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STREX EVALUATION SUMMARY

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BACKGROUND

STREX refers to the Storm Transfer and Response Experiment conducted jointly by Canada and the United States. The primary reason is to explore the interaction between the atmosphere and ocean during the development of storms over the Pacific.

The PWC study was concerned with the evaluation of drifting buoy data over the northeast Pacific for use in the operational forecast office. This note is a summary of the results and conclusions.

During the period November 2 - December 15, 1980, 23 buoys were deployed. The buoy data received were saved and plotted for the STREX evaluation.

Initially it was assumed that the buoy data would be fairly accurate and analyses could be carried out with the assumption that any conflicts in pressure values with ship data could be resolved by accepting the buoy data. However, analyses of test cases showed that data from the 6 NCAR buoys were consistently "bad" with errors of 20 to 40 mbs not uncommon (see Table 1). It was also found that this clutter of bad reports made the analysis much more difficult so a subsequent set of cases were plotted without NCAR buoys. In all, 30 analyses were carried out and a summary of the results of buoy versus analysed pressures is given in Table 2.

The data is transmitted via TIROS-N satellite to Edmonton and therefore the times received are not necessarily within the synoptic hour. The time window for inclusion of data was chosen to be $\pm$ 1 hour. If the deviation was greater no analysis was made. Initially there were 23 floating buoys as follows:

6 PAPA Alternative Data System (PADS) Buoys
-SSVD1 CWEG
-numbers 634-639 inclusive

11 Global Atmospheric Research Program (GARP) Buoys
-SSVD40 CWEG
-numbers 501 - 507 inclusive

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-SSVD41 CWEG
-numbers 508 - 511 inclusive
-sensors include wind speed and air temperature but generally unreliable.

6 National Centre for Atmospheric Research (NCAR) Buoys
-SSVD42 CWEG
-numbers 512 - 517 inclusive

See Table 3 for an example of a drifting buoy report decode. Note that the "most useful" buoys are the PADS buoys, buoy 505, and buoy 509.

DEGREE OF USEFULNESS OF BUOY REPORTS IN PWC ANALYSIS

1. More accurate placement of significant meteorological features such as lows and highs.

2. Better definition of troughs and hence more accurate placement of fronts and better indication of intensity (sharpness) of frontal zones.

3. More accurate determination of pressure gradients.

4. Most importantly reduces uncertainty in analysis and allows a better more confident starting point in assessing of objective analyses and hence for "massaging" or rejecting progs.

5. Short term 6-12 hours "monster" buoys will generally pick up disturbances and allow for amendments of 6-12 hours before occurrence of storms but floating buoys could be useful as fill in for anchored buoy reports if drift could be estimated.

6. Any information would be useful at 1200Z since ship reports at this time are almost non-existent.

7. It has been shown that historical movement and development or lack of development is very important in a west to southwesterly fetch across the Eastern Pacific. If buoys pick up position and depths of lows or troughs and fronts to a higher degree of certainty then in certain instances a better set of prognosis is likely to be produced especially along coastal B.C. This will affect marine winds as well as weather elements associated with pressure and troughs and fronts in conjunction with upper air features indicated on satellite photos.

8. Impact of the analysis may be greatest on shipping over the ocean in the eastern Pacific Region.

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CONCLUSIONS

1. Buoy reports would be useful but less so than more comprehensive data such as that obtained by stationary ships (C7P); monster buoys; SEASAT data.

2. Reliability is an important factor and close monitoring of reports are essential.

3. Ease of use and availability is another factor. Asynoptic data from reports on a moving platform is not the easiest to use - this along with questionable reliability would tend to make the analyst concentrate on other more easily used data and may tend to negate any beneficial effects the data would have.

4. Pressure tendency is very useful over oceans where data is sparse. If at all possible transmissions should be sent via GOES to obtain hourly or three-hourly readings and allow calculations of tendencies.

TABLE 1. COMPARISON OF BUOY PRESSURES WITH ANALYZED PRESSURES *

TEST CASE (NOV. 26, 1980)

Buoy Identifier		260013Z			261228Z			261753Z			270002Z		
		PRES	ACT	DIFF	PRES	ACT	DIFF	PRES	ACT	DIFF	PRES	ACT	DIFF
		(tenths of millibars)		(mb)	(tenths of millibars)		(mb)	(tenths of millibars)		(mb)	(tenths of millibars)		(mb)
GARP SSVD40	501	992	-	-	984	760	+22	933	720	+21	917	880	+4
	2	023	830	+19	868	800	+7	878	830	+5	891	980	-9
	3	917	-	-	905	730	+18	903	680	+22	896	750	+15
	4												
	5	197	-	-	086	-	-	086	-	-	117	-	-
	6	089	-	-	972	-	-	999	040	-4	031	131	-10
	7												
GARP SSVD41	8	099	020	+8	888	840	+5	863	800	+6			
	9	160	-	-	950	-	-	874	-	-	884	-	-
	10	074	-	-	744	-	-	648	-	-	593	-	-
	11	123	-	-	815	-	-	730	-	-	623	-	-
NCAR SSVD42	12	092	880	+21	060	680	+38				011	900	+11
	13	052	860	+19	023	670	+35				075	920	+16
	14	106	910	+20	082	770	+31				070	960	+11
	15	009	830	+18							968	-	-
	16	075	890	+19	040	770	+27				022	960	+6
	17	112	920	+19	081	80	+28				078	980	+10
PADS SSVD1	634	020	-	-	860	-	-	870	-	-	980	-	-
	5	936	-	-	823	-	-	922	-	-	038	-	-
	6				650	-	-	737	-	-	907	-	-
	7	006	-	-	716	-	-	614	-	-	683	-	-
	8	895	-	-	683	-	-	673	-	-			
	9	999	-	-	676	-	-	611	-	-	641	-	-

* dash marks (-) imply pressures within reasonable agreement

TABLE 2. RESULTS OF ANALYSES OF BUOY PRESSURES

(30 CASES)

	BUOY IDENTIFIER	GOOD	MARGINAL	BAD
GARP SSVD40	501	3	1	13
	2	10	1	17
	3	11	3	11
	4	1	1	3
	5	27	2	
	6	17	2	8
	7	1		1
GARP SSVD41	8	10	6	9
	9	26	1	
	10	20		7
	11	25		2
NCAR SSVD42	12	1		13
	13	1		13
	14	1		13
	15	2		11
	16	2		11
	17	1	1	11
PADS SSVD1	634	27	1	
	5	25	4	
	6	26		
	7	28	1	
	8	27	1	
	9	27	1	

TABLE 3. DRIBU CODE EXAMPLE

SSVD1 CWEG 141410

ZZXX 14120 1400/ 74713 14112 19989 20083 61616 31010 81224 69696 333
46634 =

ZZXX	Drifting buoy report identifier
14120	Day (14), month December (12), year 198(0)
1400/	GMT 1400 Z / No wind data
74713	Quadrant 7 (Eastern Pacific) Latitude 47 Deg. 13 Min. North
14112	Longitude 141 Deg. 12 Min. West
19989	Pressure Group (1) Pressure 998.9 MB
20083	Temperature Group (2) Water Temperature 8.3 C
61616----69696	Quality Control Data
333	Drifting Buoy Identifier Follows
46634	Drifting Buoy Identifier (634)