ATM 409–509: Real-Time Quantitative Precipitation Forecasting (QPF) Exercise

The purpose of this exercise is to issue QPFs and winter weather forecasts for three consecutive 12-h periods beginning at 0000 UTC. The class will be split into **four teams**. Each team will have 10 minutes to present their forecasts beginning at 3:15 pm.

1. Forecasts to be issued:

a) National QPFs for 0000–1200 UTC (overnight), 1200–0000 UTC (tomorrow), and 0000–1200 UTC (tomorrow night) for precipitation amount thresholds of 0.25", 0.50", 1.00", and 2.00" or more.

b) National 12-h snowfall amount forecasts for 4", 8", and 12" or more categories for the same time periods as above.

c) National probabilistic forecasts (to the nearest 10%) for rain and snow amounts as above, and for the conditional occurrence of ice pellets and freezing rain.

2. Methods:

a)   Work as a team.
b)   Use any available maproom and internet products.
c)   Prepare your own mesoscale analysis products, where possible.
d)   Pay special attention to surface boundaries of all kinds.
e)   Use satellite, radar imagery and precipitable water charts to locate moisture axes.
f)   Make good use of ensemble forecast products!
f)   Compute surface and upper-air moisture convergence using GEMPAK or NCL from NCEP model analysis and forecast grids, available in the directory

GEMPAK: /data1/gempak/hds/
NCL: /nfs/cas2/unidata/GRIB/ (grib2 files)
Or online from **NOMADS:** http://nomads.ncep.noaa.gov/
Feel free to use any of the available products we discussed in class on 1 September:
http://www.atmos.albany.edu/daes/atmclasses/atm509/summary.php#0901

g)   Monitor stability changes from model gridded datasets and/or low-tech simple 850–700-hPa and 700–500-hPa temperature difference maps.
h)   Check for presence or absence of severe weather "ingredients" (i.e., lift, instability, moisture, and boundaries) if the potential for severe weather exists.
i)   Summarize your QPF-related dynamical and thermodynamical reasoning by preparing composite charts that illustrate the juxtaposition of key "ingredients" (moisture axes, jet corridors, boundaries, thermal ridges, ascent zones, etc.), as in Maddox and Crisp (1999).
j)   Generate all your severe weather forecast and QPF electronically using the graphics program of your choice (e.g., PowerPoint).

3. Verification:

a) Each team will be responsible for verifying their forecasts on class days two and three.
b) SPC: http://www.spc.noaa.gov/climo/
c) NOAA/NWS: http://water.weather.gov/precip
d) WPC QPF Verification: http://www.wpc.ncep.noaa.gov/verification/mode/mode.php
e) NMQ/OU: http://nmq.ou.edu/

4. Presentation Mechanics:

a) Employ dynamics-based arguments in support of your forecasts
b) Emphasize where, how, and why your forecasts differ from official forecasts.

5. Potentially Useful Precipitation Related Links:

a) SPC Forecast Tools:
  http://www.spc.noaa.gov/exper/
b) COMET Modules:
  http://www.meted.ucar.edu/index.htm
c) WPC QPF and winter weather:
  http://www.wpc.ncep.noaa.gov/research/res2.shtml
d) WPC Model Diagnostics and d(prog)/dt:
  http://www.wpc.ncep.noaa.gov/html/model2.shtml
e) Mike Bodner's real-time standardized anomaly page at NCEP/WPC:
http://www.wpc.ncep.noaa.gov/training/SDs/
f) Kyle Griffin's archived/forecast GFS analyses:
  http://www.atmos.albany.edu/student/kgriffin/maps/
g) TwisterData model analyses and forecasts:
  http://www.twisterdata.com/
h) Tom Galarneau's real-time QG diagnostics page:
  http://www.atmo.arizona.edu/~tgalarneau/realtime/diagnostics.html
i) Pivotal Weather:
  http://www.pivotalweather.com
j) Alicia Bentley's real-time GFS map loops:
  http://www.atmos.albany.edu/student/abentley/realtime.html
k) NCAR real-time ensemble model page:
  http://ensemble.ucar.edu/
l) SPC Sounding Climatology:
  http://www.spc.noaa.gov/exper/soundingclimo/
m) SPC Severe Storm Event Archive:
  http://www.spc.noaa.gov/exper/archive/events/
n) NSSL real-time 4 km WRF forecasts:
  http://wrf.nssl.noaa.gov/
o) HRRR real-time forecasts (operational):
  http://rapidrefresh.noaa.gov/HRRR/Welcome.cgi?dsKey=hrrr_ncep_jet
p) HRRR experimental:
  http://rapidrefresh.noaa.gov/HRRR/Welcome.cgi?dsKey=hrrr_jet