A Forecaster's Guide…

1. Get a good grasp of the *current situation*. Check out **satellite** photographs and loops, **radar** loops, and the hourly **METAR** weather observations for Albany and the surrounding region. Read through the latest National Weather Service **forecast discussions** from the local offices, such as Albany (ALY), Binghamton (BGM), Buffalo (BUF), New York City/Upton (OKX), Burlington (BTV) and Boston/Taunton (BOX).

2. Look at *analysis maps* (**surface** and **upper air**) to see how synoptic-scale features have been moving and/or intensifying over the past couple of days up to the present time.

3. Take a look at the models (start with GFS) 500-mb height and vorticity fields, 300-mb jet, surface pressure, 1000-500-mb thicknesses, 700-mb relative humidity and vertical motion fields, 850-mb height and temperature fields, as well as accumulated precipitation fields. You could also look at higher resolution models, such as the WRF or HRRR, or global models like the ECMWF. Develop a "forecast scenario" from the present through the end of the forecast period.

4. Detailed output (extrapolated and MOS) from the NAM and GFS are available. You can use the "weather" program using your linux accounts (nammos, newavnmos), or go to the URL:
http://www.atmos.albany.edu/facstaff/ralazear/fcst/fcst_alb.html

5. *Make your forecast*! Look at model soundings and compare surface temperature with MOS and the NWS. Extrapolate the current satellite/RADAR, and see if the MOS numbers agree with the current situation. Use your own intuition; if the NAM has been too low on the highs lately (and the synoptic pattern is remaining relatively similar), keep it in mind when you forecast.

6. Most importantly, *learn from your mistakes*. Everyone will make them from time to time. It's important to ask yourself why your forecast was wrong. Did lower-tropospheric mixing clear out morning clouds so the high was warmer than you expected? Did overnight precipitation cause the temperature to "wet-bulb," resulting in a lower overnight low than you forecast? Make sure you do this, so you don't keep repeating the same mistakes.

Forecasting "Rules of Thumb"

1. The airport is a good absorber of radiation, and as a result, high temperatures may be warmer than anticipated.

2. Calm and clear conditions with a weak, surface anticyclonic circulation are ideal for radiational cooling, and a chilly nighttime low.

3. Clouds (especially low clouds) radiate heat (IR) back to the surface, limiting radiational cooling and keeping lows warmer.

4. Wind acts to mix out a radiation inversion, thus inhibiting nighttime cooling.

5. The 500-mb height, 850-mb temperature and 1000-500-mb thickness over Albany are all positively correlated with surface temperature in Albany. The one main exception is during a heavy precipitation event, or during conditions that are favorable for radiational cooling.

6. With cold air aloft (and in the absence of large-scale subsidence), the sun rising and rapid heating of the surface of the earth can quickly create instability cumulus clouds. This often results in a cooler high than forecast by the models.

7. Cold advection generally contributes to descending motion and deep mixing, whereas warm advection generally contributes to rising motion (QG Dynamics, or simply through isentropic lift).

8. An upward increase in anticyclonic vorticity advection contributes to descending motion, whereas an upward increase in cyclonic vorticity advection contributes to rising motion.

9. Albany lies in a valley, near the junction of the Mohawk River and the Hudson River. The terrain rises quite dramatically in nearly all directions around Albany. As a result, air has a tendency to subside into the valley as the air stream moves toward Albany. This can have the effect of diminishing precipitation locally in any season (as well as affecting temperatures through downsloping). In certain patterns, locations in the hills/mountains may receive significantly more precipitation than the city of Albany (or the airport).