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AFOS-ERA VERIFICATION OF GUIDANCE AND LOCAL AVIATION/PUBLIC WEATHER FORECASTS--NO. 17 (OCTOBER 1991 - MARCH 1992)

Valery J. Dagostaro and J. Paul Dallavalle

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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 was changed significantly a number of issues ago. Most text has been eliminated, and descriptive information about the verification data is presented in tabular form. In addition, the 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 1991 through March 1992 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. 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 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. 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. Similarly, the snow amount verification results shown in Table 5.1 are for the conterminous U.S. only. Tables 6.1 - 6.12 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 7.1 - 7.12, while the analogous local scores are given in Tables 7.13 - 7.24. Comparative verification results for the 42-h significant wind speed are presented in Tables 7.25 - 7.28. 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 8.1 - 8.4 contain the objective ceiling height forecast results for the conterminous U.S. and the Alaska Region, while Tables 8.5 - 8.8 contain ceiling height scores for the local forecasts. Analogously, Tables 9.1 - 9.8 show guidance and local visibility forecast verification scores for the conterminous U.S. stations and the Alaskan stations.

2. SUMMARY (OCTOBER 1991 - MARCH 1992)

Two stations that were included in the 1991 warm season verification, namely, Hobart, Oklahoma and McAlester, Oklahoma, were not included in the 1991-92 cool season verification.

The NGM-based MOS max/min temperature and wind guidance were produced by new forecast equations beginning 1200 UTC October 23, 1991 (Dallavalle et al., 1992).

In general, care must be used when interpreting verification results for rare events, for example, the lower categories of ceiling height or winds > 22 kt.

3. REFERENCES

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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) hours 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) hours 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 hours 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's) 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-five stations in the conterminous U.S. and six stations in Alaska used for comparative 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. Please note that LAX and BET were not included in the max/min temperature and PoP verifications. LBB and ELP were not included in the 42-h significant wind verification and the local surface wind, ceiling height, and visibility verifications. Also note that TCC and SDF were not available for the snow amount verification. TCC was not available for the cloud amount, 42-h significant wind, and MOS surface wind verifications for the 1200 UTC cycle, the MOS ceiling height and visibility verifications for the 0000 and 1200 UTC cycles, and the local ceiling height and visibility verifications for the FT release time of approximately 0900 UTC.

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
AMA	Amarillo, Texas		
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	BET*	Bethel, Alaska
FAI*	Fairbanks, Alaska	OME*	Nome, Alaska
JNU*	Juneau, Alaska	YAK*	Yakutat, Alaska

* These stations were not included in the precipitation type and snow amount verifications.

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.

Table 2.1. Comparative verification of local, LFM MOS, and NGM MOS max/min temperature forecasts for 94 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	16132	0.0	2.9	1.2	--	--	87.7
	LFM MOS		-0.4	3.4	2.4	--	--	83.5
	NGM MOS		0.1	3.2	1.9	--	--	84.6
Tonight's Min	LOCAL	16097	-0.8	3.3	1.9	0.67	0.30	85.7
	LFM MOS		-1.2	3.7	3.0	0.69	0.35	82.3
	NGM MOS		-0.7	3.6	2.6	0.72	0.34	83.5
Tomorrow's Max	LOCAL	16104	-0.7	3.9	4.1	--	--	78.4
	LFM MOS		-1.0	4.3	6.1	--	--	73.5
	NGM MOS		-0.3	4.2	6.1	--	--	74.1
Tomorrow Night's Min	LOCAL	16062	-1.2	4.3	6.0	0.55	0.38	76.0
	LFM MOS		-1.3	4.7	8.0	0.58	0.41	71.8
	NGM MOS		-1.0	4.4	6.1	0.61	0.38	75.4

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	16238	-0.7	3.0	1.1	0.70	0.24	88.5
	LFM MOS		-1.1	3.5	2.0	0.67	0.30	84.8
	NGM MOS		-0.5	3.2	1.6	0.64	0.28	86.6
Tomorrow's Max	LOCAL	16244	-0.5	3.5	2.9	--	--	82.6
	LFM MOS		-0.8	4.1	5.1	--	--	76.6
	NGM MOS		0.2	3.9	4.5	--	--	78.3
Tomorrow Night's Min	LOCAL	16206	-1.1	3.8	3.5	0.70	0.33	81.1
	LFM MOS		-1.4	4.3	5.5	0.67	0.40	76.7
	NGM MOS		-0.8	4.0	4.1	0.68	0.37	80.0
Day After Tomorrow's Max	LOCAL	16222	-0.9	4.4	6.8	--	--	72.2
	LFM MOS		-1.1	4.8	9.3	--	--	66.6
	NGM MOS		-0.2	4.7	8.2	--	--	68.3

Table 2.3. Comparative 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	4160	-0.2	2.8	1.0	--	--	87.3
	LFM MOS		-0.4	3.3	2.0	--	--	83.4
	NGM MOS		-0.1	3.1	1.1	--	--	85.1
Tonight's Min	LOCAL	4152	-0.7	3.2	1.5	0.73	0.32	86.5
	LFM MOS		-1.2	3.5	2.4	0.76	0.31	83.6
	NGM MOS		-0.4	3.4	2.0	0.77	0.35	85.0
Tomorrow's Max	LOCAL	4150	-1.3	3.8	3.3	--	--	78.8
	LFM MOS		-1.6	4.2	4.9	--	--	74.3
	NGM MOS		-0.7	3.9	4.3	--	--	77.6
Tomorrow Night's Min	LOCAL	4145	-1.8	4.2	4.9	0.69	0.32	77.0
	LFM MOS		-2.2	4.6	7.0	0.72	0.39	73.4
	NGM MOS		-1.0	4.2	4.8	0.66	0.36	77.6

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	4197	-0.6	2.9	0.9	0.72	0.27	88.9
	LFM MOS		-0.9	3.3	1.5	0.69	0.30	85.8
	NGM MOS		-0.4	3.1	1.5	0.68	0.30	87.3
Tomorrow's Max	LOCAL	4195	-0.8	3.5	2.8	--	--	81.7
	LFM MOS		-1.1	3.9	4.1	--	--	77.0
	NGM MOS		-0.2	3.6	2.9	--	--	80.5
Tomorrow Night's Min	LOCAL	4190	-1.2	3.7	2.2	0.77	0.34	82.8
	LFM MOS		-1.8	4.1	3.8	0.77	0.40	78.7
	NGM MOS		-0.6	3.7	2.9	0.72	0.33	81.9
Day After Tomorrow's Max	LOCAL	4189	-1.6	4.3	6.0	--	--	72.3
	LFM MOS		-2.0	4.7	7.4	--	--	67.9
	NGM MOS		-1.0	4.3	5.3	--	--	72.9

Table 2.5. Comparative verification of local, LFM MOS, and NGM MOS max/min temperature forecasts for 25 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	4136	0.1	2.8	1.4	--	--	84.6
	LFM MOS		-0.3	3.2	2.1	--	--	80.6
	NGM MOS		-0.2	3.0	1.4	--	--	83.0
Tonight's Min	LOCAL	4129	-0.6	3.3	1.5	0.66	0.30	85.3
	LFM MOS		-0.7	3.7	2.7	0.63	0.36	81.7
	NGM MOS		-0.8	3.4	1.9	0.69	0.37	83.7
Tomorrow's Max	LOCAL	4134	-0.3	3.6	3.4	--	--	75.2
	LFM MOS		-0.5	3.8	4.3	--	--	72.1
	NGM MOS		-0.4	4.0	5.3	--	--	69.4
Tomorrow Night's Min	LOCAL	4121	-0.9	4.3	5.6	0.51	0.43	75.0
	LFM MOS		-0.7	4.6	7.0	0.53	0.43	71.4
	NGM MOS		-0.8	4.4	5.5	0.55	0.41	74.4

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	4145	-0.6	2.9	0.8	0.72	0.27	88.2
	LFM MOS		-0.9	3.5	1.7	0.59	0.33	83.8
	NGM MOS		-0.6	3.2	1.2	0.58	0.32	86.3
Tomorrow's Max	LOCAL	4146	-0.1	3.3	2.7	--	--	79.4
	LFM MOS		-0.5	3.8	4.1	--	--	73.2
	NGM MOS		0.1	3.6	4.0	--	--	74.5
Tomorrow Night's Min	LOCAL	4134	-0.9	3.8	3.5	0.63	0.33	79.7
	LFM MOS		-0.9	4.3	5.3	0.58	0.41	75.4
	NGM MOS		-0.7	4.0	4.0	0.60	0.41	78.4
Day After Tomorrow's Max	LOCAL	4144	-0.3	4.1	5.5	--	--	68.5
	LFM MOS		-0.6	4.4	6.9	--	--	64.9
	NGM MOS		0.2	4.5	7.1	--	--	61.5

Table 2.7. Comparative 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	4901	0.1	3.1	1.5	--	--	89.8
	LFM MOS		-0.2	3.7	3.1	--	--	86.0
	NGM MOS		0.5	3.6	3.3	--	--	86.3
Tonight's Min	LOCAL	4891	-1.1	3.6	2.9	0.71	0.25	87.5
	LFM MOS		-1.6	4.0	4.2	0.75	0.32	84.7
	NGM MOS		-1.0	4.0	3.6	0.76	0.27	85.4
Tomorrow's Max	LOCAL	4892	-0.7	4.4	6.4	--	--	80.0
	LFM MOS		-0.8	4.9	9.1	--	--	75.6
	NGM MOS		0.1	4.8	8.6	--	--	76.8
Tomorrow Night's Min	LOCAL	4879	-1.4	4.8	8.6	0.54	0.38	78.3
	LFM MOS		-1.4	5.2	11.6	0.57	0.38	73.7
	NGM MOS		-1.3	4.9	8.8	0.66	0.33	77.1

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	4923	-0.9	3.2	1.4	0.74	0.20	90.4
	LFM MOS		-1.3	3.7	2.9	0.74	0.25	87.1
	NGM MOS		-0.6	3.5	2.2	0.72	0.22	88.3
Tomorrow's Max	LOCAL	4926	-0.5	3.9	4.1	--	--	84.8
	LFM MOS		-0.5	4.6	7.4	--	--	79.1
	NGM MOS		0.7	4.3	6.0	--	--	81.4
Tomorrow Night's Min	LOCAL	4915	-1.4	4.2	5.2	0.76	0.28	83.2
	LFM MOS		-1.7	4.7	8.0	0.72	0.35	79.1
	NGM MOS		-1.1	4.3	5.5	0.74	0.34	82.7
Day After Tomorrow's Max	LOCAL	4917	-0.7	5.1	10.3	--	--	73.6
	LFM MOS		-0.7	5.7	14.5	--	--	67.6
	NGM MOS		0.1	5.5	12.4	--	--	70.2

Table 2.9. Comparative 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	2935	-0.2	2.6	0.8	--	--	86.4
	LFM MOS		-0.8	3.2	2.1	--	--	80.4
	NGM MOS		0.0	3.1	1.7	--	--	81.0
Tonight's Min	LOCAL	2925	-0.6	3.1	1.3	0.42	0.41	77.0
	LFM MOS		-1.2	3.6	2.2	0.42	0.54	70.6
	NGM MOS		-0.8	3.4	2.8	0.47	0.45	72.2
Tomorrow's Max	LOCAL	2928	-0.6	3.4	2.5	--	--	77.4
	LFM MOS		-0.9	4.1	5.4	--	--	67.7
	NGM MOS		-0.5	4.2	5.5	--	--	66.9
Tomorrow Night's Min	LOCAL	2917	-0.7	3.7	3.8	0.26	0.57	66.9
	LFM MOS		-0.7	4.0	4.8	0.30	0.56	61.6
	NGM MOS		-0.9	3.8	4.3	0.47	0.53	65.7

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	2973	-0.7	2.8	1.0	0.49	0.24	80.9
	LFM MOS		-1.3	3.3	1.6	0.56	0.39	75.7
	NGM MOS		-0.4	3.0	1.2	0.38	0.32	79.2
Tomorrow's Max	LOCAL	2977	-0.5	3.0	1.6	--	--	82.3
	LFM MOS		-1.1	3.8	4.1	--	--	72.9
	NGM MOS		-0.1	3.9	4.9	--	--	71.0
Tomorrow Night's Min	LOCAL	2967	-0.8	3.4	2.3	0.48	0.45	71.9
	LFM MOS		-1.2	3.9	3.8	0.44	0.55	65.5
	NGM MOS		-0.8	3.7	3.4	0.54	0.46	68.4
Day After Tomorrow's Max	LOCAL	2972	-0.8	3.8	4.0	--	--	73.5
	LFM MOS		-0.9	4.4	6.6	--	--	64.2
	NGM MOS		-0.4	4.4	6.6	--	--	64.6

Table 2.11. Comparative verification of local and LFM MOS max/min temperature forecasts for 5 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	871	0.9	3.4	3.7	--	--	*
	LFM MOS		1.8	3.7	4.5	--	--	*
Tonight's Min	LOCAL	866	0.6	5.1	11.9	0.33	0.50	*
	LFM MOS		-0.1	5.2	12.2	0.33	0.60	*
Tomorrow's Max	LOCAL	869	1.3	4.3	8.1	--	--	*
	LFM MOS		2.7	4.6	9.6	--	--	*
Tomorrow Night's Min	LOCAL	869	0.9	6.2	19.2	0.33	0.67	*
	LFM MOS		0.2	6.2	17.6	0.33	0.71	*

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	877	-0.5	4.3	8.4	0.17	0.80	*
	LFM MOS		-1.3	4.7	9.4	0.50	0.57	*
Tomorrow's Max	LOCAL	877	0.6	3.8	5.5	--	--	*
	LFM MOS		1.8	4.0	6.2	--	--	*
Tomorrow Night's Min	LOCAL	871	0.0	5.5	13.7	0.33	0.75	*
	LFM MOS		-0.6	5.8	16.4	0.33	0.78	*
Day After Tomorrow's Max	LOCAL	876	1.1	4.7	8.2	--	--	*
	LFM MOS		2.4	5.0	10.6	--	--	*
						--	--	

* Percent improvement over climate scores were not available.

Table 3.1. Comparative verification of local, LFM MOS, and NGM MOS PoP forecasts for 94 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	Changes GE 20% to Guidance: Local % Imprv.	Changes GE 20% to Guidance: No. of Changes
12-24	LOCAL	0.0791		49.0				
(1st period)	LFM MOS	0.0868	8.9	44.0	16137	0.2385	20.2	2100
	NGM MOS	0.0832	5.0	46.3		0.2105	10.1	2642
24-36	LOCAL	0.0921		42.3				
(2nd period)	LFM MOS	0.0988	6.8	38.1	16142	0.2362	17.0	2077
	NGM MOS	0.0934	1.4	41.5		0.2094	1.6	2414
36-48	LOCAL	0.1021		34.8				
(3rd period)	LFM MOS	0.1091	6.4	30.3	16117	0.2432	17.7	2196
	NGM MOS	0.1030	0.9	34.2		0.2132	0.7	2368

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	Changes GE 20% to Guidance: Local % Imprv.	Changes GE 20% to Guidance: No. of Changes
12-24	LOCAL	0.0809		49.5				
(1st period)	LFM MOS	0.0880	8.1	45.0	16272	0.2248	17.1	2125
	NGM MOS	0.0852	5.1	46.8		0.2122	10.8	2665
24-36	LOCAL	0.0929		40.7				
(2nd period)	LFM MOS	0.0998	7.0	36.3	16249	0.2411	17.8	2118
	NGM MOS	0.0934	0.6	40.4		0.2090	0.1	2583
36-48	LOCAL	0.1061		34.0				
(3rd period)	LFM MOS	0.1125	5.7	30.0	16253	0.2323	13.6	2257
	NGM MOS	0.1084	2.1	32.6		0.2251	5.0	2489

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	Changes GE 20% to Guidance: Local % Imprv.	Changes GE 20% to Guidance: No. of Changes
12-24	LOCAL	0.0916		48.7				
(1st period)	LFM MOS	0.0960	4.6	46.2	4160	0.2172	9.2	666
	NGM MOS	0.0917	0.2	48.6		0.1976	-0.9	813
24-36	LOCAL	0.0979		47.0				
(2nd period)	LFM MOS	0.1057	7.3	42.8	4164	0.2324	17.3	660
	NGM MOS	0.0999	1.9	46.0		0.1961	3.2	761
36-48	LOCAL	0.1107		39.1				
(3rd period)	LFM MOS	0.1176	5.9	35.3	4157	0.2254	16.4	690
	NGM MOS	0.1112	0.5	38.8		0.1952	-0.3	760

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	Changes GE 20% to Guidance: Local % Imprv.	Changes GE 20% to Guidance: No. of Changes
12-24	LOCAL	0.0886		52.3				
(1st period)	LFM MOS	0.0950	6.7	48.9	4204	0.2166	12.7	655
	NGM MOS	0.0930	4.7	50.0		0.2045	10.6	802
24-36	LOCAL	0.1011		44.0				
(2nd period)	LFM MOS	0.1099	7.9	39.2	4199	0.2271	20.5	628
	NGM MOS	0.1008	-0.3	44.2		0.2043	1.5	827
36-48	LOCAL	0.1149		37.6				
(3rd period)	LFM MOS	0.1211	5.1	34.2	4201	0.2359	13.2	695
	NGM MOS	0.1203	4.5	34.6		0.2279	7.6	833

Table 3.5. Comparative verification of local, LFM MOS, and NGM MOS PoP forecasts for 25 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	0.0724		47.9				
(1st period)	LFM MOS	0.0779	7.0	44.1	4134	0.2310	13.2	498
	NGM MOS	0.0774	6.4	44.4		0.2172	10.8	638
24-36	LOCAL	0.0854		39.7				
(2nd period)	LFM MOS	0.0915	6.7	35.4	4137	0.2273	16.1	541
	NGM MOS	0.0887	3.7	37.4		0.2391	7.2	589
36-48	LOCAL	0.0943		32.9				
(3rd period)	LFM MOS	0.1015	7.1	27.8	4130	0.2404	18.5	543
	NGM MOS	0.0973	3.1	30.8		0.2396	5.9	525

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	0.0736		48.5				
(1st period)	LFM MOS	0.0808	9.0	43.4	4153	0.2277	19.8	529
	NGM MOS	0.0772	4.7	46.0		0.2149	9.1	632
24-36	LOCAL	0.0860		38.9				
(2nd period)	LFM MOS	0.0918	6.4	34.8	4146	0.2285	14.6	528
	NGM MOS	0.0889	3.3	36.8		0.2228	4.1	551
36-48	LOCAL	0.0963		32.1				
(3rd period)	LFM MOS	0.1036	7.1	26.9	4146	0.2125	15.7	586
	NGM MOS	0.0984	2.1	30.7		0.2354	7.4	528

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	LOCAL	0.0773		51.6				
(1st period)	LFM MOS	0.0884	12.6	44.6	4902	0.2628	29.9	630
	NGM MOS	0.0810	4.6	49.3		0.2152	10.3	769
24-36	LOCAL	0.0943		42.8				
(2nd period)	LFM MOS	0.1016	7.2	38.3	4901	0.2388	19.2	594
	NGM MOS	0.0935	-0.8	43.2		0.2008	-5.2	700
36-48	LOCAL	0.1061		33.8				
(3rd period)	LFM MOS	0.1145	7.3	28.5	4896	0.2659	18.2	650
	NGM MOS	0.1047	-1.4	34.7		0.2202	-4.3	715

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	LOCAL	0.0842		49.0				
(1st period)	LFM MOS	0.0919	8.4	44.3	4935	0.2263	19.5	635
	NGM MOS	0.0857	1.8	48.1		0.2076	4.6	769
24-36	LOCAL	0.0945		41.4				
(2nd period)	LFM MOS	0.1029	8.1	36.2	4928	0.2610	20.7	673
	NGM MOS	0.0918	-2.9	43.0		0.1991	-10.6	759
36-48	LOCAL	0.1107		34.1				
(3rd period)	LFM MOS	0.1184	6.5	29.5	4929	0.2493	16.6	655
	NGM MOS	0.1109	0.2	33.9		0.2130	-0.3	731

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	Local % Imprv.	No. of Changes
12-24	LOCAL	0.0737		45.9				
(1st period)	LFM MOS	0.0837	12.0	38.6	2941	0.2474	30.9	306
	NGM MOS	0.0832	11.4	39.0		0.2165	27.7	422
24-36	LOCAL	0.0896		36.5				
(2nd period)	LFM MOS	0.0945	5.3	33.0	2940	0.2569	13.2	282
	NGM MOS	0.0906	1.1	35.7		0.2054	0.2	364
36-48	LOCAL	0.0940		31.6				
(3rd period)	LFM MOS	0.0985	4.5	28.3	2934	0.2403	17.9	313
	NGM MOS	0.0964	2.5	29.8		0.1992	4.4	368

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	LOCAL	0.0751		46.4				
(1st period)	LFM MOS	0.0820	8.4	41.5	2980	0.2340	16.3	306
	NGM MOS	0.0849	11.5	39.5		0.2294	22.4	462
24-36	LOCAL	0.0880		36.0				
(2nd period)	LFM MOS	0.0917	4.0	33.4	2976	0.2481	10.9	289
	NGM MOS	0.0917	4.1	33.3		0.2178	9.5	446
36-48	LOCAL	0.0996		30.0				
(3rd period)	LFM MOS	0.1029	3.2	27.7	2977	0.2259	3.9	321
	NGM MOS	0.1013	1.7	28.8		0.2278	5.5	397

Table 3.11. Comparative verification of local and LFM MOS PoP forecasts for 5 stations in the Alaska 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	0.1406		*				
	LFM MOS	0.1680	16.3	*	682	0.2538	26.4	241
24-36 (2nd period)	LOCAL	0.1433		*				
	LFM MOS	0.1520	5.7	*	681	0.2095	11.2	236
36-48 (3rd period)	LOCAL	0.1559		*				
	LFM MOS	0.1620	3.8	*	682	0.2256	5.2	219

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: Guid. Brier Score	Local % Imprv.	No. of Changes
12-24 (1st period)	LOCAL	0.1375		*				
	LFM MOS	0.1534	10.4	*	684	0.2452	19.0	218
24-36 (2nd period)	LOCAL	0.1465		*				
	LFM MOS	0.1676	12.6	*	688	0.2399	22.5	237
36-48 (3rd period)	LOCAL	0.1536		*				
	LFM MOS	0.1507	-1.9	*	686	0.2108	-3.9	188

* Percent improvement over climate scores were not available.

Table 4.1. Comparative verification of local and LFM MOS PoPT forecasts for 87 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	0.45	0.95	1.06	90.1	0.796	0.18	0.86	0.60	0.09
		MOS	0.50	0.97	1.04	91.8	0.833	0.27	0.89	0.45	0.08
		No. Obs.	22	300	484						
	Southern 23	LOCAL	0.14	0.74	1.03	94.8	0.499	0.14	0.48	0.00	0.35
		MOS	0.43	1.22	1.00	93.9	0.529	0.00	0.70	1.00	0.43
		No. Obs.	7	23	410						
	Central 28	LOCAL	0.70	0.93	1.09	85.7	0.733	0.32	0.82	0.54	0.12
		MOS	0.40	1.00	1.07	86.7	0.749	0.20	0.87	0.50	0.13
		No. Obs.	40	292	368						
	Western 12	LOCAL	0.33	0.84	1.09	91.7	0.806	0.33	0.79	0.00	0.06
		MOS	0.00	0.87	1.08	87.9	0.718	0.00	0.75	*	0.14
		No. Obs.	3	85	176						
	All Stations	LOCAL	0.56	0.92	1.06	89.8	0.778	0.26	0.82	0.52	0.10
		MOS	0.42	0.98	1.04	90.1	0.786	0.19	0.86	0.53	0.12
		No. Obs.	72	700	1438						
30	Eastern 24	LOCAL	0.22	1.05	1.00	88.8	0.776	0.17	0.89	0.20	0.15
		MOS	1.09	0.95	1.03	90.0	0.803	0.30	0.88	0.72	0.08
		No. Obs.	23	314	476						
	Southern 22	LOCAL	0.60	0.93	1.01	97.1	0.645	0.20	0.71	0.67	0.23
		MOS	4.20	0.57	0.97	94.7	0.523	0.80	0.43	0.81	0.25
		No. Obs.	5	14	392						
	Central 28	LOCAL	0.36	1.09	1.00	84.5	0.711	0.20	0.89	0.44	0.18
		MOS	0.64	0.98	1.06	85.6	0.734	0.30	0.86	0.54	0.13
		No. Obs.	44	309	368						
	Western 12	LOCAL	3.00	1.00	0.99	90.3	0.777	0.00	0.86	1.00	0.14
		MOS	0.00	0.87	1.06	93.4	0.839	0.00	0.83	*	0.05
		No. Obs.	1	69	157						
	All Stations	LOCAL	0.37	1.06	1.00	89.1	0.770	0.19	0.88	0.48	0.17
		MOS	1.01	0.95	1.03	89.8	0.786	0.33	0.85	0.68	0.10
		No. Obs.	73	706	1393						
42	Eastern 24	LOCAL	0.50	1.07	0.98	88.3	0.764	0.25	0.89	0.50	0.17
		MOS	0.60	1.10	0.95	89.4	0.788	0.30	0.92	0.50	0.16
		No. Obs.	20	306	483						
	Southern 23	LOCAL	0.00	0.53	1.03	95.6	0.451	0.00	0.37	*	0.30
		MOS	2.00	0.84	1.00	93.8	0.428	0.00	0.47	1.00	0.44
		No. Obs.	3	19	366						
	Central 28	LOCAL	0.29	1.09	1.00	83.0	0.681	0.11	0.88	0.64	0.20
		MOS	0.50	1.10	0.98	81.9	0.662	0.13	0.87	0.74	0.21
		No. Obs.	38	282	352						
	Western 12	LOCAL	0.67	0.90	1.05	88.1	0.721	0.00	0.77	1.00	0.14
		MOS	0.33	0.84	1.08	85.7	0.658	0.00	0.70	1.00	0.17
		No. Obs.	3	77	172						
	All Stations	LOCAL	0.36	1.04	1.01	87.9	0.742	0.14	0.86	0.61	0.18
		MOS	0.59	1.06	0.99	87.4	0.734	0.17	0.86	0.71	0.19
		No. Obs.	64	684	1373						

* 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.

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	0.68	1.01	1.01	90.0	0.803	0.16	0.90	0.76	0.11
		MOS	0.96	0.95	1.04	91.8	0.839	0.52	0.89	0.46	0.06
		No. Obs.	25	324	483						
	Southern 22	LOCAL	0.80	1.19	1.00	96.8	0.668	0.20	0.75	0.75	0.37
		MOS	2.60	0.69	0.99	94.9	0.492	0.40	0.50	0.85	0.27
		No. Obs.	5	16	412						
	Central 28	LOCAL	0.69	0.97	1.06	85.9	0.738	0.29	0.85	0.59	0.12
		MOS	0.64	0.95	1.09	87.1	0.760	0.33	0.86	0.48	0.10
		No. Obs.	42	311	375						
	Western 12	LOCAL	2.00	1.06	0.97	90.4	0.774	0.00	0.87	1.00	0.18
		MOS	0.00	0.90	1.05	93.7	0.844	0.00	0.84	*	0.06
		No. Obs.	1	69	169						
	All Stations	LOCAL	0.71	1.00	1.01	90.0	0.789	0.23	0.88	0.67	0.13
		MOS	0.88	0.94	1.04	91.1	0.810	0.40	0.86	0.55	0.08
		No. Obs.	73	720	1439						
30	Eastern 24	LOCAL	0.32	1.05	1.00	89.2	0.780	0.00	0.91	1.00	0.14
		MOS	0.50	1.01	1.02	90.6	0.808	0.23	0.90	0.55	0.11
		No. Obs.	22	297	485						
	Southern 23	LOCAL	0.40	0.78	1.02	95.4	0.493	0.20	0.44	0.50	0.43
		MOS	3.40	1.11	0.96	92.5	0.455	0.40	0.61	0.88	0.45
		No. Obs.	5	18	389						
	Central 28	LOCAL	0.57	1.04	1.02	85.2	0.725	0.24	0.88	0.58	0.16
		MOS	1.07	1.05	0.95	82.9	0.691	0.31	0.88	0.71	0.17
		No. Obs.	42	288	367						
	Western 12	LOCAL	0.00	1.00	1.01	89.3	0.756	0.00	0.84	*	0.16
		MOS	0.50	0.80	1.10	88.5	0.725	0.50	0.72	0.00	0.09
		No. Obs.	2	80	170						
	All Stations	LOCAL	0.46	1.03	1.01	89.1	0.767	0.15	0.87	0.67	0.16
		MOS	1.04	1.00	1.00	88.2	0.753	0.30	0.86	0.72	0.14
		No. Obs.	71	683	1411						
42	Eastern 24	LOCAL	0.38	1.10	0.97	86.9	0.740	0.08	0.90	0.78	0.19
		MOS	1.04	1.01	0.99	88.6	0.775	0.38	0.89	0.64	0.12
		No. Obs.	24	293	464						
	Southern 22	LOCAL	0.60	1.00	1.01	95.8	0.512	0.20	0.54	0.67	0.46
		MOS	3.20	0.38	0.99	92.9	0.282	0.20	0.23	0.94	0.40
		No. Obs.	5	13	363						
	Central 28	LOCAL	0.49	1.12	0.96	80.6	0.643	0.16	0.87	0.67	0.23
		MOS	1.37	0.98	0.97	80.9	0.660	0.30	0.84	0.78	0.14
		No. Obs.	43	295	359						
	Western 12	LOCAL	0.00	1.03	1.00	89.0	0.739	0.00	0.83	*	0.20
		MOS	0.50	0.89	1.05	89.0	0.730	0.00	0.76	1.00	0.14
		No. Obs.	2	63	154						
	All Stations	LOCAL	0.45	1.10	0.98	86.7	0.722	0.14	0.87	0.70	0.21
		MOS	1.36	0.97	0.99	86.9	0.730	0.31	0.84	0.77	0.13
		No. Obs.	74	664	1340						

* This category was observed but was not forecast.

Table 5.1. Comparative verification of local and LFM MOS snow amount forecasts for 85 stations in the conterminous U.S. for the 12-24 h projection.

Cycle (UTC)	Type of Forecast	Bias ≥ 2	Bias ≥ 4	Bias ≥ 6	Percent Correct	Skill Score	Threat Score ≥ 2	Threat Score ≥ 4	Threat Score ≥ 6	POD ≥ 2	POD ≥ 4	POD ≥ 6	FAR ≥ 2	FAR ≥ 4	FAR ≥ 6
0000	LOCAL	1.73	1.28	1.31	98.2	0.295	0.236	0.112	0.111	0.52	0.23	0.23	0.70	0.82	0.82
	MOS	1.02	0.64	0.31	98.5	0.223	0.177	0.049	0.063	0.30	0.08	0.08	0.70	0.88	0.75
	No. Obs.	138	39	13											
1200	LOCAL	1.31	0.99	0.96	98.0	0.351	0.307	0.202	0.250	0.54	0.33	0.39	0.59	0.66	0.59
	MOS	0.79	0.58	0.32	98.3	0.284	0.237	0.172	0.121	0.34	0.23	0.14	0.57	0.60	0.56
	No. Obs.	192	69	28											

Table 6.1. Comparative verification of local, LFM MOS, and NGM MOS forecasts of four categories of cloud amount (clear, scattered, broken, and overcast) for 95 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	0.76	1.50	1.66	0.93	68.5	0.551
	LFM MOS	0.95	1.48	1.19	0.87	62.0	0.448
	NGM MOS	0.87	1.51	1.26	0.91	62.6	0.459
	No. Obs.	6087	1902	1572	6679		
18	LOCAL	0.57	1.69	2.15	0.74	52.1	0.363
	LFM MOS	0.81	1.77	1.36	0.75	54.3	0.377
	NGM MOS	0.72	1.85	1.45	0.77	53.7	0.371
	No. Obs.	5427	2507	2000	6456		
24	LOCAL	0.59	1.71	2.24	0.75	49.6	0.328
	LFM MOS	0.83	1.70	1.38	0.76	54.1	0.368
	NGM MOS	0.76	1.81	1.51	0.75	53.7	0.368
	No. Obs.	5766	2510	1751	6201		

Table 6.2. Same as Table 6.1 except for 94 stations for the 1200 UTC cycle.

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Percent Correct	Skill Score
12	LOCAL	0.74	1.32	1.85	0.87	62.7	0.486
	LFM MOS	0.87	1.67	1.43	0.73	55.7	0.390
	NGM MOS	0.80	1.64	1.44	0.81	56.8	0.405
	No. Obs.	5761	2525	1748	6309		
18	LOCAL	0.63	1.81	2.30	0.86	56.4	0.397
	LFM MOS	0.97	1.57	1.19	0.82	60.8	0.426
	NGM MOS	0.89	1.72	1.35	0.82	60.2	0.425
	No. Obs.	6733	1835	1434	6348		
24	LOCAL	0.61	1.85	2.12	0.85	52.6	0.345
	LFM MOS	0.93	1.62	1.20	0.84	58.6	0.403
	NGM MOS	0.85	1.77	1.30	0.85	58.3	0.404
	No. Obs.	6099	1914	1564	6770		

Table 6.3. 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	0.72	1.32	1.65	0.90	62.8	0.468
	LFM MOS	0.83	1.33	1.40	0.89	58.5	0.403
	NGM MOS	0.77	1.38	1.20	0.96	59.5	0.410
	No. Obs.	1111	612	471	1954		
18	LOCAL	0.42	1.56	2.31	0.74	50.7	0.332
	LFM MOS	0.70	1.60	1.55	0.79	53.3	0.354
	NGM MOS	0.62	1.73	1.62	0.77	52.4	0.346
	No. Obs.	1038	678	538	1889		
24	LOCAL	0.53	1.90	2.34	0.77	50.6	0.325
	LFM MOS	0.79	1.71	1.44	0.85	54.9	0.358
	NGM MOS	0.76	1.94	1.51	0.79	54.3	0.360
	No. Obs.	1300	533	419	1889		

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

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Percent Correct	Skill Score
12	LOCAL	0.62	1.52	2.09	0.88	59.8	0.432
	LFM MOS	0.82	1.75	1.52	0.81	55.9	0.376
	NGM MOS	0.77	1.81	1.57	0.82	56.7	0.389
	No. Obs.	1309	529	413	1910		
18	LOCAL	0.58	1.73	2.36	0.88	55.6	0.372
	LFM MOS	0.91	1.50	1.26	0.90	60.7	0.417
	NGM MOS	0.88	1.70	1.27	0.88	60.5	0.421
	No. Obs.	1427	443	374	1920		
24	LOCAL	0.65	1.34	1.95	0.87	53.1	0.334
	LFM MOS	0.75	1.49	1.38	0.90	55.1	0.352
	NGM MOS	0.75	1.56	1.32	0.89	55.4	0.358
	No. Obs.	1099	613	464	1990		

Table 6.5. Comparative verification of local, LFM MOS, and NGM MOS forecasts of four categories of cloud amount (clear, scattered, broken, and overcast) for 25 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	0.74	1.68	1.50	0.94	68.4	0.556
	LFM MOS	0.96	1.46	0.95	0.92	63.1	0.460
	NGM MOS	0.92	1.51	1.15	0.89	63.6	0.473
	No. Obs.	1729	470	445	1472		
18	LOCAL	0.58	1.77	1.89	0.71	50.7	0.352
	LFM MOS	0.87	1.57	1.14	0.80	56.9	0.411
	NGM MOS	0.85	1.61	1.11	0.82	57.0	0.412
	No. Obs.	1607	694	611	1370		
24	LOCAL	0.60	1.73	1.96	0.72	47.9	0.311
	LFM MOS	0.85	1.62	1.23	0.75	54.5	0.376
	NGM MOS	0.86	1.57	1.28	0.75	55.1	0.384
	No. Obs.	1607	708	513	1289		

Table 6.6. Same as Table 6.5 except for 24 stations for the 1200 UTC cycle.

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Percent Correct	Skill Score
12	LOCAL	0.73	1.35	1.75	0.85	63.8	0.510
	LFM MOS	0.89	1.61	1.26	0.71	56.4	0.402
	NGM MOS	0.90	1.45	1.13	0.83	58.5	0.424
	No. Obs.	1604	711	510	1310		
18	LOCAL	0.61	1.99	2.26	0.86	54.9	0.382
	LFM MOS	0.97	1.45	1.22	0.82	62.7	0.444
	NGM MOS	0.94	1.52	1.20	0.84	63.6	0.460
	No. Obs.	1925	485	365	1361		
24	LOCAL	0.58	2.22	1.86	0.85	50.1	0.324
	LFM MOS	0.93	1.62	1.02	0.88	59.8	0.417
	NGM MOS	0.91	1.68	1.09	0.86	61.7	0.448
	No. Obs.	1721	472	440	1499		

Table 6.7. 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	0.69	1.63	2.06	0.93	67.6	0.530
	LFM MOS	0.99	1.62	1.12	0.84	63.2	0.452
	NGM MOS	0.86	1.60	1.37	0.91	64.0	0.466
	No. Obs.	1829	517	362	2141		
18	LOCAL	0.48	2.02	2.20	0.77	51.8	0.351
	LFM MOS	0.76	2.23	1.37	0.70	52.2	0.347
	NGM MOS	0.65	2.32	1.48	0.73	52.4	0.354
	No. Obs.	1556	655	527	2103		
24	LOCAL	0.46	1.91	2.58	0.79	48.3	0.306
	LFM MOS	0.78	2.03	1.35	0.75	53.0	0.349
	NGM MOS	0.69	2.05	1.62	0.75	54.2	0.371
	No. Obs.	1674	704	439	2026		

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

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Percent Correct	Skill Score
12	LOCAL	0.70	1.37	1.92	0.92	63.8	0.490
	LFM MOS	0.86	1.80	1.45	0.74	55.4	0.379
	NGM MOS	0.72	1.85	1.56	0.81	56.5	0.395
	No. Obs.	1672	712	450	2078		
18	LOCAL	0.59	1.99	2.47	0.87	57.0	0.399
	LFM MOS	1.02	1.74	1.14	0.78	60.0	0.409
	NGM MOS	0.90	1.88	1.50	0.79	59.4	0.412
	No. Obs.	1923	515	381	2095		
24	LOCAL	0.52	2.20	2.58	0.86	52.2	0.336
	LFM MOS	1.00	1.74	1.17	0.79	59.8	0.406
	NGM MOS	0.85	1.86	1.58	0.82	58.5	0.397
	No. Obs.	1856	523	366	2166		

Table 6.9. 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	0.88	1.37	1.41	0.94	77.5	0.666
	LFM MOS	0.98	1.55	1.27	0.80	63.2	0.451
	NGM MOS	0.91	1.60	1.37	0.85	63.1	0.456
	No. Obs.	1418	303	294	1112		
18	LOCAL	0.79	1.33	2.29	0.71	56.4	0.407
	LFM MOS	0.90	1.65	1.47	0.69	55.5	0.384
	NGM MOS	0.73	1.71	1.75	0.77	52.7	0.355
	No. Obs.	1226	480	324	1094		
24	LOCAL	0.81	1.27	2.10	0.66	52.5	0.362
	LFM MOS	0.94	1.37	1.55	0.65	54.1	0.372
	NGM MOS	0.71	1.67	1.70	0.70	50.2	0.334
	No. Obs.	1185	565	380	997		

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

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Percent Correct	Skill Score
12	LOCAL	0.93	1.05	1.67	0.80	63.3	0.495
	LFM MOS	0.92	1.52	1.52	0.60	54.8	0.385
	NGM MOS	0.80	1.47	1.59	0.74	55.3	0.394
	No. Obs.	1176	573	375	1011		
18	LOCAL	0.77	1.45	2.10	0.81	58.7	0.420
	LFM MOS	0.98	1.59	1.12	0.76	60.0	0.412
	NGM MOS	0.84	1.79	1.46	0.77	56.7	0.383
	No. Obs.	1458	392	314	972		
24	LOCAL	0.72	1.72	2.22	0.84	55.7	0.376
	LFM MOS	0.97	1.65	1.20	0.80	60.2	0.408
	NGM MOS	0.83	2.13	1.24	0.84	57.5	0.386
	No. Obs.	1423	306	294	1115		

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 (h)	Type of Forecast	Bias by Category 1	2	3	4	Percent Correct	Skill Score
12	LOCAL	0.77	1.01	1.63	0.99	63.1	0.418
	LFM MOS	0.96	0.92	0.77	1.08	65.1	0.424
	No. Obs.	266	114	104	567		
18	LOCAL	0.57	1.28	1.83	0.96	55.8	0.326
	LFM MOS	0.81	0.78	1.01	1.13	62.6	0.387
	No. Obs.	254	116	121	556		
24	LOCAL	0.54	1.26	1.87	0.93	52.0	0.277
	LFM MOS	0.84	0.84	0.69	1.18	60.6	0.348
	No. Obs.	239	119	137	557		

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

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Percent Correct	Skill Score
12	LOCAL	0.79	1.03	1.56	0.95	63.5	0.443
	LFM MOS	0.96	0.81	1.15	1.02	62.4	0.408
	No. Obs.	241	123	135	556		
18	LOCAL	0.56	1.26	2.14	0.97	56.8	0.337
	LFM MOS	0.84	1.09	0.83	1.10	64.6	0.419
	No. Obs.	288	100	103	555		
24	LOCAL	0.52	1.17	2.38	0.94	51.3	0.259
	LFM MOS	0.89	0.81	0.87	1.11	63.8	0.397
	No. Obs.	272	110	105	567		

Table 7.1. Comparative verification of LFM and NGM MOS surface wind forecasts for 95 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	0.568	2891	3.3	0.9	2902	0.421	88.6	0.05	1.02	0.86	0.87	0.85	0.13	1.00
	NGM	19	0.569		3.5	1.8		0.432	87.4	0.07	0.98	1.08	1.15	1.52	1.25	4.00
											14157	1439	347	65	16	2
18	LFM	22	0.494	5434	3.2	0.3	5443	0.378	77.0	0.21	1.07	0.80	0.77	0.83	0.93	0.75
	NGM	20	0.522		3.3	1.3		0.414	76.4	0.20	1.00	0.94	1.10	1.34	1.59	4.75
											12084	2979	841	174	29	4
24	LFM	24	0.489	3414	3.5	0.8	3429	0.345	84.0	0.07	1.04	0.79	0.75	0.52	0.54	0.50
	NGM	22	0.506		3.8	1.9		0.368	82.5	0.08	0.99	0.98	1.17	1.46	1.17	2.75
											13396	1909	432	99	24	4

Table 7.2. Same as Table 7.1 except for 94 stations 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	0.511	3692	3.2	0.7	3703	0.385	84.7	0.08	1.03	0.83	0.79	0.67	0.46	0.75
	NGM	21	0.533		3.6	1.7		0.393	83.1	0.09	0.99	1.03	1.16	1.21	1.46	3.25
											13479	1911	435	100	24	4
18	LFM	21	0.536	2820	3.4	0.8	2838	0.370	87.6	0.09	1.03	0.82	0.77	0.57	0.54	0.25
	NGM	19	0.575		3.7	1.8		0.405	86.4	0.13	0.98	1.11	1.17	1.31	1.46	1.75
											14145	1487	351	67	13	4
24	LFM	22	0.544	2566	3.5	0.7	2579	0.350	87.9	0.00	1.03	0.76	0.67	0.72	0.06	0.50
	NGM	20	0.561		3.8	1.8		0.390	86.7	0.05	0.99	1.06	1.11	1.33	1.38	2.50
											14258	1441	351	64	16	2

Table 7.3. Comparative verification of LFM and NGM MOS surface wind forecasts for 24 stations in the Eastern 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	22	0.499	825	3.1	0.7	826	0.434	87.8	0.00	1.03	0.81	0.78	1.00	0.00	*
	NGM	19	0.502		3.4	1.5		0.449	86.6	0.00	0.99	1.08	1.02	1.64	0.20	*
											3533	409	113	11	5	0
18	LFM	23	0.426	1609	3.1	0.3	1611	0.385	75.7	0.17	1.05	0.90	0.73	0.66	0.50	**
	NGM	21	0.452		3.1	1.0		0.416	75.4	0.13	1.00	1.01	0.98	1.21	1.25	*
											2982	793	246	38	4	0
24	LFM	23	0.447	866	3.4	0.7	869	0.367	84.7	0.07	1.04	0.82	0.76	0.38	0.75	0.00
	NGM	20	0.506		3.7	1.4		0.389	83.7	0.00	1.00	1.00	0.96	1.35	0.25	1.00
											3418	465	112	26	8	1

Table 7.4. Same as Table 7.3 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	21	0.475	889	3.2	0.6	891	0.390	85.6	0.00	1.04	0.83	0.71	0.56	0.25	1.00
	NGM	19	0.502		3.4	1.3		0.408	84.4	0.00	0.99	1.06	0.96	0.88	0.75	0.00
											3443	456	108	25	8	1
18	LFM	23	0.471	810	3.1	0.8	813	0.415	87.6	0.00	1.02	0.86	0.91	0.76	0.40	*
	NGM	19	0.542		3.3	1.4		0.422	86.2	0.00	0.98	1.16	1.19	0.76	0.00	*
											3574	400	90	17	5	0
24	LFM	23	0.492	778	3.4	0.8	781	0.384	86.9	0.00	1.03	0.81	0.75	1.27	0.20	*
	NGM	20	0.539		3.5	1.3		0.411	86.0	0.17	0.99	1.08	0.89	1.18	0.40	*
											3566	411	110	11	5	0

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

Table 7.5. Comparative verification of LFM and NGM MOS surface wind forecasts for 25 stations in the Southern 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	22	0.578	520	3.4	1.4	522	0.404	91.8	0.00	1.00	1.00	1.03	1.00	0.00	*
	NGM	19	0.582		3.3	1.5		0.410	91.9	0.00	1.00	1.00	1.03	1.00	0.33	*
											3750	251	37	6	3	0
18	LFM	24	0.483	1299	3.3	0.8	1303	0.325	77.3	0.00	1.03	0.89	0.88	1.19	0.67	*
	NGM	21	0.527		3.1	0.9		0.386	79.2	0.33	1.02	0.91	0.85	1.24	1.33	**
											3285	709	160	21	3	0
24	LFM	26	0.489	680	3.5	1.2	683	0.301	87.6	0.00	1.02	0.91	0.65	0.00	1.00	*
	NGM	23	0.527		3.5	1.7		0.347	87.8	0.00	1.01	0.93	1.07	1.00	1.00	*
											3586	354	54	10	1	0

Table 7.6. Same as Table 7.5 except for 24 stations 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	24	0.513	759	3.3	1.3	762	0.382	88.7	0.00	1.01	0.91	0.91	0.50	0.00	*
	NGM	21	0.580		3.4	1.7		0.386	87.9	0.00	0.99	1.06	1.05	0.67	3.00	*
											3584	357	55	12	1	0
18	LFM	24	0.502	554	3.8	1.6	560	0.308	89.2	0.00	1.00	1.03	0.80	1.00	0.00	*
	NGM	21	0.522		3.5	1.6		0.403	90.6	0.00	1.00	1.05	0.67	2.33	0.00	**
											3685	274	64	3	1	0
24	LFM	25	0.492	461	3.6	1.1	465	0.339	91.4	0.00	1.01	0.95	0.56	0.17	0.00	*
	NGM	22	0.545		3.6	1.5		0.379	91.8	0.00	1.01	0.90	0.85	1.50	0.33	*
											3753	250	41	6	3	0

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

Table 7.7. Comparative verification of LFM and NGM 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	16	0.623	1169	3.1	0.5	1172	0.427	85.1	0.08	1.04	0.78	0.92	0.83	0.29	1.00
	NGM	16	0.617		3.7	2.1		0.414	81.9	0.09	0.96	1.10	1.38	1.86	2.57	4.00
											3997	589	142	36	7	2
18	LFM	20	0.534	2031	3.1	-0.2	2032	0.389	72.2	0.24	1.14	0.71	0.77	0.78	0.88	1.00
	NGM	18	0.561		3.3	1.7		0.406	69.4	0.18	0.96	0.93	1.37	1.52	1.94	7.50
											3135	1171	336	85	17	2
24	LFM	21	0.554	1212	3.3	0.2	1216	0.344	80.8	0.10	1.09	0.67	0.63	0.73	0.29	1.00
	NGM	20	0.539		4.0	2.4		0.373	77.4	0.11	0.96	1.04	1.28	1.80	1.64	5.00
											3759	702	191	44	14	2

Table 7.8. Same as Table 7.7 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	19	0.569	1329	3.0	0.2	1333	0.394	81.4	0.14	1.06	0.77	0.72	0.70	0.50	1.00
	NGM	18	0.563		3.7	2.0		0.409	78.7	0.14	0.97	1.05	1.26	1.48	1.57	6.00
											3801	709	198	44	14	2
18	LFM	17	0.592	1069	3.2	0.1	1071	0.374	84.2	0.13	1.07	0.66	0.70	0.55	0.71	0.25
	NGM	16	0.621		3.7	2.0		0.402	81.0	0.17	0.96	1.09	1.44	1.73	2.57	1.50
											3993	637	138	33	7	4
24	LFM	19	0.589	1015	3.4	0.3	1016	0.337	84.1	0.00	1.07	0.64	0.68	0.76	0.00	0.50
	NGM	18	0.569		4.0	2.2		0.373	80.6	0.03	0.96	1.13	1.38	1.68	2.43	2.50
											4041	594	146	34	7	2

Table 7.9. Comparative verification of LFM and NGM 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	27	0.399	377	4.0	1.8	382	0.375	90.5	0.00	1.00	1.04	0.85	0.67	0.00	*
	NGM	26	0.425		3.7	2.0		0.430	90.9	0.00	0.99	1.15	0.93	0.67	0.00	*
											2877	190	55	12	1	0
18	LFM	26	0.434	495	4.1	1.4	497	0.358	85.5	0.25	1.04	0.74	0.72	0.93	1.60	0.00
	NGM	26	0.447		4.2	1.8		0.376	85.0	0.27	1.02	0.87	0.91	1.10	0.80	1.50
											2682	306	99	30	5	2
24	LFM	31	0.352	656	3.8	1.4	661	0.351	83.3	0.00	1.02	0.86	1.08	0.47	2.00	0.00
	NGM	29	0.359		4.1	1.9		0.317	81.8	0.00	1.01	0.89	1.27	1.11	2.00	0.00
											2633	388	75	19	1	1

Table 7.10. Same as Table 7.9 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	27	0.375	715	3.6	1.3	717	0.350	83.3	0.00	1.02	0.87	1.03	0.84	2.00	0.00
	NGM	27	0.401		3.9	1.7		0.325	81.7	0.00	1.00	0.93	1.28	1.37	4.00	1.00
											2651	389	74	19	1	1
18	LFM	25	0.441	387	4.3	1.7	394	0.337	90.7	*	1.01	0.99	0.71	0.29	*	*
	NGM	23	0.493		4.5	2.3		0.328	89.4	0.00	0.99	1.18	1.05	0.79	**	*
											2893	176	59	14	0	0
24	LFM	27	0.417	312	4.0	1.4	317	0.301	90.8	0.00	1.02	0.81	0.56	0.38	0.00	*
	NGM	26	0.458		4.3	2.3		0.349	90.2	0.00	1.00	1.02	1.04	0.46	2.00	*
											2898	186	54	13	1	0

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

Table 7.11 Verification of LFM MOS surface wind forecasts for 6 stations in the Alaska 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	26	0.493	321	4.6	2.5	329	0.441	81.5	0.00	0.97 859	1.12 110	1.18 56	1.18 17	1.33 3	0.00 1
18	LFM	25	0.487	323	5.0	2.5	328	0.359	78.5	0.00	0.97 848	1.26 102	0.84 68	1.33 15	1.75 4	1.00 1
24	LFM	33	0.460	361	5.3	3.2	369	0.319	75.7	0.14	0.97 825	1.18 107	0.90 71	1.75 16	3.33 3	0.00 3

Table 7.12. Same as Table 7.11 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	24	0.518	320	4.3	1.8	325	0.402	79.6	0.14	0.98 834	1.18 106	0.86 70	1.67 15	0.67 3	0.00 3
18	LFM	24	0.497	323	4.7	2.7	333	0.355	78.9	0.17	1.00 850	0.90 125	0.92 59	2.15 13	0.67 3	** 0
24	LFM	29	0.422	328	5.2	2.8	337	0.348	78.7	0.00	0.96 872	1.32 105	0.96 56	1.00 17	1.67 3	1.00 1

** This category was forecast but was not observed.

Table 7.13. Verification of local surface wind forecasts for 93 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	22	0.545	5925	3.4	2.1	6020	0.434	87.1	0.03	0.97 14185	1.30 1423	0.88 358	0.91 57	0.75 16	0.33 3
9	LOCAL	30	0.417	9710	3.4	1.4	9786	0.377	74.6	0.17	0.99 11909	1.14 3039	0.75 871	0.44 167	0.48 33	0.20 5
15	LOCAL	35	0.366	8573	4.2	2.9	8750	0.310	78.4	0.11	0.92 13587	1.54 1872	1.16 450	0.64 88	0.38 26	0.25 4

Table 7.14. Same as Table 7.13 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	25	0.484	10221	3.1	1.4	10309	0.424	75.8	0.23	0.96 12077	1.23 3050	0.87 853	0.50 167	0.64 39	0.67 3
9	LOCAL	33	0.397	6593	4.1	2.6	6761	0.320	83.0	0.12	0.97 13972	1.30 1601	0.84 391	0.46 74	0.80 15	** 0
15	LOCAL	35	0.376	5777	4.2	2.7	5935	0.316	84.9	0.00	0.98 14225	1.29 1407	0.79 350	0.49 61	0.47 17	** 0

** This category was forecast but was not observed.

Table 7.15. 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	0.502	1776	3.5	2.2	1802	0.398	84.9	0.00	0.98 3642	1.19 427	0.89 115	1.91 11	1.00 5	** 0
9	LOCAL	30	0.392	2816	3.3	1.4	2830	0.340	72.3	0.14	0.99 3086	1.13 826	0.75 248	0.67 39	1.00 4	* 0
15	LOCAL	35	0.331	2309	4.2	3.0	2354	0.320	78.7	0.00	0.92 3575	1.58 470	1.27 118	0.81 26	0.22 9	0.00 1

Table 7.16. Same as Table 7.15 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	2757	3.0	1.5	2776	0.400	75.8	0.33	0.95 3196	1.21 778	1.03 181	0.43 35	0.50 6	2.00 1
9	LOCAL	35	0.340	1887	4.0	2.5	1926	0.328	82.2	0.13	0.97 3626	1.30 444	0.80 118	0.71 17	2.50 2	** 0
15	LOCAL	35	0.337	1701	4.2	2.9	1745	0.327	83.8	0.00	0.95 3725	1.50 365	0.91 99	0.56 18	1.67 3	** 0

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

Table 7.17. Verification of local surface wind forecasts for 23 stations in the Southern 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	0.557	1175	3.6	2.6	1201	0.418	91.1	0.00	0.98 3537	1.46 227	0.58 38	0.60 5	0.33 3	* 0
9	LOCAL	29	0.420	2248	3.2	1.6	2266	0.397	79.4	0.33	0.99 3020	1.15 645	0.50 129	0.15 13	0.50 2	0.00 1
15	LOCAL	33	0.375	1959	4.2	3.3	2001	0.273	83.0	0.50	0.93 3425	1.80 318	0.75 59	0.17 6	0.50 2	* 0

Table 7.18. Same as Table 7.17 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	0.489	2577	3.1	1.8	2600	0.383	77.1	0.33	0.95 3109	1.32 676	0.67 139	0.29 17	0.60 5	* 0
9	LOCAL	30	0.420	1416	4.2	3.1	1458	0.271	87.4	*	0.97 3478	1.52 246	0.56 55	0.40 5	* 0	* 0
15	LOCAL	34	0.390	1164	4.3	3.0	1204	0.248	88.7	*	0.99 3492	1.22 237	0.55 51	0.17 6	* 0	* 0

* This category was neither forecast nor observed.

Table 7.19. 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	19	0.581	2246	3.1	1.8	2276	0.458	83.0	0.08	0.95 4062	1.37 600	0.99 152	0.70 33	1.00 6	0.00 2
9	LOCAL	27	0.446	3294	3.3	1.1	3312	0.374	68.1	0.14	0.97 3154	1.17 1218	0.88 363	0.41 81	0.32 22	0.50 2
15	LOCAL	32	0.392	2960	4.0	2.5	3013	0.304	71.5	0.11	0.89 3817	1.58 755	1.12 212	0.64 42	0.29 14	0.50 2

Table 7.20. Same as Table 7.19 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	22	0.518	3425	2.9	0.9	3441	0.443	71.0	0.21	0.94 3154	1.25 1190	0.85 395	0.53 90	0.60 20	0.00 2
9	LOCAL	31	0.430	2393	3.9	2.0	2437	0.329	77.6	0.14	0.97 3954	1.28 684	0.80 172	0.32 44	0.45 11	* 0
15	LOCAL	32	0.397	2139	3.8	2.2	2185	0.337	80.5	0.00	0.98 4079	1.25 601	0.79 141	0.48 29	0.14 14	* 0

* This category was neither forecast nor observed.

Table 7.21. 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	26	0.449	728	3.9	2.2	741	0.388	91.4	0.00	1.00 2944	1.15 169	0.75 53	0.63 8	0.00 2	0.00 1
9	LOCAL	42	0.350	1352	4.2	1.9	1378	0.325	81.6	0.22	1.02 2649	1.04 350	0.63 131	0.38 34	0.80 5	0.00 2
15	LOCAL	42	0.306	1345	4.3	3.1	1382	0.296	82.8	0.25	0.98 2770	1.12 329	1.49 61	0.50 14	3.00 1	0.00 1

Table 7.22. Same as Table 7.21 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	35	0.415	1462	3.5	1.9	1492	0.406	81.7	0.15	1.00 2618	1.04 406	0.88 138	0.60 25	0.88 8	* 0
9	LOCAL	41	0.326	897	4.8	3.5	940	0.271	87.0	0.00	0.98 2914	1.16 227	1.41 46	0.75 8	1.00 2	* 0
15	LOCAL	46	0.295	773	5.0	3.4	801	0.266	88.3	0.00	1.00 2929	1.11 204	0.78 59	0.63 8	** 0	* 0

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

Table 7.23. Verification of local surface wind forecasts for 6 stations in the Alaska 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	19	0.624	400	3.6	1.7	410	0.545	84.7	0.00	0.97 862	1.17 112	1.32 57	0.76 17	0.33 3	0.50 2
9	LOCAL	30	0.481	405	4.9	2.9	424	0.375	78.6	0.00	0.96 858	1.29 105	1.09 68	1.07 15	0.25 4	1.00 1
15	LOCAL	40	0.353	455	5.0	2.8	471	0.269	73.1	0.00	0.96 843	1.37 111	0.97 78	0.89 18	1.00 3	0.50 2

Table 7.24. Same as Table 7.23 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	28	0.502	460	4.2	2.0	478	0.482	81.9	0.14	0.98 850	1.24 108	1.00 78	0.71 17	0.67 3	0.50 2
9	LOCAL	38	0.385	440	5.2	3.4	470	0.369	77.8	0.20	0.96 848	1.14 126	1.24 59	1.15 13	0.67 3	** 0
15	LOCAL	41	0.334	442	5.7	3.9	476	0.318	76.6	0.00	0.94 871	1.32 107	1.28 58	1.12 17	0.67 3	0.50 2

** This category was forecast but was not observed.

Table 7.25. Comparative verification of local, LFM, and NGM MOS 42-h significant wind forecasts for 93 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	3.95	0.146	94.8	0.09
	LFM MOS	1.00	0.85	0.184	98.1	0.11
	NGM MOS	0.99	1.44	0.250	97.7	0.15
	No. Obs.	15803	201			
± 3-h Max	LOCAL	0.99	1.32	0.259	93.8	0.17
	LFM MOS	1.03	0.29	0.205	96.2	0.12
	NGM MOS	1.02	0.48	0.289	96.1	0.18
	No. Obs.	15401	599			

Table 7.26. Same as Table 7.25 except for 92 stations 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	0.97	6.63	0.119	95.9	0.07
	LFM MOS	1.00	0.45	0.222	99.3	0.13
	NGM MOS	1.00	1.16	0.269	99.0	0.16
	No. Obs.	15873	98			
± 3-h Max	LOCAL	0.98	1.96	0.227	95.4	0.14
	LFM MOS	1.02	0.13	0.161	98.0	0.09
	NGM MOS	1.01	0.34	0.229	97.9	0.13
	No. Obs.	15636	332			

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 ≤ 22 kt	Bias by Category > 22 kt	Skill Score	Percent Forecast Correct	Threat Score 22 kt
1-min Avg	LOCAL	0.97	2.44	0.041	94.4	0.03
	LFM MOS	0.99	1.78	0.100	95.8	0.06
	No. Obs.	1020	18			
± 3-h Max	LOCAL	1.01	0.79	0.139	92.0	0.10
	LFM MOS	1.02	0.57	0.219	93.6	0.14
	No. Obs.	970	56			

Table 7.28. Same as Table 7.27 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	0.97	3.29	0.217	95.6	0.13
	LFM MOS	0.98	2.57	0.266	96.5	0.16
	No. Obs.	1024	14			
± 3-h Max	LOCAL	1.01	0.85	0.243	92.9	0.16
	LFM MOS	1.02	0.67	0.234	93.5	0.15
	No. Obs.	964	54			

Table 8.1. Comparative verification of LFM MOS and persistence ceiling height forecasts for 94 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	1.22	0.87	0.97	1.00	3.197	75.9	0.408
	PERSISTENCE	0.88	0.89	0.95	1.03	1.855	84.4	0.601
	No. Obs.	968	927	1949	11916			
18	MOS	1.30	0.79	1.11	0.98	2.584	76.6	0.406
	PERSISTENCE	1.65	0.96	0.81	1.01	2.966	75.5	0.357
	No. Obs.	513	852	2259	12033			
24	MOS	1.46	0.75	1.03	1.00	2.212	80.6	0.350
	PERSISTENCE	2.35	1.24	1.12	0.94	3.299	74.2	0.236
	No. Obs.	351	643	1570	12653			

Table 8.2. Same as Table 8.1 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	1.55	0.82	1.07	0.98	2.199	80.8	0.384
	PERSISTENCE	0.94	1.06	1.20	0.97	1.282	86.9	0.586
	No. Obs.	356	657	1596	12562			
18	MOS	1.56	0.68	0.98	0.99	3.047	77.6	0.366
	PERSISTENCE	0.50	0.97	1.14	1.01	2.424	79.0	0.385
	No. Obs.	685	741	1711	12369			
24	MOS	1.74	0.70	0.89	0.98	3.972	73.1	0.363
	PERSISTENCE	0.35	0.78	1.01	1.07	3.479	72.3	0.261
	No. Obs.	983	927	1957	11732			

Table 8.3. 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	0.60	1.13	1.87	0.82	3.209	68.5	0.363
	PERSISTENCE	0.72	0.91	1.01	1.02	2.011	82.9	0.579
	No. Obs.	40	53	166	744			
18	MOS	0.48	0.98	1.71	0.84	3.284	65.5	0.291
	PERSISTENCE	0.96	0.92	0.86	1.04	2.890	72.4	0.322
	No. Obs.	27	49	183	710			
24	MOS	0.22	1.18	1.75	0.83	3.031	64.7	0.254
	PERSISTENCE	1.35	1.18	0.86	1.01	3.396	68.0	0.196
	No. Obs.	23	39	185	736			

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	0.68	0.98	1.58	0.87	2.913	69.4	0.331
	PERSISTENCE	1.32	0.91	0.91	1.02	1.892	81.1	0.523
	No. Obs.	22	43	177	722			
18	MOS	0.48	1.26	1.89	0.79	3.186	65.8	0.292
	PERSISTENCE	1.12	1.17	0.90	1.01	2.811	73.6	0.323
	No. Obs.	25	35	177	733			
24	MOS	0.41	1.27	1.88	0.82	3.901	62.6	0.234
	PERSISTENCE	0.72	0.80	1.01	1.03	3.613	68.2	0.201
	No. Obs.	39	49	161	733			

Table 8.5. Comparative verification of local and persistence ceiling height forecasts for 92 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	0.88	0.89	1.05	1.01	2.120	82.4	0.561
	PERSISTENCE	0.90	0.91	0.94	1.03	1.874	84.4	0.606
	No. Obs.	1001	943	1996	12101			
6	LOCAL	0.58	0.69	1.12	1.04	2.522	78.4	0.455
	PERSISTENCE	1.02	0.80	0.89	1.04	2.708	78.1	0.453
	No. Obs.	883	1065	2103	11974			
9	LOCAL	0.38	0.61	0.96	1.06	2.064	79.5	0.418
	PERSISTENCE	1.92	0.94	0.79	1.01	3.006	75.1	0.352
	No. Obs.	471	906	2342	12295			
15	LOCAL	0.33	0.74	1.25	1.00	1.827	81.5	0.377
	PERSISTENCE	2.29	1.26	1.11	0.93	3.354	74.0	0.241
	No. Obs.	396	676	1679	13265			

Table 8.6. Same as Table 8.5 except for 93 stations 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	0.74	0.92	1.13	0.99	1.392	84.8	0.545
	PERSISTENCE	1.45	1.25	1.15	0.95	1.451	84.9	0.580
	No. Obs.	332	731	2050	13066			
6	LOCAL	0.54	0.89	1.32	0.98	1.694	82.7	0.450
	PERSISTENCE	1.21	1.32	1.40	0.93	2.018	80.1	0.427
	No. Obs.	395	694	1684	13234			
9	LOCAL	0.57	0.94	1.34	0.98	2.055	80.7	0.420
	PERSISTENCE	0.89	1.23	1.41	0.94	2.438	77.5	0.369
	No. Obs.	540	741	1675	13060			
15	LOCAL	0.57	1.15	1.31	0.97	2.976	75.2	0.375
	PERSISTENCE	0.52	1.08	1.24	0.99	3.418	72.1	0.278
	No. Obs.	911	846	1895	12368			

Table 8.7. 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	0.76	0.46	0.95	1.06	1.975	80.6	0.494
	PERSISTENCE	0.87	0.89	0.95	1.03	2.035	82.4	0.559
	No. Obs.	38	54	172	774			
6	LOCAL	0.71	0.41	0.95	1.06	2.342	77.2	0.405
	PERSISTENCE	0.94	0.96	0.89	1.03	2.672	75.4	0.385
	No. Obs.	35	49	184	772			
9	LOCAL	0.64	0.21	0.93	1.08	2.562	74.1	0.310
	PERSISTENCE	1.11	0.91	0.86	1.04	3.017	71.8	0.298
	No. Obs.	28	53	189	766			
15	LOCAL	0.23	0.15	0.92	1.09	2.379	74.2	0.255
	PERSISTENCE	1.50	1.15	0.86	1.01	3.364	68.1	0.180
	No. Obs.	22	41	189	787			

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	0.63	0.48	0.81	1.08	1.903	79.3	0.405
	PERSISTENCE	1.42	0.91	0.90	1.02	1.761	81.6	0.518
	No. Obs.	19	44	187	787			
6	LOCAL	0.44	0.35	0.89	1.07	2.060	76.6	0.307
	PERSISTENCE	1.50	0.93	0.94	1.01	2.208	77.6	0.401
	No. Obs.	18	43	177	798			
9	LOCAL	0.17	0.29	0.97	1.07	2.381	74.5	0.272
	PERSISTENCE	1.08	1.08	0.91	1.02	2.738	73.8	0.312
	No. Obs.	24	38	183	783			
15	LOCAL	0.13	0.21	1.19	1.06	2.880	71.6	0.249
	PERSISTENCE	0.67	0.79	0.99	1.03	3.507	68.4	0.195
	No. Obs.	39	52	171	775			

Table 9.1. Comparative verification of LFM MOS and persistence visibility forecasts for 94 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	1.53	1.10	1.13	0.94	3.157	73.6	0.353
	PERSISTENCE	0.85	0.84	0.88	1.04	1.631	84.8	0.574
	No. Obs.	617	871	2095	12335			
18	MOS	1.13	1.06	1.26	0.96	2.343	78.4	0.337
	PERSISTENCE	1.57	0.85	1.18	0.97	2.614	77.7	0.299
	No. Obs.	332	852	1550	13096			
24	MOS	1.13	0.97	1.09	0.99	1.808	82.4	0.337
	PERSISTENCE	2.60	1.14	1.24	0.94	2.694	77.0	0.227
	No. Obs.	199	628	1454	13464			

Table 9.2. Same as Table 9.1 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	1.24	0.92	1.09	0.99	1.757	83.0	0.371
	PERSISTENCE	1.03	1.15	0.95	1.00	1.092	88.9	0.583
	No. Obs.	204	629	1477	13316			
18	MOS	1.56	0.90	1.04	0.98	2.445	79.5	0.340
	PERSISTENCE	0.57	1.17	0.84	1.03	2.046	81.7	0.355
	No. Obs.	382	632	1676	13034			
24	MOS	2.05	0.99	1.02	0.94	3.870	71.2	0.307
	PERSISTENCE	0.34	0.85	0.67	1.10	3.052	74.5	0.227
	No. Obs.	635	875	2109	12160			

Table 9.3. 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	0.58	1.01	0.87	1.04	3.085	72.1	0.227
	PERSISTENCE	0.85	0.96	0.88	1.03	2.231	79.2	0.428
	No. Obs.	26	70	135	788			
18	MOS	0.34	0.71	1.43	1.01	3.365	72.5	0.218
	PERSISTENCE	0.66	0.80	1.26	1.00	3.590	71.5	0.195
	No. Obs.	32	86	94	802			
24	MOS	0.64	0.81	1.31	1.00	3.322	73.1	0.190
	PERSISTENCE	0.79	0.90	1.36	0.98	3.625	71.2	0.161
	No. Obs.	28	77	86	808			

Table 9.4. Same as Table 9.3 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	0.72	0.65	1.18	1.02	3.056	75.8	0.252
	PERSISTENCE	1.10	1.15	1.00	0.98	2.276	81.8	0.477
	No. Obs.	29	75	88	790			
18	MOS	0.36	0.83	0.84	1.06	2.553	74.7	0.210
	PERSISTENCE	1.45	1.91	0.64	1.00	3.127	73.7	0.265
	No. Obs.	22	46	140	787			
24	MOS	0.81	0.57	1.35	0.98	3.497	69.3	0.197
	PERSISTENCE	1.22	1.32	0.67	1.02	3.783	69.7	0.177
	No. Obs.	27	65	132	773			

Table 9.5. Comparative verification of local and persistence visibility forecasts for 92 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	0.87	0.76	1.18	0.99	1.930	81.1	0.507
	PERSISTENCE	0.85	0.86	0.88	1.04	1.649	84.8	0.578
	No. Obs.	647	865	2129	12401			
6	LOCAL	0.47	0.47	1.00	1.08	2.419	77.5	0.375
	PERSISTENCE	0.88	0.63	0.91	1.06	2.607	77.0	0.381
	No. Obs.	632	1177	2063	12154			
9	LOCAL	0.31	0.44	1.01	1.05	1.716	83.0	0.359
	PERSISTENCE	2.06	0.86	1.18	0.97	2.581	77.6	0.299
	No. Obs.	268	868	1589	13290			
15	LOCAL	0.27	0.51	1.01	1.03	1.485	84.7	0.347
	PERSISTENCE	2.44	1.15	1.29	0.94	2.742	76.8	0.231
	No. Obs.	227	646	1446	13697			

Table 9.6. Same as Table 9.5 except for 93 stations 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	0.65	0.62	1.27	1.00	1.240	86.9	0.499
	PERSISTENCE	1.30	1.20	1.12	0.97	1.275	87.4	0.549
	No. Obs.	206	728	1430	13812			
6	LOCAL	0.58	0.63	1.19	1.00	1.385	85.6	0.434
	PERSISTENCE	1.20	1.34	1.11	0.97	1.672	83.9	0.426
	No. Obs.	222	652	1448	13684			
9	LOCAL	0.62	0.86	1.16	1.00	1.592	83.9	0.406
	PERSISTENCE	1.02	1.43	1.03	0.98	1.953	81.9	0.364
	No. Obs.	262	610	1559	13585			
15	LOCAL	0.56	1.07	1.21	0.98	2.523	77.0	0.339
	PERSISTENCE	0.47	1.18	0.85	1.03	2.794	76.3	0.261
	No. Obs.	563	739	1876	12842			

Table 9.7. 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	1.08	0.42	1.12	1.03	2.181	79.3	0.417
	PERSISTENCE	0.85	0.95	0.97	1.01	2.214	79.2	0.429
	No. Obs.	26	73	130	807			
6	LOCAL	0.88	0.37	1.24	1.02	2.592	75.4	0.308
	PERSISTENCE	0.88	0.89	1.00	1.01	2.702	75.9	0.336
	No. Obs.	25	76	127	810			
9	LOCAL	0.55	0.19	1.53	1.05	2.944	75.0	0.207
	PERSISTENCE	0.67	0.77	1.47	0.99	3.523	72.0	0.198
	No. Obs.	33	88	85	828			
15	LOCAL	0.15	0.15	1.19	1.09	2.628	77.2	0.171
	PERSISTENCE	0.81	0.88	1.41	0.97	3.497	71.5	0.167
	No. Obs.	27	78	90	842			

Table 9.8. Same as Table 9.7 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	0.63	0.45	1.08	1.05	2.275	80.8	0.340
	PERSISTENCE	1.22	1.08	0.99	0.99	2.145	82.7	0.478
	No. Obs.	27	78	87	841			
6	LOCAL	0.56	0.31	0.99	1.07	2.343	77.9	0.217
	PERSISTENCE	1.83	1.08	0.88	0.99	2.752	77.2	0.316
	No. Obs.	18	77	100	838			
9	LOCAL	0.19	0.39	0.82	1.08	2.256	77.3	0.198
	PERSISTENCE	1.52	1.83	0.66	1.00	2.941	75.3	0.274
	No. Obs.	21	46	133	825			
15	LOCAL	0.18	0.26	0.96	1.10	2.738	74.4	0.177
	PERSISTENCE	1.18	1.20	0.70	1.02	3.670	71.0	0.183
	No. Obs.	28	70	126	809			