PACIFIC REGION TECHNICAL NOTES

82-021
October 18, 1982

A Comparison of the POP Forecasts between CMC and PWC during August 1982

Howard Richardson, Operations Technician
David Grimes, Supervising Meteorologist
Pacific Weather Centre, Vancouver, B.C.

INTRODUCTION

During the month of August, very little attention was paid to the CMC POP guidance. This presented an opportunity to conduct an independent analysis of how well the CMC guidance performs against the subjective forecasts prepared by the forecasters at the Pacific Weather Centre. It would have been better to have a larger sample than just a single month, but a program was introduced in September which incorporates the CMC POP guidance into the forecaster's decision making process.

DATA

Vancouver, Prince Rupert, Prince George, and Penticton were chosen for the purposes of comparison. The selection process was based on the availability of verifying observations at these geographic locations, and the climatic regimes.

The statistical sample was drawn from the 5 AM subjective forecasts for these sites and the CMC POP guidance based on the 00 GMT data.

VERIFICATION METHOD

A verification method is discussed in some detail in PRTN 82-013, and the same method was used. A Brier (mean square error), Root Mean Square Error (RMSE), and a Skill score were computed for each station (Table I) and formed the basis for comparison between the CMC and the PWC probability forecasts.

The probability forecasts were also grouped into three categories: those greater than 50 percent; those equal to 50 percent; and those less than 50 percent. These forecasts (Table II) were compared to the actual precipitation events to provide some information on the forecast bias.

RESULTS

The scores in Table I point to a number of interesting observations. Firstly, there appears to be little difference in the Root Mean Square Error in the CMC forecasts between Today, Tonight, and Tomorrow. Secondly, there is little difference in the Root Mean Square Error in the Tonight and Tomorrow period when comparing the CMC forecast to those of the Pacific Weather Centre's (PWC). However for the Today period these errors measured in the PWC forecasts were less than CMC (approximately a 10 percent improvement in the RMSE, while the skill score doubled). Penticton was predicted the best by CMC and interestingly enough, these scores were similar to the ones measured in the PWC forecasts for Penticton. Forecasts issued by PWC for Vancouver and Penticton verified generally better than those of the other two stations.

Contingency matrices are presented in Table II for the probability forecasts issued by PWC and CMC for each station. A number of statistics can be extracted from these tables but primarily the bias is of most interest in the early stages of the POP program.

Bias can be determined by taking the ratio of the number of precipitation events to the number of precipitation forecasts (greater than 50 percent). Therefore a forecast of no bias is 1 (or one could subtract 1 from this so no bias could be represented as zero). Looking through the various matrices, it is apparent that both CMC and PWC under forecast. However, on an average, PWC under forecasts more frequent than CMC.

Table II also shows the percentage of forecasts that were correct based on three categories. Based on this measure, Penticton forecasts were better in all 3 periods than the others.

The similarity between the CMC and the PWC forecasts for Penticton is also very noticable on this Table. As mentioned before, this was not due to the forecaster using the CMC forecast. Instead, it is likely because generally showery precipitation is most often isolated in that region of the Southern Interior during the summer and that knowledge is inherent in both POP forecasts.

CONCLUSIONS

One might be tempted to say that for at least the Tomorrow forecast, the PWC forecasters are better off using the CMC forecast and concentrate on further improving of the Day 1 forecasts. Since September, the guidance has been provided directly to the forecaster as guidance for incorporation into the Public Forecast.

Forecasters still have a tendency for under forecasting precipitation events based on the POP, but some argument can be made that maybe POP should be lower during the summer. Most precipitation events are of a showery nature, and therefore a high POP forecast would likely only result in the case of organized convection. Scattered airmass showers would likely result in a POP less than 50 percent because of the forecasters inability to predict precisely where these showers will occur. With the approach of the winter season, POP forecasts should be generally higher and this trend has been noted over the past few weeks.

TABLE 1

TODAY	PWC 5AM ISSUE AUGUST BRIER	PWC 5AM ISSUE AUGUST RMS	PWC 5AM ISSUE AUGUST SKILL%	CMC 5AM ISSUE AUGUST BRIER	CMC 5AM ISSUE AUGUST RMS	CMC 5AM ISSUE AUGUST SKILL%
VANCOUVER	.13	.36	61	.21	.46	13
PRINCE RUPERT	.16	.40	32	.19	44	20
PRINCE GEORGE	.16	.40	38	.21	46	19
PENTICTON	.13	.36	-15	.12	34	-01
AVERAGE	.14	.38	29	.18	42	13

TONIGHT	PWC 5AM ISSUE AUGUST BRIER	PWC 5AM ISSUE AUGUST RMS	PWC 5AM ISSUE AUGUST SKILL%	CMC 5AM ISSUE AUGUST BRIER	CMC 5AM ISSUE AUGUST RMS	CMC 5AM ISSUE AUGUST SKILL%
VANCOUVER	.15	.32	16	.16	.40	-18
PRINCE RUPERT	.19	.44	16	.19	.44	17
PRINCE GEORGE	.28	.53	07	.19	.44	40
PENTICTON	.17	.41	12	.17	.41	16
AVERAGE	.18	.42	15	.18	.42	14

TOMORROW	PWC 5AM ISSUE AUGUST BRIER	PWC 5AM ISSUE AUGUST RMS	PWC 5AM ISSUE AUGUST SKILL%	CMC 5AM ISSUE AUGUST BRIER	CMC 5AM ISSUE AUGUST RMS	CMC 5AM ISSUE AUGUST SKILL%
VANCOUVER	.19	.44	-06	.21	.46	-07
PRINCE RUPERT	.27	.52	00	.20	.45	29
PRINCE GEORGE	.23	.48	02	.27	.52	-10
PENTICTON	.10	.32	06	.11	.33	-04
AVERAGE	.20	.44	07	.20	.44	08

VANCOUVER

FORECAST PERIOD PERCENT		TODAY				TONIGHT				TOMORROW			
		>50	=50	<50		>50	=50	<50		>50	=50	<50	
PWC	PCPN	4	1	4	9	1	0	6	7	1	0	8	9
	NO PCPN	0	1	21	22	0	0	24	24	0	1	21	22
		4	2	25	31	1	0	30	31	1	1	29	31
	% CORRECT			81				80				71	
CMC	PCPN	1	0	8	9	1	0	6	7	0	1	8	9
	NO PCPN	1	0	20	21	0	0	23	23	0	2	19	21
		2	0	28	30	1	0	29	30	0	3	27	30
	% CORRECT			70				77				63	

PRINCE RUPERT

PWC	PCPN	3	1	7	11	3	1	6	10	3	0	9	12
	NO PCPN	0	0	20	20	3	0	18	21	0	2	17	19
		3	1	27	31	6	1	24	31	3	2	26	31
	% CORRECT			74				68				65	
CMC	PCPN	7	1	3	11	2	1	7	10	6	3	2	11
	NO PCPN	5	2	12	19	1	0	19	20	3	4	12	19
		12	3	15	30	3	1	26	30	9	7	14	30
	% CORRECT			63				70				60	

PRINCE GEORGE

PWC	PCPN	6	0	6	12	1	1	13	15	1	1	11	13
	NO PCPN	3	2	14	19	0	0	16	16	1	0	17	18
		9	2	20	31	1	1	29	31	2	1	28	31
	% CORRECT			65				55				58	
CMC	PCPN	6	0	6	12	4	3	7	14	2	2	9	13
	NO PCPN	3	1	14	18	2	0	14	16	3	3	11	17
		9	1	20	30	6	3	21	30	5	5	20	30
	% CORRECT			67				60				43	

PENTICTON

PWC	PCPN	2	0	2	4	0	0	7	7	0	2	2	4
	NO PCPN	4	1	21	27	0	0	24	24	0	0	27	27
		6	1	24	31	0	0	31	31	0	2	29	31
	% CORRECT			77				77				87	
CMC	PCPN	0	0	4	4	0	0	7	7	0	0	4	4
	NO PCPN	0	0	26	26	0	0	23	23	0	0	26	26
		0	0	30	30	0	0	30	30	0	0	30	30
	% CORRECT			87				77				87	

TABLE II