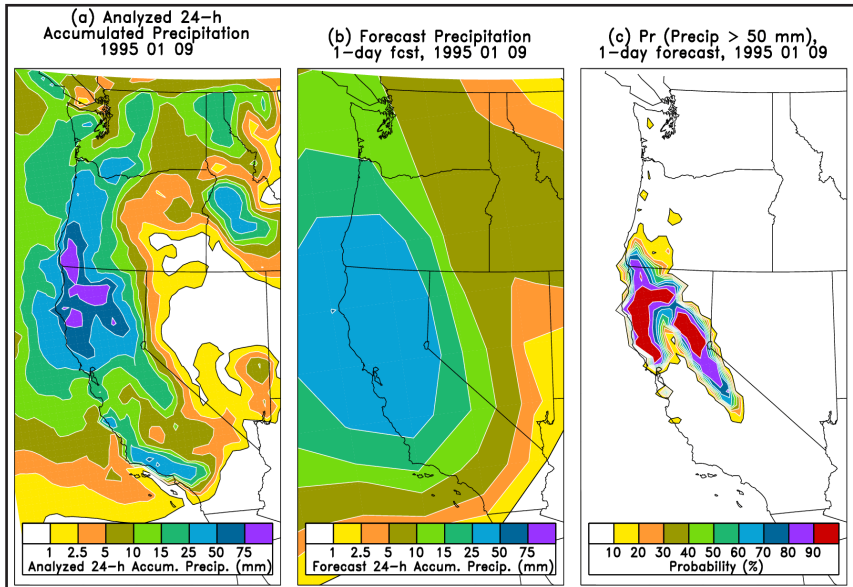




NOAA's Reforecast Project



Using Errors Diagnosed From Past Forecasts to Improve Today's Forecasts



(a) 24 hour observed precipitation amounts for 9 January 1995. (b) Average 1-day precipitation forecast. (c) Today's forecast calibrated with old reforecasts and precipitation analyses.

The National Weather Service must disseminate probabilistic weather forecasts that are specific and reliable. Unfortunately, modern numerical weather prediction models still have systematic errors, over- or underestimating probabilities, or producing geographically non-specific forecasts due to computational resource limitations. However, in a pilot project, NOAA has recently demonstrated how a large data set of old numerical forecasts and observations can be used to statistically adjust today's probabilistic forecast, making it more specific and more skillful than information from the raw model output.

Method:

- A 15-member ensemble of numerical forecast simulations are run in real time to provide 15 possible scenarios for tomorrow's weather.
- For every day since 1979, 15-member "reforecasts" were also computed using the same model and data assimilation system that was used to compute the real-time forecasts.
- Novel statistical procedures were developed to use the reforecasts and observations of the past weather to determine how to statistically modify the real-time forecasts.
- These statistical training procedures are then applied to today's numerical weather forecast output.
- A decade of investment in the development of better numerical forecast models.
- Reforecast-based products are being used for operational medium-range weather prediction products at NOAA's Climate Prediction Center.
- Reforecast-based precipitation forecast products are being incorporated into NOAA's Hydrometeorological Prediction Center.
- Based on this pilot research, NOAA, the Canadian Meteorological Center, and the European Centre for Medium-Range Weather Forecasts have all developed plans for the regular computation of reforecasts for the purpose of statistically correcting their probabilistic weather forecasts.

Outcomes:

- The statistically adjusted forecasts have been shown to be much more skillful, reliable, and geographically specific compared to the raw model output.
- The gain in skill from the statistical calibration using reforecasts is comparable to the skill gained from one

For more information, contact:
Dr. Tom Hamill
Tom.Hamill@noaa.gov
Tel: (303) 497-3060