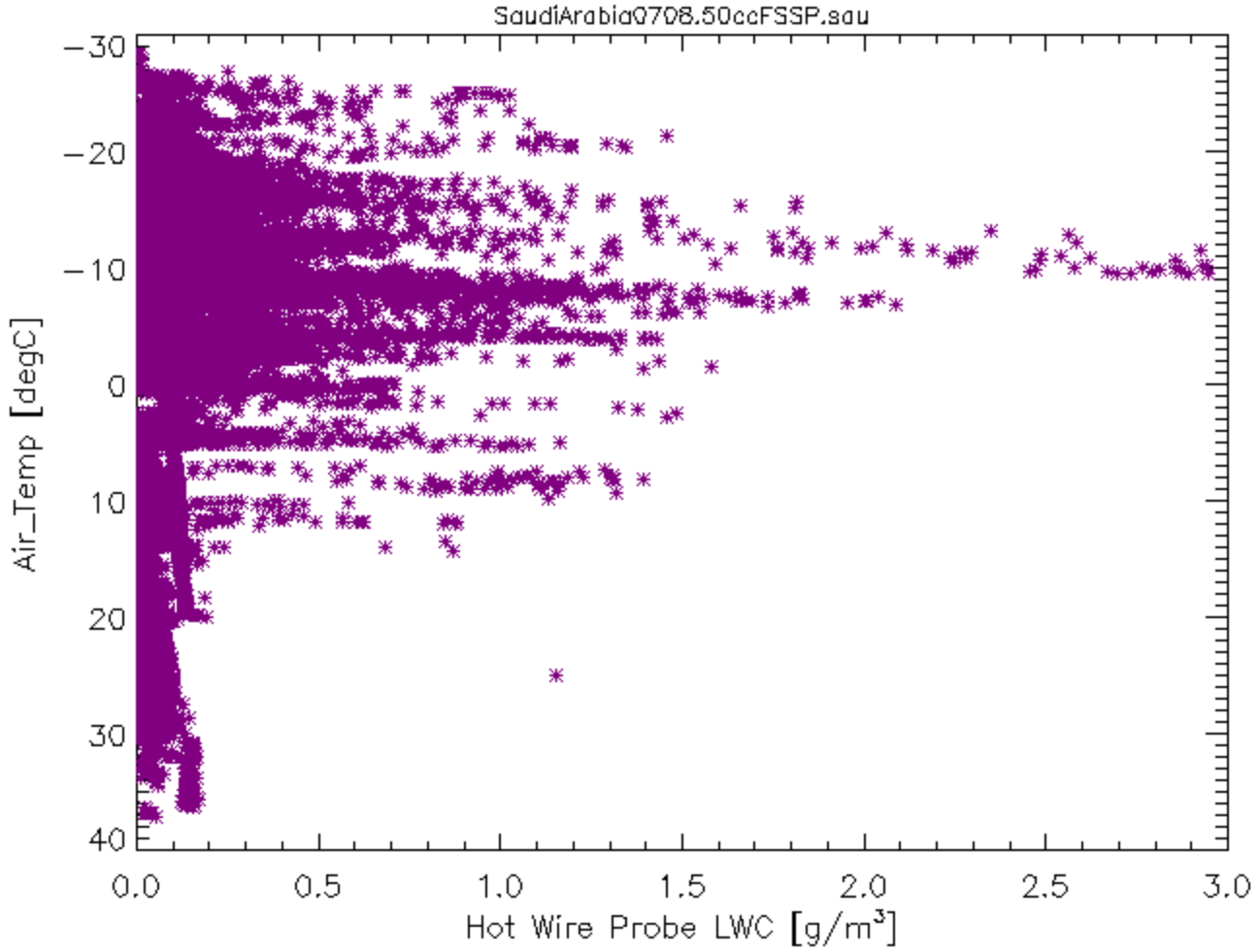
Date	Location	5%	25%	50%	75%	95%
Saudi W08	All	0.00	0.02	0.05	0.14	0.59
Saudi S08	All	-0.02	0.00	0.10	0.25	0.63
Mali 2006	All	0.00	0.09	0.24	0.62	1.46
Mali 2007	All	0.00	0.19	0.81	1.80	3.20

The 1 Hz liquid water from the DMT hot wire probe for all flights measurements with FSSP total concentrations above 50 # cm^{-3}.

Conclusions

- ??

Saudi Arabia Winter 2008



The 1 Hz cloud droplet concentration at standard temperature and pressure versus pressure altitude for all January-April 2008 Saudi Arabia flights measurements with concentrations above 50 # cm^{-3}.