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AFOS-ERA VERIFICATION OF GUIDANCE AND LOCAL AVIATION/PUBLIC WEATHER FORECASTS--NO. 15 (OCTOBER 1990 - MARCH 1991)

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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 1990 through March 1991 for maximum/minimum (max/min) temperature, probability of precipitation (PoP), precipitation type (PoPT), 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 100 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 PoPT are shown in Tables 4.1 and 4.2 for stations in the conterminous U.S. only, and Table 5.1 shows snow amount verification scores for all conterminous U.S. stations combined. 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 1990 - MARCH 1991)

After omitting the snow amount verification for the 1989-90 cool season due to missing observations, we resumed the snow amount verification this cool season.

For all weather elements, care must be used when interpreting verification results for rare events.

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) 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-four 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, and LBB and ELP were not included in the ceiling height, visibility, and local surface wind verifications. TCC was not available for the MOS ceiling height and visibility verifications for the 0000 UTC cycle and for the local ceiling height, visibility, and surface wind 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
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 verification.
\# These stations were not included in the snow amount 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.

Table 2.1. Comparative 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	16023	0.0	2.9	1.5	--	--	88.2
	LFM MOS		-0.5	3.4	2.7	--	--	83.9
	NGM MOS		0.5	3.4	3.6	--	--	82.5
Tonight's Min	LOCAL	15970	-0.6	3.6	2.8	0.67	0.26	82.5
	LFM MOS		-0.9	3.9	4.1	0.68	0.28	78.9
	NGM MOS		0.2	4.1	4.7	0.64	0.27	76.3
Tomorrow's Max	LOCAL	16012	-0.6	3.9	4.7	--	--	79.3
	LFM MOS		-1.0	4.3	6.7	--	--	74.7
	NGM MOS		0.4	4.4	7.3	--	--	71.8
Tomorrow Night's Min	LOCAL	15969	-0.8	4.6	7.4	0.53	0.31	71.5
	LFM MOS		-0.8	4.8	8.7	0.53	0.37	68.1
	NGM MOS		0.2	4.8	8.9	0.47	0.31	66.8

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	15981	-0.7	3.2	1.8	0.70	0.24	85.9
	LFM MOS		-1.0	3.7	3.0	0.67	0.28	81.6
	NGM MOS		0.1	3.5	2.8	0.57	0.22	82.2
Tomorrow's Max	LOCAL	15996	-0.5	3.5	3.3	--	--	82.7
	LFM MOS		-0.9	4.2	6.0	--	--	76.2
	NGM MOS		0.8	4.1	6.0	--	--	75.4
Tomorrow Night's Min	LOCAL	15944	-0.9	4.0	4.4	0.67	0.29	77.5
	LFM MOS		-1.3	4.5	6.8	0.68	0.36	72.5
	NGM MOS		0.4	4.4	6.4	0.58	0.29	72.3
Day After Tomorrow's Max	LOCAL	15980	-1.0	4.5	7.5	--	--	72.7
	LFM MOS		-1.3	4.9	10.1	--	--	67.6
	NGM MOS		0.2	4.8	9.2	--	--	66.8

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	4215	-0.1	2.8	1.3	--	--	87.9
	LFM MOS		-0.4	3.3	2.3	--	--	84.3
	NGM MOS		0.4	3.3	2.9	--	--	83.7
Tonight's Min	LOCAL	4188	-0.9	3.4	1.7	0.75	0.26	85.5
	LFM MOS		-1.5	3.7	2.7	0.77	0.29	82.7
	NGM MOS		-0.4	3.7	2.5	0.75	0.26	83.0
Tomorrow's Max	LOCAL	4212	-1.0	3.8	4.4	--	--	79.1
	LFM MOS		-1.5	4.2	6.4	--	--	74.9
	NGM MOS		0.6	4.0	4.8	--	--	76.5
Tomorrow Night's Min	LOCAL	4198	-1.8	4.4	5.9	0.61	0.33	75.5
	LFM MOS		-2.5	4.7	7.9	0.67	0.41	71.4
	NGM MOS		-0.5	4.5	6.1	0.52	0.26	74.8

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	4226	-0.9	3.0	0.8	0.76	0.23	88.3
	LFM MOS		-1.2	3.4	1.5	0.76	0.25	85.4
	NGM MOS		-0.2	3.3	1.2	0.65	0.24	86.4
Tomorrow's Max	LOCAL	4232	-0.7	3.5	3.0	--	--	82.1
	LFM MOS		-1.0	3.9	4.3	--	--	78.4
	NGM MOS		0.8	3.7	4.1	--	--	79.8
Tomorrow Night's Min	LOCAL	4214	-1.5	4.0	3.3	0.73	0.32	80.0
	LFM MOS		-2.3	4.4	5.6	0.79	0.38	75.2
	NGM MOS		-0.2	3.9	4.0	0.68	0.29	80.2
Day After Tomorrow's Max	LOCAL	4232	-1.5	4.4	6.8	--	--	72.4
	LFM MOS		-2.2	4.8	9.1	--	--	67.8
	NGM MOS		0.1	4.4	6.7	--	--	72.3

Table 2.5. Comparative 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	LOCAL		0.1	2.8	1.7	--	--	85.3
Max	LFM MOS	4031	-0.1	3.4	3.0	--	--	79.4
	NGM MOS		0.2	3.2	2.8	--	--	80.0
Tonight's	LOCAL		-0.6	3.4	2.3	0.63	0.35	82.7
Min	LFM MOS	4025	-0.5	3.6	3.2	0.59	0.32	80.5
	NGM MOS		-0.2	3.9	3.6	0.50	0.37	76.4
Tomorrow's	LOCAL		-0.4	3.7	4.5	--	--	74.3
Max	LFM MOS	4025	-0.6	4.0	5.4	--	--	70.6
	NGM MOS		-0.2	4.2	5.8	--	--	67.5
Tomorrow	LOCAL		-0.7	4.4	6.5	0.52	0.35	72.4
Night's	LFM MOS	4013	-0.2	4.5	6.7	0.43	0.37	70.9
Min	NGM MOS		-0.1	4.8	8.0	0.44	0.42	65.7

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	LOCAL		-0.7	3.0	1.3	0.63	0.33	86.2
Min	LFM MOS	4011	-0.6	3.5	2.5	0.51	0.40	81.5
	NGM MOS		-0.1	3.4	2.1	0.44	0.31	81.9
Tomorrow's	LOCAL		-0.3	3.4	3.5	--	--	77.8
Max	LFM MOS	4009	-0.5	4.2	6.1	--	--	69.4
	NGM MOS		0.5	3.7	4.3	--	--	72.6
Tomorrow	LOCAL		-0.8	3.8	3.1	0.62	0.36	79.0
Night's	LFM MOS	3995	-0.8	4.2	4.9	0.57	0.42	74.7
Min	NGM MOS		0.0	4.2	4.4	0.48	0.39	73.4
Day After	LOCAL		-0.7	4.2	7.0	--	--	67.9
Tomorrow's	LFM MOS	3996	-1.0	4.5	8.5	--	--	64.3
Max	NGM MOS		0.1	4.6	8.0	--	--	60.6

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	4773	0.0	3.1	1.5	--	--	90.6
	LFM MOS		-0.6	3.6	3.0	--	--	87.0
	NGM MOS		0.6	3.9	5.0	--	--	84.3
Tonight's Min	LOCAL	4754	-0.5	3.9	4.0	0.70	0.16	82.0
	LFM MOS		-1.0	4.4	5.9	0.72	0.23	77.7
	NGM MOS		0.5	4.4	7.2	0.66	0.20	75.5
Tomorrow's Max	LOCAL	4771	-0.7	4.2	6.1	--	--	82.3
	LFM MOS		-1.1	4.7	8.1	--	--	78.6
	NGM MOS		0.5	5.0	10.6	--	--	73.9
Tomorrow Night's Min	LOCAL	4753	-0.5	5.1	9.8	0.50	0.23	70.4
	LFM MOS		-0.5	5.4	11.5	0.51	0.30	67.1
	NGM MOS		0.6	5.3	12.4	0.50	0.24	65.0

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	4768	-0.8	3.5	2.9	0.73	0.17	85.1
	LFM MOS		-1.1	4.1	4.4	0.70	0.24	80.6
	NGM MOS		0.4	3.9	4.6	0.64	0.13	81.0
Tomorrow's Max	LOCAL	4781	-0.6	3.8	4.0	--	--	85.7
	LFM MOS		-1.0	4.5	7.7	--	--	79.7
	NGM MOS		1.1	4.7	8.7	--	--	77.6
Tomorrow Night's Min	LOCAL	4761	-0.8	4.4	6.5	0.69	0.16	77.0
	LFM MOS		-1.3	4.9	9.4	0.70	0.27	71.9
	NGM MOS		1.1	4.9	9.8	0.61	0.18	70.1
Day After Tomorrow's Max	LOCAL	4778	-1.0	5.0	10.2	--	--	75.3
	LFM MOS		-1.3	5.5	13.7	--	--	70.5
	NGM MOS		0.1	5.5	13.1	--	--	68.8

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		-0.1	2.8	1.3	--	--	86.2
	LFM MOS	3004	-1.0	3.3	2.5	--	--	81.2
	NGM MOS		0.6	3.4	3.6	--	--	78.9
Tonight's Min	LOCAL		-0.1	3.5	3.1	0.48	0.32	77.7
	LFM MOS	3003	-0.5	4.0	4.6	0.53	0.33	72.0
	NGM MOS		0.9	4.2	5.5	0.56	0.29	66.3
Tomorrow's Max	LOCAL		-0.3	3.6	3.5	--	--	78.1
	LFM MOS	3004	-0.8	4.2	6.5	--	--	69.8
	NGM MOS		0.9	4.3	7.3	--	--	64.4
Tomorrow Night's Min	LOCAL		-0.1	4.3	7.0	0.41	0.38	65.6
	LFM MOS	3005	0.1	4.6	8.2	0.37	0.39	60.0
	NGM MOS		1.1	4.7	8.3	0.34	0.36	58.2

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		-0.5	3.1	2.2	0.55	0.24	82.5
	LFM MOS	2976	-1.1	3.6	3.5	0.63	0.29	76.7
	NGM MOS		0.4	3.5	3.2	0.40	0.27	77.7
Tomorrow's Max	LOCAL		-0.4	3.2	2.6	--	--	81.9
	LFM MOS	2974	-1.2	4.0	5.7	--	--	72.5
	NGM MOS		1.0	4.2	6.8	--	--	66.1
Tomorrow Night's Min	LOCAL		-0.3	3.9	4.5	0.56	0.37	71.8
	LFM MOS	2974	-0.5	4.3	6.7	0.56	0.38	65.0
	NGM MOS		1.0	4.4	6.9	0.41	0.37	61.1
Day After Tomorrow's Max	LOCAL		-0.5	4.0	4.7	--	--	72.2
	LFM MOS	2974	-0.8	4.6	7.9	--	--	63.4
	NGM MOS		0.7	4.5	8.1	--	--	59.9

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		1.1	3.8	5.1	--	--	*
	LFM MOS	857	2.3	4.4	7.7	--	--	*
Tonight's Min	LOCAL		0.7	5.4	14.1	0.60	0.50	*
	LFM MOS	856	-0.3	5.5	15.0	0.80	0.43	*
Tomorrow's Max	LOCAL		1.4	4.8	10.6	--	--	*
	LFM MOS	857	2.9	5.2	11.8	--	--	*
Tomorrow Night's Min	LOCAL		0.8	6.6	20.9	0.20	0.67	*
	LFM MOS	858	-0.1	6.6	20.7	0.40	0.67	*

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		-0.5	4.6	8.3	0.60	0.40	*
	LFM MOS	835	-1.4	5.1	11.5	0.80	0.33	*
Tomorrow's Max	LOCAL		0.6	4.2	7.8	--	--	*
	LFM MOS	835	1.8	4.8	10.4	--	--	*
Tomorrow Night's Min	LOCAL		0.2	6.0	16.5	0.60	0.63	*
	LFM MOS	834	-0.9	6.2	18.9	0.80	0.43	*
Day After Tomorrow's Max	LOCAL		0.8	5.1	12.5	--	--	*
	LFM MOS	834	2.5	5.7	14.6	--	--	*
						--	--	

* Percent improvement over climate scores were 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	Changes GE 20% to Guidance: Local % Imprv.	Changes GE 20% to Guidance: No. of Changes
12-24 (1st period)	LOCAL	0.0740		51.4				
	LFM MOS	0.0819	9.7	46.2	16029	0.2298	24.0	1887
	NGM MOS	0.0780	5.2	48.7		0.2139	10.9	2294
24-36 (2nd period)	LOCAL	0.0868		43.7				
	LFM MOS	0.0919	5.6	40.3	16029	0.2293	13.8	1875
	NGM MOS	0.0876	1.0	43.1		0.2073	1.2	2280
36-48 (3rd period)	LOCAL	0.0948		37.7				
	LFM MOS	0.1017	6.8	33.1	16020	0.2321	16.9	1976
	NGM MOS	0.0968	2.0	36.4		0.2078	4.1	2313

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 (1st period)	LOCAL	0.0751		51.1				
	LFM MOS	0.0803	6.5	47.7	16014	0.2178	15.4	1873
	NGM MOS	0.0776	3.3	49.4		0.1973	4.0	2362
24-36 (2nd period)	LOCAL	0.0857		43.3				
	LFM MOS	0.0925	7.3	38.8	16006	0.2304	19.9	1805
	NGM MOS	0.0866	0.9	42.7		0.1974	2.8	2306
36-48 (3rd period)	LOCAL	0.0970		36.6				
	LFM MOS	0.1045	7.2	31.7	15993	0.2329	20.1	1949
	NGM MOS	0.0983	1.4	35.7		0.2067	1.7	2363

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	0.0826		56.2				
(1st period)	LFM MOS	0.0917	9.9	51.4	4215	0.2235	21.0	602
	NGM MOS	0.0863	4.3	54.2		0.2086	10.1	700
24-36	LOCAL	0.0933		51.8				
(2nd period)	LFM MOS	0.0999	6.6	48.3	4214	0.2207	16.1	566
	NGM MOS	0.0947	1.5	51.1		0.1941	3.0	734
36-48	LOCAL	0.1090		42.2				
(3rd period)	LFM MOS	0.1167	6.6	38.2	4213	0.2174	15.7	684
	NGM MOS	0.1106	1.4	41.4		0.2007	2.5	821

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	0.0843		56.4				
(1st period)	LFM MOS	0.0888	5.2	54.0	4237	0.2066	8.9	593
	NGM MOS	0.0861	2.1	55.5		0.1806	2.0	730
24-36	LOCAL	0.0980		47.7				
(2nd period)	LFM MOS	0.1034	5.2	44.8	4234	0.2072	12.3	567
	NGM MOS	0.0973	-0.8	48.1		0.1795	-2.9	759
36-48	LOCAL	0.1081		43.3				
(3rd period)	LFM MOS	0.1166	7.3	38.9	4234	0.2183	17.5	645
	NGM MOS	0.1086	0.5	43.1		0.1983	1.6	814

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	0.0719		48.7				
(1st period)	LFM MOS	0.0793	9.4	43.4	4038	0.2304	22.3	480
	NGM MOS	0.0759	5.2	45.9		0.2309	11.0	590
24-36	LOCAL	0.0824		41.3				
(2nd period)	LFM MOS	0.0899	8.3	35.9	4033	0.2386	22.1	486
	NGM MOS	0.0847	2.7	39.6		0.2163	7.2	523
36-48	LOCAL	0.0901		35.7				
(3rd period)	LFM MOS	0.0976	7.6	30.4	4032	0.2532	17.1	484
	NGM MOS	0.0896	-0.6	36.1		0.2088	-2.5	522

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	0.0683		50.8				
(1st period)	LFM MOS	0.0770	11.2	44.5	4010	0.2325	26.7	440
	NGM MOS	0.0731	6.5	47.3		0.2111	9.3	517
24-36	LOCAL	0.0825		40.0				
(2nd period)	LFM MOS	0.0899	8.3	34.6	4013	0.2424	24.2	447
	NGM MOS	0.0815	-1.2	40.6		0.2105	-3.3	477
36-48	LOCAL	0.0901		35.4				
(3rd period)	LFM MOS	0.0987	8.7	29.3	4000	0.2387	24.3	432
	NGM MOS	0.0931	3.1	33.3		0.2221	5.3	481

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	0.0705		51.4				
	LFM MOS	0.0783	10.0	46.0	4772	0.2416	28.6	509
	NGM MOS	0.0733	3.8	49.4		0.2144	6.9	647
24-36 (2nd period)	LOCAL	0.0851		41.1				
	LFM MOS	0.0886	4.0	38.7	4775	0.2331	8.5	533
	NGM MOS	0.0823	-3.4	43.0		0.2102	-8.9	665
36-48 (3rd period)	LOCAL	0.0919		36.3				
	LFM MOS	0.0985	6.7	31.7	4772	0.2392	20.7	534
	NGM MOS	0.0942	2.5	34.6		0.2147	6.8	608

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	0.0713		50.4				
	LFM MOS	0.0752	5.1	47.8	4786	0.2133	12.2	580
	NGM MOS	0.0705	-1.1	51.0		0.2020	-3.4	689
24-36 (2nd period)	LOCAL	0.0804		44.4				
	LFM MOS	0.0893	10.0	38.2	4782	0.2426	25.3	531
	NGM MOS	0.0827	2.8	42.8		0.2031	9.7	671
36-48 (3rd period)	LOCAL	0.0948		34.6				
	LFM MOS	0.1022	7.2	29.5	4778	0.2436	22.3	580
	NGM MOS	0.0962	1.4	33.7		0.2052	1.5	699

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	0.0702		45.4				
(1st period)	LFM MOS	0.0774	9.3	39.8	3004	0.2212	24.3	296
	NGM MOS	0.0767	8.5	40.4		0.1957	20.4	357
24-36	LOCAL	0.0861		34.9				
(2nd period)	LFM MOS	0.0885	2.8	33.1	3007	0.2235	4.7	290
	NGM MOS	0.0900	4.4	31.9		0.2161	7.5	358
36-48	LOCAL	0.0861		33.6				
(3rd period)	LFM MOS	0.0915	5.9	29.4	3003	0.2174	11.4	274
	NGM MOS	0.0911	5.5	29.8		0.2110	12.1	362

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	0.0773		41.5				
(1st period)	LFM MOS	0.0811	4.7	38.6	2981	0.2283	15.9	260
	NGM MOS	0.0832	7.1	37.0		0.2014	12.4	426
24-36	LOCAL	0.0814		36.8				
(2nd period)	LFM MOS	0.0858	5.2	33.3	2977	0.2354	15.7	260
	NGM MOS	0.0843	3.5	34.5		0.2061	8.6	399
36-48	LOCAL	0.0937		28.0				
(3rd period)	LFM MOS	0.0991	5.4	23.9	2981	0.2352	14.7	292
	NGM MOS	0.0943	0.7	27.5		0.2076	-2.8	369

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	Changes GE 20% to Guidance: Local % Imprv.	Changes GE 20% to Guidance: No. of Changes
6-18	LOCAL	0.1537		*				
(1st period)	LFM MOS	0.1876	18.1	*	681	0.2688	32.5	267
18-30	LOCAL	0.1585		*				
(2nd period)	LFM MOS	0.1731	8.4	*	676	0.2375	11.8	282
30-42	LOCAL	0.1791		*				
(3rd period)	LFM MOS	0.1749	-2.4	*	679	0.2419	-3.9	247

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	Changes GE 20% to Guidance: Local % Imprv.	Changes GE 20% to Guidance: No. of Changes
6-18	LOCAL	0.1469		*				
(1st period)	LFM MOS	0.1713	14.2	*	663	0.2485	23.7	270
18-30	LOCAL	0.1671		*				
(2nd period)	LFM MOS	0.1734	3.6	*	662	0.2351	6.5	253
30-42	LOCAL	0.1664		*				
(3rd period)	LFM MOS	0.1762	5.6	*	662	0.2574	10.3	245

* Percent improvement over climate scores were 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.

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	0.40	1.03	1.02	88.8	0.749	0.13	0.85	0.67	0.17
		MOS	0.70	0.97	1.03	90.1	0.778	0.30	0.85	0.57	0.12
		No. Obs.	30	226	540						
	Southern 22	LOCAL	0.94	0.90	1.01	95.5	0.777	0.71	0.72	0.25	0.19
		MOS	0.88	0.76	1.03	92.1	0.582	0.41	0.55	0.53	0.27
		No. Obs.	17	29	357						
	Central 28	LOCAL	0.74	0.89	1.15	85.6	0.736	0.41	0.82	0.44	0.09
		MOS	0.50	0.91	1.16	87.2	0.763	0.29	0.84	0.41	0.07
		No. Obs.	34	301	274						
	Western 12	LOCAL	0.00	0.92	1.05	90.8	0.800	0.00	0.83	1.00	0.09
		MOS	1.00	0.94	1.03	91.8	0.824	1.00	0.86	0.00	0.09
		No. Obs.	1	109	183						
	All Stations	LOCAL	0.65	0.94	1.05	89.4	0.775	0.37	0.83	0.43	0.12
		MOS	0.66	0.93	1.06	89.9	0.783	0.33	0.84	0.50	0.10
		No. Obs.	82	665	1354						
30	Eastern 24	LOCAL	0.53	1.07	1.00	88.8	0.759	0.28	0.87	0.47	0.18
		MOS	1.58	0.87	1.02	87.7	0.738	0.58	0.78	0.63	0.11
		No. Obs.	36	261	586						
	Southern 22	LOCAL	1.00	1.22	0.99	95.3	0.612	0.69	0.44	0.31	0.64
		MOS	1.15	0.44	1.01	96.7	0.694	0.77	0.44	0.33	0.00
		No. Obs.	13	9	341						
	Central 28	LOCAL	0.66	1.03	1.01	88.2	0.780	0.41	0.91	0.38	0.11
		MOS	1.53	0.91	1.05	87.1	0.768	0.56	0.85	0.63	0.07
		No. Obs.	32	320	266						
	Western 12	LOCAL	0.50	0.98	1.02	90.1	0.793	0.00	0.88	1.00	0.11
		MOS	0.75	0.95	1.03	90.1	0.793	0.25	0.85	0.67	0.11
		No. Obs.	4	106	172						
	All Stations	LOCAL	0.65	1.04	1.00	89.9	0.791	0.38	0.89	0.42	0.15
		MOS	1.46	0.90	1.02	89.3	0.782	0.59	0.82	0.60	0.09
		No. Obs.	85	696	1365						
42	Eastern 24	LOCAL	0.69	1.02	1.01	86.5	0.700	0.21	0.82	0.70	0.20
		MOS	1.38	1.06	0.95	85.8	0.700	0.41	0.83	0.70	0.22
		No. Obs.	29	227	542						
	Southern 22	LOCAL	0.55	0.58	1.05	93.5	0.578	0.27	0.50	0.50	0.13
		MOS	1.55	0.77	1.00	92.6	0.618	0.45	0.65	0.71	0.15
		No. Obs.	11	26	315						
	Central 28	LOCAL	0.47	1.02	1.04	83.1	0.686	0.25	0.85	0.47	0.17
		MOS	1.09	0.93	1.07	83.6	0.704	0.34	0.82	0.69	0.12
		No. Obs.	32	279	256						
	Western 12	LOCAL	2.00	0.91	1.05	90.4	0.797	0.00	0.83	1.00	0.09
		MOS	8.00	0.88	1.04	85.2	0.694	1.00	0.77	0.88	0.12
		No. Obs.	1	113	177						
	All Stations	LOCAL	0.59	0.98	1.03	87.3	0.731	0.23	0.82	0.60	0.17
		MOS	1.37	0.96	1.00	86.3	0.719	0.40	0.81	0.71	0.16
		No. Obs.	73	645	1290						

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

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	0.47	1.07	1.00	89.7	0.783	0.35	0.89	0.25	0.17
		MOS	1.09	0.96	1.01	89.1	0.772	0.41	0.85	0.62	0.12
		No. Obs.	34	275	575						
	Southern 22	LOCAL	0.92	0.94	1.01	95.8	0.707	0.62	0.65	0.33	0.31
		MOS	1.00	0.65	1.02	93.6	0.531	0.31	0.47	0.69	0.27
		No. Obs.	13	17	347						
	Central 28	LOCAL	0.97	0.96	1.06	85.6	0.738	0.39	0.86	0.59	0.10
		MOS	1.05	0.92	1.09	86.5	0.756	0.42	0.86	0.60	0.07
		No. Obs.	38	338	262						
	Western 12	LOCAL	0.50	0.99	1.02	89.3	0.777	0.50	0.85	0.00	0.14
		MOS	0.50	0.93	1.06	90.7	0.804	0.25	0.84	0.50	0.09
		No. Obs.	4	109	176						
	All Stations	LOCAL	0.75	1.00	1.01	89.5	0.786	0.42	0.87	0.45	0.14
		MOS	1.03	0.93	1.03	89.4	0.784	0.39	0.84	0.62	0.09
		No. Obs.	89	739	1360						
30	Eastern 24	LOCAL	0.39	1.08	1.00	86.3	0.692	0.14	0.82	0.64	0.24
		MOS	1.50	0.99	0.98	87.5	0.728	0.57	0.80	0.62	0.19
		No. Obs.	28	216	539						
	Southern 22	LOCAL	0.93	0.91	1.01	93.7	0.650	0.50	0.65	0.46	0.29
		MOS	1.29	0.96	0.99	91.8	0.577	0.50	0.61	0.61	0.36
		No. Obs.	14	23	330						
	Central 28	LOCAL	0.40	0.95	1.12	83.6	0.692	0.17	0.84	0.58	0.12
		MOS	1.30	0.94	1.04	85.1	0.729	0.43	0.85	0.67	0.09
		No. Obs.	30	317	269						
	Western 12	LOCAL	1.00	0.85	1.10	89.1	0.765	0.00	0.78	1.00	0.08
		MOS	0.00	0.92	1.05	89.8	0.783	0.00	0.83	*	0.10
		No. Obs.	1	106	167						
	All Stations	LOCAL	0.51	0.98	1.04	87.2	0.728	0.22	0.82	0.57	0.16
		MOS	1.36	0.95	1.00	87.8	0.750	0.49	0.82	0.64	0.14
		No. Obs.	73	662	1305						
42	Eastern 24	LOCAL	0.61	1.05	1.00	83.5	0.644	0.18	0.79	0.71	0.25
		MOS	2.29	0.91	0.97	84.5	0.678	0.54	0.76	0.77	0.17
		No. Obs.	28	252	557						
	Southern 22	LOCAL	1.00	1.43	0.99	94.8	0.518	0.55	0.57	0.45	0.60
		MOS	1.55	0.43	0.99	96.2	0.642	0.82	0.43	0.47	0.00
		No. Obs.	11	7	328						
	Central 28	LOCAL	0.62	1.03	1.02	83.0	0.687	0.35	0.86	0.43	0.16
		MOS	1.57	0.91	1.02	83.9	0.716	0.54	0.84	0.66	0.08
		No. Obs.	37	311	265						
	Western 12	LOCAL	0.75	0.93	1.05	86.3	0.717	0.00	0.81	1.00	0.13
		MOS	1.25	0.96	1.02	85.9	0.713	0.25	0.81	0.80	0.16
		No. Obs.	4	98	154						
	All Stations	LOCAL	0.67	1.03	1.01	85.6	0.703	0.30	0.82	0.56	0.20
		MOS	1.80	0.91	0.99	86.5	0.728	0.56	0.80	0.69	0.13
		No. Obs.	80	668	1304						

* This category was observed but was not forecast.

Table 5.1. Comparative verification of local and LFM MOS snow amount forecasts for 82 stations in the contermi-nous 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
	LOCAL	1.70	1.31	0.65	98.1	0.276	0.211	0.157	0.077	0.47	0.31	0.12	0.72	0.76	0.82
0000	MOS	1.16	1.11	0.29	98.4	0.238	0.176	0.104	0.048	0.32	0.20	0.06	0.72	0.82	0.80
	No. Obs.	136	35	17											
	LOCAL	1.47	1.07	0.48	98.0	0.287	0.229	0.208	0.156	0.46	0.36	0.20	0.69	0.67	0.58
1200	MOS	1.10	1.22	0.72	98.2	0.262	0.203	0.176	0.162	0.35	0.33	0.24	0.68	0.73	0.67
	No. Obs.	161	45	25											

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 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	1.46	1.53	0.93	68.6	0.552
	LFM MOS	0.98	1.53	1.10	0.82	62.6	0.458
	NGM MOS	0.95	1.52	1.21	0.84	62.9	0.465
	No. Obs.	6414	1951	1574	6188		
18	LOCAL	0.63	1.70	2.01	0.73	53.0	0.374
	LFM MOS	0.81	1.89	1.27	0.73	54.8	0.385
	NGM MOS	0.79	1.84	1.35	0.74	55.4	0.394
	No. Obs.	5896	2478	2006	5900		
24	LOCAL	0.63	1.80	2.05	0.75	50.9	0.342
	LFM MOS	0.85	1.80	1.27	0.76	55.1	0.379
	NGM MOS	0.82	1.84	1.38	0.73	56.2	0.397
	No. Obs.	6221	2364	1762	5777		

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

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Percent Correct	Skill Score
12	LOCAL	0.75	1.46	1.72	0.86	63.0	0.490
	LFM MOS	0.90	1.78	1.23	0.71	57.0	0.404
	NGM MOS	0.85	1.76	1.26	0.77	58.3	0.422
	No. Obs.	6228	2376	1764	5757		
18	LOCAL	0.65	1.97	2.25	0.86	57.0	0.402
	LFM MOS	0.96	1.67	1.14	0.82	62.8	0.446
	NGM MOS	0.91	1.77	1.20	0.83	63.3	0.459
	No. Obs.	7345	1704	1369	5708		
24	LOCAL	0.66	1.77	2.07	0.84	53.4	0.359
	LFM MOS	0.94	1.67	1.07	0.83	59.9	0.422
	NGM MOS	0.87	1.79	1.18	0.83	59.5	0.422
	No. Obs.	6452	1951	1573	6145		

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
	LOCAL	0.83	1.28	1.44	0.91	65.7	0.502
12	LFM MOS	0.96	1.51	1.22	0.83	61.5	0.449
	NGM MOS	0.97	1.42	1.18	0.85	62.4	0.457
	No. Obs.	1177	584	465	1990		
	LOCAL	0.55	1.57	2.05	0.75	53.1	0.366
18	LFM MOS	0.73	1.72	1.35	0.79	54.0	0.367
	NGM MOS	0.74	1.77	1.35	0.76	55.4	0.389
	No. Obs.	1132	703	540	1839		
	LOCAL	0.62	1.90	2.06	0.80	54.5	0.374
24	LFM MOS	0.86	1.69	1.22	0.86	58.1	0.401
	NGM MOS	0.88	1.82	1.25	0.80	59.9	0.432
	No. Obs.	1434	529	416	1836		

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
	LOCAL	0.66	1.67	2.02	0.85	61.2	0.459
12	LFM MOS	0.92	1.69	1.24	0.81	59.1	0.416
	NGM MOS	0.87	1.89	1.20	0.81	60.1	0.433
	No. Obs.	1454	527	414	1845		
	LOCAL	0.65	1.77	2.24	0.87	58.4	0.413
18	LFM MOS	0.98	1.37	1.15	0.90	64.0	0.461
	NGM MOS	0.94	1.61	1.07	0.89	64.3	0.470
	No. Obs.	1579	443	365	1852		
	LOCAL	0.74	1.39	1.94	0.82	55.9	0.380
24	LFM MOS	0.82	1.64	1.23	0.86	58.3	0.403
	NGM MOS	0.84	1.66	1.15	0.86	58.0	0.398
	No. Obs.	1189	585	473	1991		

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 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	0.80	1.46	1.52	0.94	69.9	0.570
	LFM MOS	1.03	1.35	0.96	0.87	66.5	0.505
	NGM MOS	1.03	1.44	1.04	0.82	66.9	0.514
	No. Obs.	1679	468	399	1483		
18	LOCAL	0.69	1.65	1.71	0.75	55.9	0.410
	LFM MOS	0.93	1.61	1.11	0.75	59.6	0.443
	NGM MOS	0.99	1.49	1.05	0.76	61.2	0.460
	No. Obs.	1623	635	586	1344		
24	LOCAL	0.68	1.74	1.87	0.74	51.8	0.353
	LFM MOS	0.90	1.74	1.18	0.72	56.7	0.397
	NGM MOS	0.93	1.70	1.21	0.68	58.7	0.424
	No. Obs.	1656	599	485	1291		

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

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Percent Correct	Skill Score
12	LOCAL	0.78	1.45	1.56	0.86	67.2	0.549
	LFM MOS	0.94	1.69	1.19	0.67	58.6	0.422
	NGM MOS	0.95	1.58	1.02	0.79	62.1	0.466
	No. Obs.	1653	605	482	1271		
18	LOCAL	0.69	2.02	2.09	0.86	60.0	0.434
	LFM MOS	0.97	1.81	1.02	0.79	65.1	0.470
	NGM MOS	0.97	1.65	1.07	0.82	66.7	0.491
	No. Obs.	1968	397	348	1296		
24	LOCAL	0.72	1.87	1.93	0.80	56.1	0.392
	LFM MOS	0.98	1.62	0.96	0.84	64.6	0.481
	NGM MOS	0.98	1.60	1.09	0.81	64.7	0.485
	No. Obs.	1703	459	392	1455		

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	0.71	1.69	1.85	0.93	65.8	0.515
	LFM MOS	0.99	1.59	1.09	0.79	62.1	0.439
	NGM MOS	0.90	1.61	1.36	0.84	61.3	0.436
	No. Obs.	2088	569	389	1705		
18	LOCAL	0.51	1.97	2.39	0.73	49.0	0.330
	LFM MOS	0.72	2.22	1.34	0.69	53.0	0.364
	NGM MOS	0.69	2.10	1.55	0.72	52.6	0.360
	No. Obs.	1847	706	496	1700		
24	LOCAL	0.49	2.06	2.37	0.75	46.6	0.296
	LFM MOS	0.77	2.07	1.33	0.73	52.8	0.352
	NGM MOS	0.75	1.96	1.45	0.76	54.0	0.368
	No. Obs.	1874	702	463	1711		

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	0.66	1.59	1.87	0.88	60.7	0.462
	LFM MOS	0.85	2.01	1.19	0.70	55.6	0.386
	NGM MOS	0.76	1.91	1.42	0.76	55.7	0.391
	No. Obs.	1875	713	469	1715		
18	LOCAL	0.54	2.50	2.66	0.85	53.0	0.360
	LFM MOS	0.94	1.90	1.16	0.79	61.9	0.427
	NGM MOS	0.89	1.99	1.23	0.82	62.7	0.443
	No. Obs.	2286	474	358	1656		
24	LOCAL	0.53	2.13	2.44	0.87	49.2	0.311
	LFM MOS	0.96	1.74	1.07	0.78	58.7	0.393
	NGM MOS	0.85	1.94	1.23	0.82	58.4	0.402
	No. Obs.	2101	576	386	1707		

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	1.36	1.26	0.97	75.0	0.630
	LFM MOS	0.94	1.72	1.13	0.81	59.7	0.405
	NGM MOS	0.91	1.64	1.29	0.83	61.1	0.428
	No. Obs.	1470	330	321	1010		
18	LOCAL	0.78	1.57	1.92	0.69	54.8	0.385
	LFM MOS	0.84	2.01	1.32	0.65	52.1	0.343
	NGM MOS	0.72	2.05	1.56	0.70	51.8	0.349
	No. Obs.	1294	434	384	1017		
24	LOCAL	0.80	1.42	1.90	0.65	51.3	0.342
	LFM MOS	0.88	1.64	1.36	0.65	52.2	0.345
	NGM MOS	0.73	1.84	1.63	0.62	51.1	0.345
	No. Obs.	1257	534	398	939		

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	1.10	1.40	0.86	63.4	0.490
	LFM MOS	0.92	1.65	1.32	0.60	54.4	0.374
	NGM MOS	0.83	1.62	1.41	0.71	54.7	0.382
	No. Obs.	1246	531	399	926		
18	LOCAL	0.77	1.48	1.98	0.86	57.5	0.396
	LFM MOS	0.96	1.57	1.24	0.74	59.6	0.400
	NGM MOS	0.84	1.81	1.47	0.76	58.8	0.406
	No. Obs.	1512	390	298	904		
24	LOCAL	0.69	1.66	1.99	0.91	53.0	0.341
	LFM MOS	0.97	1.65	1.00	0.83	57.7	0.370
	NGM MOS	0.82	2.03	1.27	0.84	56.2	0.371
	No. Obs.	1459	331	322	992		

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	0.85	1.05	1.76	0.96	64.9	0.439
	LFM MOS	1.00	1.03	0.99	1.00	65.8	0.437
	No. Obs.	294	99	83	577		
18	LOCAL	0.73	1.36	2.09	0.86	57.1	0.351
	LFM MOS	0.87	1.13	1.09	1.02	63.5	0.408
	No. Obs.	274	102	107	579		
24	LOCAL	0.71	1.34	2.05	0.85	53.5	0.318
	LFM MOS	0.91	1.03	0.92	1.05	61.7	0.392
	No. Obs.	278	111	119	546		

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	1.02	1.76	0.95	65.2	0.469
	LFM MOS	0.93	1.08	1.10	1.00	64.0	0.435
	No. Obs.	275	111	114	546		
18	LOCAL	0.64	1.40	2.03	0.96	62.1	0.419
	LFM MOS	0.94	0.97	0.84	1.06	65.6	0.435
	No. Obs.	300	108	87	556		
24	LOCAL	0.62	1.45	2.34	0.93	56.8	0.331
	LFM MOS	0.94	0.86	1.11	1.04	63.0	0.383
	No. Obs.	293	97	82	574		

Table 7.1. Comparative verification of LFM and NGM MOS surface wind guidance 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	21	0.566	3444	3.4	0.8	3462	0.403	85.9	0.16	1.02	0.91	0.81	0.77	0.50	0.11
	NGM	18	0.606		3.5	1.5		0.443	85.3	0.13	0.98	1.17	1.08	1.06	0.78	0.22
											13628	1617	482	95	18	9
18	LFM	23	0.517	6165	3.5	0.3	6187	0.375	73.7	0.14	1.07	0.86	0.82	0.70	0.55	1.14
	NGM	21	0.549		3.4	1.3		0.425	73.7	0.13	0.98	1.05	1.08	1.12	0.87	2.00
											11400	3125	1111	273	76	7
24	LFM	25	0.474	4264	3.7	0.8	4289	0.347	80.8	0.05	1.04	0.86	0.82	0.70	0.59	0.29
	NGM	25	0.482		3.8	1.7		0.383	79.7	0.02	0.98	1.10	1.18	1.09	0.38	0.29
											12899	2138	606	140	34	7

Table 7.2. Same as Table 7.1 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	0.514	4425	3.5	0.7	4442	0.381	81.4	0.09	1.03	0.91	0.79	0.85	0.55	0.29
	NGM	22	0.528		3.5	1.6		0.426	80.8	0.03	0.97	1.14	1.20	1.08	0.76	0.00
											12811	2122	618	138	33	7
18	LFM	23	0.524	3440	3.6	0.8	3457	0.348	84.2	0.06	1.03	0.85	0.77	0.61	0.26	0.00
	NGM	21	0.548		3.7	1.6		0.404	83.4	0.08	0.98	1.16	1.16	0.78	0.52	0.20
											13438	1778	467	104	23	5
24	LFM	24	0.527	3152	3.7	0.9	3181	0.348	84.8	0.03	1.03	0.88	0.72	0.66	0.32	0.22
	NGM	22	0.564		3.8	1.6		0.394	83.9	0.21	0.98	1.17	1.05	0.73	0.84	0.33
											13508	1632	486	95	19	9

Table 7.3. Comparative verification of LFM and NGM MOS surface wind guidance 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	0.507	944	3.2	0.6	947	0.395	85.9	0.00	1.03	0.86	0.69	0.38	0.00	0.00
	NGM	18	0.591		3.2	1.5		0.458	85.3	0.20	0.98	1.18	1.00	1.08	0.50	0.50
											3513	462	116	13	2	2
18	LFM	21	0.489	1757	3.1	0.1	1765	0.375	72.9	0.00	1.07	0.89	0.78	0.41	0.10	0.00
	NGM	19	0.542		3.0	1.0		0.445	74.0	0.07	0.98	1.03	1.14	0.88	0.40	0.00
											2860	892	282	58	10	1
24	LFM	25	0.416	1018	3.4	0.7	1025	0.361	83.4	0.00	1.05	0.83	0.66	0.10	0.00	*
	NGM	22	0.455		3.5	1.7		0.414	82.5	0.00	0.98	1.14	0.98	0.43	1.00	*
											3418	529	133	21	2	0

Table 7.4. Same as Table 7.3 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	0.490	1084	3.3	0.5	1086	0.393	83.8	0.00	1.04	0.89	0.61	0.45	0.00	*
	NGM	20	0.507		3.2	1.5		0.464	83.5	0.00	0.97	1.21	1.09	0.68	0.00	*
											3422	529	135	22	2	0
18	LFM	23	0.447	929	3.3	0.6	932	0.357	85.0	0.00	1.04	0.81	0.76	0.18	0.00	*
	NGM	20	0.506		3.4	1.5		0.420	84.3	0.00	0.98	1.13	1.15	0.68	0.00	*
											3513	481	102	22	3	0
24	LFM	23	0.483	894	3.3	0.7	899	0.345	84.6	0.00	1.04	0.85	0.62	0.38	0.00	0.00
	NGM	20	0.548		3.2	1.3		0.449	85.4	0.50	0.99	1.11	0.97	0.54	1.00	0.00
											3506	468	120	13	2	2

* This category was neither forecast nor observed.

Table 7.5. Comparative verification of LFM and NGM MOS surface wind guidance 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	0.529	649	3.4	1.2	652	0.381	89.3	1.00	1.01	0.96	0.75	1.00	1.00	*
	NGM	21	0.587		3.3	1.5		0.395	88.5	1.00	0.99	1.17	1.00	1.00	1.00	*
											3491	305	65	6	1	0
18	LFM	25	0.500	1478	3.6	1.3	1482	0.370	76.2	0.33	1.01	0.91	1.04	1.77	0.80	5.00
	NGM	23	0.550		3.6	1.9		0.408	75.8	0.16	0.95	1.12	1.15	2.64	1.30	5.00
											3091	686	226	22	10	1
24	LFM	25	0.502	880	3.5	1.1	883	0.340	84.9	0.00	1.01	1.03	0.66	0.74	0.67	0.00
	NGM	25	0.507		3.5	1.5		0.370	84.4	0.00	0.98	1.12	1.18	0.95	0.33	0.00
											3353	397	89	19	3	2

Table 7.6. Same as Table 7.5 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	0.522	863	3.2	1.1	865	0.378	85.6	0.00	1.01	0.97	0.90	1.00	0.67	0.00
	NGM	21	0.565		3.4	1.9		0.399	84.4	0.08	0.96	1.21	1.29	1.21	2.67	0.00
											3320	393	89	19	3	2
18	LFM	24	0.513	708	3.7	1.6	711	0.334	86.3	0.00	1.00	1.04	0.94	0.89	*	0.00
	NGM	22	0.534		3.3	1.7		0.383	86.5	1.00	0.98	1.18	1.11	0.78	*	0.00
											3414	360	66	9	0	1
24	LFM	26	0.470	595	3.8	1.5	600	0.305	87.8	0.00	1.01	0.98	0.73	0.86	0.00	*
	NGM	25	0.523		3.6	1.6		0.348	87.7	1.00	0.99	1.14	0.88	1.00	1.00	*
											3450	307	64	7	1	0

* This category was neither forecast nor observed.

Table 7.7. Comparative verification of LFM and NGM MOS surface wind guidance 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	18	0.613	1353	3.3	0.5	1360	0.401	81.6	0.18	1.04	0.85	0.86	0.88	0.75	0.20
	NGM	16	0.632		3.4	1.3		0.456	81.3	0.14	0.97	1.15	1.14	0.95	1.25	0.20
											3823	630	209	56	8	5
18	LFM	20	0.559	2235	3.4	-0.4	2243	0.348	66.7	0.08	1.17	0.77	0.72	0.64	0.46	0.50
	NGM	19	0.578		3.4	1.0		0.393	66.2	0.11	0.99	1.00	1.03	1.08	1.00	3.00
											2870	1210	464	137	35	2
24	LFM	23	0.506	1483	3.8	0.4	1490	0.352	77.7	0.03	1.08	0.73	0.83	0.73	0.48	2.00
	NGM	23	0.532		3.9	1.5		0.361	74.5	0.04	0.96	1.10	1.26	1.02	0.19	2.00
											3625	767	248	64	21	1

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	20	0.557	1583	3.4	0.1	1589	0.382	78.1	0.10	1.06	0.84	0.67	0.78	0.43	2.00
	NGM	20	0.590		3.4	1.2		0.427	76.9	0.00	0.96	1.14	1.18	0.88	0.38	0.00
											3592	762	261	64	21	1
18	LFM	20	0.591	1287	3.5	0.1	1292	0.339	79.8	0.05	1.07	0.76	0.62	0.65	0.21	0.00
	NGM	18	0.608		3.6	1.2		0.412	78.9	0.00	0.98	1.14	1.04	0.81	0.29	0.00
											3756	685	225	52	14	3
24	LFM	21	0.570	1184	3.8	0.6	1192	0.341	80.0	0.05	1.05	0.79	0.80	0.75	0.40	0.40
	NGM	19	0.598		3.9	1.3		0.376	78.1	0.21	0.97	1.20	1.11	0.66	0.60	0.40
											3784	638	216	56	10	5

Table 7.9. Comparative verification of LFM and NGM MOS surface wind guidance for 18 stations in the Western 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	23	0.490	498	3.9	1.5	503	0.417	88.4	0.10	1.00	1.11	0.91	0.65	0.29	0.00
	NGM	23	0.486		4.4	2.2		0.406	87.1	0.00	0.98	1.24	1.11	1.40	0.29	0.00
											2801	220	92	20	7	2
18	LFM	31	0.390	695	4.5	1.0	697	0.390	81.9	0.16	1.02	0.98	0.83	0.70	0.81	0.67
	NGM	31	0.383		4.6	1.6		0.411	81.7	0.17	1.00	1.08	0.98	0.86	0.67	1.00
											2579	337	139	56	21	3
24	LFM	30	0.389	883	4.2	1.5	891	0.320	77.1	0.11	1.01	0.96	1.06	0.97	1.00	0.00
	NGM	30	0.341		4.1	2.0		0.375	77.9	0.00	0.98	1.02	1.24	1.69	0.75	0.00
											2503	445	136	36	8	4

Table 7.10. Same as Table 7.9 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	28	0.406	895	4.0	1.5	902	0.355	78.2	0.13	1.00	0.98	1.13	1.15	1.00	0.00
	NGM	29	0.357		4.1	2.0		0.385	78.6	0.05	0.98	0.97	1.27	1.67	1.29	0.00
											2477	438	133	33	7	4
18	LFM	28	0.389	516	4.2	1.7	522	0.358	87.2	0.11	1.01	0.89	1.08	0.81	0.50	0.00
	NGM	28	0.389		4.7	2.7		0.355	85.0	0.15	0.97	1.20	1.64	0.81	1.17	1.00
											2755	252	74	21	6	1
24	LFM	28	0.435	479	4.2	1.3	490	0.393	88.4	0.00	1.01	1.10	0.69	0.53	0.33	0.00
	NGM	27	0.451		4.8	2.6		0.361	86.1	0.07	0.97	1.30	1.14	0.95	1.17	0.50
											2768	219	86	19	6	2

Table 7.11. Verification of LFM MOS surface wind guidance 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	29	0.462	337	4.9	2.8	342	0.353	78.6	0.20	0.95 871	1.13 104	1.61 44	0.96 27	1.40 5	* 0
18	LFM	34	0.397	316	5.5	2.8	331	0.336	78.3	0.00	0.98 858	1.14 106	1.05 59	0.76 17	1.33 6	2.00 1
24	LFM	38	0.352	389	4.9	2.2	401	0.299	74.8	0.08	1.02 814	0.99 131	0.89 57	0.73 26	0.83 12	2.00 2

Table 7.12. Same as Table 7.11 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	31	0.466	349	4.4	1.1	358	0.399	78.6	0.12	1.02 807	1.07 126	0.88 56	0.70 27	0.42 12	0.00 2
18	LFM	28	0.434	331	4.8	1.6	334	0.346	78.0	0.13	1.03 814	0.87 131	1.07 57	0.62 26	0.56 12	3.00 2
24	LFM	35	0.393	315	5.4	2.8	327	0.273	77.2	0.11	0.97 862	1.26 97	1.20 45	0.63 27	0.40 5	** 0

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

Table 7.13. Verification of local surface wind forecasts for 91 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	0.555	6394	3.5	1.9	6502	0.433	84.9	0.16	0.97 13598	1.34 1590	0.89 471	0.47 96	0.58 19	0.17 6
9	LOCAL	30	0.443	10157	3.5	1.2	10247	0.367	71.2	0.15	0.98 11209	1.24 3108	0.76 1108	0.36 276	0.42 71	0.10 10
15	LOCAL	35	0.372	9118	4.3	2.9	9299	0.308	75.0	0.05	0.90 12989	1.57 2069	1.28 573	0.56 120	0.66 35	0.50 2

Table 7.14. Same as Table 7.13 except for 92 stations 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	0.486	10647	3.1	1.2	10717	0.413	72.3	0.15	0.96 11137	1.18 3374	0.97 1055	0.57 286	0.51 67	0.14 14
9	LOCAL	33	0.394	7195	4.2	2.5	7362	0.317	79.9	0.00	0.96 13349	1.37 1775	0.98 498	0.38 104	0.33 27	0.00 4
15	LOCAL	35	0.380	6393	4.3	2.4	6616	0.328	82.0	0.00	0.97 13525	1.31 1641	0.86 462	0.31 105	0.15 20	0.09 11

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	0.500	1979	3.3	2.1	2009	0.419	84.2	0.14	0.97 3626	1.31 464	0.86 117	0.85 13	2.00 2	0.00 2
9	LOCAL	28	0.433	2919	3.2	1.1	2939	0.360	70.8	0.08	0.99 2962	1.16 908	0.77 283	0.30 61	0.50 8	0.00 1
15	LOCAL	35	0.338	2448	4.3	3.1	2500	0.311	76.4	0.00	0.91 3525	1.53 546	1.37 131	0.67 21	0.00 4	* 0

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	24	0.479	2970	3.1	1.4	2981	0.389	72.4	0.14	0.96 3039	1.16 903	1.04 239	0.50 54	1.33 3	0.00 1
9	LOCAL	33	0.350	2081	4.1	2.5	2120	0.317	79.5	0.00	0.97 3535	1.25 539	0.84 128	0.43 23	0.50 4	* 0
15	LOCAL	35	0.335	1890	4.1	2.5	1944	0.308	81.4	0.00	0.97 3626	1.31 465	0.76 112	0.40 25	0.00 2	0.00 3

* This category was neither forecast nor observed.

Table 7.17. Verification of local surface wind forecasts for 21 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	21	0.571	1240	3.4	2.2	1261	0.395	88.6	1.00	0.98 3328	1.34 283	0.64 55	0.50 6	* 0	1.00 1
9	LOCAL	29	0.447	2288	3.3	1.5	2305	0.361	76.1	0.17	0.96 2869	1.36 594	0.49 182	0.33 21	0.20 5	0.00 1
15	LOCAL	33	0.402	2048	4.2	3.2	2092	0.250	79.0	0.00	0.91 3226	1.85 359	0.96 74	0.55 11	0.00 2	* 0

Table 7.18. Same as Table 7.17 except for 22 stations 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	0.482	2549	3.1	1.5	2570	0.387	75.6	0.29	0.96 2918	1.20 710	0.97 156	0.47 34	0.33 6	0.00 1
9	LOCAL	32	0.401	1463	4.1	3.0	1501	0.284	85.6	0.00	0.95 3334	1.70 255	0.86 56	0.20 10	0.50 2	* 0
15	LOCAL	35	0.387	1241	4.4	3.0	1296	0.267	86.0	0.00	0.98 3310	1.37 276	0.68 65	0.00 5	0.00 1	0.00 1

* 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	0.593	2309	3.4	1.7	2346	0.452	80.6	0.13	0.95 3800	1.41 617	0.97 214	0.37 54	0.75 8	0.00 3
9	LOCAL	27	0.464	3472	3.4	0.9	3498	0.332	62.5	0.16	0.95 2827	1.27 1228	0.82 471	0.42 127	0.45 42	0.33 3
15	LOCAL	33	0.386	3128	4.2	2.5	3167	0.301	68.1	0.05	0.86 3574	1.63 782	1.23 261	0.44 61	1.00 19	1.00 1

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	23	0.511	3544	3.0	0.7	3557	0.414	66.1	0.15	0.93 2757	1.24 1279	0.93 478	0.65 137	0.43 46	0.10 10
9	LOCAL	31	0.435	2598	4.0	2.0	2647	0.318	73.5	0.00	0.94 3684	1.39 719	0.94 236	0.29 49	0.24 17	0.00 2
15	LOCAL	31	0.406	2337	4.0	1.9	2403	0.351	77.2	0.00	0.96 3775	1.33 655	0.89 201	0.27 56	0.08 13	0.17 6

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.

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	28	0.482	866	4.1	1.9	886	0.410	88.0	0.11	0.99 2844	1.21 226	0.91 85	0.48 23	0.11 9	* 0
9	LOCAL	40	0.359	1478	4.5	1.9	1505	0.373	78.9	0.17	1.01 2551	1.19 378	0.86 172	0.30 67	0.38 16	0.00 5
15	LOCAL	42	0.305	1494	4.5	3.1	1540	0.336	78.8	0.07	0.95 2664	1.25 382	1.51 107	0.74 27	0.40 10	0.00 1

Table 7.22. Same as Table 7.21 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	32	0.415	1584	3.7	1.4	1609	0.402	77.3	0.10	1.01 2423	1.02 482	1.01 182	0.51 61	0.67 12	0.50 2
9	LOCAL	41	0.307	1053	4.9	3.1	1094	0.287	83.3	0.00	0.97 2796	1.27 262	1.40 78	0.59 22	0.50 4	0.00 2
15	LOCAL	41	0.312	925	4.9	3.1	973	0.323	85.4	0.00	0.98 2814	1.22 245	1.08 84	0.42 19	0.50 4	0.00 1

* This category was neither forecast nor 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	21	0.556	385	3.4	2.0	395	0.555	86.5	0.33	0.97 842	1.20 95	1.25 40	0.83 23	0.60 5	* 0
9	LOCAL	36	0.374	387	5.0	2.8	408	0.385	80.7	0.00	0.97 842	1.27 95	0.93 54	1.24 17	0.40 5	0.00 1
15	LOCAL	43	0.301	405	5.5	2.7	435	0.271	74.1	0.07	1.01 793	1.04 124	1.10 52	0.75 24	0.30 10	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	30	0.437	451	3.9	1.5	470	0.472	80.9	0.25	1.01 813	1.01 127	1.09 58	0.71 28	0.38 13	0.00 2
9	LOCAL	38	0.330	450	5.1	2.8	481	0.334	76.4	0.17	0.99 832	1.08 124	1.11 55	0.78 27	0.33 9	** 0
15	LOCAL	43	0.302	464	5.7	3.9	494	0.246	74.2	0.09	0.93 866	1.50 98	1.37 46	0.78 27	1.00 5	** 0

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

Table 7.25. 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	0.95	3.17	0.211	93.1	0.13
	LFM MOS	1.01	0.56	0.232	97.4	0.14
	NGM MOS	1.00	1.07	0.314	97.0	0.20
	No. Obs.	15540	347			
± 3-h Max	LOCAL	0.98	1.26	0.314	92.0	0.22
	LFM MOS	1.05	0.22	0.199	94.7	0.12
	NGM MOS	1.03	0.42	0.300	94.7	0.19
	No. Obs.	15007	875			

Table 7.26. Same as Table 7.25 except for 91 stations for the 1200 UTC cycle. Data for TCC were not available.

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	5.77	0.082	95.0	0.05
	LFM MOS	1.00	0.46	0.199	99.1	0.11
	NGM MOS	1.00	0.55	0.146	98.9	0.08
	No. Obs.	15592	128			
± 3-h Max	LOCAL	0.98	1.62	0.180	94.0	0.12
	LFM MOS	1.03	0.13	0.134	97.2	0.08
	NGM MOS	1.03	0.16	0.130	97.1	0.07
	No. Obs.	15262	455			

Table 7.27. 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	0.98	1.88	0.148	94.5	0.10
	LFM MOS	0.99	1.33	0.120	95.4	0.08
	No. Obs.	1015	24			
± 3-h Max	LOCAL	1.01	0.79	0.175	92.2	0.12
	LFM MOS	1.03	0.56	0.216	93.5	0.14
	No. Obs.	966	57			

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	0.99	1.29	0.193	93.9	0.13
	LFM MOS	1.01	0.80	0.328	95.9	0.21
	No. Obs.	973	35			
± 3-h Max	LOCAL	1.02	0.67	0.188	91.3	0.13
	LFM MOS	1.04	0.42	0.244	93.0	0.16
	No. Obs.	925	67			

Table 8.1. 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	0.95	0.92	0.99	3.057	77.3	0.412
	PERSISTENCE	0.85	0.94	0.93	1.03	1.782	85.1	0.596
	No. Obs.	833	777	1875	11872			
18	MOS	1.59	0.82	1.10	0.97	2.579	77.6	0.404
	PERSISTENCE	1.58	0.90	0.87	1.01	2.755	76.7	0.350
	No. Obs.	446	813	2004	12015			
24	MOS	1.77	0.88	1.05	0.98	2.302	81.3	0.378
	PERSISTENCE	1.82	1.22	1.19	0.94	3.045	75.5	0.240
	No. Obs.	389	597	1455	12732			

Table 8.2. Same as Table 8.1 except for 92 stations 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	0.84	1.02	0.99	2.046	82.5	0.401
	PERSISTENCE	0.90	1.08	1.18	0.98	1.199	87.9	0.596
	No. Obs.	377	596	1463	12695			
18	MOS	1.82	0.86	0.95	0.98	2.764	79.6	0.386
	PERSISTENCE	0.61	1.00	1.09	1.01	2.138	80.8	0.386
	No. Obs.	567	648	1587	12578			
24	MOS	1.89	0.76	0.86	0.98	3.631	75.6	0.385
	PERSISTENCE	0.41	0.84	0.91	1.07	3.204	74.4	0.262
	No. Obs.	838	767	1881	11838			

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	0.51	1.65	1.32	0.91	3.347	66.9	0.306
	PERSISTENCE	0.95	1.19	0.95	1.00	2.369	79.7	0.537
	No. Obs.	39	43	165	644			
18	MOS	0.69	0.87	1.86	0.83	3.674	63.3	0.265
	PERSISTENCE	1.11	0.98	1.01	0.99	3.284	71.1	0.334
	No. Obs.	35	52	152	649			
24	MOS	0.94	1.73	1.81	0.76	3.403	62.5	0.255
	PERSISTENCE	2.11	1.12	0.99	0.96	3.490	68.5	0.244
	No. Obs.	18	41	155	657			

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	1.03	1.38	1.55	0.84	3.123	68.0	0.349
	PERSISTENCE	1.43	0.87	1.03	0.98	2.437	76.8	0.459
	No. Obs.	30	55	177	732			
18	MOS	0.97	1.46	1.68	0.80	3.787	64.2	0.315
	PERSISTENCE	1.13	0.83	1.01	1.01	3.477	70.4	0.321
	No. Obs.	38	59	182	730			
24	MOS	0.73	1.92	1.60	0.80	4.340	59.5	0.226
	PERSISTENCE	0.92	1.02	0.96	1.01	3.995	66.6	0.236
	No. Obs.	48	49	186	730			

Table 8.5. 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				Log Score	Percent Correct	Skill Score
		1	2	3	4			
3	LOCAL	0.89	0.84	1.03	1.01	2.019	83.1	0.548
	PERSISTENCE	0.87	0.92	0.93	1.03	1.756	85.2	0.598
	No. Obs.	847	813	1913	12200			
6	LOCAL	0.51	0.73	1.06	1.04	2.341	79.7	0.444
	PERSISTENCE	0.95	0.83	0.90	1.03	2.502	79.4	0.446
	No. Obs.	776	909	1978	12109			
9	LOCAL	0.33	0.58	1.02	1.05	1.933	80.7	0.403
	PERSISTENCE	1.75	0.91	0.88	1.00	2.694	77.1	0.352
	No. Obs.	420	823	2029	12500			
15	LOCAL	0.28	0.74	1.33	1.00	1.734	83.1	0.395
	PERSISTENCE	1.89	1.22	1.20	0.94	3.012	75.9	0.241
	No. Obs.	389	617	1475	13293			

Table 8.6. Same as Table 8.5 except for 92 stations for the FT issuance time of approximately 1800 UTC.

Projection (h)	Type of Forecast	Bias by Category				Log Score	Percent Correct	Skill Score
		1	2	3	4			
3	LOCAL	0.71	0.88	1.15	0.99	1.300	86.1	0.540
	PERSISTENCE	1.26	1.27	1.18	0.96	1.371	85.9	0.568
	No. Obs.	336	652	1739	13188			
6	LOCAL	0.53	0.87	1.30	0.99	1.522	84.9	0.473
	PERSISTENCE	1.09	1.33	1.38	0.94	1.862	81.9	0.432
	No. Obs.	385	620	1478	13264			
9	LOCAL	0.56	1.01	1.32	0.98	1.824	82.8	0.435
	PERSISTENCE	0.87	1.36	1.33	0.95	2.167	79.5	0.368
	No. Obs.	481	603	1528	13131			
15	LOCAL	0.53	1.11	1.31	0.98	2.597	77.3	0.376
	PERSISTENCE	0.57	1.10	1.16	1.00	3.065	74.1	0.266
	No. Obs.	734	747	1767	12501			

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	1.13	0.61	0.87	1.05	2.708	77.5	0.456
	PERSISTENCE	0.85	1.09	0.90	1.03	2.345	79.7	0.521
	No. Obs.	40	44	168	670			
6	LOCAL	0.86	0.45	0.96	1.06	3.140	73.1	0.343
	PERSISTENCE	0.77	0.91	0.96	1.03	2.668	75.0	0.412
	No. Obs.	44	53	158	673			
9	LOCAL	0.84	0.41	1.01	1.05	3.584	68.6	0.223
	PERSISTENCE	0.92	0.89	0.96	1.02	3.287	70.8	0.307
	No. Obs.	37	54	159	679			
15	LOCAL	1.25	0.18	1.06	1.04	3.042	71.1	0.250
	PERSISTENCE	1.65	0.94	0.93	1.00	3.363	68.7	0.231
	No. Obs.	20	50	162	689			

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	1.18	0.44	0.97	1.04	2.961	73.9	0.365
	PERSISTENCE	1.30	0.84	0.96	1.01	2.507	76.6	0.454
	No. Obs.	33	61	182	742			
6	LOCAL	1.20	0.36	0.95	1.06	3.118	71.4	0.314
	PERSISTENCE	1.47	0.86	0.87	1.03	2.993	72.5	0.367
	No. Obs.	30	58	200	732			
9	LOCAL	0.67	0.32	1.12	1.04	3.110	71.3	0.313
	PERSISTENCE	1.10	0.85	0.95	1.02	3.480	70.8	0.325
	No. Obs.	39	60	186	738			
15	LOCAL	0.54	0.35	1.31	1.00	3.667	67.4	0.250
	PERSISTENCE	0.86	0.98	0.95	1.02	3.946	67.2	0.240
	No. Obs.	50	52	181	735			

Table 9.1. 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				Log Score	Percent Correct	Skill Score
		1	2	3	4			
12	MOS	1.35	1.13	1.15	0.95	2.990	75.3	0.356
	PERSISTENCE	0.74	0.84	0.92	1.03	1.607	85.4	0.568
	No. Obs.	571	811	1844	12167			
18	MOS	1.22	1.14	1.22	0.96	2.221	80.2	0.372
	PERSISTENCE	1.30	0.83	1.22	0.98	2.459	78.9	0.307
	No. Obs.	325	819	1393	12822			
24	MOS	1.29	1.05	1.16	0.98	1.842	83.1	0.368
	PERSISTENCE	1.93	1.03	1.34	0.95	2.597	77.5	0.213
	No. Obs.	221	661	1275	13203			

Table 9.2. Same as Table 9.1 except for 92 stations for the 1200 UTC cycle.

Projection (h)	Type of Forecast	Bias by Category				Log Score	Percent Correct	Skill Score
		1	2	3	4			
12	MOS	1.20	0.85	1.12	0.99	1.647	84.5	0.394
	PERSISTENCE	1.11	1.14	0.98	0.99	1.137	88.7	0.557
	No. Obs.	213	657	1267	13177			
18	MOS	1.59	0.92	1.11	0.98	2.265	81.0	0.350
	PERSISTENCE	0.70	1.24	0.85	1.01	1.961	82.4	0.344
	No. Obs.	338	602	1461	13010			
24	MOS	1.98	1.10	1.03	0.94	3.568	73.7	0.327
	PERSISTENCE	0.41	0.94	0.68	1.08	2.955	75.6	0.217
	No. Obs.	575	797	1842	12136			

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	0.67	1.12	0.82	1.04	3.786	70.3	0.275
	PERSISTENCE	1.07	0.93	0.91	1.02	2.685	78.5	0.488
	No. Obs.	40	75	119	661			
18	MOS	0.68	1.02	1.06	1.01	4.166	67.9	0.241
	PERSISTENCE	0.98	0.80	1.07	1.02	4.072	69.6	0.276
	No. Obs.	44	87	101	660			
24	MOS	1.00	0.91	1.15	0.99	3.871	69.2	0.242
	PERSISTENCE	1.45	0.66	1.30	1.00	4.370	67.4	0.199
	No. Obs.	29	103	84	673			

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	0.91	0.63	1.18	1.03	3.745	71.0	0.289
	PERSISTENCE	1.47	0.88	0.75	1.02	2.988	77.7	0.464
	No. Obs.	47	112	104	756			
18	MOS	0.86	0.87	1.06	1.01	3.397	68.2	0.260
	PERSISTENCE	2.43	1.12	0.49	1.04	4.161	67.4	0.229
	No. Obs.	28	89	159	747			
24	MOS	0.58	0.77	1.49	0.96	4.423	63.2	0.176
	PERSISTENCE	1.38	1.20	0.55	1.03	4.966	64.5	0.155
	No. Obs.	50	83	138	752			

Table 9.5. 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	0.87	0.81	1.17	0.99	1.846	82.2	0.507
	PERSISTENCE	0.81	0.88	0.89	1.03	1.564	85.7	0.578
	No. Obs.	575	819	1920	12459			
6	LOCAL	0.44	0.48	1.03	1.07	2.301	78.8	0.373
	PERSISTENCE	0.77	0.66	0.93	1.05	2.423	78.4	0.382
	No. Obs.	599	1082	1844	12247			
9	LOCAL	0.30	0.41	1.09	1.04	1.652	83.7	0.356
	PERSISTENCE	1.66	0.86	1.23	0.97	2.434	79.0	0.303
	No. Obs.	279	835	1396	13262			
15	LOCAL	0.23	0.54	1.10	1.03	1.466	85.3	0.347
	PERSISTENCE	2.05	1.07	1.38	0.94	2.596	77.7	0.216
	No. Obs.	226	670	1247	13631			

Table 9.6. Same as Table 9.5 except for 92 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	0.62	0.66	1.29	1.00	1.188	87.5	0.502
	PERSISTENCE	1.21	1.19	1.10	0.98	1.244	87.8	0.538
	No. Obs.	228	708	1270	13710			
6	LOCAL	0.58	0.62	1.24	1.00	1.337	86.4	0.434
	PERSISTENCE	1.25	1.24	1.12	0.97	1.653	84.3	0.405
	No. Obs.	219	672	1242	13613			
9	LOCAL	0.72	0.78	1.22	0.99	1.517	84.8	0.400
	PERSISTENCE	1.16	1.39	1.03	0.98	1.844	82.8	0.353
	No. Obs.	236	601	1346	13560			
15	LOCAL	0.59	0.99	1.23	0.98	2.259	78.8	0.350
	PERSISTENCE	0.59	1.18	0.81	1.03	2.610	77.6	0.252
	No. Obs.	463	705	1713	12867			

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	0.84	0.60	1.16	1.02	2.114	81.3	0.534
	PERSISTENCE	1.08	0.95	0.90	1.02	2.584	79.1	0.485
	No. Obs.	38	73	119	683			
6	LOCAL	0.70	0.48	1.32	1.03	2.999	74.1	0.367
	PERSISTENCE	0.93	0.81	1.00	1.03	3.172	73.7	0.362
	No. Obs.	44	85	109	682			
9	LOCAL	0.35	0.34	1.37	1.07	3.479	70.8	0.253
	PERSISTENCE	0.91	0.78	1.03	1.03	3.989	70.1	0.276
	No. Obs.	46	87	106	681			
15	LOCAL	0.26	0.15	1.54	1.09	3.174	72.7	0.255
	PERSISTENCE	1.39	0.65	1.19	1.01	4.448	66.9	0.187
	No. Obs.	31	105	91	686			

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	0.53	0.38	1.30	1.08	3.133	74.4	0.343
	PERSISTENCE	1.38	0.89	0.75	1.03	3.019	77.1	0.449
	No. Obs.	47	111	105	749			
6	LOCAL	0.48	0.38	1.24	1.08	3.330	72.1	0.266
	PERSISTENCE	1.48	1.01	0.68	1.02	3.797	72.0	0.321
	No. Obs.	46	98	114	759			
9	LOCAL	0.62	0.41	0.96	1.09	3.222	69.6	0.212
	PERSISTENCE	2.34	1.17	0.50	1.03	4.244	67.1	0.219
	No. Obs.	29	86	157	752			
15	LOCAL	0.32	0.41	1.15	1.08	3.576	68.8	0.193
	PERSISTENCE	1.45	1.20	0.57	1.03	4.910	64.8	0.157
	No. Obs.	47	82	137	752			