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AFOS-ERA VERIFICATION OF GUIDANCE AND LOCAL AVIATION/PUBLIC WEATHER FORECASTS--NO. 16 (APRIL 1991 - SEPTEMBER 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 warm season months of April 1991 through September 1991 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 103 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 1991 - SEPTEMBER 1991)

Three stations, namely, Amarillo, Texas; Hobart, Oklahoma; and McAlester, Oklahoma, were added this season.

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

3. REFERENCES

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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-seven 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, 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
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	HBR	Hobart, Oklahoma
TUL	Tulsa, Oklahoma	MLC	McAlester, 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, 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 96 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	16084	0.0	2.6	1.2	--	--	80.8
	LFM MOS		-0.5	2.9	1.7	--	--	76.3
	NGM MOS		-0.5	3.0	1.7	--	--	75.3
Tonight's Min	LOCAL	16042	-0.3	2.6	0.5	0.43	0.49	78.8
	LFM MOS		-0.4	2.8	0.6	0.51	0.38	76.2
	NGM MOS		-1.1	2.9	0.9	0.66	0.66	73.6
Tomorrow's Max	LOCAL	16051	0.0	3.3	3.1	--	--	69.1
	LFM MOS		-0.4	3.7	3.8	--	--	63.9
	NGM MOS		-0.4	3.7	4.2	--	--	62.4
Tomorrow Night's Min	LOCAL	15994	-0.6	3.1	1.6	0.33	0.50	69.3
	LFM MOS		-0.5	3.3	2.0	0.22	0.50	66.7
	NGM MOS		-1.2	3.4	2.2	0.57	0.64	65.3

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	16077	-0.5	2.4	0.4	0.50	0.47	81.5
	LFM MOS		-0.4	2.6	0.5	0.46	0.46	79.1
	NGM MOS		-0.8	2.7	0.7	0.63	0.59	76.7
Tomorrow's Max	LOCAL	16035	0.0	3.0	2.2	--	--	74.4
	LFM MOS		-0.2	3.4	3.1	--	--	68.0
	NGM MOS		0.3	3.5	3.4	--	--	66.9
Tomorrow Night's Min	LOCAL	15987	-0.5	2.9	1.1	0.34	0.60	74.2
	LFM MOS		-0.6	3.0	1.2	0.32	0.48	71.4
	NGM MOS		-0.7	3.1	1.2	0.60	0.60	70.6
Day After Tomorrow's Max	LOCAL	15994	0.0	3.7	4.6	--	--	61.3
	LFM MOS		-0.4	4.1	5.6	--	--	55.6
	NGM MOS		-0.1	4.0	5.6	--	--	56.2

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	4018	-0.3	2.6	1.2	--	--	83.2
	LFM MOS		-0.9	3.2	1.8	--	--	77.9
	NGM MOS		-1.1	3.1	1.3	--	--	78.8
Tonight's Min	LOCAL	3993	-0.4	2.6	0.5	0.43	0.63	82.7
	LFM MOS		-0.4	2.7	0.4	0.57	0.64	81.8
	NGM MOS		-1.2	3.0	0.8	0.71	0.76	78.2
Tomorrow's Max	LOCAL	4001	-0.7	3.4	3.0	--	--	73.2
	LFM MOS		-1.3	3.8	4.2	--	--	66.8
	NGM MOS		-1.1	3.7	3.6	--	--	69.7
Tomorrow Night's Min	LOCAL	3987	-0.9	3.2	1.5	0.43	0.57	73.9
	LFM MOS		-1.0	3.3	1.8	0.43	0.50	72.3
	NGM MOS		-1.0	3.4	1.8	0.71	0.62	72.0

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	4007	-0.7	2.4	0.3	0.80	0.64	84.4
	LFM MOS		-0.5	2.6	0.3	0.80	0.64	83.2
	NGM MOS		-1.0	2.8	0.4	0.80	0.76	80.7
Tomorrow's Max	LOCAL	3997	-0.6	3.1	2.2	--	--	77.3
	LFM MOS		-1.0	3.6	3.3	--	--	70.8
	NGM MOS		-0.3	3.2	2.8	--	--	75.4
Tomorrow Night's Min	LOCAL	3981	-0.8	2.9	0.9	0.29	0.75	78.2
	LFM MOS		-1.0	3.1	0.9	0.57	0.60	76.8
	NGM MOS		-0.5	3.1	0.8	0.43	0.70	77.0
Day After Tomorrow's Max	LOCAL	3990	-0.8	3.8	4.6	--	--	67.2
	LFM MOS		-1.6	4.3	5.6	--	--	59.9
	NGM MOS		-0.8	3.9	4.9	--	--	66.2

Table 2.5. Comparative verification of local, LFM MOS, and NGM MOS max/min temperature forecasts for 27 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	4409	0.3	2.2	0.9	--	--	68.5
	LFM MOS		0.0	2.5	1.1	--	--	63.6
	NGM MOS		-0.4	2.6	1.0	--	--	61.2
Tonight's Min	LOCAL	4404	-0.1	2.2	0.3	*	*	74.3
	LFM MOS		0.2	2.4	0.4	*	*	71.7
	NGM MOS		-1.3	2.6	0.6	*	*	66.2
Tomorrow's Max	LOCAL	4401	0.4	2.8	1.9	--	--	52.3
	LFM MOS		0.4	3.0	2.0	--	--	48.0
	NGM MOS		-0.6	3.3	2.7	--	--	37.3
Tomorrow Night's Min	LOCAL	4385	-0.2	2.6	1.1	*	*	63.6
	LFM MOS		0.1	2.6	0.9	*	*	63.8
	NGM MOS		-1.5	2.9	1.0	*	*	57.5

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

Forecast Projection	Forecast Type	Number of Cases	Mean Algebraic Error (°F)	Mean Absolute Error (°F)	Percent of Absolute Errors >10°F	Probability of Detection (32°F)	False Alarm Ratio (32°F)	Improvement Over Climate
Tonight's Min	LOCAL	4389	-0.2	2.0	0.2	*	*	78.6
	LFM MOS		0.1	2.2	0.2	*	*	75.9
	NGM MOS		-0.9	2.5	0.5	*	*	68.9
Tomorrow's Max	LOCAL	4381	0.4	2.5	1.3	--	--	60.0
	LFM MOS		0.4	2.8	1.9	--	--	52.3
	NGM MOS		0.2	3.0	2.0	--	--	46.0
Tomorrow Night's Min	LOCAL	4368	-0.1	2.4	0.6	*	*	70.7
	LFM MOS		0.0	2.5	0.6	*	*	68.2
	NGM MOS		-1.1	2.8	0.9	**	1.00	61.0
Day After Tomorrow's Max	LOCAL	4358	0.5	3.1	2.9	--	--	41.9
	LFM MOS		0.4	3.2	3.1	--	--	38.1
	NGM MOS		-0.3	3.4	3.5	--	--	30.1

* 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	4771	-0.1	2.9	1.5	--	--	82.8
	LFM MOS		-0.8	3.2	2.0	--	--	79.3
	NGM MOS		-0.6	3.4	2.5	--	--	76.8
Tonight's Min	LOCAL	4764	-0.5	2.9	0.5	0.48	0.50	81.9
	LFM MOS		-0.7	3.1	0.8	0.61	0.30	79.4
	NGM MOS		-1.3	3.3	1.1	0.65	0.69	77.1
Tomorrow's Max	LOCAL	4765	-0.3	3.7	4.3	--	--	71.6
	LFM MOS		-1.0	4.0	4.7	--	--	68.5
	NGM MOS		-0.5	4.2	6.3	--	--	64.5
Tomorrow Night's Min	LOCAL	4749	-0.9	3.5	2.0	0.29	0.56	72.9
	LFM MOS		-0.9	3.7	2.7	0.17	0.64	70.1
	NGM MOS		-1.6	3.9	3.6	0.63	0.69	67.4

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	4779	-0.6	2.7	0.4	0.52	0.50	84.3
	LFM MOS		-0.6	2.9	0.6	0.39	0.53	81.8
	NGM MOS		-0.7	3.0	0.9	0.65	0.58	80.9
Tomorrow's Max	LOCAL	4769	-0.1	3.4	2.9	--	--	76.7
	LFM MOS		-0.5	3.8	4.0	--	--	71.9
	NGM MOS		0.4	4.0	5.1	--	--	68.1
Tomorrow Night's Min	LOCAL	4755	-0.7	3.2	1.6	0.33	0.64	77.2
	LFM MOS		-0.9	3.4	1.8	0.33	0.47	74.5
	NGM MOS		-0.9	3.5	1.9	0.67	0.59	74.2
Day After Tomorrow's Max	LOCAL	4763	-0.2	4.2	6.0	--	--	64.1
	LFM MOS		-0.9	4.4	6.9	--	--	61.1
	NGM MOS		0.1	4.6	8.3	--	--	57.2

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

Forecast Projection	Forecast Type	Number of Cases	Mean Algebraic Error (°F)	Mean Absolute Error (°F)	Percent of Absolute Errors >10°F	Probability of Detection (32°F)	False Alarm Ratio (32°F)	Improvement Over Climate
Today's Max	LOCAL	2886	0.3	2.5	1.2	--	--	80.0
	LFM MOS		0.0	2.9	1.8	--	--	74.7
	NGM MOS		0.1	2.8	1.8	--	--	74.7
Tonight's Min	LOCAL	2881	-0.4	2.7	0.9	0.35	0.33	62.0
	LFM MOS		-0.5	3.0	0.9	0.35	0.25	54.0
	NGM MOS		-0.5	2.8	1.2	0.65	0.48	57.8
Tomorrow's Max	LOCAL	2884	0.6	3.2	3.0	--	--	67.0
	LFM MOS		0.5	3.8	4.5	--	--	57.8
	NGM MOS		0.8	3.6	3.7	--	--	61.7
Tomorrow Night's Min	LOCAL	2873	-0.4	3.0	2.0	0.33	0.29	49.8
	LFM MOS		-0.2	3.4	2.5	0.20	0.00	40.4
	NGM MOS		-0.1	3.1	2.3	0.40	0.45	48.4

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	2902	-0.5	2.5	0.6	0.39	0.13	66.5
	LFM MOS		-0.8	2.7	0.8	0.44	0.11	61.5
	NGM MOS		-0.6	2.7	0.8	0.56	0.41	61.4
Tomorrow's Max	LOCAL	2888	0.3	2.9	2.3	--	--	73.5
	LFM MOS		0.3	3.5	3.2	--	--	64.3
	NGM MOS		1.0	3.5	3.4	--	--	62.8
Tomorrow Night's Min	LOCAL	2883	-0.5	2.9	1.5	0.38	0.40	55.5
	LFM MOS		-0.5	3.2	1.7	0.19	0.25	48.2
	NGM MOS		-0.2	3.0	1.3	0.56	0.55	52.7
Day After Tomorrow's Max	LOCAL	2883	0.7	3.7	5.0	--	--	56.8
	LFM MOS		1.0	4.4	7.0	--	--	45.8
	NGM MOS		1.0	4.0	5.3	--	--	53.5

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

Forecast Projection	Forecast Type	Number of Cases	Mean Algebraic Error (°F)	Mean Absolute Error (°F)	Percent of Absolute Errors >10°F	Probability of Detection (32°F)	False Alarm Ratio (32°F)	Improvement Over Climate
Today's Max	LOCAL		0.8	3.1	1.6	--	--	*
	LFM MOS	836	1.1	3.1	1.2	--	--	*
Tonight's Min	LOCAL		-0.3	3.1	1.2	0.00	1.00	*
	LFM MOS	836	-0.8	3.1	1.1	0.00	1.00	*
Tomorrow's Max	LOCAL		0.5	3.6	3.3	--	--	*
	LFM MOS	836	0.9	3.6	3.2	--	--	*
Tomorrow Night's Min	LOCAL		-0.6	3.5	2.5	0.00	1.00	*
	LFM MOS	836	-0.8	3.4	2.4	0.00	1.00	*

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		-0.7	2.8	1.0	0.00	1.00	*
	LFM MOS	834	-1.2	3.2	0.7	0.00	1.00	*
Tomorrow's Max	LOCAL		0.2	3.3	3.1	--	--	*
	LFM MOS	834	0.5	3.4	1.9	--	--	*
Tomorrow Night's Min	LOCAL		-0.8	3.4	2.0	0.00	1.00	*
	LFM MOS	834	-1.1	3.3	1.6	0.20	0.67	*
Day After Tomorrow's Max	LOCAL		0.4	3.8	3.5	--	--	*
	LFM MOS	834	0.6	3.8	3.4	--	--	*

* Percent improvement over climate scores were not available.

Table 3.1. Comparative verification of local, LFM MOS, and NGM MOS PoP forecasts for 96 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	0.1074		32.5				
	LFM MOS	0.1131	5.0	28.9	16062	0.2285	15.3	2107
	NGM MOS	0.1111	3.3	30.2		0.2079	7.9	2772
24-36 (2nd period)	LOCAL	0.1115		24.6				
	LFM MOS	0.1140	2.2	22.9	16067	0.2227	7.5	1740
	NGM MOS	0.1126	1.0	23.8		0.2065	1.8	2529
36-48 (3rd period)	LOCAL	0.1266		20.4				
	LFM MOS	0.1281	1.1	19.5	16041	0.2034	2.6	1830
	NGM MOS	0.1268	0.2	20.3		0.2023	-1.0	2470

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	0.1030		30.4				
	LFM MOS	0.1068	3.6	27.8	16103	0.2169	9.1	2191
	NGM MOS	0.1052	2.1	28.9		0.2001	4.9	2866
24-36 (2nd period)	LOCAL	0.1184		25.5				
	LFM MOS	0.1224	3.2	23.0	16070	0.2226	11.6	1872
	NGM MOS	0.1189	0.4	25.2		0.2067	-0.2	2574
36-48 (3rd period)	LOCAL	0.1199		19.1				
	LFM MOS	0.1207	0.7	18.5	16018	0.2129	1.1	1728
	NGM MOS	0.1194	-0.4	19.4		0.2029	-1.4	2337

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 (1st period)	LOCAL	0.1023		40.6				
	LFM MOS	0.1075	4.9	37.6	4008	0.2126	11.5	632
	NGM MOS	0.1060	3.5	38.5		0.1939	8.2	720
24-36 (2nd period)	LOCAL	0.1120		30.8				
	LFM MOS	0.1141	1.9	29.4	4000	0.2171	5.3	465
	NGM MOS	0.1118	-0.2	30.9		0.2007	-1.3	606
36-48 (3rd period)	LOCAL	0.1250		28.0				
	LFM MOS	0.1250	0.0	28.0	3994	0.1801	-1.1	539
	NGM MOS	0.1254	0.4	27.8		0.1911	-0.6	642

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 (1st period)	LOCAL	0.1035		36.6				
	LFM MOS	0.1054	1.7	35.5	4019	0.2037	5.1	547
	NGM MOS	0.1032	-0.4	36.8		0.1804	-0.7	691
24-36 (2nd period)	LOCAL	0.1154		33.8				
	LFM MOS	0.1228	6.0	29.6	4004	0.2331	17.3	591
	NGM MOS	0.1147	-0.5	34.2		0.1863	-1.5	667
36-48 (3rd period)	LOCAL	0.1192		26.1				
	LFM MOS	0.1220	2.3	24.4	3996	0.2036	6.0	498
	NGM MOS	0.1182	-0.8	26.7		0.1975	-3.2	659

Table 3.5. Comparative verification of local, LFM MOS, and NGM MOS PoP forecasts for 27 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 (1st period)	LOCAL	0.1384		27.1				
	LFM MOS	0.1438	3.7	24.2	4402	0.2297	13.6	670
	NGM MOS	0.1419	2.5	25.2		0.2127	4.6	897
24-36 (2nd period)	LOCAL	0.1264		17.4				
	LFM MOS	0.1274	0.8	16.7	4410	0.2218	3.1	571
	NGM MOS	0.1262	-0.1	17.5		0.2001	-2.0	706
36-48 (3rd period)	LOCAL	0.1569		17.0				
	LFM MOS	0.1598	1.8	15.5	4398	0.2286	5.8	589
	NGM MOS	0.1574	0.3	16.7		0.2071	-1.1	710

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 (1st period)	LOCAL	0.1174		22.6				
	LFM MOS	0.1216	3.5	19.8	4396	0.2201	9.5	722
	NGM MOS	0.1202	2.3	20.7		0.2171	6.3	857
24-36 (2nd period)	LOCAL	0.1477		21.7				
	LFM MOS	0.1517	2.6	19.6	4388	0.2196	11.4	620
	NGM MOS	0.1508	2.0	20.1		0.2203	4.6	792
36-48 (3rd period)	LOCAL	0.1346		12.1				
	LFM MOS	0.1324	-1.7	13.6	4375	0.2199	-6.5	500
	NGM MOS	0.1337	-0.7	12.7		0.2041	-3.7	566

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	0.1086		31.8				
	LFM MOS	0.1152	5.7	27.7	4765	0.2344	18.7	609
	NGM MOS	0.1114	2.6	30.0		0.2073	8.0	828
24-36 (2nd period)	LOCAL	0.1211		25.6				
	LFM MOS	0.1243	2.6	23.7	4769	0.2237	11.0	543
	NGM MOS	0.1223	1.0	24.9		0.2130	2.1	909
36-48 (3rd period)	LOCAL	0.1312		17.6				
	LFM MOS	0.1314	0.1	17.5	4761	0.1899	-1.6	524
	NGM MOS	0.1295	-1.4	18.7		0.2023	-4.0	865

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	0.1106		32.2				
	LFM MOS	0.1162	4.8	28.8	4783	0.2266	12.3	688
	NGM MOS	0.1131	2.2	30.7		0.2002	4.1	956
24-36 (2nd period)	LOCAL	0.1226		23.0				
	LFM MOS	0.1247	1.6	21.7	4775	0.2117	3.9	472
	NGM MOS	0.1208	-1.5	24.1		0.2075	-5.6	803
36-48 (3rd period)	LOCAL	0.1317		19.3				
	LFM MOS	0.1328	0.9	18.6	4761	0.2083	1.2	576
	NGM MOS	0.1325	0.6	18.8		0.2147	2.7	830

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	0.0655		32.8				
(1st period)	LFM MOS	0.0706	7.2	27.6	2887	0.2571	20.9	196
	NGM MOS	0.0707	7.4	27.5		0.2269	15.9	327
24-36	LOCAL	0.0723		25.2				
(2nd period)	LFM MOS	0.0762	5.2	21.1	2888	0.2390	16.7	161
	NGM MOS	0.0769	5.9	20.5		0.2132	14.9	308
36-48	LOCAL	0.0754		21.8				
(3rd period)	LFM MOS	0.0789	4.4	18.3	2888	0.2308	11.4	178
	NGM MOS	0.0780	3.2	19.2		0.2170	8.0	253

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	0.0678		30.2				
(1st period)	LFM MOS	0.0710	4.5	26.9	2905	0.2089	6.8	234
	NGM MOS	0.0724	6.3	25.5		0.1971	13.5	362
24-36	LOCAL	0.0715		24.9				
(2nd period)	LFM MOS	0.0737	3.0	22.6	2903	0.2269	12.1	189
	NGM MOS	0.0733	2.4	23.1		0.2133	3.1	312
36-48	LOCAL	0.0790		19.2				
(3rd period)	LFM MOS	0.0810	2.4	17.2	2886	0.2372	9.9	154
	NGM MOS	0.0778	-1.5	20.4		0.1782	-6.1	282

Table 3.11. Comparative verification of local and LFM MOS PoP forecasts for 6 stations in the Alaska Region, 0000 UTC cycle.

Forecast Projection (h)	Type of Forecast	Brier Score	Local % Imp. Over Guid.	% Imp. Over Clim.	No. of Cases	Changes GE 20% to Guidance: Guid. Brier Score	Local % Imprv.	No. of Changes
6-18 (1st period)	LOCAL	0.1342		*				
	LFM MOS	0.1461	8.1	*	655	0.2085	12.7	206
18-30 (2nd period)	LOCAL	0.1584		*				
	LFM MOS	0.1722	8.0	*	641	0.2499	17.8	190
30-42 (3rd period)	LOCAL	0.1565		*				
	LFM MOS	0.1508	-3.8	*	656	0.2009	-1.9	180

Table 3.12. Same as Table 3.11 except for the 1200 UTC cycle.

Forecast Projection (h)	Type of Forecast	Brier Score	Local % Imp. Over Guid.	% Imp. Over Clim.	No. of Cases	Changes GE 20% to Guidance: Guid. Brier Score	Local % Imprv.	No. of Changes
6-18 (1st period)	LOCAL	0.1438		*				
	LFM MOS	0.1602	10.3	*	642	0.2406	20.8	187
18-30 (2nd period)	LOCAL	0.1378		*				
	LFM MOS	0.1422	3.1	*	654	0.2194	9.2	184
30-42 (3rd period)	LOCAL	0.1660		*				
	LFM MOS	0.1692	1.9	*	643	0.2362	5.2	166

* 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 97 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	0.74	1.37	1.50	0.83	58.8	0.447
	LFM MOS	0.74	1.67	1.27	0.74	50.0	0.329
	NGM MOS	0.79	1.59	1.35	0.70	50.7	0.338
	No. Obs.	5858	3219	2286	4862		
18	LOCAL	0.56	1.35	1.54	0.57	49.4	0.322
	LFM MOS	0.71	1.41	1.18	0.67	51.9	0.352
	NGM MOS	0.64	1.51	1.29	0.52	50.6	0.335
	No. Obs.	4230	4750	3419	3970		
24	LOCAL	0.60	1.33	1.70	0.57	43.5	0.251
	LFM MOS	0.73	1.39	1.30	0.65	47.7	0.301
	NGM MOS	0.65	1.54	1.38	0.52	46.5	0.285
	No. Obs.	4618	4469	3051	4085		

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	1.21	1.50	0.69	53.7	0.384
	LFM MOS	0.84	1.45	1.11	0.61	50.0	0.328
	NGM MOS	0.75	1.47	1.28	0.56	49.0	0.318
	No. Obs.	4612	4464	3028	4083		
18	LOCAL	0.63	1.77	2.08	0.65	46.9	0.289
	LFM MOS	0.92	1.70	1.01	0.69	53.0	0.332
	NGM MOS	0.86	1.85	1.15	0.62	51.5	0.318
	No. Obs.	7321	2727	1912	4224		
24	LOCAL	0.70	1.58	1.69	0.65	45.1	0.273
	LFM MOS	0.81	1.65	1.18	0.72	49.2	0.315
	NGM MOS	0.73	1.81	1.34	0.63	47.6	0.302
	No. Obs.	5831	3229	2279	4838		

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	0.64	1.55	1.80	0.77	52.5	0.367
	LFM MOS	0.72	1.67	1.36	0.79	49.2	0.315
	NGM MOS	0.77	1.70	1.40	0.71	49.2	0.318
	No. Obs.	1381	736	512	1398		
18	LOCAL	0.40	1.21	1.71	0.61	48.9	0.303
	LFM MOS	0.50	1.28	1.29	0.78	52.8	0.352
	NGM MOS	0.41	1.41	1.37	0.62	51.4	0.331
	No. Obs.	765	1324	855	1077		
24	LOCAL	0.54	1.45	1.99	0.61	42.3	0.245
	LFM MOS	0.65	1.49	1.47	0.73	46.6	0.292
	NGM MOS	0.62	1.78	1.43	0.55	45.3	0.278
	No. Obs.	1235	958	620	1217		

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	0.64	1.33	1.81	0.70	48.2	0.318
	LFM MOS	0.76	1.59	1.25	0.66	49.4	0.325
	NGM MOS	0.71	1.74	1.28	0.58	48.2	0.312
	No. Obs.	1234	952	610	1223		
18	LOCAL	0.65	1.98	2.20	0.65	48.0	0.305
	LFM MOS	0.87	2.03	1.12	0.71	53.0	0.342
	NGM MOS	0.92	1.78	1.34	0.68	54.6	0.362
	No. Obs.	1709	534	441	1333		
24	LOCAL	0.66	1.66	1.95	0.65	44.1	0.262
	LFM MOS	0.71	1.73	1.44	0.74	47.1	0.290
	NGM MOS	0.68	1.78	1.61	0.68	46.7	0.291
	No. Obs.	1373	737	502	1401		

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 27 stations in the Southern Region, 0000 UTC cycle.

Projection (h)	Type of Forecast	Bias by Category				Percent Correct	Skill Score
		1	2	3	4		
12	LOCAL	0.63	1.38	1.43	0.85	55.9	0.416
	LFM MOS	0.66	1.70	1.16	0.73	48.1	0.311
	NGM MOS	0.74	1.50	1.27	0.73	49.5	0.329
	No. Obs.	1399	1010	756	1277		
18	LOCAL	0.53	1.34	1.24	0.55	50.0	0.303
	LFM MOS	0.77	1.37	0.99	0.65	53.7	0.360
	NGM MOS	0.82	1.40	1.06	0.47	53.2	0.350
	No. Obs.	808	1466	1348	987		
24	LOCAL	0.51	1.30	1.48	0.55	42.0	0.209
	LFM MOS	0.66	1.38	1.09	0.71	47.6	0.285
	NGM MOS	0.61	1.45	1.28	0.47	46.5	0.268
	No. Obs.	921	1398	1055	1069		

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

Projection (h)	Type of Forecast	Bias by Category				Percent Correct	Skill Score
		1	2	3	4		
12	LOCAL	0.65	1.21	1.39	0.63	54.9	0.387
	LFM MOS	0.83	1.45	0.84	0.71	49.8	0.313
	NGM MOS	0.67	1.40	1.13	0.62	49.6	0.311
	No. Obs.	919	1400	1055	1039		
18	LOCAL	0.50	1.88	2.05	0.58	41.3	0.232
	LFM MOS	0.92	1.73	0.76	0.69	50.6	0.304
	NGM MOS	0.83	2.03	0.87	0.55	46.7	0.263
	No. Obs.	1908	851	613	1041		
24	LOCAL	0.57	1.60	1.63	0.61	40.9	0.224
	LFM MOS	0.71	1.77	0.91	0.75	47.4	0.297
	NGM MOS	0.60	1.83	1.22	0.64	45.0	0.274
	No. Obs.	1377	1012	764	1263		

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	0.72	1.40	1.50	0.82	58.1	0.439
	LFM MOS	0.68	1.71	1.35	0.74	46.9	0.292
	NGM MOS	0.71	1.67	1.49	0.66	48.2	0.311
	No. Obs.	1680	961	660	1425		
18	LOCAL	0.43	1.45	1.82	0.53	45.4	0.275
	LFM MOS	0.60	1.48	1.35	0.65	47.6	0.298
	NGM MOS	0.54	1.58	1.55	0.47	47.0	0.292
	No. Obs.	1242	1347	853	1278		
24	LOCAL	0.50	1.30	1.78	0.60	42.0	0.230
	LFM MOS	0.70	1.34	1.40	0.65	46.1	0.280
	NGM MOS	0.63	1.42	1.52	0.54	45.9	0.278
	No. Obs.	1266	1350	894	1217		

Table 4.8. Same as Table 4.7 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	1.17	1.56	0.76	53.1	0.376
	LFM MOS	0.85	1.41	1.22	0.55	47.8	0.299
	NGM MOS	0.78	1.38	1.45	0.48	46.7	0.287
	No. Obs.	1272	1367	888	1239		
18	LOCAL	0.60	1.72	2.26	0.68	45.5	0.274
	LFM MOS	0.91	1.63	1.11	0.70	52.3	0.323
	NGM MOS	0.84	1.74	1.43	0.61	50.7	0.313
	No. Obs.	2141	829	529	1266		
24	LOCAL	0.69	1.59	1.71	0.64	43.6	0.254
	LFM MOS	0.78	1.62	1.34	0.68	47.1	0.291
	NGM MOS	0.71	1.82	1.44	0.58	46.5	0.290
	No. Obs.	1684	972	663	1444		

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	0.97	1.04	1.24	0.92	72.3	0.598
	LFM MOS	0.92	1.55	1.21	0.67	58.5	0.407
	NGM MOS	0.93	1.46	1.19	0.73	58.2	0.400
	No. Obs.	1398	512	358	762		
18	LOCAL	0.79	1.47	1.66	0.64	55.2	0.374
	LFM MOS	0.87	1.60	1.24	0.56	54.3	0.347
	NGM MOS	0.75	1.86	1.38	0.51	51.0	0.317
	No. Obs.	1415	613	363	628		
24	LOCAL	0.84	1.28	1.65	0.43	49.6	0.309
	LFM MOS	0.90	1.40	1.34	0.40	51.9	0.333
	NGM MOS	0.74	1.61	1.28	0.50	48.8	0.299
	No. Obs.	1196	763	482	582		

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

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Percent Correct	Skill Score
12	LOCAL	1.00	1.10	1.25	0.66	60.1	0.443
	LFM MOS	0.92	1.33	1.33	0.47	54.5	0.368
	NGM MOS	0.82	1.43	1.28	0.59	53.1	0.356
	No. Obs.	1187	745	475	582		
18	LOCAL	0.83	1.44	1.66	0.70	56.1	0.359
	LFM MOS	0.97	1.42	1.15	0.62	57.7	0.355
	NGM MOS	0.89	1.78	0.97	0.63	55.4	0.333
	No. Obs.	1563	513	329	584		
24	LOCAL	0.87	1.38	1.42	0.78	55.2	0.363
	LFM MOS	1.03	1.34	1.06	0.67	58.0	0.382
	NGM MOS	0.92	1.76	1.04	0.61	54.5	0.347
	No. Obs.	1397	508	350	730		

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	1.10	1.40	0.96	59.9	0.397
	LFM MOS	0.81	1.37	0.79	1.03	57.0	0.339
	No. Obs.	197	145	154	530		
18	LOCAL	0.59	1.28	1.85	0.84	54.9	0.323
	LFM MOS	0.78	1.18	1.32	0.94	55.7	0.310
	No. Obs.	175	133	148	561		
24	LOCAL	0.53	1.01	1.66	0.88	46.9	0.236
	LFM MOS	0.76	0.94	1.05	1.08	50.7	0.265
	No. Obs.	161	175	203	483		

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

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Percent Correct	Skill Score
12	LOCAL	0.70	0.90	1.34	0.99	58.0	0.379
	LFM MOS	0.86	0.98	1.12	1.00	57.7	0.372
	No. Obs.	160	170	203	499		
18	LOCAL	0.46	0.99	1.54	1.02	54.9	0.332
	LFM MOS	0.78	1.27	1.08	0.97	54.2	0.328
	No. Obs.	191	161	179	501		
24	LOCAL	0.39	1.02	1.78	0.98	52.0	0.266
	LFM MOS	0.86	1.16	0.96	1.02	56.1	0.319
	No. Obs.	191	143	157	546		

Table 5.1. Comparative verification of NGM and LFM MOS surface wind forecasts for 97 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	0.559	1597	3.2	1.4	1607	0.350	93.6	0.00	1.01	0.87	0.86	0.73	0.00	0.00
	NGM	21	0.555		3.5	2.2		0.346	92.4	0.11	0.99	1.18	1.61	1.47	2.50	0.50
											14869	747	103	15	2	2
18	LFM	26	0.460	4335	3.1	0.4	4344	0.365	82.0	0.04	1.06	0.75	0.70	0.61	0.19	0.17
	NGM	25	0.490		3.3	1.5		0.382	79.8	0.08	0.99	1.01	1.28	1.30	1.00	0.50
											12850	2405	481	80	16	6
24	LFM	29	0.445	3755	3.4	0.8	3774	0.317	82.4	0.06	1.05	0.78	0.66	0.50	0.30	0.00
	NGM	29	0.437		3.8	2.1		0.348	80.1	0.08	0.98	1.07	1.23	1.49	0.70	2.50
											13045	2014	507	86	23	4

Table 5.2. Same as Table 5.1 except for 96 stations for the 1200 UTC cycle.

		Direction			Speed											
								Contingency Table								
											Bias by Category					
Fcst Proj (h)	Type of Fcst.	Mean Abs. Error (deg)	Skill Score	No. of Cases	Mean Abs. Error (kt)	Mean Alg. Error (kt)	No. of Cases	Skill Score	Percent Fcst. Correct	Threat Score (>27 kt)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
12	LFM	26	0.477	3747	3.2	0.7	3763	0.333	82.6	0.03	1.05	0.79	0.66	0.59	0.25	0.00
	NGM	25	0.489		3.6	1.8		0.364	80.8	0.11	0.98	1.05	1.19	1.68	0.63	1.50
											12880	2009	489	82	24	4
18	LFM	25	0.483	1631	3.4	1.2	1643	0.298	91.9	0.00	1.02	0.80	0.47	0.30	0.00	0.00
	NGM	25	0.490		4.0	2.2		0.286	89.9	0.00	0.99	1.18	1.08	1.17	4.00	0.50
											14521	893	168	23	1	2
24	LFM	24	0.492	1274	3.4	1.3	1283	0.316	93.6	0.00	1.02	0.73	0.80	0.50	0.00	0.00
	NGM	24	0.503		3.6	1.9		0.329	92.5	0.17	0.99	1.07	1.26	1.14	1.00	0.50
											14695	751	106	14	2	2

Table 5.3. Comparative verification of NGM and LFM MOS surface wind forecasts for 24 stations in the Eastern Region, 0000 UTC cycle.

		Direction			Speed											
								Contingency Table								
											Bias by Category					
Fcst Proj (h)	Type of Fcst.	Mean Abs. Error (deg)	Skill Score	No. of Cases	Mean Abs. Error (kt)	Mean Alg. Error (kt)	No. of Cases	Skill Score	Percent Fcst. Correct	Threat Score (>27 kt)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
12	LFM	19	0.549	373	2.8	0.9	374	0.375	94.6	*	1.01	0.74	0.66	1.00	*	*
	NGM	19	0.552		3.1	2.1		0.395	93.0	*	0.98	1.36	1.24	2.00	*	*
											3617	168	29	1	0	0
18	LFM	28	0.408	1098	2.7	0.5	1099	0.356	82.4	0.00	1.06	0.74	0.72	0.67	0.00	0.00
	NGM	26	0.450		3.1	1.6		0.338	79.4	0.17	0.99	0.96	1.51	1.89	0.67	0.00
											3107	604	75	9	3	2
24	LFM	28	0.405	450	3.2	0.8	455	0.248	91.6	0.00	1.04	0.52	0.26	0.29	*	0.00
	NGM	27	0.411		3.6	2.3		0.349	89.6	0.00	0.98	1.17	1.51	0.71	*	0.00
											3502	256	35	7	0	1

Table 5.4. Same as Table 5.3 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	26	0.416	469	3.0	0.9	473	0.258	91.5	0.00	1.03	0.61	0.44	0.25	*	0.00
	NGM	24	0.474		3.4	2.1		0.325	89.3	0.00	0.98	1.25	1.31	0.50	*	0.00
											3478	251	32	4	0	1
18	LFM	21	0.492	241	3.1	1.0	242	0.262	95.4	*	1.01	0.76	0.19	0.00	*	*
	NGM	21	0.486		3.7	2.4		0.310	93.8	*	0.98	1.52	1.05	0.00	*	*
											3664	123	21	3	0	0
24	LFM	22	0.474	323	3.0	1.1	325	0.348	94.5	*	1.02	0.67	0.62	0.50	*	*
	NGM	21	0.525		3.2	2.0		0.368	92.8	*	0.98	1.36	0.93	1.00	*	*
											3600	168	29	2	0	0

* This category was neither forecast nor observed.

Table 5.5. Comparative verification of NGM and LFM MOS surface wind forecasts for 27 stations in the Southern Region, 0000 UTC cycle. Data for TCC were not available for the 12- and 24-h projections.

		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	0.472	321	3.3	1.6	325	0.301	94.9	*	1.01	0.92	0.67	0.00	*	*
	NGM	21	0.533		3.3	1.6		0.304	94.9	*	1.01	0.88	1.25	0.00	*	*
											4099	155	12	5	0	0
18	LFM	26	0.430	1074	3.1	1.1	1078	0.369	84.6	*	1.02	0.92	0.85	0.57	*	*
	NGM	25	0.456		3.4	1.9		0.364	82.6	0.00	0.97	1.12	1.32	1.07	**	*
											3782	521	108	14	0	0
24	LFM	26	0.436	912	3.3	1.2	915	0.355	86.2	0.18	1.01	0.99	0.75	0.41	0.18	*
	NGM	26	0.421		3.4	1.8		0.374	85.3	0.14	0.98	1.14	1.03	1.12	0.36	**
											3726	406	96	17	11	0

Table 5.6. Same as Table 5.5 except for 26 stations for the 1200 UTC cycle. Data for TCC were not available.

		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	0.470	819	3.3	1.1	820	0.344	86.1	0.00	1.02	0.94	0.76	0.38	0.00	*
	NGM	22	0.484		3.3	1.7		0.362	85.3	0.23	0.99	1.08	1.02	1.25	0.36	**
											3653	404	93	16	11	0
18	LFM	26	0.337	384	3.7	2.1	388	0.326	92.1	0.00	1.00	1.19	0.63	0.00	0.00	0.00
	NGM	26	0.423		3.5	1.5		0.346	93.2	0.00	1.01	0.88	0.59	0.00	0.00	0.00
											3948	205	41	4	1	1
24	LFM	25	0.462	264	3.7	2.1	266	0.250	94.3	*	1.00	0.97	1.00	0.00	*	*
	NGM	26	0.445		3.3	1.6		0.265	95.0	*	1.01	0.75	0.58	0.00	*	*
											4024	154	12	4	0	0

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

Table 5.7. Comparative verification of NGM and LFM 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	19	0.578	652	3.0	1.2	654	0.372	91.1	0.00	1.02	0.80	0.96	1.43	*	0.00
	NGM	21	0.569		3.5	2.1		0.359	89.1	0.00	0.98	1.14	1.76	1.43	**	0.00
											4271	332	46	7	0	1
18	LFM	22	0.523	1667	3.1	-0.4	1669	0.344	75.3	0.07	1.14	0.66	0.60	0.49	0.38	0.33
	NGM	21	0.540		3.2	1.2		0.405	73.9	0.05	0.99	0.95	1.29	1.24	1.00	0.33
											3331	1015	230	45	8	3
24	LFM	29	0.449	1372	3.5	0.1	1374	0.271	77.5	0.00	1.11	0.64	0.55	0.40	0.40	0.00
	NGM	29	0.439		3.9	2.1		0.323	73.5	0.05	0.95	1.12	1.34	1.53	1.40	2.00
											3600	789	204	30	5	3

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	0.499	1397	3.3	0.2	1402	0.301	78.3	0.00	1.10	0.66	0.56	0.46	0.80	0.00
	NGM	25	0.508		3.6	1.8		0.359	75.5	0.14	0.96	1.09	1.23	1.75	1.20	0.67
											3570	791	191	28	5	3
18	LFM	25	0.515	653	3.4	0.8	659	0.306	89.6	0.00	1.04	0.68	0.46	0.55	*	0.00
	NGM	25	0.517		4.2	2.2		0.268	85.4	0.00	0.97	1.21	1.26	1.82	**	1.00
											4173	366	76	11	0	1
24	LFM	24	0.484	502	3.5	1.1	506	0.326	91.0	0.00	1.03	0.61	1.06	0.86	*	0.00
	NGM	24	0.516		3.7	1.9		0.344	89.4	0.00	0.99	1.00	1.51	1.43	**	1.00
											4225	335	47	7	0	1

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

Table 5.9. Comparative verification of NGM and LFM 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	24	0.519	251	3.9	2.4	254	0.302	94.4	0.00	0.99	1.27	1.13	0.00	0.00	0.00
	NGM	26	0.456		4.4	3.3		0.251	92.9	0.20	0.98	1.46	2.13	5.00	1.00	1.00
											2882	92	16	2	2	1
18	LFM	35	0.269	496	3.5	1.0	498	0.381	88.0	0.00	1.03	0.83	0.75	1.08	0.00	0.00
	NGM	34	0.352		4.0	1.7		0.336	85.5	0.10	0.99	1.08	0.96	1.33	0.60	2.00
											2630	265	68	12	5	1
24	LFM	30	0.334	1021	3.6	1.3	1030	0.311	72.7	0.00	1.03	0.95	0.84	0.69	0.43	*
	NGM	31	0.335		4.0	2.1		0.299	70.9	0.07	1.00	0.91	1.16	1.81	0.71	**
											2217	563	172	32	7	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	0.363	1062	3.3	0.9	1068	0.333	73.3	0.11	1.04	0.95	0.77	0.82	0.25	*
	NGM	28	0.366		3.7	1.9		0.331	71.8	0.00	1.00	0.88	1.21	1.97	0.63	**
											2179	563	173	34	8	0
18	LFM	28	0.425	353	3.3	1.4	354	0.256	91.0	*	1.03	0.65	0.47	0.20	*	*
	NGM	28	0.371		4.4	2.8		0.226	87.3	0.00	0.98	1.23	1.33	1.40	**	*
											2736	199	30	5	0	0
24	LFM	26	0.441	185	3.5	1.1	186	0.321	95.6	0.00	1.01	0.81	0.28	0.00	0.00	0.00
	NGM	25	0.392		4.2	2.3		0.263	93.5	0.33	0.99	1.30	1.61	4.00	0.50	0.00
											2846	94	18	1	2	1

* 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	28	0.460	169	3.7	2.3	170	0.341	91.9	*	0.99 947	1.33 49	0.78 9	0.00 2	* 0	* 0
18	LFM	34	0.340	216	3.6	2.1	220	0.450	89.9	0.00	1.01 909	0.85 93	1.00 14	3.00 1	0.00 1	* 0
24	LFM	43	0.309	490	4.2	2.7	491	0.224	72.5	0.00	0.94 819	1.30 149	1.19 37	1.33 3	2.00 1	* 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	0.373	423	3.6	1.9	425	0.309	77.4	0.00	1.01 812	1.01 159	0.68 37	2.50 4	0.00 1	* 0
18	LFM	37	0.337	249	4.1	2.1	252	0.254	85.8	0.00	1.02 896	0.95 87	0.68 19	0.40 5	0.00 1	* 0
24	LFM	32	0.316	200	4.4	3.1	204	0.241	89.9	*	0.98 948	1.33 52	1.22 9	1.00 1	* 0	* 0

* This category was neither forecast nor observed.

Table 5.13. Verification of local surface wind forecasts for 94 stations in the conterminous U.S. 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	26	0.501	3628	3.5	2.5	3686	0.400	93.5	0.00	0.99 14987	1.31 690	0.80 102	0.59 17	0.00 2	0.00 1
9	LOCAL	34	0.379	8183	3.3	1.7	8249	0.345	80.0	0.04	1.00 12944	1.11 2275	0.65 465	0.58 59	0.54 13	0.00 5
15	LOCAL	36	0.358	9015	3.4	1.9	9077	0.319	77.3	0.03	0.98 12770	1.19 2398	0.81 534	0.52 73	0.39 18	0.00 5

Table 5.14. Same as Table 5.13 except for 95 stations for the FT issuance time of approximately 1800 UTC.

Fcst Proj (h)	Type of Fcst.	Direction			Speed											
								Contingency Table								
											Bias by Category					
		Mean Abs. Error (deg)	Skill Score	No. of Cases	Mean Abs. Error (kt)	Mean Alg. Error (kt)	No. of Cases	Skill Score	Percent Fcst. Correct	Threat Score (>27 kt)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
3	LOCAL	30	0.433	9484	2.9	1.3	9526	0.407	78.6	0.23	1.00 12408	1.05 2814	0.80 638	0.48 107	0.52 25	1.50 2
9	LOCAL	39	0.329	5606	4.3	3.3	5737	0.236	86.4	0.00	0.96 14563	1.53 1041	1.01 188	0.47 30	0.00 6	0.50 2
15	LOCAL	40	0.331	3854	4.4	3.5	4001	0.242	91.1	0.00	0.98 14988	1.41 712	0.78 122	0.06 16	0.50 2	0.00 1

Table 5.15. Verification of local surface wind forecasts for 24 stations in the Eastern 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	25	0.479	892	3.3	2.5	903	0.380	94.4	*	1.00 3860	1.19 155	0.59 22	0.67 3	* 0	* 0
9	LOCAL	36	0.346	2197	2.9	1.4	2202	0.290	80.9	0.00	1.02 3356	0.95 581	0.41 76	0.58 12	0.00 1	0.00 1
15	LOCAL	39	0.294	2017	3.4	2.3	2030	0.233	82.4	0.00	0.98 3556	1.22 422	0.73 56	1.00 5	0.00 2	0.00 2

Table 5.16. Same as Table 5.15 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	31	0.398	2317	2.6	1.0	2323	0.326	79.9	0.50	1.06 3250	0.81 699	0.55 95	0.38 13	0.50 4	* 0
9	LOCAL	41	0.300	1149	4.3	3.5	1191	0.205	90.3	0.00	0.99 3827	1.29 208	0.92 24	0.50 2	0.00 1	* 0
15	LOCAL	42	0.297	903	4.5	3.8	944	0.254	93.5	*	0.99 3908	1.38 140	1.13 16	0.00 3	* 0	* 0

* This category was neither forecast nor observed.

Table 5.17. Verification of local surface wind forecasts for 24 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	27	0.483	702	3.7	2.7	717	0.392	95.4	*	0.99 3948	1.39 119	0.71 17	0.00 3	* 0	* 0
9	LOCAL	33	0.351	1838	3.3	2.2	1862	0.362	85.9	0.00	0.99 3594	1.20 414	0.44 66	1.25 4	0.00 1	* 0
15	LOCAL	36	0.344	2044	3.4	2.3	2058	0.337	84.1	0.14	0.97 3587	1.36 418	0.54 70	0.60 10	0.14 7	* 0

Table 5.18. Same as Table 5.17 except for 25 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	30	0.387	2157	3.0	1.8	2176	0.400	84.0	0.00	0.99 3596	1.16 522	0.66 90	0.47 17	2.00 1	2.00 1
9	LOCAL	38	0.272	1145	4.4	3.5	1182	0.186	90.8	0.00	0.98 3854	1.43 176	0.67 27	0.25 8	0.00 2	** 0
15	LOCAL	37	0.327	749	4.5	3.6	781	0.171	93.5	*	0.99 3912	1.21 137	0.87 15	0.00 1	* 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 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	25	0.515	1480	3.2	2.2	1492	0.429	90.0	*	0.97 4213	1.35 330	0.91 44	0.67 9	* 0	* 0
9	LOCAL	30	0.417	2917	3.2	1.4	2935	0.351	71.7	0.00	0.96 3337	1.25 971	0.69 237	0.52 33	0.67 6	0.00 3
15	LOCAL	35	0.372	3063	3.4	1.7	3079	0.300	68.5	0.00	0.92 3344	1.34 970	0.80 241	0.67 30	1.00 4	0.00 2

* This category was neither forecast nor observed.

Table 5.20. Same as Table 5.19 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	27	0.483	3242	2.8	1.0	3250	0.423	72.4	0.18	0.97 3159	1.20 1095	0.75 307	0.45 51	0.20 10	** 0
9	LOCAL	39	0.332	2113	4.2	3.2	2144	0.270	81.1	0.00	0.92 4110	1.85 413	0.90 83	0.43 14	0.00 2	0.00 1
15	LOCAL	38	0.348	1585	4.2	3.2	1631	0.257	86.0	0.00	0.96 4230	1.58 322	0.73 64	0.00 9	1.00 1	0.00 1

** This category was forecast but was not observed.

Table 5.21. Verification of local surface wind forecasts for 18 stations in the Western Region for the FT issuance time of approximately 0900 UTC.

		Direction			Speed											
								Contingency Table								
											Bias by Category					
Fcst Proj (h)	Type of Fcst.	Mean Abs. Error (deg)	Skill Score	No. of Cases	Mean Abs. Error (kt)	Mean Alg. Error (kt)	No. of Cases	Skill Score	Percent Fcst. Correct	Threat Score (>27 kt)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
3	LOCAL	31	0.447	554	4.0	2.9	574	0.302	94.7	0.00	0.99 2966	1.29 86	0.89 19	1.00 2	0.00 2	0.00 1
9	LOCAL	41	0.299	1231	3.9	2.2	1250	0.268	83.6	0.13	1.02 2657	0.87 309	0.88 86	0.50 10	0.60 5	0.00 1
15	LOCAL	38	0.311	1891	3.2	1.3	1910	0.331	74.6	0.00	1.07 2283	0.79 588	0.97 167	0.25 28	0.40 5	0.00 1

Table 5.22. Same as Table 5.21 except for the FT issuance time of approximately 1800 UTC.

		Direction			Speed											
								Contingency Table								
											Bias by Category					
Fcst Proj (h)	Type of Fcst.	Mean Abs. Error (deg)	Skill Score	No. of Cases	Mean Abs. Error (kt)	Mean Alg. Error (kt)	No. of Cases	Skill Score	Percent Fcst. Correct	Threat Score (>27 kt)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
3	LOCAL	35	0.354	1768	3.2	1.6	1777	0.405	78.6	0.29	1.01 2403	0.94 498	1.14 146	0.58 26	0.70 10	0.00 1
9	LOCAL	41	0.313	1199	4.2	3.1	1220	0.194	83.5	0.00	0.97 2772	1.27 244	1.37 54	0.83 6	0.00 1	0.00 1
15	LOCAL	45	0.252	617	4.6	3.5	645	0.213	92.6	0.00	1.00 2938	1.23 113	0.63 27	0.33 3	0.00 1	* 0

* This category was neither forecast nor observed.

Table 5.23. Verification of local surface wind forecasts for 6 stations in the Alaska Region for the FT issuance time of approximately 0900 UTC.

Fcst Proj (h)	Type of Fcst.	Direction			Speed											
								Contingency Table								
											Bias by Category					
		Mean Abs. Error (deg)	Skill Score	No. of Cases	Mean Abs. Error (kt)	Mean Alg. Error (kt)	No. of Cases	Skill Score	Percent Fcst. Correct	Threat Score (>27 kt)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
3	LOCAL	23	0.531	291	3.5	2.6	295	0.428	93.0	*	0.99 959	1.02 52	1.56 9	1.50 2	* 0	* 0
9	LOCAL	38	0.340	293	3.7	2.2	300	0.313	88.3	0.00	1.04 903	0.63 92	1.06 16	2.00 1	0.00 1	* 0
15	LOCAL	45	0.285	336	3.9	1.2	339	0.181	79.4	0.00	1.11 830	0.50 148	0.61 36	0.25 4	0.00 1	* 0

* This category was neither forecast nor observed.

Table 5.24. Same as Table 5.23 except for the FT issuance time of approximately 1800 UTC.

Fcst Proj (h)	Type of Fcst.	Direction			Speed											
								Contingency Table								
											Bias by Category					
		Mean Abs. Error (deg)	Skill Score	No. of Cases	Mean Abs. Error (kt)	Mean Alg. Error (kt)	No. of Cases	Skill Score	Percent Fcst. Correct	Threat Score (>27 kt)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
3	LOCAL	33	0.409	500	3.1	1.2	502	0.328	80.3	0.00	1.07 826	0.75 163	0.51 39	0.75 4	0.00 1	* 0
9	LOCAL	46	0.279	471	4.7	3.5	493	0.202	81.4	0.00	0.95 920	1.49 87	1.21 19	0.60 5	0.00 2	* 0
15	LOCAL	52	0.217	462	5.4	4.8	485	0.151	83.5	*	0.91 972	2.25 56	2.89 9	0.00 1	* 0	* 0

* This category was neither forecast nor observed.

Table 5.25. Comparative verification of local, LFM MOS, and NGM MOS 42-h significant wind speed forecasts for 95 stations in the conterminous U.S. for the 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	5.68	0.082	97.1	0.05
	LFM MOS	1.00	0.61	0.158	99.3	0.09
	NGM MOS	1.00	1.58	0.156	99.0	0.09
	No. Obs.	15839	77			
± 3-h Max	LOCAL	0.99	1.30	0.193	96.2	0.12
	LFM MOS	1.02	0.14	0.100	97.9	0.06
	NGM MOS	1.01	0.36	0.197	97.7	0.11
	No. Obs.	15577	335			

Table 5.26. Same as Table 5.25 except for 94 stations for the 1200 UTC cycle. Data for TCC were not available.

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	8.10	0.013	97.8	0.01
	LFM MOS	1.00	0.13	-0.001	99.7	0.00
	NGM MOS	1.00	0.92	0.078	99.6	0.04
	No. Obs.	15624	39			
± 3-h Max	LOCAL	1.00	0.99	0.086	96.4	0.05
	LFM MOS	1.02	0.02	-0.001	97.9	0.00
	NGM MOS	1.02	0.11	0.041	97.8	0.02
	No. Obs.	15336	319			

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	6.00	-0.003	98.6	0.00
	LFM MOS	1.00	1.50	-0.002	99.5	0.00
	No. Obs.	990	2			
± 3-h Max	LOCAL	1.00	1.09	0.252	98.3	0.15
	LFM MOS	1.01	0.27	0.139	98.8	0.08
	No. Obs.	980	11			

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	2.50	0.133	97.6	0.08
	LFM MOS	1.01	0.13	0.221	99.3	0.13
	No. Obs.	997	8			
± 3-h Max	LOCAL	1.00	1.18	0.147	96.9	0.09
	LFM MOS	1.02	0.06	0.109	98.4	0.06
	No. Obs.	987	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				Log Score	Percent Correct	Skill Score
		1	2	3	4			
12	MOS	0.86	0.77	0.90	1.03	2.436	81.5	0.330
	PERSISTENCE	0.69	0.78	0.82	1.04	1.543	87.6	0.536
	No. Obs.	528	743	1270	12730			
18	MOS	0.81	0.67	0.96	1.01	1.187	85.2	0.341
	PERSISTENCE	4.55	1.97	0.65	1.00	1.814	83.4	0.296
	No. Obs.	77	292	1622	13166			
24	MOS	1.24	1.03	0.90	1.00	0.790	91.8	0.262
	PERSISTENCE	5.34	3.71	1.53	0.92	1.827	85.0	0.171
	No. Obs.	67	155	671	13938			

Table 6.2. Same as Table 6.1 except 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	1.31	0.89	0.93	1.00	0.740	92.3	0.315
	PERSISTENCE	0.73	1.25	1.37	0.98	0.562	93.3	0.486
	No. Obs.	71	148	659	13679			
18	MOS	1.37	0.80	0.91	1.00	1.461	88.6	0.329
	PERSISTENCE	0.25	0.50	1.15	1.02	1.172	88.9	0.306
	No. Obs.	219	372	805	13632			
24	MOS	1.75	0.67	0.92	1.00	3.105	79.4	0.308
	PERSISTENCE	0.10	0.24	0.74	1.11	2.305	81.6	0.179
	No. Obs.	522	738	1236	12494			

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	0.79	0.77	1.57	0.94	2.498	76.0	0.362
	PERSISTENCE	0.52	1.05	0.85	1.04	1.550	86.4	0.573
	No. Obs.	33	43	115	764			
18	MOS	1.00	0.70	1.60	0.91	2.701	72.0	0.347
	PERSISTENCE	0.80	0.67	0.71	1.09	2.352	78.2	0.364
	No. Obs.	20	67	139	736			
24	MOS	0.60	1.60	1.62	0.87	1.845	75.5	0.369
	PERSISTENCE	3.00	1.50	0.68	1.03	1.917	79.7	0.332
	No. Obs.	5	30	141	772			

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	1.40	1.40	1.28	0.93	1.630	79.9	0.451
	PERSISTENCE	2.00	1.11	1.21	0.95	1.260	84.1	0.550
	No. Obs.	5	35	149	784			
18	MOS	1.29	1.02	1.81	0.90	2.022	76.8	0.313
	PERSISTENCE	1.43	0.90	1.75	0.91	1.819	79.1	0.366
	No. Obs.	7	42	102	827			
24	MOS	1.19	1.27	1.72	0.86	3.335	69.0	0.277
	PERSISTENCE	0.31	0.91	1.40	0.97	2.407	75.4	0.331
	No. Obs.	32	45	127	776			

Table 6.5. Comparative verification of local and persistence ceiling height forecasts for 94 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	0.63	0.76	1.03	1.03	1.709	86.0	0.484
	PERSISTENCE	0.60	0.71	0.82	1.05	1.498	88.0	0.529
	No. Obs.	538	726	1296	13235			
6	LOCAL	0.38	0.52	0.95	1.05	1.778	83.0	0.393
	PERSISTENCE	1.02	0.61	0.63	1.07	1.865	83.6	0.393
	No. Obs.	318	844	1682	12930			
9	LOCAL	0.26	0.30	0.68	1.07	1.169	85.4	0.308
	PERSISTENCE	3.94	1.47	0.57	1.03	1.766	83.0	0.289
	No. Obs.	82	352	1849	13475			
15	LOCAL	0.17	0.37	1.12	1.01	0.688	91.7	0.282
	PERSISTENCE	5.14	2.95	1.38	0.94	1.631	86.0	0.187
	No. Obs.	63	175	762	14784			

Table 6.6. Same as Table 6.5 except for 95 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	0.53	0.66	1.16	0.99	0.698	90.8	0.446
	PERSISTENCE	1.31	1.78	1.65	0.94	0.890	88.7	0.462
	No. Obs.	62	204	1121	14579			
6	LOCAL	0.43	0.60	1.47	0.98	0.696	91.4	0.356
	PERSISTENCE	1.25	2.06	2.44	0.91	1.130	86.2	0.283
	No. Obs.	65	177	757	14810			
9	LOCAL	0.41	0.58	1.65	0.98	0.831	90.7	0.338
	PERSISTENCE	0.82	1.39	2.69	0.92	1.296	85.1	0.240
	No. Obs.	98	261	684	14755			
15	LOCAL	0.33	0.82	1.55	0.98	1.657	84.9	0.347
	PERSISTENCE	0.25	0.70	1.77	0.97	1.876	81.6	0.228
	No. Obs.	326	521	1041	13914			

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

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Log Score	Percent Correct	Skill Score
3	LOCAL	0.69	0.75	0.98	1.03	1.608	86.5	0.581
	PERSISTENCE	0.51	1.02	0.83	1.04	1.631	85.9	0.552
	No. Obs.	35	44	121	807			
6	LOCAL	0.52	0.76	0.98	1.04	2.424	80.0	0.425
	PERSISTENCE	0.41	1.00	0.76	1.07	2.312	80.2	0.405
	No. Obs.	44	45	135	788			
9	LOCAL	0.64	0.35	0.88	1.09	2.338	78.0	0.356
	PERSISTENCE	0.82	0.64	0.68	1.10	2.391	78.0	0.355
	No. Obs.	22	69	145	762			
15	LOCAL	1.20	0.47	0.83	1.05	1.546	81.4	0.351
	PERSISTENCE	3.60	1.41	0.67	1.03	1.930	79.9	0.337
	No. Obs.	5	32	151	817			

Table 6.8. Same as Table 6.7 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	1.00	0.51	1.01	1.02	1.271	82.7	0.446
	PERSISTENCE	2.00	1.14	1.19	0.95	1.258	84.0	0.546
	No. Obs.	5	35	159	828			
6	LOCAL	0.83	0.47	1.24	0.98	1.546	80.4	0.350
	PERSISTENCE	1.67	1.28	1.39	0.92	1.628	80.5	0.425
	No. Obs.	6	32	136	844			
9	LOCAL	0.50	0.37	1.59	0.96	1.716	79.9	0.339
	PERSISTENCE	1.25	0.93	1.69	0.91	1.854	78.8	0.366
	No. Obs.	8	43	113	863			
15	LOCAL	0.22	0.50	1.66	0.95	2.636	72.9	0.265
	PERSISTENCE	0.31	0.89	1.42	0.96	2.404	75.0	0.313
	No. Obs.	32	46	133	821			

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	1.27	1.16	1.11	0.95	2.837	71.8	0.371
	PERSISTENCE	0.53	0.42	0.76	1.12	1.776	81.0	0.488
	No. Obs.	375	896	2827	11206			
18	MOS	0.80	0.74	1.31	0.97	1.158	84.7	0.352
	PERSISTENCE	5.46	1.44	1.39	0.94	1.684	81.4	0.290
	No. Obs.	35	257	1548	13391			
24	MOS	0.81	1.19	1.27	0.97	1.070	86.1	0.339
	PERSISTENCE	6.26	1.82	1.58	0.92	1.768	80.6	0.226
	No. Obs.	31	205	1352	13651			

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	1.35	1.13	1.21	0.98	1.087	86.6	0.351
	PERSISTENCE	0.74	0.95	0.97	1.00	0.611	92.6	0.601
	No. Obs.	34	200	1327	13398			
18	MOS	3.23	1.57	0.98	0.98	1.588	84.0	0.349
	PERSISTENCE	0.27	0.88	0.80	1.03	1.037	87.6	0.400
	No. Obs.	91	216	1628	13132			
24	MOS	2.14	1.45	1.10	0.90	3.473	69.2	0.350
	PERSISTENCE	0.07	0.21	0.47	1.23	2.588	74.1	0.203
	No. Obs.	377	876	2771	10998			

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				Log Score	Percent Correct	Skill Score
		1	2	3	4			
12	MOS	0.17	1.06	0.67	1.04	1.262	87.0	0.383
	PERSISTENCE	0.92	1.00	0.67	1.03	0.840	90.9	0.578
	No. Obs.	12	33	83	834			
18	MOS	0.00	0.63	0.76	1.05	1.376	86.6	0.277
	PERSISTENCE	1.10	0.80	0.82	1.02	1.387	87.4	0.384
	No. Obs.	10	41	67	858			
24	MOS	*	0.89	0.74	1.02	0.706	91.3	0.357
	PERSISTENCE	**	1.22	1.12	0.97	1.267	87.3	0.256
	No. Obs.	0	27	50	890			

Table 7.4. Same as Table 7.3 except 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	*	0.90	0.94	1.01	0.815	90.2	0.346
	PERSISTENCE	**	1.17	1.21	0.98	0.659	92.5	0.560
	No. Obs.	0	30	52	912			
18	MOS	0.00	0.82	0.87	1.02	1.074	88.7	0.293
	PERSISTENCE	1.00	0.89	1.19	0.99	0.909	90.0	0.444
	No. Obs.	3	38	52	897			
24	MOS	0.88	1.39	0.99	0.99	1.784	83.3	0.340
	PERSISTENCE	0.19	1.16	0.70	1.04	1.448	85.4	0.332
	No. Obs.	16	31	88	853			

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

Table 7.5. Comparative verification of local and persistence visibility forecasts for 94 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	0.52	0.48	1.18	1.01	1.862	79.6	0.478
	PERSISTENCE	0.41	0.43	0.75	1.11	1.598	83.2	0.510
	No. Obs.	388	771	2740	11894			
6	LOCAL	0.32	0.29	1.01	1.05	1.713	79.5	0.385
	PERSISTENCE	1.06	0.48	0.79	1.07	1.758	80.5	0.393
	No. Obs.	151	700	2601	12321			
9	LOCAL	0.22	0.15	0.84	1.04	0.978	86.8	0.342
	PERSISTENCE	4.30	1.17	1.20	0.96	1.529	82.7	0.322
	No. Obs.	37	284	1707	13729			
15	LOCAL	0.13	0.17	0.82	1.03	0.824	88.9	0.291
	PERSISTENCE	4.97	1.69	1.55	0.93	1.590	82.1	0.227
	No. Obs.	32	197	1318	14236			

Table 7.6. Same as Table 7.5 except for 95 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	0.41	0.39	1.15	1.00	0.689	90.8	0.495
	PERSISTENCE	1.22	1.40	1.28	0.97	0.689	91.5	0.583
	No. Obs.	32	210	1329	14395			
6	LOCAL	0.28	0.39	1.09	1.00	0.769	89.8	0.424
	PERSISTENCE	1.22	1.47	1.28	0.97	0.939	88.5	0.436
	No. Obs.	32	199	1322	14256			
9	LOCAL	0.44	0.48	1.12	1.00	0.867	88.2	0.382
	PERSISTENCE	1.15	1.72	1.18	0.97	1.020	87.2	0.388
	No. Obs.	34	170	1436	14159			
15	LOCAL	0.45	0.76	1.25	0.97	1.585	81.3	0.365
	PERSISTENCE	0.24	0.87	0.82	1.04	1.501	83.1	0.337
	No. Obs.	161	336	2060	13245			

Table 7.7. 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	0.81	0.69	0.91	1.02	0.851	90.3	0.567
	PERSISTENCE	0.88	1.00	0.69	1.03	0.855	91.1	0.593
	No. Obs.	16	32	86	867			
6	LOCAL	0.44	0.47	0.98	1.05	1.841	84.2	0.359
	PERSISTENCE	0.56	0.68	0.69	1.06	1.760	85.8	0.403
	No. Obs.	25	47	86	851			
9	LOCAL	0.55	0.38	0.91	1.04	1.356	87.0	0.326
	PERSISTENCE	1.27	0.76	0.81	1.02	1.435	87.3	0.389
	No. Obs.	11	42	69	871			
15	LOCAL	*	0.30	1.13	1.01	0.880	90.0	0.265
	PERSISTENCE	*	1.07	1.23	0.97	1.319	87.2	0.252
	No. Obs.	0	30	48	924			

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

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Log Score	Percent Correct	Skill Score
3	LOCAL	*	0.47	1.27	1.00	0.769	90.7	0.375
	PERSISTENCE	*	1.20	1.27	0.98	0.606	93.1	0.588
	No. Obs.	0	30	51	945			
6	LOCAL	2.00	0.33	1.39	1.00	0.894	90.0	0.288
	PERSISTENCE	3.00	1.09	1.50	0.97	0.792	91.3	0.485
	No. Obs.	1	33	44	938			
9	LOCAL	0.50	0.21	1.38	1.01	1.062	88.0	0.252
	PERSISTENCE	0.75	0.92	1.29	0.99	0.898	90.3	0.459
	No. Obs.	4	38	52	932			
15	LOCAL	0.28	0.48	0.98	1.03	1.645	83.9	0.250
	PERSISTENCE	0.17	1.24	0.75	1.03	1.446	85.5	0.326
	No. Obs.	18	29	89	892			

* This category was forecast but was not observed.