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AFOS-ERA VERIFICATION OF GUIDANCE AND LOCAL AVIATION/PUBLIC WEATHER FORECASTS--NO. 25 (OCTOBER 1995 - MARCH 1996)

Valery J. Dagostaro and J. Paul Dallavalle

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1. INTRODUCTION

This office note continues the series of Meteorological Development Laboratory (MDL) office notes which present verification results for MDL'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 1995 through March 1996 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 101 stations in the conterminous U.S. and Alaska listed in Table 1.3. The scores are those recommended in the NWS National Verification Plan (National Weather Service 1982). Definitions of the categories used for verification are given in Table 1.4. For the aviation weather elements, we verified the local forecasts associated with the FT issuance times of approximately 0900 and 1800 UTC. Objective guidance for the aviation weather elements, as well as all local and guidance forecasts for the public weather elements, were verified for the 0000 and 1200 UTC forecast cycles. Because verification data or forecast projections for Alaska differ from those of the conterminous U.S., data for the six Alaskan stations were verified separately from those of the conterminous U.S.

For most weather elements, verification results are presented for all stations in the conterminous U.S. combined, followed by results for each of the four NWS regions in the conterminous U.S. and for the Alaska Region.

Following this convention, max/min temperature scores are presented in Tables 2.1 - 2.12. For PoP, scores are presented in Tables 3.1 - 3.10 for the conterminous U.S. stations combined and for the four NWS regions in the conterminous U.S. PoP verification scores were unavailable for the Alaskan stations (see Section 2). 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. sites 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 1995 - MARCH 1996)

During the 1995-96 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. Please note that for some weather elements, forecast definitions for LFM and NGM MOS differ slightly. In preparation for the termination of the LFM model in February 1996, dissemination of the LFM MOS guidance products for Alaska (i.e, the FMAK1 and FMAK2 bulletins) ceased on January 24, 1996. Although NGM-based MOS guidance was available for the Alaskan sites in the FOAK13 bulletin, Alaska's data collection software was unable to process the MOS guidance and, for the remainder of the cool season, no AEV data were received for stations in Alaska. As a result, the data sample for Alaska is smaller than usual.

Twenty-eight AEV stations were commissioned as ASOS sites during the cool season. The stations listed below were commissioned on the dates indicated: October 1, 1995 - Charleston, South Carolina; Erie, Pennsylvania; and Shreveport, Louisiana; November 1, 1995 - Cheyenne, Wyoming; Fargo, North Dakota; Tampa, Florida; and Portland, Oregon; December 1, 1995 - Boise, Idaho; Buffalo, New York; Cleveland, Ohio; Columbia, South Carolina; Dallas-Ft. Worth, Texas; Des Moines, Iowa; Philadelphia, Pennsylvania; and Springfield, Illinois; January 1, 1996 - Indianapolis, Indiana and Tucson, Arizona; February 1, 1996 - Beckley, West Virginia; Burlington, Vermont; Chicago (O'Hare), Illinois; Mobile, Alabama; North Platte, Nebraska; and Raleigh-Durham, North Carolina; February 22, 1996 - Omaha, Nebraska; and March 1, 1996 - Albuquerque, New Mexico; Lexington, Kentucky; Norfolk, Virginia; and Pocatello, Idaho. Because the ASOS cloud amount observations are incomplete, we set to missing the observed cloud amount data for those 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 1995-96 cool season. In addition, snow amount observations were unavailable for ASOS sites.

Dagostaro and Dallavalle (1997) documented problems affecting the locally-collected LFM MOS PoP forecasts and the verifying precipitation observations

for stations in Alaska. Although we continued to replace the LFM MOS PoP forecasts with values whose valid times matched those of the local forecasts, neither the local nor MOS PoP forecasts were verified due to the lack of verifying observations.

For the 1995-96 cool season, we eliminated from the data archive all precipitation amount observations for Providence, Rhode Island. The ASOS precipitation amount sensor caused dew to be reported as measurable precipitation. Although the problem probably occurred at other ASOS sites, the forecasters at the Taunton Weather Forecast Office seemed particularly concerned about the observations at Providence.

3. REFERENCES

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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	FMAK1	24, 48 36, 60	0000 1200	Calendar day max temperature forecast for Alaska; guidance no longer available for the conterminous U.S.
	NGM MOS	FWC	24, 48 36, 60	0000 1200	Daytime max temperature forecast.
	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. 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 and NGM MOS definitions of the max for all stations.
Min temp	LFM MOS	FMAK1	36, 60 24, 48	0000 1200	Calendar day min temperature forecast for Alaska; guidance no longer available for the conterminous U.S.
	NGM MOS	FWC	36, 60 24, 48	0000 1200	Nighttime min temperature forecast.
	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. 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 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	Forecasts are for 12-h periods ending at the indicated projections.
	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.
		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 are based on 0000 or 1200 UTC. Verifying obs corresponding to the guidance are from MDL 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 MDL 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 MDL.
	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 MDL.
Visibility	LFM MOS	FMAK2	12, 18, 24	0000, 1200	See ceiling height.
	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.

[1]Data 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 and FMAK1/FMAK2 were terminated on January 24, 1996
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

[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	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	431
Alaska	max/min temperature	LFM	329
	PoP	LFM	329
	cloud amount	LFM	329
	surface wind	LFM	329
	ceiling height	LFM	338
	visibility	LFM	338

Table 1.3. Ninety-five stations in the conterminous U.S. and six stations in Alaska used for 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[1]	Norfolk, Virginia
PWM[1]	Portland, Maine	CON[1]	Concord, New Hampshire
BOS	Boston, Massachusetts	PVD[1,6]	Providence, Rhode Island
ALB[1]	Albany, New York	BTV[1]	Burlington, Vermont
BUF[1]	Buffalo, New York	SYR[1]	Syracuse, New York
LGA	New York (LaGuardia), New York	EWR	Newark, New Jersey
RDU[1]	Raleigh-Durham, North Carolina	CLT	Charlotte, North Carolina
CLE[1]	Cleveland, Ohio		
PHL[1]	Philadelphia, Pennsylvania	AVP	Scranton, Pennsylvania
PIT	Pittsburgh, Pennsylvania	ERI[1]	Erie, Pennsylvania
CAE[1]	Columbia, South Carolina	CHS[1]	Charleston, South Carolina
CRW[1]	Charleston, West Virginia	BKW[1]	Beckley, West Virginia
BHM	Birmingham, Alabama	MOB[1]	Mobile, Alabama
AMA[1]	Amarillo, Texas	BRO[1]	Brownsville, Texas
LIT	Little Rock, Arkansas	FSM[1]	Fort Smith, Arkansas
MIA[2]	Miami, Florida	MLB[2,3]	Melbourne, Florida
TPA[1,2]	Tampa, Florida		
ATL[1]	Atlanta, Georgia	SAV	Savannah, Georgia
MSY	New Orleans, Louisiana	SHV[1]	Shreveport, Louisiana
JAN[1]	Jackson, Mississippi	MEI[1]	Meridian, Mississippi
ABQ[1]	Albuquerque, New Mexico	TCC[4]	Tucumcari, New Mexico
OKC[1]	Oklahoma City, Oklahoma	TUL[1]	Tulsa, Oklahoma
MEM	Memphis, Tennessee	BNA	Nashville, Tennessee
DFW[1]	Dallas-Ft. Worth, Texas	ABI	Abilene, Texas
LBB[1]	Lubbock, Texas	ELP[1]	El Paso, Texas
SAT[1]	San Antonio, Texas	IAH	Houston, Texas
DEN[1]	Denver, Colorado	GJT	Grand Junction, Colorado
ORD[1]	Chicago (O'Hare), Illinois	SPI[1]	Springfield, Illinois
IND[1]	Indianapolis, Indiana		
DSM[1]	Des Moines, Iowa	ALO	Waterloo, Iowa
TOP[1]	Topeka, Kansas	ICT[1]	Wichita, Kansas
SDF[1]	Louisville, Kentucky	LEX[1]	Lexington, Kentucky
DTW[1]	Detroit, Michigan	GRR[1]	Grand Rapids, Michigan
MSP	Minneapolis, Minnesota	DLH	Duluth, Minnesota
STL	St. Louis, Missouri	MCI[1]	Kansas City, Missouri
OMA[1]	Omaha, Nebraska	LBF[1]	North Platte, Nebraska
BIS	Bismarck, North Dakota	FAR[1]	Fargo, North Dakota
FSD	Sioux Falls, South Dakota	RAP[1]	Rapid City, South Dakota
MKE[1]	Milwaukee, Wisconsin	MSN	Madison, Wisconsin
CYS[1]	Cheyenne, Wyoming	CPR	Casper, Wyoming
PHX[1,2]	Phoenix, Arizona	TUS[1,2]	Tucson, Arizona
LAX[2,5]	Los Angeles, California	SAN[2]	San Diego, California
SFO[2]	San Francisco, California	FAT[1,2]	Fresno, California
BOI[1]	Boise, Idaho	PIH[1]	Pocatello, Idaho
GTF[1]	Great Falls, Montana	BIL[1]	Billings, Montana
RNO[1]	Reno, Nevada	LAS[1]	Las Vegas, Nevada
PDX[1]	Portland, Oregon	MFR	Medford, Oregon
SLC	Salt Lake City, Utah	CDC	Cedar City, Utah
SEA	Seattle-Tacoma, Washington	GEG[1]	Spokane, Washington
ANC[2,6]	Anchorage, Alaska	BET[2,6]	Bethel, Alaska
FAI[2,6]	Fairbanks, Alaska	OME[2,6]	Nome, Alaska
JNU[2,6]	Juneau, Alaska	YAK[2,6]	Yakutat, Alaska

[1]Cloud amount observations were not used and snow amount observations were unavailable after the station was commissioned as an ASOS site.
[2]Precipitation type and snow amount were not verified for this station.
[3]MLB had no data for the cloud amount and 42-h significant wind verifications.
[4]TCC 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.
[5]LAX was not included in the max/min temperature and PoP verifications.
[6]PoP was not verified for this site.

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 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		0.2	2.9	1.6	--	--	89.7
	NGM MOS	16128	0.2	3.4	3.1	--	--	85.9
Tonight's Min	LOCAL		0.3	3.5	2.8	0.66	0.21	83.0
	NGM MOS	16143	0.4	3.8	3.8	0.63	0.24	80.4
Tomorrow's Max	LOCAL		0.2	3.9	4.8	--	--	81.8
	NGM MOS	16086	0.6	4.3	7.2	--	--	77.2
Tomorrow Night's Min	LOCAL		0.3	4.5	7.4	0.57	0.31	71.7
	NGM MOS	16110	0.7	4.8	9.2	0.56	0.32	67.6

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		-0.1	3.1	1.7	0.69	0.19	86.1
	NGM MOS	16165	0.4	3.5	2.7	0.65	0.19	83.3
Tomorrow's Max	LOCAL		0.1	3.5	3.2	--	--	85.2
	NGM MOS	16115	0.7	4.0	5.3	--	--	80.9
Tomorrow Night's Min	LOCAL		0.3	3.9	4.8	0.63	0.26	78.1
	NGM MOS	16121	0.8	4.2	6.2	0.61	0.25	75.2
Day After Tomorrow's Max	LOCAL		0.5	4.4	7.3	--	--	76.6
	NGM MOS	16058	1.1	4.9	9.9	--	--	71.4

Table 2.3. Comparative verification of local and NGM MOS max/min temperature forecasts for 23 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	4067	0.2	2.9	1.7	--	--	88.2
	NGM MOS		0.5	3.3	2.4	--	--	84.7
Tonight's Min	LOCAL	4056	0.2	3.2	1.4	0.70	0.17	83.9
	NGM MOS		0.5	3.4	2.2	0.69	0.19	81.6
Tomorrow's Max	LOCAL	4058	0.4	3.7	3.8	--	--	81.2
	NGM MOS		1.0	4.0	5.2	--	--	77.3
Tomorrow Night's Min	LOCAL	4052	0.3	4.1	5.5	0.66	0.20	73.7
	NGM MOS		0.7	4.3	6.2	0.63	0.23	70.9

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

Forecast Projection	Forecast Type	Number of Cases	Mean Algebraic Error (°F)	Mean Absolute Error (°F)	Percent of Absolute Errors >10°F	Probability of Detection (32°F)	False Alarm Ratio (32°F)	Improvement Over Climate
Tonight's Min	LOCAL	4059	-0.3	3.0	1.0	0.75	0.16	86.2
	NGM MOS		0.3	3.2	1.7	0.71	0.15	83.9
Tomorrow's Max	LOCAL	4060	0.3	3.5	2.7	--	--	83.3
	NGM MOS		1.2	3.9	4.8	--	--	79.3
Tomorrow Night's Min	LOCAL	4045	0.3	3.6	3.1	0.74	0.17	80.1
	NGM MOS		0.8	3.7	3.8	0.72	0.19	78.2
Day After Tomorrow's Max	LOCAL	4048	0.7	4.2	5.2	--	--	76.7
	NGM MOS		1.7	4.5	7.0	--	--	73.1

Table 2.5. Comparative verification of local and NGM MOS max/min temperature forecasts for 26 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	2.8	1.5	--	--	90.1
	NGM MOS	4431	0.1	3.2	3.0	--	--	86.5
Tonight's Min	LOCAL		0.0	3.4	2.5	0.60	0.28	83.2
	NGM MOS	4422	0.2	3.7	3.5	0.53	0.31	80.6
Tomorrow's Max	LOCAL		0.2	3.8	4.6	--	--	81.9
	NGM MOS	4413	0.5	4.3	7.5	--	--	75.8
Tomorrow Night's Min	LOCAL		0.0	4.5	7.1	0.50	0.38	70.8
	NGM MOS	4410	0.7	4.9	9.8	0.43	0.39	64.5

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

Forecast Projection	Forecast Type	Number of Cases	Mean Algebraic Error (°F)	Mean Absolute Error (°F)	Percent of Absolute Errors >10°F	Probability of Detection (32°F)	False Alarm Ratio (32°F)	Improvement Over Climate
Tonight's Min	LOCAL		-0.1	3.1	1.4	0.64	0.24	86.1
	NGM MOS	4420	0.5	3.3	1.9	0.59	0.21	84.2
Tomorrow's Max	LOCAL		0.1	3.3	3.0	--	--	85.6
	NGM MOS	4414	0.5	3.8	4.9	--	--	80.8
Tomorrow Night's Min	LOCAL		0.1	3.9	4.6	0.56	0.32	77.2
	NGM MOS	4409	0.7	4.2	6.3	0.50	0.29	73.9
Day After Tomorrow's Max	LOCAL		0.4	4.3	7.5	--	--	75.4
	NGM MOS	4402	0.9	5.0	11.0	--	--	68.0

Table 2.7. Comparative verification of local and NGM MOS max/min temperature forecasts for 27 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	4677	0.1	3.2	2.1	--	--	90.8
	NGM MOS		0.1	3.9	4.5	--	--	87.0
Tonight's Min	LOCAL	4710	0.7	4.0	4.6	0.71	0.14	83.0
	NGM MOS		0.8	4.3	6.0	0.69	0.14	80.3
Tomorrow's Max	LOCAL	4667	0.3	4.4	7.0	--	--	83.0
	NGM MOS		0.7	5.0	10.8	--	--	78.0
Tomorrow Night's Min	LOCAL	4697	1.0	5.2	10.9	0.57	0.32	71.2
	NGM MOS		1.1	5.5	13.3	0.64	0.32	67.3

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	4739	0.2	3.5	2.7	0.71	0.16	86.6
	NGM MOS		0.7	4.0	4.4	0.70	0.16	83.3
Tomorrow's Max	LOCAL	4702	0.2	3.9	4.3	--	--	86.8
	NGM MOS		0.7	4.5	7.2	--	--	82.7
Tomorrow Night's Min	LOCAL	4726	0.9	4.5	7.1	0.63	0.23	78.0
	NGM MOS		1.3	4.8	9.1	0.65	0.20	75.0
Day After Tomorrow's Max	LOCAL	4681	0.7	5.0	10.6	--	--	77.7
	NGM MOS		1.5	5.6	14.2	--	--	72.9

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	2953	0.2	2.7	0.9	--	--	88.0
	NGM MOS		0.0	3.1	1.9	--	--	83.6
Tonight's Min	LOCAL	2955	0.1	3.2	2.4	0.64	0.27	81.2
	NGM MOS		0.1	3.4	3.0	0.56	0.43	78.1
Tomorrow's Max	LOCAL	2948	0.0	3.4	3.2	--	--	79.1
	NGM MOS		0.1	3.6	3.8	--	--	77.2
Tomorrow Night's Min	LOCAL	2951	-0.1	3.9	5.2	0.52	0.36	71.5
	NGM MOS		0.0	4.1	5.9	0.56	0.37	68.8

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	2947	0.0	2.8	1.5	0.62	0.24	84.8
	NGM MOS		0.3	3.2	2.4	0.49	0.38	80.6
Tomorrow's Max	LOCAL	2939	0.0	3.1	2.4	--	--	82.9
	NGM MOS		0.2	3.5	3.8	--	--	78.9
Tomorrow Night's Min	LOCAL	2941	0.0	3.5	3.5	0.53	0.40	77.2
	NGM MOS		0.2	3.8	4.9	0.55	0.44	73.7
Day After Tomorrow's Max	LOCAL	2927	0.0	3.7	4.5	--	--	75.9
	NGM MOS		0.2	4.0	5.5	--	--	71.5

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

Forecast Projection	Forecast Type	Number of Cases	Mean Algebraic Error (°F)	Mean Absolute Error (°F)	Percent of Absolute Errors >10°F	Probability of Detection (32°F)	False Alarm Ratio (32°F)	Improvement Over Climate
Today's Max	LOCAL	616	0.5	3.5	3.4	--	--	81.5
	LFM MOS		1.6	3.8	3.6	--	--	79.1
Tonight's Min	LOCAL	611	-1.0	5.0	9.8	0.25	0.67	70.7
	LFM MOS		-1.8	5.0	10.6	0.50	0.33	70.9
Tomorrow's Max	LOCAL	607	0.5	4.4	8.1	--	--	70.9
	LFM MOS		1.8	4.4	9.1	--	--	71.0
Tomorrow Night's Min	LOCAL	607	-0.6	5.8	16.0	0.25	0.50	61.4
	LFM MOS		-1.3	6.0	16.1	0.25	0.67	60.9

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

Forecast Projection	Forecast Type	Number of Cases	Mean Algebraic Error (°F)	Mean Absolute Error (°F)	Percent of Absolute Errors >10°F	Probability of Detection (32°F)	False Alarm Ratio (32°F)	Improvement Over Climate
Tonight's Min	LOCAL	635	-1.3	4.3	8.0	0.50	0.00	77.3
	LFM MOS		-2.4	4.9	9.4	0.50	0.33	71.9
Tomorrow's Max	LOCAL	630	-0.1	4.2	7.9	--	--	73.7
	LFM MOS		1.3	4.3	7.9	--	--	73.4
Tomorrow Night's Min	LOCAL	625	-1.2	5.5	13.4	0.50	0.60	65.4
	LFM MOS		-1.9	5.9	14.9	0.50	0.60	62.7
Day After Tomorrow's Max	LOCAL	628	-0.1	4.9	11.5	--	--	64.8
	LFM MOS		1.5	4.9	11.8	--	--	63.6

Table 3.1. Comparative verification of local and NGM MOS PoP forecasts for 92 stations in the conterminous U.S., 0000 UTC cycle.

Forecast Projection (h)	Type of Forecast	Brier Score	Local % Imp. Over Guid.	% Imp. Over Clim.	No. of Cases	Changes GE 20% to Guidance: Guid. Brier Score	Changes GE 20% to Guidance: Local % Imprv.	Changes GE 20% to Guidance: No. of Changes
12-24	LOCAL	0.0751		48.4				
(1st period)	NGM MOS	0.0790	5.0	45.8	16031	0.2116	11.1	2021
24-36	LOCAL	0.0846		42.9				
(2nd period)	NGM MOS	0.0868	2.5	41.4	16044	0.2119	5.6	1720
36-48	LOCAL	0.0935		35.8				
(3rd period)	NGM MOS	0.0962	2.9	33.9	16024	0.2189	8.2	1802

Table 3.2. Same as Table 3.1 except for the 1200 UTC cycle.

Forecast Projection (h)	Type of Forecast	Brier Score	Local % Imp. Over Guid.	% Imp. Over Clim.	No. of Cases	Changes GE 20% to Guidance: Guid. Brier Score	Changes GE 20% to Guidance: Local % Imprv.	Changes GE 20% to Guidance: No. of Changes
12-24	LOCAL	0.0779		47.4				
(1st period)	NGM MOS	0.0805	3.2	45.7	16043	0.2061	4.3	1994
24-36	LOCAL	0.0867		40.7				
(2nd period)	NGM MOS	0.0870	0.4	40.4	16034	0.2004	0.3	1878
36-48	LOCAL	0.0946		36.2				
(3rd period)	NGM MOS	0.0974	2.9	34.3	16044	0.2137	9.9	1771

Table 3.3. Comparative verification of local and NGM MOS PoP forecasts for 22 stations in the Eastern Region, 0000 UTC cycle.

Forecast Projection (h)	Type of Forecast	Brier Score	Local % Imp. Over Guid.	% Imp. Over Clim.	No. of Cases	Changes GE 20% to Guidance: Guid. Brier Score	Changes GE 20% to Guidance: Local % Imprv.	Changes GE 20% to Guidance: No. of Changes
12-24	LOCAL	0.0930		52.8				
(1st period)	NGM MOS	0.0955	2.6	51.6	3894	0.2053	6.0	630
24-36	LOCAL	0.1062		48.5				
(2nd period)	NGM MOS	0.1116	4.9	45.8	3897	0.2281	12.3	530
36-48	LOCAL	0.1159		41.4				
(3rd period)	NGM MOS	0.1185	2.2	40.1	3890	0.2171	5.3	551

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

Forecast Projection (h)	Type of Forecast	Brier Score	Local % Imp. Over Guid.	% Imp. Over Clim.	No. of Cases	Changes GE 20% to Guidance: Guid. Brier Score	Changes GE 20% to Guidance: Local % Imprv.	Changes GE 20% to Guidance: No. of Changes
12-24	LOCAL	0.0993		51.9				
(1st period)	NGM MOS	0.1056	5.9	48.9	3900	0.2271	11.5	646
24-36	LOCAL	0.1088		45.1				
(2nd period)	NGM MOS	0.1099	0.9	44.6	3895	0.2127	4.1	621
36-48	LOCAL	0.1208		42.1				
(3rd period)	NGM MOS	0.1268	4.7	39.3	3899	0.2332	13.5	613

Table 3.5. Comparative verification of local and NGM MOS PoP forecasts for 26 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	Local % Imprv.	No. of Changes
12-24 (1st period)	LOCAL	0.0590		47.0				
	NGM MOS	0.0627	5.9	43.7	4459	0.2051	13.9	441
24-36 (2nd period)	LOCAL	0.0662		42.5				
	NGM MOS	0.0701	5.5	39.1	4460	0.2204	18.7	364
36-48 (3rd period)	LOCAL	0.0746		32.8				
	NGM MOS	0.0764	2.4	31.1	4455	0.2405	7.0	390

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	Local % Imprv.	No. of Changes
12-24 (1st period)	LOCAL	0.0590		48.1				
	NGM MOS	0.0615	4.1	45.8	4450	0.2029	4.0	420
24-36 (2nd period)	LOCAL	0.0684		38.6				
	NGM MOS	0.0688	0.6	38.2	4449	0.1961	-0.1	385
36-48 (3rd period)	LOCAL	0.0736		34.7				
	NGM MOS	0.0762	3.4	32.4	4447	0.2070	10.9	369

Table 3.7. Comparative verification of local and NGM MOS PoP forecasts for 27 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	0.0731		46.8				
(1st period)	NGM MOS	0.0777	5.9	43.4	4728	0.2146	13.5	598
24-36	LOCAL	0.0847		38.4				
(2nd period)	NGM MOS	0.0816	-3.9	40.7	4729	0.1882	-15.8	505
36-48	LOCAL	0.0933		31.5				
(3rd period)	NGM MOS	0.0955	2.3	30.0	4731	0.2045	6.8	536

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	0.0788		43.2				
(1st period)	NGM MOS	0.0776	-1.5	44.1	4749	0.1770	-10.8	569
24-36	LOCAL	0.0848		38.2				
(2nd period)	NGM MOS	0.0838	-1.1	38.9	4756	0.1903	-4.0	533
36-48	LOCAL	0.0951		30.9				
(3rd period)	NGM MOS	0.0950	-0.2	31.0	4755	0.1944	0.0	467

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	0.0788		44.2				
	NGM MOS	0.0838	6.0	40.7	2950	0.2257	12.4	352
24-36 (2nd period)	LOCAL	0.0837		38.9				
	NGM MOS	0.0875	4.4	36.0	2958	0.2126	8.3	321
36-48 (3rd period)	LOCAL	0.0926		35.1				
	NGM MOS	0.0980	5.5	31.3	2948	0.2196	16.6	325

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	0.0767		43.9				
	NGM MOS	0.0807	5.0	40.9	2944	0.2183	10.4	359
24-36 (2nd period)	LOCAL	0.0881		38.3				
	NGM MOS	0.0896	1.7	37.3	2934	0.1985	0.0	339
36-48 (3rd period)	LOCAL	0.0908		34.3				
	NGM MOS	0.0944	3.8	31.7	2943	0.2122	14.4	322

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 ≥ 30% were included.

Projection (h)	Region Number of Stations	Type of Forecast	Bias ZR	Bias S	Bias R	Percent Correct	Skill Score	POD ZR	POD S	FAR ZR	FAR S
18	Eastern 23	LOCAL	1.10	0.98	1.02	92.1	0.848	0.48	0.91	0.57	0.07
		MOS	1.19	0.96	1.03	91.9	0.846	0.33	0.92	0.72	0.04
		No. Obs.	21	452	420						
	Southern 24	LOCAL	0.38	0.84	1.04	92.1	0.670	0.13	0.68	0.67	0.19
		MOS	0.63	0.86	1.03	94.8	0.792	0.38	0.76	0.40	0.13
		No. Obs.	8	37	245						
	Central 27	LOCAL	0.77	0.94	1.15	88.7	0.772	0.38	0.89	0.50	0.05
		MOS	0.65	1.00	1.05	91.0	0.814	0.31	0.94	0.53	0.06
		No. Obs.	26	392	193						
	Western 12	LOCAL	1.20	0.95	1.03	92.1	0.842	0.60	0.89	0.50	0.07
		MOS	1.00	0.93	1.05	92.4	0.847	0.40	0.89	0.60	0.04
		No. Obs.	5	129	183						
	All Stations	LOCAL	0.87	0.96	1.05	91.1	0.830	0.40	0.89	0.54	0.07
		MOS	0.87	0.97	1.04	92.1	0.850	0.33	0.92	0.62	0.05
		No. Obs.	60	1010	1041						
30	Eastern 23	LOCAL	0.80	1.07	0.95	87.5	0.768	0.34	0.92	0.58	0.14
		MOS	0.80	1.02	1.00	87.1	0.761	0.20	0.90	0.76	0.12
		No. Obs.	41	416	428						
	Southern 24	LOCAL	0.67	0.89	1.02	90.4	0.561	0.33	0.59	0.50	0.33
		MOS	1.17	0.78	1.02	92.4	0.654	0.33	0.63	0.71	0.19
		No. Obs.	6	27	217						
	Central 27	LOCAL	0.55	1.06	0.97	86.4	0.730	0.18	0.93	0.67	0.12
		MOS	0.85	0.98	1.06	87.9	0.767	0.30	0.91	0.64	0.07
		No. Obs.	33	374	220						
	Western 12	LOCAL	0.18	1.12	0.99	87.0	0.720	0.09	0.87	0.50	0.22
		MOS	0.09	0.88	1.10	86.7	0.695	0.00	0.77	1.00	0.12
		No. Obs.	11	101	218						
	All Stations	LOCAL	0.63	1.07	0.97	87.4	0.764	0.25	0.91	0.60	0.15
		MOS	0.76	0.98	1.04	87.9	0.773	0.22	0.88	0.71	0.10
		No. Obs.	91	918	1083						
42	Eastern 23	LOCAL	0.95	0.97	1.03	88.9	0.787	0.19	0.88	0.80	0.09
		MOS	1.00	0.91	1.10	89.3	0.795	0.19	0.86	0.81	0.05
		No. Obs.	21	447	429						
	Southern 24	LOCAL	0.43	0.81	1.05	91.0	0.635	0.29	0.58	0.33	0.28
		MOS	1.14	0.75	1.04	90.2	0.620	0.00	0.61	1.00	0.19
		No. Obs.	7	36	223						
	Central 27	LOCAL	0.46	1.00	1.09	85.3	0.699	0.23	0.89	0.50	0.11
		MOS	0.62	1.00	1.06	87.0	0.734	0.27	0.91	0.56	0.09
		No. Obs.	26	350	176						
	Western 12	LOCAL	0.60	0.92	1.07	85.3	0.702	0.20	0.80	0.67	0.13
		MOS	0.80	0.92	1.06	90.6	0.811	0.40	0.86	0.50	0.06
		No. Obs.	5	123	171						
	All Stations	LOCAL	0.64	0.97	1.05	87.6	0.763	0.22	0.86	0.66	0.11
		MOS	0.83	0.94	1.07	89.0	0.790	0.22	0.87	0.73	0.07
		No. Obs.	59	956	999						

Table 4.2. Same as Table 4.1 except for 85 stations for the 1200 UTC cycle.

Projection (h)	Region Number of Stations	Type of Forecast	Bias ZR	Bias S	Bias R	Percent Correct	Skill Score	POD ZR	POD S	FAR ZR	FAR S
18	Eastern 23	LOCAL	0.59	1.06	0.98	87.4	0.764	0.26	0.90	0.57	0.14
		MOS	0.90	1.02	0.99	88.4	0.785	0.26	0.91	0.71	0.11
		No. Obs.	39	419	432						
	Southern 24	LOCAL	0.80	0.85	1.03	90.8	0.597	0.20	0.64	0.75	0.25
		MOS	2.60	0.64	1.02	93.4	0.721	0.60	0.58	0.77	0.10
		No. Obs.	5	33	233						
	Central 27	LOCAL	0.88	1.00	1.01	87.9	0.761	0.31	0.92	0.64	0.08
		MOS	0.72	1.01	1.02	89.0	0.781	0.25	0.94	0.65	0.07
		No. Obs.	32	389	215						
	Western 11	LOCAL	0.44	0.96	1.04	86.9	0.715	0.11	0.80	0.75	0.17
		MOS	0.11	0.84	1.12	88.7	0.744	0.00	0.79	1.00	0.07
		No. Obs.	9	109	217						
	All Stations	LOCAL	0.69	1.02	1.01	87.9	0.772	0.26	0.89	0.63	0.13
		MOS	0.85	0.98	1.03	89.3	0.798	0.25	0.90	0.71	0.09
		No. Obs.	85	950	1097						
30	Eastern 23	LOCAL	0.95	0.96	1.04	88.9	0.787	0.33	0.88	0.65	0.09
		MOS	0.95	0.94	1.06	90.4	0.817	0.19	0.89	0.80	0.05
		No. Obs.	21	447	431						
	Southern 24	LOCAL	0.43	0.89	1.03	90.8	0.612	0.29	0.63	0.33	0.29
		MOS	0.57	0.89	1.03	92.5	0.690	0.14	0.71	0.75	0.19
		No. Obs.	7	35	239						
	Central 27	LOCAL	0.52	0.99	1.09	87.3	0.737	0.26	0.91	0.50	0.08
		MOS	0.59	1.00	1.06	88.3	0.757	0.22	0.93	0.63	0.07
		No. Obs.	27	377	179						
	Western 11	LOCAL	1.00	0.91	1.06	87.3	0.744	0.50	0.81	0.50	0.11
		MOS	1.25	0.87	1.09	89.6	0.790	0.25	0.84	0.80	0.04
		No. Obs.	4	129	174						
	All Stations	LOCAL	0.69	0.96	1.05	88.5	0.779	0.31	0.87	0.56	0.09
		MOS	0.76	0.95	1.06	90.0	0.809	0.20	0.89	0.73	0.06
		No. Obs.	59	988	1023						
42	Eastern 23	LOCAL	0.62	1.02	1.01	85.0	0.719	0.15	0.88	0.75	0.14
		MOS	0.64	0.98	1.05	86.7	0.751	0.08	0.88	0.88	0.11
		No. Obs.	39	392	428						
	Southern 24	LOCAL	0.71	0.82	1.03	90.1	0.573	0.14	0.61	0.80	0.26
		MOS	0.86	0.71	1.04	89.3	0.525	0.00	0.54	1.00	0.25
		No. Obs.	7	28	207						
	Central 27	LOCAL	0.41	1.06	1.00	84.9	0.702	0.21	0.91	0.50	0.13
		MOS	0.50	0.99	1.10	87.4	0.756	0.21	0.91	0.59	0.07
		No. Obs.	34	341	202						
	Western 11	LOCAL	0.22	1.01	1.03	86.1	0.697	0.11	0.81	0.50	0.20
		MOS	0.33	0.92	1.07	86.8	0.706	0.00	0.79	1.00	0.14
		No. Obs.	9	98	203						
	All Stations	LOCAL	0.51	1.03	1.02	85.8	0.730	0.17	0.87	0.67	0.15
		MOS	0.57	0.97	1.06	87.2	0.758	0.11	0.87	0.80	0.10
		No. Obs.	89	859	1040						

Table 5.1. Comparative verification of local and NGM MOS snow amount forecasts for 52 stations in the conterminous U.S. for the 12-24 h projection.

Cycle (UTC)	Type of Forecast	Bias ≥ 2	Bias ≥ 4	Bias ≥ 6	Percent Correct	Skill Score	Threat Score ≥ 2	Threat Score ≥ 4	Threat Score ≥ 6	POD ≥ 2	POD ≥ 4	POD ≥ 6	FAR ≥ 2	FAR ≥ 4	FAR ≥ 6
0000	LOCAL	1.46	1.23	1.22	97.5	0.455	0.403	0.439	0.244	0.71	0.68	0.43	0.52	0.45	0.64
	NGM MOS	0.98	1.09	1.09	97.8	0.422	0.384	0.370	0.263	0.55	0.57	0.43	0.44	0.48	0.60
	No. Obs.	129	53	23											
1200	LOCAL	1.52	1.56	1.43	97.2	0.420	0.341	0.333	0.342	0.64	0.64	0.62	0.58	0.59	0.57
	NGM MOS	0.98	1.36	1.14	97.9	0.432	0.363	0.373	0.286	0.53	0.64	0.48	0.46	0.53	0.58
	No. Obs.	131	39	21											

Table 6.1. Comparative verification of local and NGM MOS forecasts of four categories of cloud amount (clear, scattered, broken, and overcast) for 59 stations in the conterminous U.S., 0000 UTC cycle.

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Percent Correct	Skill Score
12	LOCAL	0.74	1.28	1.63	0.93	65.3	0.518
	NGM MOS	0.86	1.39	1.12	0.94	60.0	0.436
	No. Obs.	2689	1147	913	3022		
18	LOCAL	0.57	1.56	1.96	0.74	50.9	0.350
	NGM MOS	0.68	1.65	1.29	0.86	54.6	0.386
	No. Obs.	2522	1330	1145	2925		
24	LOCAL	0.57	1.63	2.04	0.76	49.2	0.326
	NGM MOS	0.74	1.66	1.19	0.88	55.2	0.387
	No. Obs.	2645	1269	978	2826		

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

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Percent Correct	Skill Score
12	LOCAL	0.76	1.32	1.63	0.86	60.8	0.465
	NGM MOS	0.79	1.52	1.24	0.87	57.0	0.410
	No. Obs.	2641	1294	977	2847		
18	LOCAL	0.65	1.72	2.06	0.85	55.1	0.384
	NGM MOS	0.86	1.60	1.13	0.91	60.4	0.432
	No. Obs.	3091	947	800	2921		
24	LOCAL	0.65	1.49	1.85	0.87	52.3	0.348
	NGM MOS	0.81	1.46	1.18	0.94	57.3	0.401
	No. Obs.	2675	1137	910	3044		

Table 6.3. Comparative verification of local and NGM MOS forecasts of four categories of cloud amount (clear, scattered, broken, and overcast) for 16 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	0.76	1.11	1.36	0.98	63.1	0.478
	NGM MOS	0.83	1.20	1.02	1.01	60.4	0.434
	No. Obs.	521	373	289	916		
18	LOCAL	0.51	1.35	1.82	0.83	54.5	0.376
	NGM MOS	0.67	1.48	1.18	0.91	59.6	0.435
	No. Obs.	483	373	325	914		
24	LOCAL	0.51	1.74	2.00	0.88	53.4	0.358
	NGM MOS	0.75	1.68	1.05	0.97	61.7	0.451
	No. Obs.	674	268	237	904		

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

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Percent Correct	Skill Score
12	LOCAL	0.65	1.43	1.80	0.92	60.0	0.438
	NGM MOS	0.78	1.65	1.16	0.93	61.6	0.453
	No. Obs.	669	275	237	905		
18	LOCAL	0.62	1.72	2.25	0.87	58.7	0.414
	NGM MOS	0.84	1.49	1.22	0.96	65.6	0.489
	No. Obs.	709	237	180	964		
24	LOCAL	0.74	1.20	1.49	0.91	54.8	0.367
	NGM MOS	0.73	1.31	1.11	0.99	58.3	0.406
	No. Obs.	517	371	284	920		

Table 6.5. Comparative verification of local and NGM MOS forecasts of four categories of cloud amount (clear, scattered, broken, and overcast) for 14 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	0.81	1.27	1.63	0.87	69.4	0.578
	NGM MOS	0.96	1.38	1.00	0.87	62.8	0.475
	No. Obs.	745	292	230	608		
18	LOCAL	0.67	1.82	1.50	0.62	52.0	0.367
	NGM MOS	0.84	1.83	0.90	0.79	56.4	0.413
	No. Obs.	750	333	378	573		
24	LOCAL	0.60	1.65	1.98	0.67	48.8	0.324
	NGM MOS	0.84	1.60	1.01	0.81	55.4	0.385
	No. Obs.	750	359	240	517		

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

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Percent Correct	Skill Score
12	LOCAL	0.81	1.25	1.60	0.82	63.4	0.502
	NGM MOS	0.89	1.35	1.14	0.85	58.2	0.421
	No. Obs.	755	365	244	530		
18	LOCAL	0.71	1.62	2.00	0.80	56.1	0.397
	NGM MOS	0.97	1.32	1.07	0.87	63.2	0.461
	No. Obs.	864	268	202	556		
24	LOCAL	0.71	1.61	1.77	0.78	52.5	0.358
	NGM MOS	0.93	1.39	1.02	0.89	60.3	0.440
	No. Obs.	753	294	229	616		

Table 6.7. Comparative verification of local and NGM MOS forecasts of four categories of cloud amount (clear, scattered, broken, and overcast) for 18 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	0.65	1.44	1.99	0.94	61.5	0.461
	NGM MOS	0.76	1.56	1.34	0.95	57.8	0.399
	No. Obs.	866	319	219	946		
18	LOCAL	0.39	1.72	2.74	0.76	46.5	0.296
	NGM MOS	0.52	1.73	1.94	0.87	49.7	0.319
	No. Obs.	790	376	248	937		
24	LOCAL	0.43	1.72	2.31	0.74	46.0	0.288
	NGM MOS	0.61	1.63	1.44	0.90	52.2	0.345
	No. Obs.	729	387	289	930		

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

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Percent Correct	Skill Score
12	LOCAL	0.73	1.38	1.63	0.86	60.0	0.451
	NGM MOS	0.71	1.54	1.40	0.88	53.5	0.360
	No. Obs.	725	385	286	941		
18	LOCAL	0.55	2.11	2.32	0.85	51.5	0.337
	NGM MOS	0.77	1.91	1.26	0.92	57.1	0.382
	No. Obs.	928	247	217	946		
24	LOCAL	0.48	1.76	2.40	0.89	49.4	0.312
	NGM MOS	0.72	1.62	1.40	0.96	55.5	0.368
	No. Obs.	856	312	220	948		

Table 6.9. Comparative verification of local and NGM MOS forecasts of four categories of cloud amount (clear, scattered, broken, and overcast) for 11 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	0.78	1.40	1.64	0.90	69.5	0.572
	NGM MOS	0.91	1.50	1.18	0.88	59.4	0.419
	No. Obs.	557	163	175	552		
18	LOCAL	0.76	1.27	2.08	0.68	51.3	0.351
	NGM MOS	0.71	1.58	1.40	0.85	52.7	0.361
	No. Obs.	499	248	194	501		
24	LOCAL	0.80	1.36	1.77	0.67	48.7	0.316
	NGM MOS	0.74	1.77	1.21	0.76	50.5	0.337
	No. Obs.	492	255	212	475		

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

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Percent Correct	Skill Score
12	LOCAL	0.92	1.19	1.44	0.78	59.8	0.455
	NGM MOS	0.78	1.60	1.24	0.78	54.4	0.388
	No. Obs.	492	269	210	471		
18	LOCAL	0.75	1.37	1.65	0.87	54.4	0.375
	NGM MOS	0.88	1.73	0.95	0.87	54.3	0.361
	No. Obs.	590	195	201	455		
24	LOCAL	0.73	1.40	1.85	0.88	53.0	0.346
	NGM MOS	0.88	1.65	1.22	0.86	55.0	0.362
	No. Obs.	549	160	177	560		

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

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Percent Correct	Skill Score
12	LOCAL	0.80	1.08	1.69	0.97	58.3	0.396
	LFM MOS	0.96	1.19	0.89	1.01	62.9	0.448
	No. Obs.	222	73	65	266		
18	LOCAL	0.94	0.82	1.72	0.87	50.8	0.324
	LFM MOS	1.03	0.78	0.93	1.10	57.1	0.387
	No. Obs.	158	110	83	239		
24	LOCAL	1.02	0.93	1.26	0.90	50.6	0.323
	LFM MOS	1.15	0.74	0.79	1.14	55.6	0.375
	No. Obs.	147	118	109	237		

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

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Percent Correct	Skill Score
12	LOCAL	1.09	0.76	0.98	1.08	60.0	0.444
	LFM MOS	1.26	0.60	0.85	1.12	54.5	0.363
	No. Obs.	148	126	114	240		
18	LOCAL	0.73	1.08	1.91	0.89	52.8	0.342
	LFM MOS	1.09	0.71	0.90	1.06	57.3	0.370
	No. Obs.	199	87	81	266		
24	LOCAL	0.59	1.68	2.02	0.91	50.0	0.302
	LFM MOS	1.01	0.87	0.94	1.04	60.4	0.403
	No. Obs.	228	75	66	273		

Table 7.1. Verification of NGM MOS surface wind forecasts for 95 stations in the conterminous U.S., 0000 UTC cycle.

		Direction			Speed											
								Contingency Table								
											Bias by Category					
Fcst Proj (h)	Type of Fcst.	Mean Abs. Error (deg)	Skill Score	No. of Cases	Mean Abs. Error (kt)	Mean Alg. Error (kt)	No. of Cases	Skill Score	Percent Fcst. Correct	Threat Score (>27 kt)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
12	NGM	21	0.550	5083	3.9	2.5	5180	0.404	83.6	0.12	0.96 13960	1.16 1641	1.38 462	1.64 106	1.94 31	2.57 7
18	NGM	22	0.513	8055	3.8	1.7	8139	0.392	72.1	0.13	0.96 11735	1.05 3073	1.15 1094	1.21 317	1.43 80	1.76 29
24	NGM	25	0.484	6274	4.0	2.3	6367	0.382	79.0	0.12	0.96 13110	1.10 2133	1.41 572	1.10 206	1.72 36	2.73 11

Table 7.2. Same as Table 7.1 except for 94 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	NGM	23	0.507	6336	3.8	2.2	6420	0.400	79.4	0.12	0.95 13029	1.16 2110	1.39 566	1.12 201	1.50 36	3.18 11
18	NGM	23	0.518	5194	4.0	2.4	5293	0.390	82.7	0.18	0.96 13661	1.23 1649	1.12 526	1.35 132	2.14 21	1.80 10
24	NGM	23	0.505	4969	4.1	2.5	5082	0.372	83.1	0.17	0.97 13858	1.13 1634	1.30 458	1.54 104	1.21 33	2.29 7

Table 7.3. Verification of NGM MOS surface wind forecasts for 23 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	NGM	20	0.539	1392	3.5	2.3	1418	0.420	83.7	0.09	0.95 3449	1.27 422	1.46 107	1.35 23	1.40 5	* 0
18	NGM	21	0.486	2084	3.3	1.4	2092	0.411	72.7	0.04	0.96 2844	1.09 814	1.12 273	1.17 52	0.77 13	2.00 1
24	NGM	22	0.461	1417	3.9	2.2	1445	0.390	81.4	0.11	0.96 3351	1.24 468	1.37 114	0.76 42	1.43 7	0.00 3

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

		Direction			Speed											
								Contingency Table								
											Bias by Category					
Fcst Proj (h)	Type of Fcst.	Mean Abs. Error (deg)	Skill Score	No. of Cases	Mean Abs. Error (kt)	Mean Alg. Error (kt)	No. of Cases	Skill Score	Percent Fcst. Correct	Threat Score (>27 kt)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
12	NGM	22	0.475	1469	3.7	2.1	1487	0.405	81.4	0.08	0.94 3345	1.34 466	1.32 114	0.88 42	0.43 7	0.33 3
18	NGM	21	0.518	1303	3.7	2.0	1319	0.422	83.8	0.50	0.97 3396	1.28 426	1.01 123	0.77 30	4.00 1	0.00 1
24	NGM	21	0.500	1293	3.6	2.1	1312	0.404	84.0	0.11	0.97 3445	1.23 418	1.18 108	0.96 23	1.00 5	* 0

* This category was neither forecast nor observed.

Table 7.5. Verification of NGM MOS surface wind forecasts for 27 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	NGM	19	0.571	1081	3.3	1.6	1091	0.383	87.5	0.50	1.00 3952	1.00 401	1.00 81	1.09 11	3.00 1	1.00 1
18	NGM	21	0.526	2222	3.4	1.0	2236	0.366	72.8	0.14	0.99 3357	1.05 860	1.06 281	0.58 78	0.74 19	1.00 4
24	NGM	23	0.513	1408	3.4	1.3	1426	0.411	84.3	0.08	1.01 3735	1.01 510	0.89 120	0.57 44	1.50 4	0.33 3

Table 7.6. Same as Table 7.5 except for 26 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	NGM	22	0.544	1426	3.2	1.4	1444	0.434	84.8	0.08	1.00 3708	1.05 496	1.01 119	0.56 41	1.25 4	0.67 3
18	NGM	22	0.524	1167	3.5	1.5	1180	0.373	86.0	0.00	1.01 3813	0.98 408	0.83 125	0.77 22	0.00 3	0.50 2
24	NGM	23	0.502	1056	3.5	1.7	1072	0.348	87.4	0.67	1.01 3915	0.92 400	0.92 75	0.55 11	2.00 1	1.00 1

Table 7.7. Verification of NGM MOS surface wind forecasts for 27 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	NGM	19	0.562	1935	4.1	3.0	1964	0.394	77.9	0.11	0.92 3845	1.18 596	1.55 196	2.08 52	2.26 19	4.00 4
18	NGM	21	0.541	2856	3.9	2.3	2881	0.390	65.7	0.15	0.92 2998	0.98 1083	1.29 416	1.57 141	1.92 39	1.82 22
24	NGM	24	0.510	2324	4.2	2.9	2344	0.371	73.0	0.13	0.91 3594	1.10 754	1.81 216	1.45 85	1.85 20	** 0

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

		Direction			Speed											
								Contingency Table								
											Bias by Category					
Fcst Proj (h)	Type of Fcst.	Mean Abs. Error (deg)	Skill Score	No. of Cases	Mean Abs. Error (kt)	Mean Alg. Error (kt)	No. of Cases	Skill Score	Percent Fcst. Correct	Threat Score (>27 kt)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
12	NGM	22	0.526	2313	4.1	2.8	2336	0.374	72.8	0.12	0.89 3583	1.19 747	1.70 215	1.52 84	1.75 20	** 0
18	NGM	21	0.541	1941	4.3	2.9	1979	0.382	77.1	0.22	0.91 3810	1.32 585	1.41 195	1.75 59	2.46 13	2.67 6
24	NGM	22	0.519	1917	4.3	3.0	1953	0.359	76.8	0.17	0.93 3821	1.15 596	1.54 200	2.18 50	1.38 21	3.50 4

** This category was forecast but was not observed.

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											
								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	NGM	31	0.405	675	4.9	2.9	707	0.395	86.8	0.07	0.97 2714	1.22 222	1.24 78	1.15 20	1.17 6	0.50 2
18	NGM	34	0.373	893	5.3	2.8	930	0.337	80.0	0.07	0.98 2536	1.15 316	0.94 124	1.20 46	1.67 9	2.50 2
24	NGM	35	0.368	1125	4.5	2.6	1152	0.335	77.4	0.11	0.97 2430	1.05 401	1.26 122	1.34 35	1.80 5	0.20 5

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

Fcst Proj (h)	Type of Fcst.	Direction			Speed											
								Contingency Table								
											Bias by Category					
		Mean Abs. Error (deg)	Skill Score	No. of Cases	Mean Abs. Error (kt)	Mean Alg. Error (kt)	No. of Cases	Skill Score	Percent Fcst. Correct	Threat Score (>27 kt)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
12	NGM	29	0.411	1128	4.2	2.2	1153	0.383	79.2	0.21	0.98 2393	1.04 401	1.25 118	1.09 34	2.20 5	0.40 5
18	NGM	33	0.366	783	4.9	3.2	815	0.357	84.9	0.00	0.96 2642	1.34 230	1.04 83	1.67 21	2.25 4	1.00 1
24	NGM	33	0.376	703	5.1	3.4	745	0.348	85.7	0.08	0.97 2677	1.27 220	1.25 75	1.15 20	0.67 6	0.50 2

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

		Direction			Speed											
								Contingency Table								
											Bias by Category					
Fcst Proj (h)	Type of Fcst.	Mean Abs. Error (deg)	Skill Score	No. of Cases	Mean Abs. Error (kt)	Mean Alg. Error (kt)	No. of Cases	Skill Score	Percent Fcst. Correct	Threat Score (>27 kt)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
12	LFM	16	0.578	152	4.0	2.9	156	0.448	86.4	0.00	0.97 548	1.18 55	1.05 20	1.25 4	** 0	* 0
18	LFM	21	0.465	160	3.9	2.6	161	0.464	86.3	0.00	0.98 550	1.09 64	1.00 19	3.50 2	** 0	* 0
24	LFM	28	0.471	197	4.5	3.0	200	0.417	83.4	0.25	0.96 537	1.12 69	1.41 17	3.00 3	4.00 1	* 0

Table 7.12. Same as Table 7.11 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	23	0.573	183	3.8	2.3	184	0.502	86.6	0.00	0.98 552	0.90 69	1.63 19	2.67 3	2.00 1	* 0
18	LFM	23	0.491	177	4.6	2.7	181	0.379	83.4	0.00	0.98 553	1.16 63	0.81 27	7.00 1	** 0	* 0
24	LFM	25	0.513	157	4.8	3.5	161	0.364	84.2	0.00	0.97 563	1.05 57	1.50 20	1.50 4	** 0	* 0

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

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

		Direction			Speed											
								Contingency Table								
											Bias by Category					
Fcst Proj (h)	Type of Fcst.	Mean Abs. Error (deg)	Skill Score	No. of Cases	Mean Abs. Error (kt)	Mean Alg. Error (kt)	No. of Cases	Skill Score	Percent Fcst. Correct	Threat Score (>27 kt)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
3	LOCAL	21	0.549	6170	3.4	2.0	6291	0.465	86.0	0.11	0.98 13926	1.22 1635	0.99 460	0.90 103	0.68 31	0.43 7
9	LOCAL	27	0.460	9825	3.7	1.4	9986	0.382	71.9	0.13	0.97 11560	1.21 3057	0.87 1102	0.62 312	0.56 89	0.42 31
15	LOCAL	32	0.398	8893	4.4	3.0	9158	0.315	74.9	0.07	0.90 13285	1.56 2058	1.51 557	0.70 201	1.27 33	0.63 8

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

		Direction			Speed											
								Contingency Table								
											Bias by Category					
Fcst Proj (h)	Type of Fcst.	Mean Abs. Error (deg)	Skill Score	No. of Cases	Mean Abs. Error (kt)	Mean Alg. Error (kt)	No. of Cases	Skill Score	Percent Fcst. Correct	Threat Score (>27 kt)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
3	LOCAL	23	0.521	10257	3.2	1.4	10369	0.434	73.9	0.25	0.96 11661	1.19 3110	0.99 1101	0.79 301	0.72 97	0.96 23
9	LOCAL	30	0.426	7001	4.1	2.5	7206	0.344	80.7	0.18	0.95 13690	1.37 1747	1.07 503	0.61 132	0.81 31	0.42 12
15	LOCAL	30	0.411	6258	4.2	2.4	6464	0.353	82.5	0.12	0.97 13813	1.30 1653	0.86 501	0.68 113	0.75 32	0.67 6

Table 7.15. Verification of local surface wind for 23 stations in the Eastern Region for the FT release time of approximately 0900 UTC.

		Direction			Speed											
								Contingency Table								
											Bias by Category					
Fcst Proj (h)	Type of Fcst.	Mean Abs. Error (deg)	Skill Score	No. of Cases	Mean Abs. Error (kt)	Mean Alg. Error (kt)	No. of Cases	Skill Score	Percent Fcst. Correct	Threat Score (>27 kt)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
3	LOCAL	21	0.526	1729	3.4	2.2	1778	0.465	85.9	0.13	0.98 3502	1.17 431	1.12 110	1.15 20	0.80 5	* 0
9	LOCAL	25	0.454	2630	3.5	1.3	2661	0.383	72.5	0.11	0.99 2902	1.13 823	0.80 276	0.69 52	0.42 12	3.00 1
15	LOCAL	30	0.384	2202	4.5	3.3	2294	0.314	76.8	0.06	0.89 3434	1.67 467	1.57 111	0.81 42	0.71 7	1.00 3

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

		Direction			Speed											
								Contingency Table								
											Bias by Category					
Fcst Proj (h)	Type of Fcst.	Mean Abs. Error (deg)	Skill Score	No. of Cases	Mean Abs. Error (kt)	Mean Alg. Error (kt)	No. of Cases	Skill Score	Percent Fcst. Correct	Threat Score (>27 kt)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
3	LOCAL	22	0.517	2526	3.2	1.6	2556	0.428	76.3	0.14	0.95 3081	1.23 699	1.05 217	0.81 53	0.90 10	0.67 3
9	LOCAL	29	0.410	1853	4.0	2.5	1901	0.335	80.6	0.21	0.96 3442	1.28 447	1.09 134	0.70 30	1.17 6	1.00 2
15	LOCAL	29	0.389	1717	4.2	2.6	1769	0.362	82.2	0.07	0.96 3482	1.30 427	1.02 125	1.05 22	1.17 6	2.00 1

* This category was neither forecast nor observed.

Table 7.17. Verification of local surface wind for 26 stations in the Southern Region for the FT release time of approximately 0900 UTC.

		Direction			Speed											
								Contingency Table								
											Bias by Category					
Fcst Proj (h)	Type of Fcst.	Mean Abs. Error (deg)	Skill Score	No. of Cases	Mean Abs. Error (kt)	Mean Alg. Error (kt)	No. of Cases	Skill Score	Percent Fcst. Correct	Threat Score (>27 kt)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
3	LOCAL	20	0.545	1482	3.3	2.2	1503	0.448	87.6	0.25	0.97 3854	1.27 394	0.95 87	1.09 11	2.00 1	1.00 1
9	LOCAL	26	0.474	2682	3.5	1.4	2711	0.355	71.8	0.03	0.95 3189	1.30 799	0.80 256	0.61 72	0.35 20	0.25 4
15	LOCAL	29	0.418	2286	4.2	2.9	2343	0.311	77.2	0.06	0.91 3656	1.59 517	1.26 120	0.64 45	1.33 6	0.00 3

Table 7.18. Same as Table 7.17 except for 27 stations for the FT release time of approximately 1800 UTC.

		Direction			Speed											
								Contingency Table								
											Bias by Category					
Fcst Proj (h)	Type of Fcst.	Mean Abs. Error (deg)	Skill Score	No. of Cases	Mean Abs. Error (kt)	Mean Alg. Error (kt)	No. of Cases	Skill Score	Percent Fcst. Correct	Threat Score (>27 kt)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
3	LOCAL	23	0.520	3033	3.1	1.4	3060	0.434	74.0	0.31	0.95 3227	1.25 875	0.96 281	0.64 85	0.61 23	0.67 6
9	LOCAL	28	0.433	1677	4.0	2.5	1725	0.320	83.7	0.00	0.97 3806	1.42 398	0.80 89	0.37 27	0.29 7	1.00 1
15	LOCAL	27	0.412	1420	3.9	2.2	1471	0.355	86.0	0.17	1.00 3817	1.18 396	0.58 99	0.36 14	0.50 4	** 0

** This category was forecast but was not observed.

Table 7.19. Verification of local surface wind for 27 stations in the Central Region for the FT release time of approximately 0900 UTC.

		Direction			Speed											
								Contingency Table								
											Bias by Category					
Fcst Proj (h)	Type of Fcst.	Mean Abs. Error (deg)	Skill Score	No. of Cases	Mean Abs. Error (kt)	Mean Alg. Error (kt)	No. of Cases	Skill Score	Percent Fcst. Correct	Threat Score (>27 kt)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
3	LOCAL	19	0.564	2214	3.3	1.8	2239	0.468	81.9	0.11	0.96 3823	1.28 595	1.02 191	0.87 52	0.61 23	0.33 3
9	LOCAL	26	0.479	3231	3.6	1.3	3274	0.380	66.0	0.18	0.93 2981	1.27 1086	1.01 417	0.66 136	0.67 46	0.24 21
15	LOCAL	31	0.393	2982	4.3	3.0	3040	0.304	68.2	0.07	0.84 3606	1.62 742	1.64 228	0.72 81	1.41 17	0.50 2

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

		Direction			Speed											
								Contingency Table								
											Bias by Category					
Fcst Proj (h)	Type of Fcst.	Mean Abs. Error (deg)	Skill Score	No. of Cases	Mean Abs. Error (kt)	Mean Alg. Error (kt)	No. of Cases	Skill Score	Percent Fcst. Correct	Threat Score (>27 kt)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
3	LOCAL	21	0.539	3281	3.1	1.1	3303	0.425	68.2	0.24	0.94 2948	1.20 1118	0.96 456	0.86 119	0.79 48	1.20 10
9	LOCAL	28	0.433	2471	4.0	2.3	2526	0.361	75.9	0.19	0.92 3775	1.50 637	1.14 205	0.54 56	1.00 12	0.14 7
15	LOCAL	28	0.416	2289	4.1	2.3	2350	0.358	77.5	0.15	0.94 3820	1.44 597	1.00 189	0.66 56	0.57 21	0.25 4

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

		Direction			Speed											
								Contingency Table								
											Bias by Category					
Fcst Proj (h)	Type of Fcst.	Mean Abs. Error (deg)	Skill Score	No. of Cases	Mean Abs. Error (kt)	Mean Alg. Error (kt)	No. of Cases	Skill Score	Percent Fcst. Correct	Threat Score (>27 kt)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
3	LOCAL	26	0.491	745	3.8	1.7	771	0.456	90.0	0.00	1.01 2747	1.05 215	0.78 72	0.65 20	0.50 2	0.33 3
9	LOCAL	40	0.345	1282	4.6	2.0	1340	0.356	80.4	0.08	1.03 2488	1.02 349	0.72 153	0.46 52	0.64 11	0.80 5
15	LOCAL	41	0.348	1423	4.6	3.1	1481	0.312	79.6	0.13	0.96 2589	1.23 332	1.43 98	0.61 33	1.67 3	** 0

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

		Direction			Speed											
								Contingency Table								
											Bias by Category					
Fcst Proj (h)	Type of Fcst.	Mean Abs. Error (deg)	Skill Score	No. of Cases	Mean Abs. Error (kt)	Mean Alg. Error (kt)	No. of Cases	Skill Score	Percent Fcst. Correct	Threat Score (>27 kt)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
3	LOCAL	31	0.452	1417	3.9	1.8	1450	0.408	79.4	0.27	1.00 2405	0.99 418	1.05 147	0.86 44	0.56 16	1.00 4
9	LOCAL	38	0.350	1000	4.8	3.1	1054	0.320	84.1	0.30	0.98 2667	1.17 265	1.15 75	1.05 19	0.67 6	0.50 2
15	LOCAL	38	0.344	832	4.9	2.6	874	0.283	85.4	0.00	1.00 2694	1.12 233	0.67 88	0.57 21	3.00 1	0.00 1

** This category was forecast but was not observed.

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

		Direction			Speed											
								Contingency Table								
											Bias by Category					
Fcst Proj (h)	Type of Fcst.	Mean Abs. Error (deg)	Skill Score	No. of Cases	Mean Abs. Error (kt)	Mean Alg. Error (kt)	No. of Cases	Skill Score	Percent Fcst. Correct	Threat Score (>27 kt)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
3	LOCAL	19	0.564	225	3.3	1.9	231	0.510	88.9	*	1.00 597	1.02 61	1.00 20	0.80 5	* 0	* 0
9	LOCAL	27	0.462	212	4.0	2.7	221	0.407	86.4	*	1.01 564	0.90 62	1.11 19	1.33 3	* 0	* 0
15	LOCAL	29	0.416	244	4.1	2.3	254	0.414	85.9	0.00	1.01 576	0.94 70	1.06 17	0.60 5	0.00 1	* 0

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

		Direction			Speed											
								Contingency Table								
											Bias by Category					
Fcst Proj (h)	Type of Fcst.	Mean Abs. Error (deg)	Skill Score	No. of Cases	Mean Abs. Error (kt)	Mean Alg. Error (kt)	No. of Cases	Skill Score	Percent Fcst. Correct	Threat Score (>27 kt)	1 No. Obs	2 No. Obs	3 No. Obs	4 No. Obs	5 No. Obs	6 No. Obs
3	LOCAL	29	0.428	274	3.8	2.6	282	0.441	85.5	0.50	0.98 572	1.16 69	1.11 18	0.25 4	2.00 1	* 0
9	LOCAL	35	0.297	263	4.9	3.6	285	0.308	81.9	0.00	0.97 577	1.29 63	0.85 27	0.00 1	** 0	* 0
15	LOCAL	41	0.340	269	5.4	3.9	291	0.271	81.4	0.00	0.95 599	1.42 59	1.15 20	0.20 5	** 0	* 0

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

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	0.95	2.39	0.254	91.5	0.17
	NGM MOS	1.00	1.14	0.332	95.1	0.22
	No. Obs.	15445	567			
± 3-h Max	LOCAL	1.00	1.00	0.348	89.9	0.25
	NGM MOS	1.05	0.48	0.364	92.5	0.25
	No. Obs.	14660	1352			

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	0.95	4.40	0.120	93.4	0.08
	NGM MOS	1.00	1.09	0.284	97.9	0.17
	No. Obs.	15629	224			
± 3-h Max	LOCAL	0.98	1.45	0.216	92.2	0.15
	NGM MOS	1.03	0.36	0.253	95.7	0.16
	No. Obs.	15172	680			

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	0.95	5.29	0.000	92.4	0.00
	NGM MOS	1.00	1.14	0.122	97.8	0.07
	No. Obs.	575	7			
± 3-h Max	LOCAL	0.95	3.08	0.008	91.5	0.02
	NGM MOS	1.01	0.67	0.186	97.1	0.11
	No. Obs.	542	12			

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	0.95	7.00	0.036	93.9	0.03
	NGM MOS	0.98	3.00	0.000	96.8	0.00
	No. Obs.	613	5			
± 3-h Max	LOCAL	0.96	2.33	0.129	92.8	0.09
	NGM MOS	1.00	1.00	0.111	95.6	0.07
	No. Obs.	570	15			

Table 8.1. Comparative verification of NGM MOS and persistence ceiling height forecasts for 94 stations in the conterminous U.S., 0000 UTC cycle.

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Log Score	Percent Correct	Skill Score
12	NGM MOS	0.85	1.09	1.14	0.97	3.406	72.1	0.402
	PERSISTENCE	0.89	0.91	0.97	1.03	2.166	80.6	0.565
	No. Obs.	612	555	1472	6603			
15	NGM MOS	1.05	1.15	1.09	0.96	3.613	70.1	0.381
	PERSISTENCE	1.01	0.76	0.88	1.05	2.938	74.8	0.435
	No. Obs.	500	617	1548	6344			
18	NGM MOS	1.05	1.32	1.11	0.95	2.920	71.8	0.377
	PERSISTENCE	1.80	0.93	0.85	1.01	3.271	71.4	0.332
	No. Obs.	278	514	1618	6548			
24	NGM MOS	0.86	1.22	1.14	0.97	2.412	75.9	0.342
	PERSISTENCE	2.18	1.21	1.05	0.94	3.520	70.2	0.221
	No. Obs.	218	380	1270	7167			

Table 8.2. Same as Table 8.1 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	NGM MOS	1.28	1.24	1.08	0.96	2.415	77.2	0.397
	PERSISTENCE	1.00	1.13	1.12	0.97	1.549	83.5	0.556
	No. Obs.	253	427	1456	7884			
15	NGM MOS	1.12	1.35	1.07	0.96	2.765	75.8	0.354
	PERSISTENCE	0.75	1.06	1.14	0.98	2.098	79.5	0.433
	No. Obs.	290	390	1185	7044			
18	NGM MOS	0.86	1.37	1.08	0.97	3.171	73.3	0.344
	PERSISTENCE	0.54	1.04	1.05	1.02	2.837	74.6	0.337
	No. Obs.	422	416	1321	6954			
24	NGM MOS	0.85	1.15	1.11	0.98	3.875	69.3	0.339
	PERSISTENCE	0.38	0.77	0.96	1.09	3.869	68.5	0.242
	No. Obs.	588	549	1438	6465			

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

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Log Score	Percent Correct	Skill Score
12	LFM MOS	0.62	0.63	2.02	0.89	2.528	74.3	0.263
	PERSISTENCE	1.08	0.79	1.14	0.99	1.695	85.0	0.485
	No. Obs.	13	19	64	496			
18	LFM MOS	0.27	1.00	2.03	0.88	2.475	73.6	0.253
	PERSISTENCE	0.93	1.33	1.09	0.98	2.310	79.8	0.309
	No. Obs.	15	12	70	506			
24	LFM MOS	0.00	0.32	1.89	0.91	1.760	77.3	0.345
	PERSISTENCE	2.80	0.73	1.01	0.99	2.528	75.8	0.193
	No. Obs.	5	22	75	496			

Table 8.4. Same as Table 8.3 except for the 1200 UTC cycle.

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Log Score	Percent Correct	Skill Score
12	LFM MOS	1.80	0.81	1.67	0.90	2.164	76.0	0.312
	PERSISTENCE	2.80	0.67	1.11	0.98	1.492	85.4	0.516
	No. Obs.	5	21	79	524			
18	LFM MOS	1.00	1.08	1.96	0.87	2.549	75.0	0.270
	PERSISTENCE	1.00	1.17	1.26	0.96	1.940	82.2	0.380
	No. Obs.	12	12	69	531			
24	LFM MOS	0.73	0.74	1.78	0.92	2.917	71.7	0.175
	PERSISTENCE	0.87	0.57	1.31	0.98	2.560	76.3	0.224
	No. Obs.	15	23	67	516			

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 1	2	3	4	Log Score	Percent Correct	Skill Score
3	LOCAL	0.73	0.94	1.15	1.00	1.964	82.4	0.538
	PERSISTENCE	0.86	0.90	0.96	1.02	1.779	84.4	0.576
	No. Obs.	819	774	2064	12481			
6	LOCAL	0.38	0.78	1.20	1.01	2.342	78.9	0.449
	PERSISTENCE	0.95	0.83	0.88	1.04	2.471	79.1	0.444
	No. Obs.	737	838	2255	12295			
9	LOCAL	0.26	0.61	1.13	1.02	1.856	80.4	0.433
	PERSISTENCE	1.85	0.98	0.83	1.01	2.664	76.6	0.347
	No. Obs.	379	713	2379	12655			
15	LOCAL	0.31	0.77	1.44	0.97	1.717	81.2	0.379
	PERSISTENCE	2.24	1.41	1.10	0.94	2.988	74.9	0.218
	No. Obs.	312	493	1800	13508			

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 1	2	3	4	Log Score	Percent Correct	Skill Score
3	LOCAL	0.64	0.93	1.19	0.98	1.277	85.5	0.540
	PERSISTENCE	1.36	1.31	1.16	0.96	1.394	85.0	0.550
	No. Obs.	278	543	2059	13394			
6	LOCAL	0.45	1.00	1.35	0.97	1.496	83.7	0.458
	PERSISTENCE	1.21	1.45	1.33	0.94	1.862	80.9	0.407
	No. Obs.	311	488	1788	13507			
9	LOCAL	0.43	1.00	1.46	0.96	1.814	81.5	0.416
	PERSISTENCE	0.95	1.33	1.35	0.94	2.238	78.2	0.334
	No. Obs.	397	533	1755	13408			
15	LOCAL	0.48	1.06	1.49	0.95	2.578	76.3	0.376
	PERSISTENCE	0.54	1.02	1.21	0.99	3.024	73.6	0.261
	No. Obs.	694	694	1964	12736			

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 1	2	3	4	Log Score	Percent Correct	Skill Score
3	LOCAL	0.76	0.43	1.31	0.99	1.549	83.6	0.455
	PERSISTENCE	0.88	0.78	1.11	1.00	1.671	85.6	0.516
	No. Obs.	17	23	72	548			
6	LOCAL	0.50	0.45	1.33	1.00	2.250	79.8	0.328
	PERSISTENCE	0.68	0.85	1.14	1.00	2.225	82.3	0.410
	No. Obs.	22	20	70	538			
9	LOCAL	0.41	0.47	1.13	1.02	2.088	80.7	0.297
	PERSISTENCE	0.82	1.20	1.07	0.99	2.360	80.1	0.320
	No. Obs.	17	15	71	524			
15	LOCAL	0.00	0.22	0.97	1.05	1.598	81.4	0.291
	PERSISTENCE	2.50	0.78	1.01	0.99	2.554	75.6	0.189
	No. Obs.	6	23	79	528			

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 1	2	3	4	Log Score	Percent Correct	Skill Score
3	LOCAL	0.50	0.17	0.88	1.06	1.537	82.1	0.298
	PERSISTENCE	2.67	0.58	1.12	0.98	1.562	85.1	0.511
	No. Obs.	6	24	77	526			
6	LOCAL	0.10	0.13	0.77	1.08	1.652	81.2	0.285
	PERSISTENCE	1.60	0.93	0.96	1.00	1.865	82.0	0.430
	No. Obs.	10	15	90	507			
9	LOCAL	0.07	0.13	1.12	1.03	1.740	81.5	0.292
	PERSISTENCE	1.07	1.00	1.22	0.97	2.089	81.6	0.396
	No. Obs.	14	15	74	528			
15	LOCAL	0.12	0.04	1.27	1.04	2.394	76.9	0.164
	PERSISTENCE	0.88	0.60	1.27	0.99	2.651	76.1	0.229
	No. Obs.	17	25	70	533			

Table 9.1. Comparative verification of NGM MOS and persistence visibility forecasts for 94 stations in the conterminous U.S., 0000 UTC cycle.

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Log Score	Percent Correct	Skill Score
12	NGM MOS	1.14	1.16	1.01	0.98	2.434	79.9	0.345
	PERSISTENCE	0.78	0.92	0.88	1.03	1.560	85.8	0.496
	No. Obs.	526	710	1452	13267			
15	NGM MOS	1.17	1.13	1.23	0.96	2.702	78.3	0.337
	PERSISTENCE	0.76	0.67	1.06	1.03	2.276	81.4	0.344
	No. Obs.	538	977	1216	13180			
18	NGM MOS	0.98	1.11	1.36	0.97	1.967	83.4	0.346
	PERSISTENCE	1.19	0.82	1.45	0.98	2.339	81.3	0.253
	No. Obs.	347	802	890	13894			
24	NGM MOS	1.03	1.12	1.21	0.98	1.550	86.4	0.337
	PERSISTENCE	1.79	1.13	1.55	0.95	2.367	81.0	0.173
	No. Obs.	229	575	828	14206			

Table 9.2. Same as Table 9.1 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	NGM MOS	1.07	1.18	1.20	0.98	1.468	87.0	0.364
	PERSISTENCE	1.28	1.23	0.93	0.99	1.162	89.8	0.481
	No. Obs.	221	577	825	14301			
15	NGM MOS	1.18	1.12	1.07	0.99	1.552	86.5	0.349
	PERSISTENCE	1.28	1.41	0.79	1.00	1.550	86.7	0.341
	No. Obs.	217	504	967	14072			
18	NGM MOS	0.99	1.07	1.01	1.00	1.923	83.8	0.323
	PERSISTENCE	0.81	1.26	0.66	1.02	2.034	83.7	0.263
	No. Obs.	349	568	1161	13874			
24	NGM MOS	1.12	1.13	0.98	0.99	2.555	79.7	0.332
	PERSISTENCE	0.54	0.99	0.53	1.07	2.760	79.0	0.171
	No. Obs.	529	722	1451	13329			

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

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Log Score	Percent Correct	Skill Score
12	LFM MOS	0.36	1.65	0.47	1.04	2.049	82.8	0.093
	PERSISTENCE	1.09	0.76	0.65	1.03	1.334	88.4	0.392
	No. Obs.	11	17	43	535			
18	LFM MOS	0.50	0.91	1.47	0.99	2.319	81.4	0.199
	PERSISTENCE	0.65	0.64	0.85	1.04	2.084	84.2	0.208
	No. Obs.	20	22	34	538			
24	LFM MOS	0.55	0.96	1.30	1.00	1.711	87.0	0.277
	PERSISTENCE	1.18	0.58	1.26	1.00	2.333	82.8	0.026
	No. Obs.	11	24	23	548			

Table 9.4. Same as Table 9.3 except for the 1200 UTC cycle.

Projection (h)	Type of Forecast	Bias by Category 1	2	3	4	Log Score	Percent Correct	Skill Score
12	LFM MOS	0.80	0.80	1.74	0.98	1.742	86.1	0.251
	PERSISTENCE	1.80	0.96	1.39	0.97	1.481	88.5	0.406
	No. Obs.	10	25	23	576			
18	LFM MOS	0.50	1.33	1.29	0.99	1.642	85.5	0.156
	PERSISTENCE	1.42	2.67	0.94	0.97	1.643	86.1	0.262
	No. Obs.	12	9	34	578			
24	LFM MOS	0.92	0.56	1.48	0.98	2.278	80.4	0.154
	PERSISTENCE	1.31	1.22	0.75	1.01	2.441	82.1	0.164
	No. Obs.	13	18	44	558			

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 1	2	3	4	Log Score	Percent Correct	Skill Score
3	LOCAL	0.71	0.80	1.14	1.01	1.734	83.7	0.435
	PERSISTENCE	0.80	0.90	0.92	1.02	1.538	86.1	0.504
	No. Obs.	545	727	1415	13450			
6	LOCAL	0.27	0.48	1.05	1.07	2.168	81.4	0.313
	PERSISTENCE	0.77	0.64	1.00	1.04	2.304	81.2	0.352
	No. Obs.	563	1013	1300	13248			
9	LOCAL	0.18	0.38	1.19	1.04	1.494	86.6	0.319
	PERSISTENCE	1.35	0.85	1.44	0.97	2.313	81.5	0.252
	No. Obs.	322	766	907	14132			
15	LOCAL	0.27	0.52	1.16	1.02	1.227	88.4	0.320
	PERSISTENCE	1.92	1.12	1.60	0.95	2.379	81.0	0.167
	No. Obs.	225	580	817	14489			

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 1	2	3	4	Log Score	Percent Correct	Skill Score
3	LOCAL	0.48	0.57	1.44	1.01	1.134	89.3	0.438
	PERSISTENCE	1.17	1.13	1.20	0.98	1.257	88.8	0.468
	No. Obs.	275	680	754	14555			
6	LOCAL	0.46	0.67	1.26	1.01	1.149	88.7	0.378
	PERSISTENCE	1.46	1.34	1.09	0.97	1.587	86.6	0.348
	No. Obs.	218	571	824	14473			
9	LOCAL	0.51	0.78	1.09	1.01	1.311	87.3	0.340
	PERSISTENCE	1.41	1.47	0.90	0.98	1.828	84.8	0.288
	No. Obs.	226	520	1002	14338			
15	LOCAL	0.47	0.98	1.19	1.00	2.022	81.6	0.310
	PERSISTENCE	0.75	1.17	0.68	1.03	2.501	80.5	0.210
	No. Obs.	428	651	1313	13689			

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 1	2	3	4	Log Score	Percent Correct	Skill Score
3	LOCAL	0.71	0.76	0.68	1.04	1.180	88.1	0.347
	PERSISTENCE	0.93	0.88	0.59	1.04	1.406	88.6	0.377
	No. Obs.	14	17	44	581			
6	LOCAL	0.50	0.41	0.90	1.05	1.994	84.8	0.235
	PERSISTENCE	0.59	0.64	0.67	1.05	2.101	84.8	0.227
	No. Obs.	22	22	39	563			
9	LOCAL	0.35	0.45	0.94	1.05	2.018	84.2	0.153
	PERSISTENCE	0.52	0.68	0.88	1.04	2.078	84.3	0.202
	No. Obs.	23	22	32	549			
15	LOCAL	0.40	0.13	0.92	1.05	1.253	89.4	0.187
	PERSISTENCE	1.30	0.57	1.25	1.00	2.154	83.8	0.030
	No. Obs.	10	23	24	577			

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 1	2	3	4	Log Score	Percent Correct	Skill Score
3	LOCAL	0.27	0.27	0.83	1.05	1.168	90.3	0.299
	PERSISTENCE	1.91	0.81	1.21	0.98	1.445	88.9	0.430
	No. Obs.	11	26	24	568			
6	LOCAL	0.30	0.17	0.38	1.08	1.055	90.6	0.259
	PERSISTENCE	2.00	1.06	0.82	0.99	1.682	86.5	0.307
	No. Obs.	10	18	34	552			
9	LOCAL	0.25	0.36	0.43	1.06	1.095	90.1	0.195
	PERSISTENCE	1.58	1.82	0.86	0.98	1.705	86.3	0.273
	No. Obs.	12	11	35	569			
15	LOCAL	0.27	0.20	0.37	1.09	1.575	87.5	0.106
	PERSISTENCE	1.33	1.27	0.73	1.00	2.419	83.3	0.174
	No. Obs.	15	15	41	570			