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This Technical Procedures Bulletin (TPB), written by J. Paul Dallavalle, Stephen A. Gilbert, and Captain Frederick G. Meyer, USAF, of the Techniques Development Laboratory, describes the contents of the FOAK13 and FOAK14 (AFOS product FWCAK) messages containing NGM-based MOS guidance for stations in Alaska.

The FOAK13/14 messages contain forecasts of the max/min temperature; surface temperature and dew point; opaque cloud cover; surface wind direction and speed; PoP for 6- and 12-h periods; quantitative precipitation amount for 6- and 12-h periods; conditional probability of precipitation type (freezing, snow, or liquid) and a corresponding category; snow amount; and categories of ceiling height, visibility, and obstruction to vision. Guidance is provided for projections of 6 to 60 hours for most weather elements. The FOAK13 message contains guidance for 60 stations; the FOAK14 contains guidance only for Anchorage, Fairbanks, and Juneau. Both messages are prepared daily at approximately 0400 and 1600 UTC for the 0000 and 1200 UTC forecast cycles, respectively.

The FOAK13 and FOAK14 messages became operational on October 19, 1994, and February 15, 1995, respectively. However, at the time this TPB was written, certain weather element forecasts were not yet available in the messages. A one-page reference sheet for the FOAK13/FOAK14 messages is included with this TPB.

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NGM-BASED MOS GUIDANCE FOR ALASKA - THE FOAK13/FOAK14 MESSAGES

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1. INTRODUCTION

In May 1987, the National Weather Service (NWS) implemented the first statistical guidance package (Jensenius et al. 1987) designed for application to the Nested Grid Model (NGM) (Phillips 1979, Tuccillo and Phillips 1986, Hoke et al. 1989). In November 1992, a new message (FOUS14/FWC) containing an extensive suite of weather element guidance was made available to both NWS and private sector forecasters (Dallavalle et al. 1992). In both cases, the statistical forecast packages were available only for stations in the contiguous United States. NGM-based guidance for stations in Alaska developed by the Model Output Statistics (MOS) (Glahn and Lowry 1972) approach is now available. The contents of the forecast message are very similar to those of the FOUS14/FWC package. A collective for the NWS Alaska region (FOAK13) contains guidance for 60 stations in Alaska. A second collective (FOAK14) contains guidance for the three NWS Forecast Offices in Alaska and is distributed only on the Western Region AFOS loop.

This Technical Procedures Bulletin (TPB) describes the format and contents of the FOAK13/FOAK14 messages. These messages contain forecasts of the maximum/minimum (max/min) temperature; time-specific surface temperature and dew point; categorical opaque cloud cover; surface wind direction and wind speed; probability of precipitation (PoP) for 6- and 12-h periods; quantitative precipitation for 6- and 12-h periods; conditional probability of precipitation type (freezing, snow, or liquid) and a corresponding categorical forecast; and categories of snowfall amount, ceiling height, visibility, and obstruction to vision. Guidance is provided for projections of 6 to 60 hours for most weather elements. All forecasts are for stations in Alaska. Note that the part-time stations do not have forecasts for all weather elements and/or projections. The FOAK13/FOAK14 products are prepared daily for dissemination at approximately 0400 and 1600 UTC for the 0000 and 1200 UTC forecast cycles, respectively.

Figure 1 gives an example of the FOAK13 issued for the 0000 UTC forecast cycle during the period of September 1 through May 31. Figure 2 gives an example of the message issued for the 1200 UTC forecast cycle during the same period. The FOAK14 message is identical except for the message header. Note that during the period of June 1 through August 31 the FOAK13/FOAK14 messages do not contain forecasts of snow and precipitation type. Thus, the lines labelled PTYPE, POZP, POSN, and SNOW will not appear in the message during that 3-month period. Details about the various forecast elements are given in the following sections.

2. MESSAGE HEADING

```
FOAK13 KWBC 130000
ANC        NGM MOS GUIDANCE   9/13/94 0000 UTC
DAY /TUE SEPT 13          /WED SEPT 14              /THU SEPT 15
UTC     06 09 12 15 18 21 00 03 06 09 12 15 18 21 00 03 06 09 12
```

The message heading shown above (see Figure 1 also) identifies the station for which the guidance is valid, the forecast cycle, and the day and hour for which the forecasts are valid. In this example, the FOAK13 is for Anchorage, Alaska (ANC). All stations are identified by a three- or four-character identifier. Table 1 lists the stations for which guidance is available in the FOAK13. The FOAK14 message contains the same header information except that the WMO header identification is FOAK14

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KWBC. Guidance for Anchorage (ANC), Fairbanks (FAI), and Juneau (JNU) is contained in the FOAK14.

The "NGM MOS GUIDANCE" located on the same line as the station call letters identifies the contents of the message. The date of the forecast cycle during which the message is issued follows this information. The form of mm/dd/yy where mm is the month (1 through 12), dd is the day (1 through 31), and yy is the last two digits of the year is used. The forecast cycle is identified by the standard 0000 or 1200 UTC. In this example, the NGM-based MOS guidance for ANC was issued from the 0000 UTC forecast cycle on September 13, 1994.

The DAY and UTC lines denote the date and hour at which the forecasts are valid. The DAY line indicates the day of the week and the day of month. Note that the month is denoted by three or four letter, as appropriate (JAN, FEB, MAR, APR, MAY, JUNE, JULY, AUG, SEPT, OCT, NOV, DEC). Note, also, that the message for the 1200 UTC cycle does not contain the month indicator in the DAY line for the first forecast period (Figure 2). For temperature, dew point, clouds, wind direction and speed, precipitation type, ceiling height, visibility, and obstruction to vision, the date and hour denote the specific time that the forecasts are valid. For PoP, quantitative precipitation, and snowfall amount, the time indicates the end of the period during which the forecasts are valid. For the max/min temperature, the date group gives only the approximate ending time of the daytime and nighttime periods for which the max and min temperature guidance, respectively, are valid.

3. MX/MN - MAXIMUM/MINIMUM TEMPERATURE FORECASTS

```
FOAK13 KWBC 130000
ANC        NGM MOS GUIDANCE    9/13/94 0000 UTC
DAY /TUE SEPT 13           /WED SEPT 14              /THU SEPT 15
UTC     06 09 12 15 18 21 00 03 06 09 12 15 18 21 00 03 06 09 12
MX/MN                     58          47          56          47
```

The max/min temperature forecasts are displayed for projections of 24, 36, 48, and 60 hours after the initial data time (0000 or 1200 UTC). Although the MX/MN forecasts are presented in this manner, each forecast is actually valid for a daytime or nighttime period. For the NGM-based MOS guidance, daytime is defined as 7 a.m. to 7 p.m. Local Standard Time (LST). Nighttime is defined as 7 p.m. to 8 a.m. LST. Thus, the valid date in the appropriate column of the DAY and UTC lines must be converted by the forecaster to his/her local date. This local date then denotes the appropriate daytime or nighttime for the max or min temperature forecast. For the 0000 UTC forecast cycle, the temperatures are shown in MX/MN order and are valid for today's max, tonight's min, tomorrow's max, and tomorrow night's min. For the 1200 UTC cycle, the temperatures are shown in MN/MX order and are valid for tonight's min, tomorrow's max, tomorrow night's min, and the day after tomorrow's max. Each temperature forecast is presented to the nearest whole degree Fahrenheit and three characters are allowed. A missing forecast is indicated by 999. Technical Procedures Bulletin No. 406 describes the max/min temperature guidance.

4. TEMP - SURFACE TEMPERATURE FORECASTS

```
FOAK13 KWBC 130000
ANC        NGM MOS GUIDANCE    9/13/94 0000 UTC
DAY /TUE SEPT 13           /WED SEPT 14              /THU SEPT 15
UTC     06 09 12 15 18 21 00 03 06 09 12 15 18 21 00 03 06 09 12
                          ...
TEMP    51 48 47 45 47 53 56 55 52 51 49 49 50 53 55 54 52 50 49
```

Forecasts of the time-specific temperature (at the 2-m elevation or the height of the observing shelter) are valid every 3 hours from 6 to 60 hours after 0000 and 1200 UTC. These forecasts are valid at

0600, 0900,..., 2100, 0000 UTC, and so forth. Each temperature forecast is presented to the nearest whole degree Fahrenheit; a missing forecast is indicated by 999. Because only three characters are available for the temperature forecasts, two consecutive forecasts of -10 degrees or less will appear with no spaces between them. Technical Procedures Bulletin No. 406 describes the time-specific temperature guidance.

5. DEWPT - SURFACE DEW POINT FORECASTS

```
FOAK13 KWBC 130000
ANC        NGM MOS GUIDANCE   9/13/94 0000 UTC
DAY /TUE SEPT 13          /WED SEPT 14             /THU SEPT 15
UTC     06 09 12 15 18 21 00 03 06 09 12 15 18 21 00 03 06 09 12
                          ...
DEWPT   45 44 43 41 41 42 41 43 44 43 43 43 43 44 44 45 45 44 44
```

Forecasts of the time-specific surface dew point (at the 2-m elevation or the height of the observing shelter) are valid every 3 hours from 6 to 60 hours after 0000 and 1200 UTC. These forecasts are valid at 0600, 0900,..., 2100, 0000 UTC, and so forth. Each dew point forecast is presented to the nearest whole degree Fahrenheit; a missing forecast is indicated by 999. Three characters are available for the dew point forecasts so that two consecutive forecasts of -10 degrees or less will appear with no spaces between them. Technical Procedures Bulletin No. 406 describes the time-specific dew point guidance.

6. CLDS - OPAQUE CLOUD AMOUNT CATEGORICAL FORECASTS

```
FOAK13 KWBC 130000
ANC        NGM MOS GUIDANCE   9/13/94 0000 UTC
DAY /TUE SEPT 13          /WED SEPT 14             /THU SEPT 15
UTC     06 09 12 15 18 21 00 03 06 09 12 15 18 21 00 03 06 09 12
                          ...
CLDS    CL CL CL SC SC BK BK OV OV OV OV OV OV OV OV OV OV OV OV
```

Forecast categories of opaque cloud cover (see the following table) are available in plain language for projections at 3-h intervals from 6 to 60 hours after the initial data times (0000 and 1200 UTC). All forecasts are valid for specific times (i.e., 0600, 0900, 1200 UTC, and so forth). Two characters identify the category (CL - clear; SC - scattered; BK - broken; OV - overcast); a missing forecast is denoted by "XX." Technical Procedures Bulletin No. 387 gives general information about the NGM-based MOS cloud forecasts. The categories are as follows:

<u>Opaque Cloud Cover Categories</u>

CL - < 1 tenth of opaque clouds;
SC - 1 to 5 tenths of opaque clouds;
BK - 6 to 9 tenths of opaque clouds;
OV - > 9 tenths of opaque clouds or totally obscured.

7. WDIR - SURFACE WIND DIRECTION / WSPD - SURFACE WIND SPEED FORECASTS

```
FOAK13 KWBC 130000
ANC        NGM MOS GUIDANCE   9/13/94 0000 UTC
DAY /TUE SEPT 13          /WED SEPT 14             /THU SEPT 15
UTC     06 09 12 15 18 21 00 03 06 09 12 15 18 21 00 03 06 09 12
                          ...
WDIR    25 26 26 26 26 18 17 16 15 14 15 12 11 12 12 13 14 16 15
WSPD    02 05 06 05 05 10 11 10 15 13 13 10 11 10 12 15 16 16 15
```

Surface wind direction forecasts (WDIR) are given at 3-h intervals for projections of 6 to 60 hours after the initial data times (0000 and 1200 UTC). These are forecasts of 1-minute average winds at specific times throughout each day (i.e., 0600, 0900, 1200 UTC, and so forth). The wind direction is given in tens of degrees and varies from 01 (10 degrees) to 36 (360 degrees). The normal meteorological convention for specifying wind direction is followed. Missing forecasts are denoted by 99; a calm wind is denoted by a direction of 00. Surface wind speed forecasts (WPSD) are given at the same projections as the wind direction forecasts. The wind speed forecasts are for 1-minute average winds at specific times throughout each day (i.e., 0600, 0900, 1200 UTC, and so forth). The wind speed is given in knots; the maximum speed allowed in the message is 98 knots. Missing forecasts are denoted by 99; a calm wind is denoted by a speed of 00. Technical Procedures Bulletin No. 399 gives more details on wind forecasts for the contiguous United States; a TPB describing the Alaska wind guidance is in preparation.

8. POP06 - PROBABILITY OF PRECIPITATION IN A 6-H PERIOD

```
FOAK13 KWBC 130000
ANC        NGM MOS GUIDANCE    9/13/94 0000 UTC
DAY /TUE SEPT 13          /WED SEPT 14             /THU SEPT 15
UTC    06 09 12 15 18 21 00 03 06 09 12 15 18 21 00 03 06 09 12
                          ...
POP06          2     5    35    62    74    81    80    84    65
```

The POP06 forecasts are for the probability of 0.01 inches or more of liquid-equivalent precipitation occurring during a 6-h period. The 6-h PoP's are valid for intervals of 6-12, 12-18, 18-24, 24-30, 30-36, 36-42, 42-48, 48-54, and 54-60 hours after the initial data times (0000 and 1200 UTC). In the message, the forecast values are displayed under the ending time of the period. The probability is given to the nearest percent. Values range from 0 to 100. A missing forecast value is indicated by 999. Technical Procedures Bulletin No. 409 describes the PoP guidance for the contiguous United States.

9. POP12 - PROBABILITY OF PRECIPITATION IN A 12-H PERIOD

```
FOAK13 KWBC 130000
ANC        NGM MOS GUIDANCE    9/13/94 0000 UTC
DAY /TUE SEPT 13          /WED SEPT 14             /THU SEPT 15
UTC    06 09 12 15 18 21 00 03 06 09 12 15 18 21 00 03 06 09 12
                          ...
POP12                10          75          88          92
```

The POP12 forecasts are for the probability of 0.01 inches or more of liquid-equivalent precipitation occurring during a 12-h period. The 12-h PoP's are valid for intervals of 6-18, 18-30, 30-42, and 42-54 hours after the initial data times (0000 and 1200 UTC). In the message, the forecast values are displayed under the ending time of the period. The probability is given to the nearest percent. Values range from 0 to 100. A missing forecast value is indicated by 999.

10. QPF - QUANTITATIVE PRECIPITATION FORECASTS

```
FOAK13 KWBC 130000
ANC        NGM MOS GUIDANCE    9/13/94 0000 UTC
DAY /TUE SEPT 13          /WED SEPT 14             /THU SEPT 15
UTC    06 09 12 15 18 21 00 03 06 09 12 15 18 21 00 03 06 09 12
                          ...
QPF          0/    0/0    1/    2/2    2/    2/3    2/    3/4    3/
```

Guidance for liquid-equivalent precipitation amount accumulated during a specified period is presented in categorical form. Forecasts for 6-h periods are displayed to the left of the diagonal. These forecasts are available for projections of 6-12, 12-18, 18-24, 24-30, 30-36, 36-42, 42-48, 48-54, and 54-60 hours after the initial data time (0000 and 1200 UTC). Forecasts for 12-h periods are displayed to the right of the diagonal. The 12-h forecasts are available for projections of 6-18, 18-30, 30-42, and 42-54 hours after 0000 or 1200 UTC. In the message, the forecasts are displayed beneath the hour indicating the end of the period. The QPF guidance is a categorical forecast of accumulated liquid-equivalent precipitation within certain specified amounts in the 6- or 12-h periods. The 6- and 12-h QPF categories are as follows:

6-h QPF Categories	12-h QPF Categories
0 = no precipitation;	0 = no precipitation;
1 = 0.01 - 0.09 inches;	1 = 0.01 - 0.09 inches;
2 = 0.10 - 0.24 inches;	2 = 0.10 - 0.24 inches;
3 = 0.25 - 0.49 inches;	3 = 0.25 - 0.49 inches;
4 = 0.50 - 0.99 inches;	4 = 0.50 - 0.99 inches;
5 = ≥ 1.00 inches.	5 = 1.00 - 1.99 inches;
	6 = ≥ 2.00 inches.

Missing forecasts are denoted by 9. Because of the rarity of the heavier precipitation amount events for Alaskan stations, the higher categories (primarily 4, 5, and 6) will not be predicted except at stations in the southern part of Alaska.

11. PTYPE - PRECIPITATION TYPE FORECASTS (CONDITIONAL)

```
FOAK13 KWBC 130000
ANC        NGM MOS GUIDANCE   9/13/94 0000 UTC
DAY /TUE SEPT 13          /WED SEPT 14            /THU SEPT 15
UTC    06 09 12 15 18 21 00 03 06 09 12 15 18 21 00 03 06 09 12
                         ...
PTYPE   R  R  R  R  R  R  R  R  R  R  R     R     R     R     R
```

The PTYPE guidance in the message gives the forecast precipitation type (if precipitation occurs) for specific times 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36, 42, 48, 54, and 60 hours after the initial hour of 0000 or 1200 UTC. The forecast is indicated by one character where "Z" represents freezing precipitation (freezing rain, freezing drizzle, ice pellets (sleet), or any report of these elements mixed with other precipitation types), "S" represents snow (snow, snow grains, snow pellets, or snow showers), and "R" represents liquid precipitation (rain, drizzle, or a mixture of rain or drizzle with snow). A missing forecast is denoted by "X." The precipitation type guidance is transmitted only during the period of September 1 - May 31. As with QPF, the rarity of freezing rain or sleet events means that forecasts of "Z" will not be issued for many of the Alaskan stations. Technical Procedures Bulletin No. 421 describes the precipitation type guidance.

12. POZP - PROBABILITY OF FREEZING PRECIPITATION (CONDITIONAL)

```
FOAK13 KWBC 130000
ANC        NGM MOS GUIDANCE   9/13/94 0000 UTC
DAY /TUE SEPT 13          /WED SEPT 14            /THU SEPT 15
UTC    06 09 12 15 18 21 00 03 06 09 12 15 18 21 00 03 06 09 12
                         ...
POZP    0  0  0  0  0  0  0  0  0  0  1     0     0     0     0
```

Conditional probability of freezing precipitation (given that precipitation is occurring) forecasts are available for specific times 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36, 42, 48, 54, and 60 hours after 0000

and 1200 UTC. Freezing precipitation is defined as the occurrence of freezing rain or drizzle, ice pellets (sleet), or any mixture of freezing rain, drizzle, or ice pellets with other precipitation types. The probabilities are given to the nearest whole percent, and values range from 0 to 100. Missing values are indicated by 999. These probabilities are used in producing the categorical PTYPE forecast described in Section 11. The POZP guidance is transmitted only during the period of September 1 - May 31. Because of the rarity of the freezing rain or sleet events, many stations do not have forecast equations for the POZP category. For these sites, the POZP line will never appear in the message.

13. POSN - PROBABILITY OF SNOW (CONDITIONAL)

```
FOAK13 KWBC 130000
ANC        NGM MOS GUIDANCE    9/13/94 0000 UTC
DAY /TUE SEPT 13          /WED SEPT 14             /THU SEPT 15
UTC    06 09 12 15 18 21 00 03 06 09 12 15 18 21 00 03 06 09 12
                         ...
POSN    2  1  3  5  6  8  8 10  9 11 14    18    13    15     9
```

Conditional probability of snow (given that precipitation is occurring) forecasts are available for specific times 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36, 42, 48, 54, and 60 hours after 0000 and 1200 UTC. Snow is defined as the occurrence of a pure snow event, that is, snow, snow showers, snow grains, or snow pellets or any combination of those elements. Snow mixed with rain is considered as a liquid precipitation event. The probabilities are given to the nearest whole percent, and values range from 0 to 100. Missing values are indicated by 999. These probabilities are used in producing the categorical PTYPE forecast described in Section 11. The POSN guidance is transmitted only during the period of September 1 - May 31. Note that the conditional probability of liquid precipitation is not given in the message, but may be calculated by summing the conditional probability of freezing precipitation and the conditional probability of snow and subtracting the sum from 100 %.

14. SNOW - SNOWFALL AMOUNT CATEGORICAL FORECAST

```
FOAK13 KWBC 130000
ANC        NGM MOS GUIDANCE    9/13/94 0000 UTC
DAY /TUE SEPT 13          /WED SEPT 14             /THU SEPT 15
UTC    06 09 12 15 18 21 00 03 06 09 12 15 18 21 00 03 06 09 12
                         ...
SNOW         0/    0/0    0/    0/0    0/    0/0    0/    0/0    0/
```

Categorical forecasts of snowfall amount are available in the message for both 6- and 12-h periods. The categorical forecasts of snowfall amount in 6-h periods are given to the left of the diagonal; forecasts are valid for 6-h periods ending 12, 18, 24, 30, 36, 42, 48, 54, and 60 hours after 0000 or 1200 UTC. The categorical forecasts for snowfall amount in 12-h periods are displayed to the right of the diagonal; forecasts are valid for 12-h periods ending 18, 30, 42, and 54 hours after 0000 or 1200 UTC. The 6- and 12-h snow amount categories are denoted as follows:

<u>6-h Snow Amount Categories</u>
0 = no snow;
1 = a trace to < 2 inches;
2 = ≥ 2 inches.

<u>12-h Snow Amount Categories</u>
0 = no snow;
1 = a trace to < 2 inches;
2 = 2 to < 4 inches;
4 = ≥ 4 to < 6 inches;
6 = ≥ 6 inches.

A missing forecast is denoted by 9; forecasts are disseminated only for the period of September 1 - May 31. Technical Procedures Bulletin No. 420 describes the snowfall amount forecast system.

15. CIG - CEILING HEIGHT CATEGORICAL FORECASTS

```
FOAK13 KWBC 130000
ANC        NGM MOS GUIDANCE    9/13/94 0000 UTC
DAY /TUE SEPT 13          /WED SEPT 14              /THU SEPT 15
UTC     06 09 12 15 18 21 00 03 06 09 12 15 18 21 00 03 06 09 12
                          ...
CIG      7  7  7  7  7  6  5  5  4  3  4     5     5
```

Forecasts of seven categories of ceiling height (see the following table) are available for specific times 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36, 42, and 48 hours after 0000 and 1200 UTC. The forecasts are displayed beneath the time of the day for which they are valid. Values of 1 through 7 are allowed for the categorical guidance; a value of 9 denotes a missing forecast. The categories are as follows:

Ceiling Height Categories

1 = ceiling height of < 200 feet;
2 = ceiling height of 200 - 400 feet;
3 = ceiling height of 500 - 900 feet;
4 = ceiling height of 1000 - 3000 feet;
5 = ceiling height of 3100 - 6500 feet;
6 = ceiling height of 6600 - 12,000 feet;
7 = ceiling height of > 12,000 feet.

The categorical guidance is prepared by using probability forecasts of the same categories. During the period April 1 through September 30, due to the rarity of reports of ceiling less than 200 ft, ceiling height category 1 can only be predicted at 1200 and 1500 UTC for stations located in the interior of the state. Technical Procedures Bulletin No. 414 describes the ceiling height forecast system for the contiguous United States; a TPB describing the Alaska ceiling height system is in preparation.

16. VIS - VISIBILITY CATEGORICAL FORECASTS

```
FOAK13 KWBC 130000
ANC        NGM MOS GUIDANCE    9/13/94 0000 UTC
DAY /TUE SEPT 13          /WED SEPT 14              /THU SEPT 15
UTC     06 09 12 15 18 21 00 03 06 09 12 15 18 21 00 03 06 09 12
                          ...
VIS      5  5  5  5  5  5  5  5  4  3  3     3     3
```

Forecasts of five categories of visibility (see the following table) are available for specific times 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36, 42, and 48 hours after 0000 and 1200 UTC. The forecasts are displayed beneath the time of the day for which they are valid. Values of 1 through 5 are allowed for the categorical guidance; a value of 9 denotes a missing forecast. The categories are as follows:

Visibility Categories

1 = visibility of < 1/2 mile;
2 = visibility of 1/2 - 7/8 miles;
3 = visibility of 1 - 2 3/4 miles;
4 = visibility of 3 - 5 miles;
5 = visibility of > 5 miles.

The categorical guidance is prepared by using probability forecasts of the same categories. During the period April 1 through September 30, because of the rarity of reports of visibility less than 1/2 mi, visibility category 1 can only be predicted at 1200 UTC for stations located in the interior of the state.

17. OBVIS - OBSTRUCTION TO VISION CATEGORICAL FORECASTS

```
FOAK13 KWBC 130000
ANC        NGM MOS GUIDANCE    9/13/94 0000 UTC
DAY /TUE SEPT 13          /WED SEPT 14             /THU SEPT 15
UTC    06 09 12 15 18 21 00 03 06 09 12 15 18 21 00 03 06 09 12
                         ...
OBVIS   N  N  N  N  N  N  N  N  N  F  F     F     F
```

Forecasts of four categories of obstruction to vision (see the following table) are available for specific times 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36, 42, and 48 hours after 0000 and 1200 UTC. The forecasts are displayed in plain language beneath the time of the day for which they are valid. The categories are denoted by the letters "F," "H," "B," and "N"; a value of "X" denotes a missing forecast. The categories are as follows:

Obstruction to Vision Categories

F = fog, ice fog, or ground fog;
H = haze;
B = blowing phenomenon (spray, snow, etc.);
N = no fog, haze, or blowing phenomenon.

The categorical guidance is prepared by using probability forecasts of the same categories. Note that in the equation development, cases of fog were not stratified by the occurrence of precipitation. Thus, a forecast of fog can be associated with appropriate radiation or advection conditions or with precipitation. Precipitation, which alone can reduce a station's visibility, is classified as weather, not an obstruction to vision, and so is included in the "N" category above.

18. AVAILABILITY

The FOAK13 and FOAK14 messages are produced twice daily at around 0400 and 1600 UTC. The FOAK13 guidance is available for the stations listed in Table 1. The product is disseminated to the FAA Weather Message Switching Center and over the Family of Service's Domestic Data Service. The actual receipt time by the user may lag the production time substantially, particularly during peak traffic hours when many products are being transmitted by the NWS Telecommunications Gateway. The FOAK14 message is a collective containing the guidance for three stations, namely, Anchorage (ANC), Fairbanks (FAI), and Juneau (JNU). This message is distributed on the AFOS Western Region loop as the FWCAK product and may be obtained by entering this product identifier.

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```
FOAK13 KWBC 130000
ANC        NGM MOS GUIDANCE   9/13/94 0000 UTC
DAY /TUE SEPT 13          /WED SEPT 14             /THU SEPT 15
UTC     06 09 12 15 18 21 00 03 06 09 12 15 18 21 00 03 06 09 12
MX/MN                     58          47          56          47
TEMP    51 48 47 45 47 53 56 55 52 51 49 49 50 53 55 54 52 50 49
DEWPT   45 44 43 41 41 42 41 43 44 43 43 43 43 44 44 45 45 44 44
CLDS    CL CL CL SC SC BK BK OV OV OV OV OV OV OV OV OV OV OV OV
WDIR    25 26 26 26 26 18 17 16 15 14 15 12 11 12 12 13 14 16 15
WSPD    02 05 06 05 05 10 11 10 15 13 13 10 11 10 12 15 16 16 15
POP06          2     5     35     62     74     81     80     84     65
POP12              10          75          88          92
QPF          0/    0/0   1/    2/2   2/    2/3   2/    3/4   3/
PTYPE    R  R  R  R  R  R  R  R  R  R  R     R     R     R     R
POZP     0  0  0  0  0  0  0  0  0  0  1     0     0     0     0
POSN     2  1  3  5  6  8  8 10  9 11 14    18    13    15     9
SNOW         0/    0/0   0/    0/0   0/    0/0   0/    0/0   0/
CIG      7  7  7  7  7  6  5  5  4  3  4     5     5
VIS      5  5  5  5  5  5  5  5  4  3  3     3     3
OBVIS    N  N  N  N  N  N  N  N  N  F  F     F     F
```

Figure 1. Sample FOAK13 message for Anchorage, Alaska (ANC) for the 0000 UTC cycle on September 13, 1994. This sample message was used in the line-by-line explanations given in Sections 2 through 17. The format of the FOAK14 message is identical to that shown above except "FOAK13" is replaced by "FOAK14" in the message heading.

```
FOAK13 KWBC 131200
ANC        NGM MOS GUIDANCE   9/13/94 1200 UTC
DAY /TUE 13  /WED SEPT 14             /THU SEPT 15             /
UTC     18 21 00 03 06 09 12 15 18 21 00 03 06 09 12 15 18 21 00
MN/MX                     46          56          45          57
TEMP    48 52 55 54 52 50 49 47 48 52 54 52 49 48 47 47 50 54 56
DEWPT   42 42 43 43 41 41 40 40 42 43 43 43 42 42 41 42 44 44 44
CLDS    SC BK BK OV OV OV OV OV OV OV OV OV OV OV OV OV OV OV OV
WDIR    26 21 18 17 16 18 17 16 14 15 16 15 16 15 14 18 17 16 17
WSPD    04 10 11 11 11 12 10 09 12 13 12 11 10 09 09 10 12 11 10
POP06          2    31     59     78     83     86     84     90     82
POP12             62          89          98          95
QPF          1/    2/2   2/    2/3   2/    3/3   2/    2/3   1/
PTYPE    R  R  R  R  R  R  R  R  R  R  R     R     R     R     R
POZP     0  0  0  0  0  0  0  1  0  0  0     0     0     0     0
POSN     8  9 10 12 13 14  9  8 11 10 12    13     8     7     5
SNOW         0/    0/0   0/    0/0   0/    0/0   0/    0/0   0/
CIG      7  6  6  6  5  4  4  4  3  3  4     4     4
VIS      5  5  4  4  4  4  3  3  3  2  3     3     3
OBVIS    N  N  H  F  F  F  F  F  F  F  F     F     F
```

Figure 2 Sample FOAK13 message for Anchorage, Alaska (ANC) for the 1200 UTC cycle on September 13, 1994.

Table 1. Stations available in the FOAK13 message. The latitude and longitude are given in degrees and minutes north and west, respectively. The STATUS column indicates whether forecasts were available (A) or unavailable (B) in the LFM-based MOS messages (FMAK1 or FMAK2). The AVAILABLE column indicates whether a complete (C) or incomplete (I) suite of forecasts is available for the station. If "I" is indicated, temperature, dew point, and/or wind forecasts are not available due to problems in the observational data base.

	STATION (WBAN NO.)	LATITUDE	LONGITUDE	STATUS	AVAILABLE
ADQ	- Kodiak (25501)	57° 45'	152° 31'	A	C
AKN	- King Salmon (25503)	58° 41'	156° 39'	A	C
ANC	- Anchorage (26451)	61° 10'	150° 01'	A	C
ANI	- Aniak (26516)	61° 35'	159° 32'	B	C
ANN	- Annette Island (25308)	55° 02'	131° 34'	A	I
BET	- Bethel (26615)	60° 47'	161° 48'	A	C
BIG	- Big Delta (26415)	64° 00'	145° 44'	A	C
BRW	- Barrow (27502)	71° 18'	156° 47'	A	C
BTI	- Barter Island (27401)	70° 08'	143° 38'	A	I
BTT	- Bettles (26533)	66° 55'	151° 31'	A	C
CDB	- Cold Bay (25624)	55° 12'	162° 43'	A	C
CDV	- Cordova (26410)	60° 30'	145° 30'	A	C
DLG	- Dillingham (25513)	59° 03'	158° 31'	A	C
DUT	- Dutch Harbor (25614)	53° 54'	166° 32'	B	I
ENA	- Kenai (26523)	60° 34'	151° 15'	A	C
ENN	- Nenana (26435)	64° 33'	149° 05'	B	C
FAI	- Fairbanks (26411)	64° 49'	147° 52'	A	C
FYU	- Fort Yukon (26413)	66° 33'	145° 12'	B	C
GAM	- Gambell (26703)	63° 47'	171° 45'	B	I
GKN	- Gulkana (26425)	62° 09'	145° 27'	A	C
GST	- Gustavus (25322)	58° 25'	135° 44'	B	I
HOM	- Homer (25507)	59° 38'	151° 30'	A	C
ILI	- Iliamna (25506)	59° 45'	154° 55'	B	C
JNU	- Juneau (25309)	58° 22'	134° 35'	A	C
KTN	- Ketchikan (25325)	55° 21'	131° 42'	B	C
MCG	- McGrath (26510)	62° 58'	155° 37'	A	C
MDO	- Middleton (25402)	59° 26'	146° 20'	B	C
MRI	- Merrill Field, Anchorage (26409)	61° 13'	149° 50'	B	C
OME	- Nome (26617)	64° 30'	165° 26'	A	C
ORT	- Northway (26412)	62° 57'	141° 56'	A	C
OTZ	- Kotzebue (26616)	66° 52'	162° 38'	A	C
PACZ	- Cape Romanzoff LRRS (26633)	61° 47'	166° 02'	A	C
PAED	- Elmendorf AFB (26401)	61° 15'	149° 48'	A	C
PAEH	- Cape Newenham LRRS (25623)	58° 39'	162° 04'	A	C
PAEI	- Eielson AFB (26407)	64° 39'	147° 04'	A	C
PAGA	- Galena (26501)	64° 44'	156° 56'	A	C
PAIM	- Indian Mountian LRRS (26535)	66° 00'	153° 42'	A	I
PALU	- Cape Lisburne LRRS (26631)	68° 53'	166° 08'	A	I
PAQ	- Palmer (25331)	61° 36'	149° 05'	B	I
PASV	- Sparrevohn LRRS (26534)	61° 06'	155° 34'	A	C
PATC	- Tin City LRRS (26634)	65° 34'	167° 55'	A	I
PATL	- Tatalina LRRS (26536)	62° 54'	155° 58'	A	C

Table 1. Continued.

		STATION (WBAN NO.)	LATITUDE	LONGITUDE	STATUS	AVAILABLE
PSG	-	Petersburg (25329)	56° 49'	132° 57'	A	I
PTH	-	Port Heiden (25508)	56° 57'	158° 37'	B	I
PUO	-	Prudhoe Bay (27407)	70° 15'	148° 20'	B	I
SCC	-	Deadhorse (27406)	70° 12'	148° 28'	B	C
SGY	-	Skagway (25335)	59° 27'	135° 19'	A	I
SIT	-	Sitka (25333)	57° 04'	135° 21'	A	C
SNP	-	Saint Paul Island (25713)	57° 09'	170° 13'	A	C
TAL	-	Tanana (26529)	65° 10'	152° 06'	A	I
TKA	-	Talkeetna (26528)	62° 18'	150° 06'	A	C
UNK	-	Unalakleet (26627)	63° 53'	160° 48'	B	C
VDZ	-	Valdez (26442)	61° 08'	146° 15'	A	I
VWS	-	Valdez (26479)	61° 08'	146° 21'	B	C
WRG	-	Wrangell (25338)	56° 28'	132° 23'	B	I
YAK	-	Yakutat (25339)	59° 31'	139° 40'	A	C
Z26	-	Haines (25323)	59° 14'	135° 26'	B	I
5MK	-	McKinley Park (26489)	63° 44'	148° 55'	B	I
5WD	-	Seward (26438)	60° 07'	149° 27'	B	I
5WT	-	Whittier (26444)	60° 46'	148° 41'	B	C

INTERPRETATION OF THE NGM-BASED MOS FORECAST MESSAGES (FOAK13/FOAK14)

FOAK13 KWBC 130000																				
ANC	NGM MOS GUIDANCE 9/13/94 0000 UTC																			
DAY	/TUE SEPT 13						/WED SEPT 14								/THU SEPT 15					
UTC	06	09	12	15	18	21	00	03	06	09	12	15	18	21	00	03	06	09	12	
MX/MN							58				47				56				47	
TEMP	51	48	47	45	47	53	56	55	52	51	49	49	50	53	55	54	52	50	49	- Temperature at specified time (°F).
DEWPT	45	44	43	41	41	42	41	43	44	43	43	43	43	44	44	45	45	44	44	- Dew point temperature at specified time (°F).
CLDS	CL	CL	CL	SC	SC	BK	BK	OV	OV	OV	OV	OV	OV	OV	OV	OV	OV	OV	OV	- Cloud cover forecast for specified time (see below).
WDIR	25	26	26	26	26	18	17	16	15	14	15	12	11	12	12	13	14	16	15	- Wind direction (x 10 = compass direction) for specified time.
WSPD	02	05	06	05	05	10	11	10	15	13	13	10	11	10	12	15	16	16	15	- Wind speed (kts) for specified time.
POP06			2		5		35		62		74		81		80		84		65	- Probability of precipitation for 6-h period ending at specified time.
POP12					10				75				88				92			- Probability of precipitation for 12-h period ending at specified time.
QPF		0/		0/0		1/		2/2		2/		2/3		2/		3/4		3/		- Precipitation amount forecast for 6- and 12-h periods (see below).
PTYPE	R	R	R	R	R	R	R	R	R	R	R	R		R		R		R		- Precipitation type forecast for specified time (see below).
POZP	0	0	0	0	0	0	0	0	0	0	1	0		0		0		0		- If precipitating, conditional probability of freezing precip. or ice pellets.
POSN	2	1	3	5	6	8	8	10	9	11	14	18		13		15		9		- If precipitating, conditional probability of snow for specified time.
SNOW		0/		0/0		0/		0/0		0/		0/0		0/		0/0		0/		- Snow amount for 6- and 12-h periods (see below).
CIG	7	7	7	7	7	6	5	5	4	3	4	5		5						- Ceiling height forecast for specified time (see below).
VIS	5	5	5	5	5	5	5	5	4	3	3	3		3						- Visibility forecast for specified time (see below).
OBVIS	N	N	N	N	N	N	N	N	N	F	F	F		F						- Obstruction to vision forecast for specified time (see below).

- Bulletin Header.
- Message Identification [Station, Model, Initial Date and Time (UTC)].
- Valid Month and Day (UTC).
- Valid Hour (UTC).
- Maximum or minimum temperature for daytime/nighttime period (°F).

CLDS
- CL - Clear
- SC - Scattered
- BK - Broken
- OV - Overcast

PTYPE
- L - Liquid
- Z - Freezing or Ice pellets
- S - Snow

QPF format "A/B"
- A - Value for 6-h period
  - 0 = no precipitation
  - 1 = 0.01 - 0.09 inches
  - 2 = 0.10 - 0.24 inches
  - 3 = 0.25 - 0.49 inches
  - 4 = 0.50 - 0.99 inches
  - 5 = ≥ 1.00 inches
- B - Value for 12-h period
  - 0 = no precipitation
  - 1 = 0.01 - 0.09 inches
  - 2 = 0.10 - 0.24 inches
  - 3 = 0.25 - 0.49 inches
  - 4 = 0.50 - 0.99 inches
  - 5 = 1.00 - 1.99 inches
  - 6 = ≥ 2.00 inches

SNOW format "A/B"
- A - Value for 6-h period
  - 0 = no snow
  - 1 = trace - < 2 inches
  - 2 = ≥ 2 inches
- B - Value for 12-h period
  - 0 = no snow
  - 1 = trace - < 2 inches
  - 2 = 2 - < 4 inches
  - 4 = 4 - < 6 inches
  - 6 = ≥ 6 inches

CIG
- 1 = < 200 ft.
- 2 = 200 - 400 ft.
- 3 = 500 - 900 ft.
- 4 = 1000 - 3000 ft.
- 5 = 3100 - 6500 ft.
- 6 = 6600 - 12000 ft.
- 7 = > 12000 ft.

VIS
- 1 = < 1/2 miles
- 2 = 1/2 - 7/8 miles
- 3 = 1 - 2 3/4 miles
- 4 = 3 - 5 miles
- 5 = > 5 miles

OBVIS
- B = Blowing phenomena
- F = Fog
- H = Haze
- N = No blowing phenomena, fog, or haze

REFERENCE: TECHNICAL PROCEDURES BULLETIN NO. 425: NGM-Based MOS Guidance for Alaska - The FOAK13/FOAK14 Messages