AMS Meeting - 10/23/09

Special Guest: Gino Izzi, NWS Chicago/Romeoville

7:00 - Announcements:
Calendar pictures
Severe Weather Symposium – Discount for AMS members

7:10 – Gino Izzi: “Winter Weather Forecasting: The Cold, the Snowy, and the Icy”
How to forecast snow?
-What type
-How much of each type
-When
-Be familiar with models & biases
-Recognize synoptic patterns conducive to snow
-How well does model resolve mesoscale features?
  -Don’t focus too much on details – focus on synoptic
How much will accumulate?
  -How much QPF expected?
  -How much of QPF will fall as snow?
  -Adequate surface temps?
  -What are snow-to-liquid ratios?
Forecasting precipitation type
- All about the vertical temperature profile
  -Temperature profile is dynamic – will change
    -Evaporation
    -Melting
    -Thermal advection
    -Vertical motion
    -Solar radiation
- Cloud microphysics/ice nuclei
Partial Thickness Method/Critical Thickness Method
  -Can help determine type of precip that will reach the surface
  -Critical thickness values roughly equal an average temperature of 0  Celsius
  through a given layer
Pros:
  -Great for getting the “big picture” over a large area
  -Relatively simple
Cons:
  -Narrow warm layers/deep isothermal layers can cause problems
  -Problems during transition zones between seasons
    -Need to use different thicknesses
  -Ignores cloud microphysics
Top-Down Method
  -Starts at the top of the cloud layer and works down
1) Upper levels: Is there ice in the cloud? (Ice nuclei must be present for snow)
  - At -20  C, ice almost guaranteed in cloud
2) Middle/warm layer: Does ice survive?
3) Surface: What happens to the precipitation before it reaches the surface?
   - If no ice, look at surface temps:
     - Surface > 0 °C: rain, drizzle
     - Surface < 0 °C: freezing rain/drizzle
   - If ice in cloud, then look at warm layer:
     - < 1 °C: little or no melting
     - 1-3 °C: partial melting
       - Amount of melting dependent on precip intensity & depth of warm layer
     - > 3 °C: complete melting
   - Below warm layer:
     - Temp in warm layer & surface layer:
       - < 1 °C
         - Sfc < 0: Snow
         - Sfc > 0: Rain/mix
       - < 1-3 °C
         - Sfc < 0: Sleet/mix
         - Sfc > 0: Rain/drizzle
       - > 3 °C
         - Sfc < 0: Freezing rain/Freezing drizzle
         - Sfc > 0: Rain/drizzle
   - Look for dry intrusions – can bust snow forecasts
     - Can also introduce steeper lapse rates
     - May make atmosphere less stable
   - Snow axis to the left/north of dry slot: heaviest snow

Forecasting Snow Accumulations
   - Changing precipitation type = lower snow accumulations
   - Accumulation is a function of QPF and snow:liquid ratio (SLR)
   - SLRs are dynamic and may change
     - Can use sfc temps to predict ratios
       - “Dendritic growth zone”: -12 °C to -16 °C
       - Highest QPF
       - Best accumulating snow
   - Depends on ground temperature, surface temperature, and wind strength

Lake-Effect Snow Forecasting
   - Based largely on experience
   - Use empirical methods to supplement models

9:10pm – End Meeting