National Weather Service
Office of Meteorology

Technical Procedures Bulletin

Subject: ETA-BASED MOS GUIDANCE - THE 0000/1200 UTC ALPHANUMERIC MESSAGES

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This Technical Procedures Bulletin was written by J. Paul Dallavalle and Mary C. Erickson of the NWS Meteorological Development Laboratory. It describes the format, contents and verification of the Eta MOS alphanumeric messages generated during the 0000 and 1200 UTC forecast cycles. The alphanumeric messages provide guidance on:

- Max/Min Temperature
- Temperature/dewpoint
- Wind direction/speed
- PoP/QPF
- Total Sky Cover
- Thunderstorm/severe weather.

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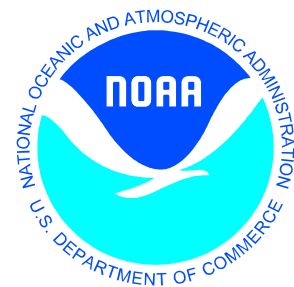
ETA-BASED MOS GUIDANCE - THE 0000/1200 UTC ALPHANUMERIC MESSAGES
by
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1. INTRODUCTION

This Technical Procedures Bulletin (TPB) describes the format and contents of the Eta MOS alphanumeric messages generated during the 0000 and 1200 UTC forecast cycles. These messages contain forecasts of the max/min temperature; time-specific surface temperature and dew point; total sky cover; surface wind direction and wind speed; probability of precipitation (PoP) for 6- and 12-h periods; categories of quantitative precipitation for 6- and 12-h periods; and probability of thunderstorms and conditional probability of severe thunder- storms for 6- and 12-h periods. Guidance is provided for projections of 6 to 60 hours for most weather elements. Note that a particular element line (see Sections 3 - 13) is not included in the message when all of the forecasts in that line are unavailable. The messages will become operational during spring of 2002.

2. MESSAGE HEADING

```
KALB    ETA MOS GUIDANCE    10/24/2000   0000 UTC
DT /OCT  24                /OCT  25    /OCT  26
HR   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 Figs. 1 and 2 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 message is valid for Albany, NY (KALB). All stations are identified by the ICAO four-character identifier.

The "ETA MOS GUIDANCE" appearing on the same line as the station call letters identifies the message contents. The date of the forecast cycle during which the message is issued follows this information. The form of mm/dd/yyyy where mm is the month (1 through 12), dd is the day (1 through 31), and yyyy is the four-digit year is used. The forecast cycle is identified by the standard 0000 or 1200 UTC. In this example, the MOS guidance for KALB was issued from the 0000 UTC forecast cycle of the Eta model on October 24, 2000.

The DT and HR lines denote the date and hour at which the forecasts are valid. The DT line indicates the day of the month. Note that the month is denoted by the standard three or four letter abbreviation. For temperature, dew point, sky cover, wind direction, and wind speed, the date and hour denote the specific time that the forecasts are valid. These forecasts are valid every 3 hours from 6 to 60 hours after initial time. For PoP, quantitative precipi- tation, thunderstorms, and severe weather, the time indicates the end of the period over 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. X/N - MAXIMUM/MINIMUM TEMPERATURE

```
KALB   ETA MOS GUIDANCE   10/24/2000   0000 UTC
DT /OCT  24              /OCT  25                 /OCT  26
HR   06 09 12 15 18 21 00 03 06 09 12 15 18 21 00 03 06 09 12
X/N                    49          30             61          43
```

The max/min surface temperature forecasts are displayed for projections of 24,
36, 48, and 60 hours after the initial data time (0000 or 1200 UTC). Although
the forecasts are presented at consecutive 12-h intervals, each forecast is
actually valid for a daytime or nighttime period. For the Eta-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 DT and HR 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, respectively. For the
0000 UTC forecast cycle, the temperatures are shown in max/min (X/N) 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 min/max (N/X)
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 a 999.

4. TMP - SURFACE TEMPERATURE

```
KALB   ETA MOS GUIDANCE   10/24/2000   0000 UTC
DT /OCT  24              /OCT  25                 /OCT  26
HR   06 09 12 15 18 21 00 03 06 09 12 15 18 21 00 03 06 09 12
                               ...
TMP  32 30 30 41 47 47 38 34 32 32 34 47 58 60 54 50 48 47 49
```

Time-specific 2-m temperature forecasts 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 pre-
sented to the nearest whole degree Fahrenheit; a missing forecast is indicated
by a 999. Only three characters are available for the temperature forecasts.
Thus, two consecutive forecasts of 100 degrees or more or of -10 degrees or
less appear with no spaces between them.

5. DPT - SURFACE DEW POINT

```
KALB   ETA MOS GUIDANCE   10/24/2000   0000 UTC
DT /OCT  24              /OCT  25                 /OCT  26
HR   06 09 12 15 18 21 00 03 06 09 12 15 18 21 00 03 06 09 12
                               ...
DPT  25 23 23 24 23 23 24 26 28 28 30 32 34 37 39 41 43 43 45
```

Time-specific 2-m dew point forecasts 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 a
999. Three characters are available for the dew point forecasts so that two
consecutive forecasts of -10 degrees or less appear with no spaces between
them.

6. CLD - TOTAL SKY COVER CATEGORIES

```
KALB    ETA MOS GUIDANCE    10/24/2000   0000 UTC
DT /OCT  24                 /OCT  25                     /OCT  26
HR    06 09 12 15 18 21 00 03 06 09 12 15 18 21 00 03 06 09 12
                                 ...
CLD  CL CL CL CL CL CL CL CL SC SC CL CL CL CL CL CL CL SC SC
```

Forecast categories of total sky 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, and so forth). Two characters identify the category (CL – clear; SC – scattered; BK – broken; OV – overcast); a missing forecast is denoted by XX.

        Total Sky Cover Categories
        CL – clear;
        SC – > 0 to 4 octas of total sky cover;
        BK – > 4 to < 8 octas of total sky cover;
        OV – 8 octas of total sky cover or totally obscured.

7. WDR - SURFACE WIND DIRECTION / WSP - SURFACE WIND SPEED

```
KALB    ETA MOS GUIDANCE    10/24/2000   0000 UTC
DT /OCT  24                 /OCT  25                     /OCT  26
HR    06 09 12 15 18 21 00 03 06 09 12 15 18 21 00 03 06 09 12
                                 ...
WDR   32 32 32 31 31 32 32 00 00 00 36 15 16 15 16 16 16 16 18
WSP   08 08 08 11 12 09 02 00 00 00 01 04 10 08 04 06 08 06 11
```

Surface wind direction (WDR) and speed (WSP) forecasts 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 the 10-m winds (a 2-minute average) 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. The wind speed is given in knots; the maximum speed allowed in the message is 98 knots. For both direction and speed, missing forecasts are denoted by 99. A calm wind is indicated by a wind direction and speed of 00.

8. P06 - PROBABILITY OF PRECIPITATION IN A 6-H PERIOD

```
KALB    ETA MOS GUIDANCE    10/24/2000   0000 UTC
DT /OCT  24                 /OCT  25                     /OCT  26
HR    06 09 12 15 18 21 00 03 06 09 12 15 18 21 00 03 06 09 12
                                 ...
P06         0        0        0        3     5        0        0        9     14
```

The P06 forecasts are for the probability of 0.01 inches or more of liquid-equivalent precipitation (PoP) 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 6-h period. The probability is given to the nearest percent. Values range from 0 to 100%. A missing forecast value is indicated by 999.

9. P12 - PROBABILITY OF PRECIPITATION IN A 12-H PERIOD

```
KALB   ETA MOS GUIDANCE   10/24/2000   0000 UTC
DT /OCT  24                /OCT   25                /OCT   26
HR   06 09 12 15 18 21 00 03 06 09 12 15 18 21 00 03 06 09 12
                                   ...
P12                    0           6           0           17
```

The P12 forecasts are for the probability of 0.01 inches or more of liquid-equivalent precipitation (PoP) occurring during a 12-h period. For nearly all stations, the 12-h PoP's are valid for intervals of 12-24, 24-36, 36-48, and 48-60 hours after the initial data times (0000 and 1200 UTC). In the message, the forecast values are displayed under the ending time of the 12-h period. The probability is given to the nearest percent. Values range from 0 to 100%. A missing forecast value is indicated by 999.

10. Q06 - QUANTITATIVE PRECIPITATION AMOUNT IN A 6-H PERIOD

```
KALB   ETA MOS GUIDANCE   10/24/2000   0000 UTC
DT /OCT  24                /OCT   25                /OCT   26
HR   06 09 12 15 18 21 00 03 06 09 12 15 18 21 00 03 06 09 12
                                   ...
Q06        0     0     0     0     0     0     0     0     0
```

Guidance for liquid-equivalent precipitation amount (QPF) accumulated during a 6-h period is presented in categorical form on the line designated Q06. 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). The forecasts are displayed beneath the hour indicating the end of the 6-h period. The Q06 guidance is a categorical forecast of liquid-equivalent precipitation equaling or exceeding certain specified amounts in the 6-h periods. The categories are as follows:

        Q06 Categories
        0 = no precipitation expected;
        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 = $\geq$ 1.00 inches.

Missing forecasts are denoted by 9.

11. Q12 - QUANTITATIVE PRECIPITATION AMOUNT IN A 12-H PERIOD

```
KALB   ETA MOS GUIDANCE   10/24/2000   0000 UTC
DT /OCT  24              /OCT  25                /OCT  26
HR   06 09 12 15 18 21 00 03 06 09 12 15 18 21 00 03 06 09 12
                                 ...
Q12                      0          0          0          0
```

Guidance for liquid-equivalent precipitation amount (QPF) accumulated during a
12-h period is presented in categorical form on the line designated Q12.
These forecasts are available for projections of 12-24, 24-36, 36-48, and 48-
60 hours after the initial data time (0000 and 1200 UTC). The forecasts are
displayed beneath the hour indicating the end of the 12-h period. The Q12
guidance is a categorical forecast of liquid-equivalent precipitation equaling
or exceeding certain specified amounts in the 12-h periods. The categories
are as follows:

        Q12 Categories
        0 = no precipitation expected;
        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 = $\geq$ 2.00 inches.

Missing forecasts are denoted by 9.

12. T06 - PROBABILITY OF THUNDERSTORMS/CONDITIONAL PROBABILITY OF SEVERE THUNDERSTORMS IN A 6-H PERIOD

```
KALB   ETA MOS GUIDANCE   10/24/2000   0000 UTC
DT /OCT  24              /OCT  25                /OCT  26
HR   06 09 12 15 18 21 00 03 06 09 12 15 18 21 00 03 06 09 12
                                 ...
T06      0/ 7  0/ 1  0/ 2  0/ 4  2/ 1  1/ 1  2/ 1 18/ 3  4/ 2
```

The T06 line represents forecasts for the probability of thunderstorms (to the
left of the diagonal) and the conditional probability of severe thunderstorms
(to the right of the diagonal) during a 6-h period. The 6-h probability
forecasts 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 pair of forecast values is displayed under the
ending time of the 6-h period. The thunderstorm probability is given to the
nearest whole percent. Values range from 0 to 100%. A missing forecast value
is indicated by 999. The conditional severe thunderstorm probability is given
to the nearest whole percent. Values range from 0 to 98%. A missing forecast
value is given by 99. Both the thunderstorm and conditional severe storm
probabilities are available year-round for stations in the contiguous U.S.
Note that these probabilities represent the likelihood of the event within a
box approximately 47 km on a side and containing the station specified.

13. T12 - PROBABILITY OF THUNDERSTORMS/CONDITIONAL PROBABILITY OF SEVERE THUNDERSTORMS IN A 12-H PERIOD

```
KALB   ETA MOS GUIDANCE    10/24/2000   0000 UTC
DT /OCT  24              /OCT   25                  /OCT   26
HR   06 09 12 15 18 21 00 03 06 09 12 15 18 21 00 03 06 09 12
                                  ...
T12            0/ 7         0/ 3         4/ 2         14/ 4
```

The T12 line represents forecasts for the probability of thunderstorms (to the left of the diagonal) and the conditional probability of severe thunderstorms (to the right of the diagonal) occurring during a 12-h period. The 12-h probability forecasts 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 pair of forecast values is displayed under the ending time of the 12-h period. The thunderstorm probability is given to the nearest whole percent. Values range from 0 to 100%. A missing forecast value is indicated by 999. The conditional severe thunderstorm probability is given to the nearest whole percent. Values range from 0 to 98%. A missing forecast value is given by 99. Both the thunderstorm and conditional severe storm probabilities are available year-round for stations in the contiguous U.S. These probabilities represent the likelihood of the event within a box approximately 47 km on a side and containing the station specified.

14. AVAILABILITY

The 0000 and 1200 UTC Eta MOS guidance will be available at approximately 0230 and 1430 UTC, respectively, in 6 alphanumeric messages transmitted to NWS AWIPS and Family of Services (FOS) circuits and containing guidance for stations in the contiguous United States (CONUS). Guidance is not available for stations outside of the CONUS. The following two-line WMO headers will be used:

    WMO Header - Region
    FOUS41 KWNO - Northeast U.S.
    METNE1

    FOUS42 KWNO - Southeast U.S.
    METSE1

    FOUS43 KWNO - North Central U.S.
    METNC1

    FOUS44 KWNO - South Central U.S.
    METSC1

    FOUS45 KWNO - Rocky Mountain Region
    METRM1

    FOUS46 KWNO - West Coast Region
    METWC1

15. STATION LIST

The Eta MOS guidance will be available for approximately 1258 stations in the CONUS The guidance is transmiteed in the six bulletins described in Section 14.

The user may check the following home pages for the station lists and corresponding WMO headers:

    http://www.nws.noaa.gov/mdl/synop/stadrg.htm

Figure 1. Sample 0000 UTC message.

```
KALB    ETA MOS GUIDANCE    10/24/2000   0000 UTC
DT /OCT   24                 /OCT   25                    /OCT   26
HR    06 09 12 15 18 21 00 03 06 09 12 15 18 21 00 03 06 09 12
X/N                         49          30          61          43
TMP   32 30 30 41 47 47 38 34 32 32 34 47 58 60 54 50 48 47 49
DPT   25 23 23 24 23 23 24 26 28 28 30 32 34 37 39 41 43 43 45
CLD   CL CL CL CL CL CL CL CL SC SC CL CL CL CL CL CL CL SC SC
WDR   32 32 32 31 31 32 32 00 00 00 36 15 16 15 16 16 16 16 18
WSP   08 08 08 11 12 09 02 00 00 00 01 04 10 08 04 06 08 06 11
P06         0     0     0     3     5     0     0     9     14
P12               0           6           0           17
Q06         0     0     0     0     0     0     0     0     0
Q12               0           0           0           0
T06      0/ 7  0/ 1  0/ 2  0/ 4  2/ 1  1/ 1  2/ 1 18/ 3  4/ 2
T12         0/ 7     0/ 3     4/ 2     14/ 4
```

Figure 2. Sample 1200 UTC message.

```
KALB    ETA MOS GUIDANCE    11/24/2000   1200 UTC
DT /NOV   24/NOV   25                    /NOV   26                    /
HR    18 21 00 03 06 09 12 15 18 21 00 03 06 09 12 15 18 21 00
N/X                         38          47          37          51
TMP   61 59 55 50 46 42 39 43 45 44 39 39 39 41 40 43 48 48 47
DPT   55 53 49 44 38 34 31 31 31 31 33 33 35 37 38 41 43 44 43
CLD   SC BK BK OV SC SC SC BK OV OV OV OV OV OV OV OV OV OV OV
WDR   17 17 20 24 26 30 31 34 01 01 00 00 05 09 13 13 13 12 14
WSP   12 10 08 08 05 05 05 02 02 02 00 00 03 03 07 03 03 02 05
P06        26    30    16     8    23    29    44    55    54
P12               36          23          51          70
Q06         1     0     0     0     0     0     1     1     2
Q12               1           0           1           3
T06      9/ 2  2/ 0  2/ 4  1/ 2  0/ 0  2/ 0  7/ 0  8/ 1  5/ 2
T12         9/ 1     2/ 4     1/ 0     12/ 1
```

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