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CHARACTERISTICS OF THE CMC 250MB STREAMLINE ANALYSIS

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INTRODUCTION

Satellite meteorologists at PWC are routinely studying satellite observed cloud field - flow pattern relationships. The CMC 250mb streamline analysis was looked upon as a possible tool*. In order to assess the reliability of the analysis, it was checked against available aircraft reported winds over the northeastern Pacific. This note is meant to outline some of the strengths and weaknesses found in day to day operations. Two cases are presented to show characteristic findings.

CMC 250MB STREAMLINE ANALYSIS

At the request of several weather centrals, CMC recently introduced an objective streamline - isotach analysis / 24hr prognosis for both surface and 250mb levels. The 250mb streamline analysis was closely looked at for two reasons. First, high level aircraft winds are available to check the initial analysis over the eastern Pacific. Secondly, unobscured high clouds associated with synoptic scale systems lie closest to this mandatory level.

PWC STREAMLINE ANALYSIS

A manually produced streamline analysis using aircraft reported winds is often used to isolate main streams and wind maxima over the Pacific. It must be noted that the winds are not exactly at the 250mb level, but within a few thousand feet each way.

CASE A - 00Z 23 AUGUST 1980

Situation - A high amplitude ridge over the eastern Pacific. A cold trough over western North America and another along 170W.

Streamline - Isotach analysis comparison
(Figures 1A, 1B)

The plotted winds on the manual PWC product give a more precise position to the mid Pacific ridge.

Aircraft winds off the Charlottes are greater by 20+ knots than those of the CMC product.

The overall pattern fit is good.

* See satellite observed cloud fields and their relationship to flow patterns Part A. Funk, L. PWC Notec November, 1980.

CASE B 12Z 24 AUGUST 1980

Situation - Nearly zonal flow across the northeastern Pacific.

Streamline - Isotach comparisons
(Figures 2A, 2A)

The two products (PWC, CMC) are very similar in the broad scale.

However, troughing along 150W and ridging along 165W are smoothed both in positioning and amplitude on the CMC product.

The manually produced wind field would show three distinct streams crossing 160W, while there is little stream distinction on the CMC streamline field.

Wind speeds are smoothed with the CMC product under analyzing winds over southern B.C. and on the streams crossing 160W.

The CMC product has been able to react to a changing flow pattern (Ridge to Zonal) over the eastern Pacific since case A, 36 hours earlier.

FIGURE I

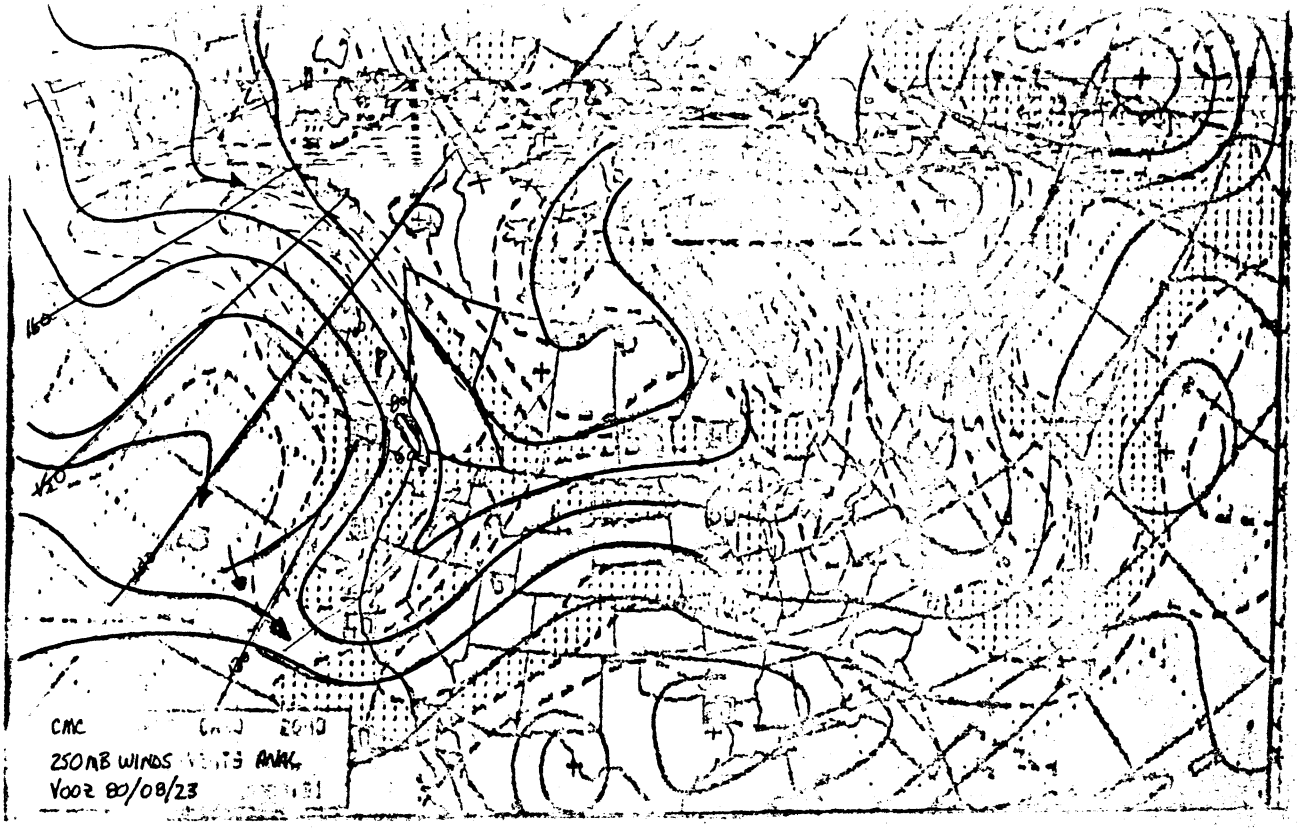
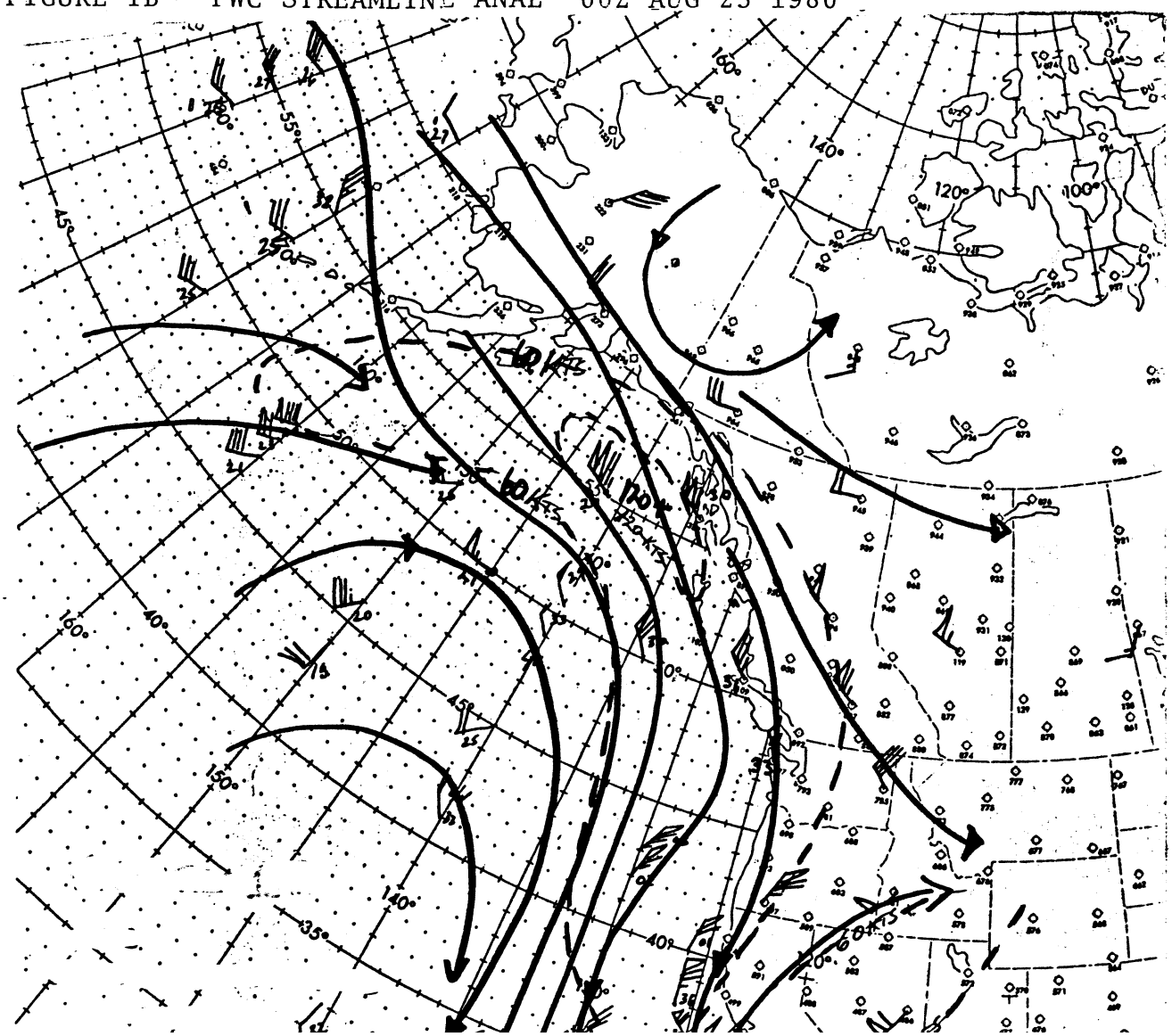


FIGURE IA - 250MB WINDS/VENTS ANAL V00Z 80/08/23

FIGURE IB - PWC STREAMLINE ANAL 00Z AUG 23 1980



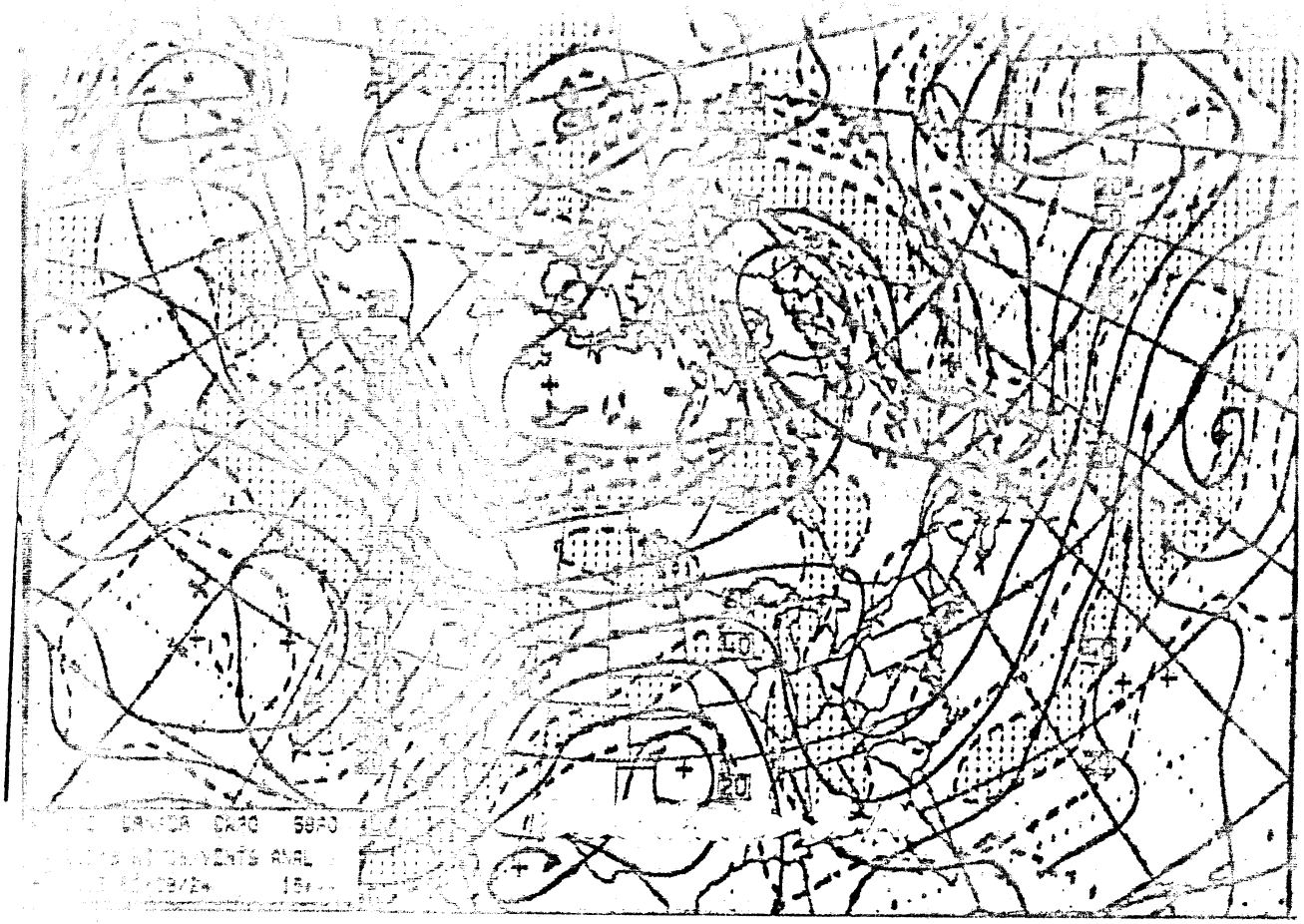


FIGURE 2A - 250MB WINDS/VENTS ANAL V12Z 80/08/24

FIGURE 2B - PWC STREAMLINE ANAL 12Z 24 AUG 1980

CONCLUSIONS

Performance of CMC 250mb streamline analysis as compared to a manually produced analysis using Airep winds.

- The CMC product agrees quite well with the observed winds and manually produced analysis. Broad scale streams and features are well handled.

- The CMC streamlines appear to be quite smoothed. Ridges and troughs are more rounded than actual winds indicate.

- The isotach field is also very smoothed. Separate and parallel streams are not well delineated. Winds are generally lighter than those observed and jet maxima are often not well defined.

- The CMC streamline has coverage west of the dateline which might be useful in longer range forecasts. Airep winds received at PWC are confined to the Pacific between the coast and 180W.

- Airep winds are received continuously at PWC so analysis are not confined to 00Z and 12Z.