PACIFIC REGION TECHNICAL NOTES

81-020

September 27, 1981

SURFACE ANALYSIS FEATURES

- TIME FOR CONSIDERATION -

Ron Nutton, Senior Meteorologist
Pacific Weather Centre, Vancouver

INTRODUCTION

Since the reception of the first weather satellite pictures, meteorologists have been increasingly hard pressed to accurately and fully represent the variety of cloud features and developments observed on the satellite imagery.

Although a "shadow of doubt" has been cast on the appropriateness of present symbolic representations of "frontal" structures and their link with atmospheric reality, this paper is concerned with the complete lack of depiction of certain boundaries/developments of which we are now aware.

The Pacific Weather Centre Satellite Unit has, to some degree, addressed this problem in its satellite analysis program by depicting significant points/lines of significance (e.g... deformation boundaries, vorticity centres/lobes etc... see figure 1). However, since the surface analyses, both regional and national, continues to be a dominant short range forecast tool to many forecasters and remains the primary briefing aid in field weather offices, I feel an expanded analysis symbolism is needed.

The following commonly observed situation will serve as a simple example:

SYNOPTIC SITUATION (17-18th September 1981)

Satellite picture - 1045Z 17th September 1981 (See Figure 2)

- Deep surface low just southwest of 50/140 ... with upper centre to southwest of surface position. "Occluding frontal wave" just northwest of 50/140 with "cold front" southeast to vicinity 45/133 to southward to 40N then as weakening frontal trail southwestward.

- Open cell cumulus field in cool northwesterly flow upstream from frontal system with ... *an area of congesting heavier convective cloud 40 - 45W / 150 - 155W.

Satellite picture - 0615Z 18th September 1981 (See Figure 3)

- Frontal system now well occluded with "cold front" from Alaskan Panhandle southeastward to just southwest of Vancouver Island with weak frontal tail southwestward.

- Area of organized convective cloud, after rapid development/ motion with the main stream aloft now lying as well

organized cloud band in N-S line between 40-50 just west of cold front.

REMARKS

In the foregoing example, present analysis standards would allow/demand the complete representation of the frontal structure on the surface analysis. However, the area of organized convective cloud behind the cold front, which become the significant weather producer was not depicted on the surface analysis. Why?

A main drawback lies in a lack of national and/or regional agreement/acceptance of what is observed, whether it should be incorporated as part of the analysis and how, if accepted, it should be represented.

This example is only one of many situations which leave many analysts uncomfortable with their product due to a lack of agreement and adequate symbolism to represent the important features of the analysis.

Surely, it is time to reconsider our present analysis practices and to develop an adequate symbolism to deal with those significant features which satellite imagery has made up allowance.

RECOMMENDATION

As a first step toward an increased symbolism I suggest the PVAL symbol, "positive vorticity advection line", (see attachment number 1 to Pacific Regional Technical Note 80-012), be incorporated for use on surface analyses (see figure 4). This symbolism has already been recognized by the AWS and was approved for implementation on AFGWS analyses in November 1979.

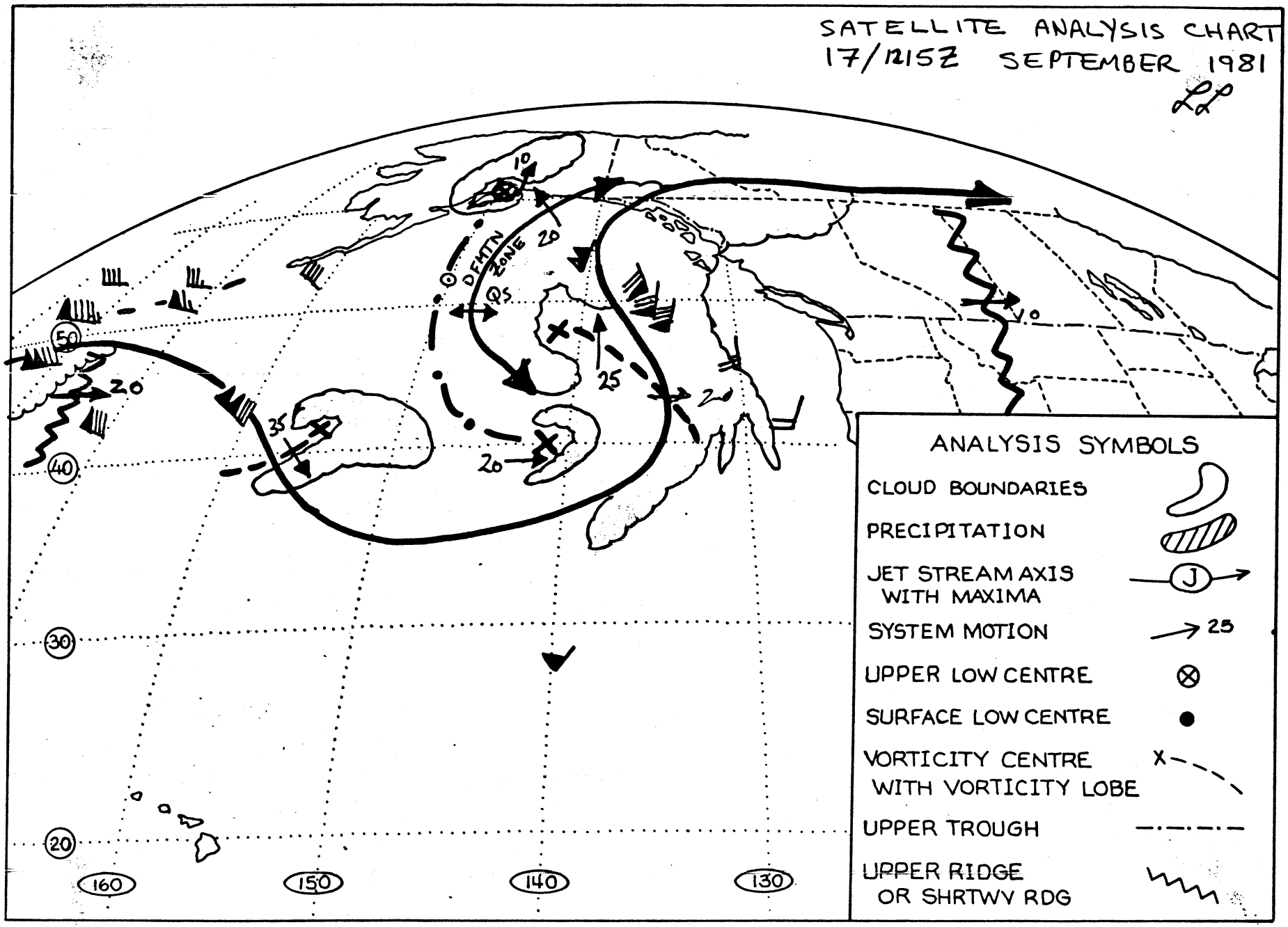
SATELLITE ANALYSIS CHART
17/1215Z SEPTEMBER 1981
LP
DFMTN ZONE
ANALYSIS SYMBOLS
CLOUD BOUNDARIES
PRECIPITATION
JET STREAM AXIS WITH MAXIMA
SYSTEM MOTION
UPPER LOW CENTRE
SURFACE LOW CENTRE
VORTICITY CENTRE WITH VORTICITY LOBE
UPPER TROUGH
UPPER RIDGE OR SHRTWV RDG
50
40
30
20
160
150
140
130

FIGURE 1.

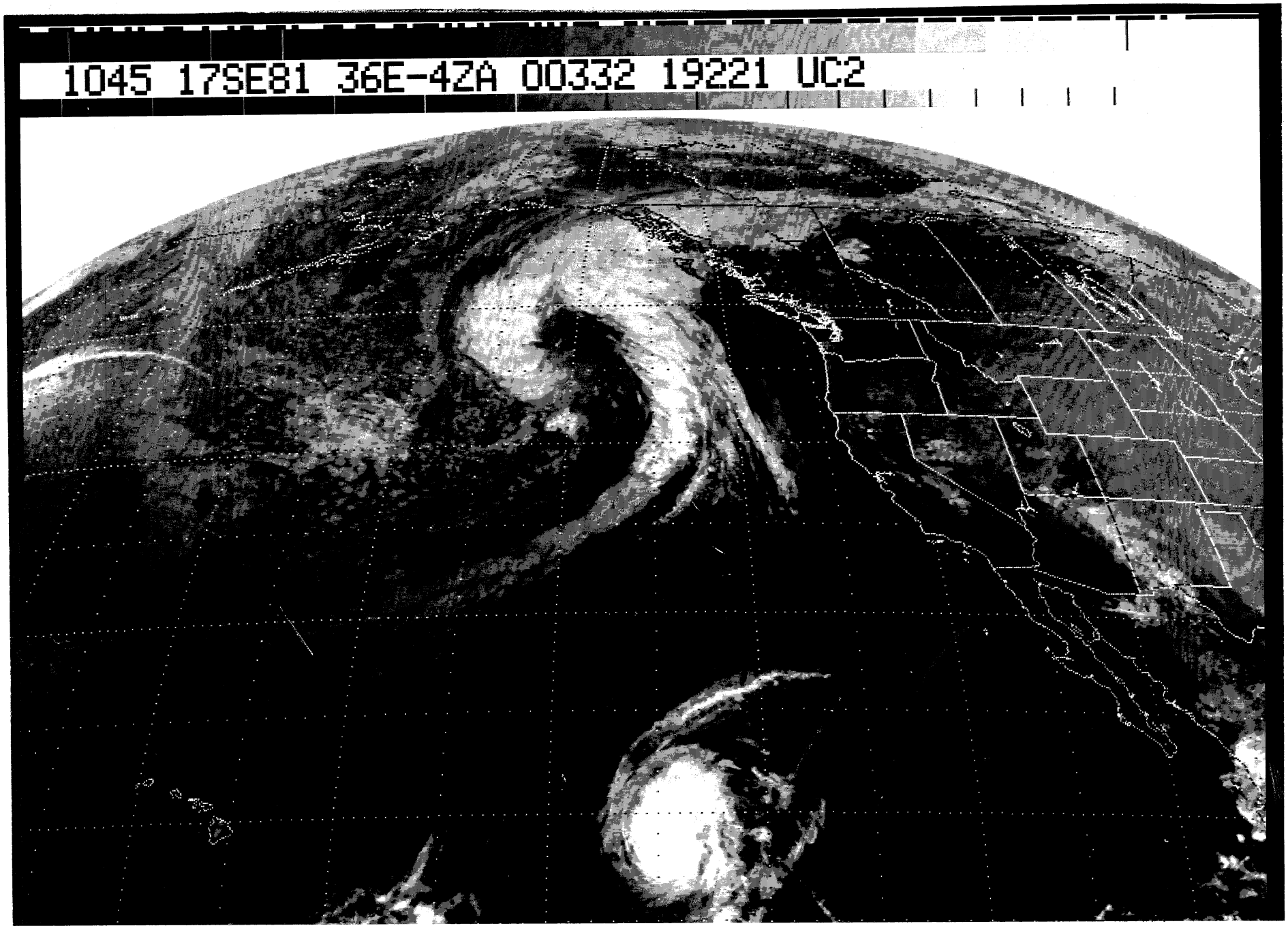

FIGURE 2.

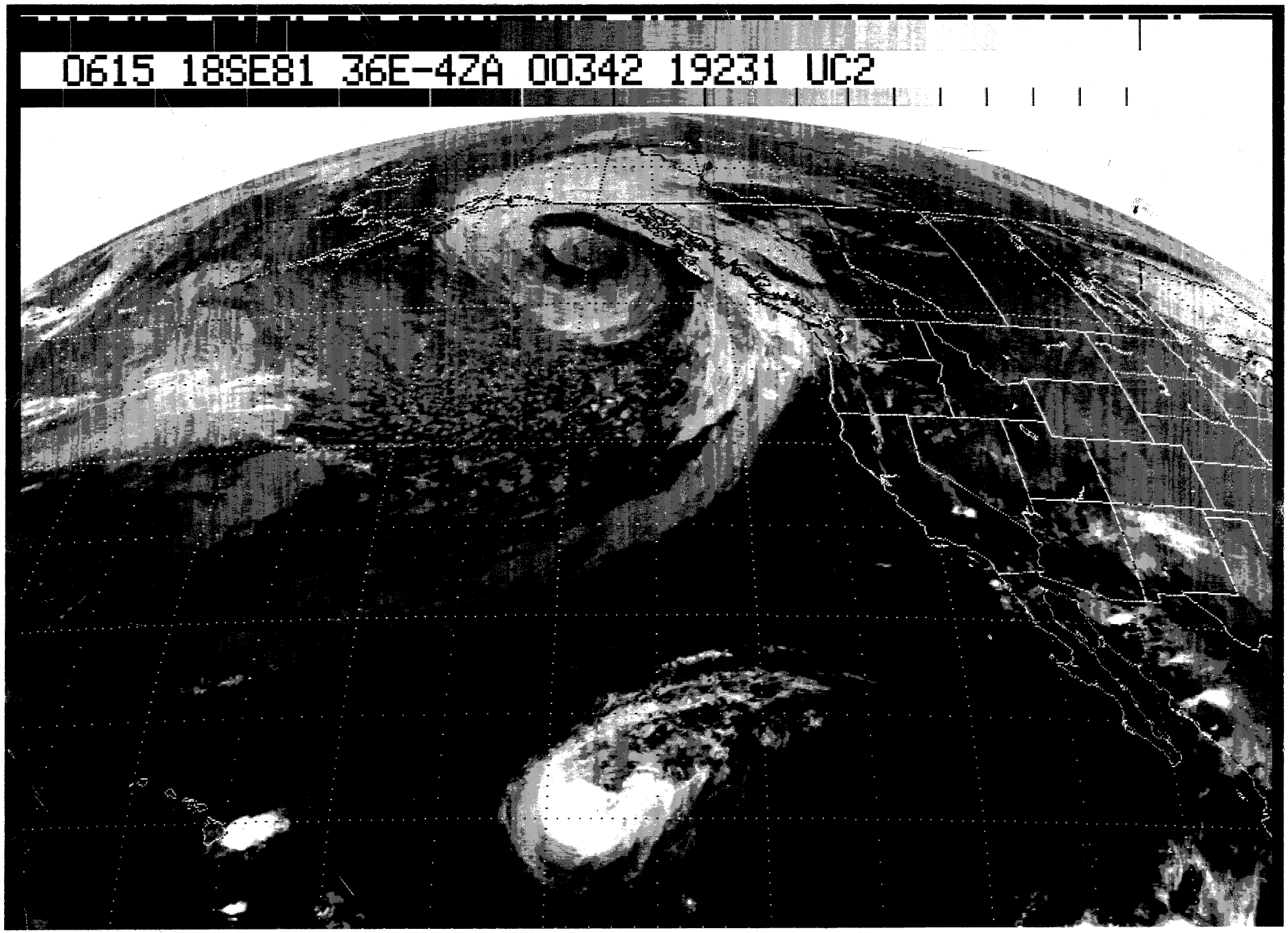

FIGURE 3.

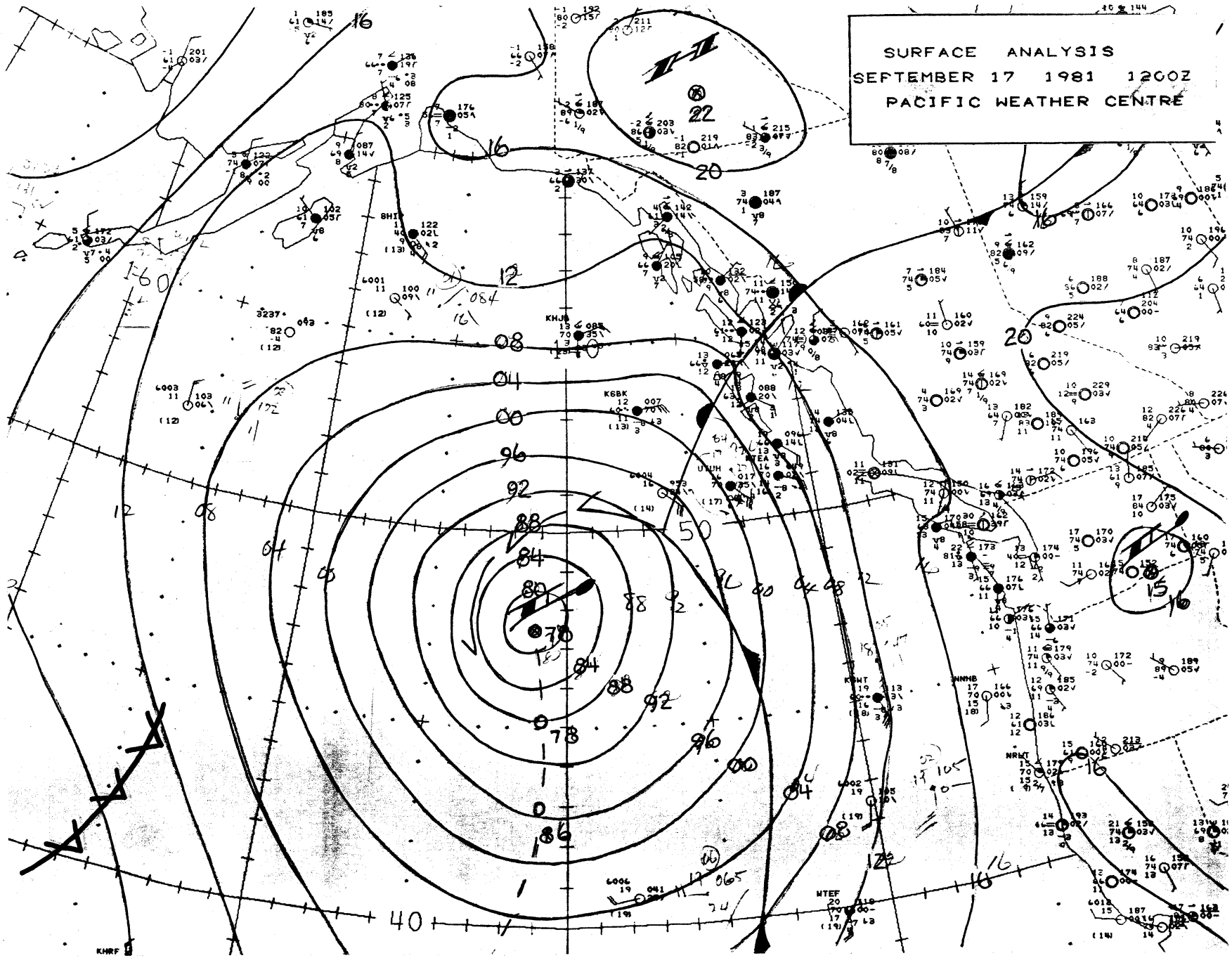
SURFACE ANALYSIS
SEPTEMBER 17 1981 1200Z
PACIFIC WEATHER CENTRE

FIGURE 4.