



## Western Region Technical Attachment No. 91-29 July 23, 1991

### NOTES ON A VISIT TO NMC

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During the third week of March of this year, I was given the opportunity to visit the National Meteorological Center (NMC) in Suitland, Maryland. What follows is a condensed version of the trip report I wrote for the Boise staff.

At NMC much care and effort is put into quality controlling the data that goes into the forecast models and in the interpretation of the models. The Senior Duty Meteorologist (SDM) monitors programs that quality control the incoming radiosonde data. The programs attempt to alert the SDM to radiosonde height and wind data that are grossly different than the first guess field or neighboring radiosonde sites. However, these programs give the SDM very little help with the quality control of moisture data. The SDMs can delete, change, and manually insert any data they want and appreciate all calls concerning bad or questionable data. After the quality control step, the SDMs give the final okay to "dump" the data and start each model run.

There are many forecast guidance functions at NMC, residing in two major areas: short and medium range. The following observations should give you an idea of how some of this guidance is produced.

- ◆ The QPF forecaster is the shift "lead" forecaster and produces the short-range QPF forecasts (AFOS charts 94Q and 98Q and narrative NMCQFPFD). The only objective products used are the model QPF forecasts, including the MRF QPF forecast which goes out to five days (not received in the field). Hence, their QPF forecasts are like ours: very subjective and empirical. NMC forecasters note that the NGM QPF in the West is too dry west of the Cascades and too wet to the east. This is one tidbit from a list of strengths and weaknesses compiled from a study of the LFM and NGM models. The full list is referenced in the second to last paragraph of this report. NMC has a very detailed U.S. terrain map to aid them in their forecasts. They receive a large plotted map of observed precipitation from all sites which report to the RFCs. They use this to verify their forecasts. They also have a clipboard of all statements and warnings issued nationwide and all of the state forecast discussions (SFD). If interesting weather, especially heavy QPF, is expected in your area, then they will most likely consult your SFD.
- ◆ The medium-range section consists of two meteorologists on a day shift only. One produces the temperature guidance, writes the NMCPMDEPD, and does the daily medium-range map discussion. The other produces the 3-5 day POP guidance and surface charts. Teleconnections are widely used, and they have a list of probabilities of below/near/above normal temperatures and POPs for selected cities based on teleconnection patterns. They use the 5-day MRF QPF forecasts mentioned above. A set of Klein temperature equations, based on the perfect prog technique from the MRF, is used to forecast temperatures in the 3-5 day period. This is supplemented by a printout of the average algebraic error of the Klein forecasts for the past 60 days. They are concerned primarily with the valley stations in the West and do not deal directly with mountain temperatures and POPs.

NMC forecasters are reluctant to deviate much from the model forecasts since the models have become very consistent. They receive the complete daily MRF out through seven days, with 500 mb charts out to ten days. They also receive the ECMWF daily forecasts out to five days,

and twice a day they receive the UKMET forecasts out to five and one-half days. The European model is best in strong ridging situations; the MRF is best in strong troughing situations; and the UKMET is usually too fast.

These forecasters have the most experience in using the medium-range models. Therefore, the NMCPMDEPD probably has the best information on the differences between the medium-range models and on the long-wave patterns. However, the NMCPMDHMD is written by the daily map discussion person who often spends most of his/her time on the discussion and the short range, and only a small fraction of his/her time preparing the medium range portion of the NMCPMDHMD.

- ◆ The surface analysis desk consists of a large light table where fronts, etc., are analyzed and traced on a computer plot of surface data. Much emphasis is placed on continuity of frontal positions. A person from the satellite branch helps locate fronts based on satellite pictures. Although they look at pressure traces on the plotted map to help locate fronts, they do not use pressure change charts. I inquired about this and noted that terrain often distorts fronts in the West such that satellite pictures are often little help. I also mentioned there are mesoanalysis programs in the field that produce pressure change charts. The lead forecaster remarked that they used to use pressure change charts and thought they were perhaps the best tool for locating fronts in the West, but did not believe they would return to their current operation due to time constraints.
- ◆ The short-range forecast desk produces the 12-48 surface progs and discussion (NMCPMDSPD), and these are combined with the low- and high-level significant weather progs produced by the Monitoring and Aviation Branch. The forecasters emphasize continuity in the first 12 hours, and because the NGM is unavailable at their press time on the day shift, they mostly use the LFM thickness, moisture fields, and MOS guidance in placing fronts, precipitation areas, and IFR, MVFR, etc., areas.
- ◆ Forecasters at NMC were very excited about the mesoscale ETA model (references to this are showing up in their PMD discussions this summer, see WRTA 91-12). I viewed examples of the excellent QPF forecasts nationwide and one example where it locally (in California) did not do as well. In March, they were testing an 80 km version out to 36 hours and hope to have a 30 km version out to 36 hours in the summer of 1992.
- ◆ The NGM MOS guidance equations have been producing percent of daily sunshine and hours of sunshine forecasts since their inception. A debate is on to determine if one or both of these should be put into the new and expanded NGM MOS guidance messages (FWCs), especially when the LFM is dropped. There are restrictions on the size of the new FWC messages. If you have any strong feelings about this, especially agricultural forecasters, please let SSD know.

The September 1989 issue of *Weather and Forecasting* has many excellent articles on NMC and its guidance. A review of these would benefit all Western Region forecasters, especially the article, "Performance of NMC's Regional Models" by Wes Junker, Jim Hoke, and Richard Grumm, which details the strengths and weaknesses of the LFM and NGM.

Finally, Dr. Louis Uccellini, Chief of the Meteorological Operations Division, encourages all field forecasters to pass along any ideas that may help NMC improve their guidance to us. If the opportunity ever arises, I encourage all field forecasters to make a visit to NMC.