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AFOS-ERA VERIFICATION OF GUIDANCE AND LOCAL AVIATION/PUBLIC WEATHER FORECASTS--NO. 13 (OCTOBER 1989 - MARCH 1990)

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1. INTRODUCTION

This office note continues the series of Techniques Development Laboratory (TDL) office notes which present verification results for TDL's automated guidance and National Weather Service (NWS) local forecasts made at Weather Service Forecast Offices (WSFO's). In order to streamline production of the documents and to encourage their use, the format has been changed significantly. Most text has been eliminated and descriptive information about the verification data is now presented in tabular form. In addition, the new format includes a section for special items of interest or changes that occurred during the verification season. For more specific information about the forecasts, observations, and verification procedure for each weather element, see Dagostaro and Dallavalle (1991).

Verification statistics are presented here for the cool season months of October 1989 through March 1990 for maximum/minimum (max/min) temperature, probability of precipitation (PoP), precipitation type (PoPT), cloud amount, surface wind, ceiling height, and visibility. Snow amount forecasts were not verified due to missing snow amount observations for most of this cool season. 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. The definitions of the official local max/min temperature forecasts and verifying observations, in turn, differ from those of the guidance.

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 Limited-area Fine Mesh Model (LFM) (Gerrity, 1977; Newell and Deaven, 1981) and the Nested Grid Model (NGM) (Hoke et al., 1989). 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 100 stations in the conterminous U.S. and NWS Alaska Region 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 the NWS Alaska Region

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 NWS regions in the conterminous U.S. and for the Alaska Region. Max/min temperature and PoP scores are presented in Tables 2.1 - 2.12 and 3.1 - 3.12, respectively. Verification results for precipitation type are shown in Tables 4.1 and 4.2 for stations in the conterminous U.S. only. Tables 5.1 - 5.12 show cloud amount verification scores for the conterminous U.S. stations and the Alaskan stations. For wind speed and direction, objective guidance verification results are presented in Tables 6.1 - 6.12, while the analogous local scores are given in Tables 6.13 - 6.24. Comparative verification results for the 42-h significant wind speed are presented in Tables 6.25 - 6.28. For ceiling height and visibility, objective and local forecast verification scores are shown only for the conterminous U.S. stations combined and for the Alaska Region. Tables 7.1 - 7.4 contain the objective ceiling height forecast results for the conterminous U.S. and the Alaska Region, while Tables 7.5 - 7.8 contain ceiling height scores for the local forecasts. Analogously, Tables 8.1 - 8.8 show guidance and local visibility forecast verification scores for the conterminous U.S. stations and the Alaskan stations.

2. SUMMARY (OCTOBER 1989 - MARCH 1990)

For the first time, MOS guidance based on the NGM was available for the entire cool season for max/min temperature, PoP, cloud amount, and surface wind. NGM-based guidance was collected centrally by TDL and, for the weather elements indicated above, comparative verification results are presented.

Forecasts of snow amount were not verified due to missing verifying observations.

Data were verified for Billings, Mont. in place of Helena, Mont. for the first time this cool season.

3. REFERENCES

Dagostaro, V. J., 1985: The national AFOS-era verification data processing system. TDL Office Note 85-9, National Weather Service, NOAA, U.S. Department of Commerce, 47 pp.

_____, and J. P. Dallavalle 1991: AFOS-era verification of guidance and local aviation/public weather forecasts--No. 11 (October 1988 - March 1989). TDL Office Note 91-2, National Weather Service, NOAA, U.S. Department of Commerce, 64 pp.

Gerrity, J. P., Jr., 1977: The LFM model--1976: A documentation. NOAA Technical Memorandum NWS NMC-60, National Oceanic and Atmospheric Administration, U.S. Department of Commerce, 68 pp.

Glahn, H. R., and D. A. Lowry, 1972: The use of Model Output Statistics (MOS) in objective weather forecasting. J. Appl. Meteor., 11, 1203-1211.

Hoke, J. E., N. A. Phillips, G. J. DiMego, J. J. Tuccillo, and J. G. Sela, 1989: The regional analysis and forecast system of the National Meteorological Center. Wea. Forecasting, 4, 323-334.

National Weather Service, 1982: National Verification Plan. National Oceanic and Atmospheric Administration, U.S. Department of Commerce, 81 pp.

Newell, J. E., and D. G. Deaven, 1981: The LFM-II model--1980. NOAA Technical Memorandum NWS NMC-66, National Oceanic and Atmospheric Administration, U.S. Department of Commerce, 20 pp.

Ruth, D. P., and C. L. Alex, 1987: AFOS-era forecast verification. NOAA Techniques Development Laboratory Computer Program NWS TDL CP 87-2, National Weather Service, NOAA, U.S. Department of Commerce, 50 pp.

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

Weather Element	Type of Data	Data Source[1]	Projections From Forecast Cycle	Forecast Cycle (UTC)	Comments
Max temp	LFM MOS	FXX	24, 48 36, 60	0000 1200	Daytime max temperature forecast for the conterminous U.S.; calendar day max temperature forecast for Alaska.
	NGM MOS	FWC	24, 48 36, 60	0000 1200	Daytime max temperature forecast for the conterminous U.S.; no guidance for Alaska.
	Local Fcst	FP	24, 48 36, 60	0000 1200	Daytime max temperature for all stations. In the conterminous U.S., actual daytime period depends on time zone and differs slightly from the guidance definition of daytime. For Alaska, forecasts are valid for 12-h periods ending at 30- (42-) and 54- (66-) h after 0000 (1200) UTC.
	Obs	SAO			Corresponds closely to the local definition of the max for all stations.
Min temp	LFM MOS	FXX	36, 60 24, 48	0000 1200	Nighttime min temperature forecast for the conterminous U.S.; calendar day min temperature forecast for Alaska.
	NGM MOS	FWC	36, 60 24, 48	0000 1200	Nighttime min temperature forecast for the conterminous U.S.; no guidance for Alaska.
	Local Fcst	FP	36, 60 24, 48	0000 1200	Nighttime min temperature for all stations. In the conterminous U.S., actual nighttime period depends on time zone and differs slightly from the guidance definition of nighttime. For Alaska, forecasts are valid for 12-h periods ending at 30- (42-) and 54- (66-) h after 1200 (0000) UTC.
	Obs	SAO			Corresponds closely to the local definition of the min for all stations.
PoP	LFM MOS	FXX	24, 36, 48	0000, 1200	For the conterminous U.S., forecasts are for 12-h periods ending at the indicated projections. For Alaska, the 12-h periods actually end at 18-, 30-, and 42-h from the forecast cycle.
	NGM MOS	FWC	24, 36, 48	0000, 1200	For the conterminous U.S., forecasts are for 12-h periods ending at the indicated projections. There is no NGM-based PoP guidance for Alaska.
	Local Fcst	FP	24, 36, 48	0000, 1200	Same as the guidance forecasts.
	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[1]	Projections From Forecast Cycle	Forecast Cycle (UTC)	Comments
Precipitation type[2]	LFM MOS	FXX	18, 30, 42	0000, 1200	Forecasts are valid at specific hours corresponding to the indicated projections. Guidance for the conterminous U.S. is for freezing, frozen, and liquid precipitation (mixed frozen and liquid is considered liquid). For Alaska, guidance is for frozen and unfrozen precipitation (freezing is considered unfrozen) but is not verified.
	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[2]	LFM MOS	FXX	24	0000, 1200	For the conterminous U.S., categorical forecasts of snow amount for the 12-h period ending at the indicated projection. No comparable guidance for Alaska.
	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	FXX	12, 18, 24	0000, 1200	Categorical forecasts of opaque sky cover.
	NGM MOS	FWC	12, 18, 24	0000, 1200	Categorical forecasts of opaque sky cover for the conterminous U.S.; no guidance for Alaska.
	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	FXX	12, 18, 24, 42	0000, 1200	Valid at specific hours after 0000 or 1200 UTC.
	NGM MOS	FWC	12, 18, 24, 42	0000, 1200	For the conterminous U.S., forecasts are valid at the indicated hours after 0000 or 1200 UTC; no guidance for Alaska.
	Local Fcst	FT	3, 9, 15	0900, 1800	Terminal aviation 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.
		MEF	42	0000, 1200	A yes/no forecast of $\geq$ 23 kt wind speed.
	Obs	SAO			Observed values at the specific hour and $\pm$ 3 hours (highest sustained wind) correspond to the valid times of the local terminal aviation forecasts. 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 TDL.

Table 1.1. Continued.

Weather Element	Type of Data	Data Source[1]	Projections From Forecast Cycle	Forecast Cycle (UTC)	Comments
Wind direction	LFM MOS	FXX	12, 18, 24	0000, 1200	Valid at specific hours after 0000 or 1200 UTC.
	NGM MOS	FWC	12, 18, 24	0000, 1200	For the conterminous U.S., forecasts are valid at the indicated hours after 0000 or 1200 UTC; no guidance for Alaska.
	Local Fcst	FT	3, 9, 15	0900, 1800	Same as for local wind speed.
	Obs	SAO			Observed values at the specific hour.
Ceiling height	LFM MOS	FXX	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.
	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 TDL.
	Obs	SAO			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 TDL.
Visibility	LFM MOS	FXX	12, 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.

[1]Data sources are as follows:
FXX - FPC bulletin contains LFM-based MOS guidance for all weather elements for stations in the conterminous U.S.; guidance for Alaska is obtained from the FMAK1 and FMAK2 bulletins
FWC - FWC bulletin contains NGM-based MOS guidance for max/min temperature, PoP, cloud amount, and surface wind for stations in the conterminous U.S. only; there is no NGM-based guidance for Alaska at this time
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 airways observation containing verifying observations corresponding to local and MOS forecasts for most weather elements
SSM - Surface synoptic report containing verifying observations of snow amount

[2]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) containing information about MOS guidance.

Geographical Area	Subject	Forecast Model	TPB No.
Conterminous U.S.	max/min temperature	LFM	356
		NGM	387
	PoP	LFM	386
		NGM	387
	precipitation type	LFM	319
	snow amount	LFM	318
	cloud amount	LFM	378
		NGM	387
	surface wind	LFM	347
		NGM	387
	ceiling height	LFM	303
	visibility	LFM	303
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-four stations in the conterminous U.S. and 6 stations in the Alaska Region used for comparative verification of MOS guidance and local forecasts of max/min temperature, probability of precipitation, precipitation type*, cloud amount, ceiling height, visibility, and surface wind. Please note that LAX was not included in the max/min temperature and PoP verifications, and LBB and ELP were not included in the ceiling height, visibility, and local surface wind verifications. TCC was not available during the 0000 UTC cycle for the ceiling height and visibility verifications.

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

* These stations were not included in the precipitation type verification.

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, and 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	1000-2900	3-6
4		≥6	OVC, X	23-27	120-150	≥3000	>6
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 (unavailable for the 1989-90 cool season).

Table 2.1. Verification of local, LFM MOS, 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	15999	-0.2	3.0	1.5	--	--	89.7
	LFM MOS		-0.6	3.5	2.6	--	--	86.5
	NGM MOS		-0.3	3.4	3.0	--	--	86.5
Tonight's Min	LOCAL	15942	-0.5	3.5	2.6	0.71	0.22	85.8
	LFM MOS		-0.9	3.8	3.4	0.69	0.23	83.5
	NGM MOS		-0.3	4.0	4.2	0.74	0.28	81.9
Tomorrow's Max	LOCAL	15978	-1.1	4.0	5.1	--	--	81.9
	LFM MOS		-1.6	4.5	7.1	--	--	77.9
	NGM MOS		-0.8	4.5	7.4	--	--	77.4
Tomorrow Night's Min	LOCAL	15917	-1.0	4.6	8.1	0.59	0.31	75.4
	LFM MOS		-1.0	4.9	9.3	0.60	0.35	72.6
	NGM MOS		-0.6	4.8	9.1	0.61	0.34	73.4

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	15853	-0.6	3.2	1.7	0.72	0.22	88.1
	LFM MOS		-0.9	3.6	2.7	0.71	0.25	85.4
	NGM MOS		-0.2	3.5	2.9	0.68	0.25	85.5
Tomorrow's Max	LOCAL	15875	-0.8	3.7	3.8	--	--	84.5
	LFM MOS		-1.3	4.3	6.4	--	--	79.7
	NGM MOS		-0.5	4.1	5.4	--	--	81.1
Tomorrow Night's Min	LOCAL	15826	-0.9	4.0	4.8	0.72	0.28	81.1
	LFM MOS		-1.3	4.4	6.9	0.71	0.32	77.3
	NGM MOS		-0.4	4.3	6.0	0.73	0.32	78.8
Day After Tomorrow's Max	LOCAL	15871	-1.5	4.6	8.3	--	--	76.2
	LFM MOS		-1.8	5.1	10.6	--	--	72.2
	NGM MOS		-1.1	4.9	10.0	--	--	73.1

Table 2.3. Verification of local, LFM MOS, and NGM MOS max/min temperature forecasts for 24 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	4159	-0.3	3.0	1.5	--	--	90.2
	LFM MOS		-0.4	3.4	2.5	--	--	87.9
	NGM MOS		-0.2	3.3	2.6	--	--	88.4
Tonight's Min	LOCAL	4125	-0.6	3.5	2.2	0.75	0.22	87.5
	LFM MOS		-0.9	3.6	2.6	0.77	0.24	86.4
	NGM MOS		-0.1	3.9	4.1	0.78	0.27	83.9
Tomorrow's Max	LOCAL	4150	-1.3	3.9	4.6	--	--	83.8
	LFM MOS		-1.7	4.3	6.1	--	--	81.5
	NGM MOS		-0.4	4.2	6.0	--	--	81.7
Tomorrow Night's Min	LOCAL	4115	-1.6	4.6	7.8	0.73	0.29	77.9
	LFM MOS		-1.9	4.9	8.9	0.81	0.34	76.0
	NGM MOS		-0.6	4.8	8.8	0.70	0.33	76.7

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	4086	-0.7	3.2	1.6	0.74	0.23	89.4
	LFM MOS		-0.7	3.5	1.9	0.70	0.25	87.8
	NGM MOS		-0.0	3.5	2.4	0.72	0.24	87.4
Tomorrow's Max	LOCAL	4105	-0.7	3.7	3.9	--	--	85.5
	LFM MOS		-0.8	4.0	5.5	--	--	83.5
	NGM MOS		-0.2	3.8	4.0	--	--	84.8
Tomorrow Night's Min	LOCAL	4079	-1.1	4.1	4.4	0.79	0.26	82.9
	LFM MOS		-1.5	4.3	5.6	0.81	0.31	80.7
	NGM MOS		-0.2	4.2	5.6	0.80	0.30	80.9
Day After Tomorrow's Max	LOCAL	4107	-1.8	4.6	7.0	--	--	79.4
	LFM MOS		-2.1	4.9	8.9	--	--	77.0
	NGM MOS		-0.8	4.6	8.2	--	--	78.4

Table 2.5. Verification of local, LFM MOS, and NGM MOS max/min temperature forecasts for 24 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	4053	-0.2	3.0	1.6	--	--	88.1
	LFM MOS		-0.6	3.5	2.9	--	--	84.2
	NGM MOS		-0.4	3.2	2.6	--	--	86.0
Tonight's Min	LOCAL	4046	-0.4	3.4	2.5	0.68	0.29	85.6
	LFM MOS		-0.5	3.7	3.1	0.63	0.30	83.4
	NGM MOS		-0.6	3.8	3.8	0.72	0.36	81.9
Tomorrow's Max	LOCAL	4048	-1.0	4.0	5.4	--	--	78.6
	LFM MOS		-1.5	4.4	7.3	--	--	74.6
	NGM MOS		-1.1	4.5	7.8	--	--	72.6
Tomorrow Night's Min	LOCAL	4041	-0.8	4.6	7.5	0.54	0.39	74.4
	LFM MOS		-0.6	4.8	8.8	0.55	0.41	72.2
	NGM MOS		-0.9	4.9	8.7	0.55	0.43	71.6

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	4009	-0.6	3.1	1.4	0.67	0.29	88.2
	LFM MOS		-0.9	3.5	2.6	0.69	0.32	84.8
	NGM MOS		-0.3	3.4	2.6	0.67	0.30	85.5
Tomorrow's Max	LOCAL	4011	-0.8	3.7	4.0	--	--	81.7
	LFM MOS		-1.3	4.4	7.1	--	--	74.5
	NGM MOS		-0.6	3.8	4.6	--	--	80.3
Tomorrow Night's Min	LOCAL	4004	-1.0	3.9	4.6	0.70	0.34	81.0
	LFM MOS		-1.2	4.3	6.8	0.69	0.39	76.5
	NGM MOS		-0.8	4.2	5.3	0.69	0.40	78.9
Day After Tomorrow's Max	LOCAL	4008	-1.3	4.6	9.1	--	--	71.7
	LFM MOS		-1.8	5.0	11.5	--	--	67.0
	NGM MOS		-1.3	4.9	9.9	--	--	68.3

Table 2.7. Verification of local, LFM MOS, and NGM MOS max/min temperature forecasts for 28 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	4820	-0.2	3.1	1.8	--	--	91.8
	LFM MOS		-0.7	3.7	3.1	--	--	88.9
	NGM MOS		-0.6	3.8	4.1	--	--	87.7
Tonight's Min	LOCAL	4803	-0.7	3.8	3.2	0.74	0.12	87.4
	LFM MOS		-1.4	4.2	4.6	0.71	0.13	84.8
	NGM MOS		-0.5	4.3	5.4	0.75	0.20	83.6
Tomorrow's Max	LOCAL	4816	-1.4	4.4	6.5	--	--	84.4
	LFM MOS		-1.9	4.9	9.2	--	--	80.2
	NGM MOS		-1.3	4.9	9.4	--	--	80.4
Tomorrow Night's Min	LOCAL	4799	-1.0	5.1	10.9	0.55	0.20	77.0
	LFM MOS		-1.1	5.5	12.5	0.50	0.26	74.0
	NGM MOS		-0.9	5.3	12.0	0.60	0.20	75.2

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	4812	-0.7	3.4	2.1	0.80	0.16	89.3
	LFM MOS		-1.0	3.9	3.4	0.81	0.19	86.8
	NGM MOS		-0.2	3.8	4.1	0.75	0.19	86.7
Tomorrow's Max	LOCAL	4817	-1.1	4.0	4.5	--	--	86.9
	LFM MOS		-1.6	4.6	7.8	--	--	82.6
	NGM MOS		-0.8	4.6	7.4	--	--	82.3
Tomorrow Night's Min	LOCAL	4800	-1.1	4.4	6.4	0.71	0.20	82.5
	LFM MOS		-1.5	5.0	9.8	0.70	0.25	78.6
	NGM MOS		-0.7	4.6	7.8	0.72	0.23	81.0
Day After Tomorrow's Max	LOCAL	4816	-1.7	5.2	10.8	--	--	78.6
	LFM MOS		-1.9	5.7	14.0	--	--	74.4
	NGM MOS		-1.8	5.6	13.6	--	--	75.1

Table 2.9. Verification of local, LFM MOS, 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	2967	-0.2	2.7	1.0	--	--	83.6
	LFM MOS		-0.9	3.2	1.6	--	--	78.1
	NGM MOS		0.3	3.2	2.4	--	--	77.0
Tonight's Min	LOCAL	2968	-0.3	3.2	2.5	0.53	0.32	74.0
	LFM MOS		-0.6	3.6	2.8	0.53	0.28	68.7
	NGM MOS		0.0	3.6	2.9	0.63	0.33	68.4
Tomorrow's Max	LOCAL	2964	-0.5	3.5	3.3	--	--	73.2
	LFM MOS		-0.8	4.1	4.7	--	--	65.3
	NGM MOS		-0.1	4.1	5.4	--	--	63.8
Tomorrow Night's Min	LOCAL	2962	-0.3	3.8	4.8	0.44	0.36	63.0
	LFM MOS		0.0	4.2	5.5	0.33	0.45	57.3
	NGM MOS		0.1	4.1	5.1	0.54	0.41	60.2

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	2946	-0.5	2.9	1.7	0.51	0.17	78.9
	LFM MOS		-1.1	3.3	2.6	0.47	0.24	73.0
	NGM MOS		-0.1	3.2	2.2	0.40	0.30	74.7
Tomorrow's Max	LOCAL	2942	-0.5	3.2	2.0	--	--	78.4
	LFM MOS		-1.2	3.9	4.4	--	--	68.1
	NGM MOS		0.1	3.8	5.2	--	--	66.4
Tomorrow Night's Min	LOCAL	2943	-0.5	3.5	3.1	0.56	0.33	69.3
	LFM MOS		-0.6	3.9	4.2	0.48	0.38	63.6
	NGM MOS		0.2	3.8	4.8	0.58	0.36	62.6
Day After Tomorrow's Max	LOCAL	2940	-0.7	3.9	4.8	--	--	67.4
	LFM MOS		-0.9	4.4	6.3	--	--	60.7
	NGM MOS		-0.1	4.3	6.6	--	--	60.1

Table 2.11. Verification of local and LFM MOS max/min temperature forecasts for 6 stations in the Alaska Region, 0000 UTC cycle. NGM MOS forecasts were not available for the stations in Alaska.

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	796	1.3	3.7	5.2	--	--	*
	LFM MOS		2.3	4.2	7.0	--	--	*
Tonight's Min	LOCAL	795	1.0	5.2	11.7	0.67	0.33	*
	LFM MOS		0.3	5.4	13.3	0.67	0.33	*
Tomorrow's Max	LOCAL	798	1.8	4.8	10.3	--	--	*
	LFM MOS		3.1	5.4	13.5	--	--	*
Tomorrow Night's Min	LOCAL	798	1.6	6.5	21.1	0.20	0.67	*
	LFM MOS		0.5	6.4	21.1	0.40	0.60	*

* Percent improvement over climate score is not available.

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	829	-0.2	4.2	7.1	0.33	0.00	*
	LFM MOS		-1.3	4.9	10.9	0.50	0.40	*
Tomorrow's Max	LOCAL	826	1.1	4.2	6.9	--	--	*
	LFM MOS		1.8	4.8	10.8	--	--	*
Tomorrow Night's Min	LOCAL	822	0.5	5.6	16.1	0.40	0.50	*
	LFM MOS		-0.6	6.1	17.4	0.40	0.60	*
Day After Tomorrow's Max	LOCAL	827	1.2	5.3	12.8	--	--	*
	LFM MOS		2.3	6.0	16.2	--	--	*

* Percent improvement over climate score is not available.

Table 3.1. Comparative verification of local, LFM MOS, and NGM MOS PoP forecasts for 93 stations in the conterminous U.S., 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	LOCAL	0.0770		49.3				
(1st period)	LFM MOS	0.0839	8.1	44.8	16048	0.2365	20.3	1931
	NGM MOS	0.0821	6.2	45.9		0.2136	11.8	2551
24-36	LOCAL	0.0883		42.1				
(2nd period)	LFM MOS	0.0931	5.2	38.9	16009	0.2155	13.0	1903
	NGM MOS	0.0898	1.7	41.1		0.2082	3.1	2536
36-48	LOCAL	0.1001		34.0				
(3rd period)	LFM MOS	0.1050	4.7	30.8	16031	0.2289	11.9	1981
	NGM MOS	0.1020	1.9	32.8		0.2082	5.3	2517

Table 3.2. Same as Table 3.1 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	LOCAL	0.0773		49.4				
(1st period)	LFM MOS	0.0840	8.0	45.0	15904	0.2263	19.5	1935
	NGM MOS	0.0813	4.8	46.9		0.1989	10.3	2560
24-36	LOCAL	0.0912		40.0				
(2nd period)	LFM MOS	0.0968	5.7	36.4	15925	0.2396	16.3	1906
	NGM MOS	0.0918	0.6	39.7		0.2007	-0.7	2566
36-48	LOCAL	0.0986		35.1				
(3rd period)	LFM MOS	0.1028	4.1	32.4	15887	0.2206	10.9	1899
	NGM MOS	0.1009	2.2	33.6		0.2072	3.1	2547

Table 3.3. Comparative verification of local, LFM MOS, and NGM MOS PoP forecasts for 24 stations in the Eastern 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	0.0912		52.4				
	LFM MOS	0.0977	6.7	49.0	4158	0.2241	15.9	640
	NGM MOS	0.0940	3.0	50.9		0.2027	7.0	791
24-36 (2nd period)	LOCAL	0.1038		46.3				
	LFM MOS	0.1079	3.8	44.2	4162	0.2099	6.7	620
	NGM MOS	0.1030	-0.7	46.7		0.1985	-1.3	839
36-48 (3rd period)	LOCAL	0.1174		38.7				
	LFM MOS	0.1233	4.8	35.7	4151	0.2232	10.0	666
	NGM MOS	0.1186	1.0	38.1		0.1968	1.6	813

Table 3.4. Same as Table 3.3 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	0.0915		52.9				
	LFM MOS	0.0972	5.9	50.0	4118	0.2131	13.5	623
	NGM MOS	0.0919	0.5	52.7		0.1862	0.4	826
24-36 (2nd period)	LOCAL	0.1057		45.1				
	LFM MOS	0.1104	4.3	42.6	4111	0.2211	11.4	638
	NGM MOS	0.1060	0.3	44.9		0.1967	-0.4	847
36-48 (3rd period)	LOCAL	0.1153		40.1				
	LFM MOS	0.1175	1.9	39.0	4112	0.2107	4.6	595
	NGM MOS	0.1193	3.4	38.1		0.2129	5.9	862

Table 3.5. Comparative verification of local, LFM MOS, and NGM MOS PoP forecasts for 24 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	Changes GE 20% to Guidance: Local % Imprv.	Changes GE 20% to Guidance: No. of Changes
12-24	LOCAL	0.0729		47.0				
(1st period)	LFM MOS	0.0800	8.8	41.8	4096	0.2289	23.3	467
	NGM MOS	0.0764	4.6	44.4		0.2217	9.5	570
24-36	LOCAL	0.0756		42.2				
(2nd period)	LFM MOS	0.0805	6.0	38.5	4051	0.2074	14.5	487
	NGM MOS	0.0782	3.3	40.3		0.2085	8.1	514
36-48	LOCAL	0.0946		31.1				
(3rd period)	LFM MOS	0.0992	4.6	27.8	4090	0.2227	9.6	515
	NGM MOS	0.0945	-0.2	31.2		0.2087	0.1	554

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	Changes GE 20% to Guidance: Local % Imprv.	Changes GE 20% to Guidance: No. of Changes
12-24	LOCAL	0.0671		48.8				
(1st period)	LFM MOS	0.0719	6.6	45.1	4014	0.2169	15.6	440
	NGM MOS	0.0737	8.9	43.8		0.2153	18.7	584
24-36	LOCAL	0.0883		35.8				
(2nd period)	LFM MOS	0.0941	6.2	31.6	4050	0.2456	17.8	481
	NGM MOS	0.0865	-2.1	37.2		0.1967	-7.4	552
36-48	LOCAL	0.0873		33.3				
(3rd period)	LFM MOS	0.0907	3.8	30.7	4011	0.2088	6.8	498
	NGM MOS	0.0859	-1.5	34.3		0.1970	-5.4	516

Table 3.7. Comparative verification of local, LFM MOS, and NGM MOS PoP forecasts for 28 stations in the Central 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	0.0745		48.5				
	LFM MOS	0.0810	7.9	44.0	4822	0.2480	18.0	583
	NGM MOS	0.0805	7.4	44.3		0.2103	11.6	806
24-36 (2nd period)	LOCAL	0.0926		39.0				
	LFM MOS	0.0975	5.0	35.8	4824	0.2165	13.5	578
	NGM MOS	0.0935	0.9	38.4		0.2110	0.6	826
36-48 (3rd period)	LOCAL	0.1006		30.2				
	LFM MOS	0.1039	3.1	27.9	4818	0.2333	8.9	538
	NGM MOS	0.1028	2.1	28.7		0.2157	6.9	785

Table 3.8. Same as Table 3.7 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	0.0811		46.7				
	LFM MOS	0.0887	8.6	41.7	4825	0.2345	20.6	628
	NGM MOS	0.0818	0.8	46.2		0.1908	2.7	754
24-36 (2nd period)	LOCAL	0.0895		38.0				
	LFM MOS	0.0960	6.7	33.5	4818	0.2599	20.2	550
	NGM MOS	0.0899	0.4	37.8		0.2054	-0.2	774
36-48 (3rd period)	LOCAL	0.1032		31.8				
	LFM MOS	0.1110	7.0	26.6	4819	0.2435	20.9	579
	NGM MOS	0.1067	3.3	29.5		0.2059	5.0	817

Table 3.9. Comparative verification of local, LFM MOS, 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	Changes GE 20% to Guidance: Local % Imprv.	Changes GE 20% to Guidance: No. of Changes
12-24	LOCAL	0.0670		47.6				
(1st period)	LFM MOS	0.0745	10.1	41.7	2972	0.2566	30.4	241
	NGM MOS	0.0759	11.7	40.6		0.2308	24.5	384
24-36	LOCAL	0.0767		38.9				
(2nd period)	LFM MOS	0.0827	7.2	34.1	2972	0.2471	23.8	218
	NGM MOS	0.0810	5.3	35.4		0.2238	11.1	357
36-48	LOCAL	0.0826		35.6				
(3rd period)	LFM MOS	0.0893	7.6	30.3	2972	0.2468	26.6	262
	NGM MOS	0.0879	6.0	31.4		0.2168	17.3	365

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	Changes GE 20% to Guidance: Local % Imprv.	Changes GE 20% to Guidance: No. of Changes
12-24	LOCAL	0.0653		48.2				
(1st period)	LFM MOS	0.0746	12.5	40.9	2947	0.2557	35.2	244
	NGM MOS	0.0758	13.8	39.9		0.2167	28.4	396
24-36	LOCAL	0.0779		39.4				
(2nd period)	LFM MOS	0.0827	5.8	35.7	2946	0.2302	16.1	237
	NGM MOS	0.0821	5.1	36.2		0.2054	6.7	393
36-48	LOCAL	0.0832		33.7				
(3rd period)	LFM MOS	0.0854	2.6	31.9	2945	0.2140	7.3	227
	NGM MOS	0.0859	3.2	31.5		0.2111	3.3	352

Table 3.11. Comparative verification of local and LFM MOS PoP forecasts for 6 stations in the Alaska Region, 0000 UTC cycle. NGM MOS forecasts were not available for the stations in Alaska.

Forecast Projection (h)	Type of Forecast	Brier Score	Local % Imp. Over Guid.	% Imp. Over Clim.	No. of Cases	Changes GE 20% to Guidance: Brier Score	Local % Imprv.	No. of Changes
6-18 (1st period)	LOCAL	0.1410		*	766	0.1862		293
	LFM MOS	0.1719	18.0	*		0.2585	28.0	
18-30 (2nd period)	LOCAL	0.1742		*	780	0.2181		282
	LFM MOS	0.1798	3.1	*		0.2353	7.3	
30-42 (3rd period)	LOCAL	0.1708		*	770	0.2130		247
	LFM MOS	0.1736	1.6	*		0.2181	2.3	

* Percent improvement over climate score is not available.

Table 3.12. Same as Table 3.11 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: Brier Score	Local % Imprv.	No. of Changes
6-18 (1st period)	LOCAL	0.1538		*	819	0.1933		310
	LFM MOS	0.1756	12.4	*		0.2470	21.7	
18-30 (2nd period)	LOCAL	0.1545		*	807	0.2071		293
	LFM MOS	0.1704	9.3	*		0.2463	15.9	
30-42 (3rd period)	LOCAL	0.1810		*	818	0.2185		259
	LFM MOS	0.1876	3.5	*		0.2355	7.2	

* Percent improvement over climate score is not available.

Table 4.1. Comparative verification of local and LFM MOS PoPT forecasts for 86 stations in the conterminous U.S. for the 0000 UTC cycle. Only cases where the local PoP was ≥30% were included. Data for TCC were not available for the 30-h projection.

Projection (h)	Region/ Number of Stations	Type of Forecast	Bias ZR	Bias S	Bias R	Percent Correct	Skill Score	POD ZR	POD S	FAR ZR	FAR S
18	Eastern 24	LOCAL	0.90	0.98	1.02	90.5	0.813	0.29	0.89	0.68	0.10
		MOS	0.86	0.98	1.02	91.5	0.833	0.48	0.90	0.44	0.08
		No. Obs.	21	348	480						
	Southern 22	LOCAL	1.13	0.48	1.04	93.9	0.573	0.50	0.41	0.56	0.15
		MOS	0.00	0.81	1.04	94.4	0.607	0.00	0.63	***	0.23
		No. Obs.	8	27	343						
	Central 28	LOCAL	0.76	0.94	1.11	88.3	0.785	0.38	0.88	0.50	0.06
		MOS	0.35	1.00	1.09	90.3	0.817	0.24	0.93	0.33	0.07
		No. Obs.	34	327	256						
	Western 12	LOCAL	**	0.86	1.10	92.8	0.855	**	0.85	1.00	0.01
		MOS	*	0.94	1.05	92.1	0.838	*	0.88	*	0.06
		No. Obs.	0	119	145						
	All Stations	LOCAL	0.90	0.93	1.05	90.8	0.816	0.37	0.86	0.60	0.07
		MOS	0.48	0.98	1.04	91.8	0.835	0.29	0.90	0.40	0.08
		No. Obs.	63	821	1224						
30	Eastern 24	LOCAL	0.66	1.06	0.98	87.4	0.758	0.22	0.91	0.67	0.14
		MOS	0.81	1.01	1.00	89.9	0.807	0.31	0.91	0.62	0.10
		No. Obs.	32	351	471						
	Southern 21	LOCAL	0.36	1.50	0.99	93.8	0.590	0.09	0.83	0.75	0.44
		MOS	0.64	0.89	1.02	94.3	0.573	0.18	0.61	0.71	0.31
		No. Obs.	11	18	341						
	Central 28	LOCAL	0.76	1.03	0.99	88.3	0.777	0.48	0.92	0.36	0.10
		MOS	0.88	0.99	1.03	88.3	0.779	0.42	0.91	0.52	0.08
		No. Obs.	33	365	258						
	Western 12	LOCAL	1.00	0.94	1.04	94.4	0.884	0.00	0.90	1.00	0.04
		MOS	1.00	0.93	1.05	91.6	0.825	0.00	0.87	1.00	0.06
		No. Obs.	1	100	150						
	All Stations	LOCAL	0.66	1.04	0.99	89.6	0.797	0.31	0.91	0.53	0.13
		MOS	0.82	0.99	1.02	90.4	0.813	0.34	0.90	0.59	0.09
		No. Obs.	77	834	1220						
42	Eastern 24	LOCAL	0.72	1.04	0.98	88.5	0.774	0.22	0.89	0.69	0.14
		MOS	1.61	1.06	0.93	90.6	0.819	0.44	0.94	0.72	0.12
		No. Obs.	18	340	469						
	Southern 22	LOCAL	0.20	0.75	1.03	94.3	0.417	0.00	0.38	1.00	0.50
		MOS	0.60	0.88	1.01	95.5	0.586	0.00	0.69	1.00	0.21
		No. Obs.	5	16	311						
	Central 28	LOCAL	0.54	0.99	1.08	81.6	0.660	0.19	0.85	0.65	0.14
		MOS	0.76	1.04	0.99	86.6	0.753	0.41	0.91	0.46	0.13
		No. Obs.	37	307	237						
	Western 12	LOCAL	*	0.87	1.11	90.8	0.813	*	0.83	*	0.04
		MOS	**	0.95	1.03	88.6	0.770	**	0.85	1.00	0.11
		No. Obs.	0	119	143						
	All Stations	LOCAL	0.57	0.99	1.03	87.8	0.757	0.18	0.86	0.68	0.13
		MOS	1.03	1.03	0.98	90.0	0.805	0.38	0.91	0.63	0.12
		No. Obs.	60	782	1160						

* This category was neither forecast nor observed.
** This category was forecast but was not observed.
*** This category was observed but was not forecast.

Table 4.2. Same as Table 4.1 except for the 1200 UTC cycle. Data for TCC were not available for the 18- and 42-h projections. Data for ELP were not available for the 30-h projection.

Projection (h)	Region/ Number of Stations	Type of Forecast	Bias			Percent Correct	Skill Score	POD		FAR	
			ZR	S	R			ZR	S	ZR	S
18	Eastern 24	LOCAL	0.53	1.02	1.01	89.9	0.804	0.31	0.90	0.41	0.12
		MOS	0.59	0.99	1.04	89.7	0.799	0.22	0.90	0.63	0.09
		No. Obs.	32	335	476						
	Southern 21	LOCAL	1.17	1.00	0.99	95.8	0.740	0.83	0.70	0.29	0.30
		MOS	0.58	1.10	1.01	94.7	0.650	0.17	0.80	0.71	0.27
		No. Obs.	12	20	345						
	Central 28	LOCAL	0.87	0.96	1.08	89.9	0.814	0.56	0.90	0.35	0.06
		MOS	0.85	0.97	1.07	89.2	0.800	0.46	0.90	0.45	0.07
		No. Obs.	39	369	275						
	Western 12	LOCAL	0.00	0.94	1.05	91.4	0.822	0.00	0.87	**	0.08
		MOS	0.50	0.94	1.05	91.1	0.815	0.50	0.87	0.00	0.08
		No. Obs.	2	104	151						
	All Stations	LOCAL	0.76	0.98	1.03	91.1	0.826	0.49	0.89	0.35	0.10
		MOS	0.71	0.98	1.04	90.6	0.815	0.33	0.89	0.53	0.09
		No. Obs.	85	828	1247						
30	Eastern 24	LOCAL	0.86	1.01	1.00	88.6	0.776	0.41	0.88	0.53	0.13
		MOS	0.82	0.96	1.03	88.5	0.772	0.23	0.86	0.72	0.10
		No. Obs.	22	332	469						
	Southern 21	LOCAL	0.60	0.77	1.03	94.0	0.584	0.20	0.58	0.67	0.25
		MOS	0.60	0.92	1.01	94.8	0.665	0.00	0.69	1.00	0.25
		No. Obs.	5	26	318						
	Central 28	LOCAL	0.54	0.96	1.13	86.5	0.749	0.34	0.88	0.37	0.08
		MOS	0.86	1.00	1.03	86.8	0.757	0.34	0.91	0.60	0.08
		No. Obs.	35	312	230						
	Western 12	LOCAL	*	0.84	1.13	90.7	0.808	*	0.82	*	0.03
		MOS	*	0.98	1.01	94.6	0.890	*	0.93	*	0.05
		No. Obs.	0	114	144						
	All Stations	LOCAL	0.66	0.95	1.05	89.2	0.785	0.35	0.86	0.46	0.10
		MOS	0.82	0.98	1.02	89.9	0.801	0.27	0.89	0.67	0.09
		No. Obs.	62	784	1161						
42	Eastern 24	LOCAL	0.55	1.08	0.97	85.6	0.721	0.10	0.89	0.82	0.18
		MOS	1.26	1.01	0.97	86.4	0.740	0.39	0.87	0.69	0.14
		No. Obs.	31	314	461						
	Southern 21	LOCAL	0.60	1.00	1.01	93.2	0.450	0.30	0.36	0.50	0.64
		MOS	1.00	0.79	1.01	92.6	0.415	0.10	0.50	0.90	0.36
		No. Obs.	10	14	312						
	Central 28	LOCAL	0.50	1.04	1.03	84.1	0.700	0.27	0.89	0.45	0.14
		MOS	1.22	0.95	1.03	85.8	0.743	0.52	0.88	0.57	0.08
		No. Obs.	40	359	250						
	Western 12	LOCAL	*	0.88	1.08	89.5	0.775	*	0.81	*	0.08
		MOS	*	0.97	1.02	87.8	0.743	*	0.83	*	0.14
		No. Obs.	0	94	143						
	All Stations	LOCAL	0.53	1.04	1.01	86.8	0.743	0.21	0.87	0.60	0.16
		MOS	1.21	0.98	1.00	87.4	0.758	0.42	0.86	0.65	0.11
		No. Obs.	81	781	1166						

* This category was neither forecast nor observed.
** This category was observed but was not forecast.

Table 5.1. Comparative verification of local, LFM MOS, and NGM MOS forecasts of four categories of cloud amount (clear, scattered, broken, and overcast) for 94 stations in the conterminous U.S., 0000 UTC cycle.

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Percent Correct	Skill Score
12	LOCAL	0.79	1.47	1.55	0.92	68.2	0.549
	LFM MOS	0.96	1.54	1.12	0.83	60.7	0.434
	NGM MOS	0.89	1.59	1.21	0.86	61.7	0.451
	No. Obs.	6472	2037	1573	6085		
18	LOCAL	0.58	1.70	2.03	0.74	50.8	0.349
	LFM MOS	0.79	1.75	1.34	0.75	54.6	0.384
	NGM MOS	0.70	1.80	1.47	0.77	53.9	0.379
	No. Obs.	5887	2662	2021	5740		
24	LOCAL	0.60	1.74	2.10	0.75	49.3	0.325
	LFM MOS	0.83	1.69	1.33	0.77	54.5	0.375
	NGM MOS	0.74	1.81	1.50	0.76	54.1	0.376
	No. Obs.	6169	2589	1788	5653		

Table 5.2. Same as Table 5.1 except for the 1200 UTC cycle.

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Percent Correct	Skill Score
12	LOCAL	0.76	1.38	1.68	0.87	62.6	0.485
	LFM MOS	0.86	1.75	1.31	0.72	56.2	0.398
	NGM MOS	0.79	1.71	1.39	0.79	57.3	0.414
	No. Obs.	6159	2531	1774	5641		
18	LOCAL	0.65	1.90	2.27	0.86	55.8	0.387
	LFM MOS	0.94	1.66	1.22	0.82	61.7	0.434
	NGM MOS	0.87	1.75	1.36	0.84	61.2	0.434
	No. Obs.	7240	1796	1338	5680		
24	LOCAL	0.64	1.76	2.07	0.85	52.0	0.342
	LFM MOS	0.93	1.58	1.19	0.83	58.5	0.405
	NGM MOS	0.84	1.71	1.27	0.86	58.3	0.407
	No. Obs.	6399	2033	1548	6088		

Table 5.3. Comparative verification of local, LFM MOS, and NGM MOS forecasts of four categories of cloud amount (clear, scattered, broken, and overcast) for 24 stations in the Eastern Region, 0000 UTC cycle.

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Percent Correct	Skill Score
12	LOCAL	0.81	1.30	1.44	0.90	63.1	0.476
	LFM MOS	0.86	1.55	1.23	0.84	56.0	0.379
	NGM MOS	0.83	1.53	1.09	0.90	59.4	0.421
	No. Obs.	1153	638	481	1879		
18	LOCAL	0.47	1.55	2.07	0.80	51.7	0.348
	LFM MOS	0.68	1.65	1.40	0.83	55.4	0.388
	NGM MOS	0.57	1.71	1.50	0.84	55.7	0.393
	No. Obs.	1152	703	538	1759		
24	LOCAL	0.55	1.87	2.28	0.79	53.5	0.366
	LFM MOS	0.85	1.65	1.28	0.86	58.9	0.414
	NGM MOS	0.79	1.87	1.33	0.83	57.9	0.407
	No. Obs.	1372	539	418	1824		

Table 5.4. Same as Table 5.3 except for the 1200 UTC cycle.

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Percent Correct	Skill Score
12	LOCAL	0.68	1.57	1.86	0.88	62.4	0.469
	LFM MOS	0.87	1.69	1.30	0.83	59.7	0.425
	NGM MOS	0.80	1.78	1.39	0.84	60.0	0.434
	No. Obs.	1353	527	403	1814		
18	LOCAL	0.65	1.84	2.26	0.86	57.3	0.395
	LFM MOS	0.93	1.64	1.16	0.88	62.8	0.448
	NGM MOS	0.85	1.69	1.34	0.90	62.5	0.447
	No. Obs.	1511	419	341	1828		
24	LOCAL	0.78	1.31	1.81	0.82	53.8	0.352
	LFM MOS	0.82	1.57	1.34	0.83	54.7	0.361
	NGM MOS	0.81	1.53	1.22	0.88	56.8	0.385
	No. Obs.	1117	628	469	1882		

Table 5.5. Comparative verification of local, LFM MOS, and NGM MOS forecasts of four categories of cloud amount (clear, scattered, broken, and overcast) for 24 stations in the Southern Region, 0000 UTC cycle.

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Percent Correct	Skill Score
12	LOCAL	0.77	1.58	1.55	0.92	69.1	0.562
	LFM MOS	0.97	1.42	0.97	0.90	65.1	0.487
	NGM MOS	0.98	1.48	1.04	0.84	65.8	0.500
	No. Obs.	1777	508	399	1384		
18	LOCAL	0.65	1.67	1.64	0.72	51.7	0.360
	LFM MOS	0.86	1.58	1.07	0.80	57.1	0.415
	NGM MOS	0.91	1.55	1.04	0.77	57.7	0.420
	No. Obs.	1595	749	619	1248		
24	LOCAL	0.59	1.79	1.85	0.77	48.5	0.315
	LFM MOS	0.79	1.66	1.29	0.79	54.8	0.377
	NGM MOS	0.84	1.67	1.21	0.74	56.6	0.399
	No. Obs.	1740	709	489	1161		

Table 5.6. Same as Table 5.5 except for the 1200 UTC cycle.

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Percent Correct	Skill Score
12	LOCAL	0.75	1.38	1.62	0.88	63.4	0.498
	LFM MOS	0.87	1.63	1.26	0.71	57.7	0.412
	NGM MOS	0.88	1.48	1.09	0.85	61.6	0.461
	No. Obs.	1728	691	487	1153		
18	LOCAL	0.63	2.13	2.21	0.87	55.8	0.384
	LFM MOS	0.93	1.65	1.16	0.84	64.7	0.462
	NGM MOS	0.93	1.70	1.21	0.81	65.1	0.470
	No. Obs.	2043	426	348	1189		
24	LOCAL	0.61	2.03	1.97	0.84	51.6	0.342
	LFM MOS	0.96	1.46	0.96	0.90	63.6	0.466
	NGM MOS	0.95	1.49	1.15	0.83	63.0	0.461
	No. Obs.	1765	514	391	1354		

Table 5.7. Comparative verification of local, LFM MOS, and NGM MOS forecasts of four categories of cloud amount (clear, scattered, broken, and overcast) for 28 stations in the Central Region, 0000 UTC cycle.

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Percent Correct	Skill Score
12	LOCAL	0.72	1.62	1.81	0.93	65.7	0.515
	LFM MOS	0.97	1.52	1.07	0.85	60.4	0.417
	NGM MOS	0.82	1.63	1.39	0.91	59.7	0.421
	No. Obs.	2069	590	415	1743		
18	LOCAL	0.44	2.03	2.33	0.73	46.9	0.308
	LFM MOS	0.71	2.03	1.48	0.71	51.7	0.348
	NGM MOS	0.57	2.06	1.66	0.79	50.4	0.338
	No. Obs.	1833	745	537	1701		
24	LOCAL	0.46	1.93	2.36	0.75	44.9	0.276
	LFM MOS	0.76	1.90	1.39	0.75	51.5	0.339
	NGM MOS	0.62	1.90	1.75	0.78	51.3	0.345
	No. Obs.	1790	762	506	1759		

Table 5.8. Same as Table 5.7 except for the 1200 UTC cycle.

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Percent Correct	Skill Score
12	LOCAL	0.71	1.48	1.78	0.87	61.5	0.472
	LFM MOS	0.80	2.05	1.31	0.67	52.9	0.358
	NGM MOS	0.68	1.96	1.51	0.77	53.3	0.367
	No. Obs.	1825	745	513	1759		
18	LOCAL	0.56	2.00	2.46	0.88	53.1	0.360
	LFM MOS	0.91	1.74	1.31	0.80	59.1	0.404
	NGM MOS	0.84	1.74	1.30	0.88	58.7	0.402
	No. Obs.	2144	590	381	1728		
24	LOCAL	0.50	2.05	2.47	0.88	48.2	0.302
	LFM MOS	0.91	1.66	1.24	0.83	56.7	0.372
	NGM MOS	0.77	1.86	1.40	0.89	55.5	0.368
	No. Obs.	2053	595	415	1778		

Table 5.9. Comparative verification of local, LFM MOS, and NGM MOS forecasts of four categories of cloud amount (clear, scattered, broken, and overcast) for 18 stations in the Western Region, 0000 UTC cycle.

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Percent Correct	Skill Score
12	LOCAL	0.89	1.38	1.33	0.96	77.8	0.667
	LFM MOS	1.00	1.77	1.21	0.73	61.8	0.427
	NGM MOS	0.93	1.83	1.42	0.75	62.3	0.442
	No. Obs.	1473	301	278	1079		
18	LOCAL	0.80	1.42	2.21	0.68	54.3	0.375
	LFM MOS	0.93	1.72	1.54	0.60	54.8	0.371
	NGM MOS	0.75	1.91	1.89	0.62	51.9	0.349
	No. Obs.	1307	465	327	1032		
24	LOCAL	0.86	1.33	1.90	0.62	51.3	0.337
	LFM MOS	0.96	1.47	1.35	0.61	53.1	0.350
	NGM MOS	0.72	1.80	1.71	0.59	49.8	0.328
	No. Obs.	1267	579	375	909		

Table 5.10. Same as Table 5.9 except for the 1200 UTC cycle.

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Percent Correct	Skill Score
12	LOCAL	0.94	1.08	1.44	0.85	63.5	0.491
	LFM MOS	0.94	1.54	1.39	0.59	55.0	0.379
	NGM MOS	0.79	1.59	1.63	0.66	54.2	0.379
	No. Obs.	1253	568	371	915		
18	LOCAL	0.80	1.52	2.09	0.81	58.2	0.396
	LFM MOS	1.00	1.57	1.27	0.70	60.3	0.398
	NGM MOS	0.85	1.89	1.69	0.71	58.1	0.391
	No. Obs.	1542	361	268	935		
24	LOCAL	0.76	1.68	2.07	0.87	56.3	0.373
	LFM MOS	1.02	1.63	1.17	0.76	59.9	0.392
	NGM MOS	0.85	2.19	1.31	0.79	58.6	0.396
	No. Obs.	1464	296	273	1074		

Table 5.11. 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. NGM MOS forecasts were not available for the stations in Alaska.

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Percent Correct	Skill Score
12	LOCAL	0.80	1.10	1.47	0.99	66.9	0.450
	LFM MOS	0.91	0.91	0.77	1.09	69.3	0.461
	No. Obs.	229	94	94	576		
18	LOCAL	0.77	1.08	1.51	0.96	61.5	0.364
	LFM MOS	0.89	0.70	1.05	1.08	68.3	0.445
	No. Obs.	188	102	116	586		
24	LOCAL	0.64	1.16	1.30	1.02	56.1	0.298
	LFM MOS	0.82	0.77	0.59	1.22	64.0	0.377
	No. Obs.	192	109	141	542		

Table 5.12. Same as Table 5.11 except for the 1200 UTC cycle.

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Percent Correct	Skill Score
12	LOCAL	0.91	0.93	1.09	1.02	66.9	0.466
	LFM MOS	0.98	0.83	0.85	1.08	64.6	0.417
	No. Obs.	204	115	143	567		
18	LOCAL	0.63	1.19	1.68	1.02	61.8	0.377
	LFM MOS	0.82	0.96	0.70	1.14	66.5	0.417
	No. Obs.	258	97	98	584		
24	LOCAL	0.62	1.10	1.95	0.99	58.4	0.320
	LFM MOS	0.93	0.74	0.72	1.12	67.1	0.419
	No. Obs.	245	99	97	597		

Table 6.1. Verification of MOS surface wind forecasts for 94 stations in the conterminous U.S., 0000 UTC cycle.

		Direction			Speed											
								Contingency Table								
											Bias by Category					
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)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
12	LFM	20	0.562	3259	3.3	0.6	3277	0.396	86.2	0.08	1.02	0.90	0.72	0.72	0.31	0.00
	NGM	18	0.590		3.4	1.5		0.444	85.6	0.15	0.98	1.16	1.03	0.97	0.81	0.80
											13655	1594	480	99	16	5
18	LFM	22	0.515	6148	3.4	-0.1	6162	0.362	73.4	0.13	1.09	0.84	0.66	0.60	0.57	0.27
	NGM	20	0.548		3.3	1.1		0.428	73.7	0.13	0.98	1.05	1.05	1.03	1.03	0.64
											11336	3269	1084	269	58	11
24	LFM	25	0.480	4028	3.6	0.4	4050	0.330	81.2	0.06	1.06	0.80	0.64	0.53	0.19	0.33
	NGM	23	0.496		3.6	1.6		0.391	80.3	0.09	0.98	1.08	1.11	0.91	0.67	0.33
											12912	2137	607	133	27	3

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

		Direction			Speed											
								Contingency Table								
											Bias by Category					
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)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
12	LFM	23	0.513	4238	3.4	0.6	4257	0.370	81.7	0.13	1.04	0.86	0.79	0.79	0.39	0.33
	NGM	21	0.542		3.4	1.5		0.420	81.1	0.10	0.97	1.13	1.10	1.00	0.75	1.00
											12798	2100	596	130	28	3
18	LFM	22	0.535	3245	3.6	0.7	3268	0.356	85.1	0.05	1.03	0.86	0.68	0.69	0.21	0.33
	NGM	20	0.552		3.7	1.7		0.402	83.9	0.12	0.98	1.18	1.10	0.91	0.86	0.00
											13377	1636	471	96	14	3
24	LFM	23	0.513	2993	3.7	0.6	3018	0.321	85.1	0.00	1.04	0.81	0.67	0.51	0.12	0.00
	NGM	21	0.545		3.7	1.7		0.403	84.4	0.09	0.98	1.21	1.01	0.96	0.65	0.80
											13534	1585	472	97	17	5

Table 6.3. Verification of MOS surface wind forecasts for 24 stations in the Eastern Region, 0000 UTC cycle.

		Direction			Speed											
								Contingency Table								
											Bias by Category					
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)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
12	LFM	21	0.496	898	3.1	0.4	902	0.428	86.5	0.00	1.04	0.85	0.62	0.55	0.00	0.00
	NGM	19	0.523		3.1	1.2		0.469	85.9	0.00	0.99	1.08	0.91	1.00	0.00	0.00
											3502	460	125	22	1	1
18	LFM	22	0.472	1800	3.1	0.1	1806	0.356	71.4	0.13	1.09	0.85	0.72	0.51	0.60	1.00
	NGM	19	0.522		3.1	1.1		0.438	73.1	0.17	0.99	0.98	1.18	0.98	0.30	0.00
											2794	993	261	53	10	1
24	LFM	25	0.436	987	3.4	0.6	998	0.364	83.8	0.11	1.04	0.80	0.77	0.70	0.29	0.00
	NGM	22	0.466		3.4	1.5		0.425	83.3	0.00	0.99	1.05	1.32	0.70	0.00	0.00
											3421	522	111	23	7	1

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

		Direction			Speed											
								Contingency Table								
											Bias by Category					
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)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
12	LFM	22	0.454	1020	3.4	0.6	1028	0.365	83.8	0.11	1.04	0.80	0.72	1.04	0.29	0.00
	NGM	19	0.491		3.3	1.4		0.441	83.3	0.00	0.97	1.14	1.29	0.78	0.00	0.00
											3362	513	108	23	7	1
18	LFM	22	0.462	880	3.3	0.5	887	0.398	85.6	0.00	1.04	0.82	0.73	0.66	0.00	*
	NGM	20	0.521		3.4	1.2		0.415	84.4	0.00	0.99	1.06	1.08	0.69	0.00	*
											3419	452	117	29	3	0
24	LFM	24	0.429	828	3.6	0.4	833	0.348	84.8	0.00	1.04	0.79	0.66	0.59	0.00	0.00
	NGM	21	0.497		3.3	1.2		0.425	84.9	0.00	1.00	1.07	0.90	0.64	0.00	0.00
											3442	453	125	22	1	1

* This category was neither forecast nor observed.

Table 6.5. Verification of MOS surface wind forecasts for 24 stations in the Southern Region, 0000 UTC cycle.

		Direction			Speed											
								Contingency Table								
											Bias by Category					
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)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
12	LFM	23	0.505	644	3.6	1.4	650	0.373	89.2	0.00	1.00	1.06	0.84	0.90	**	*
	NGM	21	0.553		3.5	1.9		0.437	89.4	0.00	0.98	1.27	1.05	1.20	**	*
											3508	284	62	10	0	0
18	LFM	24	0.502	1500	3.3	0.4	1500	0.342	75.0	0.00	1.05	0.88	0.81	0.60	0.33	*
	NGM	22	0.527		3.2	1.2		0.409	75.0	0.00	0.95	1.13	1.11	1.43	0.83	*
											3009	767	207	35	6	0
24	LFM	25	0.491	834	3.4	0.7	836	0.307	84.1	0.00	1.03	0.90	0.48	0.33	0.00	0.00
	NGM	25	0.487		3.3	1.4		0.379	84.1	0.00	0.99	1.13	0.84	0.67	0.00	0.00
											3336	434	105	12	2	1

Table 6.6. Same as Table 6.5 except for the 1200 UTC cycle. Data for TCC were not available for the 18-h projection.

		Direction			Speed											
								Contingency Table								
											Bias by Category					
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)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
12	LFM	24	0.515	828	3.4	0.9	830	0.351	85.1	0.00	1.02	0.91	0.78	0.90	1.00	0.00
	NGM	21	0.563		3.3	1.5		0.413	85.4	0.00	0.99	1.13	0.83	1.30	1.00	0.00
											3320	413	98	10	1	1
18	LFM	22	0.527	666	3.7	1.6	673	0.333	86.7	*	1.00	0.99	1.01	0.58	*	*
	NGM	19	0.555		3.4	1.5		0.383	86.9	*	0.98	1.24	0.79	0.50	*	*
											3364	336	71	12	0	0
24	LFM	26	0.485	578	3.7	1.5	585	0.284	88.1	0.00	1.00	1.06	0.64	0.67	**	*
	NGM	25	0.497		3.7	2.0		0.379	88.3	*	0.97	1.35	1.03	0.67	*	*
											3477	279	58	9	0	0

* This category was neither forecast nor observed.
** This category was forecast but was not observed.

Table 6.7. Verification of MOS surface wind forecasts for 28 stations in the Central Region, 0000 UTC cycle.

		Direction			Speed											
								Contingency Table								
											Bias by Category					
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)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
12	LFM	17	0.618	1318	3.1	0.2	1321	0.376	81.6	0.13	1.04	0.88	0.73	0.58	0.30	0.00
	NGM	15	0.651		3.3	1.4		0.424	80.3	0.25	0.96	1.22	1.14	0.81	0.80	0.75
											3890	626	205	48	10	4
18	LFM	19	0.548	2254	3.5	-0.7	2259	0.336	66.7	0.14	1.17	0.82	0.58	0.61	0.31	0.14
	NGM	18	0.572		3.4	1.0		0.399	66.5	0.14	0.97	1.05	1.03	1.05	1.25	0.71
											2938	1208	468	134	32	7
24	LFM	22	0.538	1399	3.6	0.0	1404	0.315	77.3	0.00	1.10	0.72	0.58	0.47	0.17	0.00
	NGM	21	0.564		3.7	1.6		0.379	75.3	0.16	0.97	1.13	1.08	1.03	1.33	0.00
											3646	777	253	64	12	1

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

		Direction			Speed											
								Contingency Table								
											Bias by Category					
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)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
12	LFM	21	0.583	1593	3.3	0.2	1599	0.367	77.8	0.05	1.06	0.85	0.67	0.71	0.29	1.00
	NGM	19	0.609		3.3	1.5		0.407	75.9	0.15	0.95	1.22	1.15	0.77	0.93	2.00
											3652	776	255	62	14	1
18	LFM	19	0.583	1240	3.6	0.2	1247	0.324	80.8	0.08	1.06	0.80	0.56	0.66	0.38	0.50
	NGM	18	0.579		3.7	1.7		0.397	79.1	0.15	0.95	1.23	1.17	1.08	0.63	0.00
											3873	648	200	38	8	2
24	LFM	20	0.553	1177	3.7	0.2	1183	0.295	80.5	0.00	1.07	0.72	0.70	0.46	0.09	0.00
	NGM	19	0.591		3.6	1.6		0.385	78.7	0.14	0.95	1.28	1.13	0.98	0.64	0.75
											3903	626	203	48	11	4

Table 6.9. Verification of MOS surface wind forecasts for 18 stations in the Western Region, 0000 UTC cycle.

		Direction			Speed											
								Contingency Table								
											Bias by Category					
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)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
12	LFM	23	0.457	399	3.9	1.0	404	0.396	89.0	0.00	1.02	0.83	0.74	1.16	0.20	*
	NGM	19	0.460		4.1	1.7		0.423	88.5	0.00	1.00	1.02	0.91	1.21	0.60	**
											2755	224	88	19	5	0
18	LFM	27	0.426	594	4.2	0.2	597	0.392	84.4	0.16	1.05	0.79	0.61	0.68	1.50	0.33
	NGM	26	0.473		4.2	0.9		0.419	83.7	0.17	1.01	1.04	0.78	0.74	1.20	0.67
											2595	301	148	47	10	3
24	LFM	29	0.347	808	3.9	0.7	812	0.332	80.1	0.14	1.04	0.86	0.79	0.59	0.17	**
	NGM	28	0.353		4.0	1.7		0.362	79.4	0.00	1.00	0.96	1.19	0.91	0.33	**
											2509	404	138	34	6	0

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

		Direction			Speed											
								Contingency Table								
											Bias by Category					
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)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
12	LFM	28	0.374	797	3.8	1.2	800	0.382	80.7	0.43	1.02	0.89	1.06	0.74	0.67	*
	NGM	28	0.384		3.9	1.9		0.402	80.7	0.08	1.00	0.93	1.07	1.46	1.17	**
											2464	398	135	35	6	0
18	LFM	26	0.410	459	3.9	1.2	461	0.372	89.3	0.00	1.02	0.92	0.63	0.88	0.00	0.00
	NGM	26	0.408		4.6	2.7		0.379	87.4	0.10	0.98	1.18	1.24	1.18	2.33	0.00
											2721	200	83	17	3	1
24	LFM	24	0.452	410	4.0	0.6	417	0.364	88.9	0.00	1.04	0.78	0.63	0.44	0.00	*
	NGM	23	0.452		4.6	2.3		0.403	87.6	0.00	0.99	1.12	0.87	1.44	0.80	**
											2712	227	86	18	5	0

* This category was neither forecast nor observed.
** This category was forecast but was not observed.

Table 6.11. Verification of LFM MOS surface wind forecasts for 6 stations in the Alaska Region, 0000 UTC cycle.

Fcst Proj (h)	Type of Fcst.	Direction			Speed										
								Contingency Table							
											Bias by Category				
		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)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
12	LFM	40	0.300	254	4.7	3.2	260	0.364	84.6	0.00	0.98 848	1.03 87	1.16 31	3.00 4	** 0	* 0
18	LFM	34	0.306	270	4.8	3.1	283	0.326	84.0	0.00	0.98 844	1.13 82	1.21 28	2.25 4	0.33 3	* 0
24	LFM	39	0.298	330	4.6	2.4	342	0.312	79.4	0.20	1.00 783	1.01 119	0.91 34	1.00 9	4.00 1	0.00 1

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

Fcst Proj (h)	Type of Fcst.	Direction			Speed										
								Contingency Table							
											Bias by Category				
		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)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
12	LFM	37	0.322	317	3.9	1.6	320	0.326	80.8	0.50	1.01 835	0.99 120	0.89 36	0.89 9	0.00 1	1.00 1
18	LFM	37	0.328	270	4.6	2.9	286	0.347	84.1	0.00	0.99 877	1.01 104	1.38 21	1.67 6	0.00 2	* 0
24	LFM	42	0.237	275	5.0	3.3	284	0.304	83.6	*	0.99 893	1.01 93	1.06 31	3.00 4	* 0	* 0

* This category was neither forecast nor observed.
** This category was forecast but was not observed.

Table 6.13. Verification of local surface wind forecasts for 92 stations in the conterminous U.S. for the FT issuance time of approximately 0900 UTC.

		Direction			Speed											
								Contingency Table								
											Bias by Category					
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)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
3	LOCAL	23	0.528	6355	3.5	2.0	6466	0.439	85.2	0.09	0.97 13815	1.31 1612	0.93 465	0.52 96	0.56 18	1.25 4
9	LOCAL	30	0.417	10194	3.5	1.2	10288	0.349	70.5	0.09	0.99 11303	1.19 3241	0.72 1122	0.38 270	0.49 59	0.50 12
15	LOCAL	35	0.362	9246	4.2	2.9	9431	0.309	75.3	0.07	0.91 13182	1.59 2090	1.08 591	0.72 113	0.68 25	2.50 2

Table 6.14. Same as Table 6.13 except for the FT issuance time of approximately 1800 UTC.

		Direction			Speed											
								Contingency Table								
											Bias by Category					
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)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
3	LOCAL	26	0.474	10888	3.1	1.3	10944	0.401	71.8	0.17	0.96 11303	1.20 3435	0.91 1031	0.53 286	0.96 51	0.55 11
9	LOCAL	33	0.396	7188	4.1	2.6	7399	0.327	80.9	0.08	0.96 13679	1.43 1697	0.81 513	0.56 100	0.63 16	0.00 1
15	LOCAL	35	0.374	6338	4.2	2.5	6550	0.318	82.5	0.08	0.98 13783	1.27 1607	0.82 444	0.45 112	0.50 14	0.00 7

Table 6.15. Verification of local surface wind forecasts for 24 stations in the Eastern Region for the FT issuance time of approximately 0900 UTC.

		Direction			Speed											
								Contingency Table								
											Bias by Category					
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)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
3	LOCAL	23	0.478	1917	3.5	2.2	1953	0.450	84.5	0.17	0.96 3606	1.33 466	0.99 125	0.67 21	1.00 2	2.00 1
9	LOCAL	29	0.398	2877	3.4	1.1	2907	0.330	69.1	0.14	1.03 2877	1.04 996	0.73 276	0.42 53	0.30 10	2.00 1
15	LOCAL	35	0.319	2420	4.3	3.1	2487	0.303	76.1	0.08	0.90 3516	1.59 545	1.19 121	0.76 25	0.43 7	2.00 1

Table 6.16. Same as Table 6.15 except for the FT issuance time of approximately 1800 UTC.

		Direction			Speed											
								Contingency Table								
											Bias by Category					
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)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
3	LOCAL	25	0.460	2913	3.1	1.5	2927	0.369	71.6	0.14	0.95 3005	1.19 911	0.96 212	0.65 49	2.00 4	1.00 2
9	LOCAL	34	0.335	2023	4.2	2.6	2079	0.305	79.1	0.00	0.96 3506	1.32 500	0.79 141	0.88 25	0.40 5	* 0
15	LOCAL	36	0.317	1771	4.3	2.6	1832	0.310	81.8	0.00	0.98 3590	1.21 444	0.92 118	0.83 23	0.50 2	0.00 2

* This category was neither forecast nor observed.

Table 6.17. Verification of local surface wind forecasts for 22 stations in the Southern Region for the FT issuance time of approximately 0900 UTC. Data for TCC were not available for the 3- and 15-h projections.

Fcst Proj (h)	Type of Fcst.	Direction			Speed											
								Contingency Table								
											Bias by Category					
		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)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
3	LOCAL	22	0.560	1250	3.4	2.3	1274	0.423	89.3	*	0.97 3398	1.41 265	0.88 57	0.50 6	* 0	* 0
9	LOCAL	30	0.424	2412	3.3	1.4	2425	0.342	74.4	0.00	0.99 2824	1.19 698	0.53 183	0.19 21	0.00 3	0.00 1
15	LOCAL	34	0.375	2181	4.0	3.1	2220	0.315	79.8	*	0.91 3234	1.78 400	0.84 86	0.50 8	* 0	* 0

* This category was neither forecast nor observed.

Table 6.18. Same as Table 6.17 except for the FT issuance time of approximately 1800 UTC. Data for TCC were not available for the 15-h projection.

Fcst Proj (h)	Type of Fcst.	Direction			Speed											
								Contingency Table								
											Bias by Category					
		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)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
3	LOCAL	26	0.476	2716	3.1	1.6	2736	0.368	73.6	0.13	0.95 2894	1.27 770	0.82 169	0.28 25	0.00 8	** 0
9	LOCAL	31	0.431	1541	3.9	2.8	1600	0.342	86.4	*	0.98 3366	1.35 326	0.44 62	0.25 8	* 0	* 0
15	LOCAL	34	0.397	1288	4.0	2.5	1326	0.300	86.9	0.00	0.99 3345	1.21 304	0.49 53	0.15 13	0.00 1	* 0

* This category was neither forecast nor observed.

Table 6.19. Verification of local surface wind forecasts for 28 stations in the Central Region for the FT issuance time of approximately 0900 UTC.

		Direction			Speed											
								Contingency Table								
											Bias by Category					
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)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
3	LOCAL	21	0.545	2437	3.4	1.8	2469	0.411	79.8	0.11	0.95 3964	1.37 645	0.91 196	0.45 49	0.50 10	1.00 3
9	LOCAL	28	0.439	3534	3.6	0.9	3562	0.318	62.3	0.12	0.94 3002	1.32 1196	0.82 481	0.28 152	0.68 28	0.38 8
15	LOCAL	33	0.382	3253	4.0	2.5	3297	0.279	67.9	0.00	0.86 3733	1.64 806	1.11 261	0.56 55	0.64 11	2.00 1

Table 6.20. Same as Table 6.19 except for the FT issuance time of approximately 1800 UTC.

		Direction			Speed											
								Contingency Table								
											Bias by Category					
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)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
3	LOCAL	24	0.491	3714	3.1	0.7	3728	0.393	65.5	0.18	0.94 2923	1.25 1298	0.88 486	0.46 156	1.04 27	0.43 7
9	LOCAL	31	0.411	2671	4.0	2.3	2737	0.308	74.9	0.15	0.93 3952	1.49 672	0.87 216	0.35 46	0.56 9	0.00 1
15	LOCAL	32	0.393	2446	4.1	2.1	2520	0.306	77.0	0.10	0.97 3999	1.33 647	0.81 195	0.25 51	0.20 5	0.00 5

Table 6.21. Verification of local surface wind forecasts for 18 stations in the Western Region for the FT issuance time of approximately 0900 UTC.

		Direction			Speed											
								Contingency Table								
											Bias by Category					
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)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
3	LOCAL	29	0.464	751	3.8	1.8	770	0.465	89.6	0.00	1.01 2847	0.99 236	0.92 87	0.55 20	0.50 6	* 0
9	LOCAL	40	0.340	1371	4.2	1.9	1394	0.373	80.3	0.04	1.01 2600	1.18 351	0.61 182	0.77 44	0.39 18	0.50 2
15	LOCAL	42	0.306	1392	4.5	2.9	1427	0.336	80.4	0.15	0.96 2699	1.26 339	1.06 123	1.08 25	1.00 7	** 0

* This category was neither forecast nor observed.
** This category was forecast once but was not observed.

Table 6.22. Same as Table 6.21 except for the FT issuance time of approximately 1800 UTC.

		Direction			Speed											
								Contingency Table								
											Bias by Category					
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)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
3	LOCAL	32	0.421	1545	3.5	1.5	1553	0.441	79.9	0.17	1.01 2481	0.98 456	1.02 164	0.73 56	1.08 12	0.00 2
9	LOCAL	40	0.341	953	4.6	3.2	983	0.351	86.0	0.00	0.96 2855	1.63 199	0.96 94	0.76 21	1.50 2	* 0
15	LOCAL	44	0.291	833	4.9	3.1	872	0.342	86.8	0.10	0.98 2849	1.31 212	0.95 78	0.64 25	0.83 6	* 0

* This category was neither forecast nor observed.

Table 6.23. Verification of local surface wind forecasts for 6 stations in the Alaska Region for the FT issuance time of approximately 0900 UTC.

Fcst Proj (h)	Type of Fcst.	Direction			Speed											
								Contingency Table								
											Bias by Category					
		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)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
3	LOCAL	30	0.405	368	4.2	2.9	382	0.399	85.2	0.00	0.97 865	1.24 87	1.20 30	1.50 4	** 0	* 0
9	LOCAL	40	0.347	360	4.7	3.3	385	0.347	83.8	0.00	0.96 863	1.20 86	1.33 27	3.00 4	0.33 3	* 0
15	LOCAL	47	0.260	391	4.9	2.9	409	0.272	79.1	0.00	1.00 813	0.93 117	1.00 34	1.56 9	2.00 1	0.00 1

* This category was neither forecast nor observed.
** This category was forecast once but was not observed.

Table 6.24. Same as Table 6.23 except for the FT issuance time of approximately 1800 UTC.

Fcst Proj (h)	Type of Fcst.	Direction			Speed											
								Contingency Table								
											Bias by Category					
		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)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
3	LOCAL	30	0.388	397	3.9	2.2	409	0.384	82.6	0.00	1.00 858	0.92 120	1.06 36	1.56 9	1.00 1	0.00 1
9	LOCAL	45	0.269	381	5.1	3.9	405	0.266	80.5	0.00	0.96 898	1.16 107	2.00 20	1.43 7	0.50 2	** 0
15	LOCAL	45	0.219	380	6.0	4.6	410	0.212	80.0	0.00	0.96 908	1.21 95	1.23 30	2.50 4	*** 0	*** 0

** This category was forecast once but was not observed.
*** This category was forecast twice but was not observed.

Table 6.25. Comparative verification of local and MOS 42-h surface wind speed forecasts for 92 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 22 kt
		≤ 22 kt	> 22 kt			
1-min Avg	LOCAL	0.96	2.75	0.223	94.0	0.14
	LFM MOS	1.01	0.50	0.243	97.6	0.15
	NGM MOS	1.00	1.15	0.351	97.1	0.22
	No. Obs.	15564	336			
3-h Max	LOCAL	0.99	1.10	0.287	92.5	0.19
	LFM MOS	1.04	0.20	0.192	95.0	0.11
	NGM MOS	1.03	0.46	0.342	95.1	0.22
	No. Obs.	15055	841			

Table 6.26 Same as Table 6.25 except for the 1200 UTC cycle.

Type of Verifying Observation	Type of Forecast	Bias by Category		Skill Score	Percent Forecast Correct	Threat Score 22 kt
		≤ 22 kt	> 22 kt			
1-min Avg	LOCAL	0.96	5.68	0.109	95.6	0.06
	LFM MOS	1.00	0.52	0.221	99.1	0.13
	NGM MOS	1.00	0.91	0.210	98.9	0.12
	No. Obs.	15599	117			
3-h Max	LOCAL	0.98	1.55	0.208	94.7	0.13
	LFM MOS	1.02	0.14	0.129	97.3	0.07
	NGM MOS	1.02	0.25	0.178	97.2	0.10
	No. Obs.	15282	428			

Table 6.27. Comparative verification of local and LFM MOS 42-h surface wind speed forecasts for 6 stations in the Alaska Region, 0000 UTC cycle.

Type of Verifying Observation	Type of Forecast	Bias by Category ≤ 22 kt	Bias by Category > 22 kt	Skill Score	Percent Forecast Correct	Threat Score 22 kt
1-min Avg	LOCAL	0.97	5.17	0.044	96.4	0.03
	LFM MOS	0.99	2.00	0.216	98.6	0.13
	No. Obs.	979	6			
3-h Max	LOCAL	1.00	1.07	0.106	94.6	0.07
	LFM MOS	1.02	0.41	0.280	97.0	0.17
	No. Obs.	941	29			

Table 6.28. Same as Table 6.27 except for the 1200 UTC cycle.

Type of Verifying Observation	Type of Forecast	Bias by Category ≤ 22 kt	Bias by Category > 22 kt	Skill Score	Percent Forecast Correct	Threat Score 22 kt
1-min Avg	LOCAL	0.98	2.89	-0.013	96.6	0.00
	LFM MOS	1.00	0.89	0.110	98.5	0.06
	No. Obs.	1023	9			
3-h Max	LOCAL	1.00	1.14	0.107	95.9	0.07
	LFM MOS	1.01	0.36	0.123	97.4	0.07
	No. Obs.	979	22			

Table 7.1. Comparative verification of LFM MOS and persistence ceiling height forecasts for 91 stations in the conterminous U.S., 0000 UTC cycle.

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Log Score	Percent Correct	Skill Score
12	MOS	1.30	0.88	0.97	0.99	2.969	77.8	0.379
	PERSISTENCE	0.83	0.95	0.94	1.02	1.690	85.7	0.583
	No. Obs.	743	756	1694	12237			
18	MOS	1.77	0.85	1.03	0.98	2.379	78.7	0.399
	PERSISTENCE	1.69	1.00	0.78	1.02	2.605	77.6	0.337
	No. Obs.	365	718	2049	12302			
24	MOS	1.77	0.81	1.07	0.98	1.979	82.7	0.377
	PERSISTENCE	1.98	1.32	1.08	0.96	2.837	76.8	0.217
	No. Obs.	298	533	1432	12909			

Table 7.2. Same as Table 7.1 except for 92 stations for the 1200 UTC cycle. Data for TCC were not available for the 18- and 24-h projections.

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Log Score	Percent Correct	Skill Score
12	MOS	1.48	0.79	1.04	0.99	1.824	83.7	0.396
	PERSISTENCE	0.89	1.00	1.19	0.98	1.118	88.3	0.578
	No. Obs.	293	536	1421	12819			
18	MOS	1.68	0.77	0.96	0.99	2.576	80.4	0.374
	PERSISTENCE	0.52	0.87	1.16	1.01	2.138	80.5	0.352
	No. Obs.	507	642	1488	12483			
24	MOS	1.78	0.76	0.93	0.98	3.411	76.2	0.361
	PERSISTENCE	0.35	0.73	1.02	1.05	3.078	75.0	0.234
	No. Obs.	754	755	1679	12019			

Table 7.3. Comparative verification of LFM MOS and persistence ceiling height forecasts for 6 stations in the Alaska Region, 0000 UTC cycle.

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Log Score	Percent Correct	Skill Score
12	MOS	0.96	1.15	1.62	0.82	3.382	66.8	0.348
	PERSISTENCE	1.04	0.74	1.08	1.00	2.067	79.1	0.524
	No. Obs.	25	54	186	677			
18	MOS	0.64	1.42	1.75	0.78	3.571	61.5	0.264
	PERSISTENCE	1.04	0.84	1.07	0.99	2.942	71.3	0.346
	No. Obs.	25	50	182	665			
24	MOS	0.36	1.37	1.96	0.73	3.528	60.9	0.274
	PERSISTENCE	1.00	0.89	1.05	0.99	3.325	68.0	0.272
	No. Obs.	25	46	183	651			

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

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Log Score	Percent Correct	Skill Score
12	MOS	1.45	1.04	1.65	0.80	3.220	66.8	0.351
	PERSISTENCE	0.86	0.98	1.03	1.00	2.004	79.4	0.526
	No. Obs.	22	48	186	666			
18	MOS	1.14	1.41	1.63	0.78	3.399	65.3	0.340
	PERSISTENCE	0.68	1.32	0.92	1.02	2.868	71.1	0.338
	No. Obs.	28	37	206	666			
24	MOS	0.92	1.28	1.86	0.74	3.981	59.5	0.252
	PERSISTENCE	0.73	0.89	1.03	1.01	3.364	66.9	0.244
	No. Obs.	26	53	192	681			

Table 7.5. Comparative verification of local and persistence ceiling height forecasts for 91 stations in the conterminous U.S. for the FT issuance time of approximately 0900 UTC.

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Log Score	Percent Correct	Skill Score
3	LOCAL	0.82	0.85	1.10	1.01	1.907	84.0	0.544
	PERSISTENCE	0.83	0.95	0.95	1.02	1.708	85.6	0.583
	No. Obs.	783	796	1745	12676			
6	LOCAL	0.51	0.67	1.12	1.03	2.286	80.3	0.443
	PERSISTENCE	0.93	0.85	0.86	1.04	2.437	80.0	0.434
	No. Obs.	702	886	1948	12448			
9	LOCAL	0.42	0.53	1.00	1.04	1.796	81.3	0.405
	PERSISTENCE	2.01	1.03	0.78	1.01	2.560	77.7	0.338
	No. Obs.	323	734	2137	12799			
15	LOCAL	0.40	0.62	1.33	0.99	1.649	83.2	0.371
	PERSISTENCE	2.02	1.37	1.11	0.95	2.880	76.6	0.218
	No. Obs.	321	551	1501	13615			

Table 7.6. Same as Table 7.5 except for 92 stations for the FT issuance time of approximately 1800 UTC. Data for TCC were not available for the 9-h projection.

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Log Score	Percent Correct	Skill Score
3	LOCAL	0.82	0.73	1.11	1.00	1.298	85.9	0.512
	PERSISTENCE	1.25	1.27	1.18	0.96	1.338	85.9	0.552
	No. Obs.	267	586	1815	13427			
6	LOCAL	0.52	0.76	1.30	0.99	1.525	84.6	0.433
	PERSISTENCE	1.02	1.34	1.42	0.94	1.841	81.7	0.398
	No. Obs.	325	553	1504	13613			
9	LOCAL	0.51	0.85	1.39	0.98	1.792	82.6	0.409
	PERSISTENCE	0.81	1.16	1.43	0.95	2.162	79.5	0.343
	No. Obs.	411	635	1493	13453			
15	LOCAL	0.52	1.02	1.41	0.97	2.536	77.9	0.372
	PERSISTENCE	0.50	0.97	1.26	0.99	2.938	74.5	0.247
	No. Obs.	658	757	1684	12854			

Table 7.7. Comparative verification of local and persistence ceiling height forecasts for 6 stations in the Alaska Region for the FT issuance time of approximately 0900 UTC.

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Log Score	Percent Correct	Skill Score
3	LOCAL	2.11	0.58	1.03	0.98	3.411	72.9	0.402
	PERSISTENCE	*	*	*	*	*	*	*
	No. Obs.	28	55	192	691			
6	LOCAL	1.34	0.52	1.29	0.95	3.875	68.7	0.303
	PERSISTENCE	*	*	*	*	*	*	*
	No. Obs.	38	56	166	707			
9	LOCAL	1.72	0.37	1.16	0.98	3.512	68.7	0.290
	PERSISTENCE	*	*	*	*	*	*	*
	No. Obs.	25	52	189	700			
15	LOCAL	1.65	0.37	1.14	0.98	3.800	66.4	0.225
	PERSISTENCE	*	*	*	*	*	*	*
	No. Obs.	23	49	190	695			

* Persistence observations were not available for the entire season.

Table 7.8. Same as Table 7.7 except for the FT issuance time of approximately 1800 UTC.

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Log Score	Percent Correct	Skill Score
3	LOCAL	1.78	0.42	1.08	0.99	3.351	71.5	0.331
	PERSISTENCE	*	*	*	*	*	*	*
	No. Obs.	23	52	194	731			
6	LOCAL	1.27	0.51	1.07	1.00	3.537	68.7	0.280
	PERSISTENCE	*	*	*	*	*	*	*
	No. Obs.	30	43	210	725			
9	LOCAL	1.25	0.48	1.09	0.99	3.496	69.6	0.310
	PERSISTENCE	*	*	*	*	*	*	*
	No. Obs.	28	42	219	720			
15	LOCAL	1.36	0.41	1.34	0.94	4.007	63.3	0.212
	PERSISTENCE	*	*	*	*	*	*	*
	No. Obs.	28	58	202	721			

* Persistence observations were not available for the entire season.

Table 8.1. Comparative verification of LFM MOS and persistence visibility forecasts for 91 stations in the conterminous U.S., 0000 UTC cycle.

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Log Score	Percent Correct	Skill Score
12	MOS	1.26	0.98	1.15	0.97	2.942	75.8	0.347
	PERSISTENCE	0.74	0.77	0.95	1.04	1.594	85.2	0.554
	No. Obs.	591	800	1808	12303			
18	MOS	1.28	1.08	1.19	0.97	2.214	79.9	0.324
	PERSISTENCE	1.42	0.79	1.30	0.97	2.448	78.6	0.274
	No. Obs.	309	780	1322	13094			
24	MOS	1.16	1.07	1.14	0.98	1.771	83.3	0.330
	PERSISTENCE	2.03	1.09	1.37	0.95	2.538	78.1	0.202
	No. Obs.	215	563	1241	13393			

Table 8.2. Same as Table 8.1 except for 92 stations for the 1200 UTC cycle. Data for TCC were not available for the 18- and 24-h projections.

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Log Score	Percent Correct	Skill Score
12	MOS	1.22	0.82	1.02	1.00	1.582	85.2	0.366
	PERSISTENCE	1.03	1.17	0.95	1.00	1.071	89.2	0.548
	No. Obs.	211	558	1224	13302			
18	MOS	1.45	0.87	1.03	0.99	2.175	81.6	0.332
	PERSISTENCE	0.67	1.22	0.80	1.02	1.938	82.6	0.319
	No. Obs.	322	541	1430	12860			
24	MOS	1.77	0.92	1.00	0.97	3.383	74.9	0.331
	PERSISTENCE	0.36	0.83	0.65	1.09	3.028	75.3	0.183
	No. Obs.	601	795	1782	12090			

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

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Log Score	Percent Correct	Skill Score
12	MOS	0.82	1.13	0.89	1.01	3.467	69.4	0.228
	PERSISTENCE	1.05	0.75	0.99	1.03	2.085	80.3	0.492
	No. Obs.	22	72	139	719			
18	MOS	0.53	1.11	1.25	0.98	3.857	68.0	0.225
	PERSISTENCE	0.49	0.73	1.26	1.02	3.769	71.6	0.275
	No. Obs.	47	74	109	718			
24	MOS	0.81	1.07	1.27	0.97	3.851	68.2	0.207
	PERSISTENCE	0.74	0.61	1.41	1.00	3.730	69.7	0.204
	No. Obs.	31	87	94	718			

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

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Log Score	Percent Correct	Skill Score
12	MOS	0.84	0.83	1.37	0.98	3.535	71.7	0.267
	PERSISTENCE	1.13	1.02	1.13	0.98	2.624	78.5	0.448
	No. Obs.	31	84	95	736			
18	MOS	0.67	1.14	1.10	0.98	3.258	69.0	0.225
	PERSISTENCE	1.50	1.54	0.71	1.00	3.516	70.6	0.261
	No. Obs.	24	57	146	727			
24	MOS	1.00	0.82	1.65	0.89	3.858	63.8	0.199
	PERSISTENCE	1.54	1.24	0.73	1.01	4.236	65.9	0.150
	No. Obs.	24	71	142	727			

Table 8.5. Comparative verification of local and persistence visibility forecasts for 91 stations in the conterminous U.S. for the FT issuance time of approximately 0900 UTC.

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Log Score	Percent Correct	Skill Score
3	LOCAL	0.76	0.78	1.27	0.99	1.892	81.5	0.479
	PERSISTENCE	0.76	0.79	0.94	1.03	1.562	85.4	0.560
	No. Obs.	609	780	1885	12725			
6	LOCAL	0.45	0.42	1.12	1.06	2.327	78.6	0.364
	PERSISTENCE	0.80	0.56	0.98	1.05	2.472	78.6	0.374
	No. Obs.	574	1100	1820	12488			
9	LOCAL	0.37	0.38	1.11	1.04	1.565	84.0	0.347
	PERSISTENCE	1.84	0.80	1.28	0.97	2.360	79.2	0.283
	No. Obs.	250	776	1392	13573			
15	LOCAL	0.36	0.46	1.06	1.03	1.377	86.0	0.337
	PERSISTENCE	2.11	1.05	1.44	0.94	2.522	78.2	0.200
	No. Obs.	218	587	1230	13951			

Table 8.6. Same as Table 8.5 except for 92 stations for the FT issuance time of approximately 1800 UTC. Data for TCC were not available for the 9-h projection.

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Log Score	Percent Correct	Skill Score
3	LOCAL	0.53	0.58	1.29	1.00	1.171	87.6	0.465
	PERSISTENCE	1.16	1.22	1.16	0.97	1.248	87.8	0.517
	No. Obs.	219	651	1201	14022			
6	LOCAL	0.39	0.60	1.24	1.00	1.305	86.4	0.400
	PERSISTENCE	1.16	1.35	1.12	0.97	1.621	84.5	0.384
	No. Obs.	220	581	1241	13952			
9	LOCAL	0.45	0.79	1.24	1.00	1.448	85.0	0.376
	PERSISTENCE	1.02	1.46	1.05	0.98	1.831	82.9	0.329
	No. Obs.	249	536	1324	13880			
15	LOCAL	0.47	1.04	1.22	0.99	2.296	78.5	0.325
	PERSISTENCE	0.54	1.23	0.79	1.03	2.608	77.4	0.228
	No. Obs.	468	637	1767	13078			

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

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Log Score	Percent Correct	Skill Score
3	LOCAL	0.61	0.51	1.13	1.03	2.050	79.8	0.470
	PERSISTENCE	*	*	*	*	*	*	*
	No. Obs.	23	69	142	725			
6	LOCAL	0.47	0.45	1.18	1.05	2.638	74.9	0.353
	PERSISTENCE	*	*	*	*	*	*	*
	No. Obs.	32	74	136	720			
9	LOCAL	0.33	0.43	1.39	1.04	3.260	72.4	0.244
	PERSISTENCE	*	*	*	*	*	*	*
	No. Obs.	46	70	106	738			
15	LOCAL	0.09	0.23	1.32	1.09	2.841	74.8	0.227
	PERSISTENCE	*	*	*	*	*	*	*
	No. Obs.	32	83	95	741			

* Persistence observations were not available for the entire season.

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

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Log Score	Percent Correct	Skill Score
3	LOCAL	0.40	0.44	1.20	1.06	2.626	77.3	0.292
	PERSISTENCE	*	*	*	*	*	*	*
	No. Obs.	30	86	90	785			
6	LOCAL	0.56	0.34	1.12	1.07	2.694	75.7	0.262
	PERSISTENCE	*	*	*	*	*	*	*
	No. Obs.	25	83	109	783			
9	LOCAL	0.46	0.47	0.90	1.08	2.654	74.5	0.232
	PERSISTENCE	*	*	*	*	*	*	*
	No. Obs.	24	64	137	778			
15	LOCAL	0.54	0.56	0.97	1.06	3.141	71.4	0.209
	PERSISTENCE	*	*	*	*	*	*	*
	No. Obs.	28	72	139	760			

* Persistence observations were not available for the entire season.