6.3 AWIPS VERIFY - PUBLIC FORECAST VERIFICATION FOR THE AWIPS ERA

Kenneth R. Cook*
NOAA/National Weather Service
La Crosse, Wisconsin

1. INTRODUCTION

The national deployment of AWIPS left the field with no means of verification at the Weather Forecast Office (WFO) level. With such a national emphasis on "measurement", the need for a verification program on the AWIPS platform became quite apparent.

The development of such a program allows field forecasters to assess their skill, surmise their ability to surpass the capabilities of modern day guidance, and ultimately determine and improve their level of customer service.

2. METHODOLOGY

A list of products to facilitate this program was made. From this, a standard format of forecasts, Model Output Statistics (MOS), and verification data was established.

Forecast data included the Coded Cities Forecast (CCF), MOS messages from the Nested Grid Model (NGM), Aviation (AVN) and Medium Range Forecast (MRF) model.

Chosen for its ability to be quality controlled, observed data from the RTP or STP is used. These products can be generated via RiverPro, RTPGen, or by some other means and must be in Standard Hydrometeorological Exchange Format (SHEF).

3.0 SOFTWARE SPECIFICS

3.1 *Development and Testing*

Using a number of UNIX Posix scripts and Fortran programs, an ASCII text file of forecast and observed data for each station is created. Additional programs were developed to score the available data for the forecaster(s) desired. It should be noted that MOS is not required for this program to score the forecaster data. It was created with the idea that verification of the actual forecasts was as important as the improvement over MOS.

Having developed a similar version of this software for the SOO - SAC platform, this program has been tested and utilized at the WFO, La Crosse since March of 1999. The AWIPS version began its formal debut on February 2nd, 2000. To incorporate the migration to the 5 day CCF, a new version was born on November 11th, 2000. The most recent update was finished in July 2001.

* *Corresponding author's address:* Kenneth R. Cook, National Weather Service, N2788 County Road FA, La Crosse, Wisconsin, 54601;email: kenneth.cook@noaa.gov

Overhead is minimal for the data collection program, with run time for each station being less than 20 seconds. CPU used when executing the program is less than 8 percent. The scoring program uses less overhead, taking about 10 to 20 seconds to run and using less than 4 percent of CPU.

Station data storage should be managed, keeping the file size to less than 4000 lines or about 1.6 mb. This equates to about 5 years worth of data. Absolute program maximum is 5000 lines. This maintenance is not done automatically, as it has been left to the user to move or delete the data.

3.2 *Operation*

The data storage program creates an ASCII text file for each station, which contains the forecast and observed data. Additionally, mean absolute temperature error is scored and probability of precipitation compared for the 0 through 5 day period.
Evaluations are performed on the forecasters and MOS where and when available. The output is stratified by forecast cycle and forecast type (i.e. CCF/MOS type) and is viewable via a text window.

This software may be set up to use alternative MOS and RTP sites for a particular CCF station. The author does, however, take strong issue with the validity of verifying a "foreign" MOS site against a given verification (CCF) site. The MOS temperature equations are developed on a site specific basis and this calculation would skew the data toward a more favorable output for the forecaster(s).

Using established standards of observation climatology, an alternate precipitation site may be considered viable should it reside 6 miles or less from the desired verification site.

The main scoring program “awipsverify”, produces a set of verbose statistical output for each station. This program will score data for any time period defined by the user. It can score a specified forecaster or all forecasters, and is run interactively.

When executing the program, the user may opt to score only the extended forecast portion of the CCF issued on the day shift. This flexibility was incorporated so that offices that have a policy of not updating the extended forecast on the midnight shift could objectively measure their actual forecasts issued.

Statistics calculated by this program include mean absolute temperature error, temperature bias, number of 5 & 10 degree temperature busts (inclusive) and their respective percentage as a function of forecasts, probability of precipitation forecast reliability, and improvement over MOS.

Two ASCII text output files are created when this program is run. Both of these contain the same statistical output, however they are formatted differently. One consists of output tailored to the user. The second is a

raw statistical dataset which, when ported over to a PC, can be parsed into and utilized by the enclosed QuattroPro program. From this, several graphical stratifications of the data can be obtained.

When the user output is written, it is identified either by the forecaster's name or alias. This is a configurable parameter within the program, and is included for when the forecaster's privacy is a concern.

A secondary scoring program "soo", has the same scoring time period functionality, but abbreviates the output into a summary. Each forecaster's scores are calculated along with the average of all the forecasters. These data are accumulated into one output file, stratified by forecaster number and statistic.

Statistics scored by the "soo" program include, mean absolute temperature error, temperature bias, 5 & 10 degree busts as a percentage of forecasts, forecast precipitation reliability, and improvement over MOS. This program is also run interactively.

Finally, the reliability of observed precipitation has been an issue even though a post quality controlled dataset is assumed. Thus, the program corpcpn.sc was created to allow the program manager to quality control the database's observed precipitation.

4. FUTURE DEVELOPMENT

This software will be expanded in all facets to incorporate the 7 day CCF implemented with IFPS. Additionally, a graphical representation of the statistics displayable on AWIPS will be employed. Further automation of data handling (e.g. archiving the ASCII station data) will also be improved.