Upper Air Support for the Hazardous Weather Testbed Spring Experiment

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Introduction

In 2012, National Severe Storms Laboratory (NSSL) invited Texas A&M Meteorology students to aid in upper air radiosonde launches. This was conducted during their yearly Hazardous Weather Testbed. The data collected was used to evaluate boundary layer evolution as well as inter-comparison studies for Vaisala RS-92 and iMet radiosondes.

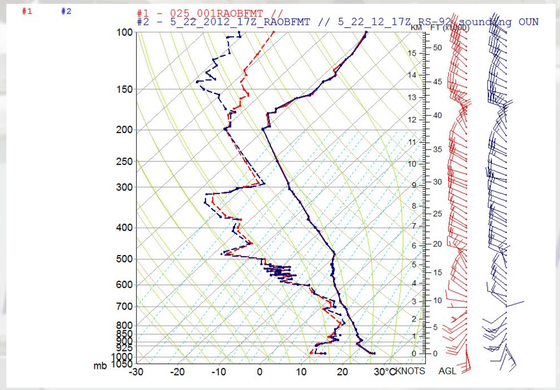
A typical day's itinerary consisted of three launches at 1500Z, 1800Z, and 2100Z respectively. When conditions were favorable, theodolites were used to track the balloon in order to obtain additional wind measurements. The A&M team provided mobile launches to study convective initiation in desired locations. In Concordia, Kansas, our team made four rapid-succession launches preceding an approaching cold front. On a different day, near Altus, Oklahoma, two balloons were launched in order to obtain data as a dry line approached.

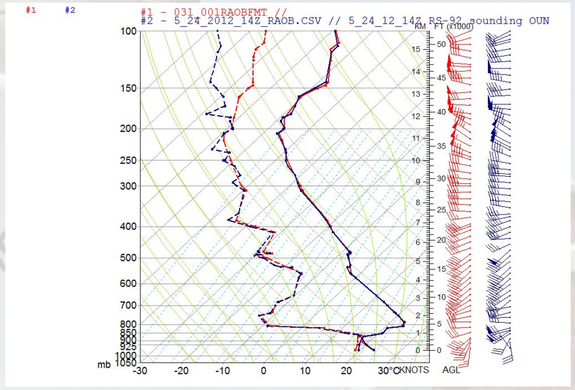
Background

Vaisala RS-92 are widely considered suitable for both operational and research purposes. The Vaisala RS-80 sondes are the company's previous generation and were the data source for many scientific experiments and daily operational launches. The iMet 1 is the sonde for use with the highly portable and less expensive iMet 3050 and 3150 systems made by International Met Systems in the U.S. These are being used by NWS Incident Meteorogist (IMET) program as well as several research and academic institutions including NSSL and TAMU. Inter-comparions of these systems have value both for current usage and in understanding characteristics of older datasets in relation to current-generation radiosondes.

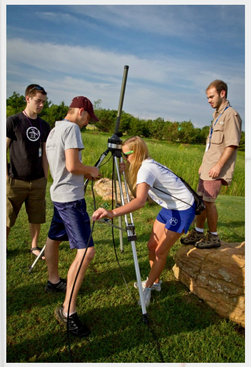
Launches

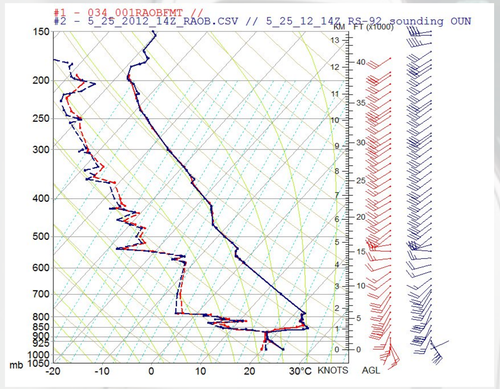
From May 22nd to the 25th, we launched a total of 13 balloons, typically at 9:00am, 12:00pm, and 3:00pm. Multiple radiosondes were attached to the same balloons in a train to obtain inter-comparison data. Below are images of the iMet and Vaisala RS-92 sounding comparisons.

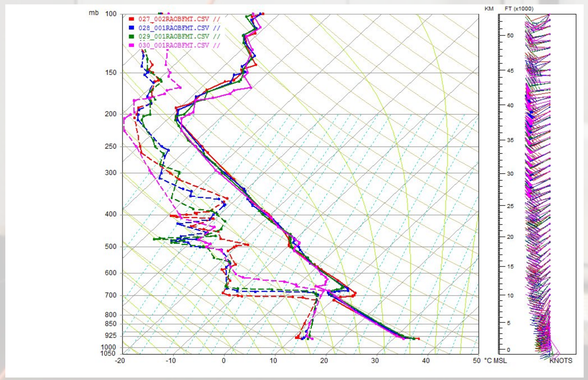




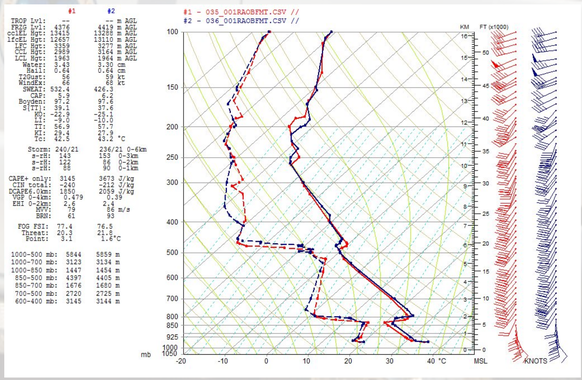
RED	iMet 1 sondes
BLUE	Vaisala RS92 sondes







Successive launches from Concordia, KS, boundary layer evolution in advance of a cold front.



Launches from Altus, OK, boundary layer evolution in advance of a dry line.

Conclusions

During the Hazardous Weather Testbed we gained valuable field experience. We learned the the process of launching balloons thoroughly as well as how to work with other students and those at NSSL and the National Weather Center.

From the launch comparisons, we can say with confidence that the iMet sondes performed comparably to the RS-92 sondes. The data from the system is dependable and the software is dependable as well. Cooperative launch efforts with the National Weather Service would produce useful soundings.

One aspect that was different about the profiles of the two sondes is that near the temperature inversion at the tropopause, the dewpoint readings of the two sondes depart. In other research conducted at A&M, RS-80 sondes agreed with the iMet dewpoint readings (Atmospheric Profiles on a Budget Using Surplus Radiosondes and Theodolites, Rivas, et. Al).

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