Tackling a Case Study

You should be able to tie together everything you've learned so far to be a Sherlock Holmes and figure out all of the why questions for any weather event

Meteorology 411 – Iowa State University – Week 12

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Start with Upper Level Maps (250,300)

- Where are the jet streaks/jet streams?
  - A) Which side of the trof has the strongest winds (west side = digging, east side=lifting)
  - B) Where are the jet quadrants favored for upward motion and sfc pressure falls
  - C) Do we have 2 jet streaks interacting “kissing jets” to give rapid development?

500 mb

- Where is the PVA? (Use best curvature and cyclonic shear if vorticity is not analyzed)
- Is the system cut off – this would make it move more slowly?
- Remember 500 mb evolves based on lower-level temperature advection.

Lower Level Maps (700,850)

- Look for warm and cold advection (WAA gives upward motion and sfc pressure falls, and best chances of precip – CAA may deepen upper-level trofs)
- Are Tds and DDs good for clouds/precip?
- Is there a good moisture source?
- Do you see pronounced convergence/divergence?

Surface Maps

- Where is the surface low
- Where are the biggest pressure falls?
- Where are fronts?
- Is there upslope or downslope?
- Are winds crossing the isobars more than normal?

Satellite and Radar

- Where is there currently precipitation
- Is it where is should be
- Any evidence of an overlooked shortwave
- How fast is stuff moving

Precipitation Type

- Thicknesses can be used for rain/snow:
  - 5400 m for 1000-500 mb often used (5520 m works for high places like Denver, while 5200 m may be needed near warm water like Seattle)
  - 1300 m for 850-1000 mb
  - 1540 m for 700-850 mb

Precipitation Type

- On Skew-T, if T is below 0C everywhere, you will have snow, unless the cloud is too shallow to produce ice nuclei, in which case freezing drizzle might happen
- Sfc Temps:

  * If less than 0 C, cannot get rain

  * If only lowest 50 mb below 0 C, frz. Rain

  * If layer deeper than 50 mb, sleet.
- 850 temp of 0 C often works for rain/snow

Precipitation Type

- Use caution in following cases:
  - Powerful upward motion will allow a warmer thickness to give snow than you expect
  - Dry air will evaporatively cool…. Thus a T of 40 and Td of 10 may start with rain but likely will quickly switch to snow
  - Cold air is a problem and is usually more reluctant to leave than you expect

Temperature forecasting

- MOS is hard to beat except in exciting weather (record temps, sudden changes, forecasts further out in time)
- Look at afternoon Tds for guide to low temperature for that night
- Look upstream for similar region temperatures