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AFOS-ERA VERIFICATION OF GUIDANCE AND LOCAL AVIATION/PUBLIC WEATHER FORECASTS--NO. 18 (APRIL 1992 - SEPTEMBER 1992)

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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 warm season months of April 1992 through September 1992 for maximum/minimum (max/min) temperature, probability of precipitation (PoP), 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. Tables 4.1 - 4.12 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 5.1 - 5.12, while the analogous local scores are given in Tables 5.13 - 5.24. Comparative verification results for the 42-h significant wind speed are presented in Tables 5.25 - 5.28. 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 6.1 - 6.4 contain the objective ceiling height forecast results for the conterminous U.S. and the Alaska Region, while Tables 6.5 - 6.8 contain ceiling height scores for the local forecasts. Analogously, Tables 7.1 - 7.8 show guidance and local visibility forecast verification scores for the conterminous U.S. stations and the Alaskan stations.

2. SUMMARY (APRIL 1992 - SEPTEMBER 1992)

The NGM-based MOS PoP guidance was produced by new forecast equations beginning 1200 UTC September 10, 1992 (Dallavalle et al. 1992a; Su 1993). The NGM-based guidance message and the forecasts contained in it are described in Dallavalle et al. 1992b. Although the NGM-based guidance is not the official guidance collected by the local verification software, local forecasts may be influenced by the new guidance.

For the 42-h significant wind speed verification, forecasts and observations are converted to one of two possible categorical values. Prior to the 1992 warm season, MOS and observed values less than or equal to 22 kt were placed in category 1, while values greater than 22 kt were placed in category 2. However, local forecasts have values of only 0 or 22, indicating a "no" or "yes" forecast of significant wind, respectively. Note also that the NWS National Verification Plan (National Weather Service 1982) and the Weather Service Operations Manual (National Weather Service 1987) define category 1 as less than 22 kt and category 2 as greater than or equal to 22 kt. Beginning with the 1992 warm season, the significant wind category definitions used in the verification were changed to match the definitions listed in these two documents.

In this warm season verification, we also corrected an error in the algorithm used to compare the max/min temperature and PoP forecasts to climatic values. Prior to the 1992 warm season, we had been comparing both the local and guidance max temperature forecasts to mismatched climatic normals. In particular, we were using the normal max temperature for the period valid 24 hours later than the forecast period. Thus, for example, when verifying "today's" max temperature forecast from the 0000 UTC cycle, we used the climatic normal max temperature for "tomorrow" instead of for "today." Similarly, we had been comparing the local and guidance PoP forecasts for the 1200 - 0000 UTC period with the monthly relative frequency of precipitation valid 24 hours later than the forecast period. As might be expected when verifying large samples over a 6-month period, the effect of using a climatic value only 24 hours in error was insignificant. No such mismatch occurred when verifying either the min temperature forecasts or the PoP forecasts valid for the 0000 - 1200 UTC period. Please note that this correction only affects the percent improvement over climate scores. The scores included in Tables 2.1 - 2.12 and 3.1 - 3.12 are the correct values. While this change would be unnoticeable, we include it here for completeness. Also note

that this is the first season in which max/min temperature improvement over climate scores were available for the stations in Alaska.

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

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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 $\geq$ 22 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	408
	PoP	LFM	386
		NGM	408, 409
	precipitation type	LFM	319
	snow amount	LFM	318
	cloud amount	LFM	378
		NGM	408
	surface wind	LFM	347
		NGM	408
	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, 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 was not available for the 42-h significant wind verifications for the 1200 UTC cycle, the MOS ceiling height and visibility verifications for the 0000 UTC cycle, 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

Table 1.4. Definitions of categories used for verification.

Category	Precipitation Type	Snow Amount* (in)	Cloud Amount	Wind Speed (kt)	Wind Direction (degrees)	Ceiling Height (ft)	Visibility (mi)
1	ZL, ZR, any combination of precipitation types that includes ZL or ZR	<2	CLR, -SCT, -BKN, -OVC, -X	≤12	340-20	≤400	<1
2	IC, IP, IPW, S, SG, SP, SW, any combination of frozen and liquid	2-3	SCT	13-17	30-60	500-900	1-2 3/4
3	L, R, RW	4-5	BKN	18-22	70-110	1000-2900	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	16365	0.2	2.6	1.2	--	--	83.2
	LFM MOS		0.0	2.9	1.9	--	--	79.4
	NGM MOS		-0.2	2.7	1.3	--	--	81.6
Tonight's Min	LOCAL	16352	-0.1	2.6	0.5	0.34	0.44	76.0
	LFM MOS		-0.2	2.9	0.7	0.45	0.39	72.2
	NGM MOS		-0.4	2.8	0.7	0.49	0.54	73.9
Tomorrow's Max	LOCAL	16353	0.3	3.3	3.3	--	--	72.5
	LFM MOS		0.5	3.6	4.6	--	--	66.7
	NGM MOS		-0.3	3.5	3.5	--	--	70.2
Tomorrow Night's Min	LOCAL	16339	-0.1	3.2	1.8	0.18	0.57	64.1
	LFM MOS		0.0	3.4	2.4	0.22	0.54	59.6
	NGM MOS		-0.5	3.3	1.9	0.33	0.72	63.3

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	16181	-0.4	2.4	0.4	0.45	0.39	78.9
	LFM MOS		-0.3	2.7	0.6	0.49	0.36	75.3
	NGM MOS		-0.2	2.5	0.4	0.47	0.42	78.2
Tomorrow's Max	LOCAL	16180	0.3	3.0	2.3	--	--	77.1
	LFM MOS		0.4	3.4	3.5	--	--	71.0
	NGM MOS		0.3	3.2	2.6	--	--	74.3
Tomorrow Night's Min	LOCAL	16159	-0.2	2.9	1.0	0.39	0.45	70.7
	LFM MOS		-0.1	3.1	1.3	0.37	0.51	66.5
	NGM MOS		-0.3	3.0	1.2	0.42	0.55	69.6
Day After Tomorrow's Max	LOCAL	16162	0.3	3.7	5.1	--	--	64.3
	LFM MOS		0.5	4.1	6.4	--	--	58.1
	NGM MOS		-0.2	3.9	5.1	--	--	62.9

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	4243	0.0	2.7	1.2	--	--	81.7
	LFM MOS		-0.2	3.0	2.4	--	--	76.6
	NGM MOS		-0.3	2.9	1.1	--	--	79.2
Tonight's Min	LOCAL	4241	-0.2	2.6	0.4	0.50	0.52	76.9
	LFM MOS		0.0	2.8	0.5	0.60	0.45	74.2
	NGM MOS		-0.2	2.7	0.5	0.70	0.48	75.1
Tomorrow's Max	LOCAL	4241	0.0	3.3	3.3	--	--	70.5
	LFM MOS		0.1	3.6	4.5	--	--	66.2
	NGM MOS		-0.3	3.6	3.6	--	--	67.5
Tomorrow Night's Min	LOCAL	4239	-0.4	3.2	1.8	0.44	0.60	64.5
	LFM MOS		-0.2	3.4	2.4	0.56	0.58	60.6
	NGM MOS		-0.2	3.3	1.5	0.67	0.72	63.9

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

Forecast Projection	Forecast Type	Number of Cases	Mean Algebraic Error (°F)	Mean Absolute Error (°F)	Percent of Absolute Errors >10°F	Probability of Detection (32°F)	False Alarm Ratio (32°F)	Improvement Over Climate
Tonight's Min	LOCAL	4189	-0.4	2.4	0.2	0.65	0.38	80.4
	LFM MOS		-0.1	2.6	0.4	0.65	0.41	77.3
	NGM MOS		-0.3	2.5	0.4	0.80	0.36	78.4
Tomorrow's Max	LOCAL	4190	0.1	3.1	2.3	--	--	75.2
	LFM MOS		0.2	3.5	3.7	--	--	69.6
	NGM MOS		0.2	3.2	2.4	--	--	73.5
Tomorrow Night's Min	LOCAL	4189	-0.3	2.9	1.0	0.63	0.48	70.4
	LFM MOS		-0.1	3.1	1.1	0.63	0.54	67.0
	NGM MOS		-0.1	2.9	0.8	0.63	0.59	71.2
Day After Tomorrow's Max	LOCAL	4190	0.1	3.9	5.1	--	--	61.1
	LFM MOS		0.0	4.1	6.0	--	--	57.0
	NGM MOS		-0.4	3.9	5.0	--	--	61.5

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	4194	0.3	2.2	0.9	--	--	77.3
	LFM MOS		0.2	2.5	1.1	--	--	73.0
	NGM MOS		-0.4	2.3	0.7	--	--	77.4
Tonight's Min	LOCAL	4192	0.1	2.3	0.2	*	*	71.6
	LFM MOS		0.3	2.4	0.2	*	*	69.1
	NGM MOS		-0.7	2.5	0.4	*	*	67.8
Tomorrow's Max	LOCAL	4194	0.4	2.8	2.3	--	--	64.0
	LFM MOS		0.8	3.2	3.3	--	--	55.5
	NGM MOS		-0.5	3.0	2.0	--	--	61.8
Tomorrow Night's Min	LOCAL	4191	0.1	2.7	0.7	*	*	62.1
	LFM MOS		0.4	2.8	0.8	*	*	58.1
	NGM MOS		-1.0	2.9	1.1	**	1.00	56.4

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	4149	-0.2	2.2	0.1	*	*	74.6
	LFM MOS		0.1	2.3	0.2	*	*	72.2
	NGM MOS		-0.4	2.2	0.1	*	*	74.5
Tomorrow's Max	LOCAL	4151	0.4	2.6	1.5	--	--	69.9
	LFM MOS		0.7	3.1	2.3	--	--	60.4
	NGM MOS		0.1	2.8	1.6	--	--	66.4
Tomorrow Night's Min	LOCAL	4147	0.0	2.5	0.3	*	*	66.4
	LFM MOS		0.3	2.6	0.6	*	*	62.9
	NGM MOS		-0.7	2.7	0.5	*	*	62.3
Day After Tomorrow's Max	LOCAL	4149	0.5	3.1	2.9	--	--	55.5
	LFM MOS		0.8	3.4	3.9	--	--	47.4
	NGM MOS		-0.3	3.2	2.6	--	--	54.6

* Events of $\leq$ 32°F were neither forecast nor observed.
** Events of $\leq$ 32°F were forecast but not observed.

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	4969	0.4	2.8	1.5	--	--	84.7
	LFM MOS		0.2	3.1	2.1	--	--	81.8
	NGM MOS		0.2	3.0	2.0	--	--	83.0
Tonight's Min	LOCAL	4958	-0.1	2.9	0.7	0.34	0.41	77.7
	LFM MOS		-0.1	3.1	1.1	0.45	0.41	74.3
	NGM MOS		-0.1	3.0	1.0	0.52	0.63	75.4
Tomorrow's Max	LOCAL	4960	0.7	3.6	4.4	--	--	74.5
	LFM MOS		0.9	4.0	6.0	--	--	69.5
	NGM MOS		0.2	3.8	4.7	--	--	73.0
Tomorrow Night's Min	LOCAL	4952	0.2	3.7	2.8	0.10	0.57	62.8
	LFM MOS		0.4	3.8	3.3	0.13	0.56	59.8
	NGM MOS		-0.1	3.7	3.0	0.30	0.74	63.1

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	4915	-0.4	2.7	0.5	0.41	0.50	80.3
	LFM MOS		-0.3	2.9	0.8	0.48	0.42	76.7
	NGM MOS		0.2	2.7	0.5	0.38	0.54	79.3
Tomorrow's Max	LOCAL	4914	0.6	3.4	3.4	--	--	78.3
	LFM MOS		0.8	3.8	4.9	--	--	73.0
	NGM MOS		1.0	3.6	3.7	--	--	75.3
Tomorrow Night's Min	LOCAL	4898	-0.1	3.2	1.5	0.38	0.48	71.8
	LFM MOS		0.0	3.4	1.9	0.28	0.56	68.3
	NGM MOS		0.0	3.2	1.7	0.41	0.60	71.0
Day After Tomorrow's Max	LOCAL	4901	0.8	4.3	7.3	--	--	65.7
	LFM MOS		1.0	4.6	9.3	--	--	60.3
	NGM MOS		0.6	4.4	7.5	--	--	64.0

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	2959	0.0	2.4	1.1	--	--	86.7
	LFM MOS		-0.3	2.8	1.7	--	--	83.0
	NGM MOS		-0.5	2.6	1.3	--	--	84.8
Tonight's Min	LOCAL	2961	-0.5	2.6	0.9	0.21	0.29	75.7
	LFM MOS		-1.1	3.1	1.0	0.33	0.20	68.5
	NGM MOS		-0.8	2.7	0.7	0.29	0.36	74.7
Tomorrow's Max	LOCAL	2958	-0.1	3.2	2.8	--	--	77.5
	LFM MOS		-0.1	3.7	4.3	--	--	70.1
	NGM MOS		-0.8	3.5	3.1	--	--	74.3
Tomorrow Night's Min	LOCAL	2957	-0.6	3.1	1.9	0.08	0.33	67.7
	LFM MOS		-0.8	3.5	3.1	0.08	0.00	59.3
	NGM MOS		-0.7	3.1	1.6	0.13	0.50	69.2

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	2928	-0.6	2.5	0.6	0.33	0.11	78.0
	LFM MOS		-1.2	2.9	0.9	0.38	0.10	72.7
	NGM MOS		-0.3	2.5	0.5	0.29	0.30	79.1
Tomorrow's Max	LOCAL	2925	0.0	2.8	1.7	--	--	82.4
	LFM MOS		-0.2	3.3	2.5	--	--	77.0
	NGM MOS		-0.3	3.1	2.2	--	--	79.0
Tomorrow Night's Min	LOCAL	2925	-0.6	2.9	1.1	0.22	0.29	72.5
	LFM MOS		-1.0	3.3	1.9	0.26	0.33	65.5
	NGM MOS		-0.6	3.0	1.6	0.26	0.14	71.5
Day After Tomorrow's Max	LOCAL	2922	-0.2	3.6	4.3	--	--	71.8
	LFM MOS		-0.2	4.2	5.8	--	--	62.8
	NGM MOS		-1.1	3.9	4.9	--	--	68.3

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	892	0.7	2.9	1.7	--	--	73.5
	LFM MOS		1.1	3.0	1.1	--	--	73.6
Tonight's Min	LOCAL	896	-0.4	3.5	2.8	0.43	0.25	56.4
	LFM MOS		-0.8	3.5	2.6	0.57	0.33	56.5
Tomorrow's Max	LOCAL	896	0.5	3.5	3.5	--	--	61.0
	LFM MOS		1.2	3.6	3.6	--	--	60.7
Tomorrow Night's Min	LOCAL	896	-0.4	3.8	3.8	0.43	0.25	49.6
	LFM MOS		-0.1	3.8	4.8	0.57	0.00	48.9

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

Forecast Projection	Forecast Type	Number of Cases	Mean Algebraic Error (°F)	Mean Absolute Error (°F)	Percent of Absolute Errors >10°F	Probability of Detection (32°F)	False Alarm Ratio (32°F)	Improvement Over Climate
Tonight's Min	LOCAL	905	-0.8	3.1	2.3	0.43	0.25	64.5
	LFM MOS		-0.9	3.3	2.3	0.57	0.20	61.0
Tomorrow's Max	LOCAL	905	0.2	3.1	2.8	--	--	68.1
	LFM MOS		0.7	3.3	2.7	--	--	66.0
Tomorrow Night's Min	LOCAL	902	-0.7	3.6	3.9	0.71	0.29	51.5
	LFM MOS		-0.7	3.6	4.7	0.57	0.43	53.2
Day After Tomorrow's Max	LOCAL	902	0.5	3.8	5.0	--	--	54.9
	LFM MOS		1.1	4.0	5.5	--	--	50.7

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	0.1033		33.4				
(1st period)	LFM MOS	0.1095	5.7	29.4	16375	0.2334	16.4	2252
	NGM MOS	0.1053	1.9	32.1		0.2114	4.7	2635
24-36	LOCAL	0.1070		28.7				
(2nd period)	LFM MOS	0.1109	3.5	26.1	16365	0.2214	10.8	1964
	NGM MOS	0.1081	1.0	28.0		0.2052	1.3	2441
36-48	LOCAL	0.1203		21.9				
(3rd period)	LFM MOS	0.1230	2.2	20.1	16360	0.2236	7.3	1978
	NGM MOS	0.1201	-0.1	22.0		0.2059	-0.9	2304

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	0.0979		34.6				
(1st period)	LFM MOS	0.1017	3.7	32.1	16188	0.2115	9.5	2224
	NGM MOS	0.0998	1.9	33.4		0.2019	3.7	2673
24-36	LOCAL	0.1110		27.8				
(2nd period)	LFM MOS	0.1141	2.7	25.8	16186	0.2155	9.2	1813
	NGM MOS	0.1121	0.9	27.1		0.2091	2.8	2321
36-48	LOCAL	0.1146		23.2				
(3rd period)	LFM MOS	0.1183	3.1	20.7	16175	0.2173	9.8	1808
	NGM MOS	0.1156	0.9	22.4		0.2156	2.9	2160

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	0.1096		41.7				
(1st period)	LFM MOS	0.1177	6.8	37.5	4245	0.2248	18.2	674
	NGM MOS	0.1121	2.2	40.4		0.1941	5.9	760
24-36	LOCAL	0.1160		36.3				
(2nd period)	LFM MOS	0.1192	2.7	34.5	4243	0.2110	12.1	564
	NGM MOS	0.1179	1.6	35.2		0.1968	2.4	727
36-48	LOCAL	0.1332		28.8				
(3rd period)	LFM MOS	0.1359	1.9	27.4	4244	0.2227	6.3	660
	NGM MOS	0.1324	-0.6	29.3		0.1931	-2.2	745

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	0.1074		40.9				
(1st period)	LFM MOS	0.1103	2.6	39.3	4194	0.1964	6.0	717
	NGM MOS	0.1061	-1.2	41.6		0.1910	-6.3	781
24-36	LOCAL	0.1186		36.2				
(2nd period)	LFM MOS	0.1240	4.4	33.2	4195	0.2136	14.1	578
	NGM MOS	0.1195	0.7	35.7		0.2017	3.6	775
36-48	LOCAL	0.1288		29.1				
(3rd period)	LFM MOS	0.1332	3.3	26.7	4193	0.2087	11.1	581
	NGM MOS	0.1264	-1.9	30.5		0.2089	-5.5	678

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	0.1227		25.8				
(1st period)	LFM MOS	0.1296	5.3	21.6	4197	0.2394	16.2	651
	NGM MOS	0.1256	2.3	24.0		0.2202	6.5	742
24-36	LOCAL	0.1159		21.6				
(2nd period)	LFM MOS	0.1197	3.1	19.0	4197	0.2141	8.0	545
	NGM MOS	0.1175	1.4	20.5		0.2054	4.0	631
36-48	LOCAL	0.1386		15.7				
(3rd period)	LFM MOS	0.1404	1.3	14.6	4194	0.2124	2.3	559
	NGM MOS	0.1396	0.7	15.1		0.2143	-0.6	627

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	0.1077		27.4				
(1st period)	LFM MOS	0.1134	5.0	23.6	4151	0.2353	13.8	611
	NGM MOS	0.1108	2.8	25.3		0.2069	6.1	702
24-36	LOCAL	0.1307		20.4				
(2nd period)	LFM MOS	0.1323	1.2	19.4	4147	0.2064	3.6	491
	NGM MOS	0.1328	1.6	19.1		0.2214	4.2	641
36-48	LOCAL	0.1237		15.7				
(3rd period)	LFM MOS	0.1241	0.4	15.3	4149	0.2063	-4.1	452
	NGM MOS	0.1246	0.8	15.0		0.2142	4.1	493

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	Changes GE 20% to Guidance: Local % Imprv.	Changes GE 20% to Guidance: No. of Changes
12-24 (1st period)	LOCAL	0.1106		31.7				
	LFM MOS	0.1162	4.8	28.3	4971	0.2353	13.5	732
	NGM MOS	0.1105	-0.1	31.8		0.2207	-1.1	853
24-36 (2nd period)	LOCAL	0.1193		28.4				
	LFM MOS	0.1250	4.6	24.9	4966	0.2352	12.3	658
	NGM MOS	0.1169	-2.0	29.8		0.2066	-6.7	806
36-48 (3rd period)	LOCAL	0.1267		20.9				
	LFM MOS	0.1315	3.6	17.9	4961	0.2391	12.3	603
	NGM MOS	0.1242	-2.1	22.5		0.2052	-4.6	716

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	Changes GE 20% to Guidance: Local % Imprv.	Changes GE 20% to Guidance: No. of Changes
12-24 (1st period)	LOCAL	0.1059		35.7				
	LFM MOS	0.1095	3.3	33.5	4917	0.2040	7.4	687
	NGM MOS	0.1074	1.5	34.8		0.2040	4.7	878
24-36 (2nd period)	LOCAL	0.1182		26.4				
	LFM MOS	0.1214	2.7	24.3	4916	0.2127	6.9	572
	NGM MOS	0.1162	-1.7	27.6		0.1992	-5.8	681
36-48 (3rd period)	LOCAL	0.1255		23.7				
	LFM MOS	0.1313	4.4	20.2	4908	0.2272	15.3	631
	NGM MOS	0.1277	1.7	22.4		0.2143	4.8	749

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	0.0546		33.2				
(1st period)	LFM MOS	0.0583	6.5	28.6	2962	0.2357	22.4	195
	NGM MOS	0.0580	5.9	29.0		0.2070	15.3	280
24-36	LOCAL	0.0610		23.6				
(2nd period)	LFM MOS	0.0630	3.2	21.1	2959	0.2258	9.6	197
	NGM MOS	0.0658	7.4	17.5		0.2224	14.5	277
36-48	LOCAL	0.0650		20.4				
(3rd period)	LFM MOS	0.0660	1.5	19.2	2961	0.2076	7.3	156
	NGM MOS	0.0683	4.8	16.4		0.2288	13.2	216

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	0.0571		29.5				
(1st period)	LFM MOS	0.0598	4.6	26.1	2926	0.2184	12.8	209
	NGM MOS	0.0621	8.2	23.2		0.2122	18.8	312
24-36	LOCAL	0.0604		26.1				
(2nd period)	LFM MOS	0.0619	2.4	24.3	2928	0.2576	14.5	172
	NGM MOS	0.0651	7.1	20.4		0.2294	19.1	224
36-48	LOCAL	0.0629		21.3				
(3rd period)	LFM MOS	0.0667	5.8	16.4	2925	0.2435	19.8	144
	NGM MOS	0.0672	6.4	15.9		0.2417	15.8	240

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	0.1334		*				
(1st period)	LFM MOS	0.1458	8.5	*	690	0.2243	15.7	203
18-30	LOCAL	0.1309		*				
(2nd period)	LFM MOS	0.1455	10.1	*	683	0.2279	19.6	186
30-42	LOCAL	0.1440		*				
(3rd period)	LFM MOS	0.1520	5.2	*	692	0.2146	8.7	202

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	0.1329		*				
(1st period)	LFM MOS	0.1495	11.1	*	696	0.2367	19.3	218
18-30	LOCAL	0.1390		*				
(2nd period)	LFM MOS	0.1450	4.2	*	703	0.2167	8.6	227
30-42	LOCAL	0.1450		*				
(3rd period)	LFM MOS	0.1537	5.7	*	695	0.2120	9.9	186

*Percent improvement over climate scores were not available.

Table 4.1. 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	0.77	1.35	1.51	0.84	60.6	0.468
	LFM MOS	0.84	1.67	1.20	0.70	51.1	0.339
	NGM MOS	0.79	1.61	1.38	0.72	52.0	0.354
	No. Obs.	6025	3041	2259	5067		
18	LOCAL	0.60	1.38	1.61	0.55	48.0	0.309
	LFM MOS	0.76	1.42	1.20	0.65	51.8	0.354
	NGM MOS	0.64	1.50	1.39	0.55	49.6	0.327
	No. Obs.	4560	4577	3199	4213		
24	LOCAL	0.61	1.33	1.89	0.57	44.6	0.268
	LFM MOS	0.75	1.40	1.42	0.62	48.5	0.310
	NGM MOS	0.64	1.50	1.60	0.53	46.9	0.293
	No. Obs.	5063	4502	2624	4298		

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

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Percent Correct	Skill Score
12	LOCAL	0.74	1.19	1.68	0.69	54.3	0.393
	LFM MOS	0.79	1.43	1.30	0.61	50.5	0.335
	NGM MOS	0.72	1.46	1.46	0.56	49.5	0.325
	No. Obs.	5054	4433	2597	4215		
18	LOCAL	0.65	1.82	2.10	0.66	48.2	0.303
	LFM MOS	0.92	1.71	1.06	0.69	55.3	0.359
	NGM MOS	0.87	1.87	1.22	0.62	53.8	0.347
	No. Obs.	7526	2571	1857	4336		
24	LOCAL	0.71	1.57	1.81	0.65	46.0	0.283
	LFM MOS	0.84	1.70	1.16	0.69	50.5	0.329
	NGM MOS	0.79	1.78	1.38	0.61	49.6	0.324
	No. Obs.	6088	3013	2225	4962		

Table 4.3. 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	0.68	1.44	1.69	0.84	55.6	0.396
	LFM MOS	0.77	1.52	1.43	0.82	52.4	0.348
	NGM MOS	0.70	1.55	1.49	0.85	53.7	0.367
	No. Obs.	1278	689	550	1689		
18	LOCAL	0.49	1.18	1.80	0.62	47.7	0.296
	LFM MOS	0.53	1.27	1.36	0.79	51.7	0.342
	NGM MOS	0.49	1.27	1.58	0.68	50.1	0.324
	No. Obs.	728	1182	871	1427		
24	LOCAL	0.54	1.33	2.13	0.72	45.6	0.286
	LFM MOS	0.68	1.35	1.54	0.83	49.8	0.327
	NGM MOS	0.60	1.52	1.71	0.72	47.1	0.299
	No. Obs.	1243	926	597	1462		

Table 4.4. Same as Table 4.3 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	1.25	2.02	0.75	51.0	0.353
	LFM MOS	0.69	1.43	1.52	0.78	51.0	0.346
	NGM MOS	0.67	1.54	1.53	0.72	50.6	0.343
	No. Obs.	1254	901	596	1430		
18	LOCAL	0.63	1.73	2.47	0.71	49.1	0.320
	LFM MOS	0.83	1.58	1.45	0.84	55.4	0.376
	NGM MOS	0.86	1.60	1.52	0.78	55.6	0.381
	No. Obs.	1608	554	449	1570		
24	LOCAL	0.65	1.47	2.05	0.74	46.6	0.286
	LFM MOS	0.72	1.53	1.47	0.85	51.1	0.332
	NGM MOS	0.71	1.57	1.60	0.80	50.6	0.330
	No. Obs.	1324	691	532	1633		

Table 4.5. 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	0.67	1.39	1.47	0.81	57.0	0.430
	LFM MOS	0.77	1.79	1.04	0.61	46.9	0.290
	NGM MOS	0.77	1.57	1.28	0.65	47.4	0.298
	No. Obs.	1436	920	697	1105		
18	LOCAL	0.52	1.43	1.25	0.50	46.4	0.257
	LFM MOS	0.71	1.45	1.00	0.59	51.5	0.330
	NGM MOS	0.67	1.50	1.05	0.46	50.8	0.317
	No. Obs.	974	1392	1129	822		
24	LOCAL	0.46	1.40	1.68	0.49	41.8	0.213
	LFM MOS	0.65	1.44	1.20	0.62	47.0	0.278
	NGM MOS	0.62	1.50	1.38	0.41	46.7	0.273
	No. Obs.	1140	1323	809	914		

Table 4.6. Same as Table 4.5 except for the 1200 UTC cycle.

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Percent Correct	Skill Score
12	LOCAL	0.63	1.31	1.51	0.57	54.6	0.387
	LFM MOS	0.73	1.52	1.02	0.57	48.9	0.300
	NGM MOS	0.65	1.45	1.30	0.53	46.9	0.277
	No. Obs.	1142	1304	806	904		
18	LOCAL	0.52	2.06	2.10	0.51	41.5	0.224
	LFM MOS	0.94	1.87	0.73	0.54	52.7	0.310
	NGM MOS	0.85	2.05	1.00	0.41	49.3	0.276
	No. Obs.	1994	765	517	875		
24	LOCAL	0.57	1.72	1.77	0.49	40.9	0.226
	LFM MOS	0.79	1.89	0.92	0.59	46.3	0.280
	NGM MOS	0.67	1.87	1.35	0.49	45.0	0.272
	No. Obs.	1452	914	688	1095		

Table 4.7. 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	0.78	1.34	1.56	0.83	60.3	0.462
	LFM MOS	0.82	1.65	1.37	0.70	50.4	0.330
	NGM MOS	0.76	1.68	1.65	0.64	50.9	0.345
	No. Obs.	1760	889	624	1635		
18	LOCAL	0.50	1.43	1.88	0.55	45.5	0.282
	LFM MOS	0.74	1.46	1.41	0.58	49.4	0.327
	NGM MOS	0.59	1.55	1.63	0.50	47.4	0.304
	No. Obs.	1297	1312	844	1448		
24	LOCAL	0.55	1.30	2.09	0.56	42.7	0.246
	LFM MOS	0.75	1.37	1.70	0.51	46.7	0.290
	NGM MOS	0.62	1.43	1.89	0.47	46.1	0.285
	No. Obs.	1405	1392	748	1389		

Table 4.8. Same as Table 4.7 except 1200 UTC cycle.

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Percent Correct	Skill Score
12	LOCAL	0.73	1.09	1.81	0.75	53.7	0.386
	LFM MOS	0.79	1.40	1.43	0.57	49.6	0.323
	NGM MOS	0.74	1.39	1.70	0.49	49.1	0.322
	No. Obs.	1400	1386	734	1357		
18	LOCAL	0.62	1.91	2.21	0.71	49.0	0.315
	LFM MOS	0.89	1.84	1.17	0.69	55.7	0.367
	NGM MOS	0.86	1.92	1.40	0.61	55.1	0.364
	No. Obs.	2289	700	521	1369		
24	LOCAL	0.75	1.56	1.91	0.62	45.2	0.272
	LFM MOS	0.83	1.77	1.39	0.62	48.9	0.313
	NGM MOS	0.85	1.78	1.55	0.53	48.8	0.316
	No. Obs.	1765	874	625	1616		

Table 4.9. 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	0.92	1.19	1.23	0.90	72.4	0.595
	LFM MOS	0.98	1.66	0.87	0.57	56.3	0.349
	NGM MOS	0.91	1.61	0.99	0.71	57.5	0.378
	No. Obs.	1551	543	388	638		
18	LOCAL	0.79	1.51	1.69	0.47	54.4	0.342
	LFM MOS	0.93	1.56	0.91	0.53	55.9	0.338
	NGM MOS	0.73	1.80	1.37	0.49	50.8	0.296
	No. Obs.	1561	691	355	516		
24	LOCAL	0.86	1.29	1.60	0.34	50.0	0.301
	LFM MOS	0.92	1.43	1.23	0.31	51.4	0.311
	NGM MOS	0.71	1.60	1.38	0.39	48.4	0.284
	No. Obs.	1275	861	470	533		

Table 4.10. Same as Table 4.9 except 1200 UTC cycle.

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Percent Correct	Skill Score
12	LOCAL	0.99	1.10	1.35	0.57	59.4	0.426
	LFM MOS	0.95	1.35	1.29	0.30	53.6	0.340
	NGM MOS	0.83	1.48	1.30	0.39	52.4	0.331
	No. Obs.	1258	842	461	524		
18	LOCAL	0.85	1.47	1.51	0.60	54.9	0.330
	LFM MOS	1.02	1.46	0.89	0.52	57.7	0.336
	NGM MOS	0.91	1.81	0.89	0.50	55.2	0.318
	No. Obs.	1635	552	370	522		
24	LOCAL	0.85	1.48	1.36	0.74	53.2	0.322
	LFM MOS	1.02	1.47	0.78	0.67	58.1	0.363
	NGM MOS	0.90	1.92	0.84	0.55	55.6	0.347
	No. Obs.	1547	534	380	618		

Table 4.11. 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	0.73	1.09	1.70	0.93	59.1	0.389
	LFM MOS	0.89	1.17	1.12	0.98	59.5	0.382
	No. Obs.	242	140	132	549		
18	LOCAL	0.60	1.28	1.80	0.87	51.4	0.290
	LFM MOS	0.96	1.03	1.36	0.91	54.8	0.326
	No. Obs.	225	148	148	551		
24	LOCAL	0.59	1.08	1.83	0.82	47.1	0.253
	LFM MOS	0.99	0.96	1.20	0.94	54.8	0.346
	No. Obs.	192	185	190	510		

Table 4.12. Same as Table 4.11 except 1200 UTC cycle.

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Percent Correct	Skill Score
12	LOCAL	0.79	0.91	1.53	0.91	60.2	0.426
	LFM MOS	1.03	0.93	1.16	0.95	57.1	0.377
	No. Obs.	195	184	191	517		
18	LOCAL	0.55	1.03	1.69	0.95	53.9	0.337
	LFM MOS	1.06	1.02	1.17	0.91	54.4	0.347
	No. Obs.	221	180	170	504		
24	LOCAL	0.49	1.21	1.94	0.95	54.5	0.320
	LFM MOS	0.96	1.18	1.15	0.94	58.3	0.369
	No. Obs.	245	141	133	559		

Table 5.1. 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	22	0.519	1632	3.2	1.3	1642	0.320	93.4	0.00	1.01	0.85	0.59	0.69	0.25	*
	NGM	20	0.549		3.5	2.2		0.348	92.3	0.00	0.99	1.20	1.33	1.69	0.25	**
											14976	761	110	16	4	0
18	LFM	25	0.470	4474	2.9	0.3	4483	0.369	82.2	0.09	1.06	0.78	0.62	0.39	0.22	0.00
	NGM	23	0.490		3.1	1.5		0.405	80.7	0.04	0.99	1.02	1.30	0.91	1.44	1.00
											12926	2431	458	82	9	1
24	LFM	28	0.438	3725	3.3	0.6	3738	0.293	82.8	0.00	1.06	0.73	0.58	0.41	0.08	0.00
	NGM	27	0.449		3.6	1.9		0.343	80.7	0.04	0.98	1.07	1.25	1.07	1.08	1.00
											13255	2020	444	83	13	1

Table 5.2. Same as Table 5.1 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	26	0.472	3740	3.0	0.5	3748	0.349	84.1	0.06	1.06	0.75	0.57	0.39	0.23	0.00
	NGM	25	0.478		3.4	1.9		0.371	81.5	0.03	0.98	1.06	1.19	1.52	1.38	6.00
											13062	1989	442	83	13	1
18	LFM	26	0.477	1671	3.3	1.1	1681	0.265	92.1	0.00	1.02	0.74	0.38	0.13	0.00	0.00
	NGM	25	0.495		3.8	2.3		0.322	90.7	0.00	0.99	1.18	1.37	0.58	0.50	0.00
											14804	893	136	31	2	1
24	LFM	24	0.498	1392	3.4	1.0	1403	0.260	93.5	0.00	1.02	0.68	0.39	0.06	0.00	*
	NGM	23	0.533		3.7	2.1		0.339	92.5	0.00	0.99	1.12	1.27	1.38	0.67	*
											14861	754	109	16	3	0

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

Table 5.3. 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	21	0.519	437	3.0	0.9	439	0.320	93.4	0.00	1.02	0.70	0.67	1.67	**	*
	NGM	18	0.566		3.2	1.9		0.397	92.5	*	0.98	1.24	1.29	2.33	*	*
											3816	212	24	3	0	0
18	LFM	26	0.403	1213	2.9	0.3	1215	0.303	81.7	0.00	1.07	0.69	0.58	0.23	1.00	*
	NGM	24	0.460		3.1	1.5		0.388	80.9	0.00	0.99	1.00	1.54	0.54	2.00	*
											3298	633	83	13	1	0
24	LFM	28	0.412	494	3.1	1.1	497	0.220	90.9	*	1.05	0.46	0.35	0.60	*	*
	NGM	27	0.415		3.8	2.8		0.271	87.7	0.00	0.98	1.09	2.26	0.80	**	*
											3692	312	23	5	0	0

Table 5.4. Same as Table 5.3 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	27	0.407	532	2.9	1.0	533	0.254	91.0	*	1.04	0.52	0.54	0.00	*	*
	NGM	24	0.442		3.5	2.4		0.300	88.6	*	0.99	1.04	1.92	0.60	*	*
											3646	306	24	5	0	0
18	LFM	25	0.479	298	3.2	1.1	300	0.283	94.9	*	1.02	0.70	0.44	0.33	*	*
	NGM	23	0.490		3.9	2.5		0.315	92.9	*	0.98	1.46	1.94	0.83	*	*
											3898	157	16	6	0	0
24	LFM	25	0.480	395	3.4	0.9	398	0.251	92.8	*	1.03	0.65	0.37	0.33	*	*
	NGM	22	0.516		3.4	1.8		0.373	92.4	*	0.99	1.10	0.85	2.00	*	*
											3789	219	27	3	0	0

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

Table 5.5. 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	24	0.511	279	3.2	1.7	283	0.355	95.8	0.00	1.00	1.05	0.29	1.00	0.00	*
	NGM	22	0.503		3.5	2.3		0.342	95.4	0.00	1.00	1.14	0.86	3.00	1.00	*
											3875	120	14	1	1	0
18	LFM	22	0.501	1026	2.7	0.8	1028	0.385	85.1	0.00	1.02	0.87	0.81	1.00	0.00	*
	NGM	20	0.535		2.9	1.6		0.387	83.6	0.00	0.99	1.01	1.61	1.80	1.00	*
											3537	541	69	5	1	0
24	LFM	25	0.438	827	3.3	1.4	830	0.229	86.0	*	1.02	0.93	0.47	1.33	*	*
	NGM	23	0.468		3.4	2.1		0.305	84.9	0.00	0.97	1.28	1.05	3.00	**	*
											3589	362	64	3	0	0

Table 5.6. Same as Table 5.5 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	23	0.473	770	2.9	1.2	771	0.311	87.8	*	1.02	0.89	0.52	0.67	*	*
	NGM	22	0.500		3.1	1.9		0.342	86.4	*	0.98	1.19	0.98	3.33	*	*
											3560	355	64	3	0	0
18	LFM	25	0.479	386	3.7	2.0	388	0.265	92.6	*	0.99	1.39	0.27	0.00	*	*
	NGM	24	0.514		3.7	2.1		0.311	93.2	*	0.99	1.24	0.60	0.20	*	*
											3833	161	30	5	0	0
24	LFM	24	0.518	248	3.8	2.4	250	0.271	95.5	*	1.00	1.00	0.67	0.00	*	*
	NGM	25	0.513		3.8	2.7		0.316	95.6	*	1.00	1.01	1.50	1.00	*	*
											3873	116	12	1	0	0

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

Table 5.7. 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	21	0.527	661	3.0	1.1	663	0.297	90.8	0.00	1.03	0.72	0.67	0.33	0.00	*
	NGM	19	0.561		3.7	2.4		0.319	88.4	0.00	0.98	1.20	1.50	1.67	0.00	**
											4356	326	52	9	3	0
18	LFM	23	0.500	1729	2.9	-0.1	1733	0.377	76.8	0.14	1.11	0.76	0.57	0.41	0.17	0.00
	NGM	22	0.507		3.0	1.3		0.415	74.9	0.07	0.98	1.02	1.26	0.94	1.17	1.00
											3444	981	223	49	6	1
24	LFM	29	0.439	1325	3.3	0.1	1330	0.278	80.1	0.00	1.10	0.68	0.37	0.20	0.00	0.00
	NGM	28	0.446		3.7	2.2		0.339	76.4	0.07	0.95	1.17	1.30	1.44	0.86	1.00
											3787	722	171	25	7	1

Table 5.8. Same as Table 5.7 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	25	0.482	1310	3.1	0.1	1313	0.336	81.3	0.13	1.09	0.68	0.48	0.27	0.14	0.00
	NGM	25	0.488		3.6	2.2		0.364	77.3	0.04	0.96	1.12	1.25	1.92	1.71	4.00
											3719	717	169	26	7	1
18	LFM	26	0.466	599	3.2	0.5	602	0.250	90.4	0.00	1.05	0.52	0.37	0.15	0.00	*
	NGM	25	0.464		4.0	2.5		0.344	88.0	0.00	0.98	1.12	1.72	0.85	1.00	*
											4307	357	60	13	1	0
24	LFM	24	0.479	532	3.1	0.4	535	0.247	91.4	0.00	1.05	0.54	0.27	0.00	0.00	*
	NGM	22	0.550		3.8	2.3		0.316	88.6	0.00	0.98	1.14	1.65	1.56	0.67	*
											4315	318	51	9	3	0

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

Table 5.9. 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	26	0.407	255	3.7	2.0	257	0.328	94.2	*	0.99	1.32	0.50	0.67	*	*
	NGM	23	0.440		3.8	2.1		0.315	94.0	*	0.99	1.19	1.25	0.67	*	*
											2929	103	20	3	0	0
18	LFM	31	0.382	506	3.5	0.8	507	0.387	87.5	0.00	1.03	0.88	0.66	0.27	0.00	*
	NGM	30	0.331		3.9	1.5		0.362	85.5	0.00	0.99	1.08	0.89	0.87	3.00	*
											2647	276	83	15	1	0
24	LFM	29	0.330	1079	3.4	0.5	1081	0.315	72.1	0.00	1.08	0.81	0.84	0.44	0.17	*
	NGM	28	0.346		3.4	1.1		0.356	72.6	0.00	1.04	0.83	1.15	0.80	0.67	*
											2187	624	186	50	6	0

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

		Direction			Speed											
								Contingency Table								
											Bias by Category					
Fcst Proj (h)	Type of Fcst.	Mean Abs. Error (deg)	Skill Score	No. of Cases	Mean Abs. Error (kt)	Mean Alg. Error (kt)	No. of Cases	Skill Score	Percent Fcst. Correct	Threat Score (>27 kt)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
12	LFM	28	0.376	1128	3.1	0.3	1131	0.365	74.1	0.00	1.08	0.86	0.66	0.47	0.33	*
	NGM	27	0.362		3.1	1.4		0.372	72.2	0.00	1.01	0.92	1.11	1.29	1.00	**
											2137	611	185	49	6	0
18	LFM	27	0.384	388	3.1	1.1	391	0.272	90.6	0.00	1.04	0.65	0.50	0.00	0.00	0.00
	NGM	27	0.413		3.6	2.0		0.280	88.7	0.00	1.00	1.02	1.13	0.14	0.00	0.00
											2766	218	30	7	1	1
24	LFM	26	0.431	217	3.7	1.3	220	0.290	95.1	*	1.01	0.81	0.53	0.00	*	*
	NGM	23	0.432		3.7	1.7		0.335	94.4	*	0.99	1.23	0.68	0.33	*	*
											2884	101	19	3	0	0

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

Table 5.11. 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	27	0.474	190	4.0	2.8	192	0.241	91.0	*	0.97 1008	1.82 38	1.00 10	0.20 5	* 0	* 0
18	LFM	38	0.329	224	4.7	3.3	230	0.260	86.9	0.00	0.99 959	0.98 82	1.54 13	1.33 3	** 0	0.00 1
24	LFM	44	0.276	495	4.5	3.3	499	0.260	75.9	0.20	0.94 886	1.20 137	1.26 38	6.50 2	1.50 2	** 0

Table 5.12. Same as Table 5.11 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	37	0.340	435	3.8	1.9	435	0.315	79.1	0.50	0.98 892	1.16 139	0.88 40	2.50 2	0.50 2	* 0
18	LFM	35	0.341	250	3.9	2.4	254	0.256	86.1	0.00	1.01 946	0.92 95	0.76 17	0.67 3	0.00 1	* 0
24	LFM	38	0.348	222	5.0	4.2	228	0.206	88.6	0.00	0.95 1022	2.27 40	1.60 10	0.20 5	** 0	* 0

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

Table 5.13. Verification of local surface wind forecasts for 93 stations in the conterminous U.S. for the FT release 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	26	0.494	3746	3.4	2.5	3806	0.353	93.5	0.00	0.99 15356	1.23 677	0.67 101	0.33 21	3.00 1	* 0
9	LOCAL	34	0.378	8536	3.2	1.7	8586	0.356	80.8	0.08	1.00 13307	1.09 2324	0.62 455	0.22 68	0.57 7	0.50 2
15	LOCAL	36	0.360	9408	3.3	1.9	9465	0.325	78.2	0.00	0.98 13163	1.17 2372	0.82 519	0.26 91	0.54 13	1.00 1

Table 5.14. Same as Table 5.13 except for the FT release time of approximately 1800 UTC.

Fcst Proj (h)	Type of Fcst.	Direction			Speed											
								Contingency Table								
											Bias by Category					
		Mean Abs. Error (deg)	Skill Score	No. of Cases	Mean Abs. Error (kt)	Mean Alg. Error (kt)	No. of Cases	Skill Score	Percent Fcst. Correct	Threat Score (>27 kt)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
3	LOCAL	30	0.426	9817	2.9	1.3	9855	0.398	78.5	0.00	1.01 12617	1.04 2848	0.79 638	0.27 117	0.00 13	0.25 4
9	LOCAL	39	0.335	5934	4.2	3.2	6059	0.239	86.9	0.00	0.96 14848	1.54 1030	0.95 170	0.43 28	0.11 9	* 0
15	LOCAL	38	0.341	4116	4.3	3.4	4275	0.273	91.9	0.00	0.98 15260	1.40 706	0.67 101	0.50 18	1.00 1	0.00 1

* This category was neither forecast nor observed.

Table 5.15. Verification of local surface wind forecasts for 24 stations in the Eastern Region for the FT release 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	25	0.476	993	3.2	2.3	1004	0.379	94.6	0.00	1.00 4041	0.97 178	0.52 21	0.67 3	** 0	* 0
9	LOCAL	34	0.365	2342	3.0	1.5	2352	0.339	82.3	0.00	1.01 3564	1.01 610	0.33 72	0.33 6	2.00 1	* 0
15	LOCAL	38	0.328	2208	3.4	2.4	2218	0.233	82.0	0.00	0.97 3744	1.32 445	0.74 53	0.17 6	** 0	* 0

Table 5.16. Same as Table 5.15 except for the FT release time of approximately 1800 UTC.

Fcst Proj (h)	Type of Fcst.	Direction			Speed											
								Contingency Table								
											Bias by Category					
		Mean Abs. Error (deg)	Skill Score	No. of Cases	Mean Abs. Error (kt)	Mean Alg. Error (kt)	No. of Cases	Skill Score	Percent Fcst. Correct	Threat Score (>27 kt)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
3	LOCAL	30	0.440	2406	2.7	1.0	2409	0.348	79.7	*	1.03 3386	0.96 717	0.36 122	0.33 9	* 0	* 0
9	LOCAL	39	0.304	1367	4.2	3.4	1399	0.272	90.4	0.00	0.97 4004	1.59 206	0.83 29	1.00 5	** 0	* 0
15	LOCAL	40	0.293	1079	4.6	3.8	1112	0.249	92.2	0.00	0.97 4068	1.67 153	1.11 19	2.00 3	** 0	* 0

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

Table 5.17. Verification of local surface wind forecasts for 23 stations in the Southern Region for the FT release 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	0.477	631	3.7	3.0	651	0.319	95.8	*	0.99 3683	1.34 94	0.33 15	1.00 1	* 0	* 0
9	LOCAL	32	0.391	1903	3.1	2.0	1914	0.383	86.3	0.00	1.00 3314	1.06 420	0.50 56	0.00 2	* 0	** 0
15	LOCAL	35	0.355	2045	3.2	2.3	2070	0.326	84.6	0.00	0.97 3346	1.29 395	0.55 51	2.00 1	* 0	** 0

Table 5.18. Same as Table 5.17 except for the FT release 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	31	0.393	2136	3.0	1.9	2147	0.346	83.2	0.00	0.99 3354	1.08 512	0.62 61	0.50 2	0.00 1	0.00 1
9	LOCAL	35	0.344	1073	4.4	3.8	1112	0.191	92.0	0.00	0.97 3647	2.25 110	0.53 15	0.17 6	0.00 1	* 0
15	LOCAL	34	0.427	708	4.5	3.7	751	0.241	94.6	*	0.99 3652	1.26 112	0.60 15	** 0	* 0	* 0

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

Table 5.19. Verification of local surface wind forecasts for 28 stations in the Central Region for the FT release 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	25	0.513	1578	3.4	2.4	1591	0.367	90.1	0.00	0.97 4599	1.48 296	0.85 48	0.27 11	1.00 1	* 0
9	LOCAL	32	0.397	3051	3.2	1.3	3067	0.345	73.8	0.13	0.99 3707	1.16 963	0.66 231	0.29 42	0.17 6	0.00 2
15	LOCAL	36	0.369	3213	3.3	1.6	3224	0.328	72.8	0.00	0.95 3762	1.30 913	0.74 229	0.32 41	0.00 8	0.00 1

Table 5.20. Same as Table 5.19 except for the FT release 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	0.459	3386	2.9	1.1	3401	0.433	74.6	0.00	0.96 3526	1.24 1057	0.78 274	0.20 69	0.00 8	0.50 2
9	LOCAL	39	0.313	2191	4.2	3.3	2231	0.248	83.2	0.00	0.93 4478	1.99 361	0.78 72	0.33 9	0.00 5	* 0
15	LOCAL	36	0.327	1687	4.1	3.2	1748	0.308	88.8	0.00	0.97 4555	1.46 320	0.60 45	0.13 8	* 0	0.00 1

* This category was neither forecast nor observed.

Table 5.21. Verification of local surface wind forecasts for 18 stations in the Western Region for the FT release 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	30	0.441	544	3.7	2.4	560	0.266	94.6	0.00	1.01 3033	0.88 109	0.65 17	0.17 6	** 0	* 0
9	LOCAL	41	0.278	1240	3.9	2.1	1253	0.315	83.2	0.00	1.01 2722	1.06 331	0.80 96	0.06 18	** 0	* 0
15	LOCAL	36	0.302	1942	3.2	1.1	1953	0.348	74.2	0.00	1.07 2311	0.79 619	1.03 186	0.19 43	1.00 5	* 0

Table 5.22. Same as Table 5.21 except for the FT release 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	0.324	1889	3.2	1.3	1898	0.388	77.0	0.00	1.06 2351	0.75 562	1.14 181	0.38 37	0.00 4	0.00 1
9	LOCAL	40	0.320	1303	3.9	2.5	1317	0.201	82.0	0.00	1.02 2719	0.84 353	1.35 54	0.38 8	0.00 3	* 0
15	LOCAL	43	0.300	642	4.4	3.2	664	0.211	93.1	0.00	1.01 2985	1.01 121	0.50 22	0.14 7	0.00 1	* 0

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

Table 5.23. Verification of local surface wind forecasts for 6 stations in the Alaska Region for the FT release 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	26	0.506	328	3.4	2.8	335	0.400	92.7	*	0.97 1011	1.87 38	1.33 9	0.25 4	* 0	* 0
9	LOCAL	42	0.321	350	4.2	2.9	357	0.253	87.6	0.00	1.01 974	0.96 83	0.79 14	0.33 3	* 0	0.00 1
15	LOCAL	44	0.284	404	3.6	1.4	405	0.200	80.7	0.00	1.08 892	0.69 140	0.27 37	0.50 2	0.00 2	0.00 1

Table 5.24. Same as Table 5.23 except for the FT release 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	34	0.368	501	3.0	1.1	501	0.393	84.1	0.33	1.06 898	0.78 142	0.56 39	1.00 2	0.50 2	0.00 1
9	LOCAL	46	0.265	463	4.3	3.3	486	0.213	83.8	0.00	0.99 951	1.02 98	1.24 17	0.67 3	1.00 1	* 0
15	LOCAL	53	0.216	439	5.1	4.5	461	0.188	87.3	0.00	0.93 1019	2.40 40	2.27 11	0.20 5	** 0	* 0

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

Table 5.25. Comparative verification of local, LFM MOS, 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	0.98	3.63	0.178	97.2	0.10
	LFM MOS	1.00	0.34	0.180	99.2	0.10
	NGM MOS	1.00	0.83	0.282	99.0	0.17
	No. Obs.	16128	122			
± 3-h Max	LOCAL	1.00	0.96	0.231	95.8	0.14
	LFM MOS	1.03	0.09	0.083	97.2	0.05
	NGM MOS	1.02	0.22	0.180	97.2	0.10
	No. Obs.	15778	462			

Table 5.26. Same as Table 5.25 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	0.99	4.04	0.043	98.3	0.02
	LFM MOS	1.00	0.05	0.033	99.6	0.02
	NGM MOS	1.00	0.30	0.080	99.6	0.04
	No. Obs.	15854	57			
± 3-h Max	LOCAL	1.01	0.55	0.103	96.4	0.06
	LFM MOS	1.03	0.01	0.009	97.4	0.00
	NGM MOS	1.03	0.04	0.025	97.3	0.01
	No. Obs.	15477	420			

Table 5.27. Comparative verification of local and LFM MOS 42-h significant wind forecasts for 6 stations in the Alaska Region, 0000 UTC cycle.

Type of Verifying Observation	Type of Forecast	Bias by Category		Skill Score	Percent Forecast Correct	Threat Score ≥22 kt
		< 22 kt	≥ 22 kt			
1-min Avg	LOCAL	0.99	2.80	0.099	98.4	0.06
	LFM MOS	1.00	2.00	0.128	98.8	0.07
	No. Obs.	1065	5			
± 3-h Max	LOCAL	1.00	0.74	0.231	97.7	0.14
	LFM MOS	1.01	0.53	0.127	97.7	0.07
	No. Obs.	1050	19			

Table 5.28. Same as Table 5.27 except for the 1200 UTC cycle.

Type of Verifying Observation	Type of Forecast	Bias by Category		Skill Score	Percent Forecast Correct	Threat Score ≥22 kt
		< 22 kt	≥ 22 kt			
1-min Avg	LOCAL	0.99	2.40	-0.007	98.4	0.00
	LFM MOS	1.00	1.00	0.196	99.3	0.11
	No. Obs.	1067	5			
± 3-h Max	LOCAL	1.00	0.71	0.057	97.5	0.04
	LFM MOS	1.01	0.29	0.084	98.1	0.05
	No. Obs.	1055	17			

Table 6.1. 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	0.87	0.78	0.90	1.03	2.604	81.3	0.351
	PERSISTENCE	0.70	0.82	0.85	1.04	1.713	86.6	0.523
	No. Obs.	681	699	1334	12828			
18	MOS	0.79	0.62	1.00	1.01	1.203	85.1	0.363
	PERSISTENCE	6.40	1.64	0.67	0.99	2.050	82.0	0.275
	No. Obs.	73	345	1655	13192			
24	MOS	1.08	0.73	0.90	1.01	0.833	91.5	0.298
	PERSISTENCE	5.73	2.71	1.47	0.92	2.003	84.2	0.180
	No. Obs.	79	199	742	13992			

Table 6.2. Same as Table 6.1 except for 95 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	1.42	0.79	0.90	1.01	0.814	91.9	0.347
	PERSISTENCE	0.76	1.10	1.29	0.98	0.557	93.5	0.541
	No. Obs.	83	196	732	13858			
18	MOS	1.49	0.64	0.98	1.00	1.687	87.1	0.312
	PERSISTENCE	0.25	0.54	1.11	1.02	1.260	88.3	0.318
	No. Obs.	275	438	881	14013			
24	MOS	1.55	0.72	0.90	1.00	3.298	79.1	0.317
	PERSISTENCE	0.10	0.34	0.75	1.11	2.467	81.1	0.192
	No. Obs.	667	679	1302	12738			

Table 6.3. 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	0.44	1.23	1.59	0.92	2.511	76.7	0.425
	PERSISTENCE	0.72	1.02	0.90	1.03	1.543	86.3	0.604
	No. Obs.	39	47	136	812			
18	MOS	0.63	0.86	1.54	0.92	3.080	69.6	0.305
	PERSISTENCE	0.84	0.67	0.81	1.07	2.806	74.8	0.315
	No. Obs.	32	70	151	777			
24	MOS	0.30	1.37	1.81	0.85	2.130	73.3	0.334
	PERSISTENCE	2.80	1.15	0.87	0.99	2.398	77.1	0.296
	No. Obs.	10	41	144	843			

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	Log Score	Percent Correct	Skill Score
12	MOS	1.18	1.25	1.55	0.89	2.060	77.3	0.404
	PERSISTENCE	1.45	1.25	1.11	0.96	1.306	85.6	0.580
	No. Obs.	11	40	146	845			
18	MOS	0.53	1.23	1.81	0.89	2.120	76.4	0.337
	PERSISTENCE	0.94	1.11	1.46	0.94	1.938	79.4	0.376
	No. Obs.	17	44	111	863			
24	MOS	1.00	1.13	1.92	0.85	3.288	69.9	0.310
	PERSISTENCE	0.40	1.06	1.25	0.99	2.866	72.7	0.246
	No. Obs.	40	48	130	824			

Table 6.5. Comparative verification of local and persistence ceiling height forecasts for 92 stations in the conterminous U.S. for the FT release 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	0.63	0.84	1.08	1.02	1.779	85.8	0.497
	PERSISTENCE	0.63	0.81	0.85	1.04	1.584	87.5	0.535
	No. Obs.	648	709	1336	13467			
6	LOCAL	0.33	0.47	1.00	1.06	1.952	82.1	0.380
	PERSISTENCE	1.04	0.66	0.65	1.07	2.070	82.7	0.391
	No. Obs.	396	879	1749	13122			
9	LOCAL	0.20	0.24	0.68	1.07	1.147	85.7	0.334
	PERSISTENCE	4.61	1.38	0.59	1.02	1.973	81.7	0.275
	No. Obs.	89	419	1920	13719			
15	LOCAL	0.14	0.34	1.06	1.01	0.708	91.4	0.318
	PERSISTENCE	5.39	2.59	1.32	0.94	1.894	84.4	0.176
	No. Obs.	76	222	857	14986			

Table 6.6. Same as Table 6.5 except for 93 stations for the FT release 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	0.47	0.70	1.22	0.99	0.744	90.7	0.467
	PERSISTENCE	1.26	1.64	1.67	0.94	0.915	88.4	0.466
	No. Obs.	70	255	1150	14758			
6	LOCAL	0.42	0.69	1.46	0.98	0.749	90.8	0.380
	PERSISTENCE	1.17	1.91	2.26	0.91	1.159	85.9	0.306
	No. Obs.	76	218	845	14947			
9	LOCAL	0.32	0.69	1.64	0.98	0.873	90.1	0.376
	PERSISTENCE	0.74	1.45	2.43	0.92	1.336	84.6	0.257
	No. Obs.	121	289	787	14878			
15	LOCAL	0.37	0.84	1.64	0.97	1.879	83.1	0.333
	PERSISTENCE	0.22	0.73	1.72	0.98	2.077	80.1	0.209
	No. Obs.	405	570	1112	13987			

Table 6.7. Comparative verification of local and persistence ceiling height forecasts for 6 stations in the Alaska Region for the FT release time of approximately 0900 UTC.

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Log Score	Percent Correct	Skill Score
3	LOCAL	0.92	0.71	0.77	1.06	1.647	85.4	0.558
	PERSISTENCE	0.75	0.98	0.91	1.03	1.574	86.2	0.601
	No. Obs.	40	48	138	830			
6	LOCAL	0.57	0.51	0.98	1.07	2.300	81.0	0.435
	PERSISTENCE	0.61	0.75	1.02	1.04	2.275	81.1	0.462
	No. Obs.	51	61	120	821			
9	LOCAL	0.56	0.32	0.77	1.12	2.484	77.9	0.348
	PERSISTENCE	0.97	0.66	0.81	1.07	2.854	74.8	0.313
	No. Obs.	32	71	155	806			
15	LOCAL	1.20	0.36	0.86	1.05	1.830	79.4	0.287
	PERSISTENCE	3.10	1.07	0.86	1.00	2.418	77.2	0.301
	No. Obs.	10	44	146	863			

Table 6.8. Same as Table 6.7 except for the FT release 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	1.13	0.57	0.95	1.03	1.513	82.3	0.408
	PERSISTENCE	1.63	1.16	1.12	0.97	1.274	85.8	0.581
	No. Obs.	8	44	147	867			
6	LOCAL	0.73	0.61	1.02	1.02	1.579	82.1	0.350
	PERSISTENCE	1.09	1.34	1.30	0.94	1.729	80.3	0.391
	No. Obs.	11	38	125	882			
9	LOCAL	0.53	0.41	1.23	1.01	1.825	79.8	0.291
	PERSISTENCE	0.87	1.11	1.43	0.94	1.982	79.1	0.364
	No. Obs.	15	46	115	879			
15	LOCAL	0.30	0.59	1.22	1.02	2.565	76.0	0.293
	PERSISTENCE	0.35	1.11	1.21	0.99	2.813	72.6	0.233
	No. Obs.	37	46	136	837			

Table 7.1. 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	1.06	0.90	0.94	1.02	2.813	73.5	0.352
	PERSISTENCE	0.56	0.47	0.75	1.12	1.849	80.9	0.473
	No. Obs.	457	963	2639	11612			
18	MOS	0.50	0.93	1.14	0.99	1.044	86.6	0.321
	PERSISTENCE	7.75	1.95	1.45	0.93	1.777	81.7	0.258
	No. Obs.	32	229	1358	13924			
24	MOS	1.09	0.94	1.18	0.99	0.981	87.7	0.330
	PERSISTENCE	7.15	1.95	1.64	0.92	1.849	81.0	0.198
	No. Obs.	34	227	1192	14066			

Table 7.2. Same as Table 7.1 except for 95 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	2.94	1.28	1.14	0.98	1.121	87.2	0.319
	PERSISTENCE	0.91	0.86	0.95	1.01	0.592	92.8	0.566
	No. Obs.	33	225	1173	13925			
18	MOS	3.08	1.41	1.02	0.97	1.752	83.8	0.325
	PERSISTENCE	0.25	0.70	0.76	1.04	1.087	87.7	0.354
	No. Obs.	121	290	1481	13729			
24	MOS	2.26	1.20	1.05	0.92	3.619	70.1	0.340
	PERSISTENCE	0.06	0.21	0.43	1.23	2.694	74.5	0.173
	No. Obs.	449	939	2596	11529			

Table 7.3. 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	0.52	0.69	0.92	1.03	1.886	84.0	0.276
	PERSISTENCE	0.65	0.89	0.78	1.03	1.245	89.2	0.514
	No. Obs.	23	35	83	900			
18	MOS	0.41	0.76	0.95	1.03	1.646	85.0	0.253
	PERSISTENCE	0.88	0.76	0.95	1.02	1.850	84.8	0.268
	No. Obs.	17	41	66	912			
24	MOS	0.50	0.95	1.37	0.99	1.032	88.9	0.221
	PERSISTENCE	3.75	1.41	1.43	0.96	1.495	86.9	0.206
	No. Obs.	4	22	46	971			

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

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Log Score	Percent Correct	Skill Score
12	MOS	0.20	0.76	1.17	1.00	0.905	90.1	0.232
	PERSISTENCE	1.80	1.86	1.07	0.97	0.835	92.3	0.492
	No. Obs.	5	21	46	977			
18	MOS	0.00	0.67	1.61	0.99	1.149	87.9	0.242
	PERSISTENCE	1.50	1.15	1.09	0.99	1.216	89.6	0.354
	No. Obs.	6	33	44	954			
24	MOS	0.43	1.11	1.20	0.99	2.073	81.7	0.244
	PERSISTENCE	0.39	1.11	0.61	1.04	1.996	84.2	0.235
	No. Obs.	23	35	80	915			

Table 7.5. Comparative verification of local and persistence visibility forecasts for 92 stations in the conterminous U.S. for the FT release time of approximately 0900 UTC.

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Log Score	Percent Correct	Skill Score
3	LOCAL	0.61	0.57	1.20	1.00	1.900	79.7	0.469
	PERSISTENCE	0.51	0.51	0.75	1.10	1.627	83.3	0.500
	No. Obs.	446	828	2521	12362			
6	LOCAL	0.30	0.33	0.94	1.06	1.673	80.5	0.365
	PERSISTENCE	1.44	0.59	0.79	1.06	1.801	80.5	0.371
	No. Obs.	157	714	2403	12871			
9	LOCAL	0.06	0.16	0.80	1.04	0.897	88.0	0.303
	PERSISTENCE	6.85	1.53	1.28	0.95	1.642	82.6	0.271
	No. Obs.	33	275	1481	14357			
15	LOCAL	0.05	0.16	0.75	1.04	0.789	90.0	0.263
	PERSISTENCE	5.26	1.76	1.64	0.93	1.745	81.8	0.184
	No. Obs.	43	239	1148	14710			

Table 7.6. Same as Table 7.5 except for 93 stations for the FT release 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	0.37	0.48	1.07	1.00	0.665	91.3	0.463
	PERSISTENCE	0.95	1.41	1.21	0.98	0.639	91.9	0.555
	No. Obs.	38	194	1220	14779			
6	LOCAL	0.26	0.34	1.07	1.01	0.753	90.4	0.387
	PERSISTENCE	0.80	1.18	1.29	0.98	0.883	89.1	0.404
	No. Obs.	46	232	1143	14663			
9	LOCAL	0.34	0.45	1.16	1.00	0.858	88.7	0.352
	PERSISTENCE	0.68	1.26	1.20	0.98	0.973	88.0	0.357
	No. Obs.	53	218	1229	14574			
15	LOCAL	0.40	0.80	1.26	0.98	1.714	81.1	0.339
	PERSISTENCE	0.16	0.66	0.78	1.05	1.582	82.9	0.287
	No. Obs.	223	413	1888	13550			

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

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Log Score	Percent Correct	Skill Score
3	LOCAL	0.79	0.70	1.06	1.01	1.357	86.9	0.427
	PERSISTENCE	0.63	0.84	0.87	1.03	1.263	89.3	0.508
	No. Obs.	24	37	77	916			
6	LOCAL	0.37	0.61	1.19	1.03	1.924	85.2	0.359
	PERSISTENCE	0.34	0.86	0.94	1.04	1.914	86.0	0.378
	No. Obs.	41	36	70	905			
9	LOCAL	0.25	0.44	0.88	1.05	1.549	86.5	0.260
	PERSISTENCE	0.70	0.79	0.97	1.02	1.849	84.9	0.270
	No. Obs.	20	39	68	936			
15	LOCAL	1.00	0.41	1.24	1.00	0.973	90.1	0.220
	PERSISTENCE	3.75	1.41	1.48	0.96	1.520	86.6	0.187
	No. Obs.	4	22	46	990			

Table 7.8. Same as Table 7.7 except for the FT release 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	1.25	0.71	1.13	1.00	0.799	91.7	0.351
	PERSISTENCE	2.00	1.86	1.02	0.98	0.846	92.2	0.468
	No. Obs.	4	21	46	995			
6	LOCAL	1.00	0.46	1.06	1.01	0.904	90.5	0.272
	PERSISTENCE	2.00	1.42	1.00	0.98	1.091	89.9	0.341
	No. Obs.	4	26	48	974			
9	LOCAL	0.80	0.38	1.09	1.02	1.045	89.9	0.230
	PERSISTENCE	1.60	1.19	1.09	0.99	1.236	89.5	0.326
	No. Obs.	5	32	44	972			
15	LOCAL	0.52	0.61	0.73	1.05	2.016	83.4	0.135
	PERSISTENCE	0.38	1.15	0.62	1.04	1.945	84.5	0.218
	No. Obs.	21	33	77	924			