Statistical Forecasting of Temperature in the Medium-Range

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Since the early 1970's, medium-range statistical forecasts of maximum (max) and minimum (min) temperature have been generated by the Techniques Development Laboratory (TDL). These early forecast equations were generated by using the Klein/Lewis perfect prog technique, and forecasts were issued for projections out to 144 hours in advance. In December 1992, TDL implemented max/min temperature forecasts based on output from the National Centers for Environmental Prediction's (NCEP's) Medium Range Forecast (MRF) model for projections out to 192 hours in advance. These forecast equations were developed by using a calibrated perfect prog approach, and the resulting forecasts demonstrated improvement over the Klein/Lewis perfect prog guidance. Finally, in April 1994, TDL implemented max/min temperature guidance developed by applying the Model Output Statistics (MOS) technique to output from the MRF. These forecasts continue to be produced operationally for projections out to 192 hours in advance. Since 1994, several enhancements to the MRF have increased its resolution and accuracy, and the demand for more detailed and more accurate objective guidance has grown accordingly. At this time, TDL is in the process of re-developing MOS temperature guidance based on output of the MRF model from 1992 to 1998.

The medium-range guidance for temperature will contain forecasts of the daytime maximum and nighttime minimum, as well as 6 hour "spot" temperature and dewpoint forecasts valid 12 to 192 hours in advance. The number of stations for which forecasts will be produced will increase dramatically from 255 to almost 1,000. Implementation of temperature guidance is expected in the fall of 1999, with improvements made thereafter. In this presentation, we discuss equation development, the definitions of the predictands, predictors used to generate the MOS equations, and verification of the objective forecasts. We discuss how the new MRF MOS package may improve temperature forecasting in the medium-range and compare the new medium-range temperature forecasts to the current operational MOS forecasts.