

**U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL WEATHER SERVICE
OFFICE OF SYSTEMS DEVELOPMENT
TECHNIQUES DEVELOPMENT LABORATORY**

TDL OFFICE NOTE 97-3

**AFOS-ERA VERIFICATION OF GUIDANCE AND
LOCAL AVIATION/PUBLIC WEATHER FORECASTS--NO. 23
(OCTOBER 1994 - MARCH 1995)**

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August 1997

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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). Verification statistics are presented here for the cool season months of October 1994 through March 1995 for maximum/minimum (max/min) temperature, probability of precipitation (PoP), precipitation type, snow amount, cloud amount, surface wind, ceiling height, and visibility. Specific details about the local and objective forecasts and the verifying observations are summarized in Table 1.1. It's important to consider this information when interpreting the verification scores. For example, the objective max/min temperature forecast system is based on calendar day observations for Alaska, but on daytime/nighttime periods for the conterminous U.S. For Alaska, the definitions of the official local max/min temperature forecasts and verifying observations, in turn, differ from those of the guidance. Dagostaro and Dallavalle (1991) provide more specific information about the forecasts, observations, and verification procedure for each weather element.

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 Nested Grid Model (NGM) (Hoke et al. 1989) and the Limited-area Fine-mesh Model (LFM) (Gerrity 1977; Newell and Deaven 1981). 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. stations.

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

shown in Tables 4.1 and 4.2 for stations in the conterminous U.S. only. Similarly, the snow amount verification results shown in Table 5.1 are for the conterminous U.S. only. Tables 6.1 - 6.12 show cloud amount verification scores. For wind speed and direction, objective guidance verification results are presented in Tables 7.1 - 7.12, while the analogous local scores are given in Tables 7.13 - 7.24. Verification results for the 42-h significant wind speed are presented for the conterminous U.S. stations combined and for the Alaska Region in Tables 7.25 - 7.28. For ceiling height, Tables 8.1 - 8.4 contain the objective forecast results for the conterminous U.S. stations combined and for the Alaska Region, while Tables 8.5 - 8.8 contain ceiling height scores for the local forecasts. Tables 9.1 - 9.8 show objective and local visibility forecast results for the conterminous U.S. stations combined and for the Alaska Region.

2. SUMMARY (OCTOBER 1994 - MARCH 1995)

During the 1994-95 cool season, the NGM-based MOS was the official objective guidance for stations in the conterminous U.S., and LFM-based MOS was the official objective guidance for stations in Alaska. On October 19, 1994, NGM-based MOS guidance for Alaska became available for max/min temperature and cloud amount (National Weather Service 1995). Precipitation type and snow amount guidance were added on November 16, 1994; wind speed and direction were added on December 7, 1994; ceiling and visibility were added on July 26, 1995; and, finally, PoP was added on August 31, 1995. Although the NGM-based guidance was not the official guidance collected by Alaska's verification software, local forecasts may have been influenced by the new guidance. Please note that for some weather elements, forecast definitions for LFM and NGM MOS differ slightly.

On October 1, 1994, Charleston, West Virginia, was commissioned as an ASOS site. For Denver, Colorado, manual verifying observations were collected at Stapleton Airport prior to February 28, 1995, and ASOS observations were collected at Denver International Airport for the remainder of the cool season. Beginning with the 1994-95 cool season, Dodge City, Kansas, was added to the AFOS-era verification program. Note that Dodge City was commissioned as an ASOS site prior to the 1994-95 cool season. Because the ASOS cloud amount observations are incomplete, we set to missing the observed cloud amount data for the ASOS stations after they were commissioned. Observed cloud amount data were also set to missing for the AEV ASOS sites listed in Table 1.3 that were commissioned prior to the 1994-95 cool season. In addition, snow amount observations were unavailable for ASOS sites.

Dagostaro and Dallavalle (1993) documented a problem that affected the 42-h significant wind verification for stations in the conterminous U.S. For 14 test sites, corrected software was in use for most of the 1994-95 cool season, while the remaining stations installed the corrected software just prior to January 1, 1995. Therefore, for the 42-h significant wind verification, we used only the data collected after the new software was installed. The problem did not affect stations in Alaska; thus, data for the entire season were verified. In addition, the new software corrected problems affecting observations of precipitation type, snow amount (at manual stations only), and precipitation amount (at ASOS stations only) for stations in the conterminous U.S. Analogous to the 42-h wind verification, for verification of these weather elements, we used only the data collected after the new software was installed. Please note that the problems for these weather elements

began in July 1994 and, therefore, did not affect the precipitation type or snow amount verifications for previous cool seasons. The problem with observations of precipitation amount at ASOS sites was accounted for in the 1994 warm season PoP verification.

On January 1, 1995, the format of the hourly surface observations changed. Due to the possible inadvertent use of the old format after January 1 or use of an old version of the data collection software, bad precipitation amount observations were collected after January 1 for some stations. The erroneous precipitation amount observations were eliminated prior to verifying the PoP forecasts for the 1994-95 cool season.

A problem documented in Dagostaro and Dallavalle (1995) that affected the PoP verifications for Alaska was mitigated, but not permanently corrected, by replacing the locally-collected LFM MOS PoP guidance with centrally-archived guidance for different valid periods. Beginning with the 1994-95 cool season, we replaced the locally-collected PoP guidance with centrally-archived values whose valid times matched those of the local forecasts and verifying observations. Specifically, we used the LFM MOS guidance for 12-h periods ending 30-, 42-, and 54-h after 0000 and 1200 UTC. Note, however, that only PoP forecasts for the first half of the cool season were verified due to problems with the verifying precipitation amount observations. After the change in the hourly observation format on January 1, Alaska's data collection software no longer collected the correct precipitation amount observations.

3. REFERENCES

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Table 1.1. Forecasts and observations in the NWS verification data.

Weather Element	Type of Data	Data Source ¹	Projections From		Forecast Cycle (UTC)	Comments
			Forecast Cycle	Forecast Cycle		
Max temp	LFM MOS	FMAK1	24, 48		0000	Calendar day max temperature forecast for Alaska; guidance no longer available for the conterminous U.S.
			36, 60		1200	
	NGM MOS	FWC	24, 48		0000	
	Local Fcst	FP	24, 48		0000	Daytime max temperature for all stations. In the conterminous U.S., actual daytime period depends on time zone. For Alaska, forecasts are valid for 12-h periods ending at 30 (42) and 54 (66) hours after 0000 (1200) UTC.
			36, 60		1200	
	Obs	SAO				Corresponds closely to the local and NGM MOS definitions of the max for all stations.
Min temp	LFM MOS	FMAK1	36, 60		0000	Calendar day min temperature forecast for Alaska; guidance no longer available for the conterminous U.S.
			24, 48		1200	
	NGM MOS	FWC	36, 60		0000	
	Local Fcst	FP	36, 60		0000	Nighttime min temperature for all stations. In the conterminous U.S., actual nighttime period depends on time zone. For Alaska, forecasts are valid for 12-h periods ending at 30 (42) and 54 (66) hours after 1200 (0000) UTC.
			24, 48		1200	
	Obs	SAO				Corresponds closely to the local and NGM MOS definitions of the min for all stations.
PoP	LFM MOS	FMAK1	30, 42, 54		0000, 1200	For Alaska, forecasts are for 12-h periods ending at the indicated projections. Guidance for the conterminous U.S. is no longer available.
	NGM MOS	FWC	24, 36, 48		0000, 1200	
	Local Fcst	FP	24, 36, 48		0000, 1200	Same as the guidance. For Alaska, the local forecasts are valid 30, 42, and 54 hours from the forecast cycle.
	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	FMAK1	18, 30, 42	0000, 1200	For Alaska, guidance is for frozen and unfrozen precipitation (freezing is considered unfrozen but is not verified). There is no guidance for the conterminous U.S.
	NGM MOS	FWC	18, 30, 42	0000, 1200	Forecasts are valid at specific hours corresponding to the indicated projections. Guidance is for freezing, frozen, and liquid precipitation (mixed frozen and liquid is considered liquid).
	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 ± 1 hour of the verifying time.
Snow amount ²	LFM MOS				For Alaska, appropriate guidance is not available; no guidance for the conterminous U.S.
	NGM MOS	FWC	24	0000, 1200	Categorical forecasts of snow amount for the 12-h period ending at the indicated projection.
	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	FMAK1	12, 18, 24	0000, 1200	Categorical forecasts of opaque sky cover for Alaska; no guidance for the conterminous U.S.
	NGM MOS	FWC	12, 18, 24	0000, 1200	Categorical forecasts of opaque sky cover.
	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	FMAK2	12, 18, 24, 42	0000, 1200	For Alaska, forecasts are valid at specific hours after 0000 or 1200 UTC; no guidance for the conterminous U.S.
	NGM MOS	FWC	12, 18, 24, 42	0000, 1200	Forecasts are valid at the indicated hours after 0000 or 1200 UTC.
	Local Fcst	FT	3, 9, 15	0900, 1800	Aviation terminal 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.
	Obs	MEF	42	0000, 1200	A yes/no forecast of ≥ 22 kt wind speed valid at the specific hour after 0000 or 1200 UTC.
	Obs	SAO			Observed values collected at the stations for the specific hour and ± 3 hours (highest sustained wind) correspond to the valid times of the local aviation terminal forecasts. Observed values corresponding to the 42-h significant wind should be based on 0000 or 1200 UTC, but are erroneously based on the FT issuance time until January 1, 1995 for the conterminous U.S. Verifying obs corresponding to the guidance are from IDL hourly archives.

Table 1.1. Continued.

Weather Element	Type of Data	Data Source ¹	Projections From Forecast Cycle	Forecast Cycle (UTC)	Comments
Wind direction	LFM MOS	FMAK2	12, 18, 24	0000, 1200	For Alaska, forecasts are valid at specific hours after 0000 or 1200 UTC; no guidance for the conterminous U.S.
	NGM MOS	FWC	12, 18, 24	0000, 1200	Forecasts are valid at the indicated hours after 0000 or 1200 UTC.
	Local Fcst	FT	3, 9, 15	0900, 1800	Same as for local aviation terminal forecasts of wind speed.
	Obs	SAO			Observed values collected at the stations for the specific hour correspond to the valid time of the local forecasts. Verifying obs corresponding to the guidance are from IDL hourly archives.
Ceiling height	LFM MOS	FMAK2	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; no guidance for the conterminous U.S.
	NGM MOS	FWC	12, 15, 18, 24	0000, 1200	Categorical value. Definitions of categories match the official definitions of LIFR, IFR, 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 IDL.
Visibility	LFM MOS	FMAK2	12, 18, 24	0000, 1200	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 IDL.
	NGM MOS	FWC	12, 15, 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.

¹Data sources are as follows:

- FMAK1, FMAK2 - bulletins contain LFM-based MOS guidance for all weather elements for stations in Alaska; LFM-based MOS guidance for the conterminous U.S. is no longer available
- FWC - FWC bulletin contains NGM-based MOS guidance for all weather elements for stations in the conterminous U.S. only
- 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

²Precipitation 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	NGM	387
	PoP	NGM	409
	precipitation type	NGM	421
	snow amount	NGM	420
	cloud amount	NGM	387
	surface wind	NGM	399
	ceiling height	NGM	414
	visibility	NGM	408
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 verification of MOS guidance and local forecasts of max/min temperature, probability of precipitation, precipitation type, snow amount, cloud amount, surface wind, ceiling height, and visibility.

DCA	Washington, D.C.	ORF	Norfolk, Virginia
PWM ¹	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 ¹	Syracuse, New York
LGA	New York (LaGuardia), New York	EWB	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 ¹	Charleston, West Virginia	BKW	Beckley, West Virginia
BHM	Birmingham, Alabama	MOB	Mobile, Alabama
AMA ¹	Amarillo, Texas	MLB ^{2,3}	Melbourne, Florida
LIT	Little Rock, Arkansas	FSM ¹	Fort Smith, Arkansas
MIA ²	Miami, Florida	TPA ²	Tampa, Florida
ATL	Atlanta, Georgia	SAV	Savannah, Georgia
MSY ⁴	New Orleans, Louisiana	SHV ⁴	Shreveport, Louisiana
JAN ¹	Jackson, Mississippi	MEI	Meridian, Mississippi
ABQ	Albuquerque, New Mexico	TCC ⁵	Tucumcari, New Mexico
OKC ¹	Oklahoma City, Oklahoma	TUL ¹	Tulsa, Oklahoma
MEM	Memphis, Tennessee	BNA	Nashville, Tennessee
DFW	Dallas-Ft. Worth, Texas	ABI	Abilene, Texas
LBB ⁶	Lubbock, Texas	ELP ⁶	El Paso, Texas
SAT	San Antonio, Texas	IAH	Houston, Texas
DDC ¹	Dodge City, Kansas		
DEN ¹	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 ¹	Topeka, Kansas	ICT ¹	Wichita, Kansas
SDF ¹	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 ^{1,2}	Phoenix, Arizona	TUS ²	Tucson, Arizona
LAX ^{2,7}	Los Angeles, California	SAN ²	San Diego, California
SFO ²	San Francisco, California	FAT ²	Fresno, California
BOI	Boise, Idaho	PIH	Pocatello, Idaho
GTF ¹	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 ²	Anchorage, Alaska	BET ²	Bethel, Alaska
FAI ²	Fairbanks, Alaska	OME ²	Nome, Alaska
JNU ^{2,8}	Juneau, Alaska	YAK ²	Yakutat, Alaska

¹Cloud amount observations were not used and snow amount observations were unavailable after the station was commissioned as an ASOS site.

²Precipitation type and snow amount were not verified for this station.

³MLB had no data for the cloud amount and 42-h significant wind verifications.

⁴MSY and SHV had no data for the precipitation type and 42-h significant wind verifications.

⁵TCC had no data for the max/min temperature, PoP, and snow amount verifications. Data also were not available for the cloud amount and 42-h significant wind verifications for the 1200 UTC cycle, the local ceiling height, visibility, and surface wind verifications for the FT release time of approximately 0900 UTC, the MOS surface wind verification for the 1200 UTC cycle, and the MOS ceiling height and visibility verifications for the 0000 and 1200 UTC cycles.

⁶LBB and ELP were not included in the local ceiling height, visibility, and surface wind verifications.

⁷LAX was not included in the max/min temperature and PoP verifications.

⁸JNU had no data for the PoP verification.

Table 1.4. Definitions of categories used for verification.

Category	Precipitation Type	Snow Amount* (in)	Cloud Amount	Wind Speed (kt)	Wind Direction (degrees)	Ceiling Height (ft)	Visibility (mi)
1	ZL, ZR, any combination of precipitation types that includes ZL or ZR	<2	CLR, -SCT, -BKN, -OVC, -X	≤12	340-20	≤400	<1
2	IC, IP, IPW, S, SG, SP, SW, any combination of frozen and liquid	2-3	SCT	13-17	30-60	500-900	1-2 3/4
3	L, R, RW	4-5	BKN	18-22	70-110	1000-3000	3-5
4		≥6	OVC, X	23-27	120-150	≥3100	>5
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 and NGM MOS max/min temperature forecasts for 95 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	16314	0.1	2.9	1.5	--	--	86.3
	NGM MOS		0.3	3.1	2.2	--	--	83.7
Tonight's Min	LOCAL	16224	-0.3	3.4	2.1	0.63	0.34	83.1
	NGM MOS		-0.2	3.5	2.7	0.61	0.31	81.7
Tomorrow's Max	LOCAL	16257	-0.2	3.8	4.8	--	--	75.2
	NGM MOS		0.2	4.0	6.0	--	--	72.1
Tomorrow Night's Min	LOCAL	16183	-0.6	4.3	5.6	0.54	0.46	72.8
	NGM MOS		-0.2	4.4	6.0	0.52	0.47	71.7

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	16298	-0.5	3.0	1.1	0.63	0.31	86.3
	NGM MOS		-0.2	3.2	1.9	0.62	0.29	84.5
Tomorrow's Max	LOCAL	16309	-0.1	3.4	3.0	--	--	80.6
	NGM MOS		0.4	3.7	4.1	--	--	77.1
Tomorrow Night's Min	LOCAL	16233	-0.4	3.8	3.6	0.61	0.41	78.5
	NGM MOS		-0.2	3.9	4.1	0.61	0.43	77.5
Day After Tomorrow's Max	LOCAL	16258	-0.3	4.3	6.8	--	--	68.8
	NGM MOS		0.1	4.5	7.7	--	--	65.6

Table 2.3. Comparative verification of local 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	4109	0.0	2.7	0.9	--	--	88.0
	NGM MOS		0.1	2.9	1.2	--	--	86.3
Tonight's Min	LOCAL	4088	-0.1	3.3	1.8	0.74	0.35	84.6
	NGM MOS		0.0	3.4	1.8	0.68	0.32	84.2
Tomorrow's Max	LOCAL	4100	-0.4	3.6	3.8	--	--	78.4
	NGM MOS		-0.1	3.7	4.2	--	--	77.1
Tomorrow Night's Min	LOCAL	4089	-0.4	4.3	5.2	0.61	0.44	75.0
	NGM MOS		-0.1	4.3	5.2	0.57	0.47	74.8

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

Forecast Projection	Forecast Type	Number of Cases	Mean Algebraic Error (°F)	Mean Absolute Error (°F)	Percent of Absolute Errors >10°F	Probability of Detection (32°F)	False Alarm Ratio (32°F)	Improvement Over Climate
Tonight's Min	LOCAL	4128	-0.5	3.0	0.8	0.75	0.32	87.2
	NGM MOS		-0.1	3.2	1.2	0.73	0.28	86.1
Tomorrow's Max	LOCAL	4124	-0.2	3.2	2.0	--	--	83.5
	NGM MOS		0.3	3.3	2.4	--	--	81.8
Tomorrow Night's Min	LOCAL	4105	-0.2	3.7	2.6	0.63	0.42	81.5
	NGM MOS		0.0	3.7	2.5	0.70	0.41	81.7
Day After Tomorrow's Max	LOCAL	4116	-0.7	4.0	5.2	--	--	74.0
	NGM MOS		-0.3	4.1	5.5	--	--	72.5

Table 2.5. Comparative verification of local and NGM MOS max/min temperature forecasts for 25 stations in the Southern Region, 0000 UTC cycle.

Forecast Projection	Forecast Type	Number of Cases	Mean Algebraic Error (°F)	Mean Absolute Error (°F)	Percent of Absolute Errors >10°F	Probability of Detection (32°F)	False Alarm Ratio (32°F)	Improvement Over Climate
Today's Max	LOCAL		0.2	3.0	2.0	--	--	81.8
	NGM MOS	4204	0.3	3.1	2.3	--	--	80.6
Tonight's Min	LOCAL		-0.7	3.3	1.9	0.55	0.34	82.4
	NGM MOS	4191	-0.8	3.4	2.5	0.58	0.29	81.1
Tomorrow's Max	LOCAL		0.1	3.9	5.0	--	--	67.4
	NGM MOS	4186	0.4	4.1	6.2	--	--	64.7
Tomorrow Night's Min	LOCAL		-1.0	4.2	5.0	0.46	0.53	71.8
	NGM MOS	4175	-0.8	4.3	5.3	0.43	0.52	70.4

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

Forecast Projection	Forecast Type	Number of Cases	Mean Algebraic Error (°F)	Mean Absolute Error (°F)	Percent of Absolute Errors >10°F	Probability of Detection (32°F)	False Alarm Ratio (32°F)	Improvement Over Climate
Tonight's Min	LOCAL		-0.7	2.9	0.8	0.62	0.31	85.9
	NGM MOS	4206	-0.5	3.1	1.5	0.57	0.30	84.2
Tomorrow's Max	LOCAL		0.0	3.5	3.8	--	--	74.4
	NGM MOS	4206	0.4	3.7	4.4	--	--	71.5
Tomorrow Night's Min	LOCAL		-0.8	3.8	3.5	0.51	0.49	76.7
	NGM MOS	4196	-0.7	3.8	3.9	0.49	0.52	76.1
Day After Tomorrow's Max	LOCAL		0.1	4.4	7.4	--	--	59.0
	NGM MOS	4190	0.4	4.7	8.1	--	--	55.9

Table 2.7. Comparative verification of local and NGM MOS max/min temperature forecasts for 29 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	5035	0.1	3.1	1.7	--	--	88.1
	NGM MOS		0.4	3.5	3.3	--	--	83.9
Tonight's Min	LOCAL	5015	-0.2	3.6	2.7	0.63	0.33	83.9
	NGM MOS		0.0	3.8	3.6	0.58	0.31	81.8
Tomorrow's Max	LOCAL	5024	-0.4	4.2	6.4	--	--	77.2
	NGM MOS		0.3	4.6	8.7	--	--	72.2
Tomorrow Night's Min	LOCAL	5010	-0.4	4.6	7.2	0.53	0.44	73.6
	NGM MOS		0.1	4.8	8.1	0.51	0.45	71.9

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	5016	-0.4	3.2	1.6	0.56	0.30	87.3
	NGM MOS		0.1	3.5	2.6	0.58	0.28	84.9
Tomorrow's Max	LOCAL	5012	-0.2	3.7	3.9	--	--	82.2
	NGM MOS		0.5	4.1	6.0	--	--	77.4
Tomorrow Night's Min	LOCAL	5000	-0.4	4.1	4.8	0.69	0.33	79.3
	NGM MOS		0.0	4.3	5.8	0.60	0.39	77.2
Day After Tomorrow's Max	LOCAL	5004	-0.5	4.8	9.4	--	--	70.3
	NGM MOS		0.2	5.2	11.1	--	--	65.7

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

Forecast Projection	Forecast Type	Number of Cases	Mean Algebraic Error (°F)	Mean Absolute Error (°F)	Percent of Absolute Errors >10°F	Probability of Detection (32°F)	False Alarm Ratio (32°F)	Improvement Over Climate
Today's Max	LOCAL		0.3	2.6	1.0	--	--	85.3
	NGM MOS	2966	0.3	2.8	1.4	--	--	83.2
Tonight's Min	LOCAL		-0.1	3.1	1.8	0.56	0.30	78.9
	NGM MOS	2930	-0.1	3.2	2.4	0.56	0.33	77.4
Tomorrow's Max	LOCAL		0.1	3.3	3.2	--	--	75.7
	NGM MOS	2947	0.3	3.5	3.7	--	--	74.2
Tomorrow Night's Min	LOCAL		-0.5	3.9	4.4	0.60	0.42	67.7
	NGM MOS	2909	-0.4	3.9	4.6	0.58	0.39	67.2

Table 2.10. Same as Table 2.9 except for the 1200 UTC cycle.

Forecast Projection	Forecast Type	Number of Cases	Mean Algebraic Error (°F)	Mean Absolute Error (°F)	Percent of Absolute Errors >10°F	Probability of Detection (32°F)	False Alarm Ratio (32°F)	Improvement Over Climate
Tonight's Min	LOCAL		-0.2	2.8	1.2	0.51	0.31	82.3
	NGM MOS	2948	-0.1	3.0	2.1	0.53	0.35	80.6
Tomorrow's Max	LOCAL		0.0	3.0	1.8	--	--	80.5
	NGM MOS	2967	0.2	3.3	2.8	--	--	76.6
Tomorrow Night's Min	LOCAL		-0.3	3.5	3.5	0.58	0.42	73.1
	NGM MOS	2932	-0.2	3.6	3.9	0.67	0.38	72.2
Day After Tomorrow's Max	LOCAL		-0.2	3.7	4.1	--	--	70.2
	NGM MOS	2948	0.0	3.9	4.8	--	--	68.0

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	1043	1.2	4.0	6.4	--	--	80.8
	LFM MOS		2.5	4.5	8.5	--	--	76.7
Tonight's Min	LOCAL	1048	0.8	5.8	16.8	0.50	0.75	70.6
	LFM MOS		0.6	6.1	17.6	0.50	0.80	68.4
Tomorrow's Max	LOCAL	1048	1.3	5.1	11.9	--	--	68.5
	LFM MOS		3.0	5.6	14.6	--	--	62.3
Tomorrow Night's Min	LOCAL	1048	1.1	7.1	24.0	0.00	1.00	55.8
	LFM MOS		1.0	7.2	25.0	0.00	1.00	56.8

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	1016	-0.3	5.1	10.5	0.50	0.50	77.1
	LFM MOS		-0.5	5.5	12.7	0.50	0.75	74.1
Tomorrow's Max	LOCAL	1005	0.7	4.5	9.3	--	--	75.1
	LFM MOS		2.0	4.9	11.6	--	--	69.8
Tomorrow Night's Min	LOCAL	1005	0.2	6.4	20.4	0.00	1.00	64.1
	LFM MOS		0.3	6.7	20.4	0.50	0.86	61.0
Day After Tomorrow's Max	LOCAL	1008	0.7	5.6	14.2	--	--	61.1
	LFM MOS		2.8	6.2	17.4	--	--	53.8

Table 3.1. Comparative verification of local and NGM MOS PoP forecasts for 95 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	Local % Imprv.	No. of Changes
12-24 (1st period)	LOCAL NGM MOS	0.0791 0.0826		49.2 47.0	14852	0.2150	8.4	1843
24-36 (2nd period)	LOCAL NGM MOS	0.0926 0.0946	4.2 2.1	41.9 40.7	14796	0.2097	5.1	1543
36-48 (3rd period)	LOCAL NGM MOS	0.1005 0.1016	1.1	35.2 34.5	14839	0.2151	4.4	1665

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	Local % Imprv.	No. of Changes
12-24 (1st period)	LOCAL NGM MOS	0.0812 0.0840		49.2 47.4	14797	0.2174	8.1	1846
24-36 (2nd period)	LOCAL NGM MOS	0.0915 0.0936	3.3 2.2	41.1 39.7	14845	0.2242	6.8	1657
36-48 (3rd period)	LOCAL NGM MOS	0.1024 0.1044	1.9	35.6 34.3	14787	0.2105	5.2	1634

Table 3.3. Comparative verification of local 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 (1st period)	LOCAL NGM MOS	0.0837 0.0861	2.8	51.9 50.5	3833	0.2103	3.4	515
24-36 (2nd period)	LOCAL NGM MOS	0.0943 0.0942	-0.2	46.4 46.5	3813	0.2017	-2.4	404
36-48 (3rd period)	LOCAL NGM MOS	0.1031 0.1048	1.6	39.8 38.8	3828	0.2210	5.2	483

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 (1st period)	LOCAL NGM MOS	0.0828 0.0843	1.8	53.2 52.3	3831	0.2093	5.1	522
24-36 (2nd period)	LOCAL NGM MOS	0.0942 0.0970	2.8	45.4 43.8	3847	0.2382	6.9	466
36-48 (3rd period)	LOCAL NGM MOS	0.1037 0.1070	3.2	41.0 39.1	3828	0.2154	9.4	459

Table 3.5. Comparative verification of local and NGM MOS PoP forecasts for 25 stations in the Southern Region, 0000 UTC cycle.

Forecast Projection (h)	Type of Forecast	Brier Score	Local % Imp. Over Guid.	% Imp. Over Clim.	No. of Cases	Changes GB 20% to Guidance		
						Guid. Brier Score	Local % Imprv.	No. of Changes
12-24 (1st period)	LOCAL NGM MOS	0.0797 0.0837		45.9 43.2	3531	0.2116	9.5	449
24-36 (2nd period)	LOCAL NGM MOS	0.0930 0.0949	4.7 2.0	35.3 34.0	3517	0.2229	6.1	386
36-48 (3rd period)	LOCAL NGM MOS	0.1025 0.1023	-0.2	30.6 30.7	3531	0.2129	-1.8	391

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 GB 20% to Guidance		
						Guid. Brier Score	Local % Imprv.	No. of Changes
12-24 (1st period)	LOCAL NGM MOS	0.0803 0.0831		43.9 42.0	3519	0.2140	11.1	443
24-36 (2nd period)	LOCAL NGM MOS	0.0934 0.0953	3.3 2.0	36.5 35.1	3529	0.2262	5.9	397
36-48 (3rd period)	LOCAL NGM MOS	0.0984 0.1002	1.8	30.2 28.9	3511	0.2068	5.6	357

Table 3.7. Comparative verification of local and NGM MOS PoP forecasts for 29 stations in the Central Region, 0000 UTC cycle.

Forecast Projection (h)	Type of Forecast	Brier Score	Local % Imp. Over Guid.	% Imp. Over Clim.	No. of Cases	Changes GE 20% to Guidance		
						Guid. Brier Score	Local % Imprv.	No. of Changes
12-24 (1st period)	LOCAL NGM MOS	0.0706 0.0722	2.3	50.3 49.1	4698	0.2073	4.3	533
24-36 (2nd period)	LOCAL NGM MOS	0.0849 0.0879	3.4	44.2 42.3	4682	0.1984	7.8	420
36-48 (3rd period)	LOCAL NGM MOS	0.0926 0.0925	-0.2	34.6 34.7	4694	0.2016	3.3	424

Table 3.8. Same as Table 3.7 except for the 1200 UTC cycle.

Forecast Projection (h)	Type of Forecast	Brier Score	Local % Imp. Over Guid.	% Imp. Over Clim.	No. of Cases	Changes GE 20% to Guidance		
						Guid. Brier Score	Local % Imprv.	No. of Changes
12-24 (1st period)	LOCAL NGM MOS	0.0757 0.0764	0.9	50.5 50.1	4660	0.2085	-0.4	509
24-36 (2nd period)	LOCAL NGM MOS	0.0821 0.0825	0.5	41.9 41.7	4677	0.2129	5.0	432
36-48 (3rd period)	LOCAL NGM MOS	0.0972 0.0976	0.4	36.4 36.1	4662	0.1902	-2.6	513

Table 3.9. Comparative verification of local and NGM MOS PoP forecasts for 17 stations in the Western Region, 0000 UTC cycle.

Forecast Projection (h)	Type of Forecast	Brier Score	Local % Imp. Over Guid.	% Imp. Over Clim.	No. of Cases	Changes GE 20% to Guidance		
						Guid. Brier Score	Local % Imprv.	No. of Changes
12-24 (1st period)	LOCAL NGM MOS	0.0863 0.0939	8.1	47.6 43.0	2790	0.2383	19.2	346
24-36 (2nd period)	LOCAL NGM MOS	0.1026 0.1060	3.1	39.0 37.1	2784	0.2182	9.2	333
36-48 (3rd period)	LOCAL NGM MOS	0.1074 0.1117	3.8	34.8 32.2	2786	0.2252	10.5	367

Table 3.10. Same as Table 3.9 except for the 1200 UTC cycle.

Forecast Projection (h)	Type of Forecast	Brier Score	Local % Imp. Over Guid.	% Imp. Over Clim.	No. of Cases	Changes GE 20% to Guidance		
						Guid. Brier Score	Local % Imprv.	No. of Changes
12-24 (1st period)	LOCAL NGM MOS	0.0894 0.0976	8.4	47.0 42.2	2787	0.2452	18.6	372
24-36 (2nd period)	LOCAL NGM MOS	0.1012 0.1054	4.0	38.8 36.3	2792	0.2176	9.9	362
36-48 (3rd period)	LOCAL NGM MOS	0.1144 0.1176	2.7	32.2 30.3	2786	0.2416	9.2	305

Table 3.11. Comparative verification of local and centrally archived LFM MOS PoP forecasts for 5 stations in the Alaska Region, 0000 UTC cycle.

Forecast Projection (h)	Type of Forecast	Brier Score	Local % Imp. Over Guid.	% Imp. Over Clim.	No. of Cases	Changes GE 20% to Guidance		
						Guid. Brier Score	Local % Imprv.	No. of Changes
18-30 (1st period)	LOCAL LFM MOS	0.1626 0.1725	5.7	*	353	0.2372	8.7	128
30-42 (2nd period)	LOCAL LFM MOS	0.1687 0.1632	-3.4	*	396	0.2054	-11.6	142
42-54 (3rd period)	LOCAL LFM MOS	0.1846 0.1921	3.9	*	348	0.2390	1.5	134

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
18-30 (1st period)	LOCAL LFM MOS	0.1505 0.1569	4.1	*	389	0.2303	6.2	140
30-42 (2nd period)	LOCAL LFM MOS	0.1809 0.1974	8.4	*	343	0.2281	11.9	130
42-54 (3rd period)	LOCAL LFM MOS	0.1740 0.1764	1.4	*	385	0.2097	1.8	159

* Percent improvement over climate scores were not available.

Table 4.1. Comparative verification of local and NGM MOS PoPT forecasts for 86 stations in the conterminous U.S. for the 0000 UTC cycle. Only cases where the local PoP was $\geq 30\%$ were included.

Projection (h)	Region Number of Stations	Type of Forecast	Bias			Percent Correct	Skill Score	POD		FAR	
			ZR	S	R			ZR	S	ZR	S
18	Eastern 24	LOCAL	0.83	1.03	0.99	88.1	0.777	0.22	0.90	0.73	0.12
		NGM MOS	0.78	0.93	1.09	89.4	0.801	0.28	0.89	0.64	0.04
		No. Obs.	18	204	223						
	Southern 21	LOCAL	0.56	0.83	1.05	90.8	0.673	0.22	0.66	0.60	0.21
		NGM MOS	0.67	1.00	1.02	96.6	0.888	0.56	0.93	0.17	0.07
No. Obs.		9	29	169							
Central 29	LOCAL	1.39	0.89	1.14	86.6	0.750	0.56	0.85	0.60	0.04	
	NGM MOS	0.56	0.98	1.09	89.3	0.790	0.33	0.92	0.40	0.06	
	No. Obs.	18	223	132							
Western 12	LOCAL	3.00	1.06	0.97	91.2	0.778	0.00	0.88	1.00	0.17	
	NGM MOS	1.00	1.10	0.97	93.7	0.839	0.00	0.94	1.00	0.14	
	No. Obs.	1	51	153							
All Stations	LOCAL	1.04	0.96	1.03	88.6	0.783	0.35	0.86	0.67	0.10	
	NGM MOS	0.67	0.97	1.04	91.3	0.832	0.35	0.91	0.48	0.06	
	No. Obs.	46	507	677							
30	Eastern 24	LOCAL	0.47	1.22	0.91	84.5	0.714	0.22	0.95	0.53	0.22
		NGM MOS	0.28	1.04	1.06	87.0	0.752	0.03	0.91	0.89	0.13
		No. Obs.	32	183	261						
	Southern 21	LOCAL	0.30	1.27	1.02	92.1	0.647	0.10	0.73	0.67	0.42
		NGM MOS	0.20	1.07	1.04	90.0	0.516	0.00	0.67	1.00	0.38
No. Obs.		10	15	165							
Central 29	LOCAL	0.67	1.02	1.06	86.7	0.740	0.33	0.92	0.50	0.09	
	NGM MOS	0.73	0.95	1.18	87.5	0.761	0.45	0.89	0.38	0.06	
	No. Obs.	33	243	115							
Western 12	LOCAL	*	1.05	0.95	89.7	0.783	*	0.90	1.00	0.14	
	NGM MOS	**	0.86	1.08	92.5	0.833	**	0.83	**	0.04	
	No. Obs.	0	63	111							
All Stations	LOCAL	0.57	1.10	0.97	87.1	0.761	0.25	0.92	0.56	0.16	
	NGM MOS	0.47	0.97	1.08	88.4	0.781	0.21	0.88	0.54	0.09	
	No. Obs.	75	504	652							
42	Eastern 24	LOCAL	0.67	1.03	1.00	81.8	0.656	0.17	0.83	0.75	0.20
		NGM MOS	0.83	0.92	1.08	89.2	0.795	0.44	0.86	0.47	0.06
		No. Obs.	18	189	226						
	Southern 21	LOCAL	0.60	0.56	1.06	90.7	0.489	0.40	0.33	0.33	0.40
		NGM MOS	0.60	0.83	1.03	92.3	0.623	0.20	0.67	0.67	0.20
No. Obs.		5	18	159							
Central 29	LOCAL	0.61	1.00	1.04	85.7	0.723	0.28	0.91	0.55	0.10	
	NGM MOS	0.56	0.91	1.20	87.6	0.765	0.39	0.87	0.30	0.05	
	No. Obs.	18	211	134							
Western 12	LOCAL	4.00	1.02	0.97	90.0	0.728	0.00	0.83	1.00	0.19	
	NGM MOS	0.00	1.10	0.98	91.0	0.751	0.00	0.86	***	0.22	
	No. Obs.	1	42	146							
All Stations	LOCAL	0.71	1.00	1.02	85.7	0.721	0.24	0.84	0.67	0.16	
	NGM MOS	0.67	0.93	1.07	89.5	0.792	0.38	0.86	0.43	0.08	
	No. Obs.	42	460	665							

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

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

Projection (h)	Region Number of Stations	Type of Forecast	Bias			Percent Correct	Skill Score	POD		FAR	
			ZR	S	R			ZR	S	ZR	S
18	Eastern 24	LOCAL	0.53	1.10	0.98	85.1	0.722	0.27	0.89	0.50	0.19
		NGM MOS	0.43	0.95	1.10	86.8	0.748	0.10	0.86	0.77	0.10
		No. Obs.	30	176	257						
	Southern 21	LOCAL	0.50	0.78	1.05	93.4	0.676	0.25	0.72	0.50	0.07
		NGM MOS	0.63	0.83	1.04	93.9	0.713	0.38	0.72	0.40	0.13
	No. Obs.	8	18	170							
Central 29	LOCAL	0.74	0.98	1.10	86.3	0.741	0.32	0.89	0.56	0.09	
	NGM MOS	0.50	0.96	1.20	88.7	0.787	0.35	0.91	0.29	0.05	
	No. Obs.	34	245	129							
Western 12	LOCAL	*	0.97	1.01	93.7	0.863	*	0.90	1.00	0.07	
	NGM MOS	**	0.86	1.08	93.7	0.859	**	0.84	**	0.02	
	No. Obs.	0	63	111							
All Stations	LOCAL	0.64	1.02	1.03	88.0	0.776	0.29	0.89	0.54	0.13	
	NGM MOS	0.49	0.94	1.10	89.5	0.801	0.25	0.88	0.49	0.07	
	No. Obs.	72	502	667							
30	Eastern 24	LOCAL	0.72	0.99	1.03	87.1	0.756	0.44	0.86	0.38	0.13
		NGM MOS	0.72	0.93	1.08	90.6	0.821	0.39	0.88	0.46	0.05
		No. Obs.	18	190	226						
	Southern 21	LOCAL	0.29	1.13	1.01	91.6	0.683	0.14	0.78	0.50	0.31
		NGM MOS	0.43	1.00	1.02	92.2	0.694	0.00	0.78	1.00	0.22
	No. Obs.	7	23	161							
Central 29	LOCAL	1.27	0.95	1.05	87.6	0.759	0.40	0.89	0.68	0.07	
	NGM MOS	0.93	0.90	1.18	87.1	0.751	0.47	0.86	0.50	0.04	
	No. Obs.	15	226	130							
Western 12	LOCAL	1.00	1.13	0.96	88.8	0.713	0.00	0.84	1.00	0.25	
	NGM MOS	1.00	1.09	0.97	91.5	0.778	0.00	0.89	1.00	0.18	
	No. Obs.	1	45	142							
All Stations	LOCAL	0.85	0.99	1.02	88.3	0.774	0.37	0.87	0.57	0.12	
	NGM MOS	0.76	0.93	1.06	89.9	0.803	0.34	0.87	0.55	0.07	
	No. Obs.	41	484	659							
42	Eastern 24	LOCAL	0.23	1.15	1.00	83.4	0.687	0.13	0.90	0.43	0.22
		NGM MOS	0.52	0.94	1.10	85.4	0.721	0.19	0.84	0.63	0.11
		No. Obs.	31	172	256						
	Southern 21	LOCAL	0.45	0.82	1.06	90.1	0.555	0.27	0.59	0.40	0.29
		NGM MOS	0.18	0.94	1.06	90.1	0.546	0.09	0.65	0.50	0.31
	No. Obs.	11	17	163							
Central 29	LOCAL	0.61	1.04	1.02	81.3	0.642	0.16	0.90	0.74	0.14	
	NGM MOS	0.68	0.96	1.15	86.1	0.740	0.35	0.89	0.48	0.07	
	No. Obs.	31	225	124							
Western 12	LOCAL	**	1.11	0.94	87.2	0.724	**	0.87	**	0.22	
	NGM MOS	**	0.83	1.09	93.0	0.838	**	0.81	**	0.02	
	No. Obs.	0	54	102							
All Stations	LOCAL	0.42	1.08	1.01	84.3	0.705	0.16	0.88	0.61	0.18	
	NGM MOS	0.53	0.94	1.10	87.4	0.760	0.25	0.85	0.54	0.09	
	No. Obs.	73	468	645							

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

Table 5.1. Comparative verification of local and NCM MOS snow amount forecasts for 74 stations in the conterminous U.S. for the 12-24 h projection.

Cycle (UTC)	Type of Forecast	Bias		Percent Correct	Skill Score	Threat Score		POD		FAR				
		≥ 2	≥ 4			≥ 2	≥ 4	≥ 2	≥ 4	≥ 2	≥ 4	≥ 2	≥ 4	≥ 6
0000	LOCAL	1.39	0.63	98.3	0.338	0.288	0.224	0.143	0.53	0.30	0.21	0.61	0.53	0.69
	NGM MOS No. Obs.	0.80 135	0.40 57	98.5 19	0.250	0.215 0.111	0.069	0.32	0.14	0.11	0.60	0.65	0.83	
1200	LOCAL	1.33	1.05	98.3	0.379	0.317	0.178	0.129	0.56	0.31	0.17	0.58	0.70	0.67
	NGM MOS No. Obs.	0.88 148	0.64 42	98.5 23	0.332	0.293 0.131	0.069	0.43	0.19	0.09	0.52	0.70	0.75	

Table 6.1. Comparative verification of local and NGM MOS forecasts of four categories of cloud amount (clear, scattered, broken, and overcast) for 82 stations in the conterminous U.S., 0000 UTC cycle.

Projection (h)	Type of Forecast	Bias by Category				Percent Correct	Skill Score
		1	2	3	4		
12	LOCAL	0.73	1.39	1.73	0.91	66.1	0.524
	NGM MOS	0.85	1.42	1.27	0.91	60.0	0.429
	No. Obs.	4735	1923	1433	5813		
18	LOCAL	0.54	1.63	1.98	0.76	51.1	0.349
	NGM MOS	0.68	1.71	1.32	0.84	53.5	0.368
	No. Obs.	4274	2309	1903	5511		
24	LOCAL	0.54	1.72	2.10	0.74	48.3	0.313
	NGM MOS	0.72	1.75	1.36	0.82	53.2	0.362
	No. Obs.	4482	2224	1703	5483		

Table 6.2. Same as Table 6.1 except for 81 stations for the 1200 UTC cycle.

Projection (h)	Type of Forecast	Bias by Category				Percent Correct	Skill Score
		1	2	3	4		
12	LOCAL	0.73	1.36	1.75	0.84	60.2	0.456
	NGM MOS	0.82	1.56	1.29	0.83	56.1	0.396
	No. Obs.	4517	2231	1704	5497		
18	LOCAL	0.63	1.75	2.32	0.83	54.2	0.370
	NGM MOS	0.90	1.62	1.20	0.87	59.7	0.417
	No. Obs.	5415	1656	1290	5555		
24	LOCAL	0.61	1.61	2.17	0.83	50.9	0.329
	NGM MOS	0.80	1.54	1.27	0.91	57.2	0.393
	No. Obs.	4763	1935	1442	5813		

Table 6.3. Comparative verification of local and NGM MOS forecasts of four categories of cloud amount (clear, scattered, broken, and overcast) for 21 stations in the Eastern Region, 0000 UTC cycle.

Projection (h)	Type of Forecast	Bias by Category				Percent Correct	Skill Score
		1	2	3	4		
12	LOCAL	0.75	1.24	1.59	0.92	61.7	0.462
	NGM MOS	0.92	1.30	1.14	0.91	58.8	0.415
	No. Obs.	1050	581	421	1548		
18	LOCAL	0.52	1.60	1.87	0.79	52.3	0.358
	NGM MOS	0.78	1.64	1.27	0.80	54.8	0.383
	No. Obs.	1011	596	509	1481		
24	LOCAL	0.54	1.86	2.18	0.80	51.4	0.341
	NGM MOS	0.83	1.77	1.21	0.84	57.8	0.405
	No. Obs.	1199	486	375	1538		

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

Projection (h)	Type of Forecast	Bias by Category				Percent Correct	Skill Score
		1	2	3	4		
12	LOCAL	0.68	1.56	1.90	0.86	60.9	0.456
	NGM MOS	0.94	1.52	1.13	0.85	60.8	0.440
	No. Obs.	1215	486	377	1548		
18	LOCAL	0.65	1.91	2.04	0.87	56.9	0.392
	NGM MOS	0.96	1.71	0.95	0.87	61.0	0.424
	No. Obs.	1331	369	327	1569		
24	LOCAL	0.70	1.35	1.80	0.85	52.4	0.342
	NGM MOS	0.86	1.44	1.10	0.90	56.6	0.387
	No. Obs.	1062	589	424	1551		

Table 6.5. Comparative verification of local and NGM MOS forecasts of four categories of cloud amount (clear, scattered, broken, and overcast) for 20 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	0.69	1.49	1.69	0.89	65.4	0.524
	NGM MOS	0.84	1.45	1.15	0.94	60.7	0.447
	No. Obs.	1162	473	388	1289		
18	LOCAL	0.57	1.63	1.65	0.70	49.3	0.333
	NGM MOS	0.72	1.65	1.03	0.87	53.3	0.372
	No. Obs.	998	635	597	1188		
24	LOCAL	0.54	1.70	1.88	0.70	45.7	0.288
	NGM MOS	0.73	1.69	1.22	0.80	51.6	0.349
	No. Obs.	1081	604	477	1147		

Table 6.6. Same as Table 6.5 except for 19 stations for the 1200 UTC cycle.

Projection (h)	Type of Forecast	Bias by Category				Percent Correct	Skill Score
		1	2	3	4		
12	LOCAL	0.73	1.34	1.64	0.81	59.3	0.454
	NGM MOS	0.84	1.52	1.11	0.83	55.5	0.395
	No. Obs.	1088	608	475	1143		
18	LOCAL	0.62	1.70	2.22	0.83	53.1	0.365
	NGM MOS	0.90	1.48	1.12	0.90	60.3	0.431
	No. Obs.	1370	448	334	1159		
24	LOCAL	0.63	1.73	1.92	0.80	50.4	0.331
	NGM MOS	0.83	1.54	1.11	0.93	58.2	0.412
	No. Obs.	1172	470	389	1284		

Table 6.7. Comparative verification of local and NGM MOS forecasts of four categories of cloud amount (clear, scattered, broken, and overcast) for 25 stations in the Central Region, 0000 UTC cycle.

Projection (h)	Type of Forecast	Bias by Category				Percent Correct	Skill Score
		1	2	3	4		
12	LOCAL	0.69	1.56	1.96	0.92	66.4	0.519
	NGM MOS	0.84	1.57	1.41	0.89	60.7	0.428
	No. Obs.	1503	526	340	1866		
18	LOCAL	0.44	1.73	2.43	0.78	49.8	0.331
	NGM MOS	0.62	1.80	1.46	0.87	53.5	0.361
	No. Obs.	1366	667	460	1741		
24	LOCAL	0.45	1.80	2.38	0.77	47.1	0.294
	NGM MOS	0.69	1.76	1.47	0.83	52.8	0.350
	No. Obs.	1373	662	453	1741		

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

Projection (h)	Type of Forecast	Bias by Category				Percent Correct	Skill Score
		1	2	3	4		
12	LOCAL	0.71	1.39	1.83	0.86	59.5	0.441
	NGM MOS	0.77	1.69	1.40	0.81	54.4	0.370
	No. Obs.	1374	664	456	1742		
18	LOCAL	0.56	1.98	2.70	0.82	52.4	0.347
	NGM MOS	0.88	1.75	1.29	0.86	58.7	0.397
	No. Obs.	1640	468	341	1789		
24	LOCAL	0.52	1.87	2.76	0.81	49.3	0.306
	NGM MOS	0.79	1.67	1.37	0.91	57.3	0.382
	No. Obs.	1496	530	350	1862		

Table 6.9. Comparative verification of local and NGM MOS forecasts of four categories of cloud amount (clear, scattered, broken, and overcast) for 16 stations in the Western Region, 0000 UTC cycle.

Projection (h)	Type of Forecast	Bias by Category				Percent Correct	Skill Score
		1	2	3	4		
12	LOCAL	0.80	1.27	1.70	0.92	72.3	0.606
	NGM MOS	0.82	1.35	1.48	0.93	59.6	0.422
	No. Obs.	1020	343	284	1110		
18	LOCAL	0.67	1.51	2.11	0.74	53.8	0.379
	NGM MOS	0.62	1.74	1.71	0.82	52.0	0.350
	No. Obs.	899	411	337	1101		
24	LOCAL	0.68	1.50	1.95	0.67	49.2	0.327
	NGM MOS	0.59	1.78	1.55	0.77	49.8	0.330
	No. Obs.	829	472	398	1057		

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

Projection (h)	Type of Forecast	Bias by Category				Percent Correct	Skill Score
		1	2	3	4		
12	LOCAL	0.85	1.14	1.66	0.81	61.4	0.476
	NGM MOS	0.72	1.49	1.52	0.81	53.4	0.370
	No. Obs.	840	473	396	1064		
18	LOCAL	0.70	1.39	2.30	0.81	54.6	0.379
	NGM MOS	0.83	1.52	1.45	0.86	58.6	0.418
	No. Obs.	1074	371	288	1038		
24	LOCAL	0.65	1.48	2.32	0.85	52.0	0.340
	NGM MOS	0.74	1.53	1.61	0.93	57.0	0.392
	No. Obs.	1033	346	279	1116		

Table 6.11. Comparative verification of local and LFM MOS forecasts of four categories of cloud amount (clear, scattered, broken, and overcast) for 6 stations in the Alaska Region, 0000 UTC cycle.

Projection (h)	Type of Forecast	Bias by Category				Percent Correct	Skill Score
		1	2	3	4		
12	LOCAL	0.84	0.91	1.36	1.04	63.9	0.437
	LFM MOS	0.94	1.08	0.72	1.07	63.6	0.421
	No. Obs.	286	117	108	533		
18	LOCAL	0.84	0.88	1.32	1.02	52.6	0.300
	LFM MOS	0.96	0.68	0.83	1.17	57.2	0.343
	No. Obs.	237	159	155	503		
24	LOCAL	0.66	1.10	1.57	0.98	54.6	0.338
	LFM MOS	0.85	0.85	0.79	1.18	58.6	0.362
	No. Obs.	253	147	141	494		

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

Projection (h)	Type of Forecast	Bias by Category				Percent Correct	Skill Score
		1	2	3	4		
12	LOCAL	0.85	0.88	1.38	1.00	59.8	0.407
	LFM MOS	1.03	0.79	0.95	1.06	60.5	0.405
	No. Obs.	250	144	140	487		
18	LOCAL	0.62	1.24	1.86	0.99	55.1	0.323
	LFM MOS	0.95	0.94	0.65	1.11	61.0	0.372
	No. Obs.	292	108	104	515		
24	LOCAL	0.55	1.33	1.74	1.01	52.3	0.274
	LFM MOS	0.98	0.81	0.83	1.09	59.9	0.356
	No. Obs.	273	113	107	521		

Table 7.1. Verification of NGM MOS surface wind forecasts for 97 stations in the conterminous U.S., 0000 UTC cycle.

Fcst Proj (h)	Direction					Speed																
	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)	Contingency Table											
											1		2		3		4		5		6	
12	NGM	21	0.562	4579	3.6	2.1	4619	0.418	86.4	0.07	0.97	1.23	1.34	1.01	1.14	1.33	14451	1434	354	90	14	6
18	NGM	23	0.519	7454	3.5	1.4	7494	0.416	75.9	0.12	0.98	1.01	1.11	1.17	1.28	1.67	12252	2880	908	241	53	12
24	NGM	26	0.488	5740	3.8	2.1	5786	0.381	81.8	0.04	0.98	1.07	1.15	1.30	1.67	3.75	13768	1930	570	108	21	4

Table 7.2. Same as Table 7.1 except for 96 stations for the 1200 UTC cycle.

Fcst Proj (h)	Direction					Speed																
	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)	Contingency Table											
											1		2		3		4		5		6	
12	NGM	24	0.505	5790	3.6	1.9	5830	0.414	82.6	0.10	0.98	1.09	1.18	1.36	1.43	3.80	13744	1935	563	107	23	5
18	NGM	24	0.512	4729	3.8	2.3	4781	0.395	85.3	0.15	0.97	1.17	1.41	1.31	0.84	2.00	14247	1558	341	81	19	4
24	NGM	24	0.506	4469	3.9	2.2	4529	0.375	85.7	0.14	0.98	1.18	1.29	1.00	1.00	1.17	14436	1432	350	90	14	6

Table 7.3. Verification of NGM MOS surface wind forecasts for 24 stations in the Eastern Region, 0000 UTC cycle.

Fcst Proj (h)	Type of Fcst.	Direction				Speed										
		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)						
12	NGM	21	0.540	1127	3.4	2.1	1138	0.405	87.3	0.13	0.97 3687	1.25 341	1.52 67	0.50 20	1.00 3	* 0
18	NGM	22	0.497	1863	3.1	1.1	1870	0.438	77.5	0.00	1.01 3042	0.92 819	1.02 187	1.36 36	1.22 9	* 0
24	NGM	24	0.468	1253	3.5	1.6	1262	0.375	84.1	0.00	1.01 3523	0.95 453	0.95 125	1.32 19	1.00 5	2.00 1

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

Fcst Proj (h)	Type of Fcst.	Direction				Speed										
		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)						
12	NGM	22	0.488	1292	3.2	1.5	1304	0.423	85.0	0.11	1.00 3545	1.02 457	1.03 123	1.17 18	0.80 5	0.00 1
18	NGM	22	0.507	1099	3.4	1.7	1111	0.418	87.1	0.00	0.98 3548	1.22 357	1.01 80	1.00 15	1.00 2	1.00 2
24	NGM	23	0.496	1097	3.7	2.0	1115	0.363	86.9	0.14	0.98 3711	1.22 340	1.19 67	0.60 20	1.00 3	* 0

* This category was forecast but was not observed.

Table 7.5. Verification of NGM MOS surface wind forecasts for 26 stations in the Southern Region, 0000 UTC cycle.

Fcst Proj (h)	Type of Fcst.	Direction				Speed										
		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)						
		Contingency Table														
										Bias by Category						
										1	2	3	4	5	6	
										No. Obs	No. Obs	No. Obs	No. Obs	No. Obs	No. Obs	
12	NGM	20	0.600	880	3.2	1.8	884	0.401	91.1	0.00	0.99	1.18	1.02	1.29	1.00	**
											3905	249	56	7	1	0
18	NGM	23	0.528	1809	3.2	1.1	1815	0.405	79.2	0.13	0.99	1.09	0.90	0.82	1.14	1.00
											3407	647	91	44	7	1
24	NGM	25	0.491	1171	3.5	1.9	1181	0.376	87.0	0.00	0.99	1.11	0.94	0.80	0.33	**
											3765	375	86	10	3	0

Table 7.6. Same as Table 7.5 except for 25 stations for the 1200 UTC cycle.

Fcst Proj (h)	Type of Fcst.	Direction				Speed										
		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)						
		Contingency Table														
										Bias by Category						
										1	2	3	4	5	6	
										No. Obs	No. Obs	No. Obs	No. Obs	No. Obs	No. Obs	
12	NGM	23	0.514	1220	3.4	1.8	1227	0.422	87.6	0.00	0.98	1.18	1.09	0.90	0.33	**
											3762	372	85	10	3	0
18	NGM	23	0.516	975	3.5	2.1	986	0.389	89.4	0.00	0.99	1.11	1.17	1.43	*	**
											3856	317	54	7	0	0
24	NGM	25	0.525	839	3.6	2.0	850	0.353	90.7	0.00	1.00	1.06	1.00	1.14	1.00	**
											3897	253	56	7	1	0

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

Table 7.7. Verification of NGM MOS surface wind forecasts for 29 stations in the Central Region, 0000 UTC cycle.

Fcst Proj (h)	Direction						Speed									
	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)	Contingency Table					
											Bias by Category		Bias by Category		Bias by Category	
										1	2	3	4	5	6	
										No. Obs	No. Obs	No. Obs	No. Obs	No. Obs	No. Obs	
12	NGM	18	0.586	1834	3.6	2.1	1839	0.429	81.7	0.05	0.95	1.20	1.46	1.33	1.67	1.33
											4128	612	161	43	6	3
18	NGM	20	0.565	2802	3.5	1.6	2812	0.398	69.0	0.19	0.95	1.02	1.30	1.31	1.12	1.38
											3310	1072	385	113	33	8
24	NGM	23	0.555	2092	3.8	2.1	2103	0.391	78.2	0.03	0.95	1.12	1.31	1.38	3.00	1.33
											3990	689	220	52	7	3

Table 7.8. Same as Table 7.7 except for the 1200 UTC cycle.

Fcst Proj (h)	Direction						Speed									
	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)	Contingency Table					
											Bias by Category		Bias by Category		Bias by Category	
											1	2	3	4	5	6
											No. Obs	No. Obs	No. Obs	No. Obs	No. Obs	No. Obs
12	NGM	20	0.564	2076	3.5	2.0	2081	0.431	79.5	0.11	0.95	1.13	1.27	1.36	1.56	3.00
											3944	688	217	53	9	4
18	NGM	20	0.564	1815	3.8	2.3	1826	0.395	80.7	0.29	0.95	1.11	1.79	1.53	0.57	4.00
											4101	644	130	38	14	1
24	NGM	21	0.533	1794	3.9	2.2	1806	0.372	80.1	0.14	0.95	1.18	1.48	1.30	0.50	1.33
											4095	603	157	43	6	3

Table 7.9. Verification of NGM MOS surface wind forecasts for 18 stations in the Western Region, 0000 UTC cycle.

Fcst Proj (h)	Type of Fcst.	Direction					Speed									
		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)	Contingency Table					
											1	2	3	4	5	6
12	NGM	31	0.410	738	4.5	2.7	758	0.388	86.6	0.11	0.97	1.34	1.17	0.75	0.50	0.33
18	NGM	34	0.356	980	4.8	2.2	997	0.387	80.3	0.00	0.98	1.09	1.03	1.00	3.00	2.33
24	NGM	37	0.357	1224	4.3	2.6	1240	0.353	77.7	0.10	0.97	1.10	1.19	1.30	1.33	*
											2490	413	139	27	6	0

Table 7.10. Same as Table 7.9 except for the 1200 UTC cycle.

Fcst Proj (h)	Type of Fcst.	Direction					Speed									
		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)	Contingency Table					
											1	2	3	4	5	6
12	NGM	33	0.379	1202	4.2	2.4	1218	0.348	77.6	0.08	0.97	1.02	1.23	1.65	2.33	*
18	NGM	36	0.334	840	4.6	3.0	858	0.347	84.8	0.00	0.96	1.33	1.34	1.10	1.67	2.00
24	NGM	32	0.352	739	4.6	2.9	758	0.376	86.5	0.15	0.98	1.25	1.16	0.70	1.75	0.33
											2733	236	70	20	4	3

* This category was forecast but was not observed.

Table 7.11. Verification of LFM MOS surface wind forecasts for 6 stations in the Alaska Region, 0000 UTC cycle.

Fcst Proj (h)	Direction					Speed										
	Type of Fcst.	Mean Abs. Error (deg)	Skill Score	No. of Cases	Mean Alg. Error (kt)	Mean Abs. Error (kt)	No. of Cases	Skill Score	Percent Fcst. Correct	Threat Score (>27 kt)	Contingency Table					
											Bias by Category		Bias by Category		Bias by Category	
											1	2	3	4	5	6
											No. Obs	No. Obs	No. Obs	No. Obs	No. Obs	No. Obs
12	LFM	26	0.483	314	4.4	2.6	321	0.407	82.8	0.13	0.95	1.50	0.77	2.40	0.75	1.00
											905	88	47	10	4	1
18	LFM	27	0.426	310	4.5	2.5	315	0.358	82.2	0.13	0.98	1.09	1.09	1.50	4.00	1.00
											896	93	43	14	1	2
24	LFM	33	0.368	370	5.5	3.5	384	0.259	76.2	0.00	0.97	0.96	1.30	1.21	6.00	2.00
											878	119	44	19	2	1

Table 7.12. Same as Table 7.11 except for the 1200 UTC cycle.

Fcst Proj (h)	Direction					Speed										
	Type of Fcst.	Mean Abs. Error (deg)	Skill Score	No. of Cases	Mean Alg. Error (kt)	Mean Abs. Error (kt)	No. of Cases	Skill Score	Percent Fcst. Correct	Threat Score (>27 kt)	Contingency Table					
											Bias by Category		Bias by Category		Bias by Category	
											1	2	3	4	5	6
											No. Obs	No. Obs	No. Obs	No. Obs	No. Obs	No. Obs
12	LFM	30	0.403	357	4.5	2.3	362	0.289	77.6	0.00	0.98	1.09	1.15	0.95	1.50	2.00
											854	115	41	20	2	1
18	LFM	31	0.387	311	4.9	2.3	315	0.310	79.0	0.00	0.98	1.16	1.04	1.07	1.00	2.00
											856	98	51	14	4	1
24	LFM	27	0.434	317	5.2	3.5	330	0.313	79.3	0.11	0.94	1.44	1.09	2.40	0.50	3.00
											877	88	44	10	4	1

Table 7.13. Verification of local surface wind forecasts for 94 stations in the conterminous U.S. for the FT release time of approximately 0900 UTC.

Fcst Proj (h)	Direction						Speed										
	Direction			Contingency Table			Direction			Contingency Table							
	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)	Bias by Category	No. Obs	No. Obs	No. Obs	No. Obs		
3	LOCAL	21	0.557	5813	3.3	1.9	5907	0.445	87.7	0.13	0.98	14266	1.21	0.92	0.59	0.67	0.50
9	LOCAL	29	0.443	9701	3.5	1.4	9797	0.380	74.3	0.13	0.98	12037	1.19	0.83	0.50	0.61	1.20
15	LOCAL	34	0.390	8622	4.2	3.0	8771	0.314	77.7	0.02	0.92	13623	1.58	1.17	0.86	0.91	6.00

Table 7.14. Same as Table 7.13 except for 95 stations for the FT release time of approximately 1800 UTC.

Fcst Proj (h)	Direction						Speed										
	Direction			Contingency Table			Direction			Contingency Table							
	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)	Bias by Category	No. Obs	No. Obs	No. Obs	No. Obs		
3	LOCAL	25	0.498	10037	3.1	1.4	10119	0.436	76.0	0.16	0.97	12036	1.18	0.91	0.79	0.68	0.29
9	LOCAL	30	0.434	6721	4.0	2.5	6895	0.343	83.2	0.10	0.96	14066	1.38	0.91	0.53	0.43	1.00
15	LOCAL	32	0.413	5871	4.1	2.6	6042	0.336	84.8	0.12	0.97	14241	1.30	0.93	0.63	0.40	1.00

Table 7.15. Verification of local surface wind forecasts for 24 stations in the Eastern Region for the FT release time of approximately 0900 UTC.

Fcst Proj (h)	Direction					Speed										
	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)	Contingency Table					
											Bias by Category					
		1		2		3		4		5		6				
		No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.			
		Obs	Obs	Obs	Obs	Obs	Obs	Obs	Obs	Obs	Obs	Obs	Obs			
3	LOCAL	21	0.523	1568	3.3	2.3	1596	0.441	88.0	0.17	0.97	1.35	1.16	0.58	1.00	*
											3677	338	69	19	3	0
9	LOCAL	26	0.426	2537	3.2	1.4	2557	0.371	74.0	0.00	0.99	1.09	0.94	0.44	0.78	*
											3036	829	191	36	9	0
15	LOCAL	32	0.375	2098	4.2	2.9	2143	0.323	79.5	0.10	0.93	1.53	1.11	0.53	0.80	1.00
											3501	452	126	19	5	1

Table 7.16. Same as Table 7.15 except for the FT release time of approximately 1800 UTC.

Fcst Proj (h)	Direction					Speed										
	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)	Contingency Table					
											Bias by Category					
		1		2		3		4		5		6				
		No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.			
		Obs	Obs	Obs	Obs	Obs	Obs	Obs	Obs	Obs	Obs	Obs	Obs			
3	LOCAL	23	0.484	2568	3.0	1.5	2585	0.441	78.2	0.00	0.96	1.18	0.92	0.97	3.50	0.00
											3194	727	190	29	2	3
9	LOCAL	29	0.418	1810	4.0	2.6	1865	0.353	83.1	0.13	0.96	1.36	0.86	0.94	1.67	0.00
											3599	429	96	16	3	1
15	LOCAL	31	0.370	1585	4.2	3.0	1645	0.332	85.3	0.22	0.96	1.48	0.86	1.36	1.00	2.00
											3680	331	77	11	4	1

* This category was forecast but was not observed.

Table 7.17. Verification of local surface wind forecasts for 23 stations in the Southern Region for the FT release time of approximately 0900 UTC.

Fcst Proj (h)	Direction						Speed									
	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)	Contingency Table					
											Bias by Category		Bias by Category		Bias by Category	
										1	2	3	4	5	6	
										No. Obs	No. Obs	No. Obs	No. Obs	No. Obs	No. Obs	
3	LOCAL	20	0.570	1153	3.2	2.0	1171	0.401	91.2	0.00	0.99	1.28	0.65	0.38	** 0.00	
9	LOCAL	27	0.444	2276	3.2	1.6	2291	0.369	79.0	0.00	0.98	1.21	0.76	0.31	1.00 *	
15	LOCAL	32	0.392	1923	4.0	3.1	1953	0.306	83.3	0.00	0.92	1.94	1.01	0.30	1.00 **	
											3520	305	71	10	1	0

Table 7.18. Same as Table 7.17 except for 24 stations for the FT release time of approximately 1800 UTC.

Fcst Proj (h)	Direction						Speed									
	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)	Contingency Table					
											Bias by Category		Bias by Category		Bias by Category	
										1	2	3	4	5	6	
										No. Obs	No. Obs	No. Obs	No. Obs	No. Obs	No. Obs	
3	LOCAL	25	0.484	2499	3.0	1.6	2515	0.398	77.9	0.00	0.96	1.23	0.88	0.79	0.00 **	
9	LOCAL	27	0.447	1397	3.9	2.8	1435	0.273	87.8	0.00	0.97	1.47	0.62	0.00	1.00 **	
15	LOCAL	31	0.435	1173	3.7	2.6	1203	0.318	89.7	0.00	0.99	1.20	0.64	0.33	* **	
											3615	255	42	6	0	0

* This category was forecast but was not observed.

** This category was neither forecast nor observed.

Table 7.19. Verification of local surface wind forecasts for 29 stations in the Central Region for the FT release time of approximately 0900 UTC.

Fcst Proj (h)	Direction						Speed															
	Direction			Speed			Direction			Speed												
	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)	Contingency Table												
Type of Fcst.									Bias by Category													
	1	2	3	4	5	6	1	2	3	4	5	6	No. Obs	No. Obs	No. Obs	No. Obs	No. Obs	No. Obs				
3	LOCAL	19	0.592	2217	3.1	1.6	2244	0.462	83.9	0.12	0.98	1.19	0.88	0.63	1.00	0.50	4144	621	153	41	8	2
9	LOCAL	26	0.482	3388	3.4	1.1	3414	0.374	68.0	0.21	0.94	1.31	0.83	0.59	0.40	1.00	3331	1079	403	114	35	10
15	LOCAL	32	0.410	3012	4.2	2.9	3048	0.304	71.5	0.00	0.87	1.66	1.26	0.96	1.10	*	3977	712	222	49	10	0

Table 7.20. Same as Table 7.19 except for the FT release time of approximately 1800 UTC.

Fcst Proj (h)	Direction						Speed															
	Direction			Speed			Direction			Speed												
	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)	Contingency Table												
Type of Fcst.									Bias by Category													
	1	2	3	4	5	6	1	2	3	4	5	6	No. Obs	No. Obs	No. Obs	No. Obs	No. Obs	No. Obs				
3	LOCAL	22	0.548	3384	2.9	0.9	3401	0.448	71.1	0.23	0.95	1.18	1.00	0.67	0.69	0.30	3221	1166	398	119	36	10
9	LOCAL	28	0.466	2412	3.9	2.2	2456	0.356	78.6	0.11	0.94	1.44	1.01	0.39	0.20	2.00	4087	630	162	49	15	1
15	LOCAL	28	0.446	2213	4.0	2.3	2251	0.346	79.6	0.13	0.95	1.32	1.10	0.50	0.20	1.00	4132	613	151	36	10	3

* This category was forecast but was not observed.

Table 7.21. Verification of local surface wind forecasts for 18 stations in the Western Region for the FT release time of approximately 0900 UTC.

Fcst Proj (h)	Direction						Speed										
	Direction			Speed			Direction			Speed							
	Type of Fcst.	Mean Abs. Error (deg)	Skill Score	No. of Cases	Mean Abs. Error (kt)	Alg. Error (kt)	Mean Alg. Error (kt)	No. of Cases	Skill Score	Percent Fcst. Correct	Threat Score (>27 kt)	Contingency Table					
												1	2	3	4	5	6
												No. Obs	No. Obs	No. Obs	No. Obs	No. Obs	No. Obs
3	LOCAL	29	0.449	875	3.8	1.9	896	0.419	89.0	0.13	1.00	1.02	0.97	0.60	0.14	0.00	
9	LOCAL	41	0.339	1500	4.4	1.9	1535	0.357	78.9	0.05	1.02	1.07	0.74	0.47	1.09	**	
15	LOCAL	41	0.340	1589	4.4	3.0	1627	0.300	78.4	0.00	0.96	1.20	1.14	1.21	0.71	**	
											2625	389	105	19	7	0	

Table 7.22. Same as Table 7.21 except for the FT release time of approximately 1800 UTC.

Fcst Proj (h)	Direction						Speed										
	Direction			Speed			Direction			Speed							
	Type of Fcst.	Mean Abs. Error (deg)	Skill Score	No. of Cases	Mean Abs. Error (kt)	Alg. Error (kt)	Mean Alg. Error (kt)	No. of Cases	Skill Score	Percent Fcst. Correct	Threat Score (>27 kt)	Contingency Table					
												1	2	3	4	5	6
												No. Obs	No. Obs	No. Obs	No. Obs	No. Obs	No. Obs
3	LOCAL	34	0.403	1586	3.8	1.8	1618	0.401	78.6	0.07	1.01	1.09	0.77	1.02	0.40	1.00	
9	LOCAL	39	0.316	1102	4.4	2.8	1139	0.322	84.8	0.00	0.99	1.18	0.93	0.75	0.00	**	
15	LOCAL	42	0.295	900	4.8	2.7	943	0.295	86.3	0.00	1.00	1.11	0.82	0.53	0.17	0.00	
											2814	232	77	19	6	1	

** This category was neither forecast nor observed.

Table 7.23. Verification of local surface wind forecasts for 6 stations in the Alaska Region for the FT release time of approximately 0900 UTC.

Fcst Proj (h)	Direction					Speed																				
	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)	Contingency Table															
											1		2		3		4		5		6					
3	LOCAL	23	0.477	379	3.1	1.7	388	0.540	87.8	0.29	0.99	898	1.15	89	0.96	1.20	0.75	1.00	0.99	898	1.15	89	0.96	1.20	0.75	1.00
9	LOCAL	34	0.382	391	4.5	2.4	405	0.404	83.9	0.11	0.99	904	1.12	95	1.05	0.63	6.00	0.50	0.99	904	1.12	95	1.05	0.63	6.00	0.50
15	LOCAL	39	0.313	421	4.6	2.2	436	0.285	78.8	0.11	1.02	856	0.95	118	0.93	0.53	3.50	0.00	1.02	856	0.95	118	0.93	0.53	3.50	0.00

Table 7.24. Same as Table 7.23 except for the FT release time of approximately 1800 UTC.

Fcst Proj (h)	Direction					Speed																				
	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)	Contingency Table															
											1		2		3		4		5		6					
3	LOCAL	33	0.368	467	4.5	2.5	485	0.353	79.6	0.00	0.98	850	1.07	115	1.43	0.75	1.00	0.00	0.98	850	1.07	115	1.43	0.75	1.00	0.00
9	LOCAL	40	0.292	459	5.2	2.9	481	0.292	78.6	0.00	0.98	857	1.18	99	1.10	0.86	0.50	0.00	0.98	857	1.18	99	1.10	0.86	0.50	0.00
15	LOCAL	43	0.274	444	5.4	3.8	478	0.273	78.3	0.00	0.94	874	1.44	87	1.32	1.30	1.00	0.00	0.94	874	1.44	87	1.32	1.30	1.00	0.00

Table 7.25. Comparative verification of local and NGM MOS 42-h significant wind forecasts for 94 stations in the conterminous U.S., 0000 UTC cycle.

Type of Verifying Observation	Type of Forecast	Bias by Category		Skill Score	Percent Forecast Correct	Threat Score ≥ 22 kt
		< 22 kt	≥ 22 kt			
1-min Avg	LOCAL	0.97	2.15	0.247	93.6	0.16
	NGM MOS	1.00	0.94	0.314	96.4	0.20
	No. Obs.	8682	251			
\pm 3-h Max	LOCAL	1.01	0.86	0.292	91.3	0.20
	NGM MOS	1.05	0.38	0.276	93.3	0.18
	No. Obs.	8304	627			

Table 7.26. Same as Table 7.25 except for 93 stations for the 1200 UTC cycle.

Type of Verifying Observation	Type of Forecast	Bias by Category		Skill Score	Percent Forecast Correct	Threat Score ≥ 22 kt
		< 22 kt	≥ 22 kt			
1-min Avg	LOCAL	0.96	5.71	0.064	95.1	0.04
	NGM MOS	1.00	1.00	0.136	98.7	0.08
	No. Obs.	8851	70			
\pm 3-h Max	LOCAL	0.98	1.62	0.121	93.9	0.08
	NGM MOS	1.02	0.28	0.154	97.0	0.09
	No. Obs.	8674	247			

Table 7.27. Comparative verification of local and LFM MOS 42-h significant wind forecasts for 6 stations in the Alaska Region, 0000 UTC cycle.

Type of Verifying Observation	Type of Forecast	Bias by Category		Skill Score	Percent Forecast Correct	Threat Score ≥ 22 kt
		< 22 kt	≥ 22 kt			
1-min Avg	LOCAL	0.96	2.70	0.259	94.2	0.16
	LFM MOS	1.00	1.09	0.275	96.8	0.17
	No. Obs.	1025	23			
\pm 3-h Max	LOCAL	1.00	1.03	0.337	92.5	0.23
	LFM MOS	1.04	0.42	0.183	93.4	0.12
	No. Obs.	958	60			

Table 7.28. Same as Table 7.27 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	0.96	2.90	0.094	92.8	0.06
	LFM MOS	0.99	1.38	0.180	96.0	0.11
	No. Obs.	982	21			
\pm 3-h Max	LOCAL	0.98	1.45	0.192	91.9	0.13
	LFM MOS	1.01	0.69	0.285	94.9	0.18
	No. Obs.	928	42			

Table 8.1. Comparative verification of NGM MOS and persistence ceiling height forecasts for 96 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	NGM MOS	0.97	1.13	1.07	0.98	3.320	73.8	0.405
	PERSISTENCE	0.89	0.91	0.95	1.03	1.998	82.9	0.591
	No. Obs.	912	891	2086	10841			
15	NGM MOS	1.02	1.08	1.07	0.98	3.686	71.3	0.374
	PERSISTENCE	0.97	0.81	0.87	1.05	2.840	76.1	0.440
	No. Obs.	827	990	2221	10471			
18	NGM MOS	1.00	1.18	1.08	0.97	2.816	73.7	0.388
	PERSISTENCE	1.70	1.00	0.78	1.02	2.999	74.3	0.371
	No. Obs.	454	798	2456	10734			
24	NGM MOS	0.94	1.14	1.10	0.98	2.362	77.9	0.346
	PERSISTENCE	2.05	1.36	1.06	0.94	3.394	72.4	0.241
	No. Obs.	368	577	1780	11624			

Table 8.2. Same as Table 8.1 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	NGM MOS	1.02	1.15	1.12	0.97	2.119	79.5	0.402
	PERSISTENCE	0.91	1.10	1.17	0.97	1.334	85.7	0.585
	No. Obs.	378	581	1794	11667			
15	NGM MOS	1.05	1.06	1.09	0.98	2.556	77.6	0.370
	PERSISTENCE	0.72	0.96	1.19	0.98	1.960	80.9	0.455
	No. Obs.	477	667	1755	11499			
18	NGM MOS	1.00	1.04	1.04	0.99	2.930	75.9	0.356
	PERSISTENCE	0.55	0.88	1.14	1.01	2.534	77.2	0.373
	No. Obs.	609	721	1804	11181			
24	NGM MOS	1.03	1.17	1.01	0.98	3.877	71.1	0.341
	PERSISTENCE	0.37	0.74	1.02	1.07	3.580	70.8	0.261
	No. Obs.	894	871	2032	10614			

Table 8.3. Comparative verification of LFM MOS and persistence ceiling height forecasts for 6 stations in the Alaska Region, 0000 UTC cycle.

Projection (h)	Type of Forecast	Bias by Category				Log Score	Percent Correct	Skill Score
		1	2	3	4			
12	LFM MOS	0.61	1.43	1.59	0.87	3.602	68.1	0.322
	PERSISTENCE	0.86	1.16	0.93	1.02	2.184	81.0	0.532
	No. Obs.	49	37	177	763			
18	LFM MOS	0.88	1.31	1.71	0.82	3.476	64.7	0.268
	PERSISTENCE	1.31	1.10	0.90	1.01	3.189	71.8	0.301
	No. Obs.	32	39	186	765			
24	LFM MOS	0.89	1.18	1.93	0.80	3.435	63.9	0.236
	PERSISTENCE	1.63	0.88	1.02	0.98	3.750	68.1	0.181
	No. Obs.	27	49	163	803			

Table 8.4. Same as Table 8.3 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	LFM MOS	1.50	1.04	1.73	0.83	3.445	67.9	0.297
	PERSISTENCE	1.12	0.94	1.07	0.99	1.860	81.7	0.521
	No. Obs.	26	47	156	780			
18	LFM MOS	1.23	1.31	2.00	0.77	3.789	63.7	0.259
	PERSISTENCE	0.90	1.05	1.05	0.99	3.036	72.1	0.271
	No. Obs.	31	39	157	762			
24	LFM MOS	0.82	1.70	1.69	0.81	4.245	61.5	0.231
	PERSISTENCE	0.60	1.11	0.95	1.03	3.746	68.5	0.219
	No. Obs.	45	37	177	734			

Table 8.5. Comparative verification of local and persistence ceiling height forecasts for 94 stations in the conterminous U.S. for the FT release 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	0.80	1.02	1.11	1.00	2.120	81.6	0.551
	PERSISTENCE	0.85	0.92	0.95	1.03	1.921	83.6	0.583
	No. Obs.	943	907	2114	12162			
6	LOCAL	0.45	0.78	1.19	1.02	2.544	77.7	0.453
	PERSISTENCE	0.93	0.82	0.88	1.04	2.695	77.6	0.442
	No. Obs.	859	1011	2280	11959			
9	LOCAL	0.31	0.64	1.10	1.03	2.049	78.6	0.425
	PERSISTENCE	1.84	1.00	0.79	1.01	2.846	75.3	0.361
	No. Obs.	435	826	2545	12282			
15	LOCAL	0.23	0.78	1.42	0.97	1.886	79.9	0.368
	PERSISTENCE	2.14	1.43	1.08	0.94	3.264	73.8	0.238
	No. Obs.	376	581	1854	13283			

Table 8.6. Same as Table 8.5 except for 95 stations for the FT release 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	0.58	1.05	1.18	0.98	1.407	84.2	0.538
	PERSISTENCE	1.28	1.32	1.18	0.95	1.497	84.1	0.559
	No. Obs.	343	641	2158	13067			
6	LOCAL	0.43	1.07	1.39	0.96	1.665	82.2	0.457
	PERSISTENCE	1.14	1.44	1.36	0.93	1.997	79.6	0.418
	No. Obs.	383	584	1866	13300			
9	LOCAL	0.38	1.02	1.49	0.95	2.004	80.0	0.419
	PERSISTENCE	0.90	1.23	1.41	0.94	2.379	77.4	0.368
	No. Obs.	485	685	1805	13153			
15	LOCAL	0.47	1.13	1.47	0.95	2.809	74.8	0.376
	PERSISTENCE	0.55	1.00	1.27	0.99	3.188	72.5	0.287
	No. Obs.	800	840	1997	12458			

Table 8.7. Comparative verification of local and persistence ceiling height forecasts for 6 stations in the Alaska Region for the FT release time of approximately 0900 UTC.

Projection (h)	Type of Forecast	Bias by Category				Log Score	Percent Correct	Skill Score
		1	2	3	4			
3	LOCAL	0.64	0.95	0.98	1.03	1.994	81.5	0.537
	PERSISTENCE	0.90	1.00	0.91	1.03	2.359	80.5	0.516
	No. Obs.	50	37	176	758			
6	LOCAL	0.51	0.64	1.21	1.01	2.632	76.9	0.413
	PERSISTENCE	0.88	0.88	1.03	1.01	3.180	73.9	0.341
	No. Obs.	51	42	159	780			
9	LOCAL	0.48	0.54	1.09	1.02	2.416	75.3	0.352
	PERSISTENCE	1.36	1.06	0.88	1.01	3.132	72.5	0.299
	No. Obs.	33	35	184	781			
15	LOCAL	0.15	0.29	1.32	1.01	2.609	72.0	0.225
	PERSISTENCE	1.67	0.77	1.04	0.98	3.757	68.6	0.176
	No. Obs.	27	48	153	790			

Table 8.8. Same as Table 8.7 except for the FT release 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	0.25	0.38	1.28	1.01	2.382	75.5	0.319
	PERSISTENCE	1.04	0.94	1.11	0.98	1.864	81.5	0.515
	No. Obs.	28	48	149	782			
6	LOCAL	0.27	0.23	1.20	1.02	2.500	73.6	0.268
	PERSISTENCE	1.04	1.10	1.01	0.99	2.665	75.2	0.352
	No. Obs.	26	39	163	764			
9	LOCAL	0.16	0.19	1.40	1.00	2.658	74.0	0.291
	PERSISTENCE	0.91	1.02	1.10	0.98	3.131	71.6	0.258
	No. Obs.	32	43	153	782			
15	LOCAL	0.12	0.22	1.32	1.02	3.383	68.3	0.207
	PERSISTENCE	0.57	1.19	0.97	1.03	3.872	67.8	0.207
	No. Obs.	49	37	174	739			

Table 9.1. Comparative verification of NGM MOS and persistence visibility forecasts for 96 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	NGM MOS	1.21	1.02	1.20	0.97	2.627	78.4	0.327
	PERSISTENCE	0.80	0.79	0.88	1.03	1.556	86.1	0.503
	No. Obs.	522	771	1475	13379			
15	NGM MOS	1.31	1.11	1.24	0.96	2.779	77.8	0.340
	PERSISTENCE	0.83	0.60	0.98	1.04	2.248	81.4	0.343
	No. Obs.	488	1006	1301	13153			
18	NGM MOS	1.17	1.11	1.45	0.96	1.929	83.5	0.323
	PERSISTENCE	1.54	0.86	1.44	0.97	2.218	81.9	0.240
	No. Obs.	270	708	905	14168			
24	NGM MOS	1.14	1.13	1.29	0.98	1.550	86.1	0.309
	PERSISTENCE	2.24	1.11	1.54	0.95	2.291	81.5	0.171
	No. Obs.	189	553	851	14626			

Table 9.2. Same as Table 9.1 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	NGM MOS	1.24	1.10	1.35	0.97	1.418	86.9	0.358
	PERSISTENCE	1.09	1.06	0.95	1.00	0.972	90.8	0.500
	No. Obs.	180	554	856	14532			
15	NGM MOS	1.15	1.15	1.25	0.98	1.571	86.2	0.336
	PERSISTENCE	0.91	1.19	0.87	1.00	1.329	88.1	0.363
	No. Obs.	217	493	923	14338			
18	NGM MOS	1.08	1.32	1.12	0.98	1.929	84.0	0.329
	PERSISTENCE	0.57	1.16	0.72	1.03	1.772	85.2	0.272
	No. Obs.	332	506	1107	14037			
24	NGM MOS	1.13	1.13	1.22	0.96	2.858	77.3	0.306
	PERSISTENCE	0.37	0.76	0.55	1.09	2.662	78.9	0.152
	No. Obs.	534	780	1461	13270			

Table 9.3. Comparative verification of LFM MOS and persistence visibility forecasts for 6 stations in the Alaska Region, 0000 UTC cycle.

Projection (h)	Type of Forecast	Bias by Category				Log Score	Percent Correct	Skill Score
		1	2	3	4			
12	LFM MOS	0.86	1.19	1.09	0.99	3.731	74.0	0.177
	PERSISTENCE	0.67	1.23	0.96	1.01	2.417	82.0	0.407
	No. Obs.	49	53	79	855			
18	LFM MOS	1.08	1.00	1.58	0.95	3.729	71.7	0.185
	PERSISTENCE	0.87	0.89	1.07	1.01	3.404	75.0	0.190
	No. Obs.	38	74	72	844			
24	LFM MOS	0.81	0.87	1.77	0.96	3.545	73.3	0.210
	PERSISTENCE	0.81	0.83	1.18	1.01	4.015	71.9	0.085
	No. Obs.	42	78	66	857			

Table 9.4. Same as Table 9.3 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	LFM MOS	0.69	0.81	1.61	0.98	3.288	74.7	0.232
	PERSISTENCE	1.43	0.97	1.00	0.98	2.443	81.6	0.445
	No. Obs.	42	75	67	829			
18	LFM MOS	0.83	0.86	1.79	0.94	3.339	71.8	0.169
	PERSISTENCE	2.07	1.08	0.85	0.97	3.697	74.7	0.217
	No. Obs.	29	66	78	829			
24	LFM MOS	0.78	0.83	2.16	0.91	3.749	70.2	0.191
	PERSISTENCE	1.28	1.37	0.84	0.98	4.121	72.3	0.160
	No. Obs.	46	54	80	826			

Table 9.5. Comparative verification of local and persistence visibility forecasts for 94 stations in the conterminous U.S. for the FT release 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	0.75	0.76	1.26	0.99	1.816	83.1	0.450
	PERSISTENCE	0.79	0.79	0.90	1.03	1.582	86.1	0.513
	No. Obs.	556	765	1480	13316			
6	LOCAL	0.34	0.45	1.08	1.06	2.169	81.0	0.322
	PERSISTENCE	0.82	0.59	0.98	1.04	2.277	81.0	0.351
	No. Obs.	536	1034	1372	13162			
9	LOCAL	0.21	0.38	1.21	1.03	1.408	86.7	0.288
	PERSISTENCE	1.77	0.90	1.46	0.96	2.204	81.9	0.243
	No. Obs.	249	668	914	14253			
15	LOCAL	0.22	0.41	1.20	1.02	1.261	87.9	0.287
	PERSISTENCE	2.26	1.06	1.56	0.95	2.341	81.1	0.174
	No. Obs.	196	570	860	14465			

Table 9.6. Same as Table 9.5 except for 95 stations for the FT release 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	0.44	0.61	1.45	1.00	1.034	89.4	0.423
	PERSISTENCE	1.27	1.15	1.16	0.98	1.121	89.6	0.472
	No. Obs.	196	588	810	14611			
6	LOCAL	0.37	0.59	1.37	1.00	1.171	88.2	0.365
	PERSISTENCE	1.28	1.19	1.08	0.98	1.431	87.2	0.360
	No. Obs.	194	570	872	14499			
9	LOCAL	0.37	0.75	1.37	0.99	1.357	86.6	0.334
	PERSISTENCE	1.05	1.33	0.96	0.99	1.634	85.7	0.303
	No. Obs.	236	510	981	14401			
15	LOCAL	0.45	1.01	1.43	0.98	2.096	80.6	0.306
	PERSISTENCE	0.56	1.11	0.71	1.04	2.340	80.9	0.201
	No. Obs.	440	605	1327	13721			

Table 9.7. Comparative verification of local and persistence visibility forecasts for 6 stations in the Alaska Region for the FT release time of approximately 0900 UTC.

Projection (h)	Type of Forecast	Bias by Category				Log Score	Percent Correct	Skill Score
		1	2	3	4			
3	LOCAL	0.58	0.75	1.17	1.03	2.060	82.9	0.426
	PERSISTENCE	0.72	1.05	1.07	1.01	2.507	81.7	0.410
	No. Obs.	50	57	75	835			
6	LOCAL	0.61	0.56	1.30	1.02	2.569	78.8	0.269
	PERSISTENCE	0.85	1.00	1.07	1.00	3.002	78.2	0.285
	No. Obs.	41	61	76	849			
9	LOCAL	0.31	0.41	1.37	1.05	2.476	79.3	0.250
	PERSISTENCE	1.00	0.82	1.16	1.00	3.340	75.3	0.195
	No. Obs.	36	74	70	849			
15	LOCAL	0.08	0.26	1.29	1.09	2.730	78.2	0.145
	PERSISTENCE	0.92	0.77	1.23	1.01	3.983	72.1	0.087
	No. Obs.	39	74	65	837			

Table 9.8. Same as Table 9.7 except for the FT release 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	0.24	0.30	1.37	1.07	2.658	79.4	0.227
	PERSISTENCE	1.45	1.03	0.97	0.98	2.418	82.0	0.449
	No. Obs.	42	73	63	828			
6	LOCAL	0.23	0.23	1.32	1.08	2.700	77.8	0.197
	PERSISTENCE	1.66	0.93	0.87	0.99	3.386	76.8	0.305
	No. Obs.	35	81	69	802			
9	LOCAL	0.21	0.30	1.31	1.05	2.557	77.4	0.164
	PERSISTENCE	2.18	1.17	0.79	0.97	3.736	74.6	0.217
	No. Obs.	28	64	81	833			
15	LOCAL	0.16	0.31	1.56	1.04	3.121	75.1	0.145
	PERSISTENCE	1.22	1.36	0.81	0.98	4.203	72.2	0.162
	No. Obs.	49	55	78	817			

