

forecasting

NMC DIAGNOSTIC CHARTS AND THE SHORT TERM FORECAST

by

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I'll concentrate on significant weather events - weather situations that may affect the health and well-being of the general public - and consider the role of the NMC Diagnostic Charts - the North American surface and standard level analyses - in making short term forecasts. I define short term to be any forecast to be out through 24 hours.

Most truly significant weather events are of a mesoscale nature. Now consider the NMC diagnostic charts. The North American surface chart is basically macroscale in nature; however, the philosophy of analysis presented in the National Weather Service's Forecasting Handbook states:

3.3 PHILOSOPHY OF ANALYSIS. The intent of analysis is to depict and identify those features related to weather systems of importance for synoptic scale and SHORT-RANGE FORECASTING (emphasis added). Such systems may be located by parameters in surface reports, or by radar analysis, or by satellite photos. Analyses are smoothed to eliminate the effect of non-representative reports WHILE STILL RETAINING DETAILS IMPORTANT FOR FORECASTING (emphasis added).

Analysis of the standard level charts is completely automated, and curiously enough, there is no stated philosophy of analysis. They basically provide a height and temperature analysis to the forecaster. Height centers are indicated as are isotachs on upper-level 300 and 200mb charts. Actually the surface and upper air observations are dense enough to detect many important mesoscale features that are not routinely detected and/or explicitly depicted upon the NMC diagnostic charts. What is the bottom line? I contend that if the forecaster is going to make a reasonable short-term forecast there are, at a minimum, two very basic requirements:

1. He must have an accurate and detailed set of analyses available to him, of current conditions over his area of concern (depending upon the meteorological situation, this area might encompass half the country or half a state).
2. These diagnostic aids must be vertically consistent so that the forecaster can quickly build a comprehensive mental picture and physical understanding of current conditions.

Although the NMC macroscale fax charts meet these requirements during fair weather conditions, they fail miserably during the 10 or 20 percent

of the time when significant weather events are developing or occurring. Thus, the forecaster must carefully reanalyze and enhance the facsimile (or AFOS) products if he is to cope with important weather events.

But wait! These are just the times when he is so busy that he may not be able to keep up with his scheduled work, much less take the time to really figure out what is going on!

Solutions? Obviously there are no simple ones. I might suggest that if manning levels and work loads are not to change, we ought to attempt to provide the forecaster better (i.e. mesoscale) guidance tailored to his area of concern. This guidance could at first be non-numerical in nature and involve detailed surface and upper-air analyses. The effort would eventually expand to include both numerical and subjective prognostic charts.

To summarize, I advocate that the human input (i.e. the professional meteorologist) be totally extracted

from the loop at NMC and injected at the Regional level so that the emphasis could be upon the mesometeorology of significant weather situations as they affect a specific mesoscale area of the country. This is especially important since the tendency at NMC is for the man to parrot or replicate the macroscale numerical output! In this way we might produce a significant increase in the accuracy of short-range forecasts by more effectively utilizing the wealth of weather data that is currently available.

Editor's note --

Mr. Maddox worked as an operational meteorologist and severe storms forecaster for a number of years before joining NOAA's Environmental Research Laboratories. He is involved in applied research on flash flood storms and medium scale convective weather systems. This article is basically his presentation at the last NWA national meeting.

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