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PWC Experimental Satellite Program Nov. 1978 - Jan. 1979

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Introduction

Reception of half-hourly GOES-WEST Satellite imagery using a GOES-TAP through Seattle began at the Pacific Weather Centre in February 1978. It was found that the spatial resolution of 1-8 kms and half-hourly temporal continuity allowed meteorologists to watch cloud system changes and to ascertain their dynamic mechanisms. The GOES-WEST Satellite also provided an extensive new data source over the sparse meteorological data area of the Eastern Pacific. As a result of the quantity and value of these data an ad hoc satellite imagery analysis program was established and functioned from February 1978 to November 1978. This program was operated by two meteorologists, John Spagnol and P. Haering. When shift schedules permitted they staffed an operational satellite desk.

In order to assess the value of this ad hoc satellite program and to train the meteorological staff in satellite analysis techniques, a formal experimental operational and training satellite program was instituted at the Pacific Weather Centre. This program ran from Nov. 1 1978 to Jan. 31, 1979. The main feature of this program was the implementation of an "operational satellite meteorologist" during the hours from 7:30 a.m. to 3:30 p.m. The operational satellite meteorologist performed two primary functions. The first was the assessment of the accuracy of the numerical initial analyses and the second was the identification of cloud systems and their trends. The evaluations were made through the analysis of satellite imagery, using the implied characteristics of the imagery to identify features such as jet streams, major cloud systems, vorticity patterns and cloud boundaries.

Allocation of Staff

In order to operate the experimental operational/training satellite program, shift schedules and work duties were rearranged. Basically, the night-shift public forecaster was dropped from the schedule. Duties of the night-shift public forecasters were then carried out by the prog-analysts with assistance from the Operations Technician. Verification of Vancouver morning forecasts issued by the public forecaster were now verified by the senior technician rather than the forecasters themselves.

Verification of Morning Public Forecasts

Throughout the program period, the Vancouver morning public forecast verification scores were closely monitored. These scores were not primarily monitored to assess the impact of the satellite analysis program, rather they were to be used to assess the impact of the double duties required of the prog-analyst to cover his own duties as well as the public forecaster's duties while on the night shifts.

Table 1 presents the Vancouver public forecast verification scores for the period of the experimental satellite/training program, Nov. 1, 1978 to Jan. 31, 1979. Scores were normalized to account for the relative difficulties of the monthly weather situations. Table 2 presents the Vancouver public forecast verification scores for the previous year when the experimental program was not in progress. Two sets of marks are shown for each month since in the previous year forecasters were evaluating their colleagues' forecasts. In order to compare the scores with the past year and eliminate the bias of the markers the Senior Technician was asked to re-grade the previous year's forecasts. His results are also shown on Table 2. It is interesting to note on the normalized scores the Senior Technician evaluated the forecasts about 5 - 10% harder but also considered the weather situations more difficult by recognizing the need for a greater number of bonus points. Figure 1 illustrates the comparative normalized scores for each season. It can be seen that scores during the experimental period were as high as or higher than scores for the previous season, even after consideration of normalization, difficulty and the bias of the marker.

Termination of Experimental Satellite/Training Program

Although a firm date was not given as to the length of the experimental program at its inception, it was rather abruptly terminated on Jan. 31, 1979. The termination was clearly a result of increased workload spread over too few staff members. When the program began, compensation in terms of satellite training and ODIT project time were offered to the shift supervisors who were carying out their own duties as well as the public forecasters during the night shift. However, due to regional and office retirements and the subsequent shortage of shift supervisors the compensation was not available and the prolonged number of night shifts under double duties became too great to endure.

Results

1. It was recognized that the prog-analyst could not over an extended period of time carry out the night shift duties of the public forecaster and also his own. It was again recognized that forecasts eminating from this period are the most important of the day.

2. An operational satellite shift would give its maximum benefit when operating during the night shift and secondly during the day shift.

3. The value of an operational satellite program was recognized. Due to the volume and complexity of the satellite data, a satellite program focussed around an operational satellite desk is mandatory to evaluate meteorological processes over the data sparse Pacific. Duties of the desk would be the analysis, interpretation and dissemination of the useful operational information contained in the radiometric satellite image.

4. The burgeoning satellite technology requires all operational meteorologists to have some training in the use of this technology. During the experimental period, 38 days of operational satellite training was distributed amongst eight meteorologists.

Table 1

Vancouver Public Forecast
Verification Scores
for Nov. 1978, Dec. 1978 and Jan. 1979

	Nov.1978	Dec.1978	Jan.1979
Possible regular points	2100	2170	2170
Possible bonus points	95	158	83
Total points possible	2195	2328	2253
Total points scored	1705	1687	1613
%of total possible points	78%	72%	72%
Difficulty factor *	1.05	1.07	1.04
Normalized Score*	82%	77%	75%

*Difficulty factor = Total points possible / Possible regular points
*Normalized Score = %of total possible points times difficulty fac.

Table 2

Vancouver Public Forecast Verification
Comparison of Markers
for Nov. 1977, Dec. 1977 and Jan. 1978 Scores

	Nov. 1977		Dec. 1977		Jan. 1978	
	Marker		Marker		Marker	
	Sr.Tech	Fcstrs	Sr.Tech	Fcstrs	Sr.Tech	Fcstrs
Possible regular points	1680	1680	1890	1890	2170	2170
Possible bonus points	129	28	124	13	142	4
Total points possible	1809	1708	2014	1903	2312	2174
Total points scored	1170	1315	1455	1467	1514	1641
% of total possible points	65%	77%	72%	77%	65%	75%
Difficulty factor	1.08	1.02	1.07	1.01	1.07	1.00
Normalized Score	70%	79%	77%	78%	70%	75%

FIGURE 1

COMPARISON OF NORMALIZED VANCOUVER MORNING PUBLIC FORECAST VERIFICATION SCORES FOR NOV, DEC, JAN OF 77/78 AND 78/79