Saudi Arabia 2007/2008
Calibration Checks
and Quality Assurance

By
David Delene
Christopher Kruse
15 um Bead Checks

![Graph showing average channel number over time]

- X-axis: Date
- Y-axis: Average Channel [#]
- Channel numbers range from 1 to 6
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 performed 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 performed 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.
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.
Unedited temperature data from the June 28, 2008 Saudi Arabia flight.
Edited temperature data from the June 28, 2008 Saudi Arabia flight.
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.
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.
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 within 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
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$^{-3}$. 
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.
The 1 Hz cloud droplet concentration at standard temperature and pressure for all measurements with concentrations above 50 # cm-3.
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 $\# \text{ cm}^{-3}$. 
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

<table>
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<th>Date</th>
<th>Location</th>
<th>5%</th>
<th>25%</th>
<th>50%</th>
<th>75%</th>
<th>95%</th>
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<td>0.19</td>
<td>0.81</td>
<td>1.80</td>
<td>3.20</td>
</tr>
</tbody>
</table>

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

• ??
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.