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A PRELIMINARY VERIFICATION OF TEMPERATURE AND PRECIPITATION FORECASTS FROM THE FOCNO2 SPECTRAL OUTPUT

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INTRODUCTION

Forecast parameter output from the CMC Spectral model has been received since early 1980. This data for Vancouver appears under the FOCNO2 CWAO5 header twice a day (See example in Appendix 'A'). This message displays a number of parameters in 3, 6 or 12 hour steps out to 60 hours.

Temperature and precipitation forecasts for the first 24 hours were abstracted from the 00Z issue of these messages over a 2 month period (August/September, 1980). The highest and the lowest forecast temperatures, over the first 24 hours, were compared to the recorded max/min temperatures at Vancouver. Similarly, the 24 hour precipitation forecast was verified against the actual precipitation recorded at Vancouver.

TEMPERATURES

Temperature forecasts are provided every three hours from time zero to 24. The lowest forecast value during this period was taken to represent the predicted minimum. The highest temperature prediction beyond 12 hours was deemed to serve as an appropriate maximum forecast. It is recognized that with the three-hour spacing of the forecast values, a realistic max/min would reside slightly outside the bounds of the abstracted values.

Figure 1 is a display of the daily FOCNO2 forecasts and of the recorded Vancouver max/min temperatures over the two-month period. It is immediately apparent that the forecast values tend to be quite consistently low — as much as 7 degrees below the actual values. This is more clearly seen in Figure 2, where the error from the actual values is plotted.

The average error and average absolute error (in brackets) of the forecast maximum temperature from the actual is -2.57 (2.8) in August and -1.6 (2.5) in September. The average error of the minimum is -2.9 (2.9) in August and -2.2 (2.8) in September.

A deficit of perhaps up to 2 degrees in the maximum temperature is acceptable in light of the effects of the three-hour forecast spacing alluded to earlier. Negative swings of more than 2 degrees should probably be considered as unsatisfactory.

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With regard to the minimum temperatures, the nearly consistently depressed values reflect a short-coming of the model. The three-hourly spacing would imply a forecast minimum even lower than the values considered in this report.

PRECIPITATION

Summer and early fall are not the best times for conducting precipitation forecast verifications on the West Coast. Nevertheless, since the required data was easily at hand, a quick comparison of the forecast and recorded amounts was performed.

Figure 3 summarizes the findings for both August and September. On the whole, the results lean toward a satisfactory performance. There was only one real "bust". On the first day of September, the forecast indicated 4mm. of precipitation but actually 45.4mm. occurred. Otherwise the forecasts leaned toward an overforecast rather than an underforecast of precipitation.

CONCLUSION

The FOCN02 temperature forecasts for Vancouver are generally on the low side. This is most noticeable on the minimum temperature forecasts where the output tends to be consistently low. No identifiable error trends were noted in the precipitation forecasts. Data from the winter months should be considered for further precipitation verifications.

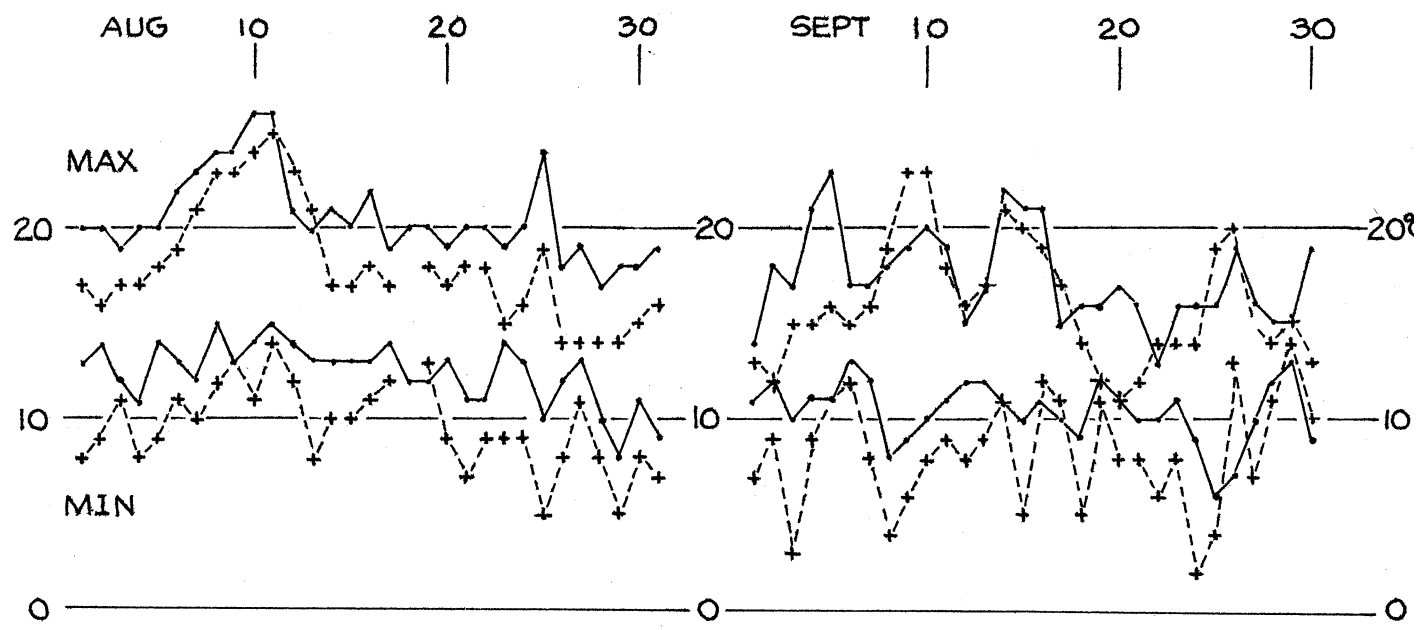

FIGURE 1. PLOTTED MAX & MIN TEMPERATURES : ACTUAL RECORD ——•——
FOCN02 FCST +-+-+

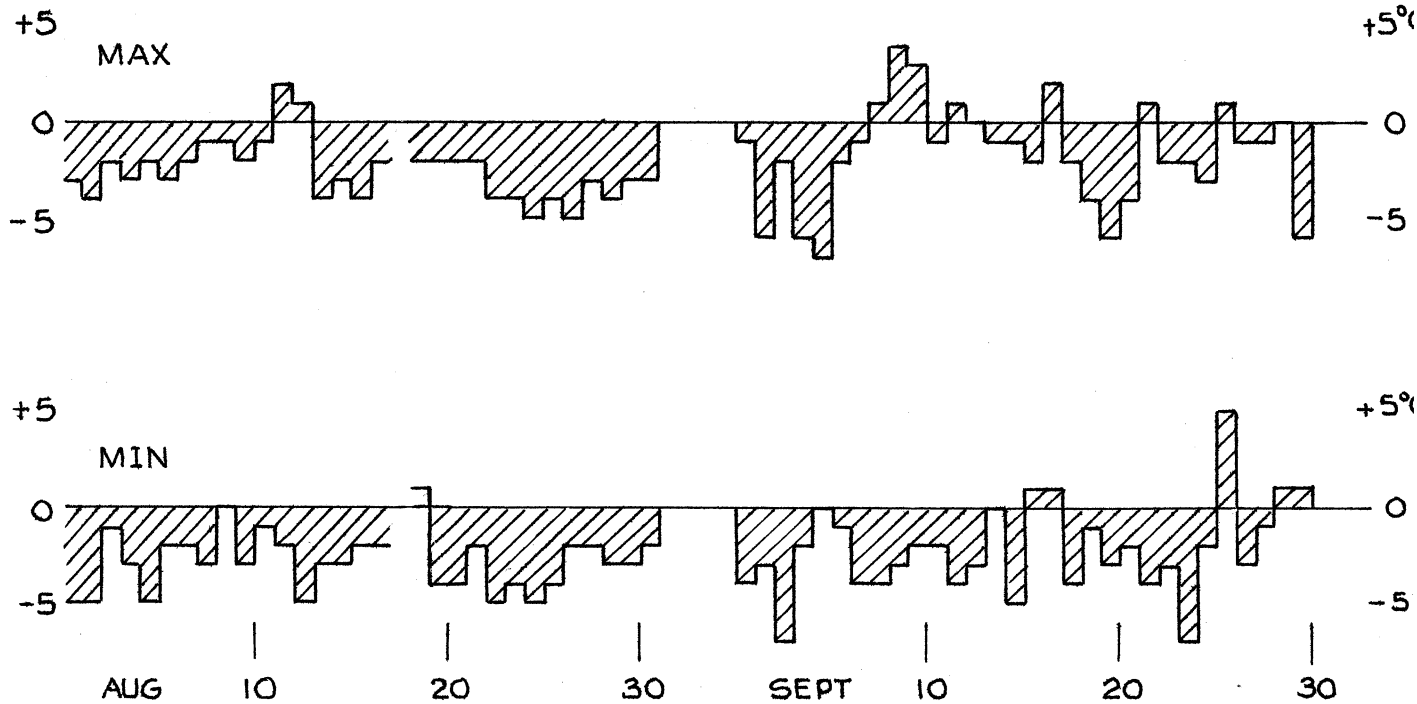

FIGURE 2. DEVIATION OF FOCN02 FORECASTS FROM ACTUALS
('0' line represents actual)

PRECIPITATION		NO. OF CASES	
FORECAST	OCCURRED	AUGUST	SEPTEMBER
NO	NO	18	9
YES	YES	9	14
YES	NO	3	6
NO	YES	0	1

OF THE NUMBER OF CASES WHERE PCPN WAS FCST AND IT OCCURRED:	AUGUST	SEPTEMBER
FCST HIGH BY OVER 25mm	0	0
FCST HIGH BY 10-24mm	0	1
FCST HIGH BY 3-10mm	2	3
FCST WITHIN ± 3mm	6	9
FCST LOW BY 3-10mm	1	0
FCST LOW BY 10-24mm	0	0
FCST LOW BY MORE THAN 25mm	0	1

Figure 3. Summary of FOCN02 precipitation verification Aug - Sept 1980.

APPENDIX 1.

FOCN02CWA05 301620

STN : VR					SPECTRAL DATA FROM SEP 30 80 12 0							
HOURS	0		6		12		18		24	36	48	60
THK	10-5	546		546		545		546		548	553	559	565
	8-5	412		413		412		413		415	419	424	428
Z	500	563		566		568		571		574	578	583	584
PCP				0		1		1		0	0	0	0
T	850	5		4		4		3		2	6	5	7
DPD	1000	3		4		4		4		3	2	5	2
	850	4		4		4		4		5	9	12	11
DTV	850			4		4		13		10	11	3	-2
	300			3		0		-8		-4	-3	5	-10
W	700			-8		-9		4		4	6	7	3
CLD	L			9		69		23		7	26	1	37
	MED			22		59		7		0	0	0	0
	HI			42		23		9		0	10	23	22
TMP	SFC	12	10	12	13	13	11	10	8	5	13	8	11
MSL		1020	1023	1025	1026	1027	1027	1030	1031	1032	1030	1030	1025
DIR	1000	273	261	243	236	254	273	301	332	2	57	107	107
SPD	1000	12	13	11	12	11	11	11	10	8	11	24	17