



PACIFIC REGION TECHNICAL NOTES

80-031

September 22, 1980

NON FORECAST OF RAIN OVER THE GREATER VANCOUVER AREA

June 16, 1980

(Forecast Investigation #6)

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INTRODUCTION

On the morning of June 16, 1980, skies were reported overcast over the Greater Vancouver area and several adjacent reporting stations, see Figs. 1(a) and 1(b), with some light showers reported at Abbotsford until about 11 a.m. Skies remained cloudy to overcast for most of the day with rain reported at Quillayute by 2 p.m. and showers spreading to Bellingham, Vancouver and Abbotsford by 7 p.m. that evening. Rain or showers continued fairly steadily through most of the night with occasional reports of moderate precipitation at several stations. A thundershower was reported at Abbotsford at 7 p.m. By 5 a.m. the next morning, Vancouver had received 29mm of rain and Abbotsford had received 29mm by 10 a.m.

Fig. 2 shows the forecast issued for Monday, June 16. The 5 a.m. forecast called for mainly sunny for Greater Vancouver and the Lower Fraser valley regions. On the 10 a.m. update this was changed to cloudy with a few sunny periods. By 4 a.m. the forecast had now changed to mainly cloudy with a few showers for Monday night and cloudy with a few sunny periods for Tuesday.

SYNOPTIC SITUATION

On the morning of June 16 an upper low centre lay just northwest of the Charlottes with a trof extending southeast nearly parallel to the coast, giving a moderate southerly flow over B.C., Fig. 3(a). The tephigram for Quillayute Fig 4(b) for 12Z Monday morning showed a fairly stable moist airmass below 800mb becoming conditionally unstable above 800mb. The surface chart for 12Z Monday Fig. 4(a) shows a weak surface gradient over B.C. A frontal wave lies just west of northern Vancouver Island with a front extending north to the east of the Charlottes and a cold front extending southward from the wave.

The author was unable to locate the satellite or PA's, FX's, therefore it is not known what guidance was used for the forecast. The morning synopsis for the public forecast indicates clouds moving over the south coast as the front moved inland and weakened.

Figs. 5(a) and (b) are the spectral 500mb and precipitation progs charts valid for 00Z, 17 June. These charts would have been available for the morning update of the public forecast. Fig. 5(a) shows a short wave trough at 500mb in a NW to SE line just west of Vancouver Island.

Fig. 5(b) shows the expected area of precipitation covering all but the southeast corner of B.C.

ANALYSIS OF EVENTS ON JUNE 16

Figs. 6(a) through (b) show a series of satellite pictures for the day of June 16. Pictures (a) and (b) indicate some cirroform clouds through Vancouver Island just ahead of the 500mb trough position. By 0045Z on June 17 (Fig. 6(c)), a significant area of bright cloud tops extend from Vancouver Island to northern Washington State with a definite limpy appearance over Washington indicating some heavy convective activity.

Figs. 7(a) and (b) are the radar echoe printouts for the morning of June 16 at 1630Z and 1650Z. Fig. 7(a) shows very little activity except for a seemingly innocent echoe west of Quillayute near the extreme edge of the radar range. By 1650Z Fig. 7(b) the echoe area has increased significantly and would indicate a fairly continuous band of precipitation approaching the southwest coast. By 20Z Quillayute was reporting R-.

Figs. 8(a) and (b) show the 250mb charts for 12Z June 16 and 00Z June 17 respectively. At 12Z a small jet max is seen upstream at 48N 140W. Fig. 8(b) shows that the 250 trof has moved further west by no jet max is shown. The winds at Salem and just offshore near 46N 130W indicate that the upstream jet has moved to just off the Washington-Oregon coast. Fig. 3(b) shows the 500mb analysis for 00Z June 17 indicating the trough off the west coast at 12Z has moved east to just off Vancouver Island and intensified in response to the movement of the 250mb jet into the trough. This is similar to the 500mb spectral prog for the same time.

SUMMARY

This was a very difficult case to forecast. The satellite pictures show very little indication of any significant jet approaching the coast.

The numerical spectral progs would indicate at least a cloudy day with some precipitation but hardly in the order of 29mm.

Probably the best clue to the impending rain was the radar reports which showed a significant area of precipitation off the west coast. These were probably missed however as the deadline for the public update is 1630Z in the summertime.

1715 YVR SA 1500 15 SCT M24 BKN 50 BKN 15 208/13/11/1604/018/0FZ
 1714 YVR SA 1400 16 SCT E25 cKN 50 BKN 20RW-- 214/13/11/2406/014
 1713 YVR SA 1300 12 SCT 20 SCT E20 BKN 50 OVC 20RW-- 200/13/11/2
 1712 YVR SA 1200 10 SCT 25 SCT M50 OVC 7R- 193/13/11/2607/010/0F
 1711 YVR RS 1100 5 SCT 0 SCT 14 SCT E80 OVC 7R-- 170/12/12/0000/
 1710 YVR SA 1000 3 SCT 8 SCT M14 OVC SRW- 190/12/12/0302/007/0FF
 1709 YVR SP 0915 3 SCT M7 BKN 14 OVC SRW- 1002 CF2CF55C3 TCU A50
 1708 YVR SA 0800 3 SCT M8 BKN 12 OVC 4RW-F 191/12/12/09/5/009/0T
 1707 YVR SA 0700 3SCT E7 BKN 12 OVC 3RW-F 192/12/11/0906/010/0-0T
 1706 YVR SA 0600 M4 BKN 15 OVC 4RW-F 178/12/11/0906/009/CF6T012
 1705 YVR SP 0525 M4 BKN 15 OVC 3RW-F 1009 CF7YCU3
 1704 YVR SA 0400 2 SCT M5 BKN 15 OVC 2RW+F 186/12/12/1510/008/0F
 1703 YVR RS 0300 3 SCT M30 BKN 45 OVC 11/2RW-F 186/14/14/1605/008
 1702 YVR SA 0200 30 SCT M60 BKN 90 OVC 8RW-- 104/15/13/2007/556/
 1701 YVR SA 0100 20 SCT 45 SCT E90 BKN 8 181/16/13/2304/007/018
 1700 YVR SA 0000 25 SCT 45 SCT E90 BKN 8 182/16/12/2207/007/0139
 1623 YVR SA 2300 25 SCT 45 SCT E70 BKN 8 180/17/12/2101/006/0139
 1622 YVR SA 2200 25 SCT 45 SCT E90 BKN 250 OVC 3 187/18/12/2010/
 1621 YVR SA 2100 20 SCT 45 SCT E100 BKN 250 OVC 0 189/18/14/2105
 1620 N/A OR MISC
 1619 N/A OR MISC
 1618 YVR SA 1900 20 SCT M45 BKN 90 OVC 3 197/16/13/2702/011/0128
 1617 YVR SA 1700 25 SCT 50 SCT E90 OVC 3 176/15/13/2103/011/0F10
 1616 YVR SA 1600 25 SCT E50 BKN 90 OVC 0 195/15/13/2403/011/0134
 INPUT STATION, THEN A SPACE, THEN THE NO. OF FRS. REQUIRED, IE. YV
 EX

1715 YXX RS 1500 6 SCT E36 BKN 15R-- 214/12/10/2106/016/0F400V U
 1714 YXX RS 1400 3 SCT R0 BKN 25 OVC 3R--F 211/11/10/1911/015/0
 1713 YXX RS 1300 4 SCT E10 BKN 30 OVC 2R-F 207/11/10/2207/014/50
 1712 YXX RS 1200 16 SCT E30 OVC 15R-- 202/12/10/2207/013/CF1507
 1711 YXX SA 1100 10 SCT M28 OVC 15R- 197/12/11/2206/011/0F1805
 1710 YXX SA 1000 7 SCT 20 SCT M40 OVC 12R- 197/12/11/2306/011/0F
 1709 N/A OR MISC
 1708 YXX RS 0900 4 SCT M10 BKN 10 OVC 2RF 200/12/11/2010/012/0F2
 1707 YXX SA 0700 5 SCT M10 BKN 15 OVC 3R-F 197/12/11/1906/012/0F
 1706 YXX SP 0635 6 SCT M10 BKN 15 OVC 3R-F 2100 SF38F5502 M0 8
 1705 YXX SA 0500 6 SCT M17 BKN 40 OVC 0R- 194/12/11/1907/010/0F1
 1704 YXX SA 0400 6 SCT E25 BKN 50 OVC 1R- 191/13/11/2405/010/0F
 1703 YXX RS 0300 6 SCT E25 BKN 50 OVC 5R-F 193/13/12/2208/010/0F
 1702 YXX RS 0200 7 SCT E30 OVC 3TRW-F 190/13/12/2110/009/0F3807 1
 1701 YXX RS 0100 10 SCT E20 BKN 50 OVC 3RW-H 185/15/12/2210/010/0
 1700 YXX SA 0000 10 SCT 30 SCT E50 O10C 5H 101/16/13/2104/007/0F
 1623 YXX SA 2300 6 SCT 20 SCT E70 BKN 100 OVC 7 185/16/12/2301/0
 1622 YXX SA 2200 6 SCT 20 SCT E50 BKN 100 OVC 3H 190/15/12/2102/0
 1621 YXX SA 2100 6 SCT 10 SCT E50 BKN 70 OVC 4R 197/15/12/2000/0
 1620 N/A OR MISC
 1619 N/A OR MISC
 1618 YXX SA 1800 5 SCT 15 SCT E60 BKN 120 OVC 5RW--H 196/14/12/2
 1617 YXX SA 1700 5 SCT 17 SCT E70 BKN 120 OVC 3RW--H 176/14/11/2
 1616 YXX RS 1600 7 SCT E30 BKN 80 OVC 3RW--H 190/14/11/2205/011/0
 INPUT STATION, THEN A SPACE, THEN THE NO. OF FRS. REQUIRED, IE. YV

FIGURE 1(a)

1715 UIL SA 1457 E16 BKN 25 OVC 7 235/53/46/2603/022/ 208 15//
 1714 UIL SA 1357 E16 BKN 25 OVC 7 232/52/48/2703/021
 1713 UIL SA 1257 E16 BKN 25 OVC 6F 230/51/49/2603/021
 1712 UIL SA 1155 E16 OVC 5F 227/51/49/2603/020/ 40000 16// 5
 1711 UIL SP RADAT 80062
 1710 UIL SA 0957 16 SCT M25 OVC 3F 227/52/50/2604/020
 1709 UIL SA 0857 M22 OVC 3F 227/52/50/0000/020/ 30200 15//
 1708 UIL SA 0757 M14 OVC 3F 227/53/51/2904/020
 1707 UIL RS 0658 M13 OVC 3F 223/54/52/2904/019/ LE10
 1706 UIL RS 0557 M12 OVC 1L-F 225/54/53/3003/019/ 30905 16// 10
 1705 UIL RS 0456 E6 OVC 3/4L-F 220/55/54/2600/010
 1704 UIL RS 0355 E10 OVC 1L-F 216/55/53/2305/017
 1703 UIL SA 0258 E10 OVC 5PW- 216/55/53/2405/017/ 30200 12//
 1702 UIL SA 0157 E10 OVC 5RW- 213/56/55/2407/016
 1701 UIL SA 0056 E15 OVC 7RW- 215/57/53/2505/016/ R050
 1700 N/A OR MISC
 1623 UIL SA 2258 E15 OVC 7RW- 215/59/52/2508/016 R044
 1622 N/A OR MISC
 1621 UIL SA 2056 20 SCT E90 OVC 7R- 213/58/50/2606/016 R053 / 0
 1620 N/A OR MISC
 1619 N/A OR MISC
 1618 UIL RS 1757 E15 BKN 50 OVC 7 213/59/50/2608/015/ 500 11//
 1617 UIL SA 1656 E50 OVC 7 203/58/49/3507/014
 1616 UIL SA 1555 10 SCT E50 OVC 7 210/58/50/0000/015
 INPUT STATION, THEN A SPACE, THEN THE NO. OF HRS. REQUIRED, IE. 7

1715 BLI SA 1452 0 -SCT 14 SCT E20 BKN 50 OVC 15 223/54/46/1809/014
 1714 BLI SA 1348 0 -SCT E14 BKN 20 OVC 10 223/52/45/1813/015/BL
 1713 BLI SA 1252 0 SCT E14 BKN 31 OVC 7 223/52/45/1912/015/015
 1712 BLI RS 1157 0 SCT E13 BKN 33 OVC 10 213/52/46/1910/015/C10
 1711 N/A OR MISC
 1710 BLI RS 0950 9 SCT 20 SCT E40 OVC 10 206/53/46/1809/014/BLI
 1709 BLI RS 0855 5 SCT E21 BKN 41 OVC 5R-F 206/53/46/1810/014/
 1708 BLI SA 0757 M9 OVC 2R-F 210/53/47/1912/015/R- ONLY R
 1707 BLI SA RS E9 OVC 2R-F 207/54/49/1818/014/C10 EG9
 1706 N/A OR MISC
 1705 BLI SA 0455 E10 BKN 25 OVC 5R-F 204/54/49/1815/013
 1704 BLI SA 0355 E10 BKN 25 OVC 5R-F 200/54/48/1311/012
 1703 BLI SA 0255 8 SCT E30 BKN 20 OVC 5R-F 204/54/46/1509/013/
 1702 BLI SP 0220 -X 6 SCT E10 BKN 3R-F 1509/013/F3
 1701 BLI SA SP -X E7 OVC 2R-F 1610/011/F8
 1700 N/A OR MISC
 1623 BLI SA 2258 15 SCT E30BKN 80 OVC 4H 195/60/51/2209/010/ 10
 1622 N/A OR MISC
 1621 BLI SA 2058 E30 BKN 80 OVC 7 202/60/51/2008/012/ 803
 1620 N/A OR MISC
 1619 N/A OR MISC
 1618 BLI SA 25 SCT E70 OVC 205/56/49/2009/013/ RWU E 400 56
 1617 BLI SA 1658 5 SCT E30 BKN 60 OVC 7 205/55/49/2008/013/ HAZ
 1616 BLI SA 1553 5 SCT E30 BKN 60 OVC 7 205/54/48/2207/013/ HAZ
 INPUT STATION, THEN A SPACE, THEN THE NO. OF HRS. REQUIRED, IE. 7

FIGURE 1(b)

FPCN11CWVR 161200
FORECASTS FOR BRITISH COLUMBIA ISSUED BY ENVIRONMENT CANADA
AT 5.00 AM PDT MONDAY 16 JUNE 1980 FOR TODAY AND TUESDAY.
THE NEXT SCHEDULED FORECAST WILL BE ISSUED AT
4 PM TODAY 16 JUNE 1980.

GREATER VANCOUVER
SUNSHINE COAST
EAST VANCOUVER ISLAND.

TODAY. MAINLY SUNNY. HIGHS NEAR 20. LOWS TONIGHT NEAR 10.
TUESDAY. CLOUDY WITH AFTERNOON SUNNY INTERVALS. HIGHS NEAR 18.

LOWER FRASER VALLEY
HOWE SOUND-WHISTLER.

TODAY AND TUESDAY. MAINLY SUNNY. HIGHS NEAR 20. LOWS TONIGHT
8 TO 10. HIGHS TUESDAY NEAR 19.

SYNOPSIS FOR BRITISH COLUMBIA.

A WEAKENING FRONTAL SYSTEM MOVING OVER THE NORTH COAST WAS GIVING
SOME RAIN TO THOSE REGIONS OVERNIGHT. INTERIOR SECTIONS AND MOST
OF THE SOUTH COAST HAD MAINLY CLEAR SKIES. PORTIONS OF THE CLOUD
FROM THE SYSTEM WILL MOVE ACROSS THE SOUTH COAST TODAY WITH
OCCASIONAL RAIN CONTINUING IN THE NORTH. INTERIOR REGIONS WILL
AGAIN START OFF WITH SUNNY SKIES BUT SHOWERS OR THUNDERSHOWERS
WILL DEVELOP IN THE AFTERNOON.

END

JUN 16 AM 031

FPCN11CWVR 161700

FORECASTS FOR BRITISH COLUMBIA ISSUED BY ENVIRONMENT CANADA
AT 10 AM PDT MONDAY 16 JUNE 1980 FOR TODAY AND TUESDAY.
THE NEXT SCHEDULED FORECAST WILL BE ISSUED AT
4 PM TODAY 16 JUNE 1980.

GREATER VANCOUVER
LOWER FRASER VALLEY
HOWE SOUND-WHISTLER
SUNSHINE COAST
EAST VANCOUVER ISLAND.

TODAY AND TUESDAY CLOUDY WITH A FEW SUNNY PERIODS. HIGHS 18 TO 20.
LOWS TONIGHT NEAR 10.

FPCN11CWVR 162300

FORECASTS FOR BRITISH COLUMBIA ISSUED BY ENVIRONMENT CANADA
AT 4.00 PM PDT MONDAY 16 JUNE 1980 FOR TONIGHT AND TUESDAY
WITH AN OUTLOOK FOR WEDNESDAY.
THE NEXT SCHEDULED FORECAST WILL BE ISSUED AT
5 AM TUESDAY 17 JUNE 1980.

GREATER VANCOUVER
LOWER FRASER VALLEY
HOWE SOUND-WHISTLER
SUNSHINE COAST
EAST VANCOUVER ISLAND.

TONIGHT MAINLY CLOUDY. A FEW SHOWERS. LOWS 8 TO 10.
TUESDAY CLOUDY WITH A FEW SUNNY PERIODS. HIGHS 18 TO 20.
WEDNESDAY OUTLOOK...CLOUDY.

SYNOPSIS FOR BRITISH COLUMBIA.

A WEAK DISTURBANCE NEAR THE BC COAST BROUGHT CLOUDS AND A FEW
SHOWERS ~~WITH SHOWERS~~ TO THE COAST TODAY. IN THE INTERIOR SKIES
REMAINED SUNNY ALTHOUGH A FEW SHOWERS OR ISOLATED THUNDERSHOWERS WERE
REPORTED FROM A FEW LOCALITIES.

NOT MUCH CHANGE IS ANTICIPATED FOR THE NEXT FEW DAYS AS WEAK
DISTURBANCE CONTINUE MOVE ONTO THE COAST THEN DISSIPATE ON
MOVING INTO THE INTERIOR.

END

FIGURE 2.

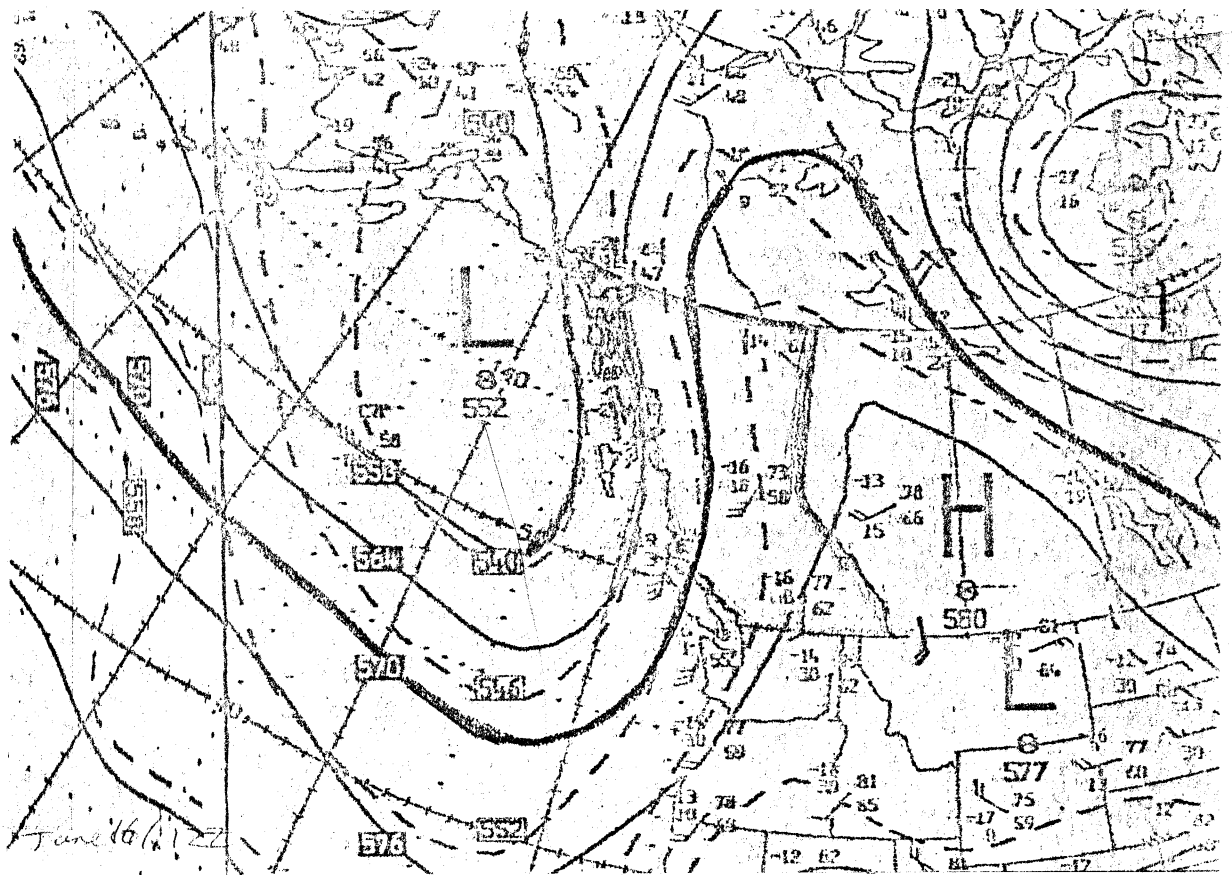


FIGURE 3(a)
500 MB ANALYSIS 1200Z JUNE 16.

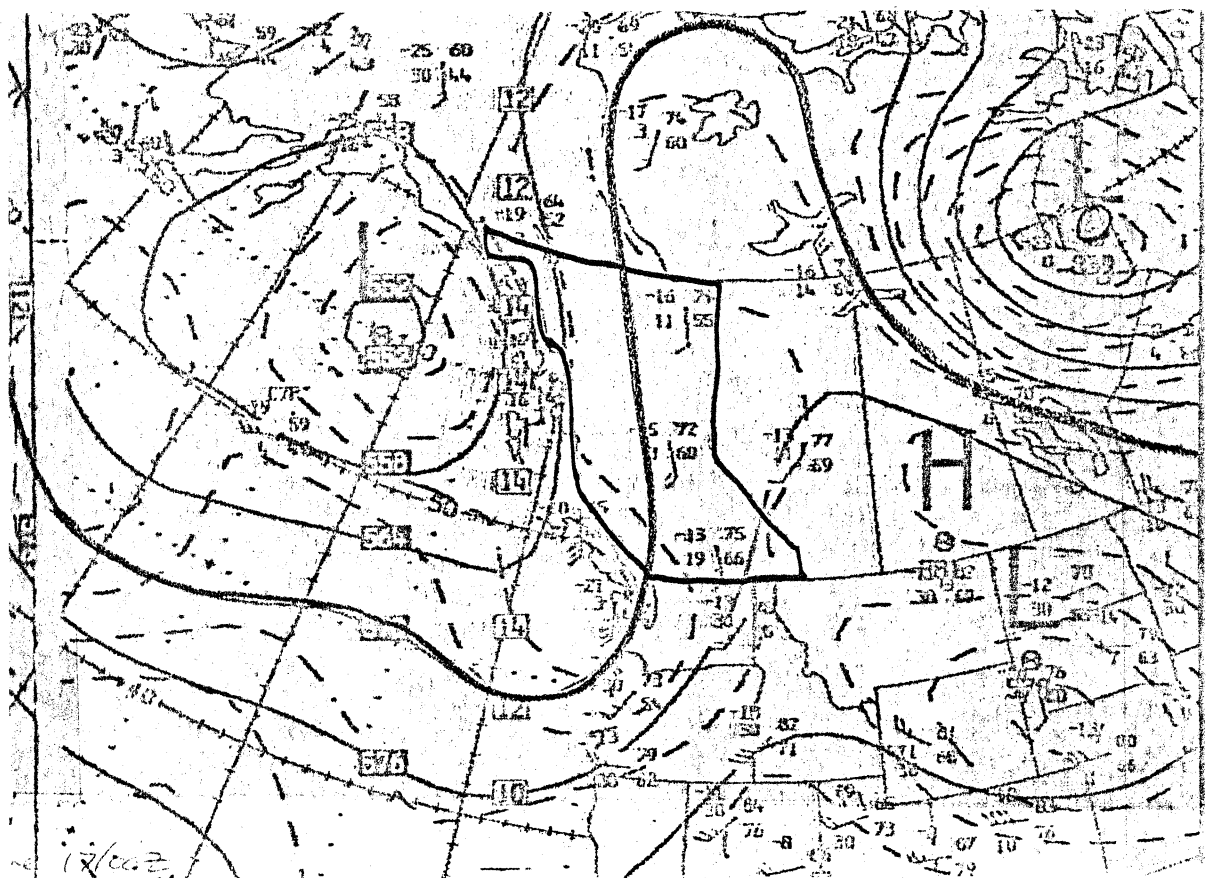


FIGURE 3(b)
500MB ANALYSIS 0000Z JUNE 17.

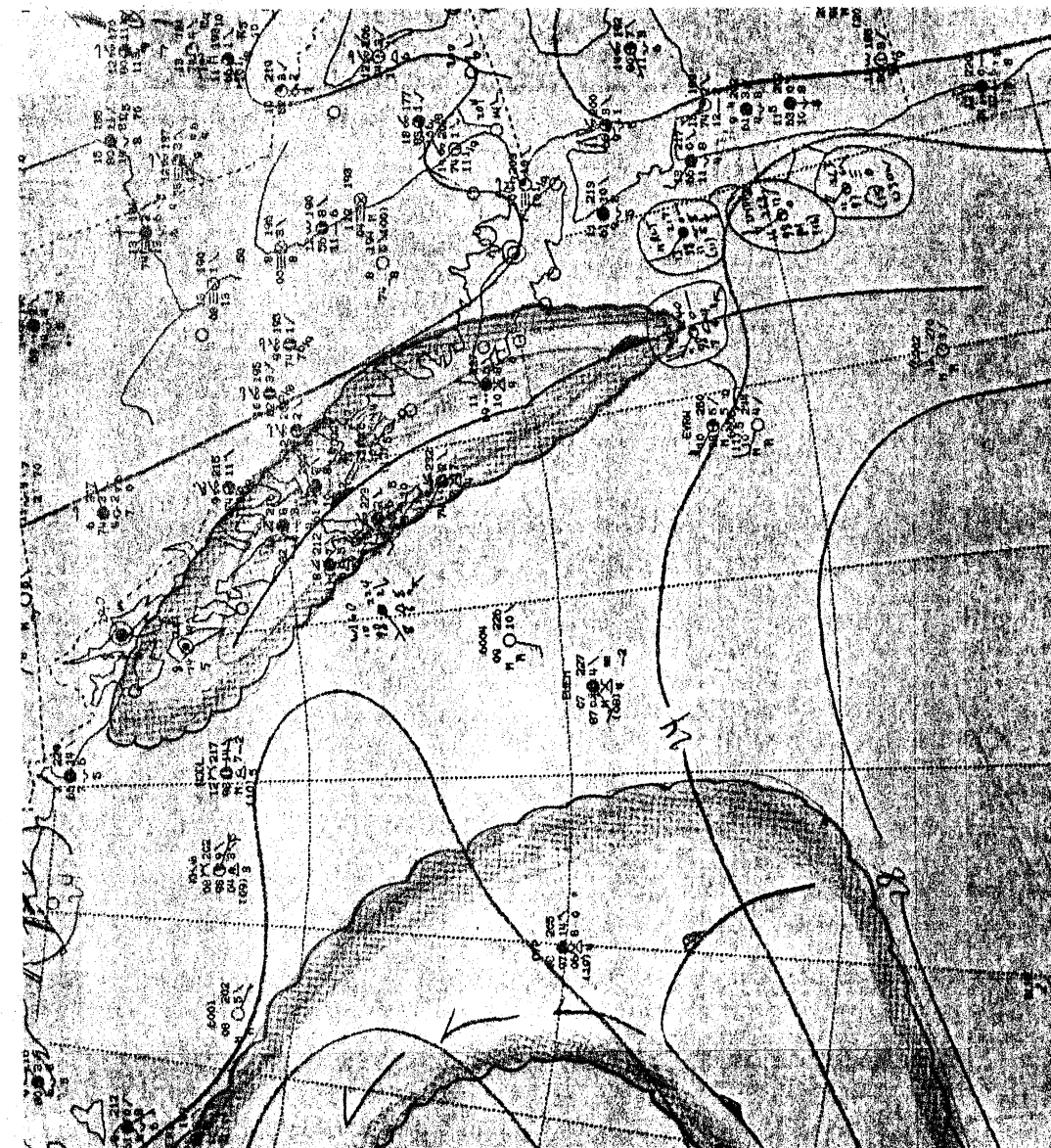


FIGURE 4 (a)
SURFACE ANALYSIS 1200Z JUNE 16.

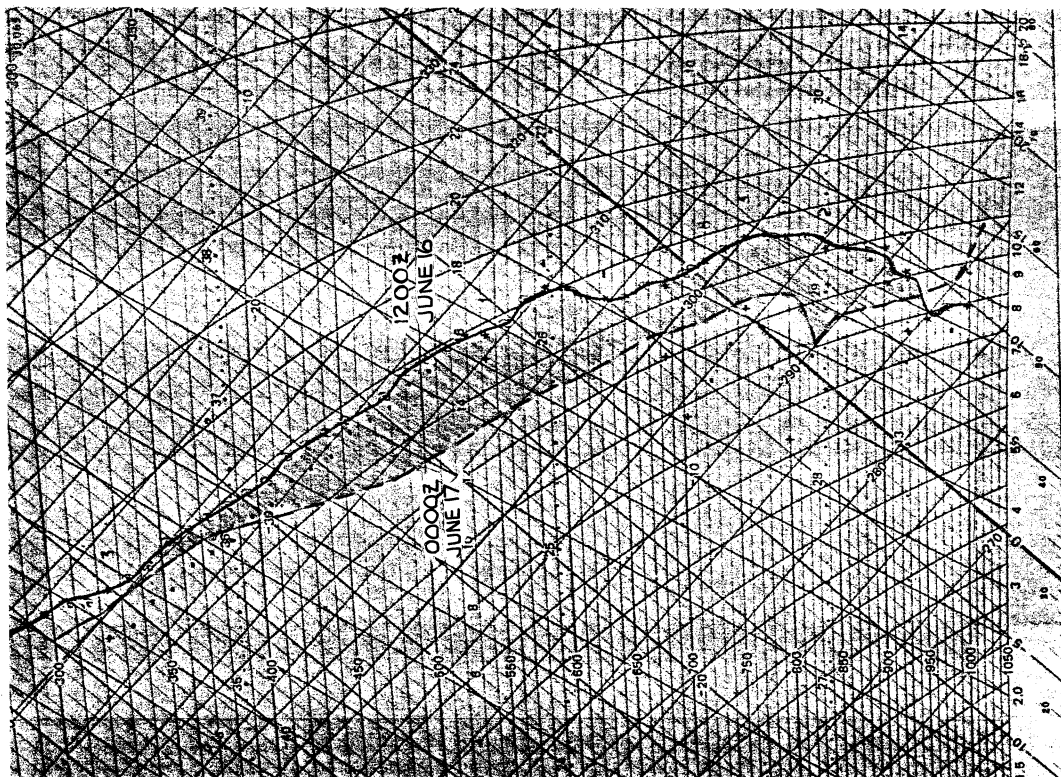


FIGURE 4 (b)
TEPHIGRAM 1200Z JUNE 16.
GILL-LAYUTE
(DASHED LINE 0000Z JUNE 17)

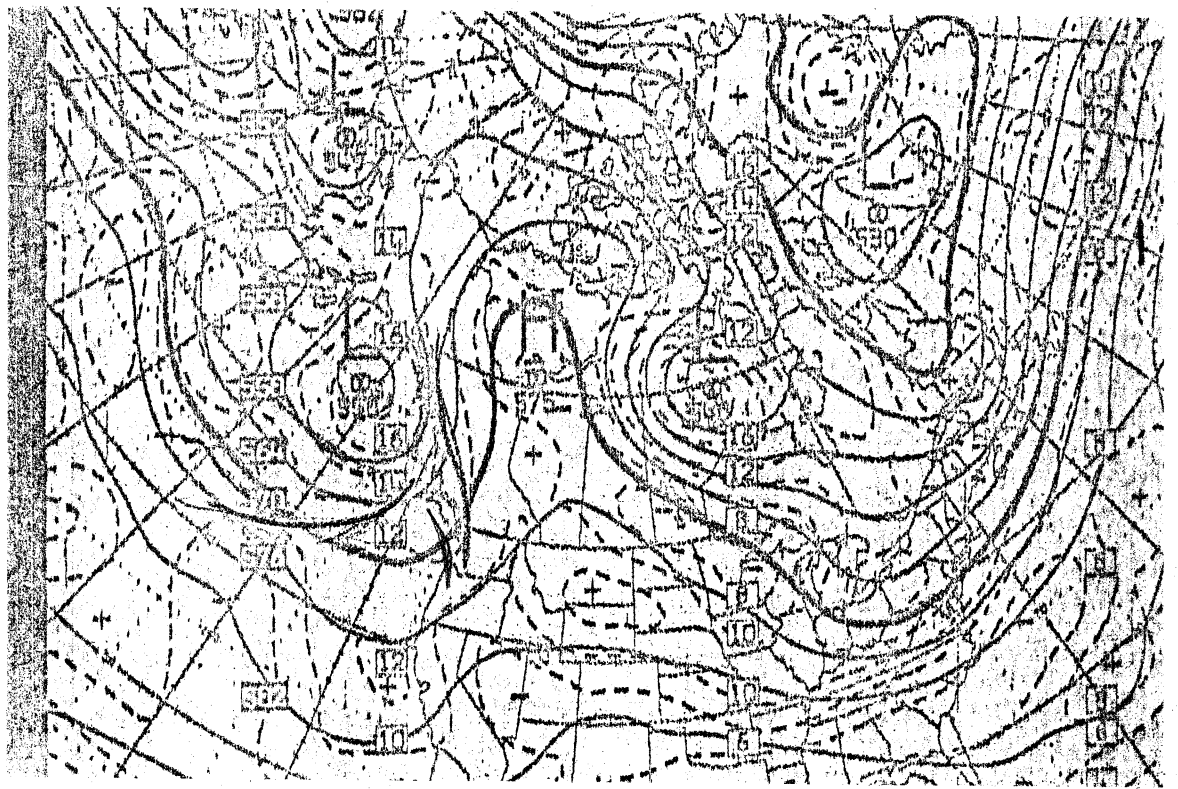


FIGURE 5(a)
500 MB SPECTRAL PROG VALID 0000Z JUNE 17.

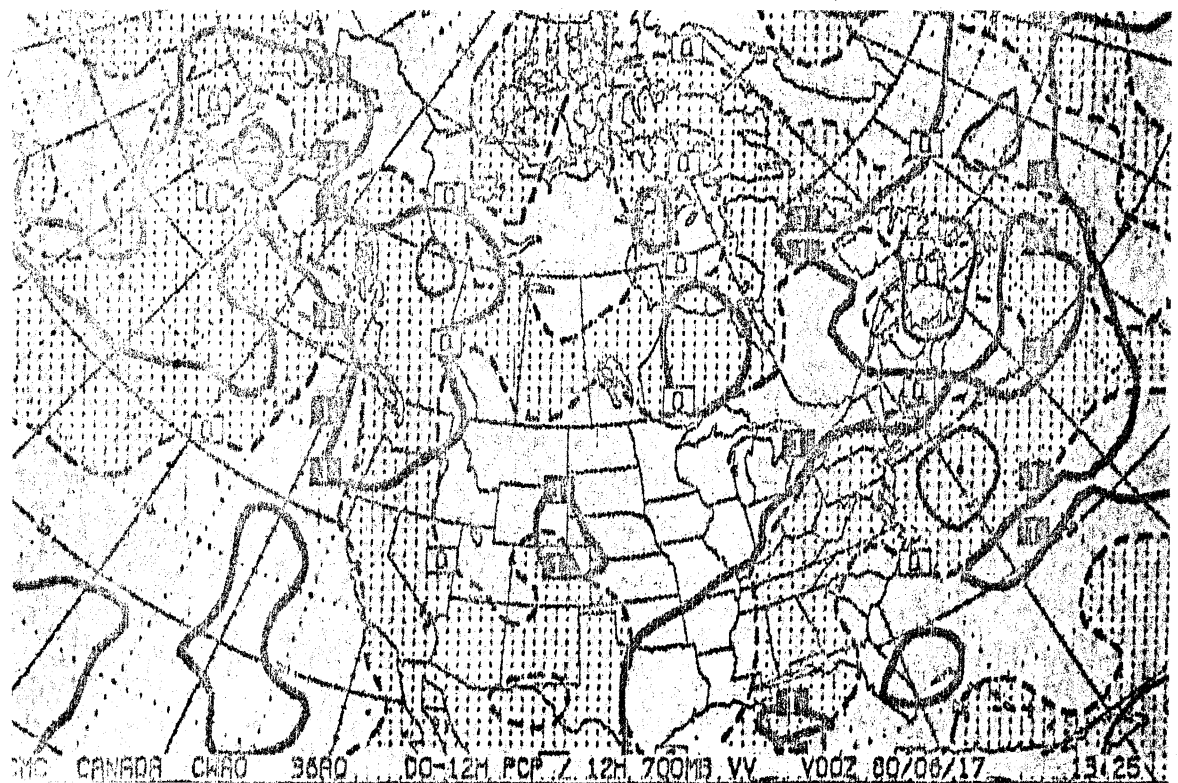


FIGURE 5(b)
SPECTRAL R.H. & PRECIPITATION PROG VALID 0000Z JUNE 17.



FIGURE 6(a)
GOES SATELLITE PICTURE 1346 JUNE 16.

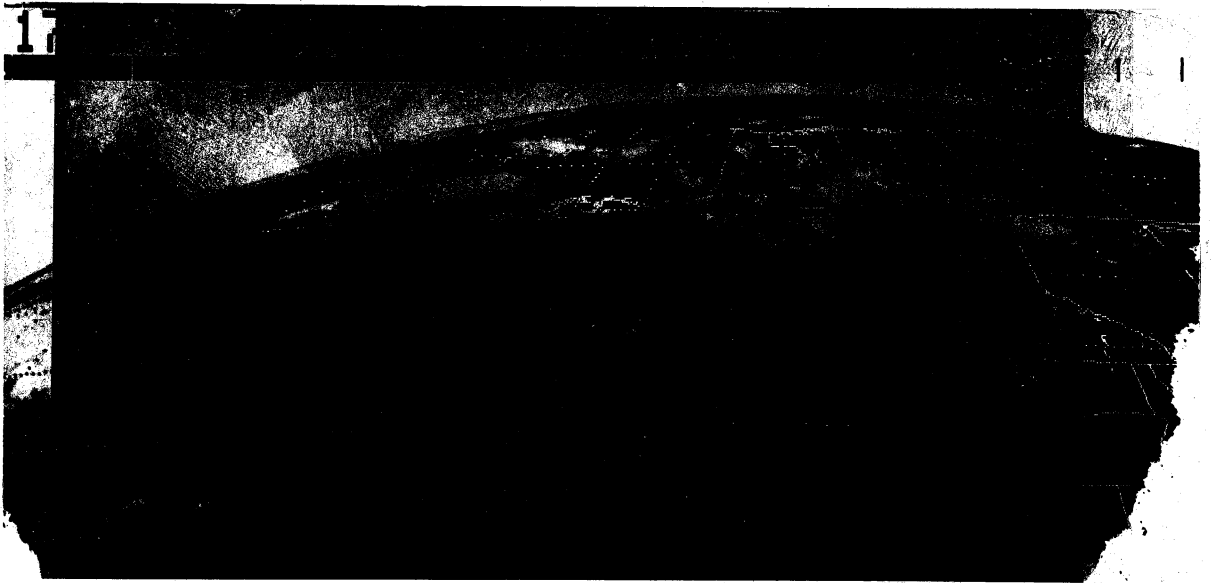


FIGURE 6(b)
GOES SATELLITE PICTURE 1745 JUNE 16.

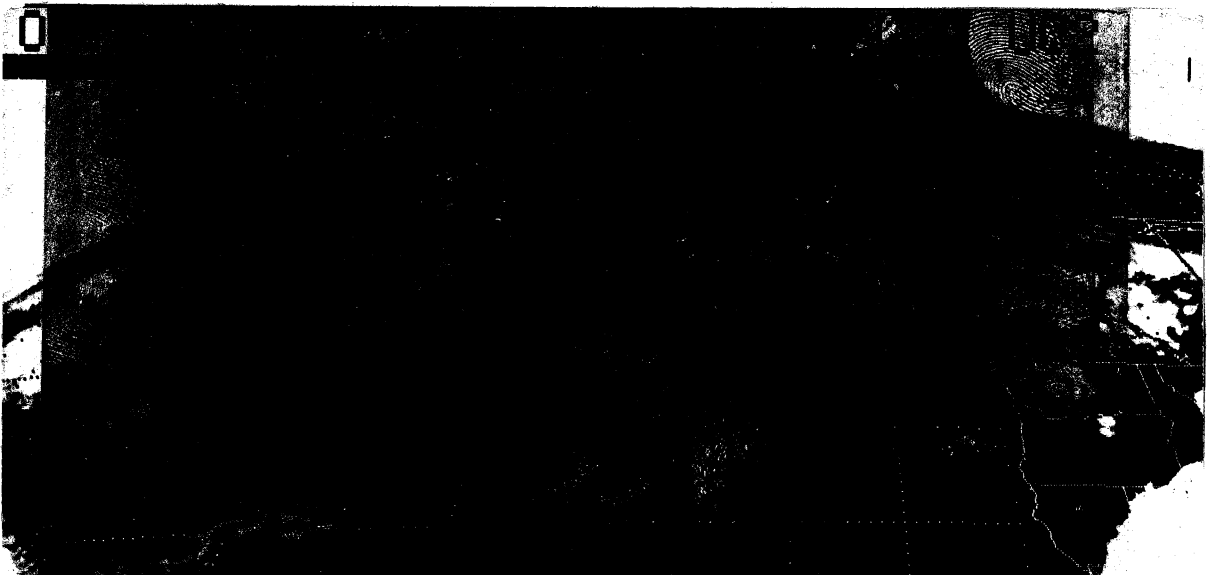
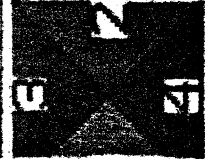


FIGURE 6(c)
GOES SATELLITE PICTURE 0045 JUNE 17.


 CAPPI 240KM JUN 16/80
 7KM LO/NORM 1630Z
 YXX

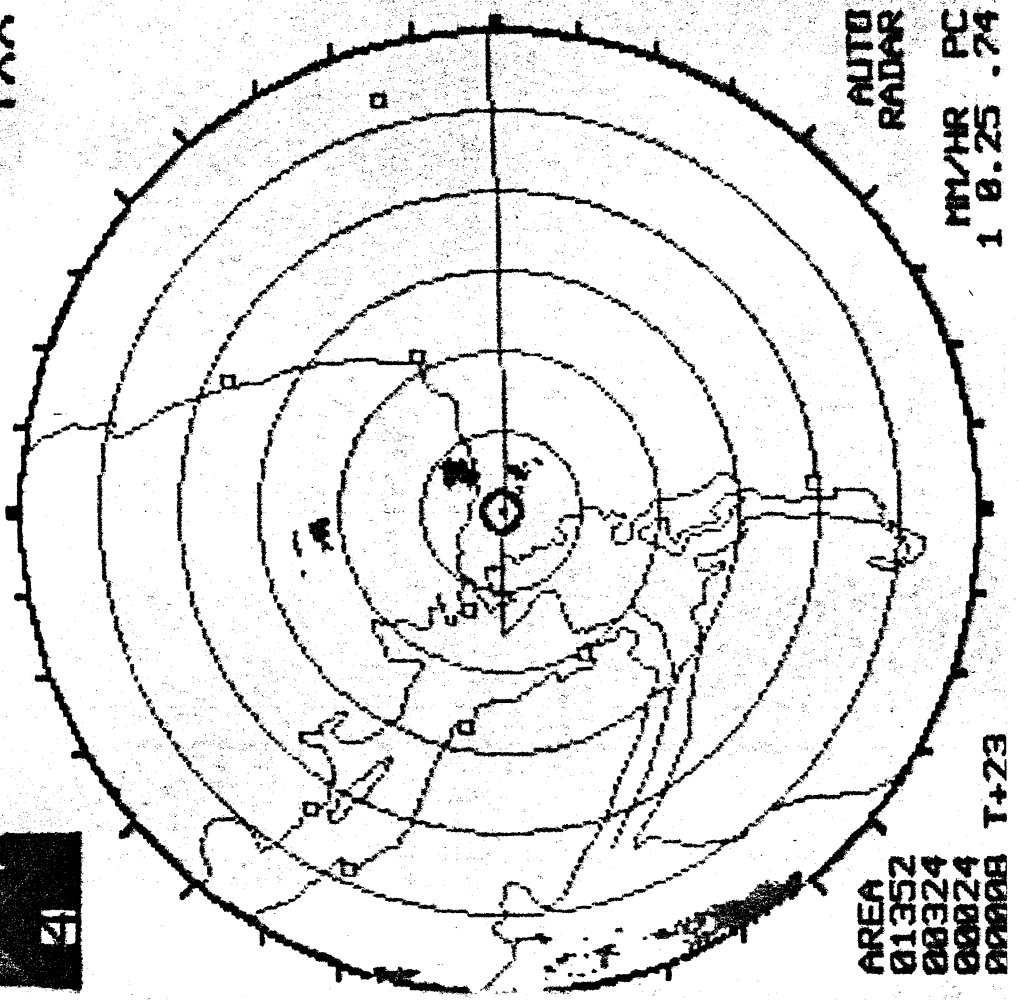
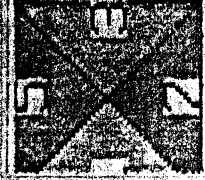


FIGURE 7(a)
 RADAR ECHO PRINTOUT
 1630Z JUNE 16.


 CAPPI 240KM JUN 16/80
 1.5KM LO/INTS 1650Z
 YXX

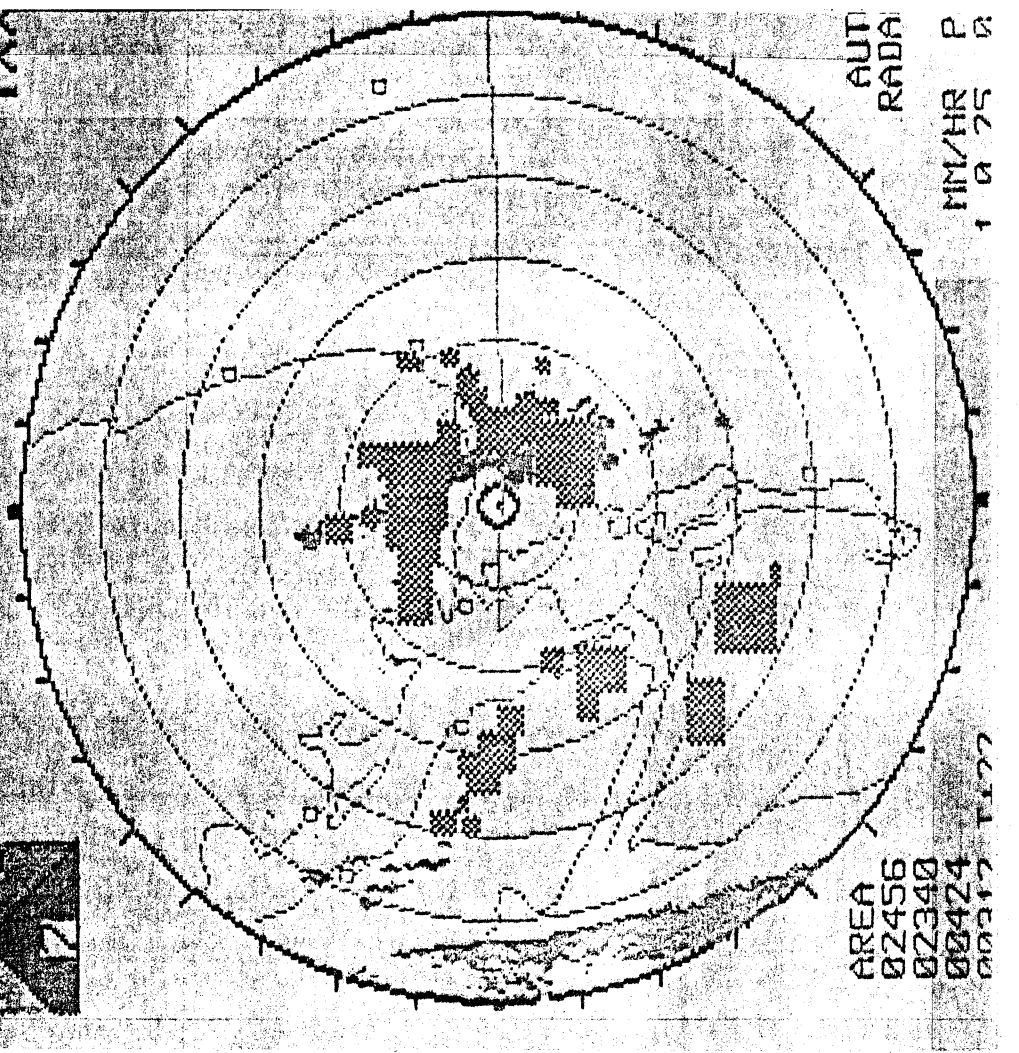


FIGURE 7(b)
 RADAR ECHO PRINTOUT
 1650Z JUNE 16.

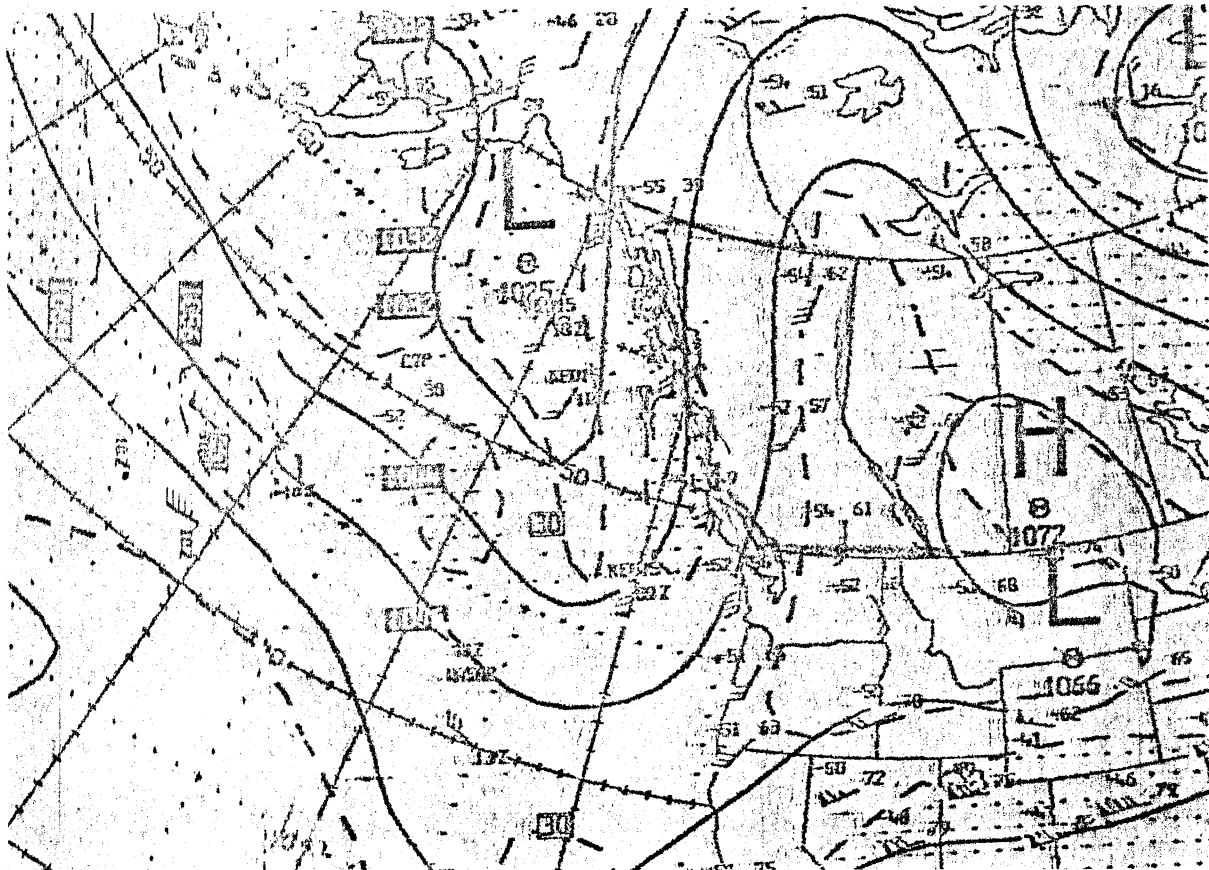


FIGURE 8(a)
250MB ANALYSIS 1200Z JUNE 16.

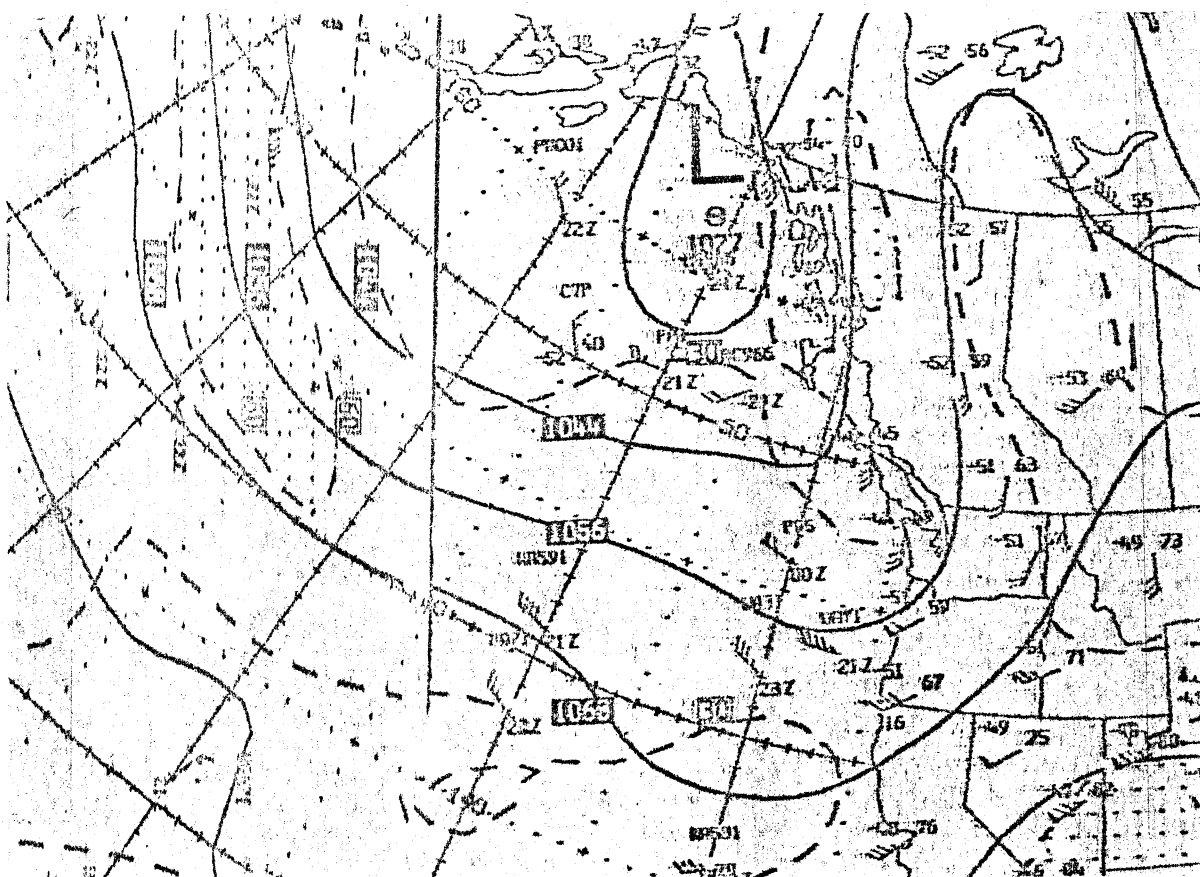


FIGURE 8(b)
250MB ANALYSIS 0000Z JUNE 17.

SURFACE ANALYSES

Basically a surface frontal system was carried in association with a north south trof aloft. A late plotted ship report on the June¹⁶ 12Z chart indicated that the wave was possibly more pronounced than indicated with about a 1019 mb pressure. The June 17, 00Z chart carried no front, but the June 17, 06Z chart again carried a front.

SELECTION OF CORRECT COMPUTER PROGNOSES

Both the LFM and Canadian Spectral model were similar in treating this event- surface pattern, 500 mb pattern and moisture analysis. These progs were accepted.

ASSESSMENT OF COMPUTER PROGNOSES

The initialization of the moisture pattern on both progs were poor and the resulting precipitation forecasts were also poor. Furthermore the lifted index progs during this period were of little help. 500 mb progs, thickness progs and surface pressure progs were good.

SATELLITE IMPLICATIONS AND INTERPRETATIONS

The satellite picture of June 15, 2215Z showed an extensive area of cloud between 128W and 134W and 45N to 50N. This was one of the last visible best resolution pictures of the day and this cloud was ahead of a trof that was supposed to move over the area. Furthermore, a wind maxima of about 120 kts was shown on the June 16, 00Z chart at 250 mbs to the south of ship papa. It is true that no such max was analyzed on the June 16, 12Z 250 mb map or June 17, 00Z map. In most such cases if no wind reports are used in the analysis the implied wind field is probably too light. Mr. Funk's preliminary work on streamlines seems to support this.

WARNINGS ISSUED AND DISCUSSIONS INITIATED

No warnings were issued although amendments to Fts and the Public forecast were made. It is also noted that considerable discussion between FWC and other weather offices took place in this event and this is to be encouraged.

MESOSCALE AND LOCAL EFFECTS

In some respects local effects had some considerable impact on the amounts of precipitation that fell. A moist southerly flow ahead of a trof is likely to produce convective precipitation over southwestern B.C. The intensity of the trof is related to both curvature and depth as well as temperature gradient (in this case some 10 degrees C. at 500 mbs.

COMMENTS

1. This case illustrates the impact of incorrect moisture initialization.
2. Precipitation amounts are probably the weakest part of computer model prediction ranking lower than the prediction of precipitation, which also is poor.
3. Also, convective precipitation is **treated differently** and not very well by each model.
4. All of these factors should be considered when interpreting computer models.