Atmospheric Sounding Visualization
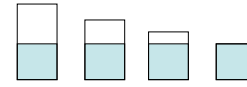
Sancho McCann

Soundings

- Pressure
- Altitude
- Temperature
- Moisture
- Wind Speed
- Wind Direction

Meteorology 101
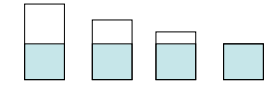
$$\text{Relative Humidity} = \frac{\text{Actual Vapour Pressure}}{\text{Saturation Vapour Pressure}}$$

Temp.	20º	15º	10º	5º
R.H.	40%	60%	80%	100%

Meteorology 101

- At 100% humidity, the temperature has reached the **dewpoint**

Temp.	20º	15º	10º	5º
R.H.	40%	60%	80%	100%

Meteorology 101

- Lifting causes cooling at 9.8ºC per 1000m

Meteorology 101

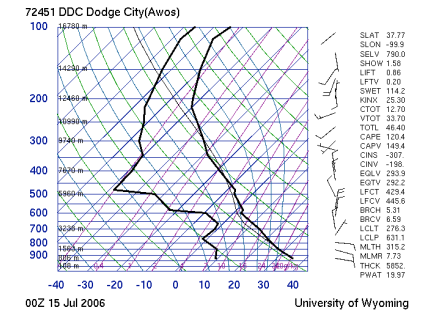- Inside a cloud, the temperature decreases much more slowly ~ 6º per 1000m
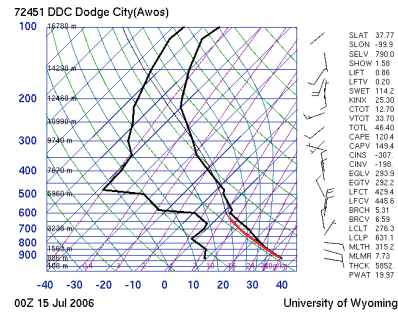

Sample Sounding Data

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72694 SLE Salem Observations at 12Z 08 Oct 2006

-----------------------------------------------------------------------
  PRES   HGHT   TEMP   DWPT   RELH   MIXR   DRCT   SKNT   THTA   THTE   THTV
  hPa     m      C      C      %     g/kg   deg    knot    K      K      K
-----------------------------------------------------------------------
 1020.0    61    6.0    3.8    86    4.95     0      0   277.6  291.2  278.4
 1000.0   224   10.0    6.9    81    6.28    15      4   283.1  300.7  284.2
  997.0   249   10.2    7.1    81    6.38    17      5   283.6  301.5  284.7
  990.3   305   10.0    6.8    80    6.30    20      6   284.0  301.6  285.0
  954.6   610    9.0    5.2    77    5.83    25      9   286.0  302.6  287.0
  925.0   871    8.2    3.8    74    5.46     5     12   287.7  303.4  288.6
  920.2   914    8.1    4.0    75    5.56     5     12   288.0  304.0  289.0
  909.0  1015    7.8    4.4    79    5.80     2     14   288.7  305.4  289.7
  902.0  1079    8.8  -11.2    23    1.81   360     15   290.4  296.0  290.7
```
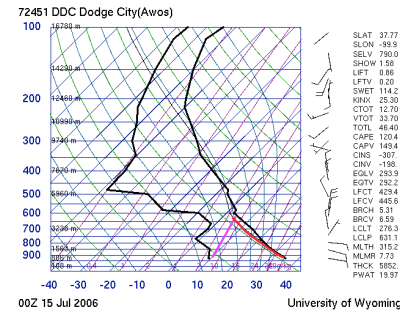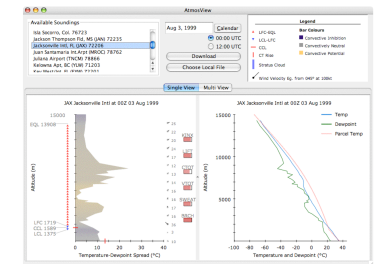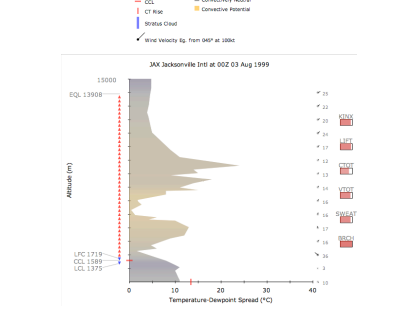

Skew-T Diagram

Skew-T Diagram

Skew-T Diagram

Problems

- Easy to forget
- Easy to make mistakes
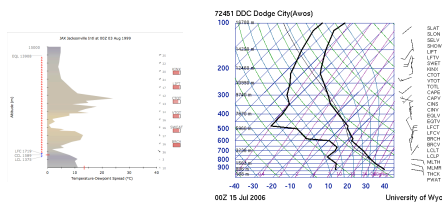- Difficult to compare
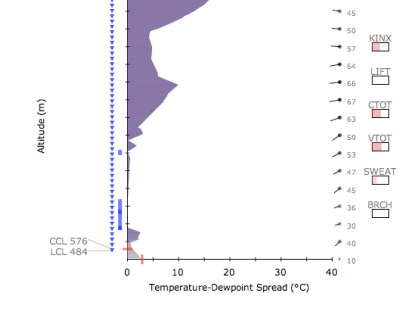- Information doesn't **pop out**

AtmosView
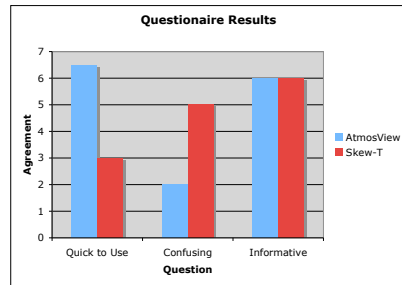

Use Scenarios

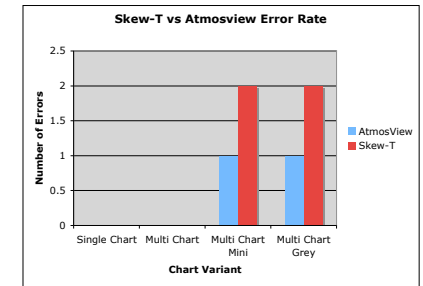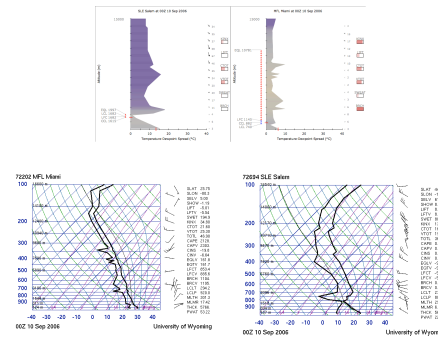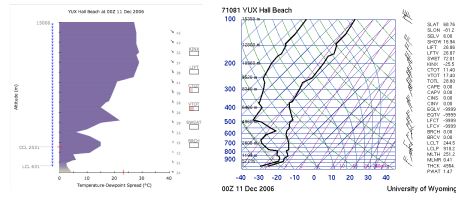
DEMO

Informal Evaluation

- 2 Students
- Given instruction on the AtmosView
- Given a set of questions to answer
- Given instruction on the Skew-T
- Given a set of questions to answer

Skew-T vs Atmosview Error Rate

Questionaire Results

Strengths

- Successful improvement to Skew-T
- Data pops out
- Quick comparisons
- Useable in miniature
- Not reliant on colour

Areas for Improvement

- Temperature not displayed

Future Work

- Improve usability of system
- Target audience: amateur meteorologists (glider pilots, students, storm-chasers)