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AFOS-ERA VERIFICATION OF GUIDANCE AND LOCAL AVIATION/PUBLIC WEATHER FORECASTS--NO. 14 (APRIL 1990 - SEPTEMBER 1990)

Valery J. Dagostaro, J. Paul Dallavalle, and Ronald W. Kessler

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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 1990 through September 1990 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 Region listed in Table 1.3. The scores are those recommended in the NWS National Verification Plan (National Weather Service, 1982). Definitions of the categories used for verification are given in Table 1.4. For the aviation weather elements, we verified the local forecasts associated with the FT issuance times of approximately 0900 and 1800 UTC. Objective guidance for the aviation weather elements, as well as all local and guidance forecasts for the public weather elements, were verified for the 0000 and 1200 UTC forecast cycles. Because verification data or forecast projections for the Alaska Region differ from those of the conterminous U.S., data for the seven Alaskan stations were verified separately from those of the conterminous U.S.

For most weather elements, verification results are presented for all stations in the conterminous U.S. combined, followed by results for each of the NWS regions in the conterminous U.S. and for the Alaska Region. Max/min temperature and PoP scores are presented in Tables 2.1 - 2.12 and 3.1 - 3.12, respectively. 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 1990 - SEPTEMBER 1990)

This is the first warm season for which MOS guidance based on the NGM was available for max/min temperature, PoP, cloud amount, and surface wind. NGM-based guidance was collected centrally by TDL and, for these weather elements, comparative verification results are presented. Also note that local and guidance verification results are presented for the 42-h significant wind speed forecasts. As with all rare events, care must be used when interpreting these verification results.

Verification sites in Alaska changed during the 1990 warm season. Prior to the 0000 UTC July 25 forecast cycle, Juneau collected data for Sitka, and Anchorage collected data for Yakutat. Beginning with the 0000 UTC July 25 forecast cycle, Juneau and Anchorage collected data for Yakutat and Bethel, respectively. Forecasts were verified for all available sites.

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-four stations in the conterminous U.S. and 7 stations in the Alaska Region 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 was not included in the max/min temperature and PoP verifications, and LBB and ELP were not included in the ceiling height, visibility, and local surface wind verifications. Max/min temperature results were not available for SIT and BET, and PoP results were not available for BET. TCC was not available for all MOS ceiling height and visibility verifications and for the local ceiling height and visibility verifications for the FT release time of 0900 UTC.

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

Table 1.4. Definitions of categories used for verification.

Category	Precipitation Type[1]	Snow Amount[2] (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		

[1]Precipitation type forecasts are not verified for the warm season months of April through September.

[2]Scores based on cumulative snow amount categories of ≥ 2, ≥ 4, and ≥ 6 inches are noted in the verification tables. Snow amount forecasts are not verified for the warm season months of April through September.

Table 2.1. Comparative verification of local, LFM MOS, and NGM MOS max/min temperature forecasts for 93 stations in the conterminous U.S., 0000 UTC cycle.

Forecast Projection	Forecast Type	Number of Cases	Mean Algebraic Error (°F)	Mean Absolute Error (°F)	Percent of Absolute Errors >10°F	Probability of Detection (32°F)	False Alarm Ratio (32°F)	Improvement Over Climate
Today's Max	LOCAL	15675	0.2	2.6	1.1	--	--	80.9
	LFM MOS		-0.1	2.8	1.5	--	--	77.7
	NGM MOS		0.2	2.8	1.6	--	--	77.6
Tonight's Min	LOCAL	15659	-0.2	2.6	0.7	0.43	0.20	75.1
	LFM MOS		-0.2	2.8	0.8	0.43	0.20	72.7
	NGM MOS		-0.8	2.9	1.0	0.58	0.43	70.3
Tomorrow's Max	LOCAL	15664	0.4	3.2	3.1	--	--	69.9
	LFM MOS		0.1	3.5	3.5	--	--	66.7
	NGM MOS		0.1	3.5	3.8	--	--	65.0
Tomorrow Night's Min	LOCAL	15658	-0.2	3.1	1.7	0.19	0.15	63.7
	LFM MOS		-0.1	3.2	1.9	0.20	0.25	62.3
	NGM MOS		-0.7	3.2	1.9	0.34	0.43	61.8

Table 2.2. Same as Table 2.1 except for the 1200 UTC cycle.

Forecast Projection	Forecast Type	Number of Cases	Mean Algebraic Error (°F)	Mean Absolute Error (°F)	Percent of Absolute Errors >10°F	Probability of Detection (32°F)	False Alarm Ratio (32°F)	Improvement Over Climate
Tonight's Min	LOCAL	15765	-0.5	2.4	0.5	0.48	0.30	77.9
	LFM MOS		-0.5	2.6	0.6	0.44	0.32	75.9
	NGM MOS		-0.7	2.7	0.7	0.49	0.47	74.1
Tomorrow's Max	LOCAL	15759	0.2	3.0	2.3	--	--	74.9
	LFM MOS		0.1	3.3	3.0	--	--	69.3
	NGM MOS		0.5	3.3	2.7	--	--	69.9
Tomorrow Night's Min	LOCAL	15739	-0.3	2.9	1.1	0.39	0.25	70.2
	LFM MOS		-0.4	3.0	1.4	0.34	0.35	67.5
	NGM MOS		-0.6	3.0	1.4	0.44	0.35	67.3
Day After Tomorrow's Max	LOCAL	15745	0.4	3.7	4.6	--	--	61.2
	LFM MOS		0.1	3.9	5.1	--	--	57.1
	NGM MOS		0.4	4.0	5.0	--	--	56.6

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	4061	0.1	2.6	0.9	--	--	79.7
	LFM MOS		0.0	2.8	1.5	--	--	76.1
	NGM MOS		-0.3	2.8	1.4	--	--	76.9
Tonight's Min	LOCAL	4057	-0.3	2.6	0.6	0.42	0.11	75.5
	LFM MOS		-0.2	2.7	0.6	0.42	0.11	74.3
	NGM MOS		-0.9	2.9	1.1	0.68	0.52	70.2
Tomorrow's Max	LOCAL	4057	0.2	3.1	2.8	--	--	70.4
	LFM MOS		0.2	3.4	3.4	--	--	66.2
	NGM MOS		0.1	3.3	2.7	--	--	68.0
Tomorrow Night's Min	LOCAL	4066	-0.4	3.2	1.7	0.20	0.33	62.9
	LFM MOS		-0.4	3.2	1.5	0.35	0.13	63.2
	NGM MOS		-0.4	3.3	1.9	0.30	0.60	60.3

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	4106	-0.5	2.4	0.2	0.42	0.43	78.6
	LFM MOS		-0.3	2.4	0.3	0.42	0.47	78.1
	NGM MOS		-0.8	2.6	0.6	0.58	0.52	74.6
Tomorrow's Max	LOCAL	4103	0.2	2.9	2.1	--	--	73.6
	LFM MOS		0.3	3.3	3.1	--	--	67.8
	NGM MOS		0.4	3.0	2.3	--	--	72.0
Tomorrow Night's Min	LOCAL	4095	-0.4	2.9	0.9	0.50	0.20	69.8
	LFM MOS		-0.4	3.0	1.1	0.44	0.42	67.9
	NGM MOS		-0.2	3.0	1.2	0.38	0.54	67.3
Day After Tomorrow's Max	LOCAL	4098	0.1	3.6	4.1	--	--	60.2
	LFM MOS		-0.1	3.9	4.8	--	--	56.3
	NGM MOS		0.6	3.7	4.1	--	--	58.4

Table 2.5. Comparative verification of local, LFM MOS, and NGM MOS max/min temperature forecasts for 24 stations in the Southern Region, 0000 UTC cycle.

Forecast Projection	Forecast Type	Number of Cases	Mean Algebraic Error (°F)	Mean Absolute Error (°F)	Percent of Absolute Errors >10°F	Probability of Detection (32°F)	False Alarm Ratio (32°F)	Improvement Over Climate
Today's Max	LOCAL	3967	0.1	2.3	1.0	--	--	76.5
	LFM MOS		-0.1	2.5	1.1	--	--	72.7
	NGM MOS		-0.1	2.5	1.3	--	--	72.4
Tonight's Min	LOCAL	3969	0.0	2.3	0.3	0.50	0.33	73.3
	LFM MOS		0.1	2.4	0.3	0.50	0.20	72.0
	NGM MOS		-0.9	2.6	0.8	0.63	0.62	66.7
Tomorrow's Max	LOCAL	3971	0.1	2.9	2.3	--	--	64.1
	LFM MOS		-0.3	3.1	1.9	--	--	60.7
	NGM MOS		-0.5	3.3	2.7	--	--	56.2
Tomorrow Night's Min	LOCAL	3964	0.1	2.8	1.1	0.25	0.00	59.8
	LFM MOS		0.3	2.8	1.2	0.38	0.25	59.9
	NGM MOS		-0.9	2.9	1.1	0.38	0.57	57.1

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	3976	-0.3	2.1	0.2	0.50	0.43	77.6
	LFM MOS		-0.1	2.2	0.3	0.50	0.33	76.2
	NGM MOS		-0.8	2.4	0.5	0.75	0.60	71.0
Tomorrow's Max	LOCAL	3975	0.0	2.6	1.7	--	--	69.6
	LFM MOS		-0.3	3.0	1.8	--	--	62.7
	NGM MOS		-0.1	3.1	2.4	--	--	60.2
Tomorrow Night's Min	LOCAL	3975	-0.1	2.5	0.7	0.71	0.29	67.7
	LFM MOS		-0.2	2.6	0.8	0.71	0.50	66.4
	NGM MOS		-0.9	2.7	0.8	0.86	0.00	64.4
Day After Tomorrow's Max	LOCAL	3976	0.1	3.1	2.9	--	--	55.7
	LFM MOS		-0.5	3.4	3.2	--	--	50.6
	NGM MOS		-0.5	3.5	2.9	--	--	49.3

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	4725	0.4	2.9	1.5	--	--	82.2
	LFM MOS		-0.1	3.1	2.1	--	--	79.6
	NGM MOS		0.5	3.1	2.2	--	--	79.3
Tonight's Min	LOCAL	4714	-0.1	2.9	0.9	0.51	0.21	78.0
	LFM MOS		-0.2	3.0	1.2	0.47	0.23	75.8
	NGM MOS		-0.6	3.1	1.4	0.61	0.34	73.7
Tomorrow's Max	LOCAL	4721	0.7	3.7	4.3	--	--	71.0
	LFM MOS		0.4	3.8	5.1	--	--	68.8
	NGM MOS		0.7	4.1	5.8	--	--	65.4
Tomorrow Night's Min	LOCAL	4712	0.0	3.5	2.5	0.22	0.09	67.3
	LFM MOS		0.1	3.6	2.8	0.16	0.22	65.3
	NGM MOS		-0.7	3.6	2.8	0.42	0.24	64.8

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	4729	-0.5	2.7	0.8	0.61	0.24	80.3
	LFM MOS		-0.5	2.8	0.8	0.51	0.28	78.2
	NGM MOS		-0.4	2.9	1.1	0.46	0.34	77.2
Tomorrow's Max	LOCAL	4734	0.5	3.3	2.9	--	--	76.5
	LFM MOS		0.3	3.7	4.2	--	--	71.4
	NGM MOS		1.1	3.8	3.7	--	--	70.5
Tomorrow Night's Min	LOCAL	4718	-0.3	3.1	1.4	0.37	0.29	73.9
	LFM MOS		-0.3	3.3	1.9	0.32	0.19	71.2
	NGM MOS		-0.5	3.3	1.9	0.46	0.30	70.2
Day After Tomorrow's Max	LOCAL	4723	0.9	4.2	6.9	--	--	62.2
	LFM MOS		0.5	4.4	7.2	--	--	59.3
	NGM MOS		1.1	4.7	8.0	--	--	55.4

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	2922	0.2	2.5	1.1	--	--	83.2
	LFM MOS		-0.3	2.8	1.2	--	--	80.1
	NGM MOS		0.6	2.7	1.5	--	--	79.5
Tonight's Min	LOCAL	2919	-0.5	2.7	1.0	0.14	0.00	69.4
	LFM MOS		-0.9	3.0	1.3	0.29	0.20	63.5
	NGM MOS		-0.9	2.9	0.8	0.29	0.33	66.4
Tomorrow's Max	LOCAL	2915	0.4	3.2	2.8	--	--	72.3
	LFM MOS		0.2	3.5	3.1	--	--	68.3
	NGM MOS		0.2	3.5	3.5	--	--	68.3
Tomorrow Night's Min	LOCAL	2916	-0.5	3.0	1.5	0.07	0.00	60.4
	LFM MOS		-0.5	3.3	2.0	0.07	0.67	56.2
	NGM MOS		-0.8	3.0	1.3	0.13	0.67	61.8

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	2954	-0.6	2.5	1.0	0.14	0.00	71.4
	LFM MOS		-1.1	2.8	1.2	0.21	0.00	66.6
	NGM MOS		-1.0	2.7	0.8	0.29	0.50	69.0
Tomorrow's Max	LOCAL	2947	0.2	2.9	2.0	--	--	77.7
	LFM MOS		-0.1	3.3	2.1	--	--	72.4
	NGM MOS		0.2	3.1	2.2	--	--	74.3
Tomorrow Night's Min	LOCAL	2951	-0.7	2.9	1.5	0.15	0.00	64.8
	LFM MOS		-1.0	3.2	1.8	0.08	0.50	59.1
	NGM MOS		-0.8	3.0	1.4	0.23	0.50	63.7
Day After Tomorrow's Max	LOCAL	2948	0.4	3.6	4.1	--	--	65.2
	LFM MOS		0.4	4.0	4.6	--	--	59.2
	NGM MOS		0.3	3.8	4.4	--	--	63.0

Table 2.11. Comparative verification of local and LFM MOS max/min temperature forecasts for 5 stations in the Alaska Region, 0000 UTC cycle. NGM MOS forecasts were not available for the Alaskan stations.

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	839	0.8	3.0	1.3	--	--	*
	LFM MOS		0.9	2.9	1.0	--	--	*
Tonight's Min	LOCAL	838	-0.8	3.0	1.4	0.20	0.50	*
	LFM MOS		-1.0	3.1	1.0	0.40	0.33	*
Tomorrow's Max	LOCAL	840	0.5	3.5	3.1	--	--	*
	LFM MOS		0.6	3.4	1.9	--	--	*
Tomorrow Night's Min	LOCAL	840	-1.0	3.5	2.1	0.17	0.00	*
	LFM MOS		-1.4	3.6	1.1	0.17	0.50	*

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	814	-1.2	2.9	1.2	0.33	0.83	*
	LFM MOS		-1.5	3.1	0.7	0.33	0.67	*
Tomorrow's Max	LOCAL	814	0.3	3.3	2.8	--	--	*
	LFM MOS		0.3	3.2	2.0	--	--	*
Tomorrow Night's Min	LOCAL	814	-1.2	3.5	1.7	0.00	1.00	*
	LFM MOS		-1.7	3.5	1.6	0.00	1.00	*
Day After Tomorrow's Max	LOCAL	809	0.1	3.9	4.4	--	--	*
	LFM MOS		0.1	3.9	4.2	--	--	*

* Percent improvement over climate scores were not available.

Table 3.1. Comparative verification of local, LFM MOS, and NGM MOS PoP forecasts for 93 stations in the conterminous U.S., 0000 UTC cycle.

Forecast Projection (h)	Type of Forecast	Brier Score	Local % Imp. Over Guid.	% Imp. Over Clim.	No. of Cases	Changes GE 20% to Guidance: Guid. Brier Score	Changes GE 20% to Guidance: Local % Imprv.	Changes GE 20% to Guidance: No. of Changes
12-24 (1st period)	LOCAL	0.0995		35.4				
	LFM MOS	0.1031	3.5	33.0	15646	0.2193	9.0	1918
	NGM MOS	0.1016	2.2	34.0		0.2052	4.6	2551
24-36 (2nd period)	LOCAL	0.1021		29.5				
	LFM MOS	0.1051	2.9	27.4	15643	0.2207	10.5	1638
	NGM MOS	0.1026	0.6	29.1		0.2016	0.5	2273
36-48 (3rd period)	LOCAL	0.1182		22.2				
	LFM MOS	0.1193	0.9	21.5	15640	0.2101	4.5	1674
	NGM MOS	0.1182	-0.1	22.3		0.1966	-2.7	2303

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	0.0947		34.7				
	LFM MOS	0.0971	2.4	33.0	15748	0.2078	4.5	2033
	NGM MOS	0.0950	0.3	34.5		0.1970	-0.6	2525
24-36 (2nd period)	LOCAL	0.1092		28.3				
	LFM MOS	0.1111	1.7	27.1	15744	0.2198	6.0	1627
	NGM MOS	0.1097	0.5	27.9		0.2079	1.1	2318
36-48 (3rd period)	LOCAL	0.1108		23.0				
	LFM MOS	0.1121	1.1	22.1	15735	0.2092	5.3	1535
	NGM MOS	0.1122	1.2	22.1		0.2085	2.6	2220

Table 3.3. Comparative verification of local, LFM MOS, and NGM MOS PoP forecasts for 24 stations in the Eastern Region, 0000 UTC cycle.

Forecast Projection (h)	Type of Forecast	Brier Score	Local % Imp. Over Guid.	% Imp. Over Clim.	No. of Cases	Changes GE 20% to Guidance: Guid. Brier Score	Local % Imprv.	No. of Changes
12-24	LOCAL	0.1083		41.7				
(1st period)	LFM MOS	0.1106	2.1	40.4	4057	0.2028	2.4	641
	NGM MOS	0.1104	1.8	40.6		0.1999	2.0	789
24-36	LOCAL	0.1113		37.5				
(2nd period)	LFM MOS	0.1132	1.6	36.5	4053	0.2102	7.5	461
	NGM MOS	0.1089	-2.3	38.9		0.1766	-9.5	685
36-48	LOCAL	0.1290		29.3				
(3rd period)	LFM MOS	0.1304	1.1	28.5	4053	0.2014	6.0	511
	NGM MOS	0.1288	-0.2	29.4		0.1880	-3.8	742

Table 3.4. Same as Table 3.3 except for the 1200 UTC cycle.

Forecast Projection (h)	Type of Forecast	Brier Score	Local % Imp. Over Guid.	% Imp. Over Clim.	No. of Cases	Changes GE 20% to Guidance: Guid. Brier Score	Local % Imprv.	No. of Changes
12-24	LOCAL	0.0973		44.7				
(1st period)	LFM MOS	0.1007	3.4	42.8	4100	0.2037	7.0	593
	NGM MOS	0.0996	2.4	43.4		0.1843	3.3	726
24-36	LOCAL	0.1162		36.5				
(2nd period)	LFM MOS	0.1192	2.6	34.9	4100	0.2192	8.1	572
	NGM MOS	0.1175	1.1	35.8		0.1987	1.0	710
36-48	LOCAL	0.1205		31.2				
(3rd period)	LFM MOS	0.1223	1.5	30.1	4095	0.2125	4.0	514
	NGM MOS	0.1239	2.7	29.2		0.2102	4.0	742

Table 3.5. Comparative verification of local, LFM MOS, and NGM MOS PoP forecasts for 24 stations in the Southern Region, 0000 UTC cycle.

Forecast Projection (h)	Type of Forecast	Brier Score	Local % Imp. Over Guid.	% Imp. Over Clim.	No. of Cases	Changes GE 20% to Guidance: Guid. Brier Score	Changes GE 20% to Guidance: Local % Imprv.	Changes GE 20% to Guidance: No. of Changes
12-24 (1st period)	LOCAL	0.1079		29.8				
	LFM MOS	0.1114	3.1	27.5	3959	0.2092	10.2	474
	NGM MOS	0.1112	3.0	27.7		0.2049	5.0	666
24-36 (2nd period)	LOCAL	0.0929		22.0				
	LFM MOS	0.0965	3.8	18.9	3962	0.2286	19.7	384
	NGM MOS	0.0962	3.4	19.2		0.2148	10.0	528
36-48 (3rd period)	LOCAL	0.1249		17.3				
	LFM MOS	0.1246	-0.3	17.6	3960	0.1947	-0.2	466
	NGM MOS	0.1249	0.0	17.4		0.1935	-2.4	576

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	0.0914		23.8				
	LFM MOS	0.0923	0.9	23.1	3970	0.1916	-0.3	504
	NGM MOS	0.0915	0.1	23.8		0.2114	2.3	603
24-36 (2nd period)	LOCAL	0.1160		23.1				
	LFM MOS	0.1171	0.9	22.3	3967	0.2055	1.7	422
	NGM MOS	0.1197	3.1	20.6		0.2137	8.8	608
36-48 (3rd period)	LOCAL	0.0975		16.9				
	LFM MOS	0.0981	0.6	16.4	3968	0.1875	6.4	358
	NGM MOS	0.0980	0.5	16.5		0.1863	4.2	439

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	LOCAL	0.1071		34.7				
(1st period)	LFM MOS	0.1115	3.9	32.1	4717	0.2303	9.4	624
	NGM MOS	0.1074	0.2	34.6		0.2015	1.8	813
24-36	LOCAL	0.1165		28.8				
(2nd period)	LFM MOS	0.1207	3.4	26.3	4717	0.2150	6.4	593
	NGM MOS	0.1155	-0.9	29.5		0.2024	-2.6	772
36-48	LOCAL	0.1292		19.9				
(3rd period)	LFM MOS	0.1304	0.9	19.1	4715	0.2227	3.6	557
	NGM MOS	0.1271	-1.6	21.2		0.2026	-6.3	731

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	LOCAL	0.1100		33.9				
(1st period)	LFM MOS	0.1132	2.8	32.0	4731	0.2157	4.7	707
	NGM MOS	0.1064	-3.4	36.1		0.1889	-8.6	869
24-36	LOCAL	0.1209		25.9				
(2nd period)	LFM MOS	0.1226	1.3	25.0	4729	0.2276	4.6	463
	NGM MOS	0.1178	-2.7	27.9		0.2091	-8.7	715
36-48	LOCAL	0.1314		19.8				
(3rd period)	LFM MOS	0.1322	0.6	19.3	4727	0.2097	3.8	507
	NGM MOS	0.1307	-0.6	20.3		0.2153	-1.1	736

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 (1st period)	LOCAL	0.0632		32.4				
	LFM MOS	0.0677	6.7	27.5	2913	0.2665	23.7	179
	NGM MOS	0.0673	6.1	28.0		0.2318	16.8	283
24-36 (2nd period)	LOCAL	0.0782		23.6				
	LFM MOS	0.0802	2.5	21.6	2911	0.2468	10.2	200
	NGM MOS	0.0819	4.5	20.0		0.2349	9.6	288
36-48 (3rd period)	LOCAL	0.0764		20.3				
	LFM MOS	0.0789	3.1	17.7	2912	0.2436	15.2	140
	NGM MOS	0.0798	4.1	16.8		0.2119	10.0	254

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 (1st period)	LOCAL	0.0711		29.6				
	LFM MOS	0.0726	2.1	28.1	2947	0.2298	6.6	229
	NGM MOS	0.0750	5.2	25.7		0.2200	5.5	327
24-36 (2nd period)	LOCAL	0.0713		24.2				
	LFM MOS	0.0732	2.6	22.1	2948	0.2358	12.3	170
	NGM MOS	0.0727	1.9	22.7		0.2156	8.4	285
36-48 (3rd period)	LOCAL	0.0819		21.4				
	LFM MOS	0.0842	2.7	19.2	2945	0.2461	11.3	156
	NGM MOS	0.0853	4.0	18.1		0.2202	6.2	303

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	LOCAL	0.1383		*				
(1st period)	LFM MOS	0.1582	12.6	*	745	0.2340	21.2	236
18-30	LOCAL	0.1601		*				
(2nd period)	LFM MOS	0.1712	6.5	*	733	0.2429	12.6	210
30-42	LOCAL	0.1594		*				
(3rd period)	LFM MOS	0.1619	1.6	*	742	0.2250	4.3	215

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	LOCAL	0.1466		*				
(1st period)	LFM MOS	0.1667	12.1	*	718	0.2584	22.3	221
18-30	LOCAL	0.1476		*				
(2nd period)	LFM MOS	0.1655	10.9	*	725	0.2290	20.3	251
30-42	LOCAL	0.1655		*				
(3rd period)	LFM MOS	0.1747	5.2	*	719	0.2405	10.0	224

* 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 94 stations in the conterminous U.S., 0000 UTC cycle.

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Percent Correct	Skill Score
12	LOCAL	0.73	1.40	1.60	0.82	58.9	0.446
	LFM MOS	0.78	1.72	1.23	0.72	50.7	0.334
	NGM MOS	0.79	1.68	1.33	0.69	51.5	0.345
	No. Obs.	5959	3028	2031	4729		
18	LOCAL	0.59	1.33	1.62	0.59	48.8	0.316
	LFM MOS	0.74	1.43	1.16	0.64	52.1	0.353
	NGM MOS	0.67	1.49	1.27	0.57	51.3	0.343
	No. Obs.	4278	4711	2953	3967		
24	LOCAL	0.61	1.35	1.74	0.58	43.6	0.253
	LFM MOS	0.74	1.46	1.29	0.60	47.5	0.296
	NGM MOS	0.63	1.54	1.42	0.57	46.7	0.288
	No. Obs.	4701	4335	2698	4020		

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	0.76	1.20	1.52	0.70	53.9	0.386
	LFM MOS	0.87	1.44	1.13	0.58	49.9	0.324
	NGM MOS	0.72	1.50	1.31	0.57	49.0	0.315
	No. Obs.	4709	4407	2737	4010		
18	LOCAL	0.64	1.87	2.08	0.66	47.3	0.289
	LFM MOS	0.97	1.63	1.01	0.67	54.3	0.335
	NGM MOS	0.85	1.88	1.18	0.66	52.5	0.326
	No. Obs.	7478	2508	1758	4122		
24	LOCAL	0.70	1.60	1.74	0.67	45.7	0.278
	LFM MOS	0.87	1.68	1.12	0.67	50.1	0.321
	NGM MOS	0.74	1.86	1.28	0.65	48.2	0.305
	No. Obs.	6008	3074	2082	4688		

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	0.62	1.61	1.80	0.79	52.7	0.364
	LFM MOS	0.77	1.79	1.25	0.77	50.6	0.329
	NGM MOS	0.76	1.79	1.43	0.73	50.8	0.336
	No. Obs.	1263	659	521	1607		
18	LOCAL	0.50	1.22	1.61	0.65	48.4	0.298
	LFM MOS	0.57	1.34	1.25	0.74	51.7	0.338
	NGM MOS	0.44	1.43	1.33	0.67	51.2	0.331
	No. Obs.	650	1207	869	1327		
24	LOCAL	0.57	1.36	2.05	0.67	43.5	0.258
	LFM MOS	0.70	1.57	1.43	0.70	47.2	0.296
	NGM MOS	0.52	1.76	1.59	0.66	45.9	0.286
	No. Obs.	1124	893	597	1438		

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	1.33	1.78	0.75	50.8	0.348
	LFM MOS	0.81	1.61	1.23	0.66	48.7	0.315
	NGM MOS	0.68	1.73	1.37	0.63	47.5	0.304
	No. Obs.	1140	913	625	1422		
18	LOCAL	0.59	1.87	2.40	0.73	47.2	0.295
	LFM MOS	0.94	1.73	1.25	0.73	54.2	0.356
	NGM MOS	0.85	1.75	1.51	0.75	54.0	0.361
	No. Obs.	1603	550	419	1527		
24	LOCAL	0.61	1.57	1.96	0.74	46.6	0.288
	LFM MOS	0.78	1.79	1.33	0.73	48.8	0.308
	NGM MOS	0.65	1.90	1.47	0.73	48.7	0.312
	No. Obs.	1259	689	538	1610		

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 24 stations in the Southern Region, 0000 UTC cycle.

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Percent Correct	Skill Score
12	LOCAL	0.66	1.46	1.51	0.76	54.5	0.393
	LFM MOS	0.71	1.83	1.00	0.65	47.6	0.291
	NGM MOS	0.77	1.67	1.17	0.61	49.1	0.310
	No. Obs.	1512	904	612	916		
18	LOCAL	0.52	1.28	1.39	0.47	48.4	0.268
	LFM MOS	0.74	1.39	0.97	0.55	52.8	0.327
	NGM MOS	0.77	1.42	0.99	0.42	53.0	0.327
	No. Obs.	864	1542	944	748		
24	LOCAL	0.48	1.48	1.47	0.45	40.5	0.186
	LFM MOS	0.66	1.55	1.05	0.54	45.9	0.255
	NGM MOS	0.61	1.60	1.20	0.38	45.4	0.248
	No. Obs.	1044	1267	818	822		

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	0.67	1.31	1.36	0.57	52.1	0.348
	LFM MOS	0.86	1.55	0.83	0.50	49.1	0.297
	NGM MOS	0.66	1.54	1.10	0.49	47.7	0.280
	No. Obs.	1031	1272	826	832		
18	LOCAL	0.54	2.21	1.89	0.54	41.7	0.214
	LFM MOS	1.00	1.66	0.64	0.63	53.5	0.288
	NGM MOS	0.85	2.10	0.86	0.49	50.8	0.279
	No. Obs.	2040	687	498	736		
24	LOCAL	0.60	1.77	1.55	0.51	41.2	0.218
	LFM MOS	0.83	1.75	0.82	0.65	47.5	0.280
	NGM MOS	0.69	1.94	1.03	0.55	43.8	0.242
	No. Obs.	1520	913	622	898		

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	0.75	1.32	1.65	0.85	59.6	0.454
	LFM MOS	0.73	1.69	1.49	0.70	49.4	0.320
	NGM MOS	0.71	1.77	1.55	0.65	49.8	0.329
	No. Obs.	1714	929	546	1498		
18	LOCAL	0.47	1.45	1.79	0.6	45.7	0.281
	LFM MOS	0.66	1.53	1.29	0.63	49.0	0.317
	NGM MOS	0.63	1.54	1.43	0.56	48.9	0.318
	No. Obs.	1292	1301	793	1309		
24	LOCAL	0.50	1.34	1.8	0.64	43.0	0.245
	LFM MOS	0.70	1.43	1.38	0.60	46.9	0.289
	NGM MOS	0.60	1.46	1.48	0.60	47.0	0.292
	No. Obs.	1335	1329	815	1214		

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	0.73	1.14	1.56	0.77	54.5	0.393
	LFM MOS	0.87	1.39	1.20	0.58	49.6	0.321
	NGM MOS	0.71	1.43	1.37	0.59	50.0	0.329
	No. Obs.	1324	1353	815	1220		
18	LOCAL	0.62	1.87	2.39	0.66	47.8	0.297
	LFM MOS	0.93	1.70	1.20	0.65	54.1	0.333
	NGM MOS	0.83	1.87	1.44	0.64	52.1	0.320
	No. Obs.	2252	733	456	1273		
24	LOCAL	0.73	1.55	1.92	0.62	44.6	0.263
	LFM MOS	0.84	1.68	1.32	0.63	48.6	0.304
	NGM MOS	0.74	1.80	1.55	0.59	46.8	0.289
	No. Obs.	1750	935	561	1463		

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	0.88	1.20	1.38	0.91	71.5	0.589
	LFM MOS	0.91	1.52	1.19	0.69	56.9	0.376
	NGM MOS	0.91	1.43	1.12	0.80	57.9	0.390
	No. Obs.	1470	536	352	708		
18	LOCAL	0.76	1.44	1.86	0.58	54.9	0.366
	LFM MOS	0.89	1.53	1.18	0.57	56.4	0.366
	NGM MOS	0.76	1.66	1.47	0.58	53.0	0.335
	No. Obs.	1472	661	347	583		
24	LOCAL	0.87	1.16	1.73	0.42	48.9	0.294
	LFM MOS	0.90	1.28	1.39	0.45	51.0	0.316
	NGM MOS	0.78	1.35	1.48	0.52	48.8	0.294
	No. Obs.	1198	846	468	546		

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

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Percent Correct	Skill Score
12	LOCAL	1.02	0.99	1.39	0.63	59.7	0.435
	LFM MOS	0.93	1.19	1.42	0.48	53.0	0.343
	NGM MOS	0.83	1.28	1.47	0.52	50.9	0.320
	No. Obs.	1214	869	471	536		
18	LOCAL	0.84	1.43	1.62	0.63	54.0	0.332
	LFM MOS	1.01	1.41	1.01	0.60	55.9	0.328
	NGM MOS	0.88	1.77	0.94	0.67	53.2	0.309
	No. Obs.	1583	538	385	586		
24	LOCAL	0.83	1.41	1.48	0.79	52.2	0.321
	LFM MOS	1.01	1.42	1.00	0.67	57.7	0.375
	NGM MOS	0.85	1.80	1.01	0.72	55.2	0.360
	No. Obs.	1479	537	361	717		

Table 4.11. Comparative verification of local and LFM MOS forecasts of four categories of cloud amount (clear, scattered, broken, and overcast) for 7 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	0.82	1.18	1.74	0.88	63.4	0.437
	LFM MOS	0.86	1.20	1.28	0.96	60.7	0.376
	No. Obs.	210	123	109	568		
18	LOCAL	0.65	1.30	1.37	0.93	54.6	0.329
	LFM MOS	0.86	0.98	1.02	1.05	56.2	0.330
	No. Obs.	195	132	172	508		
24	LOCAL	0.65	1.17	1.39	0.90	51.3	0.301
	LFM MOS	0.92	0.93	0.97	1.07	53.1	0.306
	No. Obs.	165	168	204	473		

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

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Percent Correct	Skill Score
12	LOCAL	1.03	0.95	1.08	0.97	59.4	0.411
	LFM MOS	0.97	1.01	0.99	1.01	57.4	0.377
	No. Obs.	156	167	200	460		
18	LOCAL	0.68	0.90	1.53	1.00	55.1	0.339
	LFM MOS	0.88	1.15	1.11	0.96	54.5	0.334
	No. Obs.	193	167	146	473		
24	LOCAL	0.57	1.14	1.95	0.94	54.0	0.289
	LFM MOS	0.84	1.19	1.22	0.97	58.4	0.342
	No. Obs.	203	133	108	548		

Table 5.1. Comparative verification of LFM and NGM MOS surface wind guidance for 94 stations in the conterminous U.S., 0000 UTC cycle.

		Direction			Speed											
								Contingency Table								
											Bias by Category					
Fcst Proj (h)	Type of Fcst.	Mean Abs. Error (deg)	Skill Score	No. of Cases	Mean Abs. Error (kt)	Mean Alg. Error (kt)	No. of Cases	Skill Score	Percent Fcst. Correct	Threat Score (>27 kt)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
12	LFM	21	0.554	1875	3.2	1.2	1888	0.356	92.5	0.00	1.01	0.87	0.63	1.05	0.17	0.00
	NGM	20	0.571		3.4	1.8		0.377	91.8	0.00	0.99	1.09	1.08	1.05	0.67	0.00
											14351	870	137	19	6	1
18	LFM	25	0.462	4552	3.1	0.3	4563	0.373	80.4	0.04	1.07	0.79	0.62	0.65	0.24	0.00
	NGM	24	0.479		3.1	1.3		0.421	79.7	0.09	0.99	1.02	1.04	1.18	0.67	1.00
											12154	2511	599	97	21	1
24	LFM	28	0.461	3929	3.4	0.6	3945	0.313	80.5	0.04	1.07	0.74	0.64	0.48	0.25	0.00
	NGM	27	0.456		3.6	1.7		0.354	79.1	0.05	1.00	0.98	1.07	1.33	0.75	2.00
											12368	2250	556	90	20	2

Table 5.2. Same as Table 5.1 except for 93 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	25	0.489	3960	3.2	0.5	3978	0.347	81.6	0.00	1.06	0.76	0.65	0.45	0.15	0.00
	NGM	25	0.490		3.4	1.5		0.374	80.2	0.03	1.00	0.94	1.11	1.30	0.45	0.67
											12455	2252	534	82	20	3
18	LFM	24	0.517	1763	3.5	1.3	1773	0.297	91.7	0.00	1.02	0.81	0.53	0.21	0.00	*
	NGM	23	0.508		3.8	2.2		0.321	90.1	0.00	0.99	1.22	1.07	0.76	0.50	*
											14454	908	169	34	4	0
24	LFM	23	0.543	1506	3.4	1.2	1515	0.267	92.4	0.00	1.02	0.69	0.53	0.90	0.17	0.00
	NGM	23	0.538		3.6	2.0		0.314	91.1	0.09	0.99	1.14	1.07	0.90	0.83	0.00
											14460	862	120	20	6	1

* This category was neither forecast nor observed.

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

		Direction			Speed											
								Contingency Table								
											Bias by Category					
Fcst Proj (h)	Type of Fcst.	Mean Abs. Error (deg)	Skill Score	No. of Cases	Mean Abs. Error (kt)	Mean Alg. Error (kt)	No. of Cases	Skill Score	Percent Fcst. Correct	Threat Score (>27 kt)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
12	LFM	20	0.567	530	2.8	1.1	532	0.351	92.2	*	1.01	0.80	0.70	4.00	*	*
	NGM	18	0.573		3.0	1.8		0.386	91.6	*	0.99	1.04	1.43	3.00	*	*
											3673	254	23	1	0	0
18	LFM	25	0.415	1299	2.8	0.5	1302	0.380	81.1	0.00	1.05	0.82	0.77	1.13	0.00	*
	NGM	23	0.438		2.9	1.2		0.407	80.3	0.25	1.00	0.98	1.16	2.13	0.67	*
											3135	657	111	8	3	0
24	LFM	25	0.451	616	3.2	1.1	618	0.260	88.5	0.00	1.02	0.77	0.85	0.43	0.00	*
	NGM	26	0.441		3.6	2.0		0.311	87.7	0.00	0.99	1.02	1.37	1.14	1.00	*
											3550	322	41	7	1	0

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	24	0.468	632	3.0	1.2	634	0.288	89.7	0.00	1.03	0.73	0.74	0.00	0.00	*
	NGM	23	0.450		3.4	1.9		0.316	88.1	0.00	0.99	1.09	1.50	0.00	0.00	*
											3598	316	34	5	1	0
18	LFM	23	0.479	344	3.3	1.9	347	0.296	94.2	*	1.01	0.90	0.58	0.50	*	*
	NGM	22	0.469		3.6	2.5		0.312	93.1	*	0.99	1.26	1.37	2.00	*	*
											3832	165	19	2	0	0
24	LFM	22	0.533	462	3.1	1.2	462	0.278	92.1	*	1.02	0.65	0.94	1.00	*	*
	NGM	21	0.532		3.1	2.1		0.349	90.9	*	0.99	1.09	2.35	1.00	*	*
											3716	257	17	2	0	0

* This category was neither forecast nor observed.

Table 5.5. Comparative verification of LFM and NGM MOS surface wind guidance for 24 stations in the Southern Region, 0000 UTC cycle.

		Direction			Speed											
								Contingency Table								
											Bias by Category					
Fcst Proj (h)	Type of Fcst.	Mean Abs. Error (deg)	Skill Score	No. of Cases	Mean Abs. Error (kt)	Mean Alg. Error (kt)	No. of Cases	Skill Score	Percent Fcst. Correct	Threat Score (>27 kt)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
12	LFM	25	0.521	353	3.7	1.7	358	0.355	94.4	0.00	1.00	1.17	0.76	0.50	0.00	0.00
	NGM	22	0.533		3.6	1.9		0.427	94.8	0.00	0.99	1.28	0.69	1.50	0.00	0.00
											3655	133	29	2	2	1
18	LFM	25	0.454	1017	3.2	1.0	1019	0.364	83.4	0.00	1.02	0.86	0.94	0.70	0.00	*
	NGM	24	0.476		3.2	1.8		0.429	83.4	0.00	0.98	1.08	1.39	1.50	0.50	*
											3333	518	100	10	2	0
24	LFM	25	0.458	853	3.5	1.3	859	0.290	83.4	0.00	1.02	0.92	0.92	0.14	0.00	0.00
	NGM	25	0.474		3.4	1.9		0.350	83.7	0.00	0.99	1.02	1.19	0.93	1.00	0.00
											3280	436	78	14	4	1

Table 5.6. Same as Table 5.5 except for 23 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	23	0.471	809	3.4	1.2	814	0.326	84.7	0.00	1.03	0.82	0.87	0.23	0.00	0.00
	NGM	23	0.494		3.3	1.9		0.387	84.6	0.00	1.00	0.99	1.13	1.46	0.75	1.00
											3267	443	76	13	4	1
18	LFM	26	0.445	441	3.9	1.9	443	0.303	91.9	0.00	0.99	1.21	0.77	0.30	0.00	*
	NGM	27	0.433		4.0	2.3		0.350	91.9	0.00	0.98	1.33	1.23	0.30	0.00	*
											3633	178	35	10	3	0
24	LFM	27	0.465	297	3.8	1.7	299	0.297	94.3	0.00	1.00	1.18	0.48	0.33	0.00	0.00
	NGM	28	0.470		3.9	1.9		0.345	94.1	0.00	0.99	1.47	0.60	0.33	0.00	0.00
											3662	126	25	3	2	1

* This category was neither forecast nor observed.

Table 5.7. Comparative verification of LFM and NGM MOS surface wind guidance for 28 stations in the Central Region, 0000 UTC cycle.

		Direction			Speed											
								Contingency Table								
											Bias by Category					
Fcst Proj (h)	Type of Fcst.	Mean Abs. Error (deg)	Skill Score	No. of Cases	Mean Abs. Error (kt)	Mean Alg. Error (kt)	No. of Cases	Skill Score	Percent Fcst. Correct	Threat Score (>27 kt)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
12	LFM	19	0.565	729	3.1	0.8	733	0.356	90.0	0.00	1.03	0.73	0.57	0.93	0.25	*
	NGM	19	0.586		3.3	1.5		0.370	88.5	0.00	1.00	1.06	1.03	0.60	0.50	*
											4143	363	65	15	4	0
18	LFM	22	0.506	1748	3.0	-0.5	1753	0.349	72.7	0.06	1.15	0.73	0.50	0.60	0.36	*
	NGM	21	0.537		3.1	1.0		0.404	71.8	0.10	1.00	1.01	0.97	1.11	0.57	*
											3100	1051	304	62	14	0
24	LFM	28	0.464	1412	3.5	-0.2	1419	0.269	74.9	0.10	1.16	0.60	0.41	0.41	0.67	0.00
	NGM	27	0.456		3.7	1.6		0.350	72.8	0.08	0.99	1.03	1.05	1.07	0.50	3.00
											3357	893	247	41	6	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	24	0.511	1450	3.1	.0	1457	0.331	76.7	0.00	1.13	0.66	0.57	0.41	0.17	0.00
	NGM	25	0.485		3.5	1.3		0.363	74.4	0.00	1.01	0.95	1.09	0.92	0.67	0.00
											3392	891	227	37	6	1
18	LFM	23	0.534	621	3.4	0.8	624	0.277	89.3	0.00	1.05	0.61	0.47	0.21	0.00	*
	NGM	22	0.525		3.8	2.2		0.330	87.0	0.00	0.99	1.14	0.98	1.07	2.00	*
											4164	369	81	14	1	0
24	LFM	21	0.570	547	3.4	0.8	551	0.265	89.7	0.00	1.04	0.58	0.47	0.93	0.25	*
	NGM	21	0.569		3.6	1.7		0.287	87.5	0.14	1.00	1.05	0.98	0.53	1.00	*
											4172	357	58	15	4	0

* This category was neither forecast nor observed.

Table 5.9. Comparative verification of LFM and NGM MOS surface wind guidance for 18 stations in the Western Region, 0000 UTC cycle.

Fcst Proj (h)	Type of Fcst.	Direction			Speed											
								Contingency Table								
											Bias by Category					
		Mean Abs. Error (deg)	Skill Score	No. of Cases	Mean Abs. Error (kt)	Mean Alg. Error (kt)	No. of Cases	Skill Score	Percent Fcst. Correct	Threat Score (>27 kt)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
12	LFM	24	0.414	263	3.7	2.2	265	0.352	94.1	*	1.00	1.12	0.55	1.00	*	*
	NGM	23	0.474		4.1	2.7		0.297	93.3	0.00	0.99	1.03	1.40	5.00	**	*
											2880	120	20	1	0	0
18	LFM	32	0.330	488	3.6	0.6	489	0.378	87.2	0.00	1.04	0.84	0.46	0.59	0.00	0.00
	NGM	34	0.280		3.9	1.5		0.382	85.9	0.00	1.01	1.02	0.75	0.76	1.50	0.00
											2586	285	84	17	2	1
24	LFM	31	0.343	1048	3.2	0.6	1049	0.370	74.9	0.00	1.08	0.82	0.77	0.75	0.11	*
	NGM	31	0.344		3.6	1.4		0.320	71.4	0.06	1.03	0.85	0.98	1.96	0.78	**
											2181	599	190	28	9	0

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

Fcst Proj (h)	Type of Fcst.	Direction			Speed											
								Contingency Table								
											Bias by Category					
		Mean Abs. Error (deg)	Skill Score	No. of Cases	Mean Abs. Error (kt)	Mean Alg. Error (kt)	No. of Cases	Skill Score	Percent Fcst. Correct	Threat Score (>27 kt)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
12	LFM	28	0.365	1069	3.2	0.3	1073	0.357	74.4	0.00	1.07	0.88	0.63	0.70	0.22	0.00
	NGM	28	0.415		3.4	1.2		0.355	72.9	0.08	1.04	0.82	1.06	2.00	0.22	1.00
											2198	602	197	27	9	1
18	LFM	24	0.474	357	3.2	0.9	359	0.322	91.6	*	1.03	0.78	0.38	0.00	*	*
	NGM	23	0.466		3.9	1.9		0.268	88.5	*	0.99	1.23	0.97	0.50	*	*
											2825	196	34	8	0	0
24	LFM	28	0.473	200	3.6	1.8	203	0.198	94.4	*	1.02	0.57	0.45	**	*	*
	NGM	27	0.461		4.3	3.1		0.260	92.9	0.00	0.99	1.14	0.80	**	**	*
											2910	122	20	0	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 7 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	32	0.408	164	4.3	2.4	170	0.357	91.7	0.00	1.01 921	0.93 55	1.50 8	0.40 5	0.00 2	* 0
18	LFM	39	0.298	210	4.2	1.7	213	0.334	88.1	0.00	1.00 898	1.01 73	1.06 18	0.40 5	0.00 1	0.00 2
24	LFM	45	0.271	393	4.1	2.2	393	0.221	77.0	0.00	0.99 813	1.14 125	0.93 30	0.00 9	1.00 1	0.00 1

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	0.351	326	3.7	1.7	326	0.264	79.1	0.00	1.02 789	0.98 123	0.67 30	0.63 8	3.00 1	1.00 1
18	LFM	35	0.415	175	4.3	2.4	179	0.224	87.1	*	1.04 875	0.63 88	0.93 14	1.50 2	* 0	* 0
24	LFM	39	0.309	166	4.9	2.8	170	0.275	90.4	0.00	1.00 904	1.00 52	2.29 7	0.20 5	0.50 2	* 0

* This category was neither forecast nor observed.

Table 5.13. Verification of local surface wind forecasts for 91 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	0.487	4084	3.5	2.5	4162	0.378	92.4	0.17	0.99 15090	1.22 808	1.00 116	0.54 26	0.00 4	0.50 2
9	LOCAL	35	0.368	8903	3.3	1.5	8970	0.359	78.6	0.06	1.00 12797	1.14 2529	0.56 593	0.27 109	0.25 12	0.00 3
15	LOCAL	37	0.362	9764	3.4	1.7	9844	0.323	75.3	0.04	0.99 12500	1.15 2735	0.70 688	0.36 102	0.13 24	0.00 2

Table 5.14. Same as Table 5.13 except for 92 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	0.412	10296	3.0	1.2	10350	0.396	76.2	0.10	1.01 12161	1.08 3115	0.68 805	0.39 143	0.60 20	1.00 1
9	LOCAL	38	0.344	6309	4.3	3.3	6475	0.243	84.7	0.07	0.96 14611	1.50 1232	1.01 222	0.53 36	0.23 13	* 0
15	LOCAL	39	0.338	4490	4.4	3.4	4671	0.256	90.0	0.00	0.98 15144	1.54 799	0.72 144	0.37 27	0.00 3	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 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	24	0.465	1144	3.3	2.5	1160	0.333	92.4	0.00	0.98 4014	1.36 196	0.82 22	1.00 2	0.00 1	* 0
9	LOCAL	34	0.352	2523	3.0	1.4	2533	0.330	79.1	0.00	1.02 3403	1.01 691	0.47 118	0.38 13	* 0	0.00 1
15	LOCAL	38	0.318	2361	3.6	2.4	2383	0.263	80.0	0.00	0.97 3612	1.22 545	0.72 69	1.50 4	0.00 1	* 0

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	29	0.419	2594	2.7	1.0	2601	0.369	79.0	0.00	1.03 3336	0.94 781	0.55 125	0.42 12	0.00 3	* 0
9	LOCAL	39	0.315	1523	4.3	3.5	1576	0.243	88.5	*	0.96 3996	1.61 241	1.14 29	0.50 2	* 0	* 0
15	LOCAL	39	0.285	1218	4.4	3.8	1284	0.218	90.9	*	0.96 4084	2.14 152	0.57 28	0.33 3	* 0	* 0

* This category was neither forecast nor observed.

Table 5.17. Verification of local surface wind forecasts for 21 stations in the Southern Region for the FT issuance time of approximately 0900 UTC. 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
3	LOCAL	26	0.497	670	3.9	3.0	691	0.405	95.0	0.50	0.99 3607	1.40 113	1.00 22	1.00 5	0.00 1	1.00 1
9	LOCAL	34	0.381	1898	3.3	2.1	1923	0.374	84.5	0.00	0.99 3231	1.18 430	0.49 76	0.13 8	0.00 1	* 0
15	LOCAL	35	0.346	2046	3.3	2.1	2075	0.342	82.0	0.00	0.99 3176	1.20 479	0.57 82	0.00 12	0.00 4	* 0

Table 5.18. Same as Table 5.17 except for 22 stations for the FT issuance time of approximately 1800 UTC.

		Direction			Speed											
								Contingency Table								
											Bias by Category					
Fcst Proj (h)	Type of Fcst.	Mean Abs. Error (deg)	Skill Score	No. of Cases	Mean Abs. Error (kt)	Mean Alg. Error (kt)	No. of Cases	Skill Score	Percent Fcst. Correct	Threat Score (>27 kt)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
3	LOCAL	32	0.386	2266	3.2	1.8	2292	0.392	81.3	0.00	0.99 3199	1.15 580	0.61 102	0.45 11	0.00 2	* 0
9	LOCAL	35	0.333	1118	4.5	3.7	1164	0.240	89.6	0.00	0.96 3538	1.86 169	0.66 29	0.38 8	0.00 3	* 0
15	LOCAL	36	0.367	779	4.6	3.5	816	0.319	92.7	0.00	0.98 3576	1.63 137	0.79 24	0.20 10	0.00 3	0.00 1

* This category was neither forecast nor 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	0.500	1710	3.4	2.2	1737	0.405	89.1	0.00	0.98 4404	1.23 372	1.12 57	0.28 18	0.00 2	0.00 1
9	LOCAL	33	0.389	3140	3.3	1.1	3155	0.352	70.7	0.09	0.98 3429	1.22 1062	0.64 287	0.26 70	0.38 8	0.00 1
15	LOCAL	36	0.366	3399	3.4	1.3	3418	0.305	67.4	0.00	0.96 3382	1.26 1087	0.67 326	0.35 54	0.20 10	0.00 1

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	28	0.435	3530	2.9	0.8	3538	0.380	68.8	0.11	0.97 3193	1.25 1187	0.64 381	0.35 89	0.67 12	* 0
9	LOCAL	37	0.351	2355	4.3	3.1	2396	0.257	79.1	0.00	0.92 4243	1.71 496	0.89 106	0.67 15	0.17 6	* 0
15	LOCAL	38	0.361	1801	4.2	3.1	1853	0.253	85.2	*	0.96 4420	1.54 365	0.73 67	0.46 13	* 0	* 0

* 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 issuance time of approximately 0900 UTC.

		Direction			Speed											
								Contingency Table								
											Bias by Category					
Fcst Proj (h)	Type of Fcst.	Mean Abs. Error (deg)	Skill Score	No. of Cases	Mean Abs. Error (kt)	Mean Alg. Error (kt)	No. of Cases	Skill Score	Percent Fcst. Correct	Threat Score (>27 kt)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
3	LOCAL	29	0.422	560	3.7	2.5	574	0.295	94.4	*	1.01 3065	0.85 127	0.80 15	2.00 1	* 0	* 0
9	LOCAL	43	0.265	1342	3.8	1.9	1359	0.313	82.7	0.00	1.02 2734	1.08 346	0.51 112	0.28 18	0.00 3	0.00 1
15	LOCAL	37	0.334	1958	3.2	1.2	1968	0.333	73.4	0.10	1.07 2330	0.86 624	0.79 211	0.38 32	0.11 9	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	34	0.329	1906	3.1	1.3	1919	0.403	77.7	0.13	1.05 2433	0.84 567	0.88 197	0.48 31	1.33 3	1.00 1
9	LOCAL	41	0.302	1313	4.1	2.8	1339	0.184	82.3	0.20	1.01 2834	0.90 326	1.36 58	0.45 11	0.50 4	* 0
15	LOCAL	47	0.267	692	4.4	3.5	718	0.211	92.6	*	1.01 3064	0.86 145	0.76 25	1.00 1	* 0	* 0

* This category was neither forecast nor observed.

Table 5.23. Verification of local surface wind forecasts for 7 stations in the Alaska Region for the FT issuance time of approximately 0900 UTC.

		Direction			Speed											
								Contingency Table								
											Bias by Category					
Fcst Proj (h)	Type of Fcst.	Mean Abs. Error (deg)	Skill Score	No. of Cases	Mean Abs. Error (kt)	Mean Alg. Error (kt)	No. of Cases	Skill Score	Percent Fcst. Correct	Threat Score (>27 kt)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
3	LOCAL	24	0.505	274	3.8	2.8	287	0.469	92.1	0.00	0.96 942	1.23 56	1.89 9	1.00 4	0.00 2	* 0
9	LOCAL	44	0.293	297	4.0	2.2	305	0.352	88.6	0.00	1.00 909	0.97 73	1.12 17	0.80 5	0.00 1	0.00 2
15	LOCAL	52	0.264	344	3.8	1.3	346	0.237	80.8	0.00	1.08 833	0.60 132	0.81 31	0.44 9	0.00 1	1.00 1

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

		Direction			Speed											
								Contingency Table								
											Bias by Category					
Fcst Proj (h)	Type of Fcst.	Mean Abs. Error (deg)	Skill Score	No. of Cases	Mean Abs. Error (kt)	Mean Alg. Error (kt)	No. of Cases	Skill Score	Percent Fcst. Correct	Threat Score (>27 kt)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
3	LOCAL	39	0.336	434	3.3	1.6	438	0.343	82.3	0.00	1.04 808	0.82 126	0.58 31	1.11 9	0.00 1	1.00 1
9	LOCAL	55	0.219	401	5.1	4.1	430	0.306	85.1	0.00	0.97 867	1.09 89	1.50 14	4.00 2	* 0	** 0
15	LOCAL	60	0.166	350	6.1	5.2	399	0.255	87.2	0.00	0.95 915	1.68 53	2.57 7	1.60 5	0.00 2	* 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 surface wind speed forecasts for 92 stations in the contermi-nous U.S., 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	3.49	0.161	97.5	0.09
	LFM MOS	1.00	0.55	0.192	99.2	0.11
	NGM MOS	1.00	1.25	0.249	98.9	0.15
	No. Obs.	15406	105			
± 3-h Max	LOCAL	1.00	0.97	0.218	96.3	0.13
	LFM MOS	1.02	0.15	0.123	97.6	0.07
	NGM MOS	1.02	0.35	0.210	97.4	0.12
	No. Obs.	15465	394			

Table 5.26. Same as Table 5.25 except for 91 stations for the 1200 UTC cycle. Data for TCC were not available.

Type of Verifying Observation	Type of Forecast	Bias by Category ≤ 22 kt	Bias by Category > 22 kt	Skill Score	Percent Forecast Correct	Threat Score >22 kt
1-min Avg	LOCAL	0.99	5.16	0.035	98.1	0.02
	LFM MOS	1.00	0.06	0.077	99.7	0.04
	NGM MOS	1.00	0.69	0.094	99.5	0.05
	No. Obs.	15439	49			
± 3-h Max	LOCAL	1.01	0.75	0.050	96.5	0.04
	LFM MOS	1.02	0.01	0.011	97.8	0.01
	NGM MOS	1.02	0.10	0.045	97.7	0.02
	No. Obs.	15144	337			

Table 5.27. Comparative verification of local and LFM MOS 42-h surface wind speed forecasts for 7 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	1.00	1.50	-0.010	98.0	0.00
	LFM MOS	1.01	0.00	0.000	99.2	0.00
	No. Obs.	995	8			
± 3-h Max	LOCAL	1.01	0.57	0.108	97.1	0.06
	LFM MOS	1.02	0.00	0.000	97.9	0.00
	No. Obs.	980	21			

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	8.00	-0.004	98.1	0.00
	LFM MOS	1.00	0.00	0.000	99.8	0.00
	No. Obs.	965	2			
± 3-h Max	LOCAL	1.00	1.33	0.058	97.3	0.04
	LFM MOS	1.01	0.00	0.000	98.8	0.00
	No. Obs.	952	12			

Table 6.1. Comparative verification of LFM MOS and persistence ceiling height forecasts for 91 stations in the conterminous U.S., 0000 UTC cycle.

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Log Score	Percent Correct	Skill Score
12	MOS	0.97	0.89	0.93	1.01	2.362	81.8	0.342
	PERSISTENCE	0.72	0.77	0.92	1.03	1.481	87.7	0.536
	No. Obs.	503	636	1308	12752			
18	MOS	1.33	0.70	1.11	0.99	1.163	86.1	0.355
	PERSISTENCE	5.36	1.64	0.83	0.98	1.825	83.3	0.263
	No. Obs.	67	289	1412	13266			
24	MOS	1.20	0.85	0.90	1.01	0.868	91.4	0.298
	PERSISTENCE	3.80	2.49	1.65	0.93	1.866	84.2	0.164
	No. Obs.	94	193	709	13896			

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

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Log Score	Percent Correct	Skill Score
12	MOS	1.55	0.64	0.97	1.00	0.849	91.7	0.338
	PERSISTENCE	0.65	1.10	1.29	0.99	0.613	93.0	0.496
	No. Obs.	93	204	723	14125			
18	MOS	1.48	0.79	0.91	1.00	1.571	87.6	0.315
	PERSISTENCE	0.24	0.67	0.98	1.02	1.217	88.4	0.297
	No. Obs.	246	338	950	14015			
24	MOS	1.57	0.87	0.91	0.99	2.890	79.9	0.303
	PERSISTENCE	0.12	0.35	0.71	1.10	2.217	81.7	0.168
	No. Obs.	500	647	1315	12986			

Table 6.3. Comparative verification of LFM MOS and persistence ceiling height forecasts for 7 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	0.64	0.83	1.51	0.93	3.430	70.0	0.317
	PERSISTENCE	0.82	0.79	0.92	1.04	2.059	81.7	0.534
	No. Obs.	44	53	140	705			
18	MOS	0.72	1.01	1.72	0.87	3.467	65.5	0.281
	PERSISTENCE	1.19	0.53	0.91	1.06	2.951	75.4	0.377
	No. Obs.	32	77	139	707			
24	MOS	0.88	1.40	1.54	0.87	2.366	72.2	0.344
	PERSISTENCE	4.88	0.87	0.83	1.00	3.109	72.8	0.246
	No. Obs.	8	45	147	729			

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	1.25	1.30	1.51	0.88	2.199	74.7	0.391
	PERSISTENCE	2.63	1.14	1.13	0.95	1.587	83.4	0.565
	No. Obs.	8	44	141	715			
18	MOS	0.54	1.24	1.60	0.91	2.637	74.2	0.332
	PERSISTENCE	0.92	1.20	1.42	0.93	2.739	74.5	0.326
	No. Obs.	26	45	114	754			
24	MOS	0.98	1.41	1.73	0.84	3.967	65.5	0.263
	PERSISTENCE	0.53	1.23	1.24	0.97	3.435	71.3	0.289
	No. Obs.	43	44	131	709			

Table 6.5. Comparative verification of local and persistence ceiling height forecasts for 91 stations in the conterminous U.S. for the FT issuance time of approximately 0900 UTC.

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Log Score	Percent Correct	Skill Score
3	LOCAL	0.67	0.67	1.07	1.02	1.609	86.6	0.492
	PERSISTENCE	0.67	0.76	0.88	1.04	1.433	88.1	0.530
	No. Obs.	512	632	1358	13531			
6	LOCAL	0.32	0.45	0.90	1.06	1.737	83.7	0.384
	PERSISTENCE	0.99	0.66	0.70	1.06	1.898	83.4	0.380
	No. Obs.	342	726	1709	13238			
9	LOCAL	0.17	0.28	0.69	1.06	1.082	86.5	0.308
	PERSISTENCE	3.95	1.37	0.70	1.01	1.735	83.3	0.286
	No. Obs.	86	350	1697	13897			
15	LOCAL	0.17	0.28	1.09	1.01	0.740	91.3	0.297
	PERSISTENCE	4.40	2.14	1.45	0.94	1.747	84.9	0.172
	No. Obs.	77	224	822	14911			

Table 6.6. Same as Table 6.5 except for 92 stations for the FT issuance time of approximately 1800 UTC.

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Log Score	Percent Correct	Skill Score
3	LOCAL	0.68	0.59	1.26	0.99	0.682	91.2	0.466
	PERSISTENCE	1.39	1.41	1.61	0.95	0.835	89.5	0.468
	No. Obs.	62	253	1054	14851			
6	LOCAL	0.33	0.53	1.46	0.99	0.717	91.1	0.379
	PERSISTENCE	1.10	1.60	2.07	0.93	1.072	87.3	0.318
	No. Obs.	78	222	814	14971			
9	LOCAL	0.34	0.57	1.58	0.98	0.881	90.4	0.364
	PERSISTENCE	0.59	1.42	2.18	0.94	1.270	85.8	0.252
	No. Obs.	145	250	774	14916			
15	LOCAL	0.38	0.69	1.45	0.99	1.654	84.6	0.335
	PERSISTENCE	0.26	0.74	1.44	0.99	1.855	81.8	0.212
	No. Obs.	327	476	1175	14105			

Table 6.7. Comparative verification of local ceiling height forecasts for 7 stations in the Alaska Region for the FT issuance time of approximately 0900 UTC.

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Log Score	Percent Correct	Skill Score
3	LOCAL	2.06	0.57	0.99	0.96	4.116	74.1	0.398
	PERSISTENCE	0.84	0.80	0.91	1.04	2.071	81.9	0.535
	No. Obs.	50	51	147	749			
6	LOCAL	2.30	0.45	1.02	0.97	4.378	70.3	0.345
	PERSISTENCE	0.93	0.63	0.83	1.07	2.644	77.6	0.442
	No. Obs.	44	65	161	728			
9	LOCAL	2.18	0.25	1.09	1.01	4.368	69.3	0.276
	PERSISTENCE	1.24	0.54	0.88	1.06	2.955	75.3	0.378
	No. Obs.	34	76	150	730			
15	LOCAL	8.63	0.27	1.04	0.96	3.836	70.2	0.223
	PERSISTENCE	5.13	0.78	0.85	1.00	3.029	73.3	0.257
	No. Obs.	8	49	156	774			

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	8.67	0.74	1.10	0.90	3.899	71.3	0.304
	PERSISTENCE	2.33	1.15	1.12	0.95	1.555	83.6	0.570
	No. Obs.	9	46	145	737			
6	LOCAL	4.60	0.81	1.23	0.89	3.963	70.3	0.260
	PERSISTENCE	1.53	1.39	1.19	0.94	2.333	77.3	0.397
	No. Obs.	15	36	136	740			
9	LOCAL	2.79	0.69	1.52	0.88	4.068	69.8	0.263
	PERSISTENCE	0.96	1.20	1.36	0.93	2.759	74.2	0.318
	No. Obs.	24	45	117	746			
15	LOCAL	1.36	1.04	1.50	0.88	4.790	63.9	0.218
	PERSISTENCE	0.49	1.15	1.19	0.99	3.507	70.9	0.285
	No. Obs.	47	46	138	714			

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

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Log Score	Percent Correct	Skill Score
12	MOS	1.35	1.02	0.97	0.99	2.766	73.3	0.361
	PERSISTENCE	0.68	0.43	0.78	1.11	1.710	81.5	0.491
	No. Obs.	374	998	2555	11359			
18	MOS	1.08	0.87	1.14	0.99	1.132	85.5	0.373
	PERSISTENCE	10.08	1.56	1.26	0.94	1.790	81.6	0.305
	No. Obs.	25	272	1585	13230			
24	MOS	0.96	1.08	1.17	0.98	1.098	86.5	0.367
	PERSISTENCE	5.58	1.77	1.43	0.93	1.867	80.8	0.242
	No. Obs.	45	239	1390	13499			

Table 7.2. Same as Table 7.1 except for the 1200 UTC cycle.

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Log Score	Percent Correct	Skill Score
12	MOS	2.18	1.19	1.06	0.99	1.146	86.8	0.369
	PERSISTENCE	0.73	0.94	0.99	1.00	0.641	92.3	0.610
	No. Obs.	44	249	1402	13736			
18	MOS	2.18	1.36	0.96	0.99	1.621	83.8	0.347
	PERSISTENCE	0.24	0.77	0.85	1.03	1.173	86.9	0.395
	No. Obs.	131	306	1650	13544			
24	MOS	2.44	1.16	1.05	0.93	3.391	70.7	0.347
	PERSISTENCE	0.09	0.24	0.53	1.20	2.574	75.0	0.214
	No. Obs.	366	997	2595	11579			

Table 7.3. Comparative verification of LFM MOS and persistence visibility forecasts for 7 stations in the Alaska Region for the 0000 UTC cycle.

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Log Score	Percent Correct	Skill Score
12	MOS	0.17	0.57	0.69	1.09	2.200	80.1	0.255
	PERSISTENCE	0.52	0.88	0.82	1.05	1.646	85.3	0.504
	No. Obs.	23	49	108	779			
18	MOS	0.00	0.75	1.01	1.03	1.790	82.4	0.223
	PERSISTENCE	0.93	0.95	1.20	0.99	2.178	81.2	0.273
	No. Obs.	15	44	74	831			
24	MOS	0.00	0.68	0.97	1.02	1.168	87.0	0.251
	PERSISTENCE	6.50	1.24	1.47	0.94	2.054	80.6	0.154
	No. Obs.	2	34	60	852			

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	0.00	0.58	0.81	1.03	1.026	88.3	0.276
	PERSISTENCE	1.50	1.36	0.80	1.00	0.980	90.6	0.502
	No. Obs.	2	33	59	835			
18	MOS	0.00	1.07	0.47	1.05	1.107	88.1	0.310
	PERSISTENCE	0.60	1.62	0.68	1.01	1.359	86.1	0.316
	No. Obs.	5	29	75	844			
24	MOS	1.14	0.96	0.76	1.03	2.441	79.9	0.301
	PERSISTENCE	0.14	1.02	0.52	1.08	2.180	81.3	0.263
	No. Obs.	22	45	98	782			

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

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Log Score	Percent Correct	Skill Score
3	LOCAL	0.66	0.50	1.20	1.01	1.822	80.2	0.482
	PERSISTENCE	0.59	0.46	0.79	1.09	1.530	83.7	0.520
	No. Obs.	387	872	2530	12243			
6	LOCAL	0.39	0.30	1.01	1.05	1.695	80.3	0.382
	PERSISTENCE	1.41	0.52	0.83	1.06	1.817	80.8	0.396
	No. Obs.	161	770	2408	12677			
9	LOCAL	0.15	0.21	0.81	1.04	0.984	86.9	0.342
	PERSISTENCE	8.41	1.31	1.15	0.96	1.632	82.7	0.328
	No. Obs.	27	305	1740	13959			
15	LOCAL	0.14	0.20	0.82	1.03	0.905	88.6	0.305
	PERSISTENCE	4.54	1.49	1.47	0.93	1.761	81.7	0.237
	No. Obs.	50	267	1360	14357			

Table 7.6. Same as Table 7.5 except for 92 stations for the FT issuance time of approximately 1800 UTC.

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Log Score	Percent Correct	Skill Score
3	LOCAL	0.47	0.39	1.14	1.00	0.682	90.8	0.524
	PERSISTENCE	0.87	1.24	1.22	0.97	0.661	91.8	0.611
	No. Obs.	30	251	1432	14507			
6	LOCAL	0.15	0.30	1.13	1.00	0.813	89.5	0.442
	PERSISTENCE	0.54	1.14	1.28	0.97	0.921	88.9	0.472
	No. Obs.	48	273	1365	14399			
9	LOCAL	0.38	0.48	1.08	1.00	0.921	88.1	0.402
	PERSISTENCE	0.41	1.33	1.17	0.98	1.083	86.8	0.392
	No. Obs.	64	233	1497	14291			
15	LOCAL	0.40	0.83	1.16	0.99	1.636	81.6	0.355
	PERSISTENCE	0.12	0.81	0.88	1.04	1.615	82.5	0.316
	No. Obs.	219	384	1994	13486			

Table 7.7. Comparative verification of local and persistence visibility forecasts for 7 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	0.68	0.63	0.98	1.03	1.753	83.2	0.430
	PERSISTENCE	0.48	0.83	0.81	1.05	1.538	86.5	0.525
	No. Obs.	25	48	107	811			
6	LOCAL	0.68	0.73	0.99	1.02	2.303	79.2	0.301
	PERSISTENCE	0.43	1.08	0.76	1.05	2.055	81.8	0.360
	No. Obs.	28	37	114	812			
9	LOCAL	0.33	0.40	1.08	1.04	1.744	83.7	0.234
	PERSISTENCE	0.80	0.95	1.22	0.99	2.067	82.2	0.279
	No. Obs.	15	43	72	856			
15	LOCAL	0.50	0.33	1.17	1.01	1.162	86.6	0.189
	PERSISTENCE	5.00	1.27	1.44	0.95	1.861	81.9	0.158
	No. Obs.	2	33	59	889			

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

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Log Score	Percent Correct	Skill Score
3	LOCAL	1.50	0.94	1.02	1.00	1.053	88.9	0.377
	PERSISTENCE	1.50	1.38	0.84	1.00	0.917	91.1	0.514
	No. Obs.	2	32	56	844			
6	LOCAL	1.50	0.71	1.05	1.01	1.137	87.7	0.325
	PERSISTENCE	1.50	1.45	0.74	1.00	1.237	87.6	0.335
	No. Obs.	2	31	61	830			
9	LOCAL	0.40	0.75	1.08	1.00	1.172	87.0	0.356
	PERSISTENCE	0.60	1.61	0.65	1.01	1.370	86.1	0.300
	No. Obs.	5	28	72	825			
15	LOCAL	0.24	0.73	0.93	1.05	2.084	80.4	0.307
	PERSISTENCE	0.14	0.96	0.48	1.10	2.163	81.2	0.261
	No. Obs.	21	45	103	773			