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Short-range ensemble forecasts of precipitation type

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Short-range ensemble forecasting is extended to a critical winter weather problem, forecasting precipitation type. Forecast soundings from the operational NCEP short-range ensemble forecast system are combined with five precipitation-type algorithms to produce probabilistic forecasts from January through March 2002. Thus the ensemble combines model diversity, initial condition diversity, and post-processing algorithm diversity. All verification numbers are conditioned on both the ensemble and observations recording some form of precipitation. This separates the forecast of type from the yes/no precipitation forecast.

The ensemble is very skillful in forecasting rain and snow, but it is only moderately skillful for freezing rain and unskillful for ice pellets. However, even for the unskillful forecasts the ensemble shows some ability to discriminate between the different precipitation types and thus provides some positive value to forecast users. Algorithm diversity is shown to be as important as initial condition diversity in terms of forecast quality, although neither has as big an impact as model diversity. The algorithms have their individual strengths and weaknesses, but no algorithm is clearly better or worse than the others overall.