COMPARATIVE SKILL OF OBJECTIVE POP FORECASTS DERIVED
FROM 6-HOURLY PE FORECASTS IN FOUS-1 MESSAGE

NOAA Technical Memorandum NWSTM ER 38 describes an objective technique for the use of primitive equation (PE) model output to forecast winter precipitation in the northeast coastal sections of the United States. The technique was developed using 6-hourly PE forecasts available in the FOUS-1 teletype message for New York City, Philadelphia, Washington, and Boston. The dependent data sample was for the period November 4, 1969, through March 31, 1970.

Three months (October through December 1970) of PoP forecasts generated from independent PE data for the same cities used in the development data have now been verified. The results of the verification are presented as Brier scores in the accompanying table. The abbreviation "PE" is used to denote those columns that present Brier scores for PoP forecasts objectively generated from PE data. Also presented in the table are comparative results for the PoP forecasts prepared at Weather Service Forecast Offices (WSFO) and the National Meteorological Center (NMC).

Out of a possible 184 PE model runs in the three-month period studied (two runs per day) PE forecasts were available from 170 runs. NMC and WSFO forecasts issued during the 14 times in which there were no PE forecasts available were removed from the data sample.

Verification results based on 170 independent PE runs cannot be considered conclusive. It can be expected that the results presented here will change as more data are added. Examining the results available to date, for the four stations combined we find that the Brier score in the first forecast period for the objective PE PoP forecasts (.112) was inferior to both the WSFO Brier score (.083) and the NMC Brier score (.100). In the second forecast period, however, the Brier score for PE PoP forecasts (.121) was better than the NMC Brier score (.125) but still not as good as the WSFO Brier score (.112). In the third forecast period, the objective PE Brier score (.130) remains better than the NMC Brier score (.139) and now ties the WSFO Brier score (.130).

The data used in this verification study shows that the comparative skill of the objective PE PoP forecast increases with time and by the second forecast period performs better than NMC forecasters. By the third forecast period the PE PoP forecast is equal in skill to the WSFO forecasters.

The poor comparative performance of the objective PE forecast in the first forecast period is probably due to the big time advantage that both NMC and WSFO forecasters have. These forecasters can look at data about 9 hours after the data cut-off time for the objective forecast.

COMPARATIVE BRIER SCORES
FOR OCTOBER, NOVEMBER, AND DECEMBER 1970

Station	Month	Number of Forecasts	1st Period			2nd Period			3rd Period		
			PE	WSFO	NMC	PE	WSFO	NMC	PE	WSFO	NMC
NYC	Oct.	60	.078	.054	.087	.080	.088	.094	.081	.102	.105
	Nov.	53	.234	.146	.143	.219	.173	.188	.236	.200	.218
	Dec.	57	.102	.082	.102	.114	.125	.119	.134	.130	.121
3 Month Mean		170	.135	.092	.110	.135	.127	.132	.147	.142	.145
PHL	Oct.	60	.064	.072	.089	.062	.101	.111	.064	.076	.093
	Nov.	53	.168	.092	.108	.150	.139	.152	.166	.166	.185
	Dec.	57	.090	.082	.094	.103	.088	.091	.114	.115	.127
3 Month Mean		170	.105	.081	.096	.103	.109	.118	.113	.117	.133
DCA	Oct.	60	.050	.035	.050	.070	.070	.072	.076	.084	.099
	Nov.	53	.116	.079	.105	.127	.117	.145	.161	.164	.147
	Dec.	57	.068	.059	.068	.100	.081	.095	.098	.092	.102
3 Month Mean		170	.077	.057	.073	.098	.088	.103	.110	.112	.115
BOS	Oct.	60	.104	.079	.092	.098	.088	.111	.091	.120	.124
	Nov.	53	.181	.123	.163	.213	.166	.196	.194	.171	.212
	Dec.	57	.111	.105	.110	.142	.123	.139	.174	.161	.153
3 Month Mean		170	.130	.101	.121	.149	.125	.146	.151	.150	.161
Four Stations Combined	Oct.	240	.074	.055	.080	.078	.087	.097	.078	.096	.105
	Nov.	212	.175	.110	.130	.177	.149	.171	.189	.175	.191
	Dec.	228	.093	.082	.094	.115	.104	.111	.130	.125	.126
3 Month Mean		680	.112	.083	.100	.121	.112	.125	.130	.130	.139

It was stated in NOAA Technical Memorandum NWSTM ER 38 (Page 18) that the SAM/PE model PoP forecast for the first period is believed to be superior to the PoP forecasts determined from PE predictors only. It is suggested that the SAM/PE forecasts, which have the advantage of 7 hours of later information, be used, when available, as objective guidance in lieu of PoP forecasts generated from PE data only. No SAM/PE PoP forecast verification statistics are available at this time for comparison to the other verification statistics presented here.

Since the PE PoP forecasts verified here are objectively determined from PE model output, the objective PoP forecasts can be generated by computer, using as input the 6-hourly PE forecasts. This procedure has recently been initiated and now computer-derived, experimental, objective PoP forecasts are being disseminated on teletype circuit 7072. These automated forecasts are transmitted at about 0645Z and 1045Z, but may appear as early as 0680Z and 1080Z. In addition to presenting the experimental PoP forecasts for Washington, New York, Philadelphia, and Boston, PoP forecasts are also presented for other cities in the Eastern Region.

The skill of the objective PoP forecasts for these other cities has not been determined. It is known, however, that the PoP forecasts presented in the message do not account for unusual local effects, such as the effects of the Great Lakes in causing precipitation at Buffalo and Cleveland.

Presented below is an example of the message now transmitted on circuit 7072. The message illustrated was received this morning (February 8, 1971) and presents PoP forecasts for today (PoP1), tonight (PoP2), and tomorrow (PoP3). PoP3 verifies in the period 1200Z to 2400Z, February 9, 1971.

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FOUS3 KWBC 080644
EASTERN REGION POP FORECASTS
OUTPUT FROM 00Z FEB 08 71
STA POP1 POP2 POP3    STA POP1 POP2 POP3
CLE  70   40   10     BUF  40   50   10
PIT  70   40   10     CRW  90   50   00
ALB  60   80   30     BTV  90   60   30
JFK  60   80   20     BOS  90   80   50
BGR  80   60   20     DCA  80   50   10
PHL  70   50   10     CAE  60   00   00
RDU  70   10   00     HAT  90   40   00
PWM  90   70   30
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SCIENTIFIC SERVICES DIVISION, ERH
February 8, 1971