Due one week from today (hand in or email to TA).

For this assignment, you will learn how to view upper air data from radiosonde data by using IDV.

**Upper air observations – plan view by IDV**

Radiosondes are one of the ways *in situ* measurements of winds, temperature, pressure, and humidity are collected in the troposphere and lower stratosphere. Radiosondes are launched at 00 and 12 UTC every day from sites in countries with established weather services. Radiosondes are instruments, so like any other measurement there are uncertainties involved. The temperature, pressure, humidity sensors may not be calibrated accurately (humidity sensor is most suspectable to this), the GPS sensor may have location problems (the track of the balloon is used for winds), the balloon may become glaciated, enter strong electric fields, or be caught in updrafts or downdrafts in clouds. They are also point measurements (ascending at a few meters/second), so the measurements may not be representative of their surroundings, especially in the boundary layer, near clouds and/or turbulence. Despite these issues, radiosondes are the most direct method of observing our upper atmosphere.

There are several ways to display upper-air data in IDV. For help in this lab, reference the user guide: [http://www.unidata.ucar.edu/software/idv/docs/userguide/data/choosers/PointChooser.html](http://www.unidata.ucar.edu/software/idv/docs/userguide/data/choosers/PointChooser.html)

**Upper Air Obs – Plan View**

To plot station models of radiosonde data in IDV, follow a similar procedure as you did for surface data. They are under Observations > Point data in the data chooser menu, but you will need to click on the “upper air” tab right above the server selector. After you connect, you can choose a level in the atmosphere to plot (in hPa).

Plot a 500 hPa chart time of your choosing and click on Add Source. A map should show the observations for the time you have chosen. You will see the global network of radiosondes (that reported data) plotted. Zoom in on the continental US. Use observations from a time of your choosing.

Examine the station model at station 72202 (Miami, FL).

1. **What information is plotted on the upper air station model at Miami?**

You can also perform a gridded analysis on the upper air data just like you did with the surface data. From the Dashboard tab Field Selector, you can select parameters to plot under the Gridded Fields tab. Create a contour plot of geopotential height (Z) at 500 hPa, using the optimal grid parameters you used in Lab 4.

Hints:
(a) Under Field Selector, use the “Contour Plan View” and select the 500 level
(b) Trick to get the contour labels to appear over the US: In the field selector, do not use the default region (under the “Regions” tab). Uncheck the “default” box and draw a box over the US.

2. **Do the contours agree with the reported values of geopotential height at the radiosonde sites? Do you have any speculation about why they might not always agree? (should be a simple answer)**

3. **In a short paragraph (less than 5 sentences), describe the 500 mb flow pattern over the US (i.e. zonal, meridional, etc). Note the location of any ridges and troughs. If there are any troughs, are they positively or negatively tilted?**

Please write your answers of question 1, 2, and 3 in a text or word file. Please save the 500 hPa geopotential height contour plot in a *.png file. You can either hand TA in the hard copies of these files, or email them.
Grading:
40%: IDV 500 mb height contour plot over US, including plotted station points and labeled contours
20%: Question 1
20%: Question 2
20%: Question 3

Extra Credit: Up to 10%:
5%: Create an additional IDV plot with the following information using 3/19/2013 12Z sounding data:
1. 300 mb wind speed (SPD) using color filled contours, contour interval 4 m/s
2. 300 mb wind speed (SPD) using black contours, contour interval 4 m/s
3. 300 mb geopotential height (Z) using red contours, line width=2, use default contour interval

5%: Answer the following question: Based on the current position of the 300 mb jet streak(s) relative to the trough over the central US, do you expect the trough to deepen (become more amplified) or lift (become less amplified), or stay at about the same amplitude. Why?