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
        -"Dentritic 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