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METEOROLOGICAL DEVELOPMENT LABORATORY

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**AFOS-ERA VERIFICATION OF GUIDANCE AND  
LOCAL AVIATION/PUBLIC WEATHER FORECASTS--NO. 25  
(OCTOBER 1995 - MARCH 1996)**

Valery J. Dagostaro and J. Paul Dallavalle

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1. INTRODUCTION

This office note continues the series of Meteorological Development Laboratory (MDL) office notes which present verification results for MDL's automated guidance and National Weather Service (NWS) local forecasts made at Weather Service Forecast Offices (WSFO's). Verification statistics are presented here for the cool season months of October 1995 through March 1996 for maximum/minimum (max/min) temperature, probability of precipitation (PoP), precipitation type, snow amount, cloud amount, surface wind, ceiling height, and visibility. Specific details about the local and objective forecasts and the verifying observations are summarized in Table 1.1. It's important to consider this information when interpreting the verification scores. For example, the objective max/min temperature forecast system is based on calendar day observations for Alaska, but on daytime/nighttime periods for the conterminous U.S. For Alaska, the definitions of the official local max/min temperature forecasts and verifying observations, in turn, differ from those of the guidance. Dagostaro and Dallavalle (1991) provide more specific information about the forecasts, observations, and verification procedure for each weather element.

For this season, the objective guidance was based on forecast equations developed by use of the Model Output Statistics (MOS) technique (Glahn and Lowry 1972) and applied to forecast fields from the Nested Grid Model (NGM) (Hoke et al. 1989) and the Limited-area Fine-mesh Model (LFM) (Gerrity 1977; Newell and Deaven 1981). Additional information about the objective guidance prediction equations is available from the references listed in Table 1.2. Details regarding the local data collection in the conterminous U.S. and Alaska are described briefly in Dagostaro and Dallavalle (1991). For additional information about the local data collection process, see Ruth and Alex (1987). The central data collection and data processing system is described in Dagostaro (1985).

Verification statistics are provided for the 101 stations in the conterminous U.S. and Alaska listed in Table 1.3. The scores are those recommended in the NWS National Verification Plan (National Weather Service 1982). Definitions of the categories used for verification are given in Table 1.4. For the aviation weather elements, we verified the local forecasts associated with the FT issuance times of approximately 0900 and 1800 UTC. Objective guidance for the aviation weather elements, as well as all local and guidance forecasts for the public weather elements, were verified for the 0000 and 1200 UTC forecast cycles. Because verification data or forecast projections for Alaska differ from those of the conterminous U.S., data for the six Alaskan stations were verified separately from those of the conterminous U.S.

For most weather elements, verification results are presented for all stations in the conterminous U.S. combined, followed by results for each of the four NWS regions in the conterminous U.S. and for the Alaska Region.

Following this convention, max/min temperature scores are presented in Tables 2.1 - 2.12. For PoP, scores are presented in Tables 3.1 - 3.10 for the conterminous U.S. stations combined and for the four NWS regions in the conterminous U.S. PoP verification scores were unavailable for the Alaskan stations (see Section 2). Verification results for precipitation type are shown in Tables 4.1 and 4.2 for stations in the conterminous U.S. only. Similarly, the snow amount verification results shown in Table 5.1 are for the conterminous U.S. sites only. Tables 6.1 - 6.12 show cloud amount verification scores. For wind speed and direction, objective guidance verification results are presented in Tables 7.1 - 7.12, while the analogous local scores are given in Tables 7.13 - 7.24. Verification results for the 42-h significant wind speed are presented for the conterminous U.S. stations combined and for the Alaska Region in Tables 7.25 - 7.28. For ceiling height, Tables 8.1 - 8.4 contain the objective forecast results for the conterminous U.S. stations combined and for the Alaska Region, while Tables 8.5 - 8.8 contain ceiling height scores for the local forecasts. Tables 9.1 - 9.8 show objective and local visibility forecast results for the conterminous U.S. stations combined and for the Alaska Region.

## 2. SUMMARY (OCTOBER 1995 - MARCH 1996)

During the 1995-96 cool season, the NGM-based MOS was the official objective guidance for stations in the conterminous U.S., and LFM-based MOS was the official objective guidance for stations in Alaska. Please note that for some weather elements, forecast definitions for LFM and NGM MOS differ slightly. In preparation for the termination of the LFM model in February 1996, dissemination of the LFM MOS guidance products for Alaska (i.e, the FMAK1 and FMAK2 bulletins) ceased on January 24, 1996. Although NGM-based MOS guidance was available for the Alaskan sites in the FOAK13 bulletin, Alaska's data collection software was unable to process the MOS guidance and, for the remainder of the cool season, no AEV data were received for stations in Alaska. As a result, the data sample for Alaska is smaller than usual.

Twenty-eight AEV stations were commissioned as ASOS sites during the cool season. The stations listed below were commissioned on the dates indicated: October 1, 1995 - Charleston, South Carolina; Erie, Pennsylvania; and Shreveport, Louisiana; November 1, 1995 - Cheyenne, Wyoming; Fargo, North Dakota; Tampa, Florida; and Portland, Oregon; December 1, 1995 - Boise, Idaho; Buffalo, New York; Cleveland, Ohio; Columbia, South Carolina; Dallas-Ft. Worth, Texas; Des Moines, Iowa; Philadelphia, Pennsylvania; and Springfield, Illinois; January 1, 1996 - Indianapolis, Indiana and Tucson, Arizona; February 1, 1996 - Beckley, West Virginia; Burlington, Vermont; Chicago (O'Hare), Illinois; Mobile, Alabama; North Platte, Nebraska; and Raleigh-Durham, North Carolina; February 22, 1996 - Omaha, Nebraska; and March 1, 1996 - Albuquerque, New Mexico; Lexington, Kentucky; Norfolk, Virginia; and Pocatello, Idaho. Because the ASOS cloud amount observations are incomplete, we set to missing the observed cloud amount data for those stations after they were commissioned. Observed cloud amount data were also set to missing for the AEV ASOS sites listed in Table 1.3 that were commissioned prior to the 1995-96 cool season. In addition, snow amount observations were unavailable for ASOS sites.

Dagostaro and Dallavalle (1997) documented problems affecting the locally-collected LFM MOS PoP forecasts and the verifying precipitation observations



for stations in Alaska. Although we continued to replace the LFM MOS PoP forecasts with values whose valid times matched those of the local forecasts, neither the local nor MOS PoP forecasts were verified due to the lack of verifying observations.

For the 1995-96 cool season, we eliminated from the data archive all precipitation amount observations for Providence, Rhode Island. The ASOS precipitation amount sensor caused dew to be reported as measurable precipitation. Although the problem probably occurred at other ASOS sites, the forecasters at the Taunton Weather Forecast Office seemed particularly concerned about the observations at Providence.

### 3. REFERENCES

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Table 1.1. Forecasts and observations in the NWS verification data.

| Weather Element | Type of Data | Data Source <sup>1</sup> | Projections From Forecast Cycle | Forecast Cycle (UTC) | Comments                                                                                                                                                                                                                        |
|-----------------|--------------|--------------------------|---------------------------------|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Max temp        | LFM MOS      | FMAK1                    | 24, 48<br>36, 60                | 0000<br>1200         | Calendar day max temperature forecast for Alaska; guidance no longer available for the conterminous U.S.                                                                                                                        |
|                 | NGM MOS      | FWC                      | 24, 48<br>36, 60                | 0000<br>1200         | Daytime max temperature forecast.                                                                                                                                                                                               |
|                 | Local Fcst   | FP                       | 24, 48<br>36, 60                | 0000<br>1200         | Daytime max temperature for all stations. In the conterminous U.S., actual daytime period depends on time zone. For Alaska, forecasts are valid for 12-h periods ending at 30 (42) and 54 (66) hours after 0000 (1200) UTC.     |
|                 | Obs          | SAO                      |                                 |                      | Corresponds closely to the local and NGM MOS definitions of the max for all stations.                                                                                                                                           |
|                 |              |                          |                                 |                      |                                                                                                                                                                                                                                 |
| Min temp        | LFM MOS      | FMAK1                    | 36, 60<br>24, 48                | 0000<br>1200         | Calendar day min temperature forecast for Alaska; guidance no longer available for the conterminous U.S.                                                                                                                        |
|                 | NGM MOS      | FWC                      | 36, 60<br>24, 48                | 0000<br>1200         | Nighttime min temperature forecast.                                                                                                                                                                                             |
|                 | Local Fcst   | FP                       | 36, 60<br>24, 48                | 0000<br>1200         | Nighttime min temperature for all stations. In the conterminous U.S., actual nighttime period depends on time zone. For Alaska, forecasts are valid for 12-h periods ending at 30 (42) and 54 (66) hours after 1200 (0000) UTC. |
|                 | Obs          | SAO                      |                                 |                      | Corresponds closely to the local and NGM MOS definitions of the min for all stations.                                                                                                                                           |
|                 |              |                          |                                 |                      |                                                                                                                                                                                                                                 |
| PoP             | LFM MOS      | FMAK1                    | 30, 42, 54                      | 0000, 1200           | For Alaska, forecasts are for 12-h periods ending at the indicated projections. Guidance for the conterminous U.S. is no longer available.                                                                                      |
|                 | NGM MOS      | FWC                      | 24, 36, 48                      | 0000, 1200           | Forecasts are for 12-h periods ending at the indicated projections.                                                                                                                                                             |
|                 | Local Fcst   | FP                       | 24, 36, 48                      | 0000, 1200           | Same as the guidance. For Alaska, the local forecasts are valid 30, 42, and 54 hours from the forecast cycle.                                                                                                                   |
|                 | Obs          | SAO                      |                                 |                      | Precipitation amount for 12-h periods that match those of the local forecasts.                                                                                                                                                  |
|                 |              |                          |                                 |                      |                                                                                                                                                                                                                                 |

Table 1.1. Continued.

| Weather Element                 | Type of Data | Data Source | Projections From Forecast Cycle | Forecast Cycle (UTC) | Comments                                                                                                                                                                                                                                                                                                                                               |
|---------------------------------|--------------|-------------|---------------------------------|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Precipitation type <sup>2</sup> | LFM MOS      | FMAK1       | 18, 30, 42                      | 0000, 1200           | For Alaska, guidance is for frozen and unfrozen precipitation (freezing is considered unfrozen but is not verified). There is no guidance for the conterminous U.S.                                                                                                                                                                                    |
|                                 | NGM MOS      | FWC         | 18, 30, 42                      | 0000, 1200           | Forecasts are valid at specific hours corresponding to the indicated projections. Guidance is for freezing, frozen, and liquid precipitation (mixed frozen and liquid is considered liquid).                                                                                                                                                           |
|                                 | Local Fcst   | MEF         | 18, 30, 42                      | 0000, 1200           | Forecasts of freezing, frozen, and liquid precipitation (mixed frozen and liquid is considered frozen) for all stations. Forecasts are valid at specific hours corresponding to the indicated projections.                                                                                                                                             |
|                                 | Obs          | SAO         |                                 |                      | Obs are collected at the verifying time and $\pm 1$ hour of the verifying time.                                                                                                                                                                                                                                                                        |
| Snow amount <sup>2</sup>        | LFM MOS      |             |                                 |                      | For Alaska, appropriate guidance is not available; no guidance for the conterminous U.S.                                                                                                                                                                                                                                                               |
|                                 | NGM MOS      | FWC         | 24                              | 0000, 1200           | Categorical forecasts of snow amount for the 12-h period ending at the indicated projection.                                                                                                                                                                                                                                                           |
|                                 | Local Fcst   | MEF         | 24                              | 0000, 1200           | Snow amount forecast in inches for the 12-h period ending at the indicated projection.                                                                                                                                                                                                                                                                 |
|                                 | Obs          | SSM         |                                 |                      | 12-h snow amount.                                                                                                                                                                                                                                                                                                                                      |
| Cloud amount                    | LFM MOS      | FMAK1       | 12, 18, 24                      | 0000, 1200           | Categorical forecasts of opaque sky cover for Alaska; no guidance for the conterminous U.S.                                                                                                                                                                                                                                                            |
|                                 | NGM MOS      | FWC         | 12, 18, 24                      | 0000, 1200           | Categorical forecasts of opaque sky cover.                                                                                                                                                                                                                                                                                                             |
|                                 | Local Fcst   | MEF         | 12, 18, 24                      | 0000, 1200           | Categorical forecasts of sky cover.                                                                                                                                                                                                                                                                                                                    |
|                                 | Obs          | SAO         |                                 |                      | Observed total sky cover (includes thin clouds) at the verifying hour.                                                                                                                                                                                                                                                                                 |
| Wind speed                      | LFM MOS      | FMAK2       | 12, 18, 24, 42                  | 0000, 1200           | For Alaska, forecasts are valid at specific hours after 0000 or 1200 UTC; no guidance for the conterminous U.S.                                                                                                                                                                                                                                        |
|                                 | NGM MOS      | FWC         | 12, 18, 24, 42                  | 0000, 1200           | Forecasts are valid at the indicated hours after 0000 or 1200 UTC.                                                                                                                                                                                                                                                                                     |
|                                 | Local Fcst   | FT          | 3, 9, 15                        | 0900, 1800           | Aviation terminal forecasts are valid for variable time periods. Forecasts valid for the "projections" at left are verified. Approximate FT issuance times, at left, depend on time zone where station is located.                                                                                                                                     |
|                                 | Obs          | MEF         | 42                              | 0000, 1200           | A yes/no forecast of $\geq 22$ kt wind speed valid at the specific hour after 0000 or 1200 UTC.                                                                                                                                                                                                                                                        |
|                                 |              | SAO         |                                 |                      | Observed values collected at the stations for the specific hour and $\pm 3$ hours (highest sustained wind) correspond to the valid times of the local aviation terminal forecasts. Observed values corresponding to the 42-h significant wind are based on 0000 or 1200 UTC. Verifying obs corresponding to the guidance are from MDL hourly archives. |

Table 1.1. Continued.

| Weather Element | Type of Data | Data Source <sup>1</sup> | Projections From Forecast Cycle | Forecast Cycle (UTC) | Comments                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------|--------------|--------------------------|---------------------------------|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Wind direction  | LFM MOS      | FMAK2                    | 12, 18, 24                      | 0000, 1200           | For Alaska, forecasts are valid at specific hours after 0000 or 1200 UTC; no guidance for the conterminous U.S.                                                                                                                                                                                                                                                              |
|                 | NGM MOS      | FWC                      | 12, 18, 24                      | 0000, 1200           | Forecasts are valid at the indicated hours after 0000 or 1200 UTC.                                                                                                                                                                                                                                                                                                           |
|                 | Local Fcst   | FT                       | 3, 9, 15                        | 0900, 1800           | Same as for local aviation terminal forecasts of wind speed.                                                                                                                                                                                                                                                                                                                 |
|                 | Obs          | SAO                      |                                 |                      | Observed values collected at the stations for the specific hour correspond to the valid time of the local forecasts. Verifying obs corresponding to the guidance are from MDL hourly archives.                                                                                                                                                                               |
| Ceiling height  | LFM MOS      | FMAK2                    | 12, 18, 24                      | 0000, 1200           | Categorical value. Definitions of categories match the official definitions of LIFR and IFR, but differ slightly from the official definitions of MVFR and VFR; no guidance for the conterminous U.S.                                                                                                                                                                        |
|                 | NGM MOS      | FWC                      | 12, 15, 18, 24                  | 0000, 1200           | Categorical value. Definitions of categories match the official definitions of LIFR, IFR, MVFR, and VFR.                                                                                                                                                                                                                                                                     |
|                 | Local Fcst   | FT                       | 3, 6, 9, 15                     | 0900, 1800           | Forecasts are converted to categorical values. See wind speed for FT valid times and issuance times.                                                                                                                                                                                                                                                                         |
|                 | Persis       | SAO                      |                                 |                      | Persistence observations used for comparison with the local forecasts are collected at the stations and are the latest hourly obs available at the scheduled FT release time. Since March 1987, persistence obs used for comparison with the MOS guidance are from hourly obs taken at 0900 (2100) UTC for the 0000 (1200) UTC cycle. These latter obs are collected at MDL. |
| Visibility      | LFM MOS      | FMAK2                    | 12, 18, 24                      | 0000, 1200           | Observations taken at specific hours. Obs corresponding to the valid times of the local forecasts are collected at the stations. Verifying obs that correspond to the valid times of the MOS guidance are from hourly obs collected at MDL.                                                                                                                                  |
|                 | NGM MOS      | FWC                      | 12, 15, 18, 24                  | 0000, 1200           | See ceiling height.                                                                                                                                                                                                                                                                                                                                                          |
|                 | Local Fcst   | FT                       | 3, 6, 9, 15                     | 0900, 1800           | See ceiling height.                                                                                                                                                                                                                                                                                                                                                          |
|                 | Persis       | SAO                      |                                 |                      | See ceiling height.                                                                                                                                                                                                                                                                                                                                                          |
| Obs             |              | SAO                      |                                 |                      | See ceiling height.                                                                                                                                                                                                                                                                                                                                                          |

<sup>1</sup>Data sources are as follows:

FMAK1, FMAK2 - bulletins contain LFM-based MOS guidance for all weather elements for stations in Alaska; LFM-based MOS guidance for the conterminous U.S. is no longer available and FMAK1/FMAK2 were terminated on January 24, 1996

FWC - FWC bulletin contains NGM-based MOS guidance for all weather elements for stations in the conterminous U.S. only

FP - Coded city forecast (FPUS4) bulletin containing official local public weather element forecasts in the conterminous U.S.; data in Alaska are obtained from the FPAK4 bulletin

FT - Aviation terminal forecast containing official local forecasts for aviation weather elements

MEF - Manually entered forecast product containing official local forecasts of some weather elements

SAO - Surface airports observation containing verifying observations corresponding to local and MOS forecasts for most weather elements

SSM - Surface synoptic report containing verifying observations of snow amount

<sup>2</sup>Precipitation type and snow amount forecasts are not verified for the warm season months of April through September.

Table 1.2. National Weather Service Technical Procedures Bulletins (TPB's) containing information about MOS guidance.

| Geographical Area | Subject             | Forecast Model | TPB No. |
|-------------------|---------------------|----------------|---------|
| Conterminous U.S. | max/min temperature | NGM            | 387     |
|                   | PoP                 | NGM            | 409     |
|                   | precipitation type  | NGM            | 421     |
|                   | snow amount         | NGM            | 420     |
|                   | cloud amount        | NGM            | 387     |
|                   | surface wind        | NGM            | 399     |
|                   | ceiling height      | NGM            | 414     |
|                   | visibility          | NGM            | 431     |
| Alaska            | max/min temperature | LFM            | 329     |
|                   | PoP                 | LFM            | 329     |
|                   | cloud amount        | LFM            | 329     |
|                   | surface wind        | LFM            | 329     |
|                   | ceiling height      | LFM            | 338     |
|                   | visibility          | LFM            | 338     |

Table 1.3. Ninety-five stations in the conterminous U.S. and six stations in Alaska used for verification of MOS guidance and local forecasts of max/min temperature, probability of precipitation, precipitation type, snow amount, cloud amount, surface wind, ceiling height, and visibility.

|                    |                                |                    |                            |
|--------------------|--------------------------------|--------------------|----------------------------|
| DCA                | Washington, D.C.               | ORF <sup>1</sup>   | Norfolk, Virginia          |
| PWM <sup>1</sup>   | Portland, Maine                | CON <sup>1</sup>   | Concord, New Hampshire     |
| BOS                | Boston, Massachusetts          | PVD <sup>1,6</sup> | Providence, Rhode Island   |
| ALB <sup>1</sup>   | Albany, New York               | BTU <sup>1</sup>   | Burlington, Vermont        |
| BUF <sup>1</sup>   | Buffalo, New York              | SYR <sup>1</sup>   | Syracuse, New York         |
| LGA                | New York (LaGuardia), New York | EWR                | Newark, New Jersey         |
| RDU <sup>1</sup>   | Raleigh-Durham, North Carolina | CLT                | Charlotte, North Carolina  |
| CLE <sup>1</sup>   | Cleveland, Ohio                |                    |                            |
| PHL <sup>1</sup>   | Philadelphia, Pennsylvania     | AVP                | Scranton, Pennsylvania     |
| PIT                | Pittsburgh, Pennsylvania       | ERI <sup>1</sup>   | Erie, Pennsylvania         |
| CAE <sup>1</sup>   | Columbia, South Carolina       | CHS <sup>1</sup>   | Charleston, South Carolina |
| CRW <sup>1</sup>   | Charleston, West Virginia      | BKW <sup>1</sup>   | Beckley, West Virginia     |
| BHM                | Birmingham, Alabama            | MOB <sup>1</sup>   | Mobile, Alabama            |
| AMA <sup>1</sup>   | Amarillo, Texas                | BRO <sup>1</sup>   | Brownsville, Texas         |
| LIT                | Little Rock, Arkansas          | FSM <sup>1</sup>   | Fort Smith, Arkansas       |
| MIA <sup>2</sup>   | Miami, Florida                 | MLB <sup>2,3</sup> | Melbourne, Florida         |
| TPA <sup>1,2</sup> | Tampa, Florida                 |                    |                            |
| ATL <sup>1</sup>   | Atlanta, Georgia               | SAV                | Savannah, Georgia          |
| MSY                | New Orleans, Louisiana         | SHV <sup>1</sup>   | Shreveport, Louisiana      |
| JAN <sup>1</sup>   | Jackson, Mississippi           | MEI <sup>1</sup>   | Meridian, Mississippi      |
| ABQ <sup>1</sup>   | Albuquerque, New Mexico        | TCC <sup>4</sup>   | Tucumcari, New Mexico      |
| OKC <sup>1</sup>   | Oklahoma City, Oklahoma        | TUL <sup>1</sup>   | Tulsa, Oklahoma            |
| MEM                | Memphis, Tennessee             | BNA                | Nashville, Tennessee       |
| DFW <sup>1</sup>   | Dallas-Ft. Worth, Texas        | ABI                | Abilene, Texas             |
| LBB <sup>1</sup>   | Lubbock, Texas                 | ELP <sup>1</sup>   | El Paso, Texas             |
| SAT <sup>1</sup>   | San Antonio, Texas             | IAH                | Houston, Texas             |
| DEN <sup>1</sup>   | Denver, Colorado               | GJT                | Grand Junction, Colorado   |
| ORD <sup>1</sup>   | Chicago (O'Hare), Illinois     | SPI <sup>1</sup>   | Springfield, Illinois      |
| IND <sup>1</sup>   | Indianapolis, Indiana          |                    |                            |
| DSM <sup>1</sup>   | Des Moines, Iowa               | ALO                | Waterloo, Iowa             |
| TOP <sup>1</sup>   | Topeka, Kansas                 | ICT <sup>1</sup>   | Wichita, Kansas            |
| SDF <sup>1</sup>   | Louisville, Kentucky           | LEX <sup>1</sup>   | Lexington, Kentucky        |
| DTW <sup>1</sup>   | Detroit, Michigan              | GRR <sup>1</sup>   | Grand Rapids, Michigan     |
| MSP                | Minneapolis, Minnesota         | DLH                | Duluth, Minnesota          |
| STL                | St. Louis, Missouri            | MCI <sup>1</sup>   | Kansas City, Missouri      |
| OMA <sup>1</sup>   | Omaha, Nebraska                | LBF <sup>1</sup>   | North Platte, Nebraska     |
| BIS                | Bismarck, North Dakota         | FAR <sup>1</sup>   | Fargo, North Dakota        |
| FSD                | Sioux Falls, South Dakota      | RAP <sup>1</sup>   | Rapid City, South Dakota   |
| MKE <sup>1</sup>   | Milwaukee, Wisconsin           | MSN                | Madison, Wisconsin         |
| CYS <sup>1</sup>   | Cheyenne, Wyoming              | CPR                | Casper, Wyoming            |
| PHX <sup>1,2</sup> | Phoenix, Arizona               | TUS <sup>1,2</sup> | Tucson, Arizona            |
| LAX <sup>2,5</sup> | Los Angeles, California        | SAN <sup>2</sup>   | San Diego, California      |
| SFO <sup>2</sup>   | San Francisco, California      | FAT <sup>1,2</sup> | Fresno, California         |
| BOI <sup>1</sup>   | Boise, Idaho                   | PIH <sup>1</sup>   | Pocatello, Idaho           |
| GTF <sup>1</sup>   | Great Falls, Montana           | BIL <sup>1</sup>   | Billings, Montana          |
| RNO <sup>1</sup>   | Reno, Nevada                   | LAS <sup>1</sup>   | Las Vegas, Nevada          |
| PDX <sup>1</sup>   | Portland, Oregon               | MFR                | Medford, Oregon            |
| SLC                | Salt Lake City, Utah           | CDC                | Cedar City, Utah           |
| SEA                | Seattle-Tacoma, Washington     | GEG <sup>1</sup>   | Spokane, Washington        |
| ANC <sup>2,6</sup> | Anchorage, Alaska              | BET <sup>2,6</sup> | Bethel, Alaska             |
| FAI <sup>2,6</sup> | Fairbanks, Alaska              | OME <sup>2,6</sup> | Nome, Alaska               |
| JNU <sup>2,6</sup> | Juneau, Alaska                 | YAK <sup>2,6</sup> | Yakutat, Alaska            |

<sup>1</sup>Cloud amount observations were not used and snow amount observations were unavailable after the station was commissioned as an ASOS site.

<sup>2</sup>Precipitation type and snow amount were not verified for this station.

<sup>3</sup>MLB had no data for the cloud amount and 42-h significant wind verifications.

<sup>4</sup>TCC had no data for the max/min temperature, PoP, and snow amount verifications. Data also were not available for the cloud amount and 42-h significant wind verifications for the 1200 UTC cycle, the local ceiling height, visibility, and surface wind verifications for the FT release time of approximately 0900 UTC, the MOS surface wind verification for the 1200 UTC cycle, and the MOS ceiling height and visibility verifications for the 0000 and 1200 UTC cycles.

<sup>5</sup>LAX was not included in the max/min temperature and PoP verifications.

<sup>6</sup>PoP was not verified for this site.

Table 1.4. Definitions of categories used for verification.

| Category | Precipitation Type                                                    | Snow Amount* (in) | Cloud Amount              | Wind Speed (kt) | Wind Direction (degrees) | Ceiling Height (ft) | Visibility (mi) |
|----------|-----------------------------------------------------------------------|-------------------|---------------------------|-----------------|--------------------------|---------------------|-----------------|
| 1        | ZL, ZR, any combination of precipitation types that includes ZL or ZR | <2                | CLR, -SCT, -BKN, -OVC, -X | ≤12             | 340-20                   | ≤400                | <1              |
| 2        | IC, IP, IPW, S, SG, SP, SW, any combination of frozen and liquid      | 2-3               | SCT                       | 13-17           | 30-60                    | 500-900             | 1-2 3/4         |
| 3        | L, R, RW                                                              | 4-5               | BKN                       | 18-22           | 70-110                   | 1000-3000           | 3-5             |
| 4        |                                                                       | ≥6                | OVC, X                    | 23-27           | 120-150                  | ≥3100               | >5              |
| 5        |                                                                       |                   |                           | 28-32           | 160-200                  |                     |                 |
| 6        |                                                                       |                   |                           | ≥33             | 210-240                  |                     |                 |
| 7        |                                                                       |                   |                           |                 | 250-290                  |                     |                 |
| 8        |                                                                       |                   |                           |                 | 300-330                  |                     |                 |

\*Scores based on cumulative snow amount categories of ≥ 2, ≥ 4, and ≥ 6 inches are noted in the verification tables.

Table 2.1. Comparative verification of local and NGM MOS max/min temperature forecasts for 93 stations in the conterminous U.S., 0000 UTC cycle.

| Forecast Projection  | Forecast Type | Number of Cases | Mean Algebraic Error (°F) | Mean Absolute Error (°F) | Percent of Absolute Errors >10°F | Probability of Detection (32°F) | False Alarm Ratio (32°F) | Improvement Over Climate |
|----------------------|---------------|-----------------|---------------------------|--------------------------|----------------------------------|---------------------------------|--------------------------|--------------------------|
| Today's Max          | LOCAL NGM MOS | 16128           | 0.2<br>0.2                | 2.9<br>3.4               | 1.6<br>3.1                       | --<br>--                        | --<br>--                 | 89.7<br>85.9             |
| Tonight's Min        | LOCAL NGM MOS | 16143           | 0.3<br>0.4                | 3.5<br>3.8               | 2.8<br>3.8                       | 0.66<br>0.63                    | 0.21<br>0.24             | 83.0<br>80.4             |
| Tomorrow's Max       | LOCAL NGM MOS | 16086           | 0.2<br>0.6                | 3.9<br>4.3               | 4.8<br>7.2                       | --<br>--                        | --<br>--                 | 81.8<br>77.2             |
| Tomorrow Night's Min | LOCAL NGM MOS | 16110           | 0.3<br>0.7                | 4.5<br>4.8               | 7.4<br>9.2                       | 0.57<br>0.56                    | 0.31<br>0.32             | 71.7<br>67.6             |

Table 2.2. Same as Table 2.1 except for the 1200 UTC cycle.

| Forecast Projection      | Forecast Type | Number of Cases | Mean Algebraic Error (°F) | Mean Absolute Error (°F) | Percent of Absolute Errors >10°F | Probability of Detection (32°F) | False Alarm Ratio (32°F) | Improvement Over Climate |
|--------------------------|---------------|-----------------|---------------------------|--------------------------|----------------------------------|---------------------------------|--------------------------|--------------------------|
| Tonight's Min            | LOCAL NGM MOS | 16165           | -0.1<br>0.4               | 3.1<br>3.5               | 1.7<br>2.7                       | 0.69<br>0.65                    | 0.19<br>0.19             | 86.1<br>83.3             |
| Tomorrow's Max           | LOCAL NGM MOS | 16115           | 0.1<br>0.7                | 3.5<br>4.0               | 3.2<br>5.3                       | --<br>--                        | --<br>--                 | 85.2<br>80.9             |
| Tomorrow Night's Min     | LOCAL NGM MOS | 16121           | 0.3<br>0.8                | 3.9<br>4.2               | 4.8<br>6.2                       | 0.63<br>0.61                    | 0.26<br>0.25             | 78.1<br>75.2             |
| Day After Tomorrow's Max | LOCAL NGM MOS | 16058           | 0.5<br>1.1                | 4.4<br>4.9               | 7.3<br>9.9                       | --<br>--                        | --<br>--                 | 76.6<br>71.4             |



Table 2.3. Comparative verification of local and NGM MOS max/min temperature forecasts for 23 stations in the Eastern Region, 0000 UTC cycle.

| Forecast Projection  | Forecast Type | Number of Cases | Mean Algebraic Error (°F) | Mean Absolute Error (°F) | Percent of Absolute Errors >10°F | Probability of Detection (32°F) | False Alarm Ratio (32°F) | Improvement Over Climate |
|----------------------|---------------|-----------------|---------------------------|--------------------------|----------------------------------|---------------------------------|--------------------------|--------------------------|
| Today's Max          | LOCAL NGM MOS | 4067            | 0.2<br>0.5                | 2.9<br>3.3               | 1.7<br>2.4                       | --<br>--                        | --<br>--                 | 88.2<br>84.7             |
| Tonight's Min        | LOCAL NGM MOS | 4056            | 0.2<br>0.5                | 3.2<br>3.4               | 1.4<br>2.2                       | 0.70<br>0.69                    | 0.17<br>0.19             | 83.9<br>81.6             |
| Tomorrow's Max       | LOCAL NGM MOS | 4058            | 0.4<br>1.0                | 3.7<br>4.0               | 3.8<br>5.2                       | --<br>--                        | --<br>--                 | 81.2<br>77.3             |
| Tomorrow Night's Min | LOCAL NGM MOS | 4052            | 0.3<br>0.7                | 4.1<br>4.3               | 5.5<br>6.2                       | 0.66<br>0.63                    | 0.20<br>0.23             | 73.7<br>70.9             |

Table 2.4. Same as Table 2.3 except for the 1200 UTC cycle.

| Forecast Projection      | Forecast Type | Number of Cases | Mean Algebraic Error (°F) | Mean Absolute Error (°F) | Percent of Absolute Errors >10°F | Probability of Detection (32°F) | False Alarm Ratio (32°F) | Improvement Over Climate |
|--------------------------|---------------|-----------------|---------------------------|--------------------------|----------------------------------|---------------------------------|--------------------------|--------------------------|
| Tonight's Min            | LOCAL NGM MOS | 4059            | -0.3<br>0.3               | 3.0<br>3.2               | 1.0<br>1.7                       | 0.75<br>0.71                    | 0.16<br>0.15             | 86.2<br>83.9             |
| Tomorrow's Max           | LOCAL NGM MOS | 4060            | 0.3<br>1.2                | 3.5<br>3.9               | 2.7<br>4.8                       | --<br>--                        | --<br>--                 | 83.3<br>79.3             |
| Tomorrow Night's Min     | LOCAL NGM MOS | 4045            | 0.3<br>0.8                | 3.6<br>3.7               | 3.1<br>3.8                       | 0.74<br>0.72                    | 0.17<br>0.19             | 80.1<br>78.2             |
| Day After Tomorrow's Max | LOCAL NGM MOS | 4048            | 0.7<br>1.7                | 4.2<br>4.5               | 5.2<br>7.0                       | --<br>--                        | --<br>--                 | 76.7<br>73.1             |

Table 2.5. Comparative verification of local and NGM MOS max/min temperature forecasts for 26 stations in the Southern Region, 0000 UTC cycle.

| Forecast Projection  | Forecast Type | Number Of Cases | Mean Algebraic Error (°F) | Mean Absolute Error (°F) | Percent of Absolute Errors >10°F | Probability of Detection (32°F) | False Alarm Ratio (32°F) | Improvement Over Climate |
|----------------------|---------------|-----------------|---------------------------|--------------------------|----------------------------------|---------------------------------|--------------------------|--------------------------|
| Today's Max          | LOCAL NGM MOS | 4431            | 0.2<br>0.1                | 2.8<br>3.2               | 1.5<br>3.0                       | --<br>--                        | --<br>--                 | 90.1<br>86.5             |
| Tonight's Min        | LOCAL NGM MOS | 4422            | 0.0<br>0.2                | 3.4<br>3.7               | 2.5<br>3.5                       | 0.60<br>0.53                    | 0.28<br>0.31             | 83.2<br>80.6             |
| Tomorrow's Max       | LOCAL NGM MOS | 4413            | 0.2<br>0.5                | 3.8<br>4.3               | 4.6<br>7.5                       | --<br>--                        | --<br>--                 | 81.9<br>75.8             |
| Tomorrow Night's Min | LOCAL NGM MOS | 4410            | 0.0<br>0.7                | 4.5<br>4.9               | 7.1<br>9.8                       | 0.50<br>0.43                    | 0.38<br>0.39             | 70.8<br>64.5             |

Table 2.6. Same as Table 2.5 except for the 1200 UTC cycle.

| Forecast Projection      | Forecast Type | Number Of Cases | Mean Algebraic Error (°F) | Mean Absolute Error (°F) | Percent of Absolute Errors >10°F | Probability of Detection (32°F) | False Alarm Ratio (32°F) | Improvement Over Climate |
|--------------------------|---------------|-----------------|---------------------------|--------------------------|----------------------------------|---------------------------------|--------------------------|--------------------------|
| Tonight's Min            | LOCAL NGM MOS | 4420            | -0.1<br>0.5               | 3.1<br>3.3               | 1.4<br>1.9                       | 0.64<br>0.59                    | 0.24<br>0.21             | 86.1<br>84.2             |
| Tomorrow's Max           | LOCAL NGM MOS | 4414            | 0.1<br>0.5                | 3.3<br>3.8               | 3.0<br>4.9                       | --<br>--                        | --<br>--                 | 85.6<br>80.8             |
| Tomorrow Night's Min     | LOCAL NGM MOS | 4409            | 0.1<br>0.7                | 3.9<br>4.2               | 4.6<br>6.3                       | 0.56<br>0.50                    | 0.32<br>0.29             | 77.2<br>73.9             |
| Day After Tomorrow's Max | LOCAL NGM MOS | 4402            | 0.4<br>0.9                | 4.3<br>5.0               | 7.5<br>11.0                      | --<br>--                        | --<br>--                 | 75.4<br>68.0             |

Table 2.7. Comparative verification of local and NGM MOS max/min temperature forecasts for 27 stations in the Central Region, 0000 UTC cycle.

| Forecast Projection  | Forecast Type | Number of Cases | Mean Algebraic Error (°F) | Mean Absolute Error (°F) | Percent of Absolute Errors >10°F | Probability of Detection (32°F) | False Alarm Ratio (32°F) | Improvement Over Climate |
|----------------------|---------------|-----------------|---------------------------|--------------------------|----------------------------------|---------------------------------|--------------------------|--------------------------|
| Today's Max          | LOCAL NGM MOS | 4677            | 0.1<br>0.1                | 3.2<br>3.9               | 2.1<br>4.5                       | --<br>--                        | --<br>--                 | 90.8<br>87.0             |
| Tonight's Min        | LOCAL NGM MOS | 4710            | 0.7<br>0.8                | 4.0<br>4.3               | 4.6<br>6.0                       | 0.71<br>0.69                    | 0.14<br>0.14             | 83.0<br>80.3             |
| Tomorrow's Max       | LOCAL NGM MOS | 4667            | 0.3<br>0.7                | 4.4<br>5.0               | 7.0<br>10.8                      | --<br>--                        | --<br>--                 | 83.0<br>78.0             |
| Tomorrow Night's Min | LOCAL NGM MOS | 4697            | 1.0<br>1.1                | 5.2<br>5.5               | 10.9<br>13.3                     | 0.57<br>0.64                    | 0.32<br>0.32             | 71.2<br>67.3             |

Table 2.8. Same as Table 2.7 except for the 1200 UTC cycle.

| Forecast Projection      | Forecast Type | Number of Cases | Mean Algebraic Error (°F) | Mean Absolute Error (°F) | Percent of Absolute Errors >10°F | Probability of Detection (32°F) | False Alarm Ratio (32°F) | Improvement Over Climate |
|--------------------------|---------------|-----------------|---------------------------|--------------------------|----------------------------------|---------------------------------|--------------------------|--------------------------|
| Tonight's Min            | LOCAL NGM MOS | 4739            | 0.2<br>0.7                | 3.5<br>4.0               | 2.7<br>4.4                       | 0.71<br>0.70                    | 0.16<br>0.16             | 86.6<br>83.3             |
| Tomorrow's Max           | LOCAL NGM MOS | 4702            | 0.2<br>0.7                | 3.9<br>4.5               | 4.3<br>7.2                       | --<br>--                        | --<br>--                 | 86.8<br>82.7             |
| Tomorrow Night's Min     | LOCAL NGM MOS | 4726            | 0.9<br>1.3                | 4.5<br>4.8               | 7.1<br>9.1                       | 0.63<br>0.65                    | 0.23<br>0.20             | 78.0<br>75.0             |
| Day After Tomorrow's Max | LOCAL NGM MOS | 4681            | 0.7<br>1.5                | 5.0<br>5.6               | 10.6<br>14.2                     | --<br>--                        | --<br>--                 | 77.7<br>72.9             |

Table 2.9. Comparative verification of local and NGM MOS max/min temperature forecasts for 17 stations in the Western Region, 0000 UTC cycle.

| Forecast Projection  | Forecast Type | Number of Cases | Mean Algebraic Error (°F) | Mean Absolute Error (°F) | Percent of Absolute Errors >10°F | Probability of Detection (32°F) | False Alarm Ratio (32°F) | Improvement Over Climate |
|----------------------|---------------|-----------------|---------------------------|--------------------------|----------------------------------|---------------------------------|--------------------------|--------------------------|
| Today's Max          | LOCAL NGM MOS | 2953            | 0.2<br>0.0                | 2.7<br>3.1               | 0.9<br>1.9                       | --<br>--                        | --<br>--                 | 88.0<br>83.6             |
| Tonight's Min        | LOCAL NGM MOS | 2955            | 0.1<br>0.1                | 3.2<br>3.4               | 2.4<br>3.0                       | 0.64<br>0.56                    | 0.27<br>0.43             | 81.2<br>78.1             |
| Tomorrow's Max       | LOCAL NGM MOS | 2948            | 0.0<br>0.1                | 3.4<br>3.6               | 3.2<br>3.8                       | --<br>--                        | --<br>--                 | 79.1<br>77.2             |
| Tomorrow Night's Min | LOCAL NGM MOS | 2951            | -0.1<br>0.0               | 3.9<br>4.1               | 5.2<br>5.9                       | 0.52<br>0.56                    | 0.36<br>0.37             | 71.5<br>68.8             |

Table 2.10. Same as Table 2.9 except for the 1200 UTC cycle.

| Forecast Projection      | Forecast Type | Number of Cases | Mean Algebraic Error (°F) | Mean Absolute Error (°F) | Percent of Absolute Errors >10°F | Probability of Detection (32°F) | False Alarm Ratio (32°F) | Improvement Over Climate |
|--------------------------|---------------|-----------------|---------------------------|--------------------------|----------------------------------|---------------------------------|--------------------------|--------------------------|
| Tonight's Min            | LOCAL NGM MOS | 2947            | 0.0<br>0.3                | 2.8<br>3.2               | 1.5<br>2.4                       | 0.62<br>0.49                    | 0.24<br>0.38             | 84.8<br>80.6             |
| Tomorrow's Max           | LOCAL NGM MOS | 2939            | 0.0<br>0.2                | 3.1<br>3.5               | 2.4<br>3.8                       | --<br>--                        | --<br>--                 | 82.9<br>78.9             |
| Tomorrow Night's Min     | LOCAL NGM MOS | 2941            | 0.0<br>0.2                | 3.5<br>3.8               | 3.5<br>4.9                       | 0.53<br>0.55                    | 0.40<br>0.44             | 77.2<br>73.7             |
| Day After Tomorrow's Max | LOCAL NGM MOS | 2927            | 0.0<br>0.2                | 3.7<br>4.0               | 4.5<br>5.5                       | --<br>--                        | --<br>--                 | 75.9<br>71.5             |

Table 2.11. Comparative verification of local and LFM MOS max/min temperature forecasts for 6 stations in the Alaska Region, 0000 UTC cycle.

| Forecast Projection  | Forecast Type | Number of Cases | Mean Algebraic Error (°F) | Mean Absolute Error (°F) | Percent of Absolute Errors >10°F | Probability of Detection (32°F) | False Alarm Ratio (32°F) | Improvement Over Climate |
|----------------------|---------------|-----------------|---------------------------|--------------------------|----------------------------------|---------------------------------|--------------------------|--------------------------|
| Today's Max          | LOCAL LFM MOS | 616             | 0.5<br>1.6                | 3.5<br>3.8               | 3.4<br>3.6                       | --<br>--                        | --<br>--                 | 81.5<br>79.1             |
| Tonight's Min        | LOCAL LFM MOS | 611             | -1.0<br>-1.8              | 5.0<br>5.0               | 9.8<br>10.6                      | 0.25<br>0.50                    | 0.67<br>0.33             | 70.7<br>70.9             |
| Tomorrow's Max       | LOCAL LFM MOS | 607             | 0.5<br>1.8                | 4.4<br>4.4               | 8.1<br>9.1                       | --<br>--                        | --<br>--                 | 70.9<br>71.0             |
| Tomorrow Night's Min | LOCAL LFM MOS | 607             | -0.6<br>-1.3              | 5.8<br>6.0               | 16.0<br>16.1                     | 0.25<br>0.25                    | 0.50<br>0.67             | 61.4<br>60.9             |

Table 2.12. Same as Table 2.11 except for the 1200 UTC cycle.

| Forecast Projection      | Forecast Type | Number of Cases | Mean Algebraic Error (°F) | Mean Absolute Error (°F) | Percent of Absolute Errors >10°F | Probability of Detection (32°F) | False Alarm Ratio (32°F) | Improvement Over Climate |
|--------------------------|---------------|-----------------|---------------------------|--------------------------|----------------------------------|---------------------------------|--------------------------|--------------------------|
| Tonight's Min            | LOCAL LFM MOS | 635             | -1.3<br>-2.4              | 4.3<br>4.9               | 8.0<br>9.4                       | 0.50<br>0.50                    | 0.00<br>0.33             | 77.3<br>71.9             |
| Tomorrow's Max           | LOCAL LFM MOS | 630             | -0.1<br>1.3               | 4.2<br>4.3               | 7.9<br>7.9                       | --<br>--                        | --<br>--                 | 73.7<br>73.4             |
| Tomorrow Night's Min     | LOCAL LFM MOS | 625             | -1.2<br>-1.9              | 5.5<br>5.9               | 13.4<br>14.9                     | 0.50<br>0.50                    | 0.60<br>0.60             | 65.4<br>62.7             |
| Day After Tomorrow's Max | LOCAL LFM MOS | 628             | -0.1<br>1.5               | 4.9<br>4.9               | 11.5<br>11.8                     | --<br>--                        | --<br>--                 | 64.8<br>63.6             |

Table 3.1. Comparative verification of local and NGM MOS PoP forecasts for 92 stations in the conterminous U.S., 0000 UTC cycle.

| Forecast<br>Projection<br>(h) | Type of<br>Forecast | Brier<br>Score   | Local<br>% Imp.<br>Over<br>Guid. | % Imp.<br>Over<br>Clim. | No.<br>of<br>Cases | Changes GE 20% to Guidance |                      |                   |
|-------------------------------|---------------------|------------------|----------------------------------|-------------------------|--------------------|----------------------------|----------------------|-------------------|
|                               |                     |                  |                                  |                         |                    | Guid.<br>Brier<br>Score    | Local<br>%<br>Imprv. | No. of<br>Changes |
| 12-24<br>(1st period)         | LOCAL<br>NGM MOS    | 0.0751<br>0.0790 | 5.0                              | 48.4<br>45.8            | 16031              | 0.2116                     | 11.1                 | 2021              |
| 24-36<br>(2nd period)         | LOCAL<br>NGM MOS    | 0.0846<br>0.0868 | 2.5                              | 42.9<br>41.4            | 16044              | 0.2119                     | 5.6                  | 1720              |
| 36-48<br>(3rd period)         | LOCAL<br>NGM MOS    | 0.0935<br>0.0962 | 2.9                              | 35.8<br>33.9            | 16024              | 0.2189                     | 8.2                  | 1802              |

Table 3.2. Same as Table 3.1 except for the 1200 UTC cycle.

| Forecast<br>Projection<br>(h) | Type of<br>Forecast | Brier<br>Score   | Local<br>% Imp.<br>Over<br>Guid. | % Imp.<br>Over<br>Clim. | No.<br>of<br>Cases | Changes GE 20% to Guidance |                      |                   |
|-------------------------------|---------------------|------------------|----------------------------------|-------------------------|--------------------|----------------------------|----------------------|-------------------|
|                               |                     |                  |                                  |                         |                    | Guid.<br>Brier<br>Score    | Local<br>%<br>Imprv. | No. of<br>Changes |
| 12-24<br>(1st period)         | LOCAL<br>NGM MOS    | 0.0779<br>0.0805 | 3.2                              | 47.4<br>45.7            | 16043              | 0.2061                     | 4.3                  | 1994              |
| 24-36<br>(2nd period)         | LOCAL<br>NGM MOS    | 0.0867<br>0.0870 | 0.4                              | 40.7<br>40.4            | 16034              | 0.2004                     | 0.3                  | 1878              |
| 36-48<br>(3rd period)         | LOCAL<br>NGM MOS    | 0.0946<br>0.0974 | 2.9                              | 36.2<br>34.3            | 16044              | 0.2137                     | 9.9                  | 1771              |

Table 3.3. Comparative verification of local and NGM MOS PoP forecasts for 22 stations in the Eastern Region, 0000 UTC cycle.

| Forecast<br>Projection<br>(h) | Type of<br>Forecast | Brier<br>Score   | Local<br>% Imp.<br>Over<br>Guid. | % Imp.<br>Over<br>Clim. | No.<br>of<br>Cases | Changes GE 20% to Guidance |                      |                   |
|-------------------------------|---------------------|------------------|----------------------------------|-------------------------|--------------------|----------------------------|----------------------|-------------------|
|                               |                     |                  |                                  |                         |                    | Guid.<br>Brier<br>Score    | Local<br>%<br>Imprv. | No. of<br>Changes |
| 12-24<br>(1st period)         | LOCAL<br>NGM MOS    | 0.0930<br>0.0955 | 2.6                              | 52.8<br>51.6            | 3894               | 0.2053                     | 6.0                  | 630               |
| 24-36<br>(2nd period)         | LOCAL<br>NGM MOS    | 0.1062<br>0.1116 | 4.9                              | 48.5<br>45.8            | 3897               | 0.2281                     | 12.3                 | 530               |
| 36-48<br>(3rd period)         | LOCAL<br>NGM MOS    | 0.1159<br>0.1185 | 2.2                              | 41.4<br>40.1            | 3890               | 0.2171                     | 5.3                  | 551               |

Table 3.4. Same as Table 3.3 except for the 1200 UTC cycle.

| Forecast<br>Projection<br>(h) | Type of<br>Forecast | Brier<br>Score   | Local<br>% Imp.<br>Over<br>Guid. | % Imp.<br>Over<br>Clim. | No.<br>of<br>Cases | Changes GE 20% to Guidance |                      |                   |
|-------------------------------|---------------------|------------------|----------------------------------|-------------------------|--------------------|----------------------------|----------------------|-------------------|
|                               |                     |                  |                                  |                         |                    | Guid.<br>Brier<br>Score    | Local<br>%<br>Imprv. | No. of<br>Changes |
| 12-24<br>(1st period)         | LOCAL<br>NGM MOS    | 0.0993<br>0.1056 | 5.9                              | 51.9<br>48.9            | 3900               | 0.2271                     | 11.5                 | 646               |
| 24-36<br>(2nd period)         | LOCAL<br>NGM MOS    | 0.1088<br>0.1099 | 0.9                              | 45.1<br>44.6            | 3895               | 0.2127                     | 4.1                  | 621               |
| 36-48<br>(3rd period)         | LOCAL<br>NGM MOS    | 0.1208<br>0.1268 | 4.7                              | 42.1<br>39.3            | 3899               | 0.2332                     | 13.5                 | 613               |

Table 3.5. Comparative verification of local and NGM MOS PoP forecasts for 26 stations in the Southern Region, 0000 UTC cycle.

| Forecast Projection (h) | Type of Forecast | Brier Score      | Local % Imp. Over Guid. | % Imp. Over Clim. | No. of Cases | Changes GE 20% to Guidance |                |                |
|-------------------------|------------------|------------------|-------------------------|-------------------|--------------|----------------------------|----------------|----------------|
|                         |                  |                  |                         |                   |              | Guid. Brier Score          | Local % Imprv. | No. of Changes |
| 12-24 (1st period)      | LOCAL<br>NGM MOS | 0.0590<br>0.0627 | 5.9                     | 47.0<br>43.7      | 4459         | 0.2051                     | 13.9           | 441            |
| 24-36 (2nd period)      | LOCAL<br>NGM MOS | 0.0662<br>0.0701 | 5.5                     | 42.5<br>39.1      | 4460         | 0.2204                     | 18.7           | 364            |
| 36-48 (3rd period)      | LOCAL<br>NGM MOS | 0.0746<br>0.0764 | 2.4                     | 32.8<br>31.1      | 4455         | 0.2405                     | 7.0            | 390            |

Table 3.6. Same as Table 3.5 except for the 1200 UTC cycle.

| Forecast Projection (h) | Type of Forecast | Brier Score      | Local % Imp. Over Guid. | % Imp. Over Clim. | No. of Cases | Changes GE 20% to Guidance |                |                |
|-------------------------|------------------|------------------|-------------------------|-------------------|--------------|----------------------------|----------------|----------------|
|                         |                  |                  |                         |                   |              | Guid. Brier Score          | Local % Imprv. | No. of Changes |
| 12-24 (1st period)      | LOCAL<br>NGM MOS | 0.0590<br>0.0615 | 4.1                     | 48.1<br>45.8      | 4450         | 0.2029                     | 4.0            | 420            |
| 24-36 (2nd period)      | LOCAL<br>NGM MOS | 0.0684<br>0.0688 | 0.6                     | 38.6<br>38.2      | 4449         | 0.1961                     | -0.1           | 385            |
| 36-48 (3rd period)      | LOCAL<br>NGM MOS | 0.0736<br>0.0762 | 3.4                     | 34.7<br>32.4      | 4447         | 0.2070                     | 10.9           | 369            |



Table 3.7. Comparative verification of local and NGM MOS PoP forecasts for 27 stations in the Central Region, 0000 UTC cycle.

| Forecast<br>Projection<br>(h) | Type of<br>Forecast | Brier<br>Score   | Local<br>% Imp.<br>Over<br>Guid. | % Imp.<br>Over<br>Clim. | No.<br>of<br>Cases | Changes GE 20% to Guidance |                      |                   |
|-------------------------------|---------------------|------------------|----------------------------------|-------------------------|--------------------|----------------------------|----------------------|-------------------|
|                               |                     |                  |                                  |                         |                    | Guid.<br>Brier<br>Score    | Local<br>%<br>Imprv. | No. of<br>Changes |
| 12-24<br>(1st period)         | LOCAL<br>NGM MOS    | 0.0731<br>0.0777 | 5.9                              | 46.8<br>43.4            | 4728               | 0.2146                     | 13.5                 | 598               |
| 24-36<br>(2nd period)         | LOCAL<br>NGM MOS    | 0.0847<br>0.0816 | -3.9                             | 38.4<br>40.7            | 4729               | 0.1882                     | -15.8                | 505               |
| 36-48<br>(3rd period)         | LOCAL<br>NGM MOS    | 0.0933<br>0.0955 | 2.3                              | 31.5<br>30.0            | 4731               | 0.2045                     | 6.8                  | 536               |

Table 3.8. Same as Table 3.7 except for the 1200 UTC cycle.

| Forecast<br>Projection<br>(h) | Type of<br>Forecast | Brier<br>Score   | Local<br>% Imp.<br>Over<br>Guid. | % Imp.<br>Over<br>Clim. | No.<br>of<br>Cases | Changes GE 20% to Guidance |                      |                   |
|-------------------------------|---------------------|------------------|----------------------------------|-------------------------|--------------------|----------------------------|----------------------|-------------------|
|                               |                     |                  |                                  |                         |                    | Guid.<br>Brier<br>Score    | Local<br>%<br>Imprv. | No. of<br>Changes |
| 12-24<br>(1st period)         | LOCAL<br>NGM MOS    | 0.0788<br>0.0776 | -1.5                             | 43.2<br>44.1            | 4749               | 0.1770                     | -10.8                | 569               |
| 24-36<br>(2nd period)         | LOCAL<br>NGM MOS    | 0.0848<br>0.0838 | -1.1                             | 38.2<br>38.9            | 4756               | 0.1903                     | -4.0                 | 533               |
| 36-48<br>(3rd period)         | LOCAL<br>NGM MOS    | 0.0951<br>0.0950 | -0.2                             | 30.9<br>31.0            | 4755               | 0.1944                     | 0.0                  | 467               |

Table 3.9. Comparative verification of local and NGM MOS PoP forecasts for 17 stations in the Western Region, 0000 UTC cycle.

| Forecast Projection (h) | Type of Forecast | Brier Score      | Local % Imp. Over Guid. | % Imp. Over Clim. | No. of Cases | Changes GE 20% to Guidance |                |                |
|-------------------------|------------------|------------------|-------------------------|-------------------|--------------|----------------------------|----------------|----------------|
|                         |                  |                  |                         |                   |              | Guid. Brier Score          | Local % Imprv. | No. of Changes |
| 12-24 (1st period)      | LOCAL NGM MOS    | 0.0788<br>0.0838 | 6.0                     | 44.2<br>40.7      | 2950         | 0.2257                     | 12.4           | 352            |
| 24-36 (2nd period)      | LOCAL NGM MOS    | 0.0837<br>0.0875 | 4.4                     | 38.9<br>36.0      | 2958         | 0.2126                     | 8.3            | 321            |
| 36-48 (3rd period)      | LOCAL NGM MOS    | 0.0926<br>0.0980 | 5.5                     | 35.1<br>31.3      | 2948         | 0.2196                     | 16.6           | 325            |

Table 3.10. Same as Table 3.9 except for the 1200 UTC cycle.

| Forecast Projection (h) | Type of Forecast | Brier Score      | Local % Imp. Over Guid. | % Imp. Over Clim. | No. of Cases | Changes GE 20% to Guidance |                |                |
|-------------------------|------------------|------------------|-------------------------|-------------------|--------------|----------------------------|----------------|----------------|
|                         |                  |                  |                         |                   |              | Guid. Brier Score          | Local % Imprv. | No. of Changes |
| 12-24 (1st period)      | LOCAL NGM MOS    | 0.0767<br>0.0807 | 5.0                     | 43.9<br>40.9      | 2944         | 0.2183                     | 10.4           | 359            |
| 24-36 (2nd period)      | LOCAL NGM MOS    | 0.0881<br>0.0896 | 1.7                     | 38.3<br>37.3      | 2934         | 0.1985                     | 0.0            | 339            |
| 36-48 (3rd period)      | LOCAL NGM MOS    | 0.0908<br>0.0944 | 3.8                     | 34.3<br>31.7      | 2943         | 0.2122                     | 14.4           | 322            |

Table 4.1. Comparative verification of local and NGM MOS PoPT forecasts for 86 stations in the conterminous U.S. for the 0000 UTC cycle. Only cases where the local PoP was  $\geq 30\%$  were included.

| Projection<br>(h) | Region<br>Number of<br>Stations | Type of<br>Forecast | Bias |      |      | Percent<br>Correct | Skill<br>Score | POD  |      | FAR  |      |
|-------------------|---------------------------------|---------------------|------|------|------|--------------------|----------------|------|------|------|------|
|                   |                                 |                     | ZR   | S    | R    |                    |                | ZR   | S    | ZR   | S    |
| 18                | Eastern<br>23                   | LOCAL               | 1.10 | 0.98 | 1.02 | 92.1               | 0.848          | 0.48 | 0.91 | 0.57 | 0.07 |
|                   |                                 | MOS                 | 1.19 | 0.96 | 1.03 | 91.9               | 0.846          | 0.33 | 0.92 | 0.72 | 0.04 |
|                   |                                 | No. Obs.            | 21   | 452  | 420  |                    |                |      |      |      |      |
|                   | Southern<br>24                  | LOCAL               | 0.38 | 0.84 | 1.04 | 92.1               | 0.670          | 0.13 | 0.68 | 0.67 | 0.19 |
|                   |                                 | MOS                 | 0.63 | 0.86 | 1.03 | 94.8               | 0.792          | 0.38 | 0.76 | 0.40 | 0.13 |
|                   |                                 | No. Obs.            | 8    | 37   | 245  |                    |                |      |      |      |      |
| 30                | Central<br>27                   | LOCAL               | 0.77 | 0.94 | 1.15 | 88.7               | 0.772          | 0.38 | 0.89 | 0.50 | 0.05 |
|                   |                                 | MOS                 | 0.65 | 1.00 | 1.05 | 91.0               | 0.814          | 0.31 | 0.94 | 0.53 | 0.06 |
|                   |                                 | No. Obs.            | 26   | 392  | 193  |                    |                |      |      |      |      |
|                   | Western<br>12                   | LOCAL               | 1.20 | 0.95 | 1.03 | 92.1               | 0.842          | 0.60 | 0.89 | 0.50 | 0.07 |
|                   |                                 | MOS                 | 1.00 | 0.93 | 1.05 | 92.4               | 0.847          | 0.40 | 0.89 | 0.60 | 0.04 |
|                   |                                 | No. Obs.            | 5    | 129  | 183  |                    |                |      |      |      |      |
| 42                | All<br>Stations                 | LOCAL               | 0.87 | 0.96 | 1.05 | 91.1               | 0.830          | 0.40 | 0.89 | 0.54 | 0.07 |
|                   |                                 | MOS                 | 0.87 | 0.97 | 1.04 | 92.1               | 0.850          | 0.33 | 0.92 | 0.62 | 0.05 |
|                   |                                 | No. Obs.            | 60   | 1010 | 1041 |                    |                |      |      |      |      |
|                   | Eastern<br>23                   | LOCAL               | 0.80 | 1.07 | 0.95 | 87.5               | 0.768          | 0.34 | 0.92 | 0.58 | 0.14 |
|                   |                                 | MOS                 | 0.80 | 1.02 | 1.00 | 87.1               | 0.761          | 0.20 | 0.90 | 0.76 | 0.12 |
| No. Obs.          |                                 | 41                  | 416  | 428  |      |                    |                |      |      |      |      |
| 60                | Southern<br>24                  | LOCAL               | 0.67 | 0.89 | 1.02 | 90.4               | 0.561          | 0.33 | 0.59 | 0.50 | 0.33 |
|                   |                                 | MOS                 | 1.17 | 0.78 | 1.02 | 92.4               | 0.654          | 0.33 | 0.63 | 0.71 | 0.19 |
|                   |                                 | No. Obs.            | 6    | 27   | 217  |                    |                |      |      |      |      |
|                   | Central<br>27                   | LOCAL               | 0.55 | 1.06 | 0.97 | 86.4               | 0.730          | 0.18 | 0.93 | 0.67 | 0.12 |
|                   |                                 | MOS                 | 0.85 | 0.98 | 1.06 | 87.9               | 0.767          | 0.30 | 0.91 | 0.64 | 0.07 |
|                   |                                 | No. Obs.            | 33   | 374  | 220  |                    |                |      |      |      |      |
| 90                | Western<br>12                   | LOCAL               | 0.18 | 1.12 | 0.99 | 87.0               | 0.720          | 0.09 | 0.87 | 0.50 | 0.22 |
|                   |                                 | MOS                 | 0.09 | 0.88 | 1.10 | 86.7               | 0.695          | 0.00 | 0.77 | 1.00 | 0.12 |
|                   |                                 | No. Obs.            | 11   | 101  | 218  |                    |                |      |      |      |      |
|                   | All<br>Stations                 | LOCAL               | 0.63 | 1.07 | 0.97 | 87.4               | 0.764          | 0.25 | 0.91 | 0.60 | 0.15 |
|                   |                                 | MOS                 | 0.76 | 0.98 | 1.04 | 87.9               | 0.773          | 0.22 | 0.88 | 0.71 | 0.10 |
| No. Obs.          |                                 | 91                  | 918  | 1083 |      |                    |                |      |      |      |      |
| 120               | Eastern<br>23                   | LOCAL               | 0.95 | 0.97 | 1.03 | 88.9               | 0.787          | 0.19 | 0.88 | 0.80 | 0.09 |
|                   |                                 | MOS                 | 1.00 | 0.91 | 1.10 | 89.3               | 0.795          | 0.19 | 0.86 | 0.81 | 0.05 |
|                   |                                 | No. Obs.            | 21   | 447  | 429  |                    |                |      |      |      |      |
|                   | Southern<br>24                  | LOCAL               | 0.43 | 0.81 | 1.05 | 91.0               | 0.635          | 0.29 | 0.58 | 0.33 | 0.28 |
|                   |                                 | MOS                 | 1.14 | 0.75 | 1.04 | 90.2               | 0.620          | 0.00 | 0.61 | 1.00 | 0.19 |
|                   |                                 | No. Obs.            | 7    | 36   | 223  |                    |                |      |      |      |      |
| 180               | Central<br>27                   | LOCAL               | 0.46 | 1.00 | 1.09 | 85.3               | 0.699          | 0.23 | 0.89 | 0.50 | 0.11 |
|                   |                                 | MOS                 | 0.62 | 1.00 | 1.06 | 87.0               | 0.734          | 0.27 | 0.91 | 0.56 | 0.09 |
|                   |                                 | No. Obs.            | 26   | 350  | 176  |                    |                |      |      |      |      |
|                   | Western<br>12                   | LOCAL               | 0.60 | 0.92 | 1.07 | 85.3               | 0.702          | 0.20 | 0.80 | 0.67 | 0.13 |
|                   |                                 | MOS                 | 0.80 | 0.92 | 1.06 | 90.6               | 0.811          | 0.40 | 0.86 | 0.50 | 0.06 |
|                   |                                 | No. Obs.            | 5    | 123  | 171  |                    |                |      |      |      |      |
| 240               | All<br>Stations                 | LOCAL               | 0.64 | 0.97 | 1.05 | 87.6               | 0.763          | 0.22 | 0.86 | 0.66 | 0.11 |
|                   |                                 | MOS                 | 0.83 | 0.94 | 1.07 | 89.0               | 0.790          | 0.22 | 0.87 | 0.73 | 0.07 |
|                   |                                 | No. Obs.            | 59   | 956  | 999  |                    |                |      |      |      |      |

Table 4.2. Same as Table 4.1 except for 85 stations for the 1200 UTC cycle.

| Projection<br>(h) | Region<br>Number of<br>Stations | Type of<br>Forecast      | Bias               |                     |                      | Percent<br>Correct | Skill<br>Score | POD          |              | FAR          |              |
|-------------------|---------------------------------|--------------------------|--------------------|---------------------|----------------------|--------------------|----------------|--------------|--------------|--------------|--------------|
|                   |                                 |                          | ZR                 | S                   | R                    |                    |                | ZR           | S            | ZR           | S            |
| 18                | Eastern<br>23                   | LOCAL<br>MOS<br>No. Obs. | 0.59<br>0.90<br>39 | 1.06<br>1.02<br>419 | 0.98<br>0.99<br>432  | 87.4<br>88.4       | 0.764<br>0.785 | 0.26<br>0.26 | 0.90<br>0.91 | 0.57<br>0.71 | 0.14<br>0.11 |
|                   | Southern<br>24                  | LOCAL<br>MOS<br>No. Obs. | 0.80<br>2.60<br>5  | 0.85<br>0.64<br>33  | 1.03<br>1.02<br>233  | 90.8<br>93.4       | 0.597<br>0.721 | 0.20<br>0.60 | 0.64<br>0.58 | 0.75<br>0.77 | 0.25<br>0.10 |
|                   | Central<br>27                   | LOCAL<br>MOS<br>No. Obs. | 0.88<br>0.72<br>32 | 1.00<br>1.01<br>389 | 1.01<br>1.02<br>215  | 87.9<br>89.0       | 0.761<br>0.781 | 0.31<br>0.25 | 0.92<br>0.94 | 0.64<br>0.65 | 0.08<br>0.07 |
|                   | Western<br>11                   | LOCAL<br>MOS<br>No. Obs. | 0.44<br>0.11<br>9  | 0.96<br>0.84<br>109 | 1.04<br>1.12<br>217  | 86.9<br>88.7       | 0.715<br>0.744 | 0.11<br>0.00 | 0.80<br>0.79 | 0.75<br>1.00 | 0.17<br>0.07 |
|                   | All<br>Stations                 | LOCAL<br>MOS<br>No. Obs. | 0.69<br>0.85<br>85 | 1.02<br>0.98<br>950 | 1.01<br>1.03<br>1097 | 87.9<br>89.3       | 0.772<br>0.798 | 0.26<br>0.25 | 0.89<br>0.90 | 0.63<br>0.71 | 0.13<br>0.09 |
| 30                | Eastern<br>23                   | LOCAL<br>MOS<br>No. Obs. | 0.95<br>0.95<br>21 | 0.96<br>0.94<br>447 | 1.04<br>1.06<br>431  | 88.9<br>90.4       | 0.787<br>0.817 | 0.33<br>0.19 | 0.88<br>0.89 | 0.65<br>0.80 | 0.09<br>0.05 |
|                   | Southern<br>24                  | LOCAL<br>MOS<br>No. Obs. | 0.43<br>0.57<br>7  | 0.89<br>0.89<br>35  | 1.03<br>1.03<br>239  | 90.8<br>92.5       | 0.612<br>0.690 | 0.29<br>0.14 | 0.63<br>0.71 | 0.33<br>0.75 | 0.29<br>0.19 |
|                   | Central<br>27                   | LOCAL<br>MOS<br>No. Obs. | 0.52<br>0.59<br>27 | 0.99<br>1.00<br>377 | 1.09<br>1.06<br>179  | 87.3<br>88.3       | 0.737<br>0.757 | 0.26<br>0.22 | 0.91<br>0.93 | 0.50<br>0.63 | 0.08<br>0.07 |
|                   | Western<br>11                   | LOCAL<br>MOS<br>No. Obs. | 1.00<br>1.25<br>4  | 0.91<br>0.87<br>129 | 1.06<br>1.09<br>174  | 87.3<br>89.6       | 0.744<br>0.790 | 0.50<br>0.25 | 0.81<br>0.84 | 0.50<br>0.80 | 0.11<br>0.04 |
|                   | All<br>Stations                 | LOCAL<br>MOS<br>No. Obs. | 0.69<br>0.76<br>59 | 0.96<br>0.95<br>988 | 1.05<br>1.06<br>1023 | 88.5<br>90.0       | 0.779<br>0.809 | 0.31<br>0.20 | 0.87<br>0.89 | 0.56<br>0.73 | 0.09<br>0.06 |
| 42                | Eastern<br>23                   | LOCAL<br>MOS<br>No. Obs. | 0.62<br>0.64<br>39 | 1.02<br>0.98<br>392 | 1.01<br>1.05<br>428  | 85.0<br>86.7       | 0.719<br>0.751 | 0.15<br>0.08 | 0.88<br>0.88 | 0.75<br>0.88 | 0.14<br>0.11 |
|                   | Southern<br>24                  | LOCAL<br>MOS<br>No. Obs. | 0.71<br>0.86<br>7  | 0.82<br>0.71<br>28  | 1.03<br>1.04<br>207  | 90.1<br>89.3       | 0.573<br>0.525 | 0.14<br>0.00 | 0.61<br>0.54 | 0.80<br>1.00 | 0.26<br>0.25 |
|                   | Central<br>27                   | LOCAL<br>MOS<br>No. Obs. | 0.41<br>0.50<br>34 | 1.06<br>0.99<br>341 | 1.00<br>1.10<br>202  | 84.9<br>87.4       | 0.702<br>0.756 | 0.21<br>0.21 | 0.91<br>0.91 | 0.50<br>0.59 | 0.13<br>0.07 |
|                   | Western<br>11                   | LOCAL<br>MOS<br>No. Obs. | 0.22<br>0.33<br>9  | 1.01<br>0.92<br>98  | 1.03<br>1.07<br>203  | 86.1<br>86.8       | 0.697<br>0.706 | 0.11<br>0.00 | 0.81<br>0.79 | 0.50<br>1.00 | 0.20<br>0.14 |
|                   | All<br>Stations                 | LOCAL<br>MOS<br>No. Obs. | 0.51<br>0.57<br>89 | 1.03<br>0.97<br>859 | 1.02<br>1.06<br>1040 | 85.8<br>87.2       | 0.730<br>0.758 | 0.17<br>0.11 | 0.87<br>0.87 | 0.67<br>0.80 | 0.15<br>0.10 |

Table 5.1. Comparative verification of local and NGM MOS snow amount forecasts for 52 stations in the conterminous U.S. for the 12-24 h projection.

| Cycle<br>(UTC) | Type of<br>Forecast | Bias     |          | Percent<br>Correct | Skill<br>Score | Threat Score |          | POD      |          | FAR      |          |
|----------------|---------------------|----------|----------|--------------------|----------------|--------------|----------|----------|----------|----------|----------|
|                |                     | $\geq 2$ | $\geq 4$ |                    |                | $\geq 2$     | $\geq 4$ | $\geq 2$ | $\geq 4$ | $\geq 2$ | $\geq 4$ |
| 0000           | LOCAL               | 1.46     | 1.23     | 97.5               | 0.455          | 0.403        | 0.439    | 0.71     | 0.68     | 0.52     | 0.45     |
|                | NGM MOS             | 0.98     | 1.09     |                    | 0.422          | 0.384        | 0.370    | 0.55     | 0.57     | 0.44     | 0.48     |
|                | No. Obs.            | 129      | 53       |                    |                |              |          |          |          |          |          |
| 1200           | LOCAL               | 1.52     | 1.56     | 97.2               | 0.420          | 0.341        | 0.333    | 0.64     | 0.64     | 0.58     | 0.59     |
|                | NGM MOS             | 0.98     | 1.36     |                    | 0.432          | 0.363        | 0.373    | 0.53     | 0.64     | 0.46     | 0.53     |
|                | No. Obs.            | 131      | 39       |                    |                |              |          |          |          |          |          |

Table 6.1. Comparative verification of local and NGM MOS forecasts of four categories of cloud amount (clear, scattered, broken, and overcast) for 59 stations in the conterminous U.S., 0000 UTC cycle.

| Projection<br>(h) | Type of<br>Forecast | Bias by Category |      |      |      | Percent<br>Correct | Skill<br>Score |
|-------------------|---------------------|------------------|------|------|------|--------------------|----------------|
|                   |                     | 1                | 2    | 3    | 4    |                    |                |
| 12                | LOCAL               | 0.74             | 1.28 | 1.63 | 0.93 | 65.3               | 0.518          |
|                   | NGM MOS             | 0.86             | 1.39 | 1.12 | 0.94 | 60.0               | 0.436          |
|                   | No. Obs.            | 2689             | 1147 | 913  | 3022 |                    |                |
| 18                | LOCAL               | 0.57             | 1.56 | 1.96 | 0.74 | 50.9               | 0.350          |
|                   | NGM MOS             | 0.68             | 1.65 | 1.29 | 0.86 | 54.6               | 0.386          |
|                   | No. Obs.            | 2522             | 1330 | 1145 | 2925 |                    |                |
| 24                | LOCAL               | 0.57             | 1.63 | 2.04 | 0.76 | 49.2               | 0.326          |
|                   | NGM MOS             | 0.74             | 1.66 | 1.19 | 0.88 | 55.2               | 0.387          |
|                   | No. Obs.            | 2645             | 1269 | 978  | 2826 |                    |                |

Table 6.2. Same as Table 6.1 except for the 1200 UTC cycle.

| Projection<br>(h) | Type of<br>Forecast | Bias by Category |      |      |      | Percent<br>Correct | Skill<br>Score |
|-------------------|---------------------|------------------|------|------|------|--------------------|----------------|
|                   |                     | 1                | 2    | 3    | 4    |                    |                |
| 12                | LOCAL               | 0.76             | 1.32 | 1.63 | 0.86 | 60.8               | 0.465          |
|                   | NGM MOS             | 0.79             | 1.52 | 1.24 | 0.87 | 57.0               | 0.410          |
|                   | No. Obs.            | 2641             | 1294 | 977  | 2847 |                    |                |
| 18                | LOCAL               | 0.65             | 1.72 | 2.06 | 0.85 | 55.1               | 0.384          |
|                   | NGM MOS             | 0.86             | 1.60 | 1.13 | 0.91 | 60.4               | 0.432          |
|                   | No. Obs.            | 3091             | 947  | 800  | 2921 |                    |                |
| 24                | LOCAL               | 0.65             | 1.49 | 1.85 | 0.87 | 52.3               | 0.348          |
|                   | NGM MOS             | 0.81             | 1.46 | 1.18 | 0.94 | 57.3               | 0.401          |
|                   | No. Obs.            | 2675             | 1137 | 910  | 3044 |                    |                |

Table 6.3. Comparative verification of local and NGM MOS forecasts of four categories of cloud amount (clear, scattered, broken, and overcast) for 16 stations in the Eastern Region, 0000 UTC cycle.

| Projection<br>(h) | Type of<br>Forecast | Bias by Category |      |      |      | Percent<br>Correct | Skill<br>Score |
|-------------------|---------------------|------------------|------|------|------|--------------------|----------------|
|                   |                     | 1                | 2    | 3    | 4    |                    |                |
| 12                | LOCAL               | 0.76             | 1.11 | 1.36 | 0.98 | 63.1               | 0.478          |
|                   | NGM MOS             | 0.83             | 1.20 | 1.02 | 1.01 | 60.4               | 0.434          |
|                   | No. Obs.            | 521              | 373  | 289  | 916  |                    |                |
| 18                | LOCAL               | 0.51             | 1.35 | 1.82 | 0.83 | 54.5               | 0.376          |
|                   | NGM MOS             | 0.67             | 1.48 | 1.18 | 0.91 | 59.6               | 0.435          |
|                   | No. Obs.            | 483              | 373  | 325  | 914  |                    |                |
| 24                | LOCAL               | 0.51             | 1.74 | 2.00 | 0.88 | 53.4               | 0.358          |
|                   | NGM MOS             | 0.75             | 1.68 | 1.05 | 0.97 | 61.7               | 0.451          |
|                   | No. Obs.            | 674              | 268  | 237  | 904  |                    |                |

Table 6.4. Same as Table 6.3 except for the 1200 UTC cycle.

| Projection<br>(h) | Type of<br>Forecast | Bias by Category |      |      |      | Percent<br>Correct | Skill<br>Score |
|-------------------|---------------------|------------------|------|------|------|--------------------|----------------|
|                   |                     | 1                | 2    | 3    | 4    |                    |                |
| 12                | LOCAL               | 0.65             | 1.43 | 1.80 | 0.92 | 60.0               | 0.438          |
|                   | NGM MOS             | 0.78             | 1.65 | 1.16 | 0.93 | 61.6               | 0.453          |
|                   | No. Obs.            | 669              | 275  | 237  | 905  |                    |                |
| 18                | LOCAL               | 0.62             | 1.72 | 2.25 | 0.87 | 58.7               | 0.414          |
|                   | NGM MOS             | 0.84             | 1.49 | 1.22 | 0.96 | 65.6               | 0.489          |
|                   | No. Obs.            | 709              | 237  | 180  | 964  |                    |                |
| 24                | LOCAL               | 0.74             | 1.20 | 1.49 | 0.91 | 54.8               | 0.367          |
|                   | NGM MOS             | 0.73             | 1.31 | 1.11 | 0.99 | 58.3               | 0.406          |
|                   | No. Obs.            | 517              | 371  | 284  | 920  |                    |                |

Table 6.5. Comparative verification of local and NGM MOS forecasts of four categories of cloud amount (clear, scattered, broken, and overcast) for 14 stations in the Southern Region, 0000 UTC cycle.

| Projection<br>(h) | Type of<br>Forecast | Bias by Category |      |      |      | Percent<br>Correct | Skill<br>Score |
|-------------------|---------------------|------------------|------|------|------|--------------------|----------------|
|                   |                     | 1                | 2    | 3    | 4    |                    |                |
| 12                | LOCAL               | 0.81             | 1.27 | 1.63 | 0.87 | 69.4               | 0.578          |
|                   | NGM MOS             | 0.96             | 1.38 | 1.00 | 0.87 | 62.8               | 0.475          |
|                   | No. Obs.            | 745              | 292  | 230  | 608  |                    |                |
| 18                | LOCAL               | 0.67             | 1.82 | 1.50 | 0.62 | 52.0               | 0.367          |
|                   | NGM MOS             | 0.84             | 1.83 | 0.90 | 0.79 | 56.4               | 0.413          |
|                   | No. Obs.            | 750              | 333  | 378  | 573  |                    |                |
| 24                | LOCAL               | 0.60             | 1.65 | 1.98 | 0.67 | 48.8               | 0.324          |
|                   | NGM MOS             | 0.84             | 1.60 | 1.01 | 0.81 | 55.4               | 0.385          |
|                   | No. Obs.            | 750              | 359  | 240  | 517  |                    |                |

Table 6.6. Same as Table 6.5 except for the 1200 UTC cycle.

| Projection<br>(h) | Type of<br>Forecast | Bias by Category |      |      |      | Percent<br>Correct | Skill<br>Score |
|-------------------|---------------------|------------------|------|------|------|--------------------|----------------|
|                   |                     | 1                | 2    | 3    | 4    |                    |                |
| 12                | LOCAL               | 0.81             | 1.25 | 1.60 | 0.82 | 63.4               | 0.502          |
|                   | NGM MOS             | 0.89             | 1.35 | 1.14 | 0.85 | 58.2               | 0.421          |
|                   | No. Obs.            | 755              | 365  | 244  | 530  |                    |                |
| 18                | LOCAL               | 0.71             | 1.62 | 2.00 | 0.80 | 56.1               | 0.397          |
|                   | NGM MOS             | 0.97             | 1.32 | 1.07 | 0.87 | 63.2               | 0.461          |
|                   | No. Obs.            | 864              | 268  | 202  | 556  |                    |                |
| 24                | LOCAL               | 0.71             | 1.61 | 1.77 | 0.78 | 52.5               | 0.358          |
|                   | NGM MOS             | 0.93             | 1.39 | 1.02 | 0.89 | 60.3               | 0.440          |
|                   | No. Obs.            | 753              | 294  | 229  | 616  |                    |                |



Table 6.7. Comparative verification of local and NGM MOS forecasts of four categories of cloud amount (clear, scattered, broken, and overcast) for 18 stations in the Central Region, 0000 UTC cycle.

| Projection<br>(h) | Type of<br>Forecast | Bias by Category |      |      |      | Percent<br>Correct | Skill<br>Score |
|-------------------|---------------------|------------------|------|------|------|--------------------|----------------|
|                   |                     | 1                | 2    | 3    | 4    |                    |                |
| 12                | LOCAL               | 0.65             | 1.44 | 1.99 | 0.94 | 61.5               | 0.461          |
|                   | NGM MOS             | 0.76             | 1.56 | 1.34 | 0.95 | 57.8               | 0.399          |
|                   | No. Obs.            | 866              | 319  | 219  | 946  |                    |                |
| 18                | LOCAL               | 0.39             | 1.72 | 2.74 | 0.76 | 46.5               | 0.296          |
|                   | NGM MOS             | 0.52             | 1.73 | 1.94 | 0.87 | 49.7               | 0.319          |
|                   | No. Obs.            | 790              | 376  | 248  | 937  |                    |                |
| 24                | LOCAL               | 0.43             | 1.72 | 2.31 | 0.74 | 46.0               | 0.288          |
|                   | NGM MOS             | 0.61             | 1.63 | 1.44 | 0.90 | 52.2               | 0.345          |
|                   | No. Obs.            | 729              | 387  | 289  | 930  |                    |                |

Table 6.8. Same as Table 6.7 except for the 1200 UTC cycle.

| Projection<br>(h) | Type of<br>Forecast | Bias by Category |      |      |      | Percent<br>Correct | Skill<br>Score |
|-------------------|---------------------|------------------|------|------|------|--------------------|----------------|
|                   |                     | 1                | 2    | 3    | 4    |                    |                |
| 12                | LOCAL               | 0.73             | 1.38 | 1.63 | 0.86 | 60.0               | 0.451          |
|                   | NGM MOS             | 0.71             | 1.54 | 1.40 | 0.88 | 53.5               | 0.360          |
|                   | No. Obs.            | 725              | 385  | 286  | 941  |                    |                |
| 18                | LOCAL               | 0.55             | 2.11 | 2.32 | 0.85 | 51.5               | 0.337          |
|                   | NGM MOS             | 0.77             | 1.91 | 1.26 | 0.92 | 57.1               | 0.382          |
|                   | No. Obs.            | 928              | 247  | 217  | 946  |                    |                |
| 24                | LOCAL               | 0.48             | 1.76 | 2.40 | 0.89 | 49.4               | 0.312          |
|                   | NGM MOS             | 0.72             | 1.62 | 1.40 | 0.96 | 55.5               | 0.368          |
|                   | No. Obs.            | 856              | 312  | 220  | 948  |                    |                |

Table 6.9. Comparative verification of local and NGM MOS forecasts of four categories of cloud amount (clear, scattered, broken, and overcast) for 11 stations in the Western Region, 0000 UTC cycle.

| Projection<br>(h) | Type of<br>Forecast | Bias by Category |      |      |      | Percent<br>Correct | Skill<br>Score |
|-------------------|---------------------|------------------|------|------|------|--------------------|----------------|
|                   |                     | 1                | 2    | 3    | 4    |                    |                |
| 12                | LOCAL               | 0.78             | 1.40 | 1.64 | 0.90 | 69.5               | 0.572          |
|                   | NGM MOS             | 0.91             | 1.50 | 1.18 | 0.88 | 59.4               | 0.419          |
|                   | No. Obs.            | 557              | 163  | 175  | 552  |                    |                |
| 18                | LOCAL               | 0.76             | 1.27 | 2.08 | 0.68 | 51.3               | 0.351          |
|                   | NGM MOS             | 0.71             | 1.58 | 1.40 | 0.85 | 52.7               | 0.361          |
|                   | No. Obs.            | 499              | 248  | 194  | 501  |                    |                |
| 24                | LOCAL               | 0.80             | 1.36 | 1.77 | 0.67 | 48.7               | 0.316          |
|                   | NGM MOS             | 0.74             | 1.77 | 1.21 | 0.76 | 50.5               | 0.337          |
|                   | No. Obs.            | 492              | 255  | 212  | 475  |                    |                |

Table 6.10. Same as Table 6.9 except for the 1200 UTC cycle.

| Projection<br>(h) | Type of<br>Forecast | Bias by Category |      |      |      | Percent<br>Correct | Skill<br>Score |
|-------------------|---------------------|------------------|------|------|------|--------------------|----------------|
|                   |                     | 1                | 2    | 3    | 4    |                    |                |
| 12                | LOCAL               | 0.92             | 1.19 | 1.44 | 0.78 | 59.8               | 0.455          |
|                   | NGM MOS             | 0.78             | 1.60 | 1.24 | 0.78 | 54.4               | 0.388          |
|                   | No. Obs.            | 492              | 269  | 210  | 471  |                    |                |
| 18                | LOCAL               | 0.75             | 1.37 | 1.65 | 0.87 | 54.4               | 0.375          |
|                   | NGM MOS             | 0.88             | 1.73 | 0.95 | 0.87 | 54.3               | 0.361          |
|                   | No. Obs.            | 590              | 195  | 201  | 455  |                    |                |
| 24                | LOCAL               | 0.73             | 1.40 | 1.85 | 0.88 | 53.0               | 0.346          |
|                   | NGM MOS             | 0.88             | 1.65 | 1.22 | 0.86 | 55.0               | 0.362          |
|                   | No. Obs.            | 549              | 160  | 177  | 560  |                    |                |

Table 6.11. Comparative verification of local and LFM MOS forecasts of four categories of cloud amount (clear, scattered, broken, and overcast) for 6 stations in the Alaska Region, 0000 UTC cycle.

| Projection<br>(h) | Type of<br>Forecast | Bias by Category |      |      |      | Percent<br>Correct | Skill<br>Score |
|-------------------|---------------------|------------------|------|------|------|--------------------|----------------|
|                   |                     | 1                | 2    | 3    | 4    |                    |                |
| 12                | LOCAL               | 0.80             | 1.08 | 1.69 | 0.97 | 58.3               | 0.396          |
|                   | LFM MOS             | 0.96             | 1.19 | 0.89 | 1.01 | 62.9               | 0.448          |
|                   | No. Obs.            | 222              | 73   | 65   | 266  |                    |                |
| 18                | LOCAL               | 0.94             | 0.82 | 1.72 | 0.87 | 50.8               | 0.324          |
|                   | LFM MOS             | 1.03             | 0.78 | 0.93 | 1.10 | 57.1               | 0.387          |
|                   | No. Obs.            | 158              | 110  | 83   | 239  |                    |                |
| 24                | LOCAL               | 1.02             | 0.93 | 1.26 | 0.90 | 50.6               | 0.323          |
|                   | LFM MOS             | 1.15             | 0.74 | 0.79 | 1.14 | 55.6               | 0.375          |
|                   | No. Obs.            | 147              | 118  | 109  | 237  |                    |                |

Table 6.12. Same as Table 6.11 except for the 1200 UTC cycle.

| Projection<br>(h) | Type of<br>Forecast | Bias by Category |      |      |      | Percent<br>Correct | Skill<br>Score |
|-------------------|---------------------|------------------|------|------|------|--------------------|----------------|
|                   |                     | 1                | 2    | 3    | 4    |                    |                |
| 12                | LOCAL               | 1.09             | 0.76 | 0.98 | 1.08 | 60.0               | 0.444          |
|                   | LFM MOS             | 1.26             | 0.60 | 0.85 | 1.12 | 54.5               | 0.363          |
|                   | No. Obs.            | 148              | 126  | 114  | 240  |                    |                |
| 18                | LOCAL               | 0.73             | 1.08 | 1.91 | 0.89 | 52.8               | 0.342          |
|                   | LFM MOS             | 1.09             | 0.71 | 0.90 | 1.06 | 57.3               | 0.370          |
|                   | No. Obs.            | 199              | 87   | 81   | 266  |                    |                |
| 24                | LOCAL               | 0.59             | 1.68 | 2.02 | 0.91 | 50.0               | 0.302          |
|                   | LFM MOS             | 1.01             | 0.87 | 0.94 | 1.04 | 60.4               | 0.403          |
|                   | No. Obs.            | 228              | 75   | 66   | 273  |                    |                |

Table 7.1. Verification of NGM MOS surface wind forecasts for 95 stations in the conterminous U.S., 0000 UTC cycle.

| Fcst Proj<br>(h) | Type of Fcst. | Direction             |             |              |                      | Speed                |              |                   |                       |                       |                  |              |              |             |            |            |
|------------------|---------------|-----------------------|-------------|--------------|----------------------|----------------------|--------------|-------------------|-----------------------|-----------------------|------------------|--------------|--------------|-------------|------------|------------|
|                  |               | Mean Abs. Error (deg) | Skill Score | No. of Cases | Mean Abs. Error (kt) | Mean Alg. Error (kt) | No. of Cases | Contingency Table |                       |                       |                  |              |              |             |            |            |
|                  |               |                       |             |              |                      |                      |              | Skill Score       | Percent Fcst. Correct | Threat Score (>27 kt) | Bias by Category |              |              |             |            |            |
|                  |               |                       |             |              |                      |                      |              |                   |                       |                       | 1<br>Obs         | 2<br>Obs     | 3<br>Obs     | 4<br>Obs    | 5<br>Obs   | 6<br>Obs   |
| 12               | NGM           | 21                    | 0.550       | 5083         | 3.9                  | 2.5                  | 5180         | 0.404             | 83.6                  | 0.12                  | 0.96<br>13960    | 1.16<br>1641 | 1.38<br>462  | 1.64<br>106 | 1.94<br>31 | 2.57<br>7  |
| 18               | NGM           | 22                    | 0.513       | 8055         | 3.8                  | 1.7                  | 8139         | 0.392             | 72.1                  | 0.13                  | 0.96<br>11735    | 1.05<br>3073 | 1.15<br>1094 | 1.21<br>317 | 1.43<br>80 | 1.76<br>29 |
| 24               | NGM           | 25                    | 0.484       | 6274         | 4.0                  | 2.3                  | 6367         | 0.382             | 79.0                  | 0.12                  | 0.96<br>13110    | 1.10<br>2133 | 1.41<br>572  | 1.10<br>206 | 1.72<br>36 | 2.73<br>11 |

Table 7.3. Verification of NGM MOS surface wind forecasts for 23 stations in the Eastern Region, 0000 UTC cycle.

| Fcst Proj (h) | Direction             |             |              |                      | Speed                |              |             |                       |                       |                  |                 |                 |                 |                 |                 |           |
|---------------|-----------------------|-------------|--------------|----------------------|----------------------|--------------|-------------|-----------------------|-----------------------|------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------|
|               |                       |             |              |                      | Contingency Table    |              |             |                       |                       |                  |                 |                 |                 |                 |                 |           |
|               | Mean Abs. Error (deg) | Skill Score | No. of Cases | Mean Abs. Error (kt) | Mean Alg. Error (kt) | No. of Cases | Skill Score | Percent Fcst. Correct | Threat Score (>27 kt) | Bias by Category |                 |                 |                 |                 |                 |           |
|               |                       |             |              |                      |                      |              |             |                       |                       | 1<br>No.<br>Obs  | 2<br>No.<br>Obs | 3<br>No.<br>Obs | 4<br>No.<br>Obs | 5<br>No.<br>Obs | 6<br>No.<br>Obs |           |
| 12            | NGM                   | 20          | 0.539        | 1392                 | 3.5                  | 2.3          | 1418        | 0.420                 | 83.7                  | 0.09             | 0.95<br>3449    | 1.27<br>422     | 1.46<br>107     | 1.35<br>23      | 1.40<br>5       | *<br>0    |
| 18            | NGM                   | 21          | 0.486        | 2084                 | 3.3                  | 1.4          | 2092        | 0.411                 | 72.7                  | 0.04             | 0.96<br>2844    | 1.09<br>814     | 1.12<br>273     | 1.17<br>52      | 0.77<br>13      | 2.00<br>1 |
| 24            | NGM                   | 22          | 0.461        | 1417                 | 3.9                  | 2.2          | 1445        | 0.390                 | 81.4                  | 0.11             | 0.96<br>3351    | 1.24<br>468     | 1.37<br>114     | 0.76<br>42      | 1.43<br>7       | 0.00<br>3 |

Table 7.4. Same as Table 7.3 except for the 1200 UTC cycle.

| Fcst<br>Proj<br>(h) | Direction           |                                | Speed          |                    |                               |                               |                    |                |                             |                             |                 |                 |                 |                 |                 |                 |
|---------------------|---------------------|--------------------------------|----------------|--------------------|-------------------------------|-------------------------------|--------------------|----------------|-----------------------------|-----------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                     | Contingency Table   |                                |                |                    |                               |                               | Bias by Category   |                |                             |                             |                 |                 |                 |                 |                 |                 |
|                     | Type<br>Of<br>Fcst. | Mean<br>Abs.<br>Error<br>(deg) | Skill<br>Score | No.<br>of<br>Cases | Mean<br>Abs.<br>Error<br>(kt) | Mean<br>Alg.<br>Error<br>(kt) | No.<br>of<br>Cases | Skill<br>Score | Percent<br>Fcst.<br>Correct | Threat<br>Score<br>(>27 kt) | 1<br>No.<br>Obs | 2<br>No.<br>Obs | 3<br>No.<br>Obs | 4<br>No.<br>Obs | 5<br>No.<br>Obs | 6<br>No.<br>Obs |
| 12                  | NGM                 | 22                             | 0.475          | 1469               | 3.7                           | 2.1                           | 1487               | 0.405          | 81.4                        | 0.08                        | 0.94<br>3345    | 1.34<br>466     | 1.32<br>114     | 0.88<br>42      | 0.43<br>7       | 0.33<br>3       |
| 18                  | NGM                 | 21                             | 0.518          | 1303               | 3.7                           | 2.0                           | 1319               | 0.422          | 83.8                        | 0.50                        | 0.97<br>3396    | 1.28<br>426     | 1.01<br>123     | 0.77<br>30      | 4.00<br>1       | 0.00<br>1       |
| 24                  | NGM                 | 21                             | 0.500          | 1293               | 3.6                           | 2.1                           | 1312               | 0.404          | 84.0                        | 0.11                        | 0.97<br>3445    | 1.23<br>418     | 1.18<br>108     | 0.96<br>23      | 1.00<br>5       | *<br>0          |

\* This category was neither forecast nor observed.

Table 7.5. Verification of NGM MOS surface wind forecasts for 27 stations in the Southern Region, 0000 UTC cycle.

| Fcst Proj<br>(h) | Direction     |                       | Speed             |              |                      |                      |              |             |                       |                       |                  |             |             |            |            |           |
|------------------|---------------|-----------------------|-------------------|--------------|----------------------|----------------------|--------------|-------------|-----------------------|-----------------------|------------------|-------------|-------------|------------|------------|-----------|
|                  |               |                       | Contingency Table |              |                      |                      |              |             |                       |                       |                  |             |             |            |            |           |
|                  | Type of Fcst. | Mean Abs. Error (deg) | Skill Score       | No. of Cases | Mean Abs. Error (kt) | Mean Alg. Error (kt) | No. of Cases | Skill Score | Percent Fcst. Correct | Threat Score (>27 kt) | Bias by Category |             |             |            |            |           |
|                  |               |                       |                   |              |                      |                      |              |             |                       |                       | 1<br>Obs         | 2<br>Obs    | 3<br>Obs    | 4<br>Obs   | 5<br>Obs   | 6<br>Obs  |
| 12               | NGM           | 19                    | 0.571             | 1081         | 3.3                  | 1.6                  | 1091         | 0.383       | 87.5                  | 0.50                  | 1.00<br>3952     | 1.00<br>401 | 1.00<br>81  | 1.09<br>11 | 3.00<br>1  | 1.00<br>1 |
| 18               | NGM           | 21                    | 0.526             | 2222         | 3.4                  | 1.0                  | 2236         | 0.366       | 72.8                  | 0.14                  | 0.99<br>3357     | 1.05<br>860 | 1.06<br>281 | 0.58<br>78 | 0.74<br>19 | 1.00<br>4 |
| 24               | NGM           | 23                    | 0.513             | 1408         | 3.4                  | 1.3                  | 1426         | 0.411       | 84.3                  | 0.08                  | 1.01<br>3735     | 1.01<br>510 | 0.89<br>120 | 0.57<br>44 | 1.50<br>4  | 0.33<br>3 |

Table 7.6. Same as Table 7.5 except for 26 stations for the 1200 UTC cycle.

| Fcst<br>Proj<br>(h) | Speed               |                                |                |                    |                               |                               |                    |                |                             |                             |                  |                 |                 |                 |                 |                 |
|---------------------|---------------------|--------------------------------|----------------|--------------------|-------------------------------|-------------------------------|--------------------|----------------|-----------------------------|-----------------------------|------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                     | Direction           |                                |                |                    | Contingency Table             |                               |                    |                |                             |                             |                  |                 |                 |                 |                 |                 |
|                     | Type<br>of<br>Fcst. | Mean<br>Abs.<br>Error<br>(deg) | Skill<br>Score | No.<br>of<br>Cases | Mean<br>Abs.<br>Error<br>(kt) | Mean<br>Alg.<br>Error<br>(kt) | No.<br>of<br>Cases | Skill<br>Score | Percent<br>Fcst.<br>Correct | Threat<br>Score<br>(>27 kt) | Bias by Category |                 |                 |                 |                 |                 |
|                     |                     |                                |                |                    |                               |                               |                    |                |                             |                             | 1<br>No.<br>Obs  | 2<br>No.<br>Obs | 3<br>No.<br>Obs | 4<br>No.<br>Obs | 5<br>No.<br>Obs | 6<br>No.<br>Obs |
| 12                  | NGM                 | 22                             | 0.544          | 1426               | 3.2                           | 1.4                           | 1444               | 0.434          | 84.8                        | 0.08                        | 1.00<br>3708     | 1.05<br>496     | 1.01<br>119     | 0.56<br>41      | 1.25<br>4       | 0.67<br>3       |
| 18                  | NGM                 | 22                             | 0.524          | 1167               | 3.5                           | 1.5                           | 1180               | 0.373          | 86.0                        | 0.00                        | 1.01<br>3813     | 0.98<br>408     | 0.83<br>125     | 0.77<br>22      | 0.00<br>3       | 0.50<br>2       |
| 24                  | NGM                 | 23                             | 0.502          | 1056               | 3.5                           | 1.7                           | 1072               | 0.348          | 87.4                        | 0.67                        | 1.01<br>3915     | 0.92<br>400     | 0.92<br>75      | 0.55<br>11      | 2.00<br>1       | 1.00<br>1       |

Table 7.7. Verification of NGM MOS surface wind forecasts for 27 stations in the Central Region, 0000 UTC cycle.

| Fcst Proj<br>(h) | Type of Fcst. | Direction             |             |              |                      |                      | Speed        |             |                       |                       |                  |      |      |      |      |      |      | Contingency Table |           |           |           |           |           |           |  |  |  |
|------------------|---------------|-----------------------|-------------|--------------|----------------------|----------------------|--------------|-------------|-----------------------|-----------------------|------------------|------|------|------|------|------|------|-------------------|-----------|-----------|-----------|-----------|-----------|-----------|--|--|--|
|                  |               | Mean Abs. Error (deg) | Skill Score | No. of Cases | Mean Abs. Error (kt) | Mean Alg. Error (kt) | No. of Cases | Skill Score | Percent Fcst. Correct | Threat Score (>27 kt) | Bias by Category |      |      |      |      |      |      |                   | 1 No. Obs | 2 No. Obs | 3 No. Obs | 4 No. Obs | 5 No. Obs | 6 No. Obs |  |  |  |
|                  |               |                       |             |              |                      |                      |              |             |                       |                       |                  |      |      |      |      |      |      |                   |           |           |           |           |           |           |  |  |  |
| 12               | NGM           | 19                    | 0.562       | 1935         | 4.1                  | 3.0                  | 1964         | 0.394       | 77.9                  | 0.11                  | 0.92             | 1.18 | 1.55 | 2.08 | 2.26 | 4.00 | 3845 | 596               | 196       | 52        | 19        | 4         |           |           |  |  |  |
| 18               | NGM           | 21                    | 0.541       | 2856         | 3.9                  | 2.3                  | 2881         | 0.390       | 65.7                  | 0.15                  | 0.92             | 0.98 | 1.29 | 1.57 | 1.92 | 1.82 | 2998 | 1083              | 416       | 141       | 39        | 22        |           |           |  |  |  |
| 24               | NGM           | 24                    | 0.510       | 2324         | 4.2                  | 2.9                  | 2344         | 0.371       | 73.0                  | 0.13                  | 0.91             | 1.10 | 1.81 | 1.45 | 1.85 | **   | 3594 | 754               | 216       | 85        | 20        | 0         |           |           |  |  |  |

Table 7.8. Same as Table 7.7 except for the 1200 UTC cycle.

| Fcst Proj (h) | Type Of Fcst. | Direction             |             |              |                      | Speed                |              |             |                       |                       |                  |          |          |         |         | Contingency Table |           |           |           |           |           |           |  |  |  |  |  |
|---------------|---------------|-----------------------|-------------|--------------|----------------------|----------------------|--------------|-------------|-----------------------|-----------------------|------------------|----------|----------|---------|---------|-------------------|-----------|-----------|-----------|-----------|-----------|-----------|--|--|--|--|--|
|               |               | Mean Abs. Error (deg) | Skill Score | No. of Cases | Mean Abs. Error (kt) | Mean Alg. Error (kt) | No. of Cases | Skill Score | Percent Fcst. Correct | Threat Score (>27 kt) | Bias by Category |          |          |         |         |                   | 1 No. Obs | 2 No. Obs | 3 No. Obs | 4 No. Obs | 5 No. Obs | 6 No. Obs |  |  |  |  |  |
|               |               |                       |             |              |                      |                      |              |             |                       |                       | 1                | 2        | 3        | 4       | 5       | 6                 |           |           |           |           |           |           |  |  |  |  |  |
| 12            | NGM           | 22                    | 0.526       | 2313         | 4.1                  | 2.8                  | 2336         | 0.374       | 72.8                  | 0.12                  | 0.89 3583        | 1.19 747 | 1.70 215 | 1.52 84 | 1.75 20 | ** 0              |           |           |           |           |           |           |  |  |  |  |  |
| 18            | NGM           | 21                    | 0.541       | 1941         | 4.3                  | 2.9                  | 1979         | 0.382       | 77.1                  | 0.22                  | 0.91 3810        | 1.32 585 | 1.41 195 | 1.75 59 | 2.46 13 | 2.67 6            |           |           |           |           |           |           |  |  |  |  |  |
| 24            | NGM           | 22                    | 0.519       | 1917         | 4.3                  | 3.0                  | 1953         | 0.359       | 76.8                  | 0.17                  | 0.93 3821        | 1.15 596 | 1.54 200 | 2.18 50 | 1.38 21 | 3.50 4            |           |           |           |           |           |           |  |  |  |  |  |

\*\* This category was forecast but was not observed.

Table 7.9. Verification of NGM MOS surface wind forecasts for 18 stations in the Western Region, 0000 UTC cycle.

| Fcst<br>Proj<br>(h) | Direction           |                                |                |                    | Speed                         |                               |                    |                | Contingency Table           |                             |                  |             |             |            |            |            |            |            |            |            |   |  |
|---------------------|---------------------|--------------------------------|----------------|--------------------|-------------------------------|-------------------------------|--------------------|----------------|-----------------------------|-----------------------------|------------------|-------------|-------------|------------|------------|------------|------------|------------|------------|------------|---|--|
|                     | Type<br>of<br>Fcst. | Mean<br>Abs.<br>Error<br>(deg) | Skill<br>Score | No.<br>of<br>Cases | Mean<br>Abs.<br>Error<br>(kt) | Mean<br>Alg.<br>Error<br>(kt) | No.<br>of<br>Cases | Skill<br>Score | Percent<br>Fcst.<br>Correct | Threat<br>Score<br>(>27 kt) | Bias by Category |             |             |            |            |            |            |            |            |            |   |  |
|                     |                     |                                |                |                    |                               |                               |                    |                |                             |                             | 1                |             | 2           |            | 3          |            | 4          |            | 5          |            | 6 |  |
|                     |                     |                                |                |                    |                               |                               |                    |                |                             |                             | No.<br>Obs       | No.<br>Obs  | No.<br>Obs  | No.<br>Obs | No.<br>Obs | No.<br>Obs | No.<br>Obs | No.<br>Obs | No.<br>Obs | No.<br>Obs |   |  |
| 12                  | NGM                 | 31                             | 0.405          | 675                | 4.9                           | 2.9                           | 707                | 0.395          | 86.8                        | 0.07                        | 0.97<br>2714     | 1.22<br>222 | 1.24<br>78  | 1.15<br>20 | 1.17<br>6  | 0.50<br>2  |            |            |            |            |   |  |
| 18                  | NGM                 | 34                             | 0.373          | 893                | 5.3                           | 2.8                           | 930                | 0.337          | 80.0                        | 0.07                        | 0.98<br>2536     | 1.15<br>316 | 0.94<br>124 | 1.20<br>46 | 1.67<br>9  | 2.50<br>2  |            |            |            |            |   |  |
| 24                  | NGM                 | 35                             | 0.368          | 1125               | 4.5                           | 2.6                           | 1152               | 0.335          | 77.4                        | 0.11                        | 0.97<br>2430     | 1.05<br>401 | 1.26<br>122 | 1.34<br>35 | 1.80<br>5  | 0.20<br>5  |            |            |            |            |   |  |

Table 7.10. Same as Table 7.9 except for the 1200 UTC cycle.

| Fcst<br>Proj<br>(h) | Type<br>of<br>Fcst. | Direction                      |                |                    |                               | Speed                         |                    |                             |                              |                |              |             |             |                  |           |           |   |            |
|---------------------|---------------------|--------------------------------|----------------|--------------------|-------------------------------|-------------------------------|--------------------|-----------------------------|------------------------------|----------------|--------------|-------------|-------------|------------------|-----------|-----------|---|------------|
|                     |                     | Mean<br>Abs.<br>Error<br>(deg) | Skill<br>Score | No.<br>of<br>Cases | Mean<br>Abs.<br>Error<br>(kt) | Mean<br>Alg.<br>Error<br>(kt) | No.<br>of<br>Cases | Contingency Table           |                              |                |              |             |             | Bias by Category |           |           |   |            |
|                     |                     |                                |                |                    |                               |                               |                    | Threat<br>Score<br>(>27 kt) | Percent<br>Fcst..<br>Correct | Skill<br>Score | No.<br>Obs   | 1           | 2           | 3                | 4         | 5         | 6 |            |
|                     |                     |                                |                |                    |                               |                               |                    |                             |                              |                |              |             |             |                  |           |           |   | No.<br>Obs |
| 12                  | NGM                 | 29                             | 0.411          | 1128               | 4.2                           | 2.2                           | 1153               | 0.383                       | 79.2                         | 0.21           | 0.98<br>2393 | 1.04<br>401 | 1.25<br>118 | 1.09<br>34       | 2.20<br>5 | 0.40<br>5 |   |            |
| 18                  | NGM                 | 33                             | 0.366          | 783                | 4.9                           | 3.2                           | 815                | 0.357                       | 84.9                         | 0.00           | 0.96<br>2642 | 1.34<br>230 | 1.04<br>83  | 1.67<br>21       | 2.25<br>4 | 1.00<br>1 |   |            |
| 24                  | NGM                 | 33                             | 0.376          | 703                | 5.1                           | 3.4                           | 745                | 0.348                       | 85.7                         | 0.08           | 0.97<br>2677 | 1.27<br>220 | 1.25<br>75  | 1.15<br>20       | 0.67<br>6 | 0.50<br>2 |   |            |



Table 7.11. Verification of LFM MOS surface wind forecasts for 6 stations in the Alaska Region, 0000 UTC cycle.

| Fcst Proj<br>(h) | Type<br>Of<br>Fcst. | Direction                      |                | Speed              |                               |                               |                    |                |                             |                             |                   |                 |                 |                 |                 |                 |
|------------------|---------------------|--------------------------------|----------------|--------------------|-------------------------------|-------------------------------|--------------------|----------------|-----------------------------|-----------------------------|-------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                  |                     | Mean<br>Abs.<br>Error<br>(deg) | Skill<br>Score | No.<br>Of<br>Cases | Mean<br>Abs.<br>Error<br>(kt) | Mean<br>Alg.<br>Error<br>(kt) | No.<br>Of<br>Cases | Skill<br>Score | Percent<br>Fcst.<br>Correct | Threat<br>Score<br>(>27 kt) | Contingency Table |                 |                 |                 |                 |                 |
|                  |                     |                                |                |                    |                               |                               |                    |                |                             |                             | Bias by Category  |                 |                 |                 |                 |                 |
|                  |                     |                                |                |                    |                               |                               |                    |                |                             |                             | 1<br>No.<br>Obs   | 2<br>No.<br>Obs | 3<br>No.<br>Obs | 4<br>No.<br>Obs | 5<br>No.<br>Obs | 6<br>No.<br>Obs |
| 12               | LFM                 | 16                             | 0.578          | 152                | 4.0                           | 2.9                           | 156                | 0.448          | 86.4                        | 0.00                        | 0.97<br>548       | 1.18<br>55      | 1.05<br>20      | 1.25<br>4       | **<br>0         | *<br>0          |
| 18               | LFM                 | 21                             | 0.465          | 160                | 3.9                           | 2.6                           | 161                | 0.464          | 86.3                        | 0.00                        | 0.98<br>550       | 1.09<br>64      | 1.00<br>19      | 3.50<br>2       | **<br>0         | *<br>0          |
| 24               | LFM                 | 28                             | 0.471          | 197                | 4.5                           | 3.0                           | 200                | 0.417          | 83.4                        | 0.25                        | 0.96<br>537       | 1.12<br>69      | 1.41<br>17      | 3.00<br>3       | 4.00<br>1       | *<br>0          |

Table 7.12. Same as Table 7.11 except for the 1200 UTC cycle.

| Fcst<br>Proj<br>(h) | Direction           |                                |                |                    | Speed                         |                               |                    |                   |                             |                             |                  |            |            |           |           |          |
|---------------------|---------------------|--------------------------------|----------------|--------------------|-------------------------------|-------------------------------|--------------------|-------------------|-----------------------------|-----------------------------|------------------|------------|------------|-----------|-----------|----------|
|                     | Type<br>Of<br>Fcst. | Mean<br>Abs.<br>Error<br>(deg) | Skill<br>Score | No.<br>Of<br>Cases | Mean<br>Abs.<br>Error<br>(kt) | Mean<br>Alg.<br>Error<br>(kt) | No.<br>Of<br>Cases | Contingency Table |                             |                             |                  |            |            |           |           |          |
|                     |                     |                                |                |                    |                               |                               |                    | Skill<br>Score    | Percent<br>Fcst.<br>Correct | Threat<br>Score<br>(>27 kt) | Bias by Category |            |            |           |           |          |
|                     |                     |                                |                |                    |                               |                               |                    |                   |                             |                             | 1<br>Obs         | 2<br>Obs   | 3<br>Obs   | 4<br>Obs  | 5<br>Obs  | 6<br>Obs |
| 12                  | LFM                 | 23                             | 0.573          | 183                | 3.8                           | 2.3                           | 184                | 0.502             | 86.6                        | 0.00                        | 0.98<br>552      | 0.90<br>69 | 1.63<br>19 | 2.67<br>3 | 2.00<br>1 | *<br>0   |
| 18                  | LFM                 | 23                             | 0.491          | 177                | 4.6                           | 2.7                           | 181                | 0.379             | 83.4                        | 0.00                        | 0.98<br>553      | 1.16<br>63 | 0.81<br>27 | 7.00<br>1 | **<br>0   | *<br>0   |
| 24                  | LFM                 | 25                             | 0.513          | 157                | 4.8                           | 3.5                           | 161                | 0.364             | 84.2                        | 0.00                        | 0.97<br>563      | 1.05<br>57 | 1.50<br>20 | 1.50<br>4 | **<br>0   | *<br>0   |

\* This category was neither forecast nor observed.

\*\* This category was forecast but was not observed.

Table 7.13. Verification of local surface wind for 94 stations in the conterminous U.S. for the FT release time of approximately 0900 UTC.

|               |               | Direction             |             | Speed        |                      |                      |              |             |                       |                       |                  |              |              | Contingency Table |            |            |         |         |         |         |         |         |
|---------------|---------------|-----------------------|-------------|--------------|----------------------|----------------------|--------------|-------------|-----------------------|-----------------------|------------------|--------------|--------------|-------------------|------------|------------|---------|---------|---------|---------|---------|---------|
| Fcst Proj (h) | Type of Fcst. | Mean Abs. Error (deg) | Skill Score | No. of Cases | Mean Abs. Error (kt) | Mean Alg. Error (kt) | No. of Cases | Skill Score | Percent Fcst. Correct | Threat Score (>27 kt) | Bias by Category |              |              |                   |            |            |         |         |         |         |         |         |
|               |               |                       |             |              |                      |                      |              |             |                       |                       | 1                |              | 2            |                   | 3          |            | 4       |         | 5       |         | 6       |         |
|               |               |                       |             |              |                      |                      |              |             |                       |                       | No. Obs          | No. Obs      | No. Obs      | No. Obs           | No. Obs    | No. Obs    | No. Obs | No. Obs | No. Obs | No. Obs | No. Obs | No. Obs |
| 3             | LOCAL         | 21                    | 0.549       | 6170         | 3.4                  | 2.0                  | 6291         | 0.465       | 86.0                  | 0.11                  | 0.98<br>13926    | 1.22<br>1635 | 0.99<br>460  | 0.90<br>103       | 0.68<br>31 | 0.43<br>7  |         |         |         |         |         |         |
| 9             | LOCAL         | 27                    | 0.460       | 9825         | 3.7                  | 1.4                  | 9986         | 0.382       | 71.9                  | 0.13                  | 0.97<br>11560    | 1.21<br>3057 | 0.87<br>1102 | 0.62<br>312       | 0.56<br>89 | 0.42<br>31 |         |         |         |         |         |         |
| 15            | LOCAL         | 32                    | 0.398       | 8893         | 4.4                  | 3.0                  | 9158         | 0.315       | 74.9                  | 0.07                  | 0.90<br>13285    | 1.56<br>2058 | 1.51<br>557  | 0.70<br>201       | 1.27<br>33 | 0.63<br>8  |         |         |         |         |         |         |

Table 7.14. Same as Table 7.13 except for 95 stations for the FT release time of approximately 1800 UTC.

| Speed         |               |                       |             |              |                      |                      |              |             |                       |                       |                  |              |              |             |            |            |         |         |         |         |         |         |
|---------------|---------------|-----------------------|-------------|--------------|----------------------|----------------------|--------------|-------------|-----------------------|-----------------------|------------------|--------------|--------------|-------------|------------|------------|---------|---------|---------|---------|---------|---------|
| Direction     |               |                       |             |              |                      |                      |              |             |                       | Contingency Table     |                  |              |              |             |            |            |         |         |         |         |         |         |
| Fcst Proj (h) | Type of Fcst. | Mean Abs. Error (deg) | Skill Score | No. of Cases | Mean Abs. Error (kt) | Mean Alg. Error (kt) | No. of Cases | Skill Score | Percent Fcst. Correct | Threat Score (>27 kt) | Bias by Category |              |              |             |            |            |         |         |         |         |         |         |
|               |               |                       |             |              |                      |                      |              |             |                       |                       | 1                |              | 2            |             | 3          |            | 4       |         | 5       |         | 6       |         |
|               |               |                       |             |              |                      |                      |              |             |                       |                       | No. Obs          | No. Obs      | No. Obs      | No. Obs     | No. Obs    | No. Obs    | No. Obs | No. Obs | No. Obs | No. Obs | No. Obs | No. Obs |
| 3             | LOCAL         | 23                    | 0.521       | 10257        | 3.2                  | 1.4                  | 10369        | 0.434       | 73.9                  | 0.25                  | 0.96<br>11661    | 1.19<br>3110 | 0.99<br>1101 | 0.79<br>301 | 0.72<br>97 | 0.96<br>23 |         |         |         |         |         |         |
| 9             | LOCAL         | 30                    | 0.426       | 7001         | 4.1                  | 2.5                  | 7206         | 0.344       | 80.7                  | 0.18                  | 0.95<br>13690    | 1.37<br>1747 | 1.07<br>503  | 0.61<br>132 | 0.81<br>31 | 0.42<br>12 |         |         |         |         |         |         |
| 15            | LOCAL         | 30                    | 0.411       | 6258         | 4.2                  | 2.4                  | 6464         | 0.353       | 82.5                  | 0.12                  | 0.97<br>13813    | 1.30<br>1653 | 0.86<br>501  | 0.68<br>113 | 0.75<br>32 | 0.67<br>6  |         |         |         |         |         |         |

Table 7.15. Verification of local surface wind for 23 stations in the Eastern Region for the FT release time of approximately 0900 UTC.

| Fcst Proj<br>(h) | Type of Fcst. | Direction             |             | Speed        |                      |                      |              |                       |             |                       |                  |       |       |       |       |       |
|------------------|---------------|-----------------------|-------------|--------------|----------------------|----------------------|--------------|-----------------------|-------------|-----------------------|------------------|-------|-------|-------|-------|-------|
|                  |               | Mean Abs. Error (deg) | Skill Score | No. of Cases | Mean Abs. Error (kt) | Mean Alg. Error (kt) | No. of Cases | Contingency Table     |             |                       |                  |       |       |       |       |       |
|                  |               |                       |             |              |                      |                      |              | Percent Fcst. Correct | Skill Score | Threat Score (>27 kt) | Bias by Category |       |       |       |       |       |
|                  |               |                       |             |              |                      |                      |              |                       |             |                       | 1 Obs            | 2 Obs | 3 Obs | 4 Obs | 5 Obs | 6 Obs |
|                  |               |                       |             |              |                      |                      |              |                       |             |                       |                  |       |       |       |       |       |
| 3                | LOCAL         | 21                    | 0.526       | 1729         | 3.4                  | 2.2                  | 1778         | 0.465                 | 85.9        | 0.13                  | 0.98             | 1.17  | 1.12  | 1.15  | 0.80  | *     |
|                  |               |                       |             |              |                      |                      |              |                       |             |                       | 3502             | 431   | 110   | 20    | 5     | 0     |
| 9                | LOCAL         | 25                    | 0.454       | 2630         | 3.5                  | 1.3                  | 2661         | 0.383                 | 72.5        | 0.11                  | 0.99             | 1.13  | 0.80  | 0.69  | 0.42  | 3.00  |
|                  |               |                       |             |              |                      |                      |              |                       |             |                       | 2902             | 823   | 276   | 52    | 12    | 1     |
| 15               | LOCAL         | 30                    | 0.384       | 2202         | 4.5                  | 3.3                  | 2294         | 0.314                 | 76.8        | 0.06                  | 0.89             | 1.67  | 1.57  | 0.81  | 0.71  | 1.00  |
|                  |               |                       |             |              |                      |                      |              |                       |             |                       | 3434             | 467   | 111   | 42    | 7     | 3     |

Table 7.16. Same as Table 7.15 except for the FT release time of approximately 1800 UTC.

| Fcst<br>Proj<br>(h) | Direction           |                                | Speed             |                    |                               |                               |                    |                |                             |                             |                  |             |             |            |            |           |            |     |            |     |            |     |
|---------------------|---------------------|--------------------------------|-------------------|--------------------|-------------------------------|-------------------------------|--------------------|----------------|-----------------------------|-----------------------------|------------------|-------------|-------------|------------|------------|-----------|------------|-----|------------|-----|------------|-----|
|                     |                     |                                | Contingency Table |                    |                               |                               |                    |                |                             |                             |                  |             |             |            |            |           |            |     |            |     |            |     |
|                     | Type<br>of<br>Fcst. | Mean<br>Abs.<br>Error<br>(deg) | Skill<br>Score    | No.<br>of<br>Cases | Mean<br>Abs.<br>Error<br>(kt) | Mean<br>Alg.<br>Error<br>(kt) | No.<br>of<br>Cases | Skill<br>Score | Percent<br>Fcst.<br>Correct | Threat<br>Score<br>(>27 kt) | Bias by Category |             |             |            |            |           |            |     |            |     |            |     |
|                     |                     |                                |                   |                    |                               |                               |                    |                |                             |                             | 1                |             | 2           |            | 3          |           | 4          |     | 5          |     | 6          |     |
|                     |                     |                                |                   |                    |                               |                               |                    |                |                             |                             | No.<br>Obs       | Obs         | No.<br>Obs  | Obs        | No.<br>Obs | Obs       | No.<br>Obs | Obs | No.<br>Obs | Obs | No.<br>Obs | Obs |
| 3                   | LOCAL               | 22                             | 0.517             | 2526               | 3.2                           | 1.6                           | 2556               | 0.428          | 76.3                        | 0.14                        | 0.95<br>3081     | 1.23<br>699 | 1.05<br>217 | 0.81<br>53 | 0.90<br>10 | 0.67<br>3 |            |     |            |     |            |     |
| 9                   | LOCAL               | 29                             | 0.410             | 1853               | 4.0                           | 2.5                           | 1901               | 0.335          | 80.6                        | 0.21                        | 0.96<br>3442     | 1.28<br>447 | 1.09<br>134 | 0.70<br>30 | 1.17<br>6  | 1.00<br>2 |            |     |            |     |            |     |
| 15                  | LOCAL               | 29                             | 0.389             | 1717               | 4.2                           | 2.6                           | 1769               | 0.362          | 82.2                        | 0.07                        | 0.96<br>3482     | 1.30<br>427 | 1.02<br>125 | 1.05<br>22 | 1.17<br>6  | 2.00<br>1 |            |     |            |     |            |     |

\* This category was neither forecast nor observed.

Table 7.17. Verification of local surface wind for 26 stations in the Southern Region for the FT release time of approximately 0900 UTC.

| Fcst<br>Proj<br>(h) | Direction           |                                | Speed          |                    |                               |                               |                    |                |                             |                             |                  |                 |                 |                 |                 |                 |
|---------------------|---------------------|--------------------------------|----------------|--------------------|-------------------------------|-------------------------------|--------------------|----------------|-----------------------------|-----------------------------|------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                     |                     |                                |                |                    | Contingency Table             |                               |                    |                |                             |                             |                  |                 |                 |                 |                 |                 |
|                     | Type<br>Of<br>Fcst. | Mean<br>Abs.<br>Error<br>(deg) | Skill<br>Score | No.<br>Of<br>Cases | Mean<br>Abs.<br>Error<br>(kt) | Mean<br>Alg.<br>Error<br>(kt) | No.<br>of<br>Cases | Skill<br>Score | Percent<br>Fcst.<br>Correct | Threat<br>Score<br>(>27 kt) | Bias by Category |                 |                 |                 |                 |                 |
|                     |                     |                                |                |                    |                               |                               |                    |                |                             |                             | 1<br>No.<br>Obs  | 2<br>No.<br>Obs | 3<br>No.<br>Obs | 4<br>No.<br>Obs | 5<br>No.<br>Obs | 6<br>No.<br>Obs |
| 3                   | LOCAL               | 20                             | 0.545          | 1482               | 3.3                           | 2.2                           | 1503               | 0.448          | 87.6                        | 0.25                        | 0.97<br>3854     | 1.27<br>394     | 0.95<br>87      | 1.09<br>11      | 2.00<br>1       | 1.00<br>1       |
| 9                   | LOCAL               | 26                             | 0.474          | 2682               | 3.5                           | 1.4                           | 2711               | 0.355          | 71.8                        | 0.03                        | 0.95<br>3189     | 1.30<br>799     | 0.80<br>256     | 0.61<br>72      | 0.35<br>20      | 0.25<br>4       |
| 15                  | LOCAL               | 29                             | 0.418          | 2286               | 4.2                           | 2.9                           | 2343               | 0.311          | 77.2                        | 0.06                        | 0.91<br>3656     | 1.59<br>517     | 1.26<br>120     | 0.64<br>45      | 1.33<br>6       | 0.00<br>3       |

Table 7.18. Same as Table 7.17 except for 27 stations for the FT release time of approximately 1800 UTC.

| Fcst Proj<br>(h) | Direction     |                       | Speed             |              |                      |                      |              |             |                       |                       |                  |                 |                 |                 |                 |                 |
|------------------|---------------|-----------------------|-------------------|--------------|----------------------|----------------------|--------------|-------------|-----------------------|-----------------------|------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                  | Direction     |                       | Contingency Table |              |                      |                      |              |             |                       |                       |                  |                 |                 |                 |                 |                 |
|                  | Type of Fcst. | Mean Abs. Error (deg) | Skill Score       | No. of Cases | Mean Abs. Error (kt) | Mean Alg. Error (kt) | No. of Cases | Skill Score | Percent Fcst. Correct | Threat Score (>27 kt) | Bias by Category |                 |                 |                 |                 |                 |
|                  |               |                       |                   |              |                      |                      |              |             |                       |                       | 1<br>No.<br>Obs  | 2<br>No.<br>Obs | 3<br>No.<br>Obs | 4<br>No.<br>Obs | 5<br>No.<br>Obs | 6<br>No.<br>Obs |
| 3                | LOCAL         | 23                    | 0.520             | 3033         | 3.1                  | 1.4                  | 3060         | 0.434       | 74.0                  | 0.31                  | 0.95<br>3227     | 1.25<br>875     | 0.96<br>281     | 0.64<br>85      | 0.61<br>23      | 0.67<br>6       |
| 9                | LOCAL         | 28                    | 0.433             | 1677         | 4.0                  | 2.5                  | 1725         | 0.320       | 83.7                  | 0.00                  | 0.97<br>3806     | 1.42<br>398     | 0.80<br>89      | 0.37<br>27      | 0.29<br>7       | 1.00<br>1       |
| 15               | LOCAL         | 27                    | 0.412             | 1420         | 3.9                  | 2.2                  | 1471         | 0.355       | 86.0                  | 0.17                  | 1.00<br>3817     | 1.18<br>396     | 0.58<br>99      | 0.36<br>14      | 0.50<br>4       | **<br>0         |

\*\* This category was forecast but was not observed.

Table 7.19. Verification of local surface wind for 27 stations in the Central Region for the FT release time of approximately 0900 UTC.

| Fcst Proj (h) | Direction     |                       |             |              |                      | Speed                |              |                  |                       |                       |
|---------------|---------------|-----------------------|-------------|--------------|----------------------|----------------------|--------------|------------------|-----------------------|-----------------------|
|               | Direction     |                       |             |              |                      | Contingency Table    |              |                  |                       |                       |
|               | Type of Fcst. | Mean Abs. Error (deg) | Skill Score | No. of Cases | Mean Abs. Error (kt) | Mean Alg. Error (kt) | No. of Cases | Skill Score      | Percent Fcst. Correct | Threat Score (>27 kt) |
| 3             | LOCAL         | 19                    | 0.564       | 2214         | 3.3                  | 1.8                  | 2239         | 0.468            | 81.9                  | 0.11                  |
| 9             | LOCAL         | 26                    | 0.479       | 3231         | 3.6                  | 1.3                  | 3274         | 0.380            | 66.0                  | 0.18                  |
| 15            | LOCAL         | 31                    | 0.393       | 2982         | 4.3                  | 3.0                  | 3040         | 0.304            | 68.2                  | 0.07                  |
|               |               |                       |             |              |                      |                      |              | Bias by Category |                       |                       |
|               |               |                       |             |              |                      |                      |              | 1                | 2                     | 3                     |
|               |               |                       |             |              |                      |                      |              | No. Obs          | No. Obs               | No. Obs               |
|               |               |                       |             |              |                      |                      |              | 3823             | 595                   | 191                   |
|               |               |                       |             |              |                      |                      |              | 0.96             | 1.28                  | 1.02                  |
|               |               |                       |             |              |                      |                      |              | 0.93             | 1.27                  | 1.01                  |
|               |               |                       |             |              |                      |                      |              | 2981             | 1086                  | 417                   |
|               |               |                       |             |              |                      |                      |              | 0.84             | 1.62                  | 1.64                  |
|               |               |                       |             |              |                      |                      |              | 3606             | 742                   | 228                   |
|               |               |                       |             |              |                      |                      |              | 0.61             | 0.87                  | 0.61                  |
|               |               |                       |             |              |                      |                      |              | 0.23             | 0.23                  | 0.33                  |
|               |               |                       |             |              |                      |                      |              | 0.67             | 0.67                  | 0.24                  |
|               |               |                       |             |              |                      |                      |              | 0.46             | 0.46                  | 0.21                  |
|               |               |                       |             |              |                      |                      |              | 1.41             | 0.72                  | 1.41                  |
|               |               |                       |             |              |                      |                      |              | 0.50             | 0.50                  | 0.50                  |
|               |               |                       |             |              |                      |                      |              | 1.17             | 0.81                  | 1.17                  |
|               |               |                       |             |              |                      |                      |              | 0.23             | 0.23                  | 0.33                  |

Table 7.20. Same as Table 7.19 except for the FT release time of approximately 1800 UTC.

| Fcst Proj (h) | Direction     |                       |             |              |                      | Speed                |              |                  |                       |                       |
|---------------|---------------|-----------------------|-------------|--------------|----------------------|----------------------|--------------|------------------|-----------------------|-----------------------|
|               | Direction     |                       |             |              |                      | Contingency Table    |              |                  |                       |                       |
|               | Type of Fcst. | Mean Abs. Error (deg) | Skill Score | No. of Cases | Mean Abs. Error (kt) | Mean Alg. Error (kt) | No. of Cases | Skill Score      | Percent Fcst. Correct | Threat Score (>27 kt) |
| 3             | LOCAL         | 21                    | 0.539       | 3281         | 3.1                  | 1.1                  | 3303         | 0.425            | 68.2                  | 0.24                  |
| 9             | LOCAL         | 28                    | 0.433       | 2471         | 4.0                  | 2.3                  | 2526         | 0.361            | 75.9                  | 0.19                  |
| 15            | LOCAL         | 28                    | 0.416       | 2289         | 4.1                  | 2.3                  | 2350         | 0.358            | 77.5                  | 0.15                  |
|               |               |                       |             |              |                      |                      |              | Bias by Category |                       |                       |
|               |               |                       |             |              |                      |                      |              | 1                | 2                     | 3                     |
|               |               |                       |             |              |                      |                      |              | No. Obs          | No. Obs               | No. Obs               |
|               |               |                       |             |              |                      |                      |              | 2948             | 1118                  | 456                   |
|               |               |                       |             |              |                      |                      |              | 0.94             | 1.20                  | 0.96                  |
|               |               |                       |             |              |                      |                      |              | 0.92             | 1.50                  | 1.14                  |
|               |               |                       |             |              |                      |                      |              | 3775             | 637                   | 205                   |
|               |               |                       |             |              |                      |                      |              | 0.94             | 1.44                  | 1.00                  |
|               |               |                       |             |              |                      |                      |              | 3820             | 597                   | 189                   |
|               |               |                       |             |              |                      |                      |              | 0.57             | 0.66                  | 0.57                  |
|               |               |                       |             |              |                      |                      |              | 0.21             | 0.56                  | 0.21                  |
|               |               |                       |             |              |                      |                      |              | 1.20             | 0.79                  | 1.20                  |
|               |               |                       |             |              |                      |                      |              | 1.0              | 0.48                  | 1.0                   |
|               |               |                       |             |              |                      |                      |              | 0.14             | 1.00                  | 0.14                  |
|               |               |                       |             |              |                      |                      |              | 0.12             | 0.56                  | 0.12                  |
|               |               |                       |             |              |                      |                      |              | 0.25             | 0.66                  | 0.25                  |
|               |               |                       |             |              |                      |                      |              | 0.4              | 0.21                  | 0.4                   |

Table 7.21. Verification of local surface wind for 18 stations in the Western Region for the FT release time of approximately 0900 UTC.

| Fcst Proj<br>(h) | Direction           |                                | Speed             |                    |                               |                               |                    |                |                             |                             |                  |             |             |            |            |           |
|------------------|---------------------|--------------------------------|-------------------|--------------------|-------------------------------|-------------------------------|--------------------|----------------|-----------------------------|-----------------------------|------------------|-------------|-------------|------------|------------|-----------|
|                  |                     |                                | Contingency Table |                    |                               |                               |                    |                |                             |                             |                  |             |             |            |            |           |
|                  | Type<br>Of<br>Fcst. | Mean<br>Abs.<br>Error<br>(deg) | Skill<br>Score    | No.<br>Of<br>Cases | Mean<br>Abs.<br>Error<br>(kt) | Mean<br>Alg.<br>Error<br>(kt) | No.<br>Of<br>Cases | Skill<br>Score | Percent<br>Fcst.<br>Correct | Threat<br>Score<br>(>27 kt) | Bias by Category |             |             |            |            |           |
|                  |                     |                                |                   |                    |                               |                               |                    |                |                             |                             | 1<br>Obs         | 2<br>Obs    | 3<br>Obs    | 4<br>Obs   | 5<br>Obs   | 6<br>Obs  |
|                  |                     |                                |                   |                    |                               |                               |                    |                |                             |                             |                  |             |             |            |            |           |
| 3                | LOCAL               | 26                             | 0.491             | 745                | 3.8                           | 1.7                           | 771                | 0.456          | 90.0                        | 0.00                        | 1.01<br>2747     | 1.05<br>215 | 0.78<br>72  | 0.65<br>20 | 0.50<br>2  | 0.33<br>3 |
| 9                | LOCAL               | 40                             | 0.345             | 1282               | 4.6                           | 2.0                           | 1340               | 0.356          | 80.4                        | 0.08                        | 1.03<br>2488     | 1.02<br>349 | 0.72<br>153 | 0.46<br>52 | 0.64<br>11 | 0.80<br>5 |
| 15               | LOCAL               | 41                             | 0.348             | 1423               | 4.6                           | 3.1                           | 1481               | 0.312          | 79.6                        | 0.13                        | 0.96<br>2589     | 1.23<br>332 | 1.43<br>98  | 0.61<br>33 | 1.67<br>3  | **<br>0   |

Table 7.22. Same as Table 7.21 except for the FT release time of approximately 1800 UTC.

|  |  | Direction |  | Speed |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|--|--|-----------|--|-------|--|-------------------|--|--|--|--|--|--|--|--|--|--|--|
|  |  |           |  |       |  | Contingency Table |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |
|  |  |           |  |       |  |                   |  |  |  |  |  |  |  |  |  |  |  |

\*\* This category was forecast but was not observed.

Table 7.23. Verification of local surface wind for 6 stations in the Alaska Region for the FT release time of approximately 0900 UTC.

| Fcst Proj<br>(h) | Direction        |                             | Speed          |                    |                            |                            |                   |                             |                             |                  |             |            |            |           |          |   |
|------------------|------------------|-----------------------------|----------------|--------------------|----------------------------|----------------------------|-------------------|-----------------------------|-----------------------------|------------------|-------------|------------|------------|-----------|----------|---|
|                  | Type Of<br>Fcst. | Mean<br>Abs. Error<br>(deg) | Skill<br>Score | No.<br>Of<br>Cases | Mean<br>Abs. Error<br>(kt) | Mean<br>Alg. Error<br>(kt) | Contingency Table |                             |                             |                  |             |            |            |           |          |   |
|                  |                  |                             |                |                    |                            |                            | Skill<br>Score    | Percent<br>Fcst.<br>Correct | Threat<br>Score<br>(>27 kt) | Bias by Category |             |            |            |           |          |   |
|                  |                  |                             |                |                    |                            |                            |                   |                             |                             | 1<br>Obs         | 2<br>Obs    | 3<br>Obs   | 4<br>Obs   | 5<br>Obs  | 6<br>Obs |   |
| 3                | LOCAL            | 19                          | 0.564          | 225                | 3.3                        | 1.9                        |                   | 0.510                       | 88.9                        | *                | 1.00<br>597 | 1.02<br>61 | 1.00<br>20 | 0.80<br>5 | *        | 0 |
| 9                | LOCAL            | 27                          | 0.462          | 212                | 4.0                        | 2.7                        |                   | 0.407                       | 86.4                        | *                | 1.01<br>564 | 0.90<br>62 | 1.11<br>19 | 1.33<br>3 | *        | 0 |
| 15               | LOCAL            | 29                          | 0.416          | 244                | 4.1                        | 2.3                        |                   | 0.414                       | 85.9                        | 0.00             | 1.01<br>576 | 0.94<br>70 | 1.06<br>17 | 0.60<br>5 | *<br>1   | 0 |

Table 7.24. Same as Table 7.23 except for the FT release time of approximately 1800 UTC.

| Fcst. Proj<br>(h) | Direction     |                       |             |              | Speed                |                      |                   |                       |                       |       |       |       |                  |       |       |  |  |
|-------------------|---------------|-----------------------|-------------|--------------|----------------------|----------------------|-------------------|-----------------------|-----------------------|-------|-------|-------|------------------|-------|-------|--|--|
|                   | Type Of Fcst. | Mean Abs. Error (deg) | Skill Score | No. Of Cases | Mean Abs. Error (kt) | Mean Alg. Error (kt) | Contingency Table |                       |                       |       |       |       | Bias by Category |       |       |  |  |
|                   |               |                       |             |              |                      |                      | Skill Score       | Percent Fcst. Correct | Threat Score (>27 kt) | 1 Obs | 2 Obs | 3 Obs | 4 Obs            | 5 Obs | 6 Obs |  |  |
| 3                 | LOCAL         | 29                    | 0.428       | 274          | 3.8                  | 2.6                  | 0.441             | 85.5                  | 0.50                  | 0.98  | 1.16  | 1.11  | 0.25             | 2.00  | *     |  |  |
|                   |               |                       |             |              |                      |                      |                   |                       |                       | 572   | 69    | 18    | 4                | 1     | 0     |  |  |
| 9                 | LOCAL         | 35                    | 0.297       | 263          | 4.9                  | 3.6                  | 0.308             | 81.9                  | 0.00                  | 0.97  | 1.29  | 0.85  | 0.00             | **    | *     |  |  |
|                   |               |                       |             |              |                      |                      |                   |                       |                       | 577   | 63    | 27    | 1                | 0     | 0     |  |  |
| 15                | LOCAL         | 41                    | 0.340       | 269          | 5.4                  | 3.9                  | 0.271             | 81.4                  | 0.00                  | 0.95  | 1.42  | 1.15  | 0.20             | **    | *     |  |  |
|                   |               |                       |             |              |                      |                      |                   |                       |                       | 599   | 59    | 20    | 5                | 0     | 0     |  |  |

\* This category was neither forecast nor observed.

\*\* This category was forecast but was not observed.

Table 7.25. Comparative verification of local and NGM MOS 42-h significant wind forecasts for 94 stations in the conterminous U.S., 0000 UTC cycle.

| Type of Verifying Observation | Type of Forecast | Bias by Category |              | Skill Score | Percent Forecast Correct | Threat Score $\geq 22$ kt |
|-------------------------------|------------------|------------------|--------------|-------------|--------------------------|---------------------------|
|                               |                  | < 22 kt          | $\geq 22$ kt |             |                          |                           |
| 1-min Avg                     | LOCAL            | 0.95             | 2.39         | 0.254       | 91.5                     | 0.17                      |
|                               | NGM MOS          | 1.00             | 1.14         | 0.332       | 95.1                     | 0.22                      |
|                               | No. Obs.         | 15445            | 567          |             |                          |                           |
| $\pm$ 3-h Max                 | LOCAL            | 1.00             | 1.00         | 0.348       | 89.9                     | 0.25                      |
|                               | NGM MOS          | 1.05             | 0.48         | 0.364       | 92.5                     | 0.25                      |
|                               | No. Obs.         | 14660            | 1352         |             |                          |                           |

Table 7.26. Same as Table 7.25 except for 93 stations for the 1200 UTC cycle.

| Type of Verifying Observation | Type of Forecast | Bias by Category |              | Skill Score | Percent Forecast Correct | Threat Score $\geq 22$ kt |
|-------------------------------|------------------|------------------|--------------|-------------|--------------------------|---------------------------|
|                               |                  | < 22 kt          | $\geq 22$ kt |             |                          |                           |
| 1-min Avg                     | LOCAL            | 0.95             | 4.40         | 0.120       | 93.4                     | 0.08                      |
|                               | NGM MOS          | 1.00             | 1.09         | 0.284       | 97.9                     | 0.17                      |
|                               | No. Obs.         | 15629            | 224          |             |                          |                           |
| $\pm$ 3-h Max                 | LOCAL            | 0.98             | 1.45         | 0.216       | 92.2                     | 0.15                      |
|                               | NGM MOS          | 1.03             | 0.36         | 0.253       | 95.7                     | 0.16                      |
|                               | No. Obs.         | 15172            | 680          |             |                          |                           |



Table 7.27. Comparative verification of local and LFM MOS 42-h significant wind forecasts for 6 stations in the Alaska Region, 0000 UTC cycle.

| Type of Verifying Observation | Type of Forecast | Bias by Category |              | Skill Score | Percent Forecast Correct | Threat Score $\geq 22$ kt |
|-------------------------------|------------------|------------------|--------------|-------------|--------------------------|---------------------------|
|                               |                  | < 22 kt          | $\geq 22$ kt |             |                          |                           |
| 1-min Avg                     | LOCAL            | 0.95             | 5.29         | 0.000       | 92.4                     | 0.00                      |
|                               | NGM MOS          | 1.00             | 1.14         | 0.122       | 97.8                     | 0.07                      |
|                               | No. Obs.         | 575              | 7            |             |                          |                           |
| $\pm 3$ -h Max                | LOCAL            | 0.95             | 3.08         | 0.008       | 91.5                     | 0.02                      |
|                               | NGM MOS          | 1.01             | 0.67         | 0.186       | 97.1                     | 0.11                      |
|                               | No. Obs.         | 542              | 12           |             |                          |                           |

Table 7.28. Same as Table 7.27 except for the 1200 UTC cycle.

| Type of Verifying Observation | Type of Forecast | Bias by Category |              | Skill Score | Percent Forecast Correct | Threat Score $\geq 22$ kt |
|-------------------------------|------------------|------------------|--------------|-------------|--------------------------|---------------------------|
|                               |                  | < 22 kt          | $\geq 22$ kt |             |                          |                           |
| 1-min Avg                     | LOCAL            | 0.95             | 7.00         | 0.036       | 93.9                     | 0.03                      |
|                               | NGM MOS          | 0.98             | 3.00         | 0.000       | 96.8                     | 0.00                      |
|                               | No. Obs.         | 613              | 5            |             |                          |                           |
| $\pm 3$ -h Max                | LOCAL            | 0.96             | 2.33         | 0.129       | 92.8                     | 0.09                      |
|                               | NGM MOS          | 1.00             | 1.00         | 0.111       | 95.6                     | 0.07                      |
|                               | No. Obs.         | 570              | 15           |             |                          |                           |

Table 8.1. Comparative verification of NGM MOS and persistence ceiling height forecasts for 94 stations in the conterminous U.S., 0000 UTC cycle.

| Projection<br>(h) | Type of<br>Forecast | Bias by Category |      |      |      | Log<br>Score | Percent<br>Correct | Skill<br>Score |
|-------------------|---------------------|------------------|------|------|------|--------------|--------------------|----------------|
|                   |                     | 1                | 2    | 3    | 4    |              |                    |                |
| 12                | NGM MOS             | 0.85             | 1.09 | 1.14 | 0.97 | 3.406        | 72.1               | 0.402          |
|                   | PERSISTENCE         | 0.89             | 0.91 | 0.97 | 1.03 | 2.166        | 80.6               | 0.565          |
|                   | No. Obs.            | 612              | 555  | 1472 | 6603 |              |                    |                |
| 15                | NGM MOS             | 1.05             | 1.15 | 1.09 | 0.96 | 3.613        | 70.1               | 0.381          |
|                   | PERSISTENCE         | 1.01             | 0.76 | 0.88 | 1.05 | 2.938        | 74.8               | 0.435          |
|                   | No. Obs.            | 500              | 617  | 1548 | 6344 |              |                    |                |
| 18                | NGM MOS             | 1.05             | 1.32 | 1.11 | 0.95 | 2.920        | 71.8               | 0.377          |
|                   | PERSISTENCE         | 1.80             | 0.93 | 0.85 | 1.01 | 3.271        | 71.4               | 0.332          |
|                   | No. Obs.            | 278              | 514  | 1618 | 6548 |              |                    |                |
| 24                | NGM MOS             | 0.86             | 1.22 | 1.14 | 0.97 | 2.412        | 75.9               | 0.342          |
|                   | PERSISTENCE         | 2.18             | 1.21 | 1.05 | 0.94 | 3.520        | 70.2               | 0.221          |
|                   | No. Obs.            | 218              | 380  | 1270 | 7167 |              |                    |                |

Table 8.2. Same as Table 8.1 except for the 1200 UTC cycle.

| Projection<br>(h) | Type of<br>Forecast | Bias by Category |      |      |      | Log<br>Score | Percent<br>Correct | Skill<br>Score |
|-------------------|---------------------|------------------|------|------|------|--------------|--------------------|----------------|
|                   |                     | 1                | 2    | 3    | 4    |              |                    |                |
| 12                | NGM MOS             | 1.28             | 1.24 | 1.08 | 0.96 | 2.415        | 77.2               | 0.397          |
|                   | PERSISTENCE         | 1.00             | 1.13 | 1.12 | 0.97 | 1.549        | 83.5               | 0.556          |
|                   | No. Obs.            | 253              | 427  | 1456 | 7884 |              |                    |                |
| 15                | NGM MOS             | 1.12             | 1.35 | 1.07 | 0.96 | 2.765        | 75.8               | 0.354          |
|                   | PERSISTENCE         | 0.75             | 1.06 | 1.14 | 0.98 | 2.098        | 79.5               | 0.433          |
|                   | No. Obs.            | 290              | 390  | 1185 | 7044 |              |                    |                |
| 18                | NGM MOS             | 0.86             | 1.37 | 1.08 | 0.97 | 3.171        | 73.3               | 0.344          |
|                   | PERSISTENCE         | 0.54             | 1.04 | 1.05 | 1.02 | 2.837        | 74.6               | 0.337          |
|                   | No. Obs.            | 422              | 416  | 1321 | 6954 |              |                    |                |
| 24                | NGM MOS             | 0.85             | 1.15 | 1.11 | 0.98 | 3.875        | 69.3               | 0.339          |
|                   | PERSISTENCE         | 0.38             | 0.77 | 0.96 | 1.09 | 3.869        | 68.5               | 0.242          |
|                   | No. Obs.            | 588              | 549  | 1438 | 6465 |              |                    |                |

Table 8.3. Comparative verification of LFM MOS and persistence ceiling height forecasts for 6 stations in the Alaska Region, 0000 UTC cycle.

| Projection<br>(h) | Type of<br>Forecast | Bias by Category |      |      |      | Log<br>Score | Percent<br>Correct | Skill<br>Score |
|-------------------|---------------------|------------------|------|------|------|--------------|--------------------|----------------|
|                   |                     | 1                | 2    | 3    | 4    |              |                    |                |
| 12                | LFM MOS             | 0.62             | 0.63 | 2.02 | 0.89 | 2.528        | 74.3               | 0.263          |
|                   | PERSISTENCE         | 1.08             | 0.79 | 1.14 | 0.99 | 1.695        | 85.0               | 0.485          |
|                   | No. Obs.            | 13               | 19   | 64   | 496  |              |                    |                |
| 18                | LFM MOS             | 0.27             | 1.00 | 2.03 | 0.88 | 2.475        | 73.6               | 0.253          |
|                   | PERSISTENCE         | 0.93             | 1.33 | 1.09 | 0.98 | 2.310        | 79.8               | 0.309          |
|                   | No. Obs.            | 15               | 12   | 70   | 506  |              |                    |                |
| 24                | LFM MOS             | 0.00             | 0.32 | 1.89 | 0.91 | 1.760        | 77.3               | 0.345          |
|                   | PERSISTENCE         | 2.80             | 0.73 | 1.01 | 0.99 | 2.528        | 75.8               | 0.193          |
|                   | No. Obs.            | 5                | 22   | 75   | 496  |              |                    |                |

Table 8.4. Same as Table 8.3 except for the 1200 UTC cycle.

| Projection<br>(h) | Type of<br>Forecast | Bias by Category |      |      |      | Log<br>Score | Percent<br>Correct | Skill<br>Score |
|-------------------|---------------------|------------------|------|------|------|--------------|--------------------|----------------|
|                   |                     | 1                | 2    | 3    | 4    |              |                    |                |
| 12                | LFM MOS             | 1.80             | 0.81 | 1.67 | 0.90 | 2.164        | 76.0               | 0.312          |
|                   | PERSISTENCE         | 2.80             | 0.67 | 1.11 | 0.98 | 1.492        | 85.4               | 0.516          |
|                   | No. Obs.            | 5                | 21   | 79   | 524  |              |                    |                |
| 18                | LFM MOS             | 1.00             | 1.08 | 1.96 | 0.87 | 2.549        | 75.0               | 0.270          |
|                   | PERSISTENCE         | 1.00             | 1.17 | 1.26 | 0.96 | 1.940        | 82.2               | 0.380          |
|                   | No. Obs.            | 12               | 12   | 69   | 531  |              |                    |                |
| 24                | LFM MOS             | 0.73             | 0.74 | 1.78 | 0.92 | 2.917        | 71.7               | 0.175          |
|                   | PERSISTENCE         | 0.87             | 0.57 | 1.31 | 0.98 | 2.560        | 76.3               | 0.224          |
|                   | No. Obs.            | 15               | 23   | 67   | 516  |              |                    |                |

Table 8.5. Comparative verification of local and persistence ceiling height forecasts for 94 stations in the conterminous U.S. for the FT release time of approximately 0900 UTC.

| Projection<br>(h) | Type of<br>Forecast | Bias by Category |      |      |       | Log<br>Score | Percent<br>Correct | Skill<br>Score |
|-------------------|---------------------|------------------|------|------|-------|--------------|--------------------|----------------|
|                   |                     | 1                | 2    | 3    | 4     |              |                    |                |
| 3                 | LOCAL               | 0.73             | 0.94 | 1.15 | 1.00  | 1.964        | 82.4               | 0.538          |
|                   | PERSISTENCE         | 0.86             | 0.90 | 0.96 | 1.02  | 1.779        | 84.4               | 0.576          |
|                   | No. Obs.            | 819              | 774  | 2064 | 12481 |              |                    |                |
| 6                 | LOCAL               | 0.38             | 0.78 | 1.20 | 1.01  | 2.342        | 78.9               | 0.449          |
|                   | PERSISTENCE         | 0.95             | 0.83 | 0.88 | 1.04  | 2.471        | 79.1               | 0.444          |
|                   | No. Obs.            | 737              | 838  | 2255 | 12295 |              |                    |                |
| 9                 | LOCAL               | 0.26             | 0.61 | 1.13 | 1.02  | 1.856        | 80.4               | 0.433          |
|                   | PERSISTENCE         | 1.85             | 0.98 | 0.83 | 1.01  | 2.664        | 76.6               | 0.347          |
|                   | No. Obs.            | 379              | 713  | 2379 | 12655 |              |                    |                |
| 15                | LOCAL               | 0.31             | 0.77 | 1.44 | 0.97  | 1.717        | 81.2               | 0.379          |
|                   | PERSISTENCE         | 2.24             | 1.41 | 1.10 | 0.94  | 2.988        | 74.9               | 0.218          |
|                   | No. Obs.            | 312              | 493  | 1800 | 13508 |              |                    |                |

Table 8.6. Same as Table 8.5 except for 95 stations for the FT release time of approximately 1800 UTC.

| Projection<br>(h) | Type of<br>Forecast | Bias by Category |      |      |       | Log<br>Score | Percent<br>Correct | Skill<br>Score |
|-------------------|---------------------|------------------|------|------|-------|--------------|--------------------|----------------|
|                   |                     | 1                | 2    | 3    | 4     |              |                    |                |
| 3                 | LOCAL               | 0.64             | 0.93 | 1.19 | 0.98  | 1.277        | 85.5               | 0.540          |
|                   | PERSISTENCE         | 1.36             | 1.31 | 1.16 | 0.96  | 1.394        | 85.0               | 0.550          |
|                   | No. Obs.            | 278              | 543  | 2059 | 13394 |              |                    |                |
| 6                 | LOCAL               | 0.45             | 1.00 | 1.35 | 0.97  | 1.496        | 83.7               | 0.458          |
|                   | PERSISTENCE         | 1.21             | 1.45 | 1.33 | 0.94  | 1.862        | 80.9               | 0.407          |
|                   | No. Obs.            | 311              | 488  | 1788 | 13507 |              |                    |                |
| 9                 | LOCAL               | 0.43             | 1.00 | 1.46 | 0.96  | 1.814        | 81.5               | 0.416          |
|                   | PERSISTENCE         | 0.95             | 1.33 | 1.35 | 0.94  | 2.238        | 78.2               | 0.334          |
|                   | No. Obs.            | 397              | 533  | 1755 | 13408 |              |                    |                |
| 15                | LOCAL               | 0.48             | 1.06 | 1.49 | 0.95  | 2.578        | 76.3               | 0.376          |
|                   | PERSISTENCE         | 0.54             | 1.02 | 1.21 | 0.99  | 3.024        | 73.6               | 0.261          |
|                   | No. Obs.            | 694              | 694  | 1964 | 12736 |              |                    |                |

Table 8.7. Comparative verification of local and persistence ceiling height forecasts for 6 stations in the Alaska Region for the FT release time of approximately 0900 UTC.

| Projection<br>(h) | Type of<br>Forecast | Bias by Category |      |      |      | Log<br>Score | Percent<br>Correct | Skill<br>Score |
|-------------------|---------------------|------------------|------|------|------|--------------|--------------------|----------------|
|                   |                     | 1                | 2    | 3    | 4    |              |                    |                |
| 3                 | LOCAL               | 0.76             | 0.43 | 1.31 | 0.99 | 1.549        | 83.6               | 0.455          |
|                   | PERSISTENCE         | 0.88             | 0.78 | 1.11 | 1.00 | 1.671        | 85.6               | 0.516          |
|                   | No. Obs.            | 17               | 23   | 72   | 548  |              |                    |                |
| 6                 | LOCAL               | 0.50             | 0.45 | 1.33 | 1.00 | 2.250        | 79.8               | 0.328          |
|                   | PERSISTENCE         | 0.68             | 0.85 | 1.14 | 1.00 | 2.225        | 82.3               | 0.410          |
|                   | No. Obs.            | 22               | 20   | 70   | 538  |              |                    |                |
| 9                 | LOCAL               | 0.41             | 0.47 | 1.13 | 1.02 | 2.088        | 80.7               | 0.297          |
|                   | PERSISTENCE         | 0.82             | 1.20 | 1.07 | 0.99 | 2.360        | 80.1               | 0.320          |
|                   | No. Obs.            | 17               | 15   | 71   | 524  |              |                    |                |
| 15                | LOCAL               | 0.00             | 0.22 | 0.97 | 1.05 | 1.598        | 81.4               | 0.291          |
|                   | PERSISTENCE         | 2.50             | 0.78 | 1.01 | 0.99 | 2.554        | 75.6               | 0.189          |
|                   | No. Obs.            | 6                | 23   | 79   | 528  |              |                    |                |

Table 8.8. Same as Table 8.7 except for the FT release time of approximately 1800 UTC.

| Projection<br>(h) | Type of<br>Forecast | Bias by Category |      |      |      | Log<br>Score | Percent<br>Correct | Skill<br>Score |
|-------------------|---------------------|------------------|------|------|------|--------------|--------------------|----------------|
|                   |                     | 1                | 2    | 3    | 4    |              |                    |                |
| 3                 | LOCAL               | 0.50             | 0.17 | 0.88 | 1.06 | 1.537        | 82.1               | 0.298          |
|                   | PERSISTENCE         | 2.67             | 0.58 | 1.12 | 0.98 | 1.562        | 85.1               | 0.511          |
|                   | No. Obs.            | 6                | 24   | 77   | 526  |              |                    |                |
| 6                 | LOCAL               | 0.10             | 0.13 | 0.77 | 1.08 | 1.652        | 81.2               | 0.285          |
|                   | PERSISTENCE         | 1.60             | 0.93 | 0.96 | 1.00 | 1.865        | 82.0               | 0.430          |
|                   | No. Obs.            | 10               | 15   | 90   | 507  |              |                    |                |
| 9                 | LOCAL               | 0.07             | 0.13 | 1.12 | 1.03 | 1.740        | 81.5               | 0.292          |
|                   | PERSISTENCE         | 1.07             | 1.00 | 1.22 | 0.97 | 2.089        | 81.6               | 0.396          |
|                   | No. Obs.            | 14               | 15   | 74   | 528  |              |                    |                |
| 15                | LOCAL               | 0.12             | 0.04 | 1.27 | 1.04 | 2.394        | 76.9               | 0.164          |
|                   | PERSISTENCE         | 0.88             | 0.60 | 1.27 | 0.99 | 2.651        | 76.1               | 0.229          |
|                   | No. Obs.            | 17               | 25   | 70   | 533  |              |                    |                |

Table 9.1. Comparative verification of NGM MOS and persistence visibility forecasts for 94 stations in the conterminous U.S., 0000 UTC cycle.

| Projection<br>(h) | Type of<br>Forecast | Bias by Category |      |      |       | Log<br>Score | Percent<br>Correct | Skill<br>Score |
|-------------------|---------------------|------------------|------|------|-------|--------------|--------------------|----------------|
|                   |                     | 1                | 2    | 3    | 4     |              |                    |                |
| 12                | NGM MOS             | 1.14             | 1.16 | 1.01 | 0.98  | 2.434        | 79.9               | 0.345          |
|                   | PERSISTENCE         | 0.78             | 0.92 | 0.88 | 1.03  | 1.560        | 85.8               | 0.496          |
|                   | No. Obs.            | 526              | 710  | 1452 | 13267 |              |                    |                |
| 15                | NGM MOS             | 1.17             | 1.13 | 1.23 | 0.96  | 2.702        | 78.3               | 0.337          |
|                   | PERSISTENCE         | 0.76             | 0.67 | 1.06 | 1.03  | 2.276        | 81.4               | 0.344          |
|                   | No. Obs.            | 538              | 977  | 1216 | 13180 |              |                    |                |
| 18                | NGM MOS             | 0.98             | 1.11 | 1.36 | 0.97  | 1.967        | 83.4               | 0.346          |
|                   | PERSISTENCE         | 1.19             | 0.82 | 1.45 | 0.98  | 2.339        | 81.3               | 0.253          |
|                   | No. Obs.            | 347              | 802  | 890  | 13894 |              |                    |                |
| 24                | NGM MOS             | 1.03             | 1.12 | 1.21 | 0.98  | 1.550        | 86.4               | 0.337          |
|                   | PERSISTENCE         | 1.79             | 1.13 | 1.55 | 0.95  | 2.367        | 81.0               | 0.173          |
|                   | No. Obs.            | 229              | 575  | 828  | 14206 |              |                    |                |

Table 9.2. Same as Table 9.1 except for the 1200 UTC cycle.

| Projection<br>(h) | Type of<br>Forecast | Bias by Category |      |      |       | Log<br>Score | Percent<br>Correct | Skill<br>Score |
|-------------------|---------------------|------------------|------|------|-------|--------------|--------------------|----------------|
|                   |                     | 1                | 2    | 3    | 4     |              |                    |                |
| 12                | NGM MOS             | 1.07             | 1.18 | 1.20 | 0.98  | 1.468        | 87.0               | 0.364          |
|                   | PERSISTENCE         | 1.28             | 1.23 | 0.93 | 0.99  | 1.162        | 89.8               | 0.481          |
|                   | No. Obs.            | 221              | 577  | 825  | 14301 |              |                    |                |
| 15                | NGM MOS             | 1.18             | 1.12 | 1.07 | 0.99  | 1.552        | 86.5               | 0.349          |
|                   | PERSISTENCE         | 1.28             | 1.41 | 0.79 | 1.00  | 1.550        | 86.7               | 0.341          |
|                   | No. Obs.            | 217              | 504  | 967  | 14072 |              |                    |                |
| 18                | NGM MOS             | 0.99             | 1.07 | 1.01 | 1.00  | 1.923        | 83.8               | 0.323          |
|                   | PERSISTENCE         | 0.81             | 1.26 | 0.66 | 1.02  | 2.034        | 83.7               | 0.263          |
|                   | No. Obs.            | 349              | 568  | 1161 | 13874 |              |                    |                |
| 24                | NGM MOS             | 1.12             | 1.13 | 0.98 | 0.99  | 2.555        | 79.7               | 0.332          |
|                   | PERSISTENCE         | 0.54             | 0.99 | 0.53 | 1.07  | 2.760        | 79.0               | 0.171          |
|                   | No. Obs.            | 529              | 722  | 1451 | 13329 |              |                    |                |

Table 9.3. Comparative verification of LFM MOS and persistence visibility forecasts for 6 stations in the Alaska Region, 0000 UTC cycle.

| Projection<br>(h) | Type of<br>Forecast | Bias by Category |      |      |      | Log<br>Score | Percent<br>Correct | Skill<br>Score |
|-------------------|---------------------|------------------|------|------|------|--------------|--------------------|----------------|
|                   |                     | 1                | 2    | 3    | 4    |              |                    |                |
| 12                | LFM MOS             | 0.36             | 1.65 | 0.47 | 1.04 | 2.049        | 82.8               | 0.093          |
|                   | PERSISTENCE         | 1.09             | 0.76 | 0.65 | 1.03 | 1.334        | 88.4               | 0.392          |
|                   | No. Obs.            | 11               | 17   | 43   | 535  |              |                    |                |
| 18                | LFM MOS             | 0.50             | 0.91 | 1.47 | 0.99 | 2.319        | 81.4               | 0.199          |
|                   | PERSISTENCE         | 0.65             | 0.64 | 0.85 | 1.04 | 2.084        | 84.2               | 0.208          |
|                   | No. Obs.            | 20               | 22   | 34   | 538  |              |                    |                |
| 24                | LFM MOS             | 0.55             | 0.96 | 1.30 | 1.00 | 1.711        | 87.0               | 0.277          |
|                   | PERSISTENCE         | 1.18             | 0.58 | 1.26 | 1.00 | 2.333        | 82.8               | 0.026          |
|                   | No. Obs.            | 11               | 24   | 23   | 548  |              |                    |                |

Table 9.4. Same as Table 9.3 except for the 1200 UTC cycle.

| Projection<br>(h) | Type of<br>Forecast | Bias by Category |      |      |      | Log<br>Score | Percent<br>Correct | Skill<br>Score |
|-------------------|---------------------|------------------|------|------|------|--------------|--------------------|----------------|
|                   |                     | 1                | 2    | 3    | 4    |              |                    |                |
| 12                | LFM MOS             | 0.80             | 0.80 | 1.74 | 0.98 | 1.742        | 86.1               | 0.251          |
|                   | PERSISTENCE         | 1.80             | 0.96 | 1.39 | 0.97 | 1.481        | 88.5               | 0.406          |
|                   | No. Obs.            | 10               | 25   | 23   | 576  |              |                    |                |
| 18                | LFM MOS             | 0.50             | 1.33 | 1.29 | 0.99 | 1.642        | 85.5               | 0.156          |
|                   | PERSISTENCE         | 1.42             | 2.67 | 0.94 | 0.97 | 1.643        | 86.1               | 0.262          |
|                   | No. Obs.            | 12               | 9    | 34   | 578  |              |                    |                |
| 24                | LFM MOS             | 0.92             | 0.56 | 1.48 | 0.98 | 2.278        | 80.4               | 0.154          |
|                   | PERSISTENCE         | 1.31             | 1.22 | 0.75 | 1.01 | 2.441        | 82.1               | 0.164          |
|                   | No. Obs.            | 13               | 18   | 44   | 558  |              |                    |                |

Table 9.5. Comparative verification of local and persistence visibility forecasts for 94 stations in the conterminous U.S. for the FT release time of approximately 0900 UTC.

| Projection<br>(h) | Type of<br>Forecast | Bias by Category |      |      |       | Log<br>Score | Percent<br>Correct | Skill<br>Score |
|-------------------|---------------------|------------------|------|------|-------|--------------|--------------------|----------------|
|                   |                     | 1                | 2    | 3    | 4     |              |                    |                |
| 3                 | LOCAL               | 0.71             | 0.80 | 1.14 | 1.01  | 1.734        | 83.7               | 0.435          |
|                   | PERSISTENCE         | 0.80             | 0.90 | 0.92 | 1.02  | 1.538        | 86.1               | 0.504          |
|                   | No. Obs.            | 545              | 727  | 1415 | 13450 |              |                    |                |
| 6                 | LOCAL               | 0.27             | 0.48 | 1.05 | 1.07  | 2.168        | 81.4               | 0.313          |
|                   | PERSISTENCE         | 0.77             | 0.64 | 1.00 | 1.04  | 2.304        | 81.2               | 0.352          |
|                   | No. Obs.            | 563              | 1013 | 1300 | 13248 |              |                    |                |
| 9                 | LOCAL               | 0.18             | 0.38 | 1.19 | 1.04  | 1.494        | 86.6               | 0.319          |
|                   | PERSISTENCE         | 1.35             | 0.85 | 1.44 | 0.97  | 2.313        | 81.5               | 0.252          |
|                   | No. Obs.            | 322              | 766  | 907  | 14132 |              |                    |                |
| 15                | LOCAL               | 0.27             | 0.52 | 1.16 | 1.02  | 1.227        | 88.4               | 0.320          |
|                   | PERSISTENCE         | 1.92             | 1.12 | 1.60 | 0.95  | 2.379        | 81.0               | 0.167          |
|                   | No. Obs.            | 225              | 580  | 817  | 14489 |              |                    |                |

Table 9.6. Same as Table 9.5 except for 95 stations for the FT release time of approximately 1800 UTC.

| Projection<br>(h) | Type of<br>Forecast | Bias by Category |      |      |       | Log<br>Score | Percent<br>Correct | Skill<br>Score |
|-------------------|---------------------|------------------|------|------|-------|--------------|--------------------|----------------|
|                   |                     | 1                | 2    | 3    | 4     |              |                    |                |
| 3                 | LOCAL               | 0.48             | 0.57 | 1.44 | 1.01  | 1.134        | 89.3               | 0.438          |
|                   | PERSISTENCE         | 1.17             | 1.13 | 1.20 | 0.98  | 1.257        | 88.8               | 0.468          |
|                   | No. Obs.            | 275              | 680  | 754  | 14555 |              |                    |                |
| 6                 | LOCAL               | 0.46             | 0.67 | 1.26 | 1.01  | 1.149        | 88.7               | 0.378          |
|                   | PERSISTENCE         | 1.46             | 1.34 | 1.09 | 0.97  | 1.587        | 86.6               | 0.348          |
|                   | No. Obs.            | 218              | 571  | 824  | 14473 |              |                    |                |
| 9                 | LOCAL               | 0.51             | 0.78 | 1.09 | 1.01  | 1.311        | 87.3               | 0.340          |
|                   | PERSISTENCE         | 1.41             | 1.47 | 0.90 | 0.98  | 1.828        | 84.8               | 0.288          |
|                   | No. Obs.            | 226              | 520  | 1002 | 14338 |              |                    |                |
| 15                | LOCAL               | 0.47             | 0.98 | 1.19 | 1.00  | 2.022        | 81.6               | 0.310          |
|                   | PERSISTENCE         | 0.75             | 1.17 | 0.68 | 1.03  | 2.501        | 80.5               | 0.210          |
|                   | No. Obs.            | 428              | 651  | 1313 | 13689 |              |                    |                |



Table 9.7. Comparative verification of local and persistence visibility forecasts for 6 stations in the Alaska Region for the FT release time of approximately 0900 UTC.

| Projection<br>(h) | Type of<br>Forecast | Bias by Category |      |      |      | Log<br>Score | Percent<br>Correct | Skill<br>Score |
|-------------------|---------------------|------------------|------|------|------|--------------|--------------------|----------------|
|                   |                     | 1                | 2    | 3    | 4    |              |                    |                |
| 3                 | LOCAL               | 0.71             | 0.76 | 0.68 | 1.04 | 1.180        | 88.1               | 0.347          |
|                   | PERSISTENCE         | 0.93             | 0.88 | 0.59 | 1.04 | 1.406        | 88.6               | 0.377          |
|                   | No. Obs.            | 14               | 17   | 44   | 581  |              |                    |                |
| 6                 | LOCAL               | 0.50             | 0.41 | 0.90 | 1.05 | 1.994        | 84.8               | 0.235          |
|                   | PERSISTENCE         | 0.59             | 0.64 | 0.67 | 1.05 | 2.101        | 84.8               | 0.227          |
|                   | No. Obs.            | 22               | 22   | 39   | 563  |              |                    |                |
| 9                 | LOCAL               | 0.35             | 0.45 | 0.94 | 1.05 | 2.018        | 84.2               | 0.153          |
|                   | PERSISTENCE         | 0.52             | 0.68 | 0.88 | 1.04 | 2.078        | 84.3               | 0.202          |
|                   | No. Obs.            | 23               | 22   | 32   | 549  |              |                    |                |
| 15                | LOCAL               | 0.40             | 0.13 | 0.92 | 1.05 | 1.253        | 89.4               | 0.187          |
|                   | PERSISTENCE         | 1.30             | 0.57 | 1.25 | 1.00 | 2.154        | 83.8               | 0.030          |
|                   | No. Obs.            | 10               | 23   | 24   | 577  |              |                    |                |

Table 9.8. Same as Table 9.7 except for the FT release time of approximately 1800 UTC.

| Projection<br>(h) | Type of<br>Forecast | Bias by Category |      |      |      | Log<br>Score | Percent<br>Correct | Skill<br>Score |
|-------------------|---------------------|------------------|------|------|------|--------------|--------------------|----------------|
|                   |                     | 1                | 2    | 3    | 4    |              |                    |                |
| 3                 | LOCAL               | 0.27             | 0.27 | 0.83 | 1.05 | 1.168        | 90.3               | 0.299          |
|                   | PERSISTENCE         | 1.91             | 0.81 | 1.21 | 0.98 | 1.445        | 88.9               | 0.430          |
|                   | No. Obs.            | 11               | 26   | 24   | 568  |              |                    |                |
| 6                 | LOCAL               | 0.30             | 0.17 | 0.38 | 1.08 | 1.055        | 90.6               | 0.259          |
|                   | PERSISTENCE         | 2.00             | 1.06 | 0.82 | 0.99 | 1.682        | 86.5               | 0.307          |
|                   | No. Obs.            | 10               | 18   | 34   | 552  |              |                    |                |
| 9                 | LOCAL               | 0.25             | 0.36 | 0.43 | 1.06 | 1.095        | 90.1               | 0.195          |
|                   | PERSISTENCE         | 1.58             | 1.82 | 0.86 | 0.98 | 1.705        | 86.3               | 0.273          |
|                   | No. Obs.            | 12               | 11   | 35   | 569  |              |                    |                |
| 15                | LOCAL               | 0.27             | 0.20 | 0.37 | 1.09 | 1.575        | 87.5               | 0.106          |
|                   | PERSISTENCE         | 1.33             | 1.27 | 0.73 | 1.00 | 2.419        | 83.3               | 0.174          |
|                   | No. Obs.            | 15               | 15   | 41   | 570  |              |                    |                |

