CENTRAL REGION TECHNICAL ATTACHMENT 88-13

YES, THE ELFP WORKS!

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1. Overview

We have heard some rumbling around the region concerning the ELFP. Many of you probably are making the same remarks that were heard here in Wyoming when the ELFP was started back in the fall of 1987. Some of the typical remarks were "Who cares!" "Why change now, we have been doing it this way for all these years." "The public likes it the old way." Well we found out different. The public doesn't like it the old way, and they do care, and they do want to see some changes. After some surveys were made, we found out that the public and the media do like the new ELFP format. We also found out our judgments concerning the forecast were prejudiced by what WE LIKED or what WE THOUGHT the public liked. We were surprised that they wanted things to be different. "Shocked" may be a better word. Our egos were a bit tainted, but we got through it okay and our ELFP is getting better each day. Our suggestion ... here's your chance to have your ideas heard. The ELFP can be written in just about any format. Very little guidance was given in C-11 and the related ROML. So you have plenty of leeway. Let your words be heard, but remember, be professional. That was our guide through the orientation period.

Here are some of our ideas that got us started. Maybe they will help you. The biggest hurdle you will have is just getting started. Give ELFP a chance and it may grow on you. You may like it.

2. ELFP at Cheyenne

First of all, when told we would be doing the ELFP at Cheyenne, we wanted it to remain a meteorological technician responsibility. So we kept this in mind when beginning our plans.

We immediately began construction of a workbook that was titled "The ELFP." This would be a quick reference notebook that would aid even the newest person on station. In fact, we thought so much of a new person that some of the items covered may even get boring for the more experienced employees.

At the very beginning of our notebook, we have a brief introduction along with a listing of its contents.

The notebook is then divided into eight sections. The first section is devoted to the CRH input, which in this case is ROML C-02-88. The second section is input from the MIC (AM) of Wyoming. These are items that he thinks will help or hinder the program locally. Another important point, which is critical to the ELFP program is that the MIC is quite active in our ELFP and continually is giving his input and support.

The next section is titled "DO's and DON'Ts." As the title states, this section informs us of what we can or cannot do. This part of our notebook continues to grow as someone is always finding a new way to word a forecast. All the pros and cons are weighed before any new item is added or changed.

Next is the "Examples" section. This section is really a great help to the forecaster. We list examples of TIME PERIODS that can and may be used on each and every forecast. A page of examples is given for POP's. Everyone has some ideas on how to give the "chance of or the probability of rain/snow." You will be surprised at how many ways you can tell the public they may or may not get wet or snowed on. Examples are given for just about every possible weather element that could occur (i.e., humidity, wind chill, ice, rising and falling temperatures, and beginning and ending times for precipitation). This section can go on and on.

Basically the next section is "Guides and Aids to Short Range Forecasting." We search for any product or guideline that could help make a better forecast. When they are found they are listed in the book. The more experienced people will need less guidance, the newer people will need more. Forecast discussions with the lead and aviation forecasters has been our greatest aid at Cheyenne.

Section six is the verification program. Here we are competing against real-time weather conditions. There is no competition within the ranks of the WSFO forecasters or the forecast programs. The ELFP verification is a bit tough and is still in its testing stages, but we are learning as we go. An example of our verification program is attached.

The final two sections of our notebook are set aside for SUGGESTIONS and USER FEEDBACK. Anytime anyone has a suggestion they usually jot it down. We then make a decision on whether it is useable or not. User feedback gives us many insights on what the public really wants, not what we want to give them.

3. Summary

In summary, we have made some of the following conclusions. It is our opinion that separate OM and ROML's should be written for the ELFP. There are many references to the C-11 concerning the ELFP that no longer have any significance. Some comments simply do not apply to this program. Furthermore, the importance of the ELFP is such that better guidance and quality control could be obtained if it were considered as a separate program instead of combined with the zones.

Surveys from the public and media revealed that forecasting the time of maximum/minimum temperature was not used. We dropped this from our forecast almost immediately. In response to answers such as "we know the time of day or

night that the high/low occur" the public was not interested in a noon or midnight temperature. The usual response was "we are interested in a rapid rise or fall." Additional interest was shown in a temperature forecast for a specific time in the evening when a local event of importance was to begin or end. This could be a sporting event, rodeo, concern, etc.

The one item that was very evident during our test of the verification program was that updated forecasts were rarely needed due to the frequency the ELFP was issued. Each time a forecast would appear to need an update, a new forecast was due. There were only four cases that an update was required.

Of course, we have received some criticism, but we did not let this sway us from our goal to provide a better forecast for the Cheyenne area. We accepted all comments as constructive criticism. So far, we have received many, many laudatory comments. Yes, the ELFP works!

ATTACHMENT 1

ENHANCED LOCAL FORECAST PROGRAM (ELFP)

VERIFICATION PROGRAM (TEST WSFO CHEYENNE)

This program will be objective and evaluate real-time conditions. There will be no competition with other forecasters or forecast programs (MOS). This program will not be used in our personal ratings. However, it will be used as a quality control tool to improve our overall ELFP's.

This program will score the first period of the 4AM and 4PM forecasts. However, it MAY also be done for the first period of all forecasts, depending on requirements from regional headquarters. Doing all forecasts would insure the forecasts were being updated as required.

The ELFP must be specific in the first period. Therefore, we need to evaluate almost anything that is forecast. The program takes the forecast and breaks it down into various parameters. The score of all parameters are added together and divided by the number used. Not all forecasts would have the same number of parameters. A fair weather day would only have a few, while a bad weather day could have as many as nine. Verification will be done only for the first period. Point totals will be limited and strict, as the ELFP must at all times be fine tuned for what is going on "NOW."

The final score for each forecast would be graded as follows:

    8 & 9 Excellent
    6 & 7 Good
    4 & 5 Fair
    2 & 3 Poor
    0 & 1 Useless.

These scores could be used as a guide for the issuance of a better product. It would show where further guidance and training is required.

It would also be a very good tool for insuring that all forecasts are being updated properly (Time and Parameters).

The following parameters will be used in the ELFP verification program:

    1. TEMPERATURE
    2. TIMING OF TEMPERATURE TRENDS
    3. CLOUDS
    4. TIMING OF CLOUD TRENDS
    5. PRECIPITATION
    6. TIMING OF PRECIPITATION
    7. WIND SPEED
    8. WIND DIRECTION

9.   TIME OF WIND SHIFTS OR WIND SPEED CHANGES
10.   UPDATES

Although this is not a forecast parameter, points will be deducted for untimely updates, or updates that are not done at all. It is very important that the forecast agrees with current conditions at all times. Therefore, UPDATES must be completed when required, and must be timely.

The use of the above parameters will also help to eliminate unnecessary wording in some of our ELFP's, such as "variable," "increasing or decreasing clouds." It would also help to eliminate hedging, as this could not be graded.

Hedging would be a zero. It will make us put our neck out on the limb, we will have to make a Yes/No decision. This would also eliminate the numerous or unnecessary wind changes some people forecast, such as "southwest wind 10 to 20 mph becoming northwest 15 to 25 mph." This really doesn't tell anyone anything. This will also give us some incentive to update our forecasts. A description of the parameters that will be verified are as follows.

TEMPERATURE

Five categories will be used, but take note that "Near" will be hard to hit and may present some problems and should be avoided. Also note the large drops in points awarded as you get further away from the value forecast.

AROUND –   can be used to forecast a value two degrees either side of the stated number (i.e., AROUND 80 would equal 78, 79, 80, 81, and 82). POINTS will be awarded as follows:

A hit is within 2 degrees of the value	= 9 points
3 degrees off	= 5 points
4 degrees off	= 3 points
5 degrees off or more	= 0 points

LOWER –   can be used to forecast values 0, 1, and 2 (i.e., LOWER 80's would equal 80, 81, and 82). POINTS will be awarded as follows:

A hit would be 0, 1, and 2	= 9 points
1 degree lower than 0, or 1 degree higher than 2 would	= 6 points
2 degrees lower than 0, or 2 degrees higher than 2 would	= 3 points
3 degrees lower than 0, or 3 degrees higher than 2 would	= 0 points

MID -   can be used to forecast values 3, 4, 5, 6, and 7 (i.e., MID 80's would equal 83, 84, 85, 86 and 87). POINTS will be awarded as follows:

A hit would be 4, 5, and 6	= 9 points
1 degree lower than 4, or 1 degree higher than 6 would	= 8 points
2 degrees lower than 4, or 2 degrees higher than 6 would	= 5 points
3 degrees lower than 4, or 3 degrees higher than 6 would	= 3 points
4 degrees lower than 4, or 3 degrees higher than 6 would	= 0 points

UPPER -   can be used to forecast values 7, 8, and 9 (i.e., UPPER 80's would equal 87, 88, and 89). POINTS will be awarded as follows:

A hit would be 8 and 9	= 9 points
1 degree lower than 8, or 1 degree higher than 9 would	= 7 points
2 degrees lower than 8, or 2 degrees higher than 9 would	= 5 points
3 degrees lower than 8, or 3 degrees higher than 9 would	= 3 points
4 degrees lower than 8, or 3 degrees higher than 9 would	= 0 points

NEAR -   can be used to forecast values 8 and 9 (i.e., NEAR 90 would equal 88 and 89). POINTS will be awarded as follows:

A hit would be 9	= 9 points
1 degree higher or lower would	= 8 points
2 degrees higher or lower would	= 5 points
3 degrees higher or lower would	= 3 points
4 degrees higher or lower would	= 0 points

TIMING OF TEMPERATURE

This category will cover forecasts which give times for temperature changes. Points will be awarded based on how close the forecast time was met. Forecasting times of temperature changes may present some problems and should be limited to primarily frontal passages or as is the case in Cheyenne, wind shifts

have a significant influence on the temperature. Be careful, do not over use this category. It may cost you points. Points will be awarded in the following manner:

Within two hours	=	9 points
Two to three hours	=	6 points
Three to four hours	=	3 points
Greater than four hours	=	0 points

CLOUDS

Most people only want to know if it is going to be sunny, clear or cloudy. Therefore, we are not going to separate several groups of categories. We will only award points for three categories. We will combine a few, as basically they are almost the same. The first period of the ELFP is meant to be very specific. Therefore, do not use increasing, decreasing or variable clouds. We will forecast:

Clear, mostly clear, sunny and mostly sunny - will be used for sky conditions of 0-3 tenths. If thin up to 9 tenths during the day, and 5 tenths at night.

Partly cloudy or partly sunny - will be used for sky conditions of 4, 5, 6, and 7 tenths. If thin up to 10 tenths during the day, and 9 tenths at night.

Cloudy and mostly cloudy - will be used for sky conditions of 8-10 tenths. This would be opaque or thin overcast at night, daytime 10/tenths opaque.

The results can be taken from columns 78 and 79, MF1-10B. Points will be awarded as follows:

A hit	=	9 points
One category off	=	5 points
Two categories off	=	0 points

TIMING OF CLOUDS

The first period of the ELFP is meant to be very specific. The use of increasing, decreasing or variable does not compute in this program. Therefore, the use of a timing group is quite handy. We can say "BECOMING MOSTLY CLOUDY BY 10AM." There are a few cases when you could use increasing or decreasing, but all you do is make the forecast too wordy. For example, "increasing clouds this

morning...cloudy by 12pm." This is your choice. Again, the use of a timing group can present problems, therefore its use should be limited. Be careful. Points will be awarded as follows:

Within two hours is a hit	=	9 points
Two to three hours	=	6 points
Three to four hours	=	3 points
Greater than four hours	=	0 points

PRECIPITATION

Precipitation will be graded on whether it occurs or not. The occurrence of precipitation will include "trace events." "RWU or SWU within 15 miles" of the weather station can also be used to verify. This can be done by using radar and indicating on the observation, RWU 10 NW etc. This also includes thunderstorms, but rain or snow must be falling from the storm somewhere within 15 miles of the station. A thunderstorm without rain or snow will not verify. If you are going to have dry thunderstorms, say so on the forecast. The next problem with verifying precipitation is the percent that is used in each event. We have decided on the following:

Forecast		Occurs	Does Not Occur
0	percent	0	9
10-20	percent	3	7
30-50	percent	5	3
60-70	percent	7	1
80-100	percent	9	0

If at all possible, POP's should not be used during the first period.

TIMING OF PRECIPITATION

Points will be awarded for the beginning and ending times of precipitation events, and the time precipitation changes from a liquid to a solid or vice versa. Points will be a bit more lax in this situation, as we want to try as much as possible to forecast the start or end of a precipitation event.

A hit is within two hours	= 9 points
Two to three hours	= 8 points
Three to four hours	= 6 points
Greater than four hours	= 4 points

WIND DIRECTION

Eight points of the compass will be used. For verification purposes, the average direction for the period will be used. When forecasting wind directions, use north, northeast, east, southeast, south, southwest, west and northwest. Points will be awarded as follows:

A hit	= 9 points
Within one	= 7 points
Within two	= 3 points
Three or greater	= 0 points

WIND SPEED

Points will be awarded for how close the forecast was to the average speed during the specified period. The reference number will be the average of the ranged used; i.e., 10 to 20 mph = 15.

Within 5 mph	= 9 points
Within 10 mph	= 7 points
Within 15 mph	= 5 points
Within 20 mph	= 3 points
Greater than 20 mph	= 0 points

TIME OF WIND SHIFTS OR SIGNIFICANT WIND SPEED CHANGES

Points will be awarded for how close a time change was met.

Within two hours	= 9 points
Within three hours	= 7 points
Within four hours	= 5 points
Within five hours	= 3 points
Greater than five hours	= 0 points

UPDATES

It was extremely hard to come up with a fair way to judge updated forecasts. The best way appears to be a take-away system. Points will be subtracted from each ones total for not updating when required. Adding points for someone doing their job does not compute. Therefore, points will be done in the following manner:

A forecast that is not updated when required	= Minus 9 points
A forecast updated two to three hours late	= Minus 7 points
A forecast updated one to two hours late	= Minus 3 points
A forecast that is updated within one hour	= 0

Local worksheets have been constructed and results were compiled beginning with December 1987 data. Some results follow:

VERIFICATION DATA

Name   WSFO CHEYENNE   Month/Year
A = 415AM FORECAST   P = 415P FORECAST

DAY	TEMP	TIME TEMP	CLDS	TIME CLDS	PCPN	TIME PCPN	WIND DRCTN	WIND SPEED	TIME WIND	TOTAL SCORE
1 A	8		9				9	7		33=8.3
P	0		9				9	9		27=6.8
2 A	9		9				9	7		34=8.5
P	9		9				9	9		36=9.0
3 A	9		5	0			9	7		30=6.0
P	8		9				3	7		27=6.8
4 A	0		9				3	9		21=5.3
P	0				7	4				11=3.7
5 A	5				9	9	9	7	7	46=7.7
P	9			5			9	9		32=9.0

Some results from the verification program so far were overall that we had a good rating of 7.2. The wind and cloud forecasts were excellent. The precipitation forecasts were very good. Our nemesis was temperature forecasting. Although the rating was fair, there were too many temperature forecasts that would be rated poor to useless. This is the category that will require most of our attention.